

## APPENDIX

- A. Analysis of Streets, Roads and Intersections
- B. Analysis of Non-motorized Network
- C. Capitol Boulevard Plan – Transportation Summary
- D. Brewery District Plan – Transportation Summary

## A. ANALYSIS OF ROADS, AND INTERSECTIONS

This Document has been published separately

# Appendix A

## Analysis of Roads and Intersections

Project Reference:

SCJ #625.17

Path: N:\Projects\0625 City of Tumwater\0625.17 Tumwater  
Transportation Master Plan\Traffic\Report\2016 0607 Appendix A.docx



**SCJ ALLIANCE**  
CONSULTING SERVICES



# 1. EXISTING ROADWAY CONDITIONS

## 1.1 TRAFFIC VOLUME COUNTS AND INTERSECTION LANE GEOMETRY

A comprehensive traffic volume count program was conducted to identify base year traffic volumes within the study area. Sixty-nine intersection counts were collected, primarily by Traffic Count Consultants, a traffic data collection firm. Most of the counts were conducted between 4:00 PM and 6:00 PM on June 23, 24, 25 and 30, 2015 and July 1, 2015. The traffic volumes were summarized to identify the highest individual hour within the two-hour count period. These traffic volumes were used for our base year operations analysis and as the basis for future year traffic volume projections. The turning movement count worksheets are provided in **Appendix A-1**. The existing 2015 PM peak hour intersection turning movement volumes are shown on **Figure 1**.

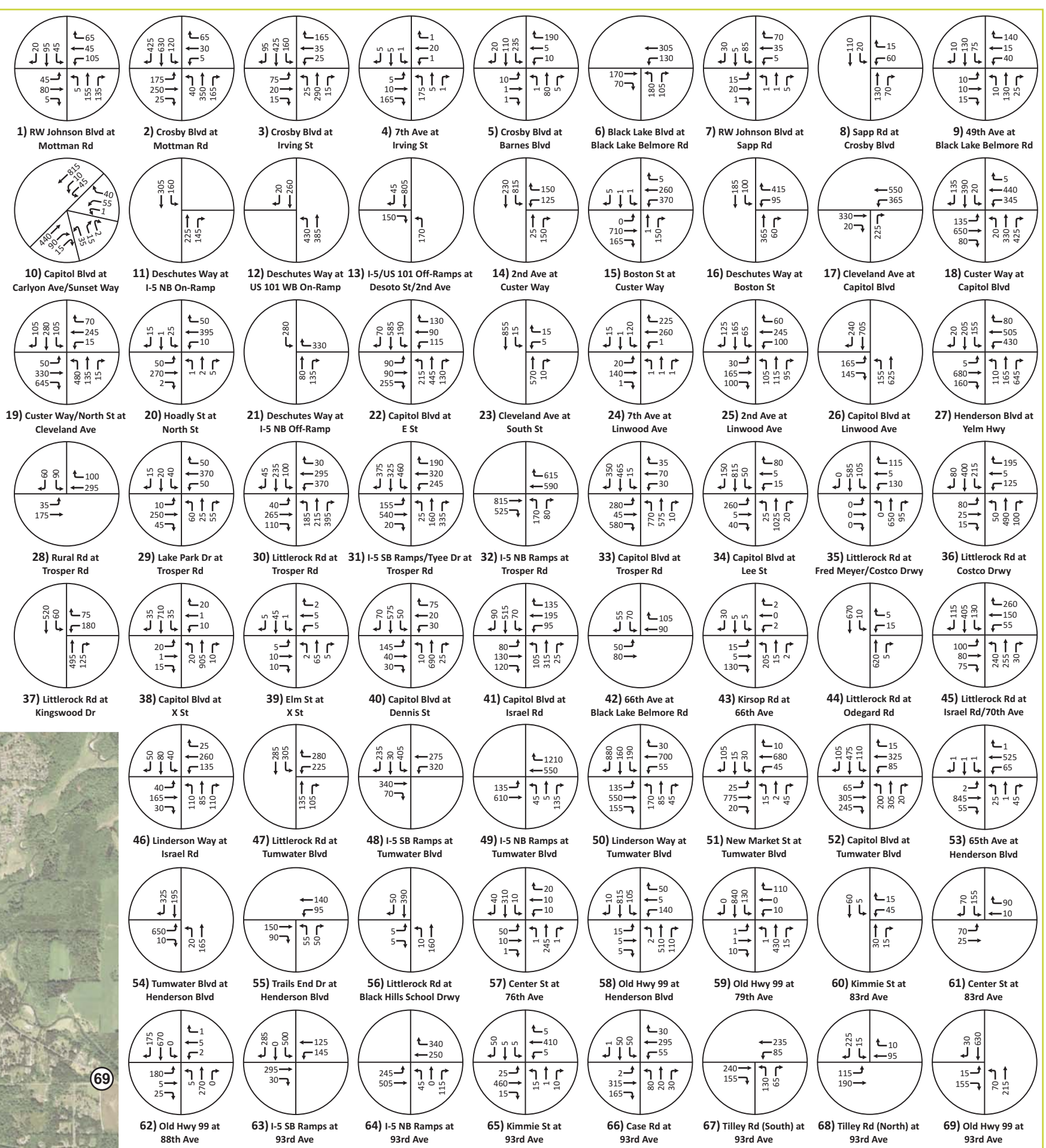
The existing intersection lane geometry and control types are provided on **Figure 2**.

## 1.2 CRASH HISTORY

A crash history analysis was performed for the study intersections. Washington State Department of Transportation provided collision data for all of the study intersections, including those in the UGA and WSDOT right-of-way. The data includes all reported vehicle crashes occurring over the most current complete five-year span of January 1, 2010 through December 31, 2014. A crash frequency rate per Millions of Entering Vehicles (MEV) was calculated for the study intersections based on the following formula:

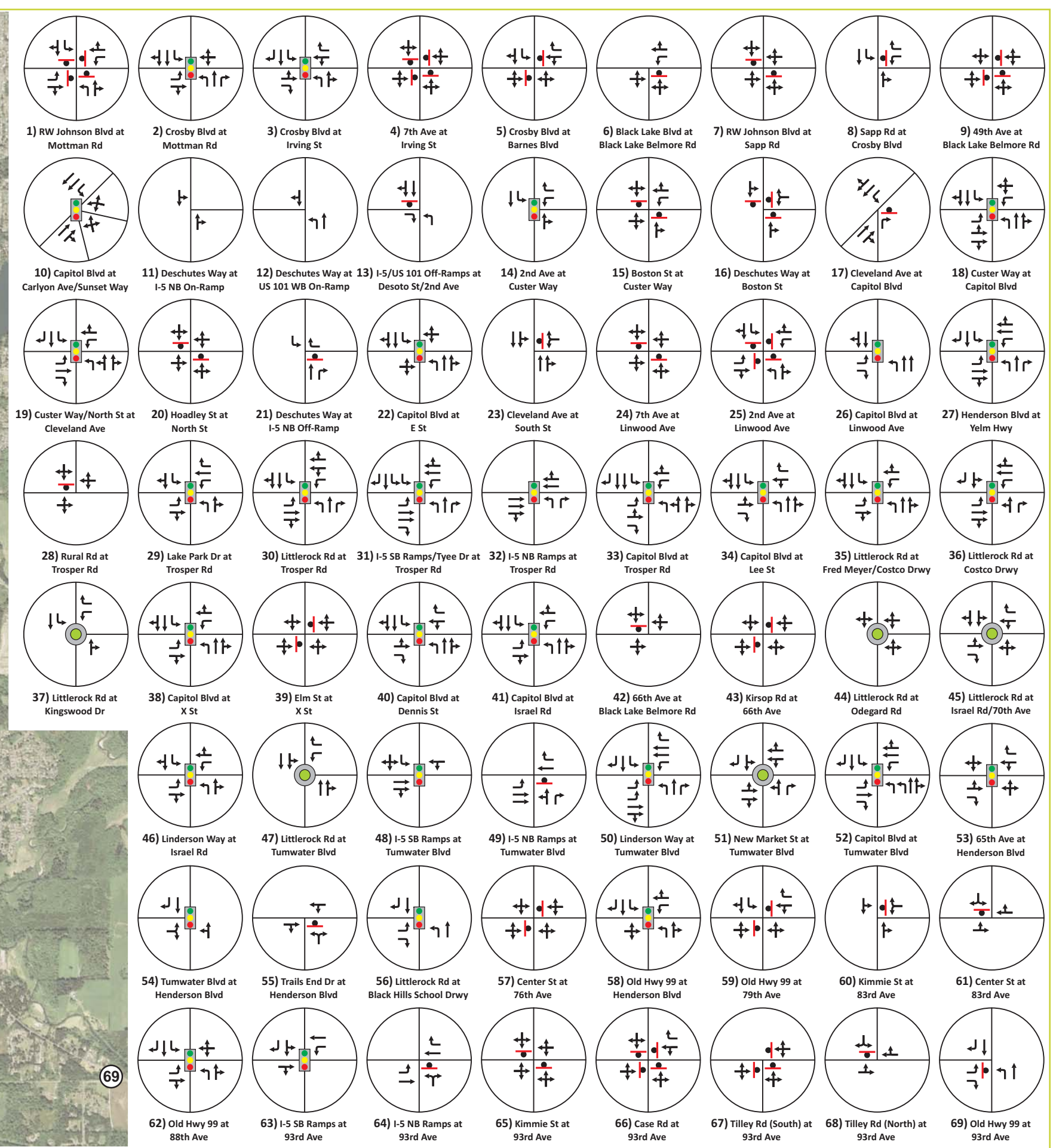
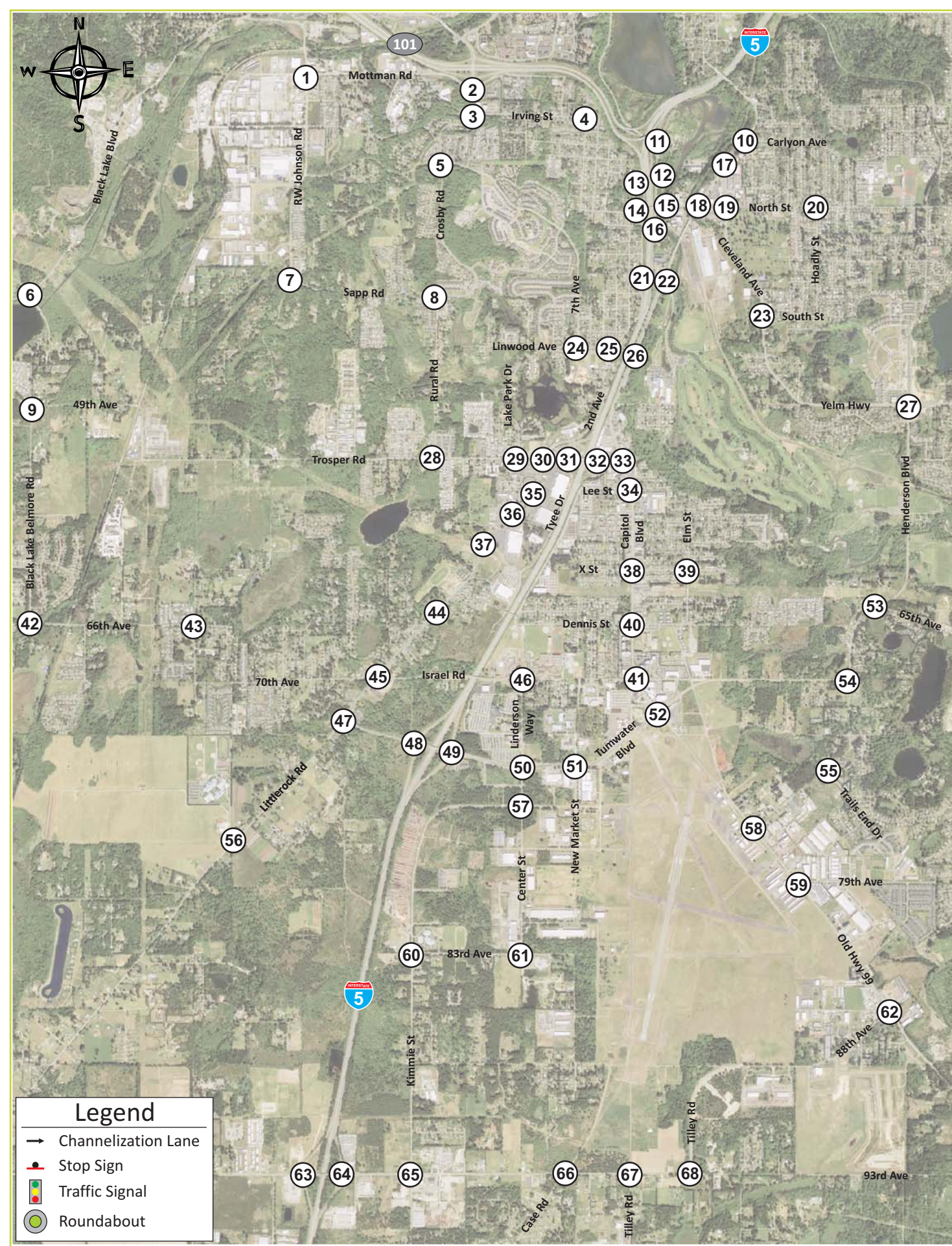
$$\text{Crash Rate per MEV} = \frac{1,000,000 \times \text{Total Collisions}}{365 \times \text{Number of Years} \times \text{Average Daily Entering Traffic}}$$

The crash rates by intersection are summarized in **Table 1**.



Tumwater Transportation Master Plan  
 Tumwater, Washington

Figure 1  
 Existing 2015 PM Peak Hour  
 Intersection Traffic Volumes



Tumwater Transportation Master Plan  
Tumwater, Washington

Figure 2  
Existing 2015  
Intersection Channelization

**Table 1. Intersection Crash History 2010 through 2014**

		Total Number of Reported Crashes	Number Involving Injuries	Number Involving Bikes or Peds	Total Daily Entering Traffic Volume	Crash Rate per MEV
1	RW Johnson Blvd/Mottman Rd	8	3	0	7,950	0.551
2	Crosby Blvd/Mottman Rd	29	8	0	22,860	0.695
3	Crosby Blvd/Irving St	19	4	0	13,470	0.773
4	7 <sup>th</sup> Ave/Irving St	0	0	0	3,880	0.000
5	Crosby Blvd/Barnes Blvd	1	0	0	6,670	0.082
6	Black Lake Blvd/Black Lake Belmore Rd	2	0	0	9,550	0.115
7	RW Johnson Blvd/Sapp Rd	1	0	0	2,700	0.203
8	Sapp Rd/Crosby Blvd	1	0	0	4,040	0.136
9	49 <sup>th</sup> Ave/Black Lake Belmore Rd	2	1	0	6,050	0.181
10	Capitol Blvd/Carlyon Ave/Sunset Way	1	0	0	15,540	0.035
11	Deschutes Way/I-5 NB On-Ramp	0	0	0	8,310	0.000
12	Deschutes Way/US 101 WB On-Ramp	1	0	0	10,920	0.050
13	I-5/US 101 Off-Ramps/Desoto St/2 <sup>nd</sup> Ave	18	5	0	11,700	0.843
14	2 <sup>nd</sup> Ave/Custer Way	4	1	0	14,900	0.147
15	Boston St/Custer Way	5	3	1	16,640	0.165
16	Deschutes Way/Boston St	7	3	0	12,200	0.314
17	Cleveland Ave/Capitol Blvd	4	2	0	14,880	0.147
18	Custer Way/Capitol Blvd	18	4	1	29,760	0.331
19	Custer Way/North St/Cleveland Ave	19	7	1	24,740	0.421
20	Hoadly St/North St	2	1	0	8,250	0.133
21	Deschutes Way/I-5 NB Off-Ramp	0	0	0	8,210	0.000
22	Capitol Blvd/E St	11	6	1	24,120	0.250
23	Cleveland Ave/South St	2	2	0	14,720	0.074
24	7 <sup>th</sup> Ave/Linwood Ave	3	2	0	7,890	0.208
25	2 <sup>nd</sup> Ave/Linwood Ave	11	3	0	13,670	0.441
26	Capitol Blvd/Linwood Ave	8	3	0	20,390	0.215
27	Henderson Blvd/Yelm Hwy	37	14	1	31,600	0.642
28	Rural Rd/Trosper Rd	4	1	0	7,540	0.291
29	Lake Park Dr/Trosper Rd	4	3	1	9,930	0.221
30	Littlerock Rd/Trosper Rd	32	6	0	22,890	0.766
31	I-5 SB Ramps/Tyee Dr/Trosper Rd	65	16	1	31,540	1.129
32	I-5 NB Ramps/Trosper Rd	28	8	0	27,960	0.549
33	Capitol Blvd/Trosper Rd	35	8	0	32,230	0.595
34	Capitol Blvd/Lee St	42	9	3	24,930	0.923
35	Littlerock Rd/Fred Meyer-Costco Drwy	2	1	1	16,800	0.065
36	Littlerock Rd/Costco Drwy	3	1	1	17,740	0.093
37	Littlerock Rd/Kingswood Dr	15	7	1	14,520	0.566
38	Capitol Blvd/X St	4	3	0	17,900	0.122
39	Elm St/X St	1	0	0	1,600	0.342
40	Capitol Blvd/Dennis St	9	4	0	17,630	0.280



**Table 1 Cont. Intersection Crash History 2010 through 2014**

	<b>Intersection</b>	<b>Total Number of Reported Crashes</b>	<b>Number Involving Injuries</b>	<b>Number Involving Bikes or Peds</b>	<b>Total Daily Entering Traffic Volume</b>	<b>Crash Rate per MEV</b>
41	Capitol Blvd/Israel Rd	20	7	2	18,750	0.584
42	66 <sup>th</sup> Ave/Black Lake Belmore Rd	5	2	0	4,470	0.613
43	Kirsop Rd/66 <sup>th</sup> Ave	4	3	0	4,120	0.532
44	Littlerock Rd/Odegard Rd	5	1	1	13,200	0.208
45	Littlerock Rd/Israel Rd/70 <sup>th</sup> Ave	12	1	0	18,910	0.348
46	Linderson Way/Israel Rd	7	2	0	11,300	0.339
47	Littlerock Rd/Tumwater Blvd	19	3	0	13,300	0.783
48	I-5 SB Ramps/Tumwater Blvd	15	2	0	16,780	0.490
49	I-5 NB Ramps/Tumwater Blvd	14	4	0	26,910	0.285
50	Linderson Way/Tumwater Blvd	15	6	0	31,510	0.261
51	New Market St/Tumwater Blvd	8	2	0	17,690	0.248
52	Capitol Blvd/Tumwater Blvd	27	8	0	22,500	0.658
53	65 <sup>th</sup> Ave/Henderson Blvd	2	1	0	15,630	0.070
54	Tumwater Blvd/Henderson Blvd	5	2	0	13,700	0.200
55	Trails End Dr/Henderson Blvd	1	1	0	5,810	0.094
56	Littlerock Rd/Black Hills School Drwy	1	0	0	6,160	0.089
57	Center St/76 <sup>th</sup> Ave	0	0	0	7,030	0.000
58	Old Hwy 99/Henderson Blvd	15	8	0	17,820	0.461
59	Old Hwy 99/79 <sup>th</sup> Ave	4	1	0	15,540	0.141
60	Kimmie St/83 <sup>rd</sup> Ave	0	0	0	1,700	0.000
61	Center St/83 <sup>rd</sup> Ave	2	1	0	4,230	0.259
62	Old Hwy 99/88 <sup>th</sup> Ave	3	0	0	13,370	0.123
63	I-5 SB Ramps/93 <sup>rd</sup> Ave	22	5	0	13,770	0.875
64	I-5 NB Ramps/93 <sup>rd</sup> Ave	5	2	0	15,000	0.183
65	Kimmie St/93 <sup>rd</sup> Ave	5	5	0	10,020	0.273
66	Case Rd/93 <sup>rd</sup> Ave	0	0	0	10,950	0.000
67	Tilley Rd (South)/93 <sup>rd</sup> Ave	9	1	0	9,140	0.540
68	Tilley Rd (North)/93 <sup>rd</sup> Ave	4	3	0	6,500	0.337
69	Old Hwy 99/93 <sup>rd</sup> Ave	4	3	0	11,120	0.197

\*“Under 23U.S. Code §148 and 23 U.S. § 409, Safety Data, reports, surveys, schedules, lists compiled or collected for the purposes of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data”

A crash rate under 1.00 per MEV is typically considered within normal range for an urban intersection. In the study area one intersection exceeded the 1.00 crash rate and three others were over 0.80. Those locations are discussed below.

### 1.2.1 I-5/US 101 Off-Ramps/Desoto St/2<sup>nd</sup> Ave

This intersection had 18 reported crashes over the 5-year period, a crash rate of 0.843 with an average of 3.6 per crashes per year. The primary collision type was rear-end collision for vehicles on the off-

ramp. This could likely be a result of occasional congestion and queuing on the off-ramp, compounded by vehicles weaving to get into the inside lane to eventually make a left-turn onto Custer Way. The next most common type involved collisions between a vehicle turning left and vehicle going straight. This could reflect occasional driver confusion over the unusual intersection configuration.

There is a planned improvement to allow for two left-turn lanes on 2<sup>nd</sup> Avenue for vehicles turning onto Custer Way. This is intended to improve the lane utilization on the off-ramp and reduce weaving conflicts as both off-ramp lanes could be used to get into the double left-turn lanes at Custer Way. This intersection should continue to be monitored.

### 1.2.2 I-5 SB Ramps/Tyee Dr/Trosper Rd

This intersection experienced 65 crashes and a rate of 1.129 crashes per MEV over the five-year study period. Over half of the collisions at this intersection are rear-end collisions, with the primary circumstance being vehicles traveling eastbound on Trosper Rd. This is likely the result of congestion between the SB Ramps/Tyee Drive intersection and the 2<sup>nd</sup> Ave/Littlerock Rd intersection. The next primary circumstance for rear-end collisions occurs in the NB right-turn lane, likely the result of vehicles unable to make right-turn-on-red maneuvers.

There is a planned improvement to install a two-lane roundabout at this location. It will be built in conjunction with a roundabout at Trosper Rd/2<sup>nd</sup> Ave/Littlerock Rd, and together they should reduce the congestion experienced today along Trosper Road, which should reduce the number of rear-end collisions.

### 1.2.3 Capitol Blvd/Lee St

This intersection had 42 reported collisions between 2010 and 2014, equating to a crash rate of 0.923 crashes per MEV. The primary collision type for this intersection was rear-end collisions for vehicles traveling NB on Capitol Blvd. This is likely a result of the congestion and resultant queues created by the Trosper Rd/Capitol Blvd intersection.

There is no improvement specifically planned for this location, however the Trosper Road Interchange project is being constructed to relieve the congestion currently caused by the Trosper Rd/Capitol Blvd intersection. The completion of this improvement should improve congestion along Capitol Blvd and reduce the number of rear-end collisions at this location.

### 1.2.4 I-5 SB Ramps/93<sup>rd</sup> Avenue (SR 121)

This intersection experienced 22 crashes over a five year period, resulting in a crash rate of 0.875 crashes per MEV. There was not a predominant collision type at this intersection, but the majority of crashes occurred by vehicles traveling SB on the I-5 SB ramp. 21 of the 22 recorded crashes occurred in 2010 and 2011. After 2011 a traffic signal was installed at this intersection to improve traffic operations for the SB approach. This improvement has seen the crash rate drop to almost zero, with only 1 crash occurring between 2012-2014.

The intersection crash data is provided in **Appendix A-2**.

## 2. TRAFFIC VOLUME FORECASTS

### 2.1 OVERVIEW

This report provides operational assessment of the City roadway network for the existing year (2015) for the forecast years of 2022 and 2040. The traffic volume forecasts were prepared using the TRPC regional travel demand model as the basis. The regional model has been calibrated to a 2014 base year and has a 2040 forecast horizon.

### 2.2 TRAVEL DEMAND MODELING PROCESS

A travel demand model is a computer model that uses mathematical representations of transportation facilities and transportation demand to estimate travel patterns in a specific geographic area. Travel demand modeling typically uses the four-step modeling process described below:

- Trip Generation – is the process of estimating the amount of person-trips that will be generated within the modeled area. Households and employment are the primary drivers of trip generation.
- Trip Distribution – evaluates the attractiveness of compatible land-uses to connect two ends of the same trip, e.g., a work-to-home trip is common during the evening peak hour with an employment base producing an outbound trip and a household attracting an inbound trip.
- Mode Choice – reflects the process of estimating the traveling public's selection of a travel mode such as passenger vehicle (SOV or HOV), heavy vehicle, walk, bike or transit. The availability (supply) of a particular mode affects the demand of that mode, for example, close proximity to a transit stop with good headways makes the transit option more attractive and can influence a traveler's mode choice.
- Assignment – is the final step of determining each traveler's route from their origin to their destination. There are almost always multiple options for a route between two points. The primary consideration in route choice is travel time, which can be affected by roadway speed limits, traffic signals, congestion and other frictions.

### 2.3 TRPC TRAVEL DEMAND MODEL

The TRPC regional travel demand model was built using INRO's Emme software. The model provides a detailed representation of the arterial and collector roadways throughout Thurston County. Particular detail has been provided in the urban areas of the county, including Tumwater and environs. The model uses household and employment information as a basis for estimating the trip-producing characteristics of neighborhoods, employment centers, retail districts, schools, etc. within the cities and unincorporated county. Measured local travel parameters were incorporated to calibrate the model to local conditions. When model-produced traffic characteristics closely match measured traffic characteristics the model is considered calibrated.

A calibrated model can be used to test the effects of changes of one or many variables on the system. Adding a new roadway provides different route choices which can affect traffic flows, adding transit service or enhanced walk and bike facilities can affect mode choice. Changes to the amount or type of land-use will also affect the volume and characteristics of travel in an area.

The TRPC model has been updated and calibrated to a 2014 base year. The model update was completed with oversight from a regional Transportation Advisory Committee (TAC) that included representation from the City of Tumwater and multiple other affected jurisdictions in the Thurston County. The regional model has a planning horizon year of 2040. The 2040 model reflects predicted changes to household and employment throughout the region consistent with regional forecasting and Tumwater land-use planning.

The 2040 forecast model also includes transportation improvements consistent with the Regional Transportation Plan. The specific improvements that are assumed to be completed in the “base” 2040 network within the City of Tumwater UGA are listed below.

#### 2040 “Base” Model Planned Network Improvements

- Tyee Drive Extension – New street connection from Kingswood Drive to Prine Drive
- E Street Extension – New multi-lane roadway from Capitol Boulevard to Cleveland Avenue
- Old Highway 99 Improvements – Widen existing roadway from 73<sup>rd</sup> Avenue to 88<sup>th</sup> Avenue
- Tumwater Boulevard Interchange – Widen over-crossing and improve ramps at existing Tumwater Boulevard/Interstate 5 interchange
- Capitol Boulevard Improvements – Intersection and capacity improvements on Capitol Boulevard between Trosper Road and Israel Road, construction of new 6<sup>th</sup> Avenue collector, relocation of I-5 NB off-ramp terminal at Trosper Road to 6<sup>th</sup> Avenue
- Brewery District Plan – Incorporate lane reductions and intersection improvements per the Brewery District Plan

While additional improvements were evaluated, no additional roadway projects were added to the 2040 “base” model for traffic volume forecasting purposes.

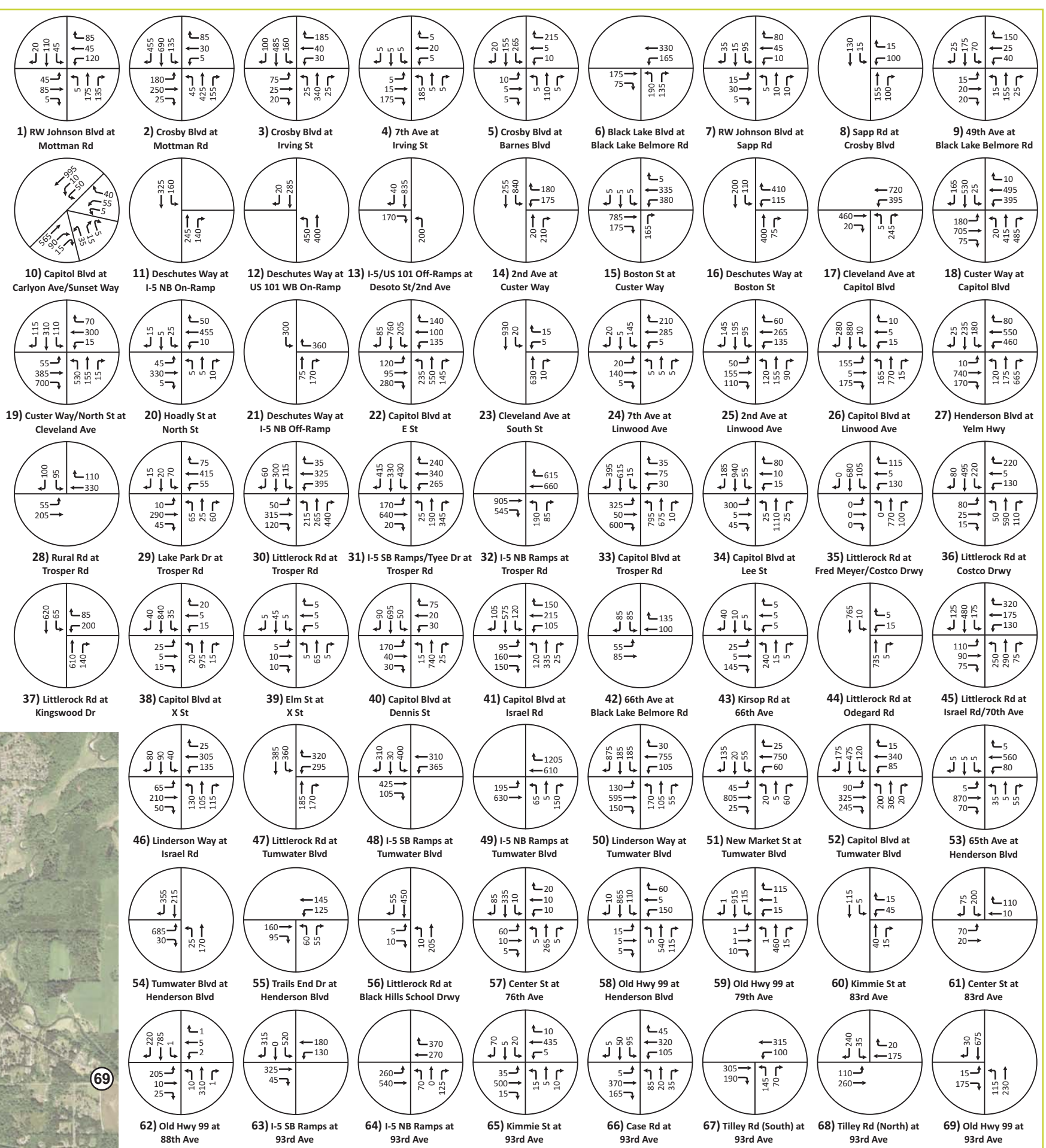
Model plots showing the Traffic Analysis Zone structure, roadway network and “raw” model traffic volumes are included in **Appendix A-3**.

## 2.4 MODEL VOLUME POST-PROCESSING

While the model is calibrated to replicate existing travel patterns, traffic volumes on individual roadways vary somewhat from existing traffic counts. To account for this variance, the transportation model traffic volume assignments were post-processed to align them with existing ground counts. Specifically, the traffic volume growth increment between the 2014 base year model and 2040 forecast model was calculated for each individual study intersection. The traffic growth predicted by the model was then added to the actual counted traffic volumes at each intersection. All traffic volume forecasts were individually reviewed and manually adjusted as appropriate.

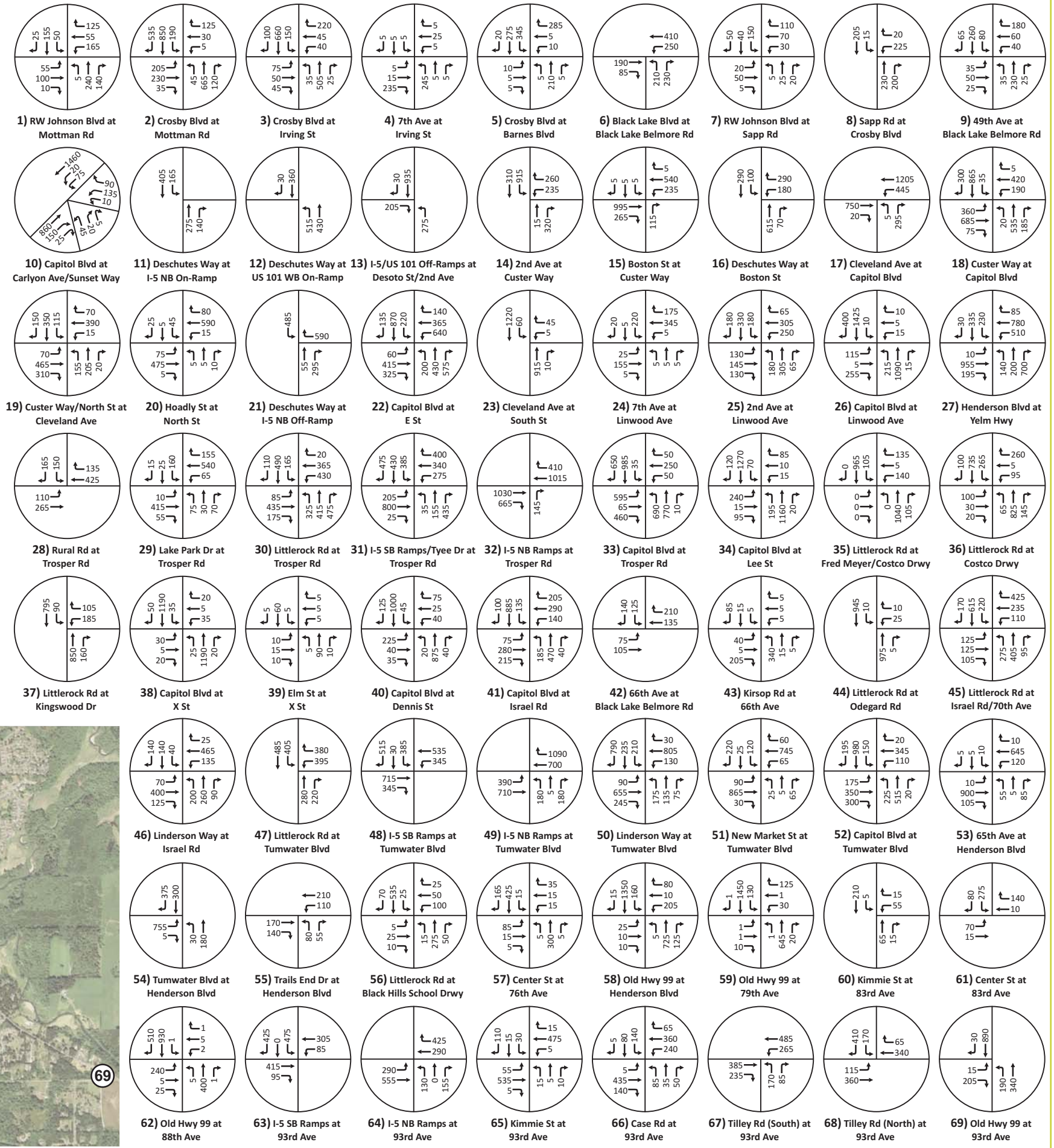
For the 2022 horizon the model growth was calculated between the 2014 and 2040 models and 7 years of that growth was added to the 2015 actual counts. The 2040 model was run assuming none of the RTP projects in place by the 2022 horizon.

The 2022 and 2040 traffic volume forecasts are provided on **Figure 3** and **Figure 4**. The traffic volume calculation spreadsheet showing the 2022 and 2040 forecasts attached in **Appendix A-4**.



Tumwater Transportation Master Plan  
Tumwater, Washington

Figure 3  
Projected 2022 PM Peak Hour  
Intersection Traffic Volumes



Tumwater Transportation Master Plan  
 Tumwater, Washington

Figure 4  
 Projected 2040 PM Peak Hour  
 Intersection Traffic Volumes

### 3. ROADWAY AND INTERSECTION OPERATIONS SUMMARY

#### 3.1 ANALYSIS METHODOLOGIES

The acknowledged source for determining overall capacity for intersections is the current edition of the Highway Capacity Manual (HCM). Intersection analysis was performed using version 9 of the Synchro/SimTraffic software package. This software implements the methods of the 2010 HCM. Capacity analysis calculations for intersections determine the amount of “control delay” (in seconds) that drivers will experience while proceeding through an intersection. Control delay includes all deceleration delay, stopped delay and acceleration delay caused by the traffic control device. The LOS is directly related to the amount of delay experienced. Capacity analysis results are described in terms of level of service (LOS). LOS is a qualitative term describing operating conditions a driver will experience while traveling on a particular street or highway during a specific time interval. It ranges from A (very little delay) to F (long delays and congestion).

For intersections under traffic signal, modern roundabout and all-way stop-control (AWSC) the intersection average delay is considered to represent the intersection LOS. For intersections under two-way stop-control (TWSC), the LOS/delay criteria are different than for signalized intersections because driver expectation is that a signalized intersection is designed to carry higher traffic volumes and experience greater delay. **Table 2** shows the level of service criteria for signalized, modern roundabout and stop sign-controlled intersections.

A planning level evaluation of roadway segments was prepared for most collector and arterial roadway segments within the study area. The analysis was based on the volume to capacity ratio (v/c). This ratio compares the measured or forecasted traffic volume on a roadway segment to the theoretical vehicle carrying capacity of the roadway segment. A roadway segment with a v/c of 1.0 or greater is determined to have higher traffic demand than it can functionally handle. In this analysis the roadway capacities used were taken from the TRPC Regional demand model. The roadway segment LOS standards are also shown on **Table 2**.

**Table 2. Level of Service/Delay Criteria for Intersections**

Level of Service	Signalized Intersection Delay (seconds/vehicle)	Stop Sign-Controlled and RAB Delay (seconds/vehicle)	Roadway Segment (v/c)
A	≤ 10	≤ 10	0.0 – 0.59
B	> 10-20	> 10-15	0.60 – 0.69
C	> 20-35	> 15-25	0.70 – 0.79
D	> 35-55	> 25-35	0.80 – 0.89
E	> 55-80	> 35-50	0.90 – 0.99
F	> 80	> 50	1.00>

### 3.1.1 Level of Service Standard

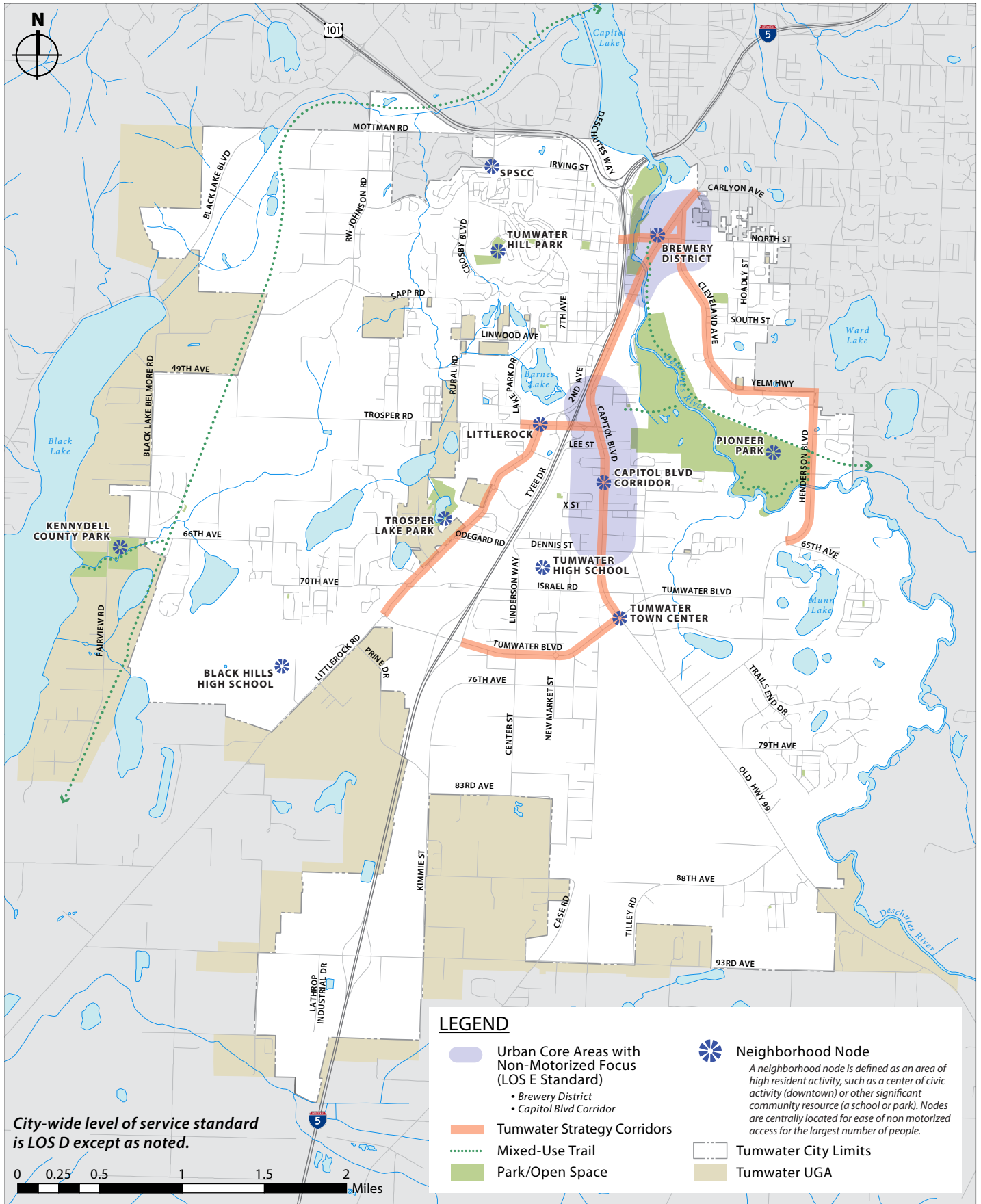
The following LOS designations describe Tumwater’s policy in the city and its urban growth area:

- For the designated “Urban Core Areas” LOS E is the acceptable standard of system performance. The Urban Core Areas are shown on **Figure 5** (Figure 9 of the Tumwater Master Plan).
- For the rest of the City and its urban growth area, LOS D will apply.
- The City has established Tumwater Strategy Corridors where the local LOS standard still applies, but it is acknowledged that some intersections or roadways may experience periodic congestion that exceeds the applicable standard. The Tumwater Strategy Corridors are also shown on **Figure 5**.

### 3.2 EXISTING OPERATIONS

**Table 3** shows the existing level of service at each study intersection. For intersections under minor street stop-sign control, the LOS of the most difficult movement (typically the minor street left-turn) represents the intersection level of service for purposes of assessing potential impacts. The intersection average LOS is commonly used as the concurrency threshold for reviewing new development impacts. The operational analysis worksheets are provided in **Appendix A-5**.





**Table 3. Existing 2015 PM Peak Hour Level of Service**

Number	Intersection	Intersection Control	2015 Base Year	
			LOS (Delay)	Worst v/c
1	RW Johnson Blvd/Mottman Rd	AWSC	B (12)	0.50
2	Crosby Blvd/Mottman Rd	Signal	B (16)	0.78
3	Crosby Blvd/Irving St	Signal	B (11)	0.59
4	7 <sup>th</sup> Ave/Irving St	AWSC	A (9)	0.25
5	Crosby Blvd/Barnes Blvd	TWSC	C (22)	0.22
6	Black Lake Blvd/Black Lake Belmore Rd	TWSC	E (37)	0.75
7	RW Johnson Blvd/Sapp Rd	TWSC	B (10)	0.17
8	Sapp Rd/Crosby Blvd	TWSC	B (12)	0.11
9	49 <sup>th</sup> Ave/Black Lake Belmore Rd <sup>1</sup>	TWSC	A (9)	
10	Capitol Blvd/Carlyon Ave/Sunset Way <sup>2</sup>	Signal	B (10)	0.51
11	Deschutes Way/I-5 NB On-Ramp	Yield	A (9)	0.18
12	Deschutes Way/US 101 WB On-Ramp	Yield	A (10)	0.37
13	I-5/US 101 Off-Ramps/Desoto St/2 <sup>nd</sup> Ave <sup>1</sup>	TWSC	D (32)	
14	2 <sup>nd</sup> Ave/Custer Way	Signal	B (15)	0.79
15	Boston St/Custer Way	TWSC	D (30)	0.52
16	Deschutes Way/Boston St	AWSC	D (29)	0.87
17	Cleveland Ave/Capitol Blvd	TWSC	B (11)	0.35
18	Custer Way/Capitol Blvd	Signal	D (39)	0.90
19	Custer Way/North St/Cleveland Ave	Signal	D (48)	0.96
20	Hoadly St/North St	TWSC	C (20)	0.16
21	Deschutes Way/I-5 NB Off-Ramp <sup>1</sup>	TWSC	B (12)	
22	Capitol Blvd/E St	Signal	C (23)	0.83
23	Cleveland Ave/South St	TWSC	B (15)	0.06
24	7 <sup>th</sup> Ave/Linwood Ave	TWSC	C (18)	0.34
25	2 <sup>nd</sup> Ave/Linwood Ave	AWSC	C (25)	0.76
26	Capitol Blvd/Linwood Ave	Signal	B (17)	0.81
27	Henderson Blvd/Yelm Hwy	Signal	D (49)	1.01
28	Rural Rd/Trosper Rd	TWSC	C (16)	0.23
29	Lake Park Dr/Trosper Rd	Signal	B (14)	0.69
30	Littlerock Rd/Trosper Rd	Signal	D (42)	0.81
31	I-5 SB Ramps/Tyee Dr/Trosper Rd	Signal	D (45)	0.91
32	I-5 NB Ramps/Trosper Rd	Signal	A (7)	0.87
33	Capitol Blvd/Trosper Rd <sup>3</sup>	Signal	F (30)	0.85
34	Capitol Blvd/Lee St <sup>2</sup>	Signal	C (24)	0.86
35	Littlerock Rd/Fred Meyer Drwy/Costco Drwy	Signal	A (8)	0.51
36	Littlerock Rd/Costco Drwy <sup>2</sup>	Signal	C (21)	0.79
37	Littlerock Rd/Kingswood Dr	RAB	A (6)	0.61
38	Capitol Blvd/X St	Signal	A (7)	0.49

**Table 3 Cont. Existing 2015 PM Peak Hour Level of Service**

Number	Intersection	Intersection Control	2015 Base Year	
			LOS (Delay)	Worst v/c
39	Elm St/X St	TWSC	A (10)	0.04
40	Capitol Blvd/Dennis St <sup>2</sup>	Signal	B (12)	0.67
41	Capitol Blvd/Israel Rd	Signal	C (22)	0.82
42	66 <sup>th</sup> Ave/Black Lake Belmore Rd	TWSC	B (11)	0.18
43	Kirsop Rd/66 <sup>th</sup> Ave	TWSC	B (13)	0.21
44	Littlerock Rd/Odegard Rd	RAB	A (5)	0.59
45	Littlerock Rd/Israel Rd/70 <sup>th</sup> Ave	RAB	A (9)	0.61
46	Linderson Way/Israel Rd	Signal	B (17)	0.71
47	Littlerock Rd/Tumwater Blvd	RAB	A (8)	0.37
48	I-5 SB Ramps/Tumwater Blvd	Signal	B (12)	0.83
49	I-5 NB Ramps/Tumwater Blvd	TWSC	F (106)	0.66
50	Linderson Way/Tumwater Blvd	Signal	C (35)	1.09
51	New Market St/Tumwater Blvd	RAB	A (4)	0.32
52	Capitol Blvd/Tumwater Blvd	Signal	D (36)	0.93
53	65 <sup>th</sup> Ave/Henderson Blvd	Signal	A (7)	0.70
54	Tumwater Blvd/Henderson Blvd	Signal	C (34)	0.91
55	Trails End Dr/Henderson Blvd	TWSC	B (13)	0.22
56	Littlerock Rd/Black Hills School Drwy	Signal	A (3)	0.33
57	Center St/76 <sup>th</sup> Ave	TWSC	C (17)	0.19
58	Old Hwy 99/Henderson Blvd	Signal	B (13)	0.70
59	Old Hwy 99/79 <sup>th</sup> Ave	TWSC	F (64)	0.19
60	Kimmie St/83 <sup>rd</sup> Ave	TWSC	A (9)	0.08
61	Center St/83 <sup>rd</sup> Ave	TWSC	B (12)	0.33
62	Old Hwy 99/88 <sup>th</sup> Ave	Signal	A (9)	0.66
63	I-5 SB Ramps/93 <sup>rd</sup> Ave	Signal	B (20)	0.83
64	I-5 NB Ramps/93 <sup>rd</sup> Ave	TWSC	B (12)	0.24
65	Kimmie St/93 <sup>rd</sup> Ave	TWSC	C (21)	0.14
66	Case Rd/93 <sup>rd</sup> Ave	AWSC	C (20)	0.78
67	Tilley Rd (South)/93 <sup>rd</sup> Ave	AWSC	B (15)	0.62
68	Tilley Rd (North)/93 <sup>rd</sup> Ave	TWSC	B (14)	0.28
69	Old Hwy 99/93 <sup>rd</sup> Ave	TWSC	C (18)	0.37

1. Due to the unique nature of this intersection control, HCM cannot be used to calculate delay. Sim-Traffic simulation was used to calculate average delay.
2. HCM 2000 was used at this signal because the shared through-left lane is not accurately analyzed in HCM 2010.
3. This intersection is being graded based on the known congestion along Capitol Boulevard as a result of the signal.

### 3.3 2040 BASELINE CONDITIONS

To accommodate the Regional Transportation Projects included in the forecast model, several intersection improvements are assumed to be in place for the 2040 baseline condition. A brief summary

of the Regional Transportation Projects that affect study intersections and the impacted intersections are provided below:

### 3.3.1 Brewery District Plan

The Brewery District Plan aims to change the focus of the transportation network around the brewery properties to accommodate multiple modes of travel. Lane reductions along Custer Way and Capitol Blvd are planned to improve pedestrian and bicycle mobility. To accommodate these lane reductions, several roundabouts are planned. The following motorized facilities are impacted by this project:

- Capitol Blvd/Carlyon Ave/Sunset Way – Install Roundabout
- Boston Ave/Custer Way – Install Roundabout
- Deschutes Way/Boston St – Install Signal
- Capitol Blvd/Cleveland Ave – Install Roundabout
- Capitol Blvd/Custer Way – Install Roundabout
- Cleveland Ave/Custer Way/North St – Install Roundabout

### 3.3.2 E Street Extension

To provide congestion relief to the Custer Way corridor and facilitate the Brewery District Plan, an extension of E Street across Tumwater Valley to Cleveland Avenue is planned. To accommodate this improvement, the following study intersections will be affected:

- Capitol Blvd/E St intersection – Install Roundabout

### 3.3.3 Old Highway 99 Improvements

The widening of Old Highway 99 from 73<sup>rd</sup> Avenue to 88<sup>th</sup> Avenue is planned to accommodate growing traffic volumes to and from the area southeast of Tumwater. This widening project affects the following study intersections:

- Henderson Blvd/Old Hwy 99 – Install Roundabout
- 79<sup>th</sup> Ave/Old Hwy 99 – Include additional NB and SB through lane
- 88<sup>th</sup> Ave/Old Hwy 99 – Install Roundabout

### 3.3.4 Tumwater Boulevard Interchange

The Tumwater Boulevard Interchange will be rebuilt with a wider bridge crossing over I-5 and improved ramps. The following study intersections will be affected by this project:

- Tumwater Blvd/I-5 SB Ramps – Install Roundabout
- Tumwater Blvd/I-5 NB Ramps – Install Roundabout

The operational results for the 2040 baseline conditions are provided in **Table 4**. The intersections that fail to meet the proposed level of service standard are in bold.

**Table 4. Projected 2040 Baseline PM Peak Hour Level of Service**

Number	Intersection	Intersection Control	2040 Base Year	
			LOS (Delay)	Worst v/c
1	RW Johnson Blvd/Mottman Rd	AWSC	C (17)	0.73
2	Crosby Blvd/Mottman Rd	Signal	B (17)	0.64
3	Crosby Blvd/Irving St	Signal	B (12)	0.77
4	7 <sup>th</sup> Ave/Irving St	AWSC	B (10)	0.35
5	<b>Crosby Blvd/Barnes Blvd</b>	<b>TWSC</b>	<b>F (60)</b>	<b>0.37</b>
6	<b>Black Lake Blvd/Black Lake Belmore Rd</b>	<b>TWSC</b>	<b>F (200+)</b>	<b>1.66</b>
7	RW Johnson Blvd/Sapp Rd	TWSC	B (15)	0.40
8	Sapp Rd/Crosby Blvd	TWSC	C (21)	0.51
9	49 <sup>th</sup> Ave/Black Lake Belmore Rd <sup>1</sup>	TWSC	B (12)	
10	Capitol Blvd/Carlyon Ave/Sunset Way <sup>2</sup>	RAB	B (12)	0.73
11	Deschutes Way/I-5 NB On-Ramp	Yield	A (9)	0.15
12	Deschutes Way/US 101 WB On-Ramp	Yield	B (11)	0.47
13	<b>I-5/US 101 Off-Ramps/Desoto St/2<sup>nd</sup> Ave<sup>1</sup></b>	<b>TWSC</b>	<b>F (200+)</b>	
14	2 <sup>nd</sup> Ave/Custer Way	Signal	D (40)	0.90
15	Boston St/Custer Way	RAB	B (12)	0.70
16	Deschutes Way/Boston St	Signal	C (20)	0.92
17	Cleveland Ave/Capitol Blvd	RAB	B (10)	0.66
18	Custer Way/Capitol Blvd	RAB	D (36)	1.03
19	Custer Way/North St/Cleveland Ave	RAB	B (13)	0.68
20	<b>Hoadly St/North St</b>	<b>TWSC</b>	<b>F (54)</b>	<b>0.52</b>
21	Deschutes Way/I-5 NB Off-Ramp <sup>1</sup>	TWSC	D (30)	
22	Capitol Blvd/E St	RAB	D (38)	1.06
23	Cleveland Ave/South St	TWSC	C (21)	0.19
24	7 <sup>th</sup> Ave/Linwood Ave	TWSC	D (33)	0.68
25	<b>2<sup>nd</sup> Ave/Linwood Ave</b>	<b>AWSC</b>	<b>F (58)</b>	<b>1.03</b>
26	Capitol Blvd/Linwood Ave	Signal	D (44)	1.06
27	<b>Henderson Blvd/Yelm Hwy</b>	<b>Signal</b>	<b>F (82)</b>	<b>1.13</b>
28	<b>Rural Rd/Trosper Rd</b>	<b>TWSC</b>	<b>F (53)</b>	<b>0.71</b>
29	Lake Park Dr/Trosper Rd	Signal	B (14)	0.77
30	Littlerock Rd/Trosper Rd	Signal	E (58)	1.01
31	I-5 SB Ramps/Tyee Dr/Trosper Rd	Signal	D (50)	0.92
32	I-5 NB Ramps/Trosper Rd	TWSC	C (19)	0.37
33	<b>Capitol Blvd/Trosper Rd</b>	<b>Signal</b>	<b>F (112)</b>	<b>1.31</b>
34	Capitol Blvd/Lee St <sup>2</sup>	Signal	C (25)	0.92
35	Littlerock Rd/Fred Meyer Drwy/Costco Drwy	Signal	A (10)	0.68
36	Littlerock Rd/Costco Drwy <sup>2</sup>	Signal	C (27)	0.87
37	Littlerock Rd/Kingswood Dr	RAB	B (14)	1.01
38	Capitol Blvd/X St	Signal	A (10)	0.63
39	Elm St/X St	TWSC	A (10)	0.05

**Table 4 Cont. Projected 2040 Baseline PM Peak Hour Level of Service**

Number	Intersection	Intersection Control	2040 Base Year	
			LOS (Delay)	Worst v/c
40	Capitol Blvd/Dennis St <sup>2</sup>	Signal	B (16)	0.76
41	Capitol Blvd/Israel Rd	Signal	D (42)	1.00
42	66 <sup>th</sup> Ave/Black Lake Belmore Rd	TWSC	C (16)	0.46
43	Kirsop Rd/66 <sup>th</sup> Ave	TWSC	C (19)	0.41
44	Littlerock Rd/Odegard Rd	RAB	A (5)	0.83
45	Littlerock Rd/Israel Rd/70 <sup>th</sup> Ave	RAB	C (25)	1.06
46	Linderson Way/Israel Rd	Signal	D (49)	1.15
47	Littlerock Rd/Tumwater Blvd	RAB	A (9)	0.64
48	I-5 SB Ramps/Tumwater Blvd	RAB	C (22)	0.99
49	I-5 NB Ramps/Tumwater Blvd	RAB	A (7)	0.67
50	Linderson Way/Tumwater Blvd	Signal	D (47)	1.27
51	New Market St/Tumwater Blvd	RAB	A (6)	0.42
52	Capitol Blvd/Tumwater Blvd	Signal	D (55)	1.41
53	65 <sup>th</sup> Ave/Henderson Blvd	Signal	B (10)	0.78
54	Tumwater Blvd/Henderson Blvd	Signal	D (45)	1.01
55	Trails End Dr/Henderson Blvd	TWSC	C (16)	0.31
56	Littlerock Rd/Black Hills School Drwy	Signal	A (4)	0.46
57	Center St/76 <sup>th</sup> Ave	TWSC	D (33)	0.46
58	Old Hwy 99/Henderson Blvd	RAB	B (11)	0.69
<b>59</b>	<b>Old Hwy 99/79<sup>th</sup> Ave</b>	<b>TWSC</b>	<b>F (177)</b>	<b>0.67</b>
60	Kimmie St/83 <sup>rd</sup> Ave	TWSC	B (11)	0.11
61	Center St/83 <sup>rd</sup> Ave	TWSC	C (15)	0.51
62	Old Hwy 99/88 <sup>th</sup> Ave	RAB	A (8)	0.53
63	I-5 SB Ramps/93 <sup>rd</sup> Ave	Signal	D (35)	1.07
<b>64</b>	<b>I-5 NB Ramps/93<sup>rd</sup> Ave</b>	<b>TWSC</b>	<b>F (112)</b>	<b>1.06</b>
65	Kimmie St/93 <sup>rd</sup> Ave	TWSC	D (34)	0.52
<b>66</b>	<b>Case Rd/93<sup>rd</sup> Ave</b>	<b>AWSC</b>	<b>F (53)</b>	<b>1.30</b>
<b>67</b>	<b>Tilley Rd (South)/93<sup>rd</sup> Ave</b>	<b>AWSC</b>	<b>F (54)</b>	<b>1.28</b>
<b>68</b>	<b>Tilley Rd (North)/93<sup>rd</sup> Ave</b>	<b>TWSC</b>	<b>F (60)</b>	<b>0.78</b>
<b>69</b>	<b>Old Hwy 99/93<sup>rd</sup> Ave</b>	<b>TWSC</b>	<b>E (36)</b>	<b>0.67</b>

1. Due to the unique nature of this intersection control, HCM cannot be used to calculate delay. Sim-Traffic simulation was used to calculate average delay.
2. HCM 2000 was used at this signal because the shared through-left lane is not accurately analyzed in HCM 2010.

### 3.4 PROPOSED CAPITAL IMPROVEMENTS

The City of Tumwater has, through different subarea studies and previous planning efforts, identified future roadway improvements that address the majority of the projected operational deficiencies, several of which are designed to improve network connectivity or secondary modes of travel. All of these previously identified improvement projects have been consolidated into the proposed project list,

with the inclusion of a few new improvements to address new projected operational deficiencies. These projects are summarized below by project type.

### 3.4.1 Roadway Improvements

#### R-1 Littlerock Road: Tumwater Blvd to Western City Limits

This is currently a two-lane facility running north/south and providing access from Tumwater to southwest Thurston County. It is planned to be widened to three lanes in the future, providing a two-way left-turn lane (TWLTL). This roadway is a primary entry point to the City, and the current volume projections approach the threshold for multiple through lanes each direction. It is suggested that the roadway operations be monitored and that all future development along the roadway be set back to accommodate a five-lane section.

#### R-2 Tyee Drive: Bishop Rd to Israel Rd

Tyee Drive is currently a two-lane roadway traveling parallel to Littlerock and providing access to the commercial properties. This project would extend Tyee Drive from its current southern terminus at Bishop Road, south to Israel Road. This extension will be a two lane roadway and will include the installation of a roundabout at Israel Road.

#### R-3 Tyee Drive: Israel Rd to Tumwater Blvd

This project will continue the extension of Tyee Drive south to Tumwater Blvd. This portion of Tyee Drive is currently planned to be four/five lanes, however the need for this additional capacity should be reassessed as the surrounding properties are developed.

#### R-4 Tyee Drive: Tumwater Blvd to Prine Dr

This project will continue the extension of Tyee Drive south to Prine Dr. This portion of Tyee Drive will continue to be planned for four/five lanes. As with project R-3, the need for the additional width should be reassessed as the adjacent properties are developed.

#### R-5 Tyee Drive: Prine Dr to Littlerock Rd

This project will complete the extension of Tyee Drive, connecting into Littlerock Road at the existing Black Hills High School driveway. This portion of Tyee Drive will serve residential properties and is planned as a three lane roadway. This project will also include improvements to the traffic signal at Black Hills High School driveway/Littlerock Rd

#### R-6 Trosper Road: Lake Park Dr to Rural Rd

This roadway is currently two lanes with on-street parking provided at the west end of the segment and partial bicycle lanes. Repurposing the existing asphalt will allow this roadway to be converted into a three lane section with continuous bicycle lanes.

#### R-7 Tumwater Boulevard: Capitol Blvd to Henderson Blvd

This roadway is currently two lanes. This improvement will widen Tumwater Blvd to three lanes and include intersection improvements at Bonniewood Dr.

R-8 Tumwater Boulevard: I-5 Interchange

The Tumwater Boulevard interchange is currently a three-lane bridge with stop-control for the NB ramps and signal control for the SB ramps. This improvement will install roundabouts at both ramp terminals and widen the bridge to accommodate these roundabouts. Since WSDOT has jurisdiction over the interchange, this will become a WSDOT project.

R-9 Tumwater Boulevard: Tye Dr extension to I-5 SB Ramps

Currently this portion of Tumwater Boulevard is three lanes, with two travel lanes eastbound and one travel lane westbound. With the completion of Tye Dr, this portion of Tumwater Boulevard is projected to experience an increase in traffic. This improvement will widen Tumwater Boulevard to five lanes, providing two travel lanes in each direction and a TWLTL.

R-10 E Street: Capitol Blvd to Cleveland Ave

Currently E Street is a short two-lane roadway connecting Deschutes Way to Capitol Blvd. To facilitate better network connectivity and relieve congestion along Custer Way, this improvement will extend E Street east across the Deschutes River valley to Cleveland Ave. This extension will be four lanes will also provide access to valley floor properties on the east side of the railroad tracks. A separate access is planned for properties on the west side of the railroad tracks. This project will include the installation of roundabouts at Capitol Blvd and Cleveland Ave.

R-11 Old Highway 99: Tumwater Blvd to 73<sup>rd</sup> Ave

This section of Old Highway 99 is currently a two-lane roadway south Tumwater Blvd. This improvement will widen Old Highway 99 to five lanes and has already been funded.

R-12 Old Highway 99: 73<sup>rd</sup> Ave to 88<sup>th</sup> Ave

This section of Old Highway 99 is currently two lanes. This improvement will widen Old Highway 99 to five lanes, continuing the widening of project R-11 south. This project will include intersection improvements at Bonniewood Dr, Henderson Blvd and 88<sup>th</sup> Ave. The Henderson Blvd and 88<sup>th</sup> Ave intersections will be converted from signals to roundabouts. This improvement is a Regional Transportation Project.

R-13 Old Highway 99: 88<sup>th</sup> Ave to 93<sup>rd</sup> Ave

This portion of Old Highway 99 is currently two lanes. This improvement will widen Old Highway 99 to three lanes, adding a TWLTL and/or median section. The projected 2040 volumes are approaching the threshold for a five-lane section and it is recommended that future development along this segment be constructed with setbacks adequate to accommodate five lanes. To realize full benefit of a five lane roadway section would require Old Highway 99 to be widened to five lanes past the southern boundary of the Tumwater UGA. The segments of Old Highway 99 north and south of 93<sup>rd</sup> Ave should continue to be monitored.



R-14 Henderson Boulevard: Tumwater Blvd to 65<sup>th</sup> Ave

This portion of Henderson Boulevard is currently a two-lane roadway. This improvement will widen Henderson Boulevard to three lanes, providing left-turn lanes at intersecting roadways and a TWLTL or a median along the rest of the segment.

R-15 Henderson Boulevard: Old Hwy 99 to Tumwater Blvd

This portion of Henderson Boulevard is currently a two-lane roadway. This improvement will widen Henderson Boulevard to three lanes, providing left-turn lanes at intersecting roadways and a TWLTL or a median along the rest of the segment.

R-16 32<sup>nd</sup> Avenue: Ferguson St to Black Lake Blvd

32<sup>nd</sup> Avenue is currently a three-lane roadway between RW Johnson Blvd and Ferguson St, with single travel lanes in each direction and a TWLTL. This improvement will extend 32<sup>nd</sup> Avenue west to Black Lake Blvd, continuing the three lane section. This improvement will include intersection improvements at Black Lake Blvd. This project will be constructed as development occurs in the surrounding area, and is expected to be developer funded.

R-17 70<sup>th</sup> Avenue: Kirsop Rd to 73<sup>rd</sup>/66<sup>th</sup> Connector

70<sup>th</sup> Avenue is currently a two-lane roadway. This improvement will extend 70<sup>th</sup> Avenue west to a future north/south roadway to provide access to the property west of Black Hills High School. This extension will be a three-lane roadway, including a TWLTL. The project will include intersection improvements at Kirsop Rd. This improvement will occur as the property west of Black Hills High School develops, and is expected to be developer funded.

R-18 73<sup>rd</sup> Avenue: Prine Dr extension to 73<sup>rd</sup>/66<sup>th</sup> Connector

73<sup>rd</sup> Avenue is currently a two-lane road serving a small community of homes east of Littlerock Rd. This project will construct a new segment of 73<sup>rd</sup> Avenue west of Littlerock Rd, between the extension of Prine Dr and a future north/south roadway further west. This new roadway will be three lanes and will serve the future development of property west of Black Hills High School. It will be constructed as development occurs and the need for a third lane will be reassessed at that time. It is expected to be developer funded.

R-19 Prine Drive: Tyee Dr to 73<sup>rd</sup> Ave

Prine Drive is currently a two lane neighborhood road east of Littlerock Rd. This improvement will extend Prine Drive west to the proposed 73<sup>rd</sup> Ave roadway and will widen the existing segment of Prine Drive between Littlerock Rd and the Tyee Dr extension. This roadway improvement is part of the proposed access plan for the property west of Black Hills High School and will be constructed as development occurs. It is expected to be developer funded.

R-20 93<sup>rd</sup> Avenue: Lathrop Industrial Dr to I-5 SB Ramps

This portion of 93<sup>rd</sup> Avenue is currently a two lane roadway. This improvement will widen 93<sup>rd</sup> Avenue to five lanes, providing two lanes in each direction and either a TWLTL or a median. This project will include

intersection improvements at Lathrop Industrial Dr. This improvement is driven by the expected development of properties on both sides of 93<sup>rd</sup> Avenue. The additional through-lanes will add/drop at Lathrop Industrial Dr.

R-21 SR 121 (93<sup>rd</sup> Avenue): I-5 NB Ramps to Kimmie St

This portion of 93<sup>rd</sup> Avenue is currently two lanes. This improvement will widen 93<sup>rd</sup> Avenue to five lanes, providing two lanes in each direction and a TWLTL. This improvement will include intersection improvements at Kimmie St.

R-22 SR 121 (93<sup>rd</sup> Avenue): Kimmie St to Tilley Rd (south)

This portion of 93<sup>rd</sup> Avenue is two lanes. This improvement will add a TWLTL, creating a three lane roadway. Previous studies have found that a five lane section may be needed along this portion of 93<sup>rd</sup> Avenue, depending on how the area develops. As development occurs, setbacks should allow for a five lane roadway.

R-23 93<sup>rd</sup> Avenue: Lathrop Industrial Dr to Western City Limits

This segment of 93<sup>rd</sup> Avenue is currently a two-lane roadway. This improvement will widen 93<sup>rd</sup> Avenue to include a TWLTL or median control.

R-24 SR 121 (93<sup>rd</sup> Avenue): I-5 Interchange

Currently the interchange bridge over I-5 is two lanes. As the properties on each side of I-5 develop, the bridge will require widening. This improvement will widen the bridge to five lanes, providing two travel lanes and left-turn pockets for both on-ramps. It is anticipated that this will become a WSDOT project.

R-25 6<sup>th</sup> Avenue: T St to Lee St

This project is to construct a new north/south roadway west of Capitol Blvd. With the completion of the Trospen Rd interchange project, the NB ramps will be relocated to 6<sup>th</sup> Avenue north of this location. This improvement will extend the new roadway south to Lee St to provide better network connectivity. It will be a three-lane roadway and will include intersection improvements at Lee St.

R-26 Custer Way: Boston St to Cleveland Ave

This project is a part of the Brewery District Plan. Currently this portion of Custer Way is a four-lane road with sidewalk and no bicycle lanes. The improvement will reduce the travel lanes to three, with the EB direction providing a single through lane and the WB direction providing two through lanes. This lane reduction will allow for the addition a median and an EB bicycle lane. This project requires the construction of roundabouts at brewery area intersections, projects I-2, I-4, I-6, I-7 and I-8.

R-27 Capitol Boulevard: E St to Cleveland Ave

This project is a part of the Brewery District Plan. Currently this segment of Capitol Boulevard is five lanes, with sidewalks and no bicycle lanes. This improvement will reduce the travel lanes to three, providing one NB lane and two SB lanes. With this lane reduction a center median will be installed and

bicycle lanes will be constructed in both directions. This improvement requires the construction of roundabouts at brewery area intersections, projects I-2, I-4, I-6, I-7 and I-8.

R-28 Capitol Boulevard: Cleveland Ave to Carlyon Ave

This improvement is a part of the Brewery District Plan. This section of Capitol Boulevard is currently five lanes with sidewalks and no bicycle lanes. This project will reduce the travel lanes to four, with two lanes in each direction. With this reduction bicycle lanes and a center median will be constructed. This improvement requires the construction of roundabouts at brewery area intersections, projects I-2, I-4, I-6, I-7 and I-8.

R-29 Capitol Boulevard: Israel to M St

This project is a part of the Capitol Boulevard Corridor Plan. This section of Capitol Boulevard currently provides five travel lanes and sidewalks, with no bicycle lanes. The improvement will remove the TWLTL, allowing for the addition of bicycle lanes in both directions and a raised median. This project requires the construction of roundabouts along the corridor, projects I-15, I-16, I-17 and I-18

R-30 North/South Connector: Lee St to Trosper Rd

This project is a part of the Capitol Boulevard Corridor Plan. This improvement will construct a new north/south roadway east of Capitol Blvd. The roadway will provide two travel lanes, and bicycle lanes in both directions. This improvement will provide better access to the commercial properties.

R-31 Odegard Road: Littlerock Rd to Tyee Dr

Odegard Road is currently a two lane roadway extending east from Littlerock Rd, providing access to a small collection of residential units. This improvement constructs a three-lane extension of Odegard Road east to the proposed Tyee Dr extension, providing enhanced network connectivity.

R-32 Bishop Road: Littlerock Rd to Tyee Dr

Bishop Road is currently a two-lane roadway extending east from Littlerock Rd, providing access to commercial and residential properties. This improvement will construct a three lane extension of Bishop Road east to the proposed Tyee Dr extension, providing enhanced network connectivity.

R-33 73<sup>rd</sup>/66<sup>th</sup> Connector: 66<sup>th</sup> Ave to 73<sup>rd</sup> Ave

This project will construct a new north/south roadway west of Black Hills High School, connecting 66<sup>th</sup> Ave and 73<sup>rd</sup> Ave. It will be constructed as a three-lane roadway and will be constructed as development occurs. It is expected to be developer funded.

R-34 New Market Street: Tumwater Blvd to Israel Rd

Currently New Market Street is a two-lane roadway extending north from Tumwater Blvd and providing access to the New Market Skills Center. This improvement will construct a three-lane extension of New Market Street north to Israel Rd.

R-35 Town Center Connector: Tumwater Blvd to Israel Rd

This project will construct a new north/south three-lane roadway east of New Market St, connecting Tumwater Blvd and Israel Rd.

R-36 72<sup>nd</sup> Avenue: Cleanwater Dr to Linderson Way

This roadway is currently a site access road to property west of Tumwater Blvd. This improvement will improve the existing roadway to a three lane roadway and construct an extension east to Linderson Way, providing a parallel route to Tumwater Blvd to enhance connectivity for the properties north of Tumwater Blvd.

R-37 Doelman Property: South of 73<sup>rd</sup> Ave

The Doelman property is located south of 73<sup>rd</sup> Avenue and west of Black Hills High School. This property will construct an internal roadway network to serve the future development, and is expected to be developer funded.

R-38 Trospen Road Interchange: NB Ramps

The existing NB ramps for the Trospen Road interchange provide right turn on-ramp movements in both directions and a full access off-ramp. To address the projected deficiency at Trospen Rd/Capitol Blvd, this improvement will relocate the NB ramp termini south of Trospen Road. The current ramps will be constructed as 6<sup>th</sup> Ave and provide limited access to Trospen Road. The WB to NB right turn on-ramp will remain. Traffic traveling NB on Capitol Blvd will be able to access the NB on-ramp south of Trospen Road, using Lee St and 6<sup>th</sup> Ave. This project will include improvements to the existing NB Ramp intersection.

R-39 Deschutes Way: E St to US 101 On-ramp

This portion of Deschutes Way is currently two travel lanes with sidewalks and no bicycle lanes. Parking is provided on the west side of the road south of Boston St and on the east side of the road north of Boston St. Multiple improvement alternatives are still under consideration for this roadway, designed to accommodate the additional traffic as a result of the E St extension. The final design recommendation will be determined in the E St extension study.

### 3.4.2 Intersection Improvements

I-1 Black Lake Belmore at Black Lake Boulevard

This intersection is currently under stop-sign control for the minor street approach, Black Lake Belmore. The intersection is projected to operate at an LOS F in 2040. This project will construct a single lane roundabout.

I-2 Capitol Boulevard at Carlyon Avenue/Sunset Way

This intersection is currently under traffic signal control. It has an unusual layout, with both Carlyon Ave and Sunset Way being WB approaches. This intersection is not projected to have operational issues in the future, but to accommodate the Brewery District Plan improvements along Capitol Boulevard this improvement will construct a two lane roundabout. A roundabout will also better accommodate the unusual intersection configuration.

I-3 2<sup>nd</sup> Avenue at Custer Way

This intersection is currently under traffic signal control. The projected intersection operations do not require improvements, but the upstream I-5/US-101 off-ramp intersection projects to operate an LOS F. To improve the operations of the upstream intersection, this improvement will restripe the SB approach to convert the existing through lane into a shared through-left lane, providing a second SB left-turn lane. This will greatly improve the lane utilization at the upstream intersection, and will also improve the projected operations at this intersection.

I-4 Boston Street at Custer Way

This intersection currently operates under stop sign-control for the minor street approaches. The NB approach is restricted to through and right turn movements. The Brewery District Plan includes a roundabout at this location to facilitate the lane reduction along Custer Way. This improvement will construct a teardrop roundabout at this location, with the east side of the roundabout connecting to a median and limiting the NB approach to right-turns only.

I-5 Deschutes Way at Boston St

This intersection is currently under all-way stop-control. With the construction of the E Street crossing this intersection will experience a large increase of through traffic along Deschutes Way, which will result in the operations falling below the proposed level of service standard. This improvement will install a traffic signal as a part of the Brewery District Plan.

I-6 Capitol Boulevard at Cleveland Ave

This intersection currently operates under stop-control for the Cleveland Avenue approach. Due to the approach angle of the NB Capitol Boulevard and NB Cleveland Avenue approaches, the Cleveland Ave approach only allows a right-turn movement. This improvement will construct a two lane roundabout, to better serve the existing approach angles and to facilitate the Brewery District Plan's lane reduction along Capitol Boulevard.

I-7 Capitol Boulevard at Custer Way

This intersection is currently operated with a traffic signal. To accommodate the lane reductions along both Custer Way and Capitol Boulevard proposed in the Brewery District Plan, this improvement will construct a two-lane roundabout.

I-8 Cleveland Avenue at Custer Way/North Street

This intersection is currently operated with a traffic signal. As part of the Brewery District Plan, this improvement will construct a two lane roundabout to accommodate the lane reduction along Custer Way.

I-9 Linwood Avenue at 2<sup>nd</sup> Avenue

This intersection is currently under all-way stop-control. The projected intersection operations are below the proposed level of service standard. This improvement will construct a two-lane roundabout.

#### I-10 Capitol Boulevard at Linwood Avenue

This intersection is currently under traffic signal control. Although the projected operational analysis is within the proposed level of service standard, to accommodate the median treatment along Capitol Boulevard proposed in the Capitol Boulevard Corridor Plan, this improvement will construct a two-lane roundabout.

#### I-11 Henderson Avenue at Yelm Highway

This intersection currently operates under traffic signal control. The existing operational analysis results suggests the intersection may experience operational issues in the near future. The projected 2040 analysis falls below the proposed level of service standard. This improvement will widen the WB approach to provide a 2<sup>nd</sup> left-turn lane. Construction of a two lane roundabout could also provide the same operational benefit. Both improvements present right-of-way challenges. A future intersection design study would identify the preferred solution.

#### I-12 Trosper Road at Rural Road

This intersection is currently under stop sign-control for Rural Road. The projected 2040 operational analysis will fall below the proposed level of service standard. This improvement will construct an EB left-turn lane. This and the addition of a TWLTL on Trosper Road east of Rural Road completed in project R-6 will allow for the intersection to remain under stop-sign control.

#### I-13 Trosper Road at 2<sup>nd</sup> Avenue/Littlerock Road

This intersection is currently under traffic signal control. The projected 2040 level of service is expected to be within the proposed level of service standard, but with some long queues during the peak periods. To provide congestion relief and improve the operations of the intersection, this improvement will construct a two lane roundabout. Due to the close proximity to the Trosper Road/Tyee Drive intersection, this improvement must be constructed with I-14.

#### I-14 Trosper Road at Tyee Drive/I-5 SB Ramps

This intersection is currently under traffic signal control. The projected 2040 operations are within the proposed LOS Standard, but with heavy congestion along most of the approaches. To improve the projected congestion, this improvement will construct a two lane roundabout. This improvement will require project I-13 to be completed. Construction of a roundabout should also improve the safety performance of the intersection by improving the alignment of the north and south approaches.

#### I-15 Trosper Road at Capitol Boulevard

Currently this intersection is under traffic signal control. While the existing level of service is within the LOS standard, the current congestion and extended queues experienced during the PM peak period results in this intersection being graded as failing. The Trosper Road interchange improvement, project R-38, was developed to address the existing and projected operational issues at this intersection. This improvement will construct a two-lane roundabout.

#### I-16 T Street at Capitol Boulevard

This intersection is currently stop sign-controlled. Future redevelopment of the WSDOT Olympic Region property is expected to use T Street as a primary access, which will require intersection improvements. As part of the Capitol Boulevard Corridor Plan and to accommodate the Trospen Road interchange improvement, this project will construct a two-lane roundabout. With the completion of the 6<sup>th</sup> Avenue roadway project, project R-25, this roundabout will allow for the existing traffic signal at Lee Street to be removed, creating better intersection control spacing along Capitol Boulevard.

I-17 X Street at Capitol Boulevard

This intersection currently operates under traffic signal control. As part of the Capitol Boulevard Corridor Plan, this improvement will construct a two-lane roundabout. This improvement is not needed to improve an operational deficiency, but will facilitate the redevelopment of Capitol Boulevard.

I-18 Dennis Street at Capitol Boulevard

This intersection currently operates under traffic signal control. As part of the Capitol Boulevard Corridor Plan, this improvement will construct a two-lane roundabout. This improvement is not needed to improve an operational deficiency, but will facilitate the redevelopment of Capitol Boulevard.

I-19 Old Highway 99 at 79<sup>th</sup> Avenue

This intersection is currently under stop sign-control for the 79<sup>th</sup> Avenue approach. The minor street movement currently operates below the accepted LOS standards, but the volumes are not sufficient to meet traffic signal warrants. In the future the volumes on Old highway 99 are expected to grow enough that intersection control improvements become warranted. This improvement will construct a two-lane roundabout.

I-20 93<sup>rd</sup> Avenue at I-5 Northbound Ramps

Currently this intersection operates under stop sign-control for the I-5 NB off-ramp. This intersection is projected to operate below the proposed LOS standard in 2040. This improvement will construct a traffic signal.

I-21 93<sup>rd</sup> Avenue at Kimmie Street

This intersection currently operates with stop sign-control for both approaches of Kimmie Street. Based on the volume projections from the travel demand model, this intersection will operate within the proposed LOS standards. Previous studies have identified operational deficiencies at this location, and if the properties along 93<sup>rd</sup> Avenue develop, improvements will be needed. This project will construct a traffic signal, which should be built as development occurs.

I-22 93<sup>rd</sup> Avenue at Case Road

This intersection currently operates under all-way stop-control. This intersection is projected to operate below the proposed LOS standard in 2040. This project is currently identified on the City's traffic impact fee program and will construct a single-lane roundabout. This roundabout should be designed to accommodate widening of 93<sup>rd</sup> Avenue to five lanes.

I-23 93<sup>rd</sup> Avenue at Tilley Road (south)

Currently this intersection operates with all-way stop-control. The projected 2040 operational results are below the proposed LOS standard. This improvement will construct a single-lane roundabout. Should median control be implemented along 93<sup>rd</sup> Avenue between Tilley Road and Case Road, construction of this roundabout would be required.

I-24 93<sup>rd</sup> Avenue at Tilley Road (north)

This intersection currently operates under all-way stop-control. This intersection is projected to operate below the proposed LOS standard in 2040. This improvement will construct a single-lane roundabout.

I-25 93<sup>rd</sup> Avenue at Old Highway 99

This intersection is currently operated with stop sign control for the 93<sup>rd</sup> Avenue approach. Currently acceleration lanes have been constructed for both NB and SB directions on Old Highway 99. As traffic volumes increase along Old Highway 99, these acceleration lanes will not be sufficient to accommodate the traffic on 93<sup>rd</sup> Avenue. This improvement will construct a single-lane roundabout. This roundabout should be designed to accommodate future widening along Old Highway 99.

### 3.4.3 Additional Intersection Deficiencies

With completion of the entire roadway and intersection project lists, the projected 2040 operational analysis still indicates a few locations that may operate below the proposed LOS standard. Here is a brief description of these locations:

Crosby Boulevard at Barnes Road

This intersection is projected to operate at an LOS F for the EB approach and an LOS E for the WB approach. The EB approach serves as a driveway for a small apartment complex and has very low peak hour volumes. The WB approach has more volume, but the heavy movement is right-turning traffic, which is provided with a separate turn lane. The peak hour traffic signal volume warrants were reviewed at this location and the forecasted volumes don't meet applicable traffic volume thresholds. This intersection should be monitored, but until signal warrants can be met no intersection improvements are proposed.

Hoadly Street at North Street

This intersection is currently stop sign-controlled for the north and south approaches. The projected 2040 operational analysis indicates the SB approach will operate at an LOS F. This is a low volume approach and is not projected to meet the peak hour traffic signal volume warrant. This intersection should be monitored, but until signal warrants can be met no intersection improvements are proposed.

### 3.4.4 Roadway Deficiencies

A planning level evaluation of roadway segments was prepared for most collector and arterial roadway segments within the study area. The analysis was based on the volume to capacity ratio (v/c). In this analysis the roadway capacities used were taken from the TRPC Regional demand model. In general, these capacities tend to be conservatively low and offer a "first-screening" of roadways that may be approaching capacity difficulties. In most urban settings the intersections are what determine the



success of the roadway segments. However, in some instances it may be appropriate to consider addressing roadway segment capacity deficiencies, in the following ways:

- Adding through capacity lanes
- Improving signal progression
- Adding right and/or left-turn lanes at intersections
- Adding a continuous two-way left-turn lane or center median
- Consolidating driveways to reduce conflicts

The roadway segment analysis results are provided on **Figures 10, 11 and 12** of the Tumwater Master Plan. The complete roadway segment analysis results are provided in Appendix A-4. Below is a discussion of some of the notable roadway segments.

#### Henderson Boulevard - Between 65<sup>th</sup> Avenue and Yelm Highway

Currently this portion of Henderson Boulevard is a two lane roadway with turn lanes at all significant intersections. The 2040 roadway segment analysis indicates that Henderson Blvd will have a v/c ratio greater than 1.0. Given that the intersections already have turn lanes provided, the only meaningful improvement to address the projected volume would be additional through lanes. This segment of Henderson Boulevard has multiple geographic constraints that make roadway widening undesirable. Since the current corridor is built to the long term vision for this roadway, Henderson Boulevard has been designated a Tumwater Strategy Corridor. This roadway should continue to be monitored.

#### Deschutes Way – Between E Street and US-101 Ramps

This portion of Deschutes Way is currently a two lane roadway. With the completion of the E Street extension Deschutes Way will experience an increase in volume accessing the US-101 and I-5 on-ramps. This roadway is included on the Capital Improvements list, with the exact roadway improvement to be determined in the E Street extension study. Eventually, either with this initial improvement or a future improvement, a 2<sup>nd</sup> NB travel lane may be needed to accommodate this growth in volume.

#### Israel Road – Between Linderson Way and Littlerock Road

This portion of Israel Road is a two lane section. The projected 2040 v/c ratio indicates this roadway will operate with a v/c ratio above 1.0. Given the current lack of driveway interruptions along this portion of Israel Road, the intersection analysis at Israel Rd/Linderson Way and Israel Rd/Littlerock Rd should provide a more meaningful indication of how Israel Road is operating. As development occurs on this segment of Israel Road, additional right-turn or left-turn lanes and/or turn movement restrictions at cross-streets may need need to be evaluated to minimize friction on through traffic.

#### Linderson Way – Between Tumwater Boulevard and Israel Road

Linderson Way north of Tumwater Boulevard is currently a five lane section, which narrows down to three lanes north of 73<sup>rd</sup> Avenue until Israel Road. Based on the existing counts, this roadway has a v/c ratio above 1.0 during the PM peak hour SB approaching Tumwater Boulevard. Congestion on this roadway tends to be of short duration as the office buildings generate spikes of outbound traffic. As traffic increases this roadway should be monitored for potential efficiency improvements including right turn lanes at cross-streets/major driveways.

## Old Highway 99 – South of 93<sup>rd</sup> Avenue

This portion of Old Highway 99 is currently a two lane section. The segments of Old Highway 99 north of 93<sup>rd</sup> Avenue are listed in the Capital Improvements list, widening to five lanes north of 88<sup>th</sup> Avenue and to three lanes between 88<sup>th</sup> Avenue and 93<sup>rd</sup> Avenue. As growth continues south of the City, this roadway may require additional through lanes. Although this improvement may not provide meaningful benefit unless it extends south beyond the City boundary.

### 3.5 2040 WITH PROPOSED CAPITAL IMPROVEMENTS

The operational results were prepared for 2040 volume conditions with the proposed improvements in place for affected intersections. The 2040 operational analysis results with the proposed improvements are provided in **Table 5**.

**Table 5. Projected 2040 With Improvements PM Peak Hour Level of Service**

Number	Intersection	Existing Intersection Control	Improvement	2040 With Improvement	
				LOS (Delay)	Worst v/c
6	Black Lake Blvd/Black Lake Belmore Rd	TWSC	RAB	B (11)	0.64
13	I-5/US 101 Off-Ramps/Desoto St/2 <sup>nd</sup> Ave	TWSC	Lanes	E (50)	
14	2 <sup>nd</sup> Ave/Custer Way	Signal	Lanes	C (25)	0.85
25	2 <sup>nd</sup> Ave/Linwood Ave	AWSC	RAB	B (19)	0.80
26	Capitol Blvd/Linwood Ave	Signal	RAB	B (17)	0.84
27	Henderson Blvd/Yelm Hwy	Signal	Signal	D (55)	1.01
28	Rural Rd/Trosper Rd	TWSC	Lanes	C (18)	0.37
30	2 <sup>nd</sup> Ave/Littlerock Rd/Trosper Rd	Signal	RAB	C (32)	0.96
31	Tyee Dr/SB I-5 Ramps/Trosper Rd	Signal	RAB	C (23)	0.92
33	Capitol Blvd/Trosper Rd	Signal	RAB	C (26)	0.94
38	Capitol Blvd/X St	Signal	RAB	A (8)	0.50
40	Capitol Blvd/Dennis St	Signal	RAB	A (9)	0.56
56	Littlerock Rd/Black Hills School Drwy	Signal	Lanes	C (27)	0.83
59	Old Hwy 99/79 <sup>th</sup> Ave	TWSC	RAB	A (8)	0.59
63	I-5 SB Ramps/93 <sup>rd</sup> Ave	Signal	Lanes	B (15)	0.67
64	I-5 NB Ramps/93 <sup>rd</sup> Ave	TWSC	Signal	A (9)	0.77
65	Kimmie St/93 <sup>rd</sup> Ave	TWSC	Signal	B (14)	0.73
66	Case Rd/93 <sup>rd</sup> Ave	AWSC	RAB	B (16)	0.79
67	Tilley Rd (South)/93 <sup>rd</sup> Ave	AWSC	RAB	B (17)	0.79
68	Tilley Rd (North)/93 <sup>rd</sup> Ave	TWSC	RAB	B (12)	0.71
69	Old Hwy 99/93 <sup>rd</sup> Ave	TWSC	RAB	C (24)	0.92

1. Due to the unique nature of this intersection control, HCM cannot be used to calculate delay. Sim-Traffic simulation was used to calculate average delay.
2. HCM 2000 was used at this signal because the shared through-left lane is not accurately analyzed in HCM 2010.

### 3.6 2022 BASELINE CONDITIONS

The Capital Facilities Plan contains all the perceived roadway and intersection improvements the City will need to construct to maintain the proposed LOS standards in 2040. To determine which of these improvements may be warranted or needed in the short term, a 2022 analysis was performed.

To prepare the analysis volumes for the 2022 analysis, a 2040 forecast was prepared using the TRPC travel demand model, with all of the regional transportation projects removed. Then a portion of the model growth between the existing 2014 travel demand model and this unimproved 2040 travel demand model was added to the existing 2015 turning movement counts to produce 2022 analysis volumes. The operational results for these intersections are provided below in **Table 6**.

**Table 6. Projected 2022 PM Peak Hour Level of Service**

Number	Intersection	Intersection Control	2022 Base Year	
			LOS (Delay)	Worst v/c
1	RW Johnson Blvd/Mottman Rd	AWSC <sup>1</sup>	B (13)	0.55
2	Crosby Blvd/Mottman Rd	Signal	B (17)	0.77
3	Crosby Blvd/Irving St	Signal	B (10)	0.67
4	7 <sup>th</sup> Ave/Irving St	AWSC	A (9)	0.26
5	Crosby Blvd/Barnes Blvd	TWSC <sup>2</sup>	D (29)	0.26
6	Black Lake Blvd/Black Lake Belmore Rd	TWSC	F (72)	0.96
7	RW Johnson Blvd/Sapp Rd	TWSC	B (11)	0.23
8	Sapp Rd/Crosby Blvd	TWSC	B (13)	0.23
9	49 <sup>th</sup> Ave/Black Lake Belmore Rd <sup>1</sup>	TWSC	A (9)	
10	Capitol Blvd/Carlyon Ave/Sunset Way <sup>2</sup>	Signal	B (11)	0.49
11	Deschutes Way/I-5 NB On-Ramp	Yield	A (9)	0.19
12	Deschutes Way/US 101 WB On-Ramp	Yield	A (10)	0.40
13	I-5/US 101 Off-Ramps/Desoto St/2 <sup>nd</sup> Ave <sup>1</sup>	TWSC	C (24)	
14	2 <sup>nd</sup> Ave/Custer Way	Signal	C (31)	1.10
15	Boston St/Custer Way	TWSC	E (42)	0.58
16	Deschutes Way/Boston St	AWSC	E (41)	0.95
17	Cleveland Ave/Capitol Blvd	TWSC	B (13)	0.43
18	Custer Way/Capitol Blvd	Signal	E (60)	1.00
19	Custer Way/North St/Cleveland Ave	Signal	E (70)	1.15
20	Hoadly St/North St	TWSC	C (23)	0.19
21	Deschutes Way/I-5 NB Off-Ramp <sup>1</sup>	TWSC	D (26)	
22	Capitol Blvd/E St	Signal	C (33)	0.87
23	Cleveland Ave/South St	TWSC	C (16)	0.07
24	7 <sup>th</sup> Ave/Linwood Ave	TWSC	C (20)	0.43
25	2 <sup>nd</sup> Ave/Linwood Ave	AWSC	E (38)	0.93
26	Capitol Blvd/Linwood Ave	Signal	C (28)	1.00
27	Henderson Blvd/Yelm Hwy	Signal	E (68)	1.13
28	Rural Rd/Trosper Rd	TWSC	C (20)	0.30
29	Lake Park Dr/Trosper Rd	Signal	B (14)	0.72
30	Littlerock Rd/Trosper Rd	Signal	D (44)	0.83
31	I-5 SB Ramps/Tyee Dr/Trosper Rd	Signal	D (46)	0.92
32	I-5 NB Ramps/Trosper Rd	Signal	A (7)	0.89
33	Capitol Blvd/Trosper Rd <sup>3</sup>	Signal	F (31)	0.89
34	Capitol Blvd/Lee St <sup>2</sup>	Signal	C (26)	0.88
35	Littlerock Rd/Fred Meyer Drwy/Costco Drwy	Signal	A (8)	0.59
36	Littlerock Rd/Costco Drwy <sup>2</sup>	Signal	C (22)	0.84
37	Littlerock Rd/Kingswood Dr	RAB	A (6)	0.75
38	Capitol Blvd/X St	Signal	A (8)	0.53

**Table 6 Cont. Projected 2022 PM Peak Hour Level of Service**

Number	Intersection	Intersection Control	2022 Base Year	
			LOS (Delay)	Worst v/c
39	Elm St/X St	TWSC	A (10)	0.04
40	Capitol Blvd/Dennis St <sup>2</sup>	Signal	B (13)	0.71
41	Capitol Blvd/Israel Rd	Signal	C (25)	0.85
42	66 <sup>th</sup> Ave/Black Lake Belmore Rd	TWSC	B (12)	0.25
43	Kirsop Rd/66 <sup>th</sup> Ave	TWSC	B (15)	0.28
44	Littlerock Rd/Odegard Rd	RAB	A (5)	0.68
45	Littlerock Rd/Israel Rd/70 <sup>th</sup> Ave	RAB	B (11)	0.76
46	Linderson Way/Israel Rd	Signal	B (19)	0.76
47	Littlerock Rd/Tumwater Blvd	RAB	A (8)	0.49
48	I-5 SB Ramps/Tumwater Blvd	Signal	B (13)	0.87
49	I-5 NB Ramps/Tumwater Blvd	TWSC	F (200+)	1.47
50	Linderson Way/Tumwater Blvd	Signal	D (37)	1.09
51	New Market St/Tumwater Blvd	RAB	A (5)	0.36
52	Capitol Blvd/Tumwater Blvd	Signal	D (39)	1.03
53	65 <sup>th</sup> Ave/Henderson Blvd	Signal	A (8)	0.74
54	Tumwater Blvd/Henderson Blvd	Signal	D (43)	0.99
55	Trails End Dr/Henderson Blvd	TWSC	C (15)	0.27
56	Littlerock Rd/Black Hills School Drwy	Signal	A (3)	0.38
57	Center St/76 <sup>th</sup> Ave	TWSC	C (20)	0.24
58	Old Hwy 99/Henderson Blvd	Signal	B (15)	0.75
59	Old Hwy 99/79 <sup>th</sup> Ave	TWSC	F (79)	0.25
60	Kimmie St/83 <sup>rd</sup> Ave	TWSC	A (10)	0.09
61	Center St/83 <sup>rd</sup> Ave	TWSC	B (13)	0.41
62	Old Hwy 99/88 <sup>th</sup> Ave	Signal	B (12)	0.79
63	I-5 SB Ramps/93 <sup>rd</sup> Ave	Signal	C (22)	0.88
64	I-5 NB Ramps/93 <sup>rd</sup> Ave	TWSC	B (14)	0.35
65	Kimmie St/93 <sup>rd</sup> Ave	TWSC	C (25)	0.28
66	Case Rd/93 <sup>rd</sup> Ave	AWSC	E (43)	1.00
67	Tilley Rd (South)/93 <sup>rd</sup> Ave	AWSC	C (25)	0.84
68	Tilley Rd (North)/93 <sup>rd</sup> Ave	TWSC	C (18)	0.34
69	Old Hwy 99/93 <sup>rd</sup> Ave	TWSC	C (20)	0.45

1. Due to the unique nature of this intersection control, HCM cannot be used to calculate delay. Sim-Traffic simulation was used to calculate average delay.
2. HCM 2000 was used at this signal because the shared through-left lane is not accurately analyzed in HCM 2010.
3. This intersection is being graded based on the known congestion along Capitol Boulevard as a result of the signal.

Based on this analysis, the following intersections are projected to operate at an LOS E or worse by 2022:

- 6) Black Lake Boulevard at Black Lake Belmore
- 15) Boston Street at Custer Way
- 16) Deschutes Way at Boston St
- 18) Custer Way at Capitol Boulevard
- 19) Custer Way/North Street at Cleveland Avenue
- 25) 2<sup>nd</sup> Avenue at Linwood Avenue
- 27) Henderson Boulevard at Yelm Highway
- 49) I-5 NB Ramps at Tumwater Boulevard
- 59) Old Highway 99 at 79<sup>th</sup> Avenue
- 66) Case Road at 93<sup>rd</sup> Avenue

Each of these intersections has an improvement identified in the 2040 improvement package that will accommodate the 2022 traffic volumes.

## 4. PROJECT COST ESTIMATES

### 4.1 PLANNING LEVEL ROADWAY PROJECT COST ESTIMATES

Planning level cost estimates were developed using eight elements:

- Preparation
- Roadwork
- Construction Staging
- Right-of-Way
- Environmental
- Utilities
- Engineering
- Permitting

Preparation and Roadwork element estimates were developed by using WSDOT unit bid data and current comparable project bid data. This data was organized to estimate standard project items in basic units: linear feet, square feet and cubic feet. Projects were then measured in GIS and CAD software to estimate each item.

Construction Staging was estimated by using a percentage of the Roadwork estimation based on three different levels:

- Typical Construction (5%) – Typical construction using simple stages and efficient construction practices.
- Staging (20%) – Moderately complex construction that will require more complex staging to complete construction.
- Difficult/Inefficient (35%) – Difficult or inefficient construction that will require complex staging and atypical construction practices to complete.

The Right-of-Way element was estimated using data from Thurston County's Geodata GIS data base. Right-of-Way impact was measured to evaluate how many parcels could be affected by the project. Geodata was used to create an average cost per square foot of the affected parcels. This cost per square foot was combined with typical Right-of-Way acquisition fees to develop the total Right-of-Way cost estimate.

Environmental and Utilities elements were estimated using different levels of risk associated with a percentage of the Roadwork estimation: low (5%), medium (10%) and high (20). This risk was calculated by viewing aerial images and assessing risk of environmental and utilities impact.

The Engineering element was estimated by using industry standards of 15% of construction costs for design and 10% of construction costs for construction engineering.

Permitting was estimated by assuming City specific projects would require 3% of construction costs. Projects involving WSDOT were estimated to require an additional 10% of construction costs for permitting.

A 30% conceptual contingency was included in each project estimate.

The planning level cost estimates for roadway projects is provided in **Table 7**.

## 4.2 PLANNING LEVEL INTERSECTION PROJECT COST ESTIMATES

Planning level intersection cost estimates were developed using WSDOT unit bid data and current comparable project construction cost data. Each intersection was evaluated using aerial images to determine size and type of intersection improvements. Based on the type of intersection improvements, potential Right-of-Way acquisition area was calculated. Potential Right-of-Way acquisition and size of intersection improvements were compared to recent intersection project construction cost information to develop intersection cost estimates.

The planning level cost estimates for intersections are provided in **Table 8**. A summary of the total Capital Improvements is provided in **Table 9**.



**Table 7. Planning Level Cost Estimates – Roadway Projects**

<b>Project Number</b>	<b>Project</b>	<b>Total Cost</b>
R-1	Littlerock Road	\$8,470,000
R-2	Tyee Drive <sup>1</sup>	\$4,800,000
R-3	Tyee Drive	\$7,000,000
R-4	Tyee Drive	\$6,770,000
R-5	Tyee Drive	\$9,220,000
R-6	Trosper Road	\$1,050,000
R-7	Tumwater Boulevard	\$6,540,000
R-8	Tumwater Boulevard	\$15,425,793
R-9	Tumwater Boulevard	\$2,370,000
R-10	E Street	\$37,790,000
R-11	Old Highway 99 <sup>1</sup>	\$610,000
R-12	Old Highway 99	\$20,270,000
R-13	Old Highway 99	\$10,090,000
R-14	Henderson Boulevard	\$3,970,000
R-15	Henderson Boulevard	\$8,840,000
R-16	32 <sup>nd</sup> Street <sup>2</sup>	\$7,770,000
R-17	70 <sup>th</sup> Street <sup>2</sup>	\$3,700,000
R-18	73 <sup>rd</sup> Street <sup>2</sup>	\$9,640,000
R-19	Prine Drive <sup>2</sup>	\$5,730,000
R-20	93 <sup>rd</sup> Avenue	\$2,140,000
R-21	93 <sup>rd</sup> Avenue	\$4,410,000
R-22	93 <sup>rd</sup> Avenue	\$9,770,000
R-23	93 <sup>rd</sup> Avenue	\$3,400,000
R-24	93 <sup>rd</sup> Avenue	\$10,810,000
R-25	6 <sup>th</sup> Avenue	\$5,800,000
R-26	Custer Way	\$290,000
R-27	Capitol Boulevard	\$1,030,000
R-28	Capitol Boulevard	\$1,030,000
R-29	Capitol Boulevard	\$3,340,000
R-30	New North/South Street	\$2,740,000
R-31	Odegard Road	\$3,610,000
R-32	Bishop Road	\$937,792
R-33	73 <sup>rd</sup> /66 <sup>th</sup> Connector <sup>2</sup>	\$6,030,000
R-34	New Market Street	\$4,040,000
R-35	Town Center Connector	\$3,480,000
R-36	72 <sup>nd</sup> Avenue	\$5,360,000
R-37	Doelman Property <sup>2</sup>	\$22,260,000
R-38	Trosper Road Interchange	\$5,650,000
R-39	Deschutes Way	\$2,850,000
<b>TOTAL</b>		<b>\$269,033,585</b>

1. Project is already funded
2. Projected expected to be developer funded

**Table 8. Planning Level Cost Estimates – Intersection Projects**

<b>Project Number</b>	<b>Project</b>	<b>Total Cost</b>
I-1	Black Lake Belmore/Black Lake Blvd	\$2,500,000
I-2	Capitol Blvd/Carlyon Ave	\$3,500,000
I-3	2 <sup>nd</sup> Ave/Custer Way	\$100,000
I-4	Boston St/Custer Way	\$4,000,000
I-5	Deschutes Way/Boston St	\$500,000
I-6	Capitol Blvd/Cleveland Ave	\$3,500,000
I-7	Capitol Blvd/Custer Way	\$3,500,000
I-8	Cleveland Ave/Custer Way/North St	\$4,500,000
I-9	Linwood Ave/2 <sup>nd</sup> Ave	\$2,500,000
I-10	Capitol Blvd/Linwood Ave	\$2,500,000
I-11	Henderson Blvd/Yelm Hwy	\$2,500,000
I-12	Trosper Rd/Rural Rd	\$500,000
I-13	Trosper Rd/2 <sup>nd</sup> Ave/Littlerock Rd	\$2,500,000
I-14	Trosper Rd/Tyee Dr/SB I-5 Ramps	\$2,500,000
I-15	Trosper Rd/Capitol Blvd	\$6,000,000
I-16	T St/Capitol Blvd	\$5,500,000
I-17	X St/Capitol Blvd	\$4,000,000
I-18	Dennis St/Capitol Blvd	\$3,000,000
I-19	Old Hwy 99/79 <sup>th</sup> Ave	\$2,000,000
I-20	93 <sup>rd</sup> Ave/I-5 NB Ramps	\$500,000
I-21	93 <sup>rd</sup> Ave/Kimmie St	\$500,000
I-22	93 <sup>rd</sup> Ave/Case Rd	\$2,500,000
I-23	93 <sup>rd</sup> Ave/Tilley Rd (south)	\$2,500,000
I-24	93 <sup>rd</sup> Ave/Tilley Rd (north)	\$2,500,000
I-25	93 <sup>rd</sup> Ave/Old Hwy 99	\$2,500,000
<b>TOTAL</b>		<b>\$66,100,000</b>

**Table 9. Planning Level Cost Estimates – Cost Summary**

Total Roadway Cost	\$269,033,585
Total Intersection Cost	\$66,100,000
<b>Total Cost</b>	<b>\$335,133,585</b>
Developer Funded/ Already Funded	-\$60,540,000
<b>Potential Cost for City</b>	<b>\$274,593,585</b>

---

**APPENDIX A-1**  
**TURNING MOVEMENT COUNTS**

---



Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2Inc.com

WB:RDRE

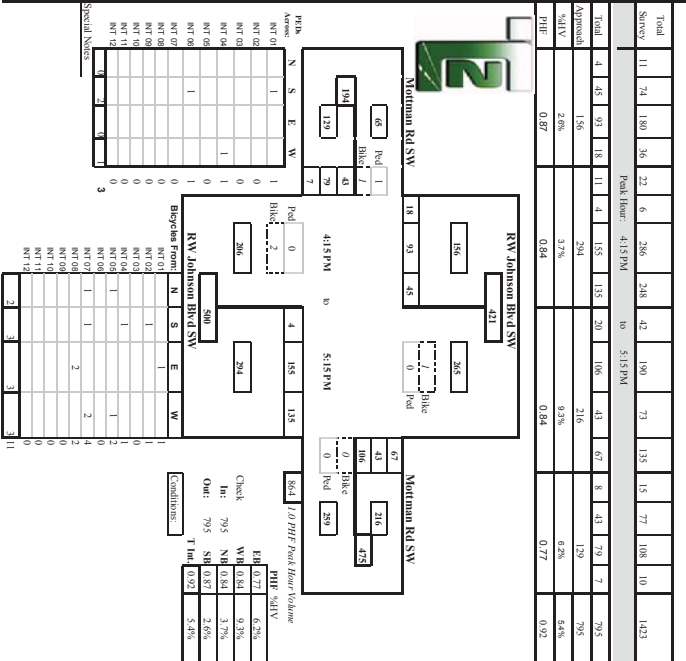
Location: RV Johnson Blvd SW & Madman Rd SW

Turnpike, Washington

Date of Count: Tues 6/30/2015

Checked By: Jess

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
4:15 P	4	7	23	9	44
4:30 P	2	17	23	5	51
4:45 P	1	8	19	2	31
5:00 P	0	9	23	5	44
5:15 P	1	11	25	6	44
5:30 P	0	9	15	3	30
5:45 P	1	9	24	4	39
6:00 P	2	4	26	2	35
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>11</b>	<b>74</b>	<b>180</b>	<b>36</b>	<b>222</b>
<b>Approach</b>	<b>136</b>	<b>18</b>	<b>11</b>	<b>4</b>	<b>158</b>
<b>%DIV</b>	<b>2.8%</b>	<b>0.4%</b>	<b>0.2%</b>	<b>0.1%</b>	<b>2.5%</b>
<b>PIF</b>	<b>0.87</b>	<b>0.84</b>	<b>0.84</b>	<b>0.84</b>	<b>0.84</b>



Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2Inc.com

WB:RDRE

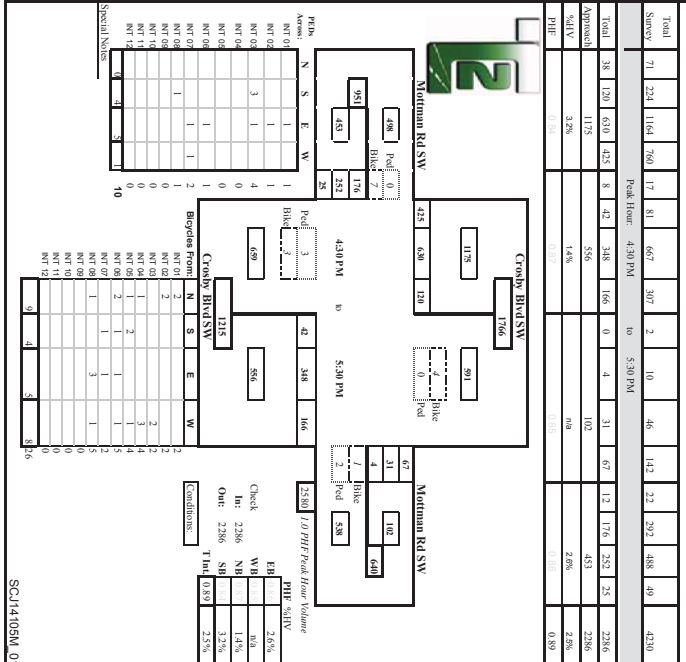
Location: Crosby Blvd SW & Madman Rd SW

Turnpike, Washington

Date of Count: Wed 10/08/2014

Checked By: Jess

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
4:15 P	10	23	131	90	254
4:30 P	11	30	123	90	254
4:45 P	16	21	133	86	256
5:00 P	10	28	143	82	263
5:15 P	7	37	169	125	338
5:30 P	5	34	185	123	347
5:45 P	5	30	152	71	258
6:00 P	7	21	128	84	240
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>71</b>	<b>224</b>	<b>1164</b>	<b>760</b>	<b>1719</b>
<b>Approach</b>	<b>1275</b>	<b>558</b>	<b>1449</b>	<b>789</b>	<b>2981</b>
<b>%DIV</b>	<b>2.2%</b>	<b>1.6%</b>	<b>4.2%</b>	<b>2.3%</b>	<b>2.8%</b>
<b>PIF</b>	<b>0.89</b>	<b>0.89</b>	<b>0.89</b>	<b>0.89</b>	<b>0.89</b>



SCJ14105W\_01D



Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 923-7211 E-Mail: Tam@TCCinc.com

WB/DRB

Location: Crosby Blvd SW & Irving St SW  
 Turnover, Washington

Date of Count: Wed 10/08/2014  
 Checked By: Jess

Time Interval	From North on (SB)				From South on (NB)				From East on (WB)				From West on (EB)				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
Endural	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	4
4:15 P	3	48	38	13	2	1	60	3	1	3	3	44	1	32	8	2	300
4:30 P	2	34	80	8	1	1	62	2	0	3	2	43	3	21	1	1	238
4:45 P	2	35	84	15	1	2	62	3	0	4	2	45	0	19	3	2	286
5:00 P	3	43	82	23	1	3	54	2	0	9	8	35	4	23	5	3	290
5:15 P	3	46	109	23	0	7	84	8	0	6	12	49	0	24	8	3	359
5:30 P	2	54	113	30	1	13	79	3	1	3	12	44	3	16	2	3	352
5:45 P	3	38	120	20	1	3	73	1	0	8	4	38	2	10	4	7	326
6:00 P	1	36	78	19	1	4	65	4	0	2	4	34	3	14	0	6	266
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>19</b>	<b>309</b>	<b>764</b>	<b>151</b>	<b>8</b>	<b>34</b>	<b>519</b>	<b>26</b>	<b>2</b>	<b>38</b>	<b>47</b>	<b>312</b>	<b>16</b>	<b>159</b>	<b>31</b>	<b>27</b>	<b>2457</b>

Total	Peak Hour: 4:45 PM				Total
	T	L	S	R	
161	424	96	3	26	290
681	310	228	108	1347	
%HV	0.9%	0.9%	0.9%	0.9%	
PIF	0.03	0.03	0.03	0.89	



Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 923-7211 E-Mail: Tam@TCCinc.com

WB/DRB

Location: 7th Ave SW & Irving St  
 Turnover, Washington

Date of Count: Tues 6/30/2015  
 Checked By: Jess

Time Interval	From North on (SB)				From South on (NB)				From East on (WB)				From West on (EB)				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
Endural	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	4
4:15 P	0	0	0	0	1	40	1	1	0	0	1	0	0	1	0	0	6
4:30 P	0	0	0	0	0	46	0	0	0	1	9	1	0	0	0	6	39
4:45 P	0	0	0	0	1	46	0	0	0	1	3	1	1	1	1	5	29
5:00 P	0	0	0	0	0	50	1	1	1	1	1	0	1	0	0	3	49
5:15 P	0	0	0	0	2	57	0	0	0	0	2	0	0	0	1	3	49
5:30 P	0	0	0	0	1	47	1	0	0	0	5	0	0	0	1	2	45
5:45 P	0	0	0	0	1	41	2	0	0	0	6	0	0	3	2	23	87
6:00 P	0	0	0	0	2	49	1	1	0	0	6	1	1	1	1	4	30
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>354</b>	<b>6</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>37</b>	<b>4</b>	<b>3</b>	<b>8</b>	<b>33</b>	<b>299</b>	<b>759</b>

Total	Peak Hour: 4:45 PM				Total
	T	L	S	R	
0	4	1	173	4	181
8	178	20	183	388	
%HV	na	0.9%	na	0.86	
PIF	0.40	0.86	0.71	0.86	



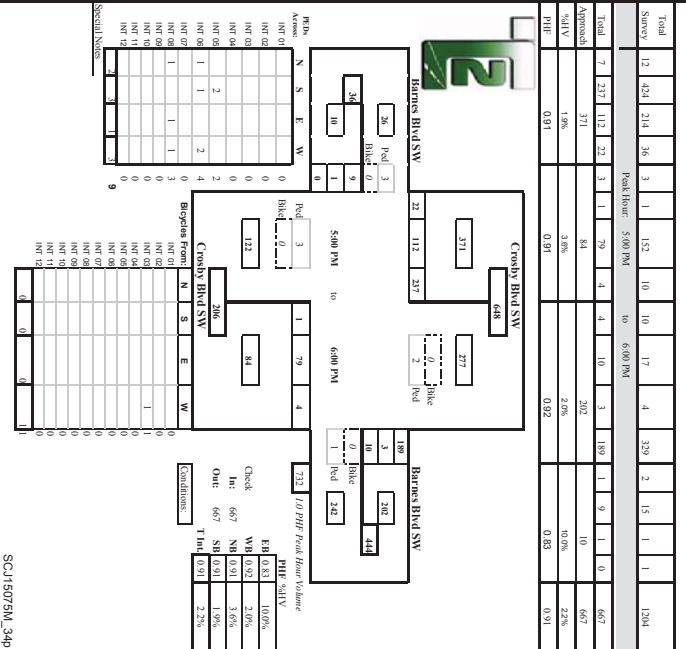


Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com  
 WBER/DRE

Intersection: Crosby Blvd SW & Barnes Blvd SW Date of Count: Tues 6/30/2015

Location: Tamworth, Washington Checked By: Jess

Time Interval	From North on (SB) Crosby Blvd SW			From South on (NB) Crosby Blvd SW			From East on (WB) Barnes Blvd SW			From West on (EB) Barnes Blvd SW			Interval Total																	
	T	L	S	T	L	S	T	L	S	T	L	S																		
4:15 P	2	45	25	3	0	0	20	1	2	2	2	1	46	1	3	0	147													
4:30 P	0	42	21	3	0	0	22	1	1	1	0	2	32	0	0	0	122													
4:45 P	2	42	29	3	0	0	17	2	0	2	0	0	29	0	2	0	127													
5:00 P	1	58	27	3	0	0	14	2	3	3	3	0	31	0	1	0	141													
5:15 P	2	45	28	5	2	0	14	2	0	4	2	2	40	0	2	0	142													
5:30 P	0	46	24	3	0	0	22	0	2	1	0	4	47	0	2	1	172													
5:45 P	3	63	24	3	0	0	22	1	0	3	0	0	50	0	2	0	170													
6:00 P	2	45	35	4	1	1	21	1	2	2	1	5	52	1	3	0	183													
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0													
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0													
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0													
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0													
<b>Total</b>	<b>12</b>	<b>424</b>	<b>214</b>	<b>36</b>	<b>3</b>	<b>1</b>	<b>152</b>	<b>10</b>	<b>17</b>	<b>4</b>	<b>239</b>	<b>2</b>	<b>15</b>	<b>1</b>	<b>1</b>	<b>1204</b>														
<b>Survey</b>	Peak Hour: 5:00 PM to 6:00 PM																													
<b>Approach</b>	7			27			112			22			112			277			189			202			10			667		
%LTIV	1.9%			3.0%			0.9%			0.9%			0.9%			0.9%			0.9%			10.0%			2.0%			0.9%		
PIEV	0.9%			0.9%			0.9%			0.9%			0.9%			0.9%			0.9%			0.9%			0.9%			0.9%		

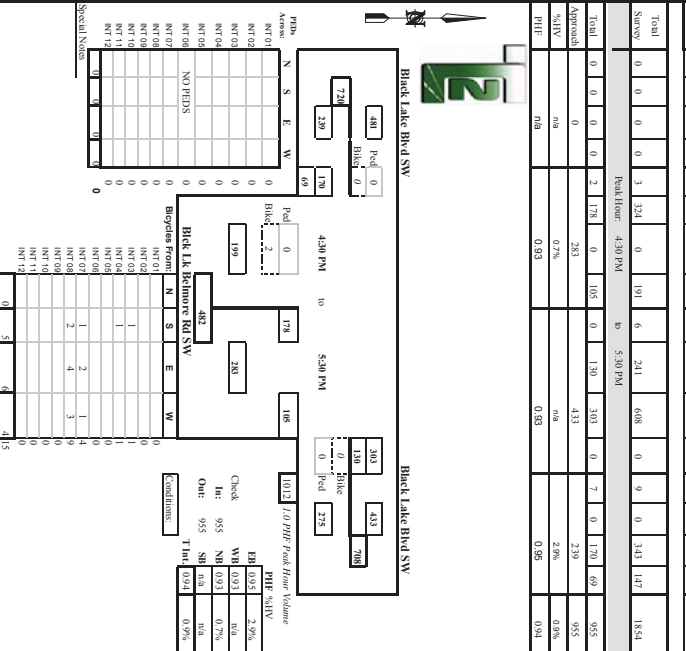


Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com  
 WBER/DRE

Intersection: Black Lake Balance Rd SW & Black Lake Blvd SW Date of Count: Tues 6/30/2015

Location: Tamworth, Washington Checked By: Jess

Time Interval	From North on (SB) Black Lake Rd SW			From South on (NB) Black Lake Rd SW			From East on (WB) Black Lake Blvd SW			From West on (EB) Black Lake Blvd SW			Interval Total																										
	T	L	S	T	L	S	T	L	S	T	L	S																											
4:15 P	0	0	0	0	0	0	13	2	31	64	0	0	31	21	191																								
4:30 P	0	0	0	0	0	0	15	0	32	1	32	71	0	2	46	27	243																						
4:45 P	0	0	0	0	0	0	47	0	29	0	37	75	0	2	0	43	17	248																					
5:00 P	0	0	0	0	0	0	34	0	27	0	35	67	0	1	0	44	12	219																					
5:15 P	0	0	0	0	0	0	41	0	29	0	25	77	0	1	0	44	19	255																					
5:30 P	0	0	0	0	0	0	56	0	20	0	33	84	0	3	0	59	21	253																					
5:45 P	0	0	0	0	0	0	38	0	18	3	20	81	0	0	0	42	16	215																					
6:00 P	0	0	0	0	0	0	40	0	23	0	28	89	0	0	0	54	14	248																					
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																					
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																					
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																					
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																					
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>324</b>	<b>0</b>	<b>191</b>	<b>6</b>	<b>241</b>	<b>608</b>	<b>0</b>	<b>9</b>	<b>0</b>	<b>343</b>	<b>147</b>	<b>1854</b>																					
<b>Survey</b>	Peak Hour: 4:30 PM to 5:30 PM																																						
<b>Approach</b>	0			0			2			178			0			105			0			130			303			7			170			69			955		
%LTIV	0			0			0.7%			0.7%			0.7%			0.7%			0.7%			2.9%			0.9%			0.9%			0.9%								
PIEV	n/a			n/a			0.93			0.93			0.93			0.93			0.93			0.95			0.95			0.95			0.94								





Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2Inc.com

WB0308E

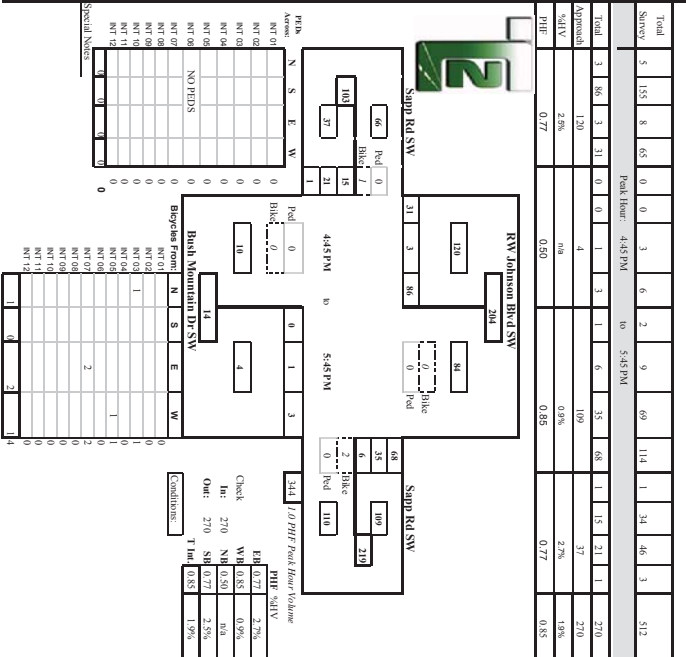
Intersection: RV Johnson Blvd SW/Brush Mountain Dr SW & Sapp Rd SW

Location: Tumwater, Washington

Date of Count: Tues 6/30/2015

Checked By: Jess

Time	From North on (S9)			From South on (N9)			From East on (WB)			From West on (EB)			Interval					
Ending at	T	L	S	T	L	S	T	L	S	T	L	S	Total					
4:15 P	1	24	2	14	0	0	2	0	0	9	18	0	3	14	0	86		
4:30 P	0	14	2	7	0	0	1	0	1	7	10	0	4	6	0	52		
4:45 P	1	16	0	8	0	0	0	0	0	5	12	0	6	5	0	52		
5:00 P	0	10	1	7	0	0	0	0	1	1	5	1	2	4	0	55		
5:15 P	1	28	1	10	0	0	1	1	0	2	9	15	0	3	8	1	79	
5:30 P	1	13	0	8	0	0	0	0	0	2	10	17	0	5	5	0	60	
5:45 P	1	26	1	6	0	0	0	2	0	11	20	0	5	4	0	76		
6:00 P	0	15	1	5	0	0	1	1	0	2	13	6	0	6	0	2	52	
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<b>Total</b>	<b>5</b>	<b>155</b>	<b>8</b>	<b>65</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>6</b>	<b>2</b>	<b>69</b>	<b>114</b>	<b>1</b>	<b>34</b>	<b>46</b>	<b>3</b>	<b>512</b>		
<b>Survey</b>	Peak Hour: 4:45 PM to 5:45 PM																	
<b>Total</b>	<b>3</b>	<b>86</b>	<b>3</b>	<b>31</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>6</b>	<b>35</b>	<b>68</b>	<b>1</b>	<b>15</b>	<b>21</b>	<b>1</b>	<b>270</b>	
<b>Approach</b>	130			109			199			37			198			404		
<b>%HV</b>	2.9%			0.9%			2.7%			0.9%			1.9%			4.7%		
<b>PIF</b>	0.77			0.50			0.85			0.77			0.85			0.85		



Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2Inc.com

WB0308E

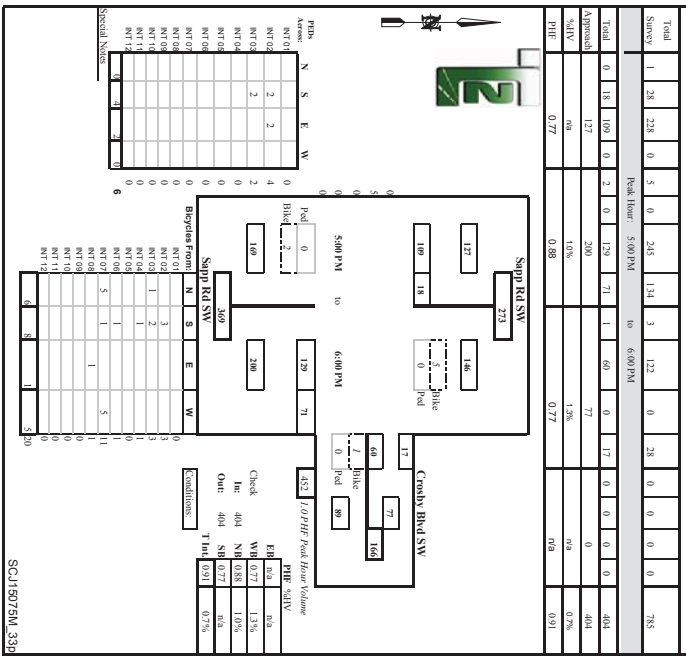
Intersection: Sapp Rd SW & Crosby Blvd SW

Location: Tumwater, Washington

Date of Count: Tues 6/30/2015

Checked By: Jess

Time	From North on (S9)			From South on (N9)			From East on (WB)			From West on (EB)			Interval					
Ending at	T	L	S	T	L	S	T	L	S	T	L	S	Total					
4:15 P	1	6	4	0	0	0	34	13	1	14	0	2	0	0	0	113		
4:30 P	0	2	24	0	2	0	30	23	0	16	0	4	0	0	0	99		
4:45 P	0	2	29	0	0	0	24	15	0	10	0	3	0	0	0	83		
5:00 P	0	0	22	0	1	0	28	12	1	22	0	2	0	0	0	86		
5:15 P	0	4	37	0	2	0	32	13	0	20	0	5	0	0	0	111		
5:30 P	0	6	24	0	0	0	36	21	0	17	0	3	0	0	0	107		
5:45 P	0	4	27	0	0	0	30	25	1	11	0	4	0	0	0	99		
6:00 P	0	4	21	0	0	0	31	14	0	12	0	5	0	0	0	87		
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<b>Total</b>	<b>1</b>	<b>28</b>	<b>238</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>245</b>	<b>134</b>	<b>3</b>	<b>122</b>	<b>0</b>	<b>28</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>785</b>		
<b>Survey</b>	Peak Hour: 5:00 PM to 6:00 PM																	
<b>Total</b>	<b>0</b>	<b>18</b>	<b>109</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>129</b>	<b>71</b>	<b>1</b>	<b>60</b>	<b>0</b>	<b>17</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>404</b>		
<b>Approach</b>	127			200			1496			77			0			404		
<b>%HV</b>	4.0%			1.0%			4.9%			0.2%			0.0%			4.7%		
<b>PIF</b>	0.77			0.88			0.77			0.77			0.8			0.91		



SCJ19075M\_339



Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 923-7211 E-Mail: Team@TC2inc.com

WBED:DBE

Date of Count: Tues 6/30/2015

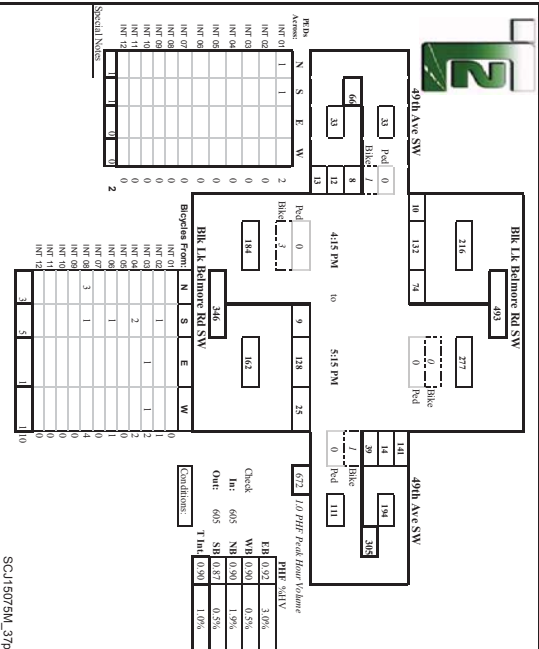
Checked By: Jess

Intersection: Black Lake Rd SW & 49th Ave SW

Location: Tumwater, Washington

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Total
4:15 P	2	18	29	2	51
4:30 P	1	21	36	5	63
4:45 P	0	24	34	2	60
5:00 P	0	16	29	2	47
5:15 P	0	13	33	1	47
5:30 P	1	18	34	1	54
5:45 P	0	11	25	1	37
6:00 P	0	10	16	1	27
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>4</b>	<b>131</b>	<b>236</b>	<b>20</b>	<b>491</b>
<b>Survey</b>	<b>4</b>	<b>131</b>	<b>236</b>	<b>20</b>	<b>491</b>

Approach	SB	NB	WB	EB	Total
SB	4	0	0	0	4
NB	131	236	20	0	387
WB	0	0	236	20	256
EB	0	0	0	20	20
<b>Total</b>	<b>135</b>	<b>236</b>	<b>256</b>	<b>20</b>	<b>647</b>



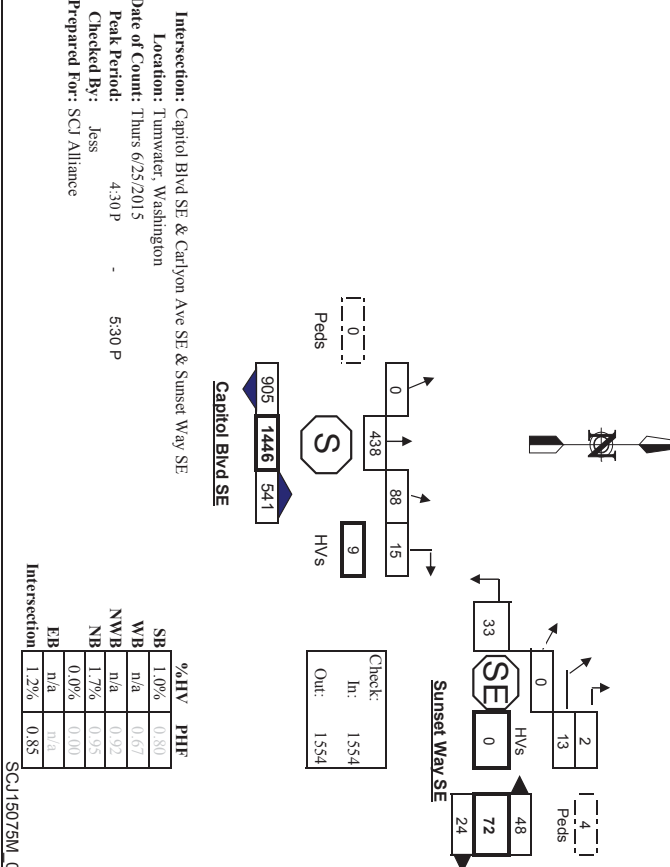
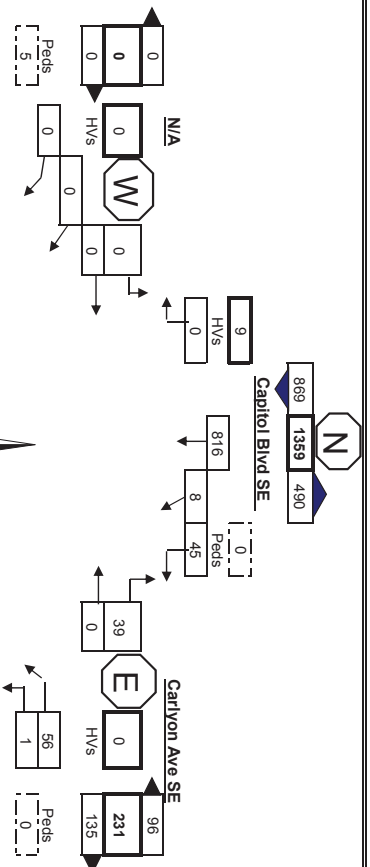
Traffic Count Consultants, Inc.

Phone: (425) 253 926-6009

E-Mail: Team@TC2inc.com

DBE/WBE

DBE/WBE



SCJ15075M\_01p



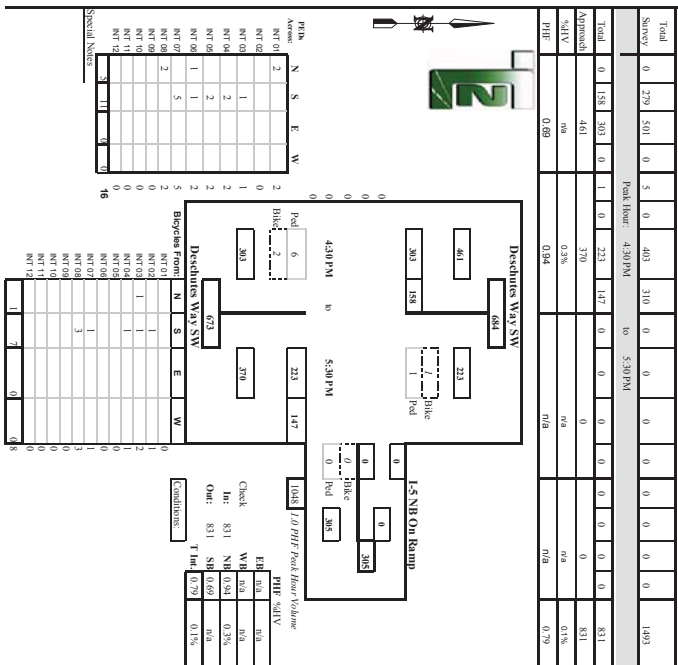


Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: [Team@TC2inc.com](mailto:Team@TC2inc.com)  
 WRE/DRE

Date of Count: Wed 7/01/2015  
 Checked By: Jess

**Intersection:** Deshutes Way SW & I-5 NB On Ramp  
**Location:** Tumwater, Washington

Time Interval	From North on (SB) Deshutes Way SW	From South on (NB) Deshutes Way SW	From East on (WB) I-5 NB On Ramp	From West on (EB) 0	Interval Total
Endural	1	1	1	1	4
4:15 P	38	49	0	0	87
4:30 P	0	25	53	0	78
4:45 P	0	32	71	0	103
5:00 P	0	27	48	0	75
5:15 P	0	64	103	0	167
5:30 P	0	35	81	0	116
5:45 P	0	34	51	0	85
6:00 P	0	24	45	0	69
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
Total	0	279	500	0	779
Survey	0	279	500	0	779
Peak Hour: 4:30 PM to 5:30 PM	0	403	310	0	713
Total	0	158	303	0	461
Approach	461	0	0	0	461
%HV	na	0.2%	na	na	0.1%
PIF	0.89	0.84	na	na	0.79

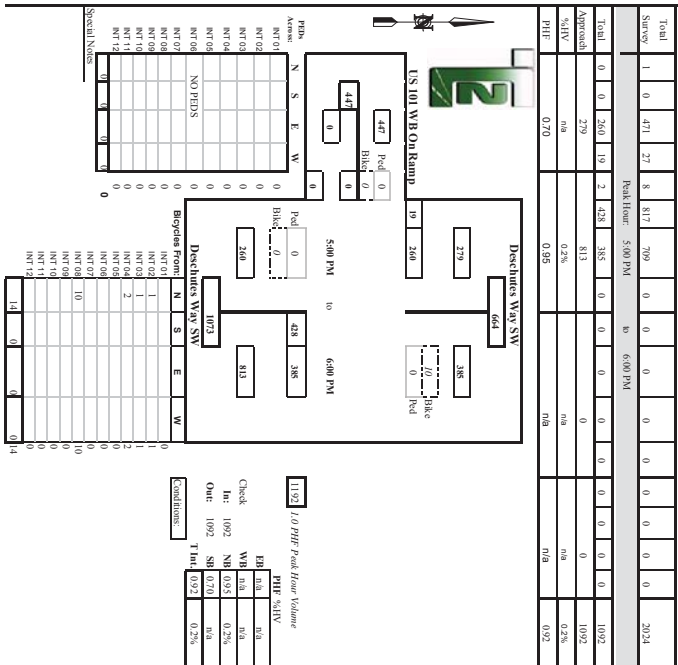


Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: [Team@TC2inc.com](mailto:Team@TC2inc.com)  
 WRE/DRE

Date of Count: Wed 7/01/2015  
 Checked By: Jess

**Intersection:** Deshutes Way SW & US 101 WB On Ramp  
**Location:** Tumwater, Washington

Time Interval	From North on (SB) Deshutes Way SW	From South on (NB) Deshutes Way SW	From East on (WB) US 101 WB On Ramp	From West on (EB) 0	Interval Total
Endural	1	1	1	1	4
4:15 P	0	0	47	0	47
4:30 P	0	0	38	67	105
4:45 P	0	0	72	89	161
5:00 P	0	0	47	4	51
5:15 P	0	0	92	7	99
5:30 P	0	0	76	5	81
5:45 P	0	0	48	3	51
6:00 P	0	0	43	4	47
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
Total	0	0	471	27	498
Survey	0	0	471	27	498
Peak Hour: 5:00 PM to 6:00 PM	0	0	817	79	896
Total	0	0	260	19	279
Approach	279	0	0	0	279
%HV	na	0.2%	na	na	0.2%
PIF	0.70	0.85	na	na	0.92





Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**

Phone: (253) 924-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBED/DB

Intersection: I-5 SB/US 101 EB Off Ramps, N 2nd Ave SW & Desoto St SW

Date of Count: Tues 6/30/2015

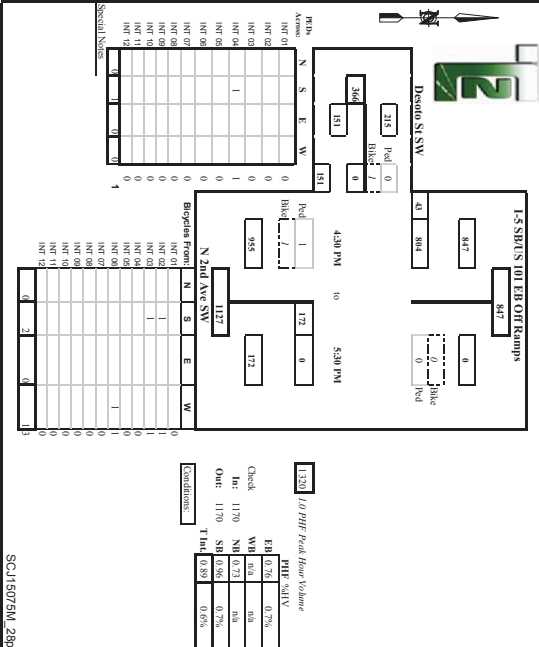
Location: Tumwater, Washington

Checked By: Jess

Time Interval	From North on (SB) N 2nd Ave SW	From South on (NB) N 2nd Ave SW	From East on (WB) Desoto St SW	From West on (EB) Desoto St SW	Interval Total
4:15 P	1	0	0	0	1
4:30 P	1	0	0	0	1
4:45 P	0	0	0	0	0
5:00 P	1	0	0	0	1
5:15 P	1	0	0	0	1
5:30 P	4	0	0	0	4
5:45 P	1	0	0	0	1
6:00 P	0	0	0	0	0
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2247</b>

Approach	SB	NB	WB	EB
SB	0.79%	0%	0%	0%
NB	0.98%	0%	0%	0%
WB	0.78%	0%	0%	0%
EB	0.78%	0%	0%	0%
<b>Total</b>	<b>0.98%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>



Prepared for: **TENW**  
**Traffic Count Consultants, Inc.**

Phone: (253) 924-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBED/DB

Intersection: N 2nd Ave SW & Carter Way SW

Date of Count: Tues 2/10/2015

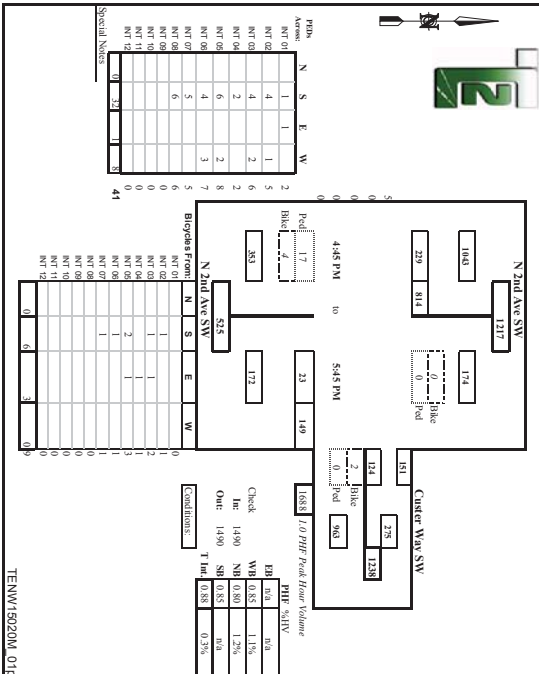
Location: Tumwater, Washington

Checked By: Jess

Time Interval	From North on (SB) N 2nd Ave SW	From South on (NB) N 2nd Ave SW	From East on (WB) Carter Way SW	From West on (EB) Carter Way SW	Interval Total
4:15 P	1	213	47	0	261
4:30 P	3	199	68	0	270
4:45 P	0	186	45	0	231
5:00 P	0	200	51	0	251
5:15 P	0	186	55	0	241
5:30 P	0	240	65	0	305
5:45 P	0	188	58	0	246
6:00 P	0	160	50	0	210
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>4</b>	<b>1574</b>	<b>439</b>	<b>0</b>	<b>2318</b>

Approach	SB	NB	WB	EB
SB	0.04%	0%	0%	0%
NB	0.68%	0%	0%	0%
WB	0.19%	0%	0%	0%
EB	0%	0%	0%	0%
<b>Total</b>	<b>0.91%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>





Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-6099 FAX: (253) 922-7211 E-Mail: Team@TC2Inc.com

WB/E/DBE

Date of Count: Thurs 02/25/2015

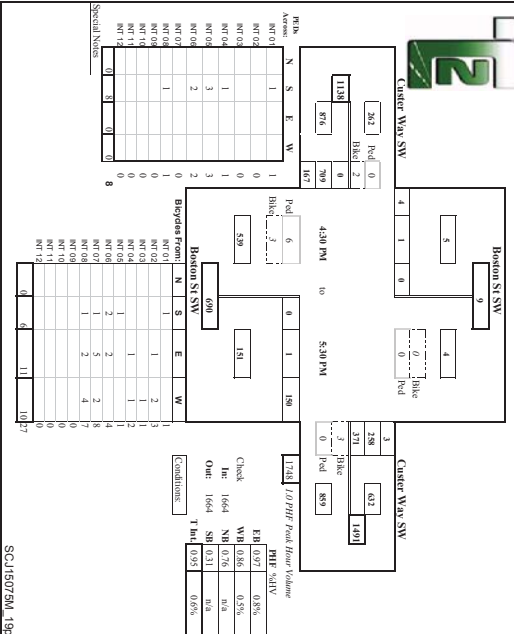
Intersection: Boston St SW & Carter Way SW  
 Location: Turnpike, Washington

Checked By: Jess

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
4:15 P	0	0	0	0	0
4:30 P	0	0	0	0	0
4:45 P	0	0	0	0	0
5:00 P	0	0	0	0	0
5:15 P	0	0	0	0	0
5:30 P	0	0	0	0	0
5:45 P	0	0	0	0	0
6:00 P	0	0	0	0	0
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Total Surveys	0	1	6	0	0	2	271	9	784	460	4	10	1	1272	299	3170
Peak Hour: 4:30 PM	to 5:30 PM															

Approach	5	181	637	876	1664
SAHV	0.96	0.96	0.96	0.96	0.96
PHV	0.371	0.78	0.98	0.97	0.95



Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-6099 FAX: (253) 922-7211 E-Mail: Team@TC2Inc.com

WB/E/DBE

Date of Count: Wed 7/01/2015

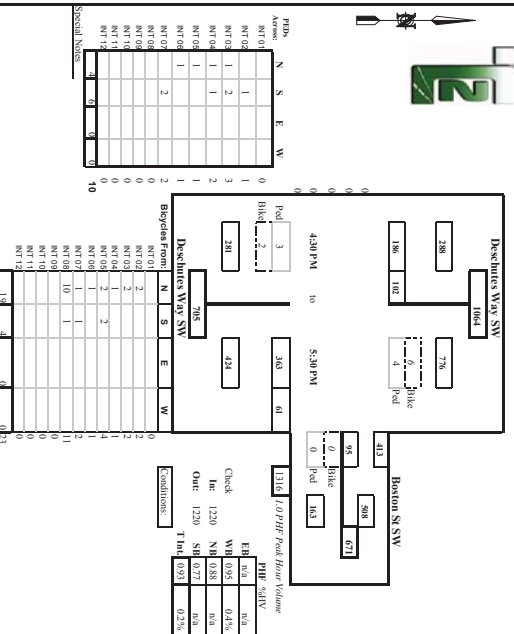
Intersection: Deshutes Way SW & Boston St SW  
 Location: Turnpike, Washington

Checked By: Jess

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
4:15 P	1	14	29	0	44
4:30 P	0	19	30	0	49
4:45 P	0	21	50	0	71
5:00 P	0	17	31	0	48
5:15 P	0	36	57	0	93
5:30 P	0	38	48	0	86
5:45 P	0	12	37	0	49
6:00 P	0	10	33	0	43
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>1</b>	<b>127</b>	<b>315</b>	<b>0</b>	<b>443</b>

Total Surveys	1	127	315	0	4	0	700	108	4	174	0	823	0	0	0	2276
Peak Hour: 4:30 PM	to 5:30 PM															

Approach	102	186	0	0	0	0	363	61	2	95	0	413	0	0	0	1230
SAHV	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
PHV	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77





Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
Phone: (253) 926-6009 FAX: (253) 923-2711 E-Mail: Team@TCCinc.com  
WB/DBE

WB/DBE

Date of Count: Thurs 6/25/2015

Checked By: Jess

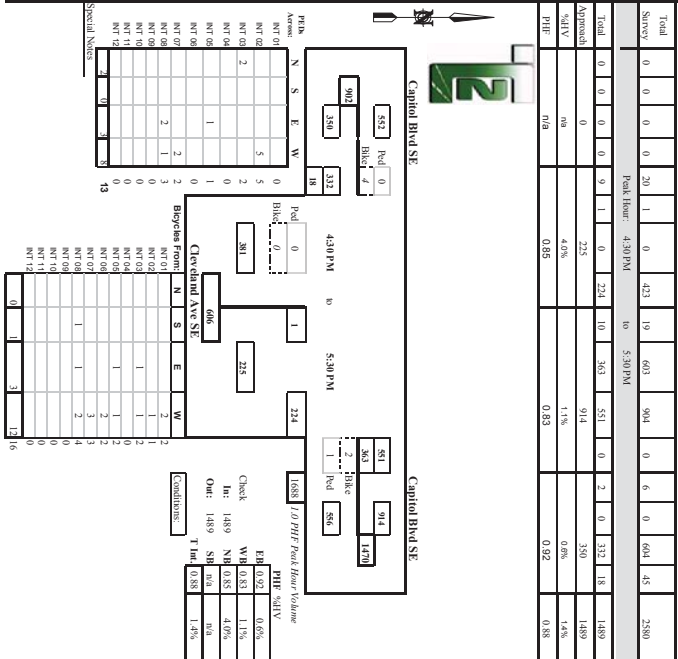
Intersection: Cleveland Ave SE & Capitol Blvd SE

Location: Tummwater, Washington

Time	From North on SB	From South on NB	From East on WB	From West on EB	Interval
Hour	T S R T L	T L S R	T T S R	T T L S	S R
4:15 P	0	0	4	0	2
4:30 P	0	0	3	0	0
4:45 P	0	0	3	0	0
5:00 P	0	0	2	0	0
5:15 P	0	0	1	0	0
5:30 P	0	0	3	1	0
5:45 P	0	0	0	0	0
6:00 P	0	0	0	0	0
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
Total	0	0	20	1	0
Show	0	0	423	19	603

Peak Hour	4:30 PM	to	5:30 PM
Total	0	0	9
Approach	0	225	914
%HV	n/a	4.9%	1.1%
PIF	n/a	0.85	0.83



Prepared for: **DBE/WBE**  
**Traffic Count Consultants, Inc.**  
Phone: (425) 253 926-6009 E-Mail: Team@TCCinc.com  
DBE/WBE

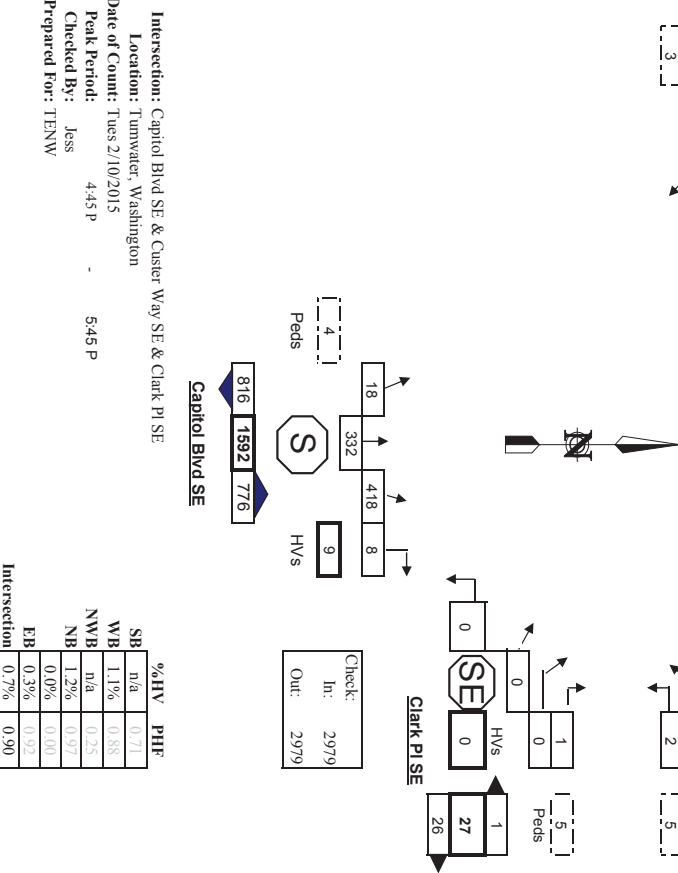
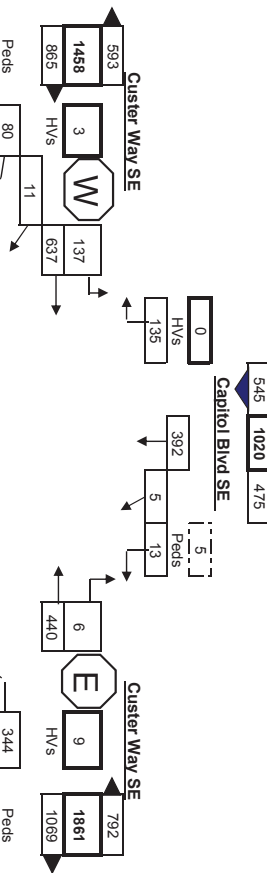
DBE/WBE

Date of Count: Tues 2/10/2015

Checked By: Jess

Intersection: Capitol Blvd SE & Customer Way SE

Location: Tummwater, Washington



TENW15020M\_02P

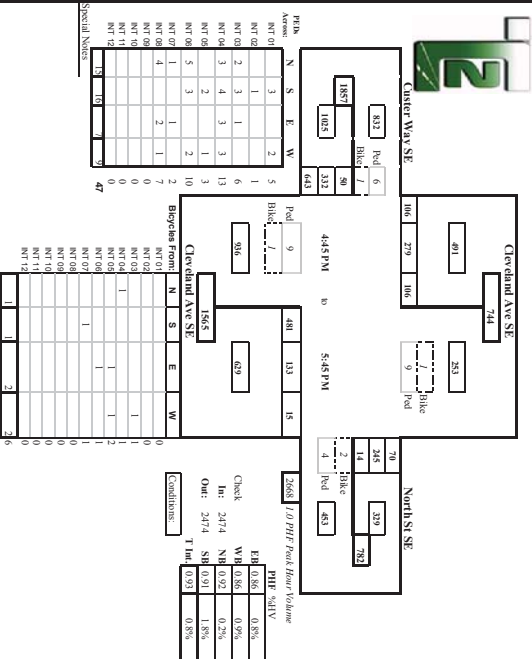


Prepared for: **TENW**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-6009 FAX: (253) 923-7211 E-Mail: Team@TC2inc.com  
 WRE030E

Intersection: Cleveland Ave SE & North St SE/Carter Way SE  
 Location: Turner, Washington

Date of Count: Tues 2/10/2015  
 Checked By: Jess

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
4:15 P	1	1	1	1	4
4:30 P	1	1	1	1	4
4:45 P	1	1	1	1	4
5:00 P	1	1	1	1	4
5:15 P	1	1	1	1	4
5:30 P	1	1	1	1	4
5:45 P	1	1	1	1	4
6:00 P	1	1	1	1	4
6:15 P	1	1	1	1	4
6:30 P	1	1	1	1	4
6:45 P	1	1	1	1	4
7:00 P	1	1	1	1	4
<b>Total</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>80</b>
<b>Survey</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
<b>Approach</b>	<b>4.91</b>	<b>4.91</b>	<b>4.91</b>	<b>4.91</b>	<b>19.64</b>
<b>SAHV</b>	<b>1.8%</b>	<b>1.8%</b>	<b>1.8%</b>	<b>1.8%</b>	<b>7.2%</b>
<b>PIF</b>	<b>0.91</b>	<b>0.91</b>	<b>0.91</b>	<b>0.91</b>	<b>3.64</b>

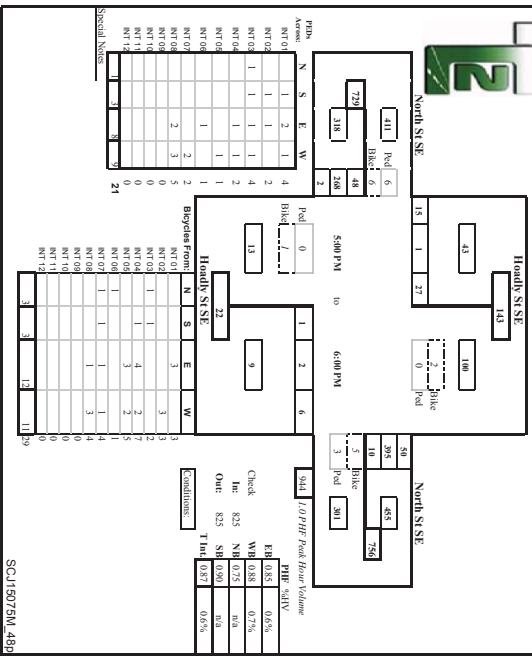


Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-6009 FAX: (253) 923-7211 E-Mail: Team@TC2inc.com  
 WRE030E

Intersection: Healdy St SE & North St SE  
 Location: Turner, Washington

Date of Count: Tues 6/23/2015  
 Checked By: Jess

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
4:15 P	0	0	0	0	0
4:30 P	0	0	0	0	0
4:45 P	0	0	0	0	0
5:00 P	0	0	0	0	0
5:15 P	0	0	0	0	0
5:30 P	0	0	0	0	0
5:45 P	0	0	0	0	0
6:00 P	0	0	0	0	0
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Survey</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>
<b>Approach</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>SAHV</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>
<b>PIF</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>



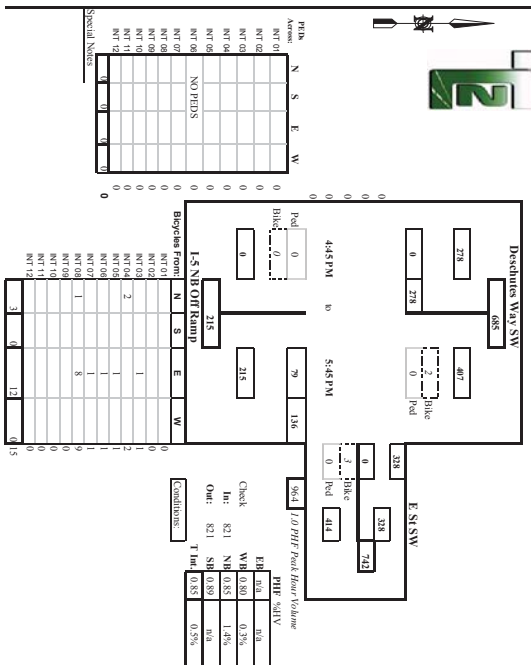


Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-6009 FAX: (253) 922-2711 E-Mail: Team@TCConsult.com

WB/DDBE  
 Date of Count: **Thursday 6/25/2015**  
 Checked By: **Jess**

Intersection: **Deputies Way SW 1.5 NB Off Ramp & E SWSW**  
 Location: **Tamuning, Washington**

Time Interval	From North on (SB)				From South on (NB)				From East on (WB)				From West on (EB)				Interval Total
	T	F	S	R	T	F	S	R	T	F	S	R	T	F	S	R	
Leading Interval	1	60	0	0	2	0	26	29	2	0	0	58	0	0	0	0	172
4:30 P	1	48	0	0	1	0	15	31	1	0	0	58	0	0	0	0	153
4:45 P	0	63	0	0	0	0	21	29	0	0	0	52	0	0	0	0	165
5:00 P	0	56	0	0	0	0	18	33	0	0	0	53	0	0	0	0	162
5:15 P	0	78	0	0	1	0	22	35	1	0	0	72	0	0	0	0	205
5:30 P	0	68	0	0	1	0	14	32	0	0	0	99	0	0	0	0	213
5:45 P	0	76	0	0	1	0	25	38	0	0	0	102	0	0	0	0	241
6:00 P	0	36	0	0	0	0	15	26	0	0	0	74	0	0	0	0	151
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	2	485	0	0	6	0	155	351	4	0	0	570	0	0	0	0	1561
<b>Survey</b>																	
<b>Peak Hour:</b> 4:45 PM to 5:45 PM																	
<b>Total</b>	0	278	0	0	3	0	79	156	1	0	0	255	0	0	0	0	821
<b>Approach</b>																	
MBLV	na	1.4%															0.2%
PIIF	0.89				0.85				0.80				na				0.85



Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-6009 FAX: (253) 922-2711 E-Mail: Team@TCConsult.com

WB/DDBE  
 Date of Count: **Thursday 6/25/2015**  
 Checked By: **Jess**

Intersection: **Capital Blvd SE & E SWSW**  
 Location: **Tamuning, Washington**

Time Interval	From North on (SB)				From South on (NB)				From East on (WB)				From West on (EB)				Interval Total
	T	F	S	R	T	F	S	R	T	F	S	R	T	F	S	R	
Leading Interval	1	191	437	72	2	210	444	132	0	115	91	131	2	90	88	252	2412
4:30 P	4	46	106	9	2	42	89	21	0	19	19	23	1	20	19	44	457
4:45 P	4	23	142	5	2	28	130	17	0	14	14	16	0	21	20	56	468
5:00 P	1	47	105	6	1	41	105	33	0	22	19	23	0	21	18	40	480
5:15 P	1	44	175	14	2	53	126	35	0	25	18	30	2	19	25	64	628
5:30 P	3	61	182	20	1	65	130	45	0	35	21	31	0	24	27	62	702
5:45 P	2	40	125	32	3	57	83	19	0	33	47	0	26	18	89	402	
6:00 P	1	76	116	22	1	38	97	23	0	22	24	30	0	23	8	59	468
6:15 P	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	18	329	1062	125	15	963	858	216	0	188	159	228	3	171	154	445	4295
<b>Survey</b>																	
<b>Peak Hour:</b> 4:45 PM to 5:45 PM																	
<b>Total</b>	7	191	587	72	7	210	444	132									2412
<b>Approach</b>																	
MBLV	0.6%				0.9%												0.2%
PIIF	0.91				0.82				0.75				0.91				0.86



SCJ15075M (40)





Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**

Phone: (253)924-6009 FAX: (253)922-7211 E-Mail: Team@TC2inc.com

WBEDB/E

Date of Count: **Thu 6/30/2015**

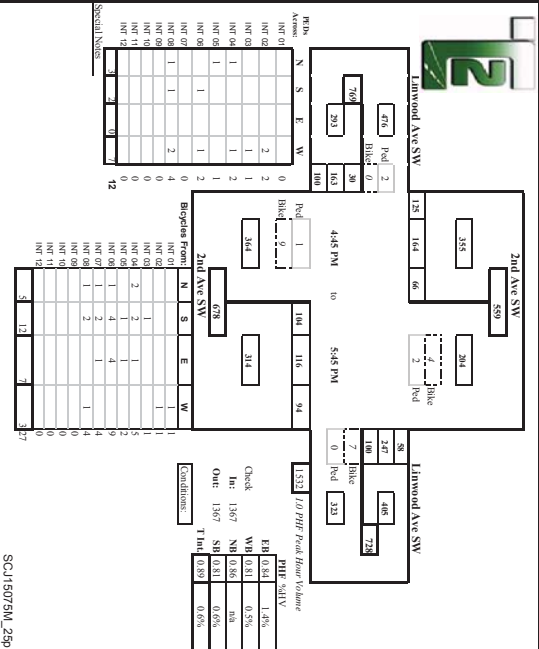
Checked By: **Jess**

Intersection: **2nd Ave SW & Linwood Ave SW**

Location: **Tamworth, Washington**

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total	
4:15 P	18	47	25	0	30	
4:30 P	1	8	41	25	0	25
4:45 P	0	21	37	26	1	26
5:00 P	1	13	37	24	0	23
5:15 P	0	16	40	29	0	29
5:30 P	1	24	46	39	0	39
5:45 P	0	12	42	35	0	35
6:00 P	1	9	25	32	0	37
6:15 P	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0
<b>Total</b>	<b>4</b>	<b>122</b>	<b>314</b>	<b>223</b>	<b>162</b>	<b>243</b>

Approach	%	PHV
Total	2.66	164
SB	0.96	59
NB	0.81	51



Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**

Phone: (253)924-6009 FAX: (253)922-7211 E-Mail: Team@TC2inc.com

WBEDB/E

Date of Count: **Thu 6/25/2015**

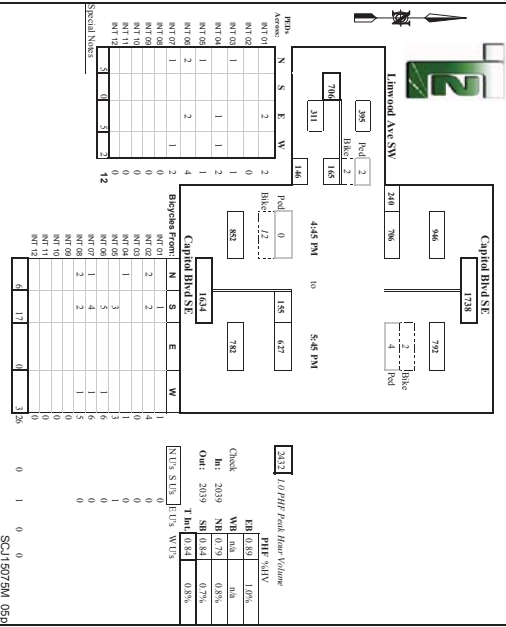
Checked By: **Jess**

Intersection: **Capitol Blvd SE & Linwood Ave SW**

Location: **Tamworth, Washington**

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total	
4:15 P	3	0	133	47	2	37
4:30 P	3	0	145	37	1	45
4:45 P	3	0	150	54	4	41
5:00 P	3	0	145	34	1	31
5:15 P	1	0	195	64	1	46
5:30 P	2	0	199	83	1	50
5:45 P	2	0	167	89	3	28
6:00 P	2	0	124	35	1	32
6:15 P	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0
<b>Total</b>	<b>17</b>	<b>0</b>	<b>1258</b>	<b>413</b>	<b>14</b>	<b>309</b>

Approach	%	PHV
Total	7	706
SB	0.76	46
NB	0.69	41





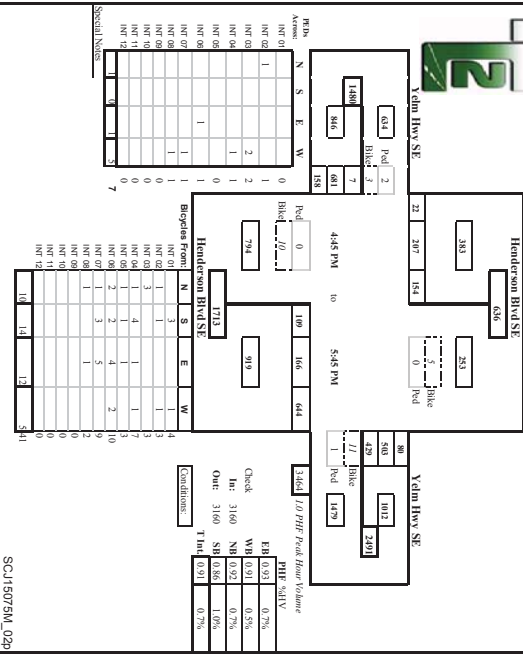


Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 925-6009 FAX: (253) 925-7211 E-Mail: Team@TC2inc.com  
 WBE/DBE

Intersection: Henderson Blvd SE & Yalm Hwy SE  
 Location: Turnwact, Washington  
 Date of Count: Thurs 6/25/2015  
 Checked By: Jess

Time	From North on (SB)				From South on (NB)				From East on (WB)				From West on (EB)				Interval			
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R				
4:15 P	1	1	1	1	2	24	20	123	4	72	111	12	1	1	1	1	142	27	606	
4:30 P	1	1	1	1	46	40	9	0	12	20	115	3	85	113	14	0	154	23	630	
4:45 P	0	0	0	0	32	33	1	1	29	33	169	2	100	118	25	0	148	34	723	
5:00 P	1	1	1	1	31	42	7	0	33	33	142	0	98	112	21	1	1	178	35	733
5:15 P	0	0	0	0	42	46	2	1	24	40	123	3	90	145	20	2	1	158	30	781
5:30 P	2	1	1	1	51	51	7	1	27	50	174	1	134	125	18	1	1	183	44	866
5:45 P	1	1	1	1	30	46	6	4	25	43	156	1	107	121	21	2	3	163	49	780
6:00 P	1	1	1	1	24	51	2	0	18	40	106	5	87	85	11	1	2	109	28	581
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	7	393	363	39	9	192	229	1157	19	773	920	143	8	11	1234	267				5680
Survey	Peak Hour: 4:45 PM to 5:45 PM																			

Approach	SB	NB	WB	EB
Total	4	154	207	22
SAHV	1.96	0.26	0.76	0.76
PHV	0.89	0.92	0.91	0.91

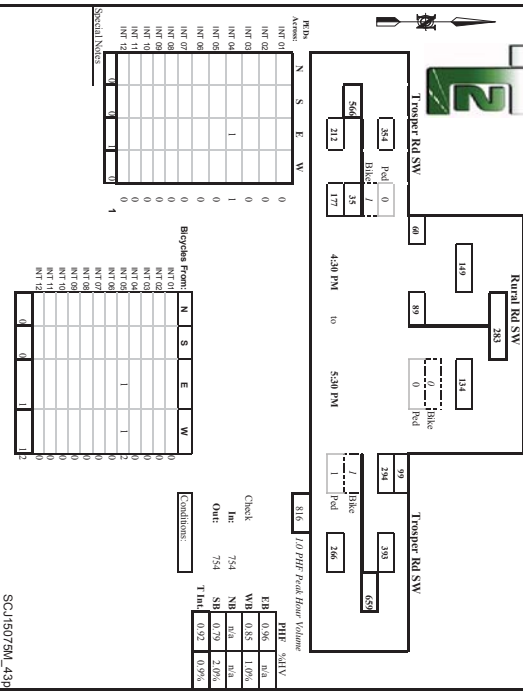


Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 925-6009 FAX: (253) 925-7211 E-Mail: Team@TC2inc.com  
 WBE/DBE

Intersection: Rural Rd SW & Trooper Rd SW  
 Location: Turnwact, Washington  
 Date of Count: Thurs 6/25/2015  
 Checked By: Jess

Time	From North on (SB)				From South on (NB)				From East on (WB)				From West on (EB)				Interval			
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R				
4:15 P	1	1	1	1	0	0	0	0	0	1	0	69	16	1	8	46	0	164		
4:30 P	1	1	1	1	23	0	12	0	0	0	0	4	0	63	19	1	6	49	0	172
4:45 P	0	0	0	0	23	0	14	0	0	0	0	0	0	69	30	0	7	48	0	191
5:00 P	2	1	1	1	17	0	10	0	0	0	0	3	0	75	14	0	10	43	0	169
5:15 P	0	0	0	0	23	0	24	0	0	0	0	0	0	64	26	0	10	43	0	190
5:30 P	1	1	1	1	26	0	12	0	0	0	0	1	0	86	29	0	8	43	0	204
5:45 P	0	0	0	0	25	0	17	0	0	0	0	0	0	88	19	1	7	49	0	185
6:00 P	1	1	1	1	14	0	14	0	0	0	0	1	0	61	20	0	5	32	0	146
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	6	167	0	112	0	0	0	0	0	10	0	555	173	3	61	353	0	1421		
Survey	Peak Hour: 4:30 PM to 5:30 PM																			

Approach	SB	NB	WB	EB
Total	3	80	0	60
SAHV	149	2.06	0	0
PHV	0.79	0.79	0	0.86



SCJ15075M\_026

SCJ15075M\_436



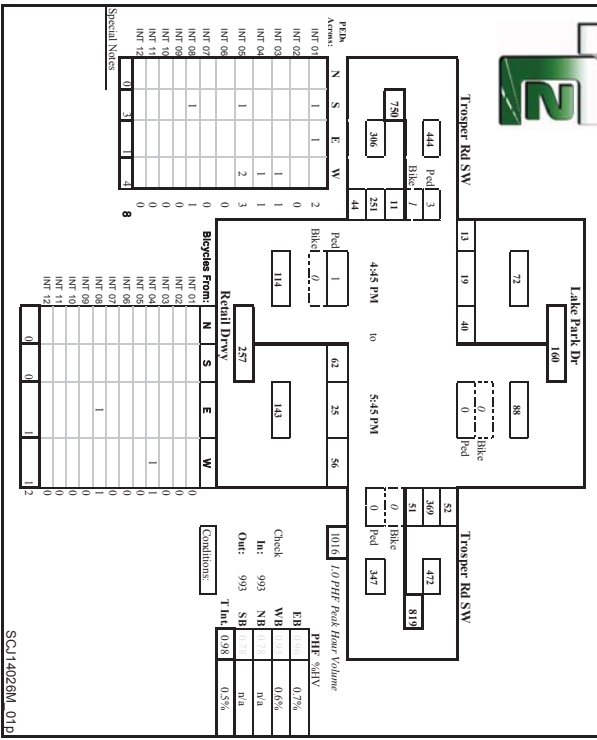
Prepared for: **SCJ Alliance/Shea Carr Jewell**  
 Traffic Count Consultants, Inc.  
 Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: [TC@TCINC.com](mailto:TC@TCINC.com)  
 WB/E/DRE

Location: Lake Park Dr & Trospier Rd SW  
 Date of Count: Wed 3/05/2014  
 Checked By: JSS

Time Interval	From North on (SB)				From South on (NB)				From East on (WB)				From West on (EB)				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
Endured	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 P	0	9	3	5	0	6	7	7	0	9	8	6	0	2	60	8	209
4:30 P	0	9	1	4	0	10	3	12	1	8	8	1	2	62	8	8	214
4:45 P	0	6	6	2	0	12	2	15	0	17	7	8	0	4	75	10	232
5:00 P	0	12	3	1	0	11	5	14	1	11	10	1	2	63	13	251	
5:15 P	0	12	5	6	0	17	4	8	0	13	9	1	0	5	59	10	241
5:30 P	0	10	9	1	0	17	5	16	2	16	8	1	2	67	11	254	
5:45 P	0	6	2	5	0	17	11	18	0	11	8	1	2	62	10	247	
6:00 P	0	10	2	1	0	12	5	10	1	12	9	5	1	3	56	8	216
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>74</b>	<b>31</b>	<b>25</b>	<b>0</b>	<b>102</b>	<b>42</b>	<b>100</b>	<b>5</b>	<b>97</b>	<b>710</b>	<b>79</b>	<b>4</b>	<b>22</b>	<b>504</b>	<b>78</b>	<b>1864</b>

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

Total	0	40	19	13	0	62	25	56	3	51	369	52	2	11	251	44	993
Approach		72				143				472					306		993
%HV		69%				60%				60%					67%		63%
PHF		0.73				0.73				0.73				0.73			0.98



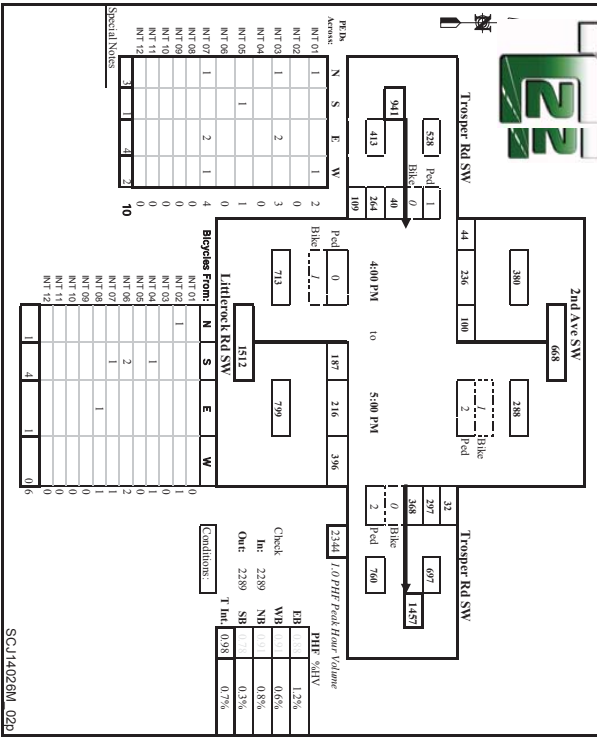
Prepared for: **SCJ Alliance/Shea Carr Jewell**  
 Traffic Count Consultants, Inc.  
 Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: [TC@TCINC.com](mailto:TC@TCINC.com)  
 WB/E/DRE

Location: 2nd Ave SW/Hillock Rd SW & Trospier Rd SW  
 Date of Count: Wed 3/05/2014  
 Checked By: JSS

Time Interval	From North on (SB)				From South on (NB)				From East on (WB)				From West on (EB)				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
Endured	0	29	49	9	1	41	44	102	1	113	65	13	0	7	61	38	563
4:15 P	0	29	82	11	1	45	57	97	2	71	66	7	3	12	59	36	572
4:30 P	1	23	58	6	1	52	46	95	1	94	87	7	0	11	80	27	586
4:45 P	0	19	47	18	3	49	69	102	0	90	79	5	2	10	62	18	566
5:00 P	0	24	51	7	0	45	57	95	2	104	69	9	0	11	61	21	553
5:15 P	0	21	62	9	0	31	58	110	0	70	70	10	0	8	68	21	538
5:30 P	0	13	58	15	1	44	59	95	2	74	59	11	2	13	60	27	528
5:45 P	0	12	30	13	2	34	47	102	0	68	51	8	1	9	40	22	445
6:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>2</b>	<b>170</b>	<b>446</b>	<b>88</b>	<b>9</b>	<b>341</b>	<b>437</b>	<b>796</b>	<b>8</b>	<b>684</b>	<b>546</b>	<b>70</b>	<b>8</b>	<b>81</b>	<b>403</b>	<b>200</b>	<b>4352</b>

Peak Hour: 4:00 PM to 5:00 PM

Total	1	100	246	44	6	187	216	396	4	348	297	32	5	40	264	109	2289
Approach		380				799				697				413			2289
%HV		0.3%				0.8%				0.8%				1.8%			0.7%
PHF		0.33				0.73				0.73				0.73			0.98



SCJ14026M\_01D

SCJ14026M\_02D

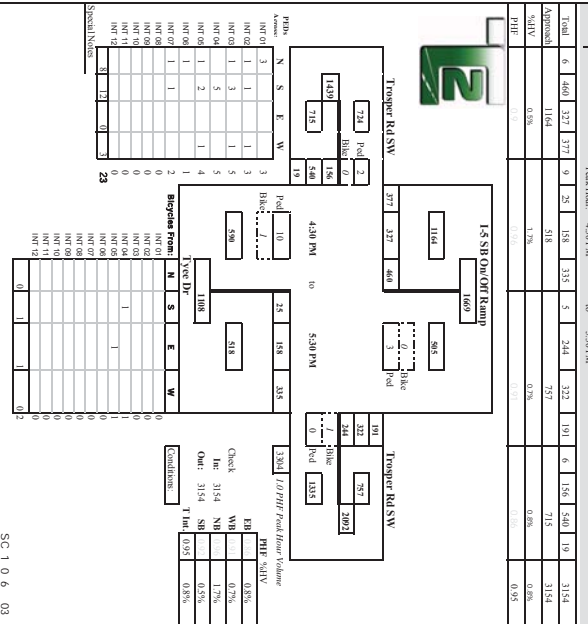


Prepared for: **SCJ Alliance/Shea Carr Jewell**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-6099 FAX: (253) 922-2271 E-Mail: [Team@TCinc.com](mailto:Team@TCinc.com)

WBUD/BE:   
 Date of Count: **Wed 3/15/2014**  
 Joss

**Project:** I-5 NB On/Off Ramp/Trce Dr & Trooper Rd SW  
**Location:** Tumwater, Washington

Time Interval	From North on (SB) I-5 NB On/Off Ramp	From South on (NB) I-5 NB On/Off Ramp	From East on (WB) Trooper Rd SW	From West on (EB) Trooper Rd SW	Interval Total
4:15P	112	91	114	1	318
4:30P	6	98	87	0	191
4:45P	2	117	67	105	291
5:00P	0	128	90	97	315
5:15P	1	118	76	89	264
5:30P	3	99	84	36	222
5:45P	1	116	84	25	226
6:00P	1	108	47	62	218
6:15P	0	0	0	0	0
6:30P	0	0	0	0	0
6:45P	0	0	0	0	0
7:00P	0	0	0	0	0
<b>Total</b>	<b>181</b>	<b>684</b>	<b>715</b>	<b>10</b>	<b>1590</b>
<b>Approach</b>	<b>1564</b>	<b>3271</b>	<b>3771</b>	<b>9</b>	<b>2512</b>
<b>SB/EB</b>	<b>0.92%</b>	<b>1.72%</b>	<b>0.72%</b>	<b>0.02%</b>	<b>0.29%</b>
<b>WB/EB</b>					

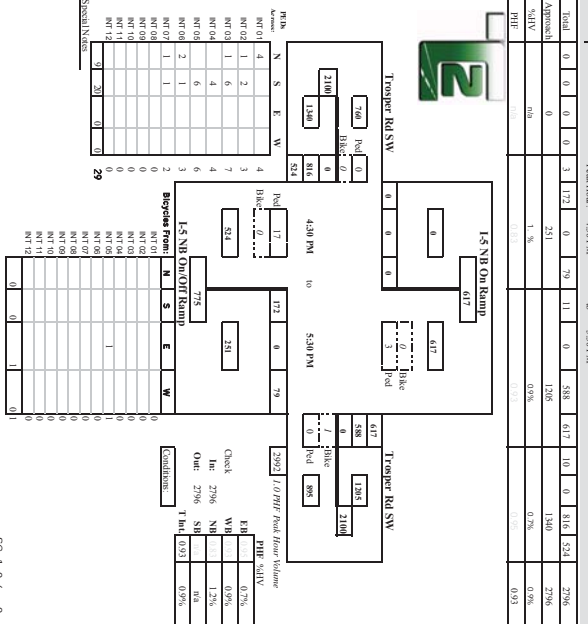


Prepared for: **SCJ Alliance/Shea Carr Jewell**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-6099 FAX: (253) 922-2271 E-Mail: [Team@TCinc.com](mailto:Team@TCinc.com)

WBUD/BE:   
 Date of Count: **Wed 3/15/2014**  
 Joss

**Project:** I-5 NB On/Off Ramp & Trooper Rd SW  
**Location:** Tumwater, Washington

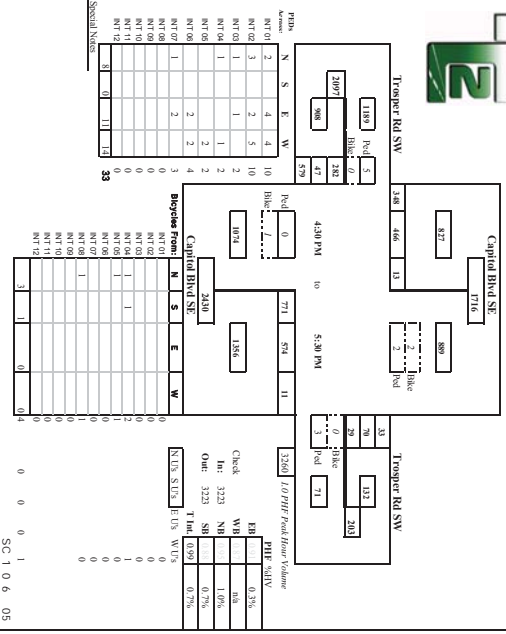
Time Interval	From North on (SB) I-5 NB On/Off Ramp	From South on (NB) I-5 NB On/Off Ramp	From East on (WB) Trooper Rd SW	From West on (EB) Trooper Rd SW	Interval Total
4:15P	0	0	0	0	0
4:30P	0	0	0	0	0
4:45P	0	0	0	0	0
5:00P	0	0	0	0	0
5:15P	0	0	0	0	0
5:30P	0	0	0	0	0
5:45P	0	0	0	0	0
6:00P	0	0	0	0	0
6:15P	0	0	0	0	0
6:30P	0	0	0	0	0
6:45P	0	0	0	0	0
7:00P	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Approach</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>SB/EB</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>
<b>WB/EB</b>					



Intersection: Capital Blvd SE & Trooper Rd SW  
 Location: Timonium, Washington  
 Date of Count: Wed 3/05/2014  
 JCS

Time Interval	From North on (S9)	From South on (WB)	From East on (WB)	From West on (E9)	Interval Total
4:15P	6	3	188	42	247
4:30P	1	5	95	41	142
4:45P	1	4	97	28	130
5:00P	1	1	105	42	150
5:15P	3	6	135	95	240
5:30P	1	2	129	83	215
5:45P	1	6	128	90	225
6:00P	1	6	84	72	163
6:15P	0	0	0	0	0
6:30P	0	0	0	0	0
6:45P	0	0	0	0	0
7:00P	0	0	0	0	0
<b>Total</b>	<b>13</b>	<b>31</b>	<b>861</b>	<b>653</b>	<b>2145</b>

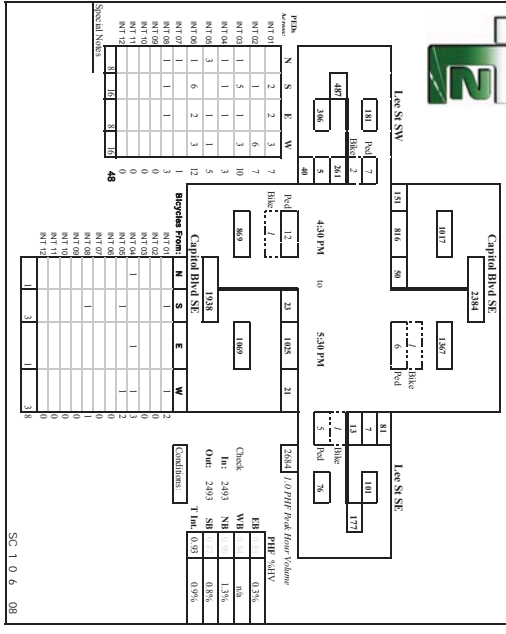
Approach	S9	WB	E9	WB
Volume	132	908	282	472
SATV	132	908	282	472
HTV	132	908	282	472



Intersection: Capital Blvd SE & Lee St SE SW  
 Location: Timonium, Washington  
 Date of Count: Wed 03/20/14  
 JCS

Time Interval	From North on (S9)	From South on (WB)	From East on (WB)	From West on (E9)	Interval Total
4:15P	3	13	184	29	229
4:30P	2	8	190	31	231
4:45P	1	10	214	25	250
5:00P	2	13	166	33	214
5:15P	3	15	230	46	294
5:30P	2	12	206	47	267
5:45P	5	10	229	34	301
6:00P	2	14	175	31	222
6:15P	0	0	0	0	0
6:30P	0	0	0	0	0
6:45P	0	0	0	0	0
7:00P	0	0	0	0	0
<b>Total</b>	<b>20</b>	<b>95</b>	<b>1594</b>	<b>276</b>	<b>2085</b>

Approach	S9	WB	E9	WB
Volume	1072	1069	101	396
SATV	1072	1069	101	396
HTV	1072	1069	101	396





Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-4099 FAX: (253) 923-2111 E-Mail: Team@TCCinc.com

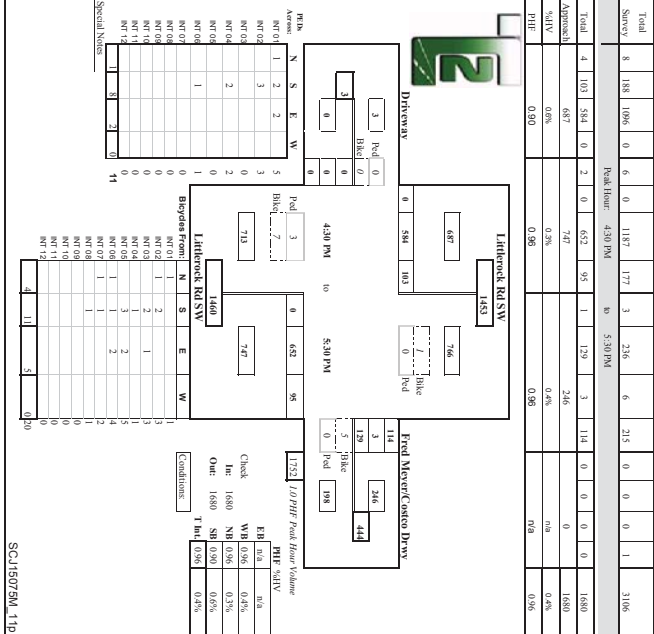
WBEB08E

Date of Count: Wed 6/23/15

Intersection: Litchford Rd SW & Fred Meyer/Casco Drwy  
 Location: Turnward, Washington

Checked By: Jss

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Internal
Litchford Rd SW	1	1	1	1	1
4:30P	1	1	1	1	1
4:45P	1	1	1	1	1
5:00P	1	1	1	1	1
5:15P	1	1	1	1	1
5:30P	1	1	1	1	1
5:45P	1	1	1	1	1
6:00P	1	1	1	1	1
6:15P	1	1	1	1	1
6:30P	1	1	1	1	1
6:45P	1	1	1	1	1
7:00P	1	1	1	1	1
<b>Total</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>
<b>Survey</b>	<b>188</b>	<b>188</b>	<b>187</b>	<b>177</b>	<b>236</b>
<b>Peak Hour</b>	<b>4:30 PM</b>	<b>5:30 PM</b>	<b>6</b>	<b>215</b>	<b>0</b>
<b>Total</b>	<b>4</b>	<b>103</b>	<b>84</b>	<b>0</b>	<b>2</b>
<b>Approach</b>	<b>687</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>632</b>
<b>ADIVT</b>	<b>0.96</b>	<b>0</b>	<b>747</b>	<b>95</b>	<b>1</b>
<b>ADIVT</b>	<b>0.96</b>	<b>0</b>	<b>0.96</b>	<b>0.96</b>	<b>0.96</b>
<b>ADIVT</b>	<b>0.96</b>	<b>0</b>	<b>0.96</b>	<b>0.96</b>	<b>0.96</b>



Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-4099 FAX: (253) 923-2111 E-Mail: Team@TCCinc.com

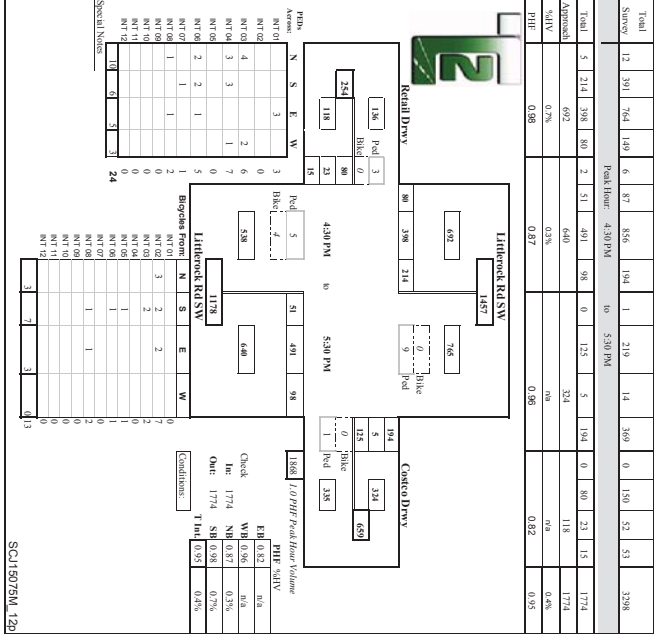
WBEB08E

Date of Count: Wed 6/23/15

Intersection: Litchford Rd SW & Casco Drwy  
 Location: Turnward, Washington

Checked By: Jss

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Internal
Litchford Rd SW	1	1	1	1	1
4:30P	1	1	1	1	1
4:45P	1	1	1	1	1
5:00P	1	1	1	1	1
5:15P	1	1	1	1	1
5:30P	1	1	1	1	1
5:45P	1	1	1	1	1
6:00P	1	1	1	1	1
6:15P	1	1	1	1	1
6:30P	1	1	1	1	1
6:45P	1	1	1	1	1
7:00P	1	1	1	1	1
<b>Total</b>	<b>12</b>	<b>391</b>	<b>364</b>	<b>149</b>	<b>6</b>
<b>Survey</b>	<b>87</b>	<b>856</b>	<b>194</b>	<b>1</b>	<b>219</b>
<b>Peak Hour</b>	<b>4:30 PM</b>	<b>5:30 PM</b>	<b>14</b>	<b>369</b>	<b>0</b>
<b>Total</b>	<b>5</b>	<b>214</b>	<b>398</b>	<b>30</b>	<b>3</b>
<b>Approach</b>	<b>607</b>	<b>0</b>	<b>51</b>	<b>491</b>	<b>98</b>
<b>ADIVT</b>	<b>0.96</b>	<b>0</b>	<b>640</b>	<b>0</b>	<b>125</b>
<b>ADIVT</b>	<b>0.96</b>	<b>0</b>	<b>0.96</b>	<b>0.96</b>	<b>0.96</b>
<b>ADIVT</b>	<b>0.96</b>	<b>0</b>	<b>0.96</b>	<b>0.96</b>	<b>0.96</b>





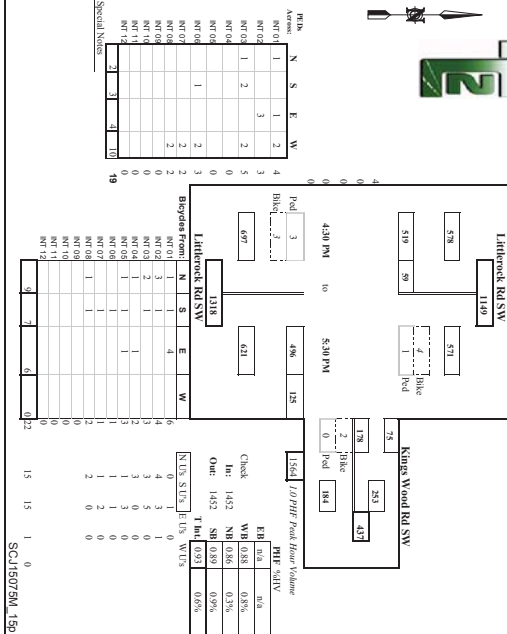
Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-4099 FAX: (253) 922-2171 E-Mail: [Team@TCCinc.com](mailto:Team@TCCinc.com)  
 WBE/DDBE

Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-4099 FAX: (253) 922-2171 E-Mail: [Team@TCCinc.com](mailto:Team@TCCinc.com)  
 WBE/DDBE

**Intersection:** Lifford Rd SW & Kings Wood Dr SW  
**Location:** Tammeter, Washington  
**Date of Count:** Wed 6/2/2015  
**Checked By:** Jess

Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
4:30P	1 12 129	0 2 0 99	0 41 0 22	0 0 0 0	340
4:45P	1 16 137	0 1 0 103	0 28 0 18	0 0 0 0	312
5:00P	3 21 118	0 1 0 108	0 47 0 25	0 0 0 0	368
5:15P	0 9 128	0 0 0 114	0 32 0 22	0 0 0 0	353
5:30P	1 9 154	0 1 0 150	0 34 0 14	0 0 0 0	391
5:45P	0 12 138	0 0 0 98	0 39 0 14	0 0 0 0	313
6:00P	2 12 116	0 2 0 76	0 22 0 50	0 0 0 0	293
6:15P	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0
6:30P	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0
6:45P	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0
7:00P	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0
<b>Total</b>	<b>10 111 1093</b>	<b>0 7 0 872</b>	<b>253 2 349</b>	<b>0 0 0 0</b>	<b>2770</b>

Approach	Volume	Peak Hour	Peak Hour: 4:30 PM	Peak Hour: 5:30 PM	Peak Hour: 6:30 PM
SB	678	621	178	178	143
NB	696	626	123	123	143
WB	696	626	123	123	143
EB	696	626	123	123	143
<b>Total</b>	<b>2666</b>	<b>2516</b>	<b>524</b>	<b>524</b>	<b>573</b>

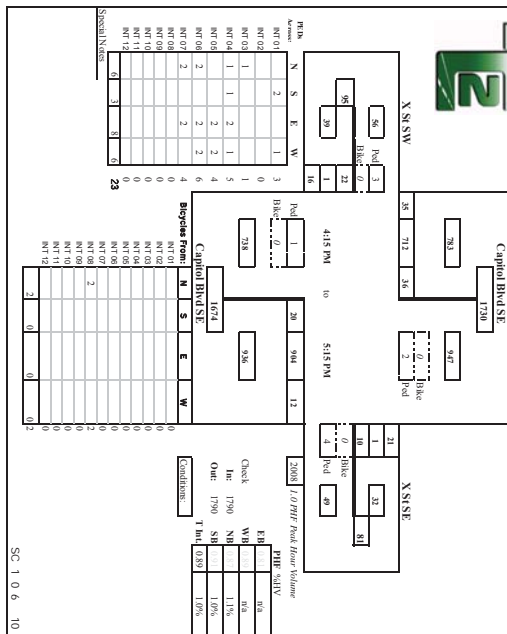


Prepared for: **SCJ Alliance/Shea Carr Jewell**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-4099 FAX: (253) 922-2171 E-Mail: [Team@TCCinc.com](mailto:Team@TCCinc.com)  
 WBE/DDBE

**Intersection:** Capitol Blvd SE & X St SE SW  
**Location:** Tammeter, Washington  
**Date of Count:** Wed 3/9/2014  
**Checked By:** Jess

Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
4:15P	2 9 178	5 2 2 190	7 0 0 0	0 3 0 3	397
4:30P	3 8 176	10 2 3 192	1 0 2 1	4 0 4 0	401
4:45P	1 6 181	8 2 7 214	3 0 1 0	7 0 5 1	442
5:00P	2 7 161	8 1 7 214	6 0 4 0	5 0 6 0	443
5:15P	2 15 190	9 5 3 205	2 0 3 0	5 0 7 0	492
5:30P	1 10 168	7 2 5 167	0 0 3 1	3 0 2 0	371
5:45P	4 7 195	4 1 1 5 191	1 0 1 0	3 0 4 0	411
6:00P	2 9 186	9 1 1 121	4 0 3 0	4 0 5 0	305
6:15P	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0
6:30P	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0
6:45P	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0
7:00P	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0
<b>Total</b>	<b>17 71 1384</b>	<b>40 18 53 1575</b>	<b>24 0 17 2</b>	<b>34 0 38 2</b>	<b>3772</b>

Approach	Volume	Peak Hour	Peak Hour: 4:15 PM	Peak Hour: 5:15 PM	Peak Hour: 6:15 PM
SB	783	712	38	30	20
NB	1796	1716	904	12	12
WB	696	626	123	123	143
EB	696	626	123	123	143
<b>Total</b>	<b>3071</b>	<b>2774</b>	<b>1067</b>	<b>168</b>	<b>175</b>



SC 1 0 6 10



Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-2721 E-Mail: [Team@TCinc.com](mailto:Team@TCinc.com)

WB/DRE

Intersection: Elm St SE & X St SE

Location: Tumwater, Washington

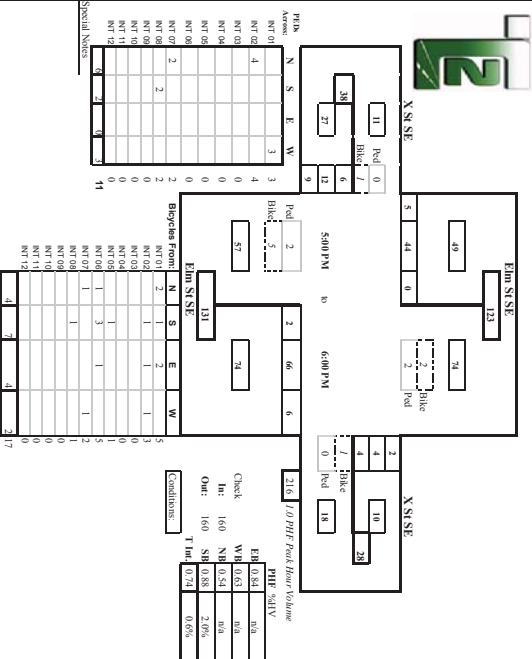
Date of Count: Thurs 6/25/2015

Checked By: Jess

Time Interval	From North on (SB)				From South on (NB)				From East on (WB)				From West on (EB)				Interval Total		
	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	T			
4:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 P	0	0	13	0	0	1	12	1	0	0	2	0	0	0	0	3	3	35	35
4:45 P	0	0	10	2	0	1	12	0	0	1	0	0	0	0	1	3	0	30	30
5:00 P	0	0	11	2	0	1	7	2	0	1	1	0	0	0	3	0	0	38	38
5:15 P	0	0	12	0	0	1	29	4	0	2	0	0	1	0	1	2	2	54	54
5:30 P	1	0	8	2	0	1	16	0	0	0	0	2	0	0	4	1	1	35	35
5:45 P	0	0	13	1	0	0	10	2	0	0	0	0	0	0	0	4	4	35	35
6:00 P	0	0	11	2	0	0	11	0	0	2	2	0	0	0	1	5	2	36	36
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>2</b>	<b>0</b>	<b>81</b>	<b>9</b>	<b>0</b>	<b>7</b>	<b>110</b>	<b>9</b>	<b>0</b>	<b>6</b>	<b>8</b>	<b>2</b>	<b>0</b>	<b>11</b>	<b>19</b>	<b>13</b>	<b>272</b>	<b>272</b>	

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

Total	1	0	44	5	0	2	66	6	0	4	4	2	0	6	12	9	160
Approach	49					74				10							160
%HV	2.0%					na				na							0.8%
PIF	0.88					0.84				0.63							0.74



Prepared for: **SCJ Alliance/Shea Carr Jewell**  
**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-2721 E-Mail: [Team@TCinc.com](mailto:Team@TCinc.com)

WB/DRE

Intersection: Capitol Blvd SE & Dennis St SE SW

Location: Tumwater, Washington

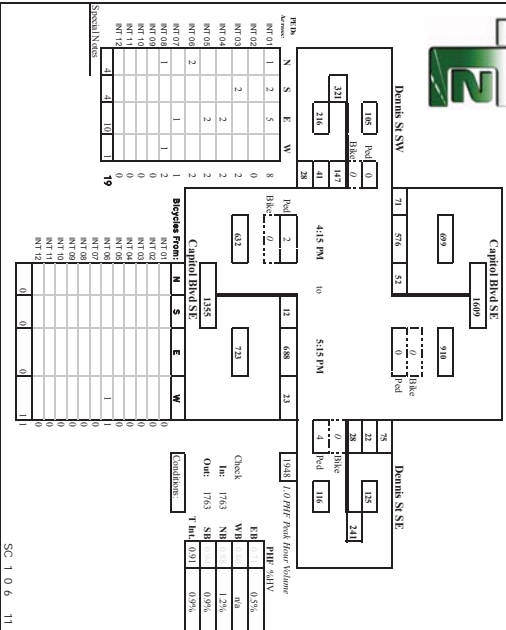
Date of Count: Wed 3/02/2014

Checked By: Jess

Time Interval	From North on (SB)				From South on (NB)				From East on (WB)				From West on (EB)				Interval Total
	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	T	
4:15 P	2	14	19	0	2	2	144	15	0	16	4	15	0	29	7	4	403
4:30 P	3	17	19	0	2	4	151	4	0	7	5	14	0	30	4	7	399
4:45 P	1	7	12	2	4	153	7	0	8	23	0	32	12	5	4	4	425
5:00 P	0	16	134	23	2	3	196	6	0	7	5	16	0	42	4	4	456
5:15 P	2	12	151	23	3	1	186	6	0	6	4	22	43	21	12	43	487
5:30 P	2	15	125	19	2	5	136	4	0	7	4	11	0	25	9	6	366
5:45 P	4	17	156	13	1	3	148	4	0	6	8	18	0	19	7	3	402
6:00 P	2	11	116	15	1	2	91	3	0	8	4	17	1	13	9	4	325
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>16</b>	<b>109</b>	<b>1108</b>	<b>137</b>	<b>15</b>	<b>24</b>	<b>1207</b>	<b>49</b>	<b>0</b>	<b>63</b>	<b>42</b>	<b>136</b>	<b>2</b>	<b>212</b>	<b>73</b>	<b>43</b>	<b>3272</b>

Peak Hour: 4:15 PM to 5:15 PM

Total	6	52	376	71	9	12	688	21	28	22	75	1	147	41	28	176
Approach	609					721			125							176
%HV	0.9%					1.4%			na		na					0.9%
PIF	0.99					0.99			0.96							0.91



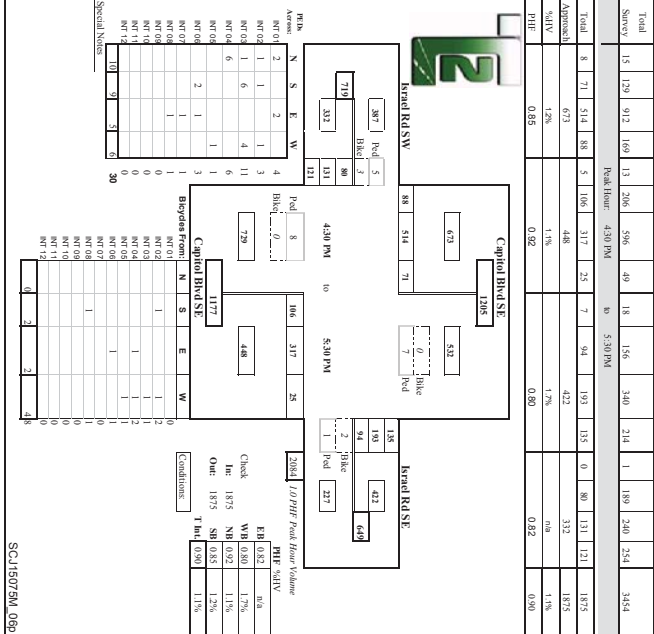


Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-6099 FAX: (253) 922-7211 E-Mail: Team@TCCinc.com

WB/D/BE Date of Count: Wed 6/23/15  
 Checked By: Jess

Intersection: Capital Blvd/SEK Road/R/S/SW  
 Location: Tammec, Washington

Interval	From North on (SB)				From South on (NB)				From East on (WB)				From West on (EB)				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:30P	2	16	0	17	0	0	0	0	0	0	30	12	0	6	10	0	81
4:30P	2	21	0	13	0	0	0	0	3	0	19	23	0	10	10	0	96
4:45P	0	17	0	18	0	0	0	0	1	0	32	25	0	9	20	0	118
5:00P	0	8	0	19	0	0	0	0	0	0	18	18	0	13	22	0	103
5:15P	0	22	0	10	0	0	0	0	0	0	21	24	1	18	14	0	109
5:30P	0	22	0	6	0	0	0	0	0	0	22	40	0	9	18	0	117
5:45P	0	19	0	12	0	0	0	0	0	0	22	15	0	4	15	0	87
6:00P	0	10	0	5	0	0	0	0	1	0	22	24	0	7	11	0	79
6:15P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>4</b>	<b>135</b>	<b>0</b>	<b>100</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>173</b>	<b>181</b>	<b>1</b>	<b>76</b>	<b>125</b>	<b>0</b>	<b>790</b>
Peak Hour: 4:30 PM to 5:30 PM																	
<b>Total</b>	<b>8</b>	<b>71</b>	<b>314</b>	<b>88</b>	<b>5</b>	<b>106</b>	<b>317</b>	<b>25</b>	<b>7</b>	<b>94</b>	<b>193</b>	<b>135</b>	<b>0</b>	<b>80</b>	<b>131</b>	<b>121</b>	<b>1835</b>
<b>Approach</b>	SB				NB				WB				EB				<b>Total</b>
	126				436				432				312				1486
	n/a				n/a				n/a				n/a				0.92
<b>PHF</b>	0.87				0.79				0.79				0.80				0.95

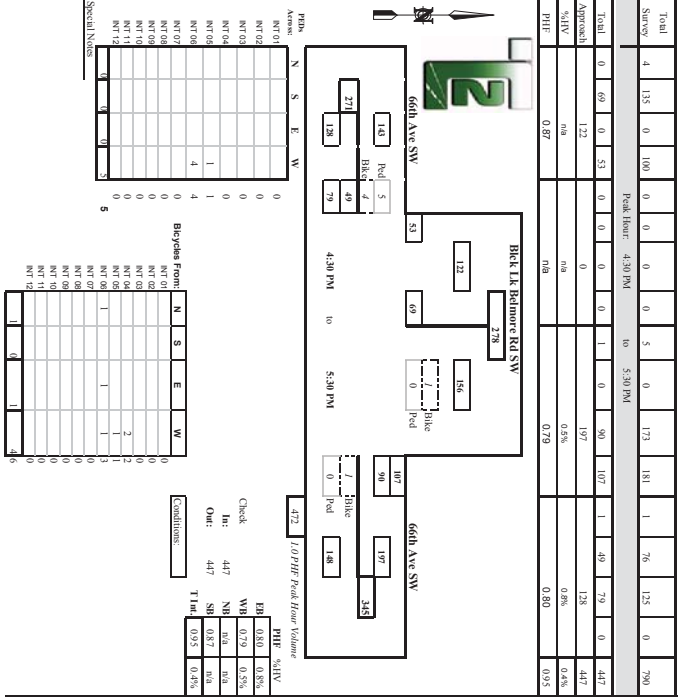


Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-6099 FAX: (253) 922-7211 E-Mail: Team@TCCinc.com

WB/D/BE Date of Count: Tues 6/30/15  
 Checked By: Jess

Intersection: Black Lake Rd/Balmore Rd/SW & 66th Ave/SW  
 Location: Tammec, Washington

Interval	From North on (SB)				From South on (NB)				From East on (WB)				From West on (EB)				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:30P	2	16	0	17	0	0	0	0	0	0	30	12	0	6	10	0	81
4:30P	2	21	0	13	0	0	0	0	3	0	19	23	0	10	10	0	96
4:45P	0	17	0	18	0	0	0	0	1	0	32	25	0	9	20	0	118
5:00P	0	8	0	19	0	0	0	0	0	0	18	18	0	13	22	0	103
5:15P	0	22	0	10	0	0	0	0	0	0	21	24	1	18	14	0	109
5:30P	0	22	0	6	0	0	0	0	0	0	22	40	0	9	18	0	117
5:45P	0	19	0	12	0	0	0	0	0	0	22	15	0	4	15	0	87
6:00P	0	10	0	5	0	0	0	0	1	0	22	24	0	7	11	0	79
6:15P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>4</b>	<b>135</b>	<b>0</b>	<b>100</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>173</b>	<b>181</b>	<b>1</b>	<b>76</b>	<b>125</b>	<b>0</b>	<b>790</b>
Peak Hour: 4:30 PM to 5:30 PM																	
<b>Total</b>	<b>0</b>	<b>69</b>	<b>0</b>	<b>53</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>90</b>	<b>107</b>	<b>1</b>	<b>49</b>	<b>79</b>	<b>0</b>	<b>447</b>
<b>Approach</b>	SB				NB				WB				EB				<b>Total</b>
	122				197				128				447				448
	n/a				n/a				n/a				n/a				0.86
<b>PHF</b>	0.87				0.79				0.79				0.80				0.95







Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TCCH.com

WBEDBE

Intersection: Kirsop Rd SW & 66th Ave SW

Location: Turnover, Washington

Date of Count: Tues 6/30/2015

Checked By: Jess

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Internal
4:15 P	0	0	0	0	0
4:30 P	0	2	3	0	0
4:45 P	0	1	3	8	1
5:00 P	0	0	2	9	0
5:15 P	0	0	1	7	0
5:30 P	0	2	1	5	1
5:45 P	1	3	2	4	1
6:00 P	2	2	4	1	4
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>3</b>	<b>11</b>	<b>17</b>	<b>40</b>	<b>5</b>
<b>Survey</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Internal
4:15 P	0	0	0	0	0
4:30 P	0	2	3	0	0
4:45 P	0	1	3	8	1
5:00 P	0	0	2	9	0
5:15 P	0	0	1	7	0
5:30 P	0	2	1	5	1
5:45 P	1	3	2	4	1
6:00 P	2	2	4	1	4
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>3</b>	<b>11</b>	<b>17</b>	<b>40</b>	<b>5</b>
<b>Survey</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>



Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TCCH.com

WBEDBE

Intersection: Litchford Rd SW & Odgers Rd SW

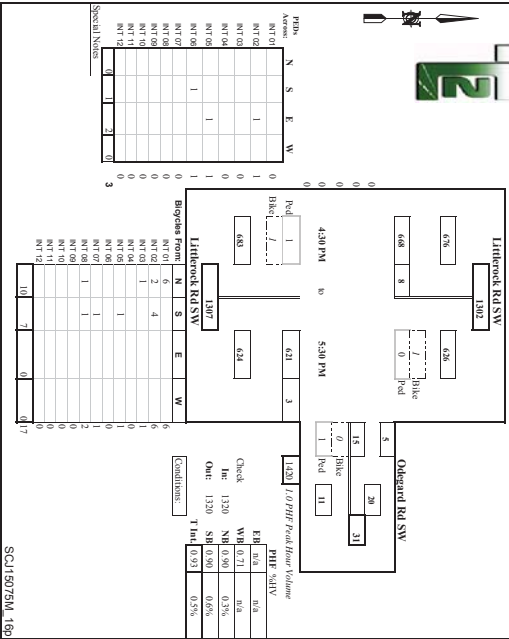
Location: Turnover, Washington

Date of Count: Wed 6/24/2015

Checked By: Jess

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Internal
4:15 P	0	1	151	0	0
4:30 P	1	0	154	0	0
4:45 P	1	2	164	0	1
5:00 P	2	0	158	0	0
5:15 P	0	3	161	0	1
5:30 P	1	3	185	0	0
5:45 P	0	3	173	0	2
6:00 P	2	1	149	0	0
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>7</b>	<b>13</b>	<b>1525</b>	<b>0</b>	<b>4</b>
<b>Survey</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Internal
4:15 P	0	1	151	0	0
4:30 P	1	0	154	0	0
4:45 P	1	2	164	0	1
5:00 P	2	0	158	0	0
5:15 P	0	3	161	0	1
5:30 P	1	3	185	0	0
5:45 P	0	3	173	0	2
6:00 P	2	1	149	0	0
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>7</b>	<b>13</b>	<b>1525</b>	<b>0</b>	<b>4</b>
<b>Survey</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>



SCJ15075M\_15p



Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-4099 FAX: (253) 923-2211 E-Mail: Team@TCCinc.com

WBEBDBE

Date of Count: Wed 6/24/2015

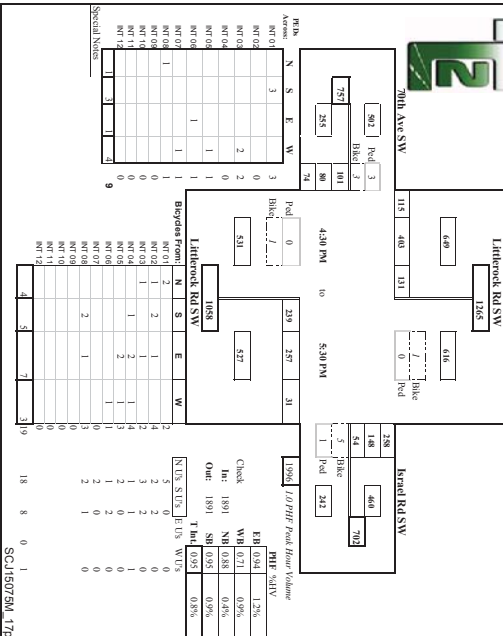
Checked By: JAS

Intersection: Lifford Rd SW & Barst Rd SW/70th Ave SW

Location: Turnward, Washington

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
4:30P	0	31	81	23	135
4:30P	1	29	111	26	167
4:30P	1	38	102	20	171
5:00P	0	35	91	32	158
5:00P	0	30	104	26	160
5:30P	1	28	106	37	172
5:30P	1	27	99	37	163
6:00P	2	30	102	33	167
6:15P	0	0	0	0	0
6:30P	0	0	0	0	0
6:45P	0	0	0	0	0
7:00P	0	0	0	0	0
<b>Total</b>	<b>10</b>	<b>248</b>	<b>796</b>	<b>234</b>	<b>1288</b>
<b>Survey</b>	<b>10</b>	<b>248</b>	<b>796</b>	<b>234</b>	<b>1288</b>

Approach	SB	NB	WB	EB	Total
SB	10	0	0	0	10
NB	0	248	0	0	248
WB	0	0	796	0	796
EB	0	0	0	234	234
<b>Total</b>	<b>10</b>	<b>248</b>	<b>796</b>	<b>234</b>	<b>1288</b>



Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-4099 FAX: (253) 923-2211 E-Mail: Team@TCCinc.com

WBEBDBE

Date of Count: Wed 6/24/2015

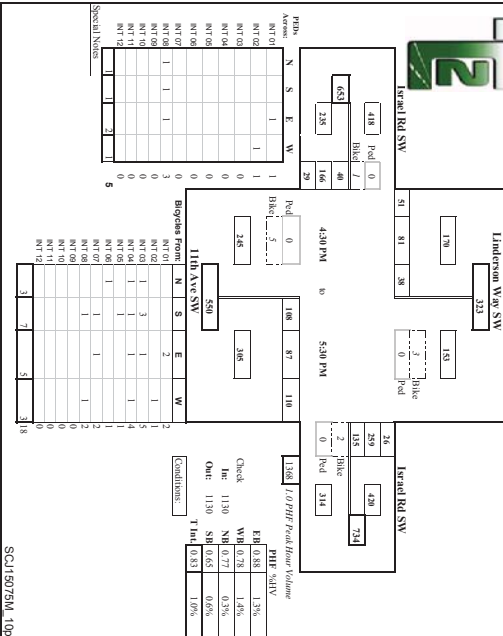
Checked By: JAS

Intersection: Lifford Rd SW & Barst Rd SW/11th Ave SW

Location: Turnward, Washington

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
4:30P	0	6	27	14	47
4:30P	0	10	18	12	40
4:30P	1	10	22	11	44
5:00P	0	8	14	7	39
5:00P	0	15	27	23	65
5:30P	0	5	18	10	33
5:30P	0	2	11	13	26
6:00P	0	2	11	13	26
6:15P	0	0	0	0	0
6:30P	0	0	0	0	0
6:45P	0	0	0	0	0
7:00P	0	0	0	0	0
<b>Total</b>	<b>1</b>	<b>61</b>	<b>152</b>	<b>102</b>	<b>316</b>
<b>Survey</b>	<b>1</b>	<b>61</b>	<b>152</b>	<b>102</b>	<b>316</b>

Approach	SB	NB	WB	EB	Total
SB	1	0	0	0	1
NB	0	61	0	0	61
WB	0	0	152	0	152
EB	0	0	0	102	102
<b>Total</b>	<b>1</b>	<b>61</b>	<b>152</b>	<b>102</b>	<b>316</b>





Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-6099 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

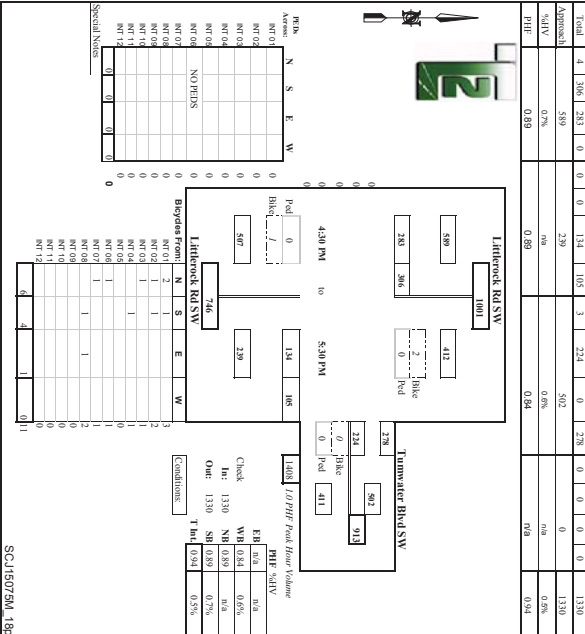
WB/E/D/B/E Date of Count: Wed 6/24/2015  
 Checked By: Jess

Intersection: Lidbeck Rd SW & Tumwater Blvd SW

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
Lidbeck Rd SW	T L T S R	T L T S R	T L T S R	T L T S R	
4:30 P	0 125 61 0	0 0 0 33 9 3	40 0 0	54 0 0	281
4:30 P	0 67 89 0	0 0 0 32 19 0	48 0 0	58 0 0	313
4:45 P	1 74 70 0	0 0 0 31 28 1	80 0 0	69 0 0	332
5:00 P	3 77 54 0	0 0 0 36 27 1	36 0 0	0 0 0	299
5:15 P	0 75 91 0	0 0 0 35 15 1	71 0 0	60 0 0	347
5:30 P	0 80 68 0	0 0 0 32 35 0	37 0 0	80 0 0	332
5:45 P	1 79 68 0	1 0 0 43 11 1	49 0 0	67 0 0	317
6:00 P	2 60 48 0	0 0 0 29 33 0	43 0 0	64 0 0	277
6:15 P	0 0 0 0	0 0 0 0 0 0	0 0 0	0 0 0	0
6:30 P	0 0 0 0	0 0 0 0 0 0	0 0 0	0 0 0	0
6:45 P	0 0 0 0	0 0 0 0 0 0	0 0 0	0 0 0	0
7:00 P	0 0 0 0	0 0 0 0 0 0	0 0 0	0 0 0	0
<b>Total</b>	<b>7 847 540 0</b>	<b>2 0 0 271 177 7</b>	<b>413 0</b>	<b>521 0 0 0 0 0</b>	<b>2318</b>

Peak Hour: 4:30 PM to 5:30 PM

Total	4	306	333	0	0	134	105	3	224	0	128	0	0	1	0	1330
Approach	%IV	0.7%	0.9%	0.0%	0.0%	0.2%	0.2%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.2%
PIEV		0.9%	0.9%	0.0%	0.0%	0.2%	0.2%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.2%
PIEF		0.9%	0.9%	0.0%	0.0%	0.2%	0.2%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.2%



Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-6099 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

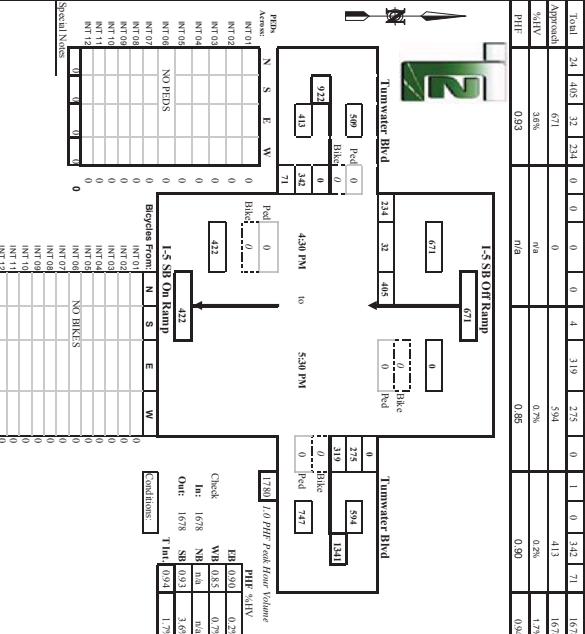
WB/E/D/B/E Date of Count: Wed 6/24/2015  
 Checked By: Jess

Intersection: I-5 SB Ramps & Tumwater Blvd

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
I-5 SB Off Ramp	T L T S R	T L T S R	T L T S R	T L T S R	
4:30 P	5 119 9 50	0 0 0 0 0 0	0 0 0 69 31 0	1 0 0 60 19	79
4:30 P	5 96 6 46	0 0 0 0 0 0	0 0 0 60 60 0	0 0 0 79 12	159
4:45 P	3 101 6 60	0 0 0 0 0 0	0 0 2 77 89 0	0 0 0 92 11	146
5:00 P	8 107 10 46	0 0 0 0 0 0	0 0 0 62 58 0	1 0 0 90 15	183
5:15 P	7 104 8 68	0 0 0 0 0 0	0 0 0 112 61 0	0 0 0 64 26	145
5:30 P	6 98 8 60	0 0 0 0 0 0	0 0 2 68 65 0	0 0 0 96 19	144
5:45 P	3 94 3 42	0 0 0 0 0 0	0 0 0 58 66 0	0 0 0 70 10	143
6:00 P	7 83 9 51	0 0 0 0 0 0	0 0 0 35 56 0	2 0 0 85 18	117
6:15 P	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0
6:30 P	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0
6:45 P	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0
7:00 P	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0
<b>Total</b>	<b>44 797 50 423</b>	<b>0 0 0 0 0 0</b>	<b>5 541 110 0</b>	<b>4 0 0 636 130</b>	<b>3096</b>

Peak Hour: 4:30 PM to 5:30 PM

Total	24	405	52	241	0	0	0	0	4	319	275	0	1	1	342	71	1678
Approach	%IV	67%	38%	0%	0%	0%	0%	0%	0%	0.7%	0.7%	0%	0%	0%	4.1%	1.7%	6.7%
PIEV		0.9%	0.9%	n/a	n/a	0.2%	0.2%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.2%
PIEF		0.9%	0.9%	n/a	n/a	0.2%	0.2%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.2%





Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-6099 FAX: (253) 922-7211 E-Mail: Team@TC2Inc.com

WB/E/DBE

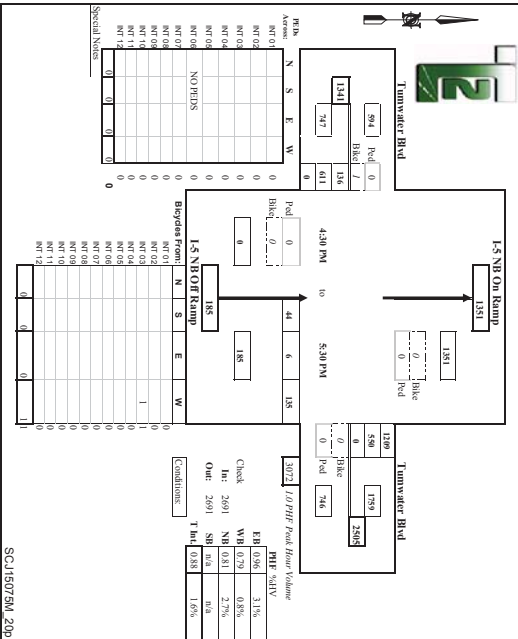
Date of Count: Wed 6/24/2015

Intersection: I-5 NB Ramps & Turnwater Blvd

Location: Turnwater, Washington

Checked By: Jess

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
4:30 P	0	0	0	0	0
4:35 P	0	0	0	0	0
4:40 P	0	0	0	0	0
4:45 P	0	0	0	0	0
4:50 P	0	0	0	0	0
4:55 P	0	0	0	0	0
5:00 P	0	0	0	0	0
5:05 P	0	0	0	0	0
5:10 P	0	0	0	0	0
5:15 P	0	0	0	0	0
5:20 P	0	0	0	0	0
5:25 P	0	0	0	0	0
5:30 P	0	0	0	0	0
5:35 P	0	0	0	0	0
5:40 P	0	0	0	0	0
5:45 P	0	0	0	0	0
5:50 P	0	0	0	0	0
5:55 P	0	0	0	0	0
6:00 P	0	0	0	0	0
6:05 P	0	0	0	0	0
6:10 P	0	0	0	0	0
6:15 P	0	0	0	0	0
6:20 P	0	0	0	0	0
6:25 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:35 P	0	0	0	0	0
6:40 P	0	0	0	0	0
6:45 P	0	0	0	0	0
6:50 P	0	0	0	0	0
6:55 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Survey	0	12	88	15	215
Peak Hour: 4:30 PM	0	0	530	0	530
Approach	0	0	188	135	323
ADMT	0	0	1759	747	2506
ADMT	0	0	276	516	792
PHE	0	0	0.81	0.79	0.80



Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-6099 FAX: (253) 922-7211 E-Mail: Team@TC2Inc.com

WB/E/DBE

Date of Count: Tues 3/02/2015

Intersection: I-5 NB Ramps & Turnwater Blvd SW

Location: Turnwater, Washington

Checked By: Jess

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
4:30 P	6	41	27	138	212
4:35 P	2	32	18	124	176
4:40 P	4	55	27	268	344
4:45 P	1	39	38	171	249
4:50 P	1	61	27	261	350
4:55 P	2	34	69	178	283
5:00 P	2	40	25	186	273
5:05 P	1	16	13	65	95
5:10 P	0	0	0	0	0
5:15 P	0	0	0	0	0
5:20 P	0	0	0	0	0
5:25 P	0	0	0	0	0
5:30 P	0	0	0	0	0
5:35 P	0	0	0	0	0
5:40 P	0	0	0	0	0
5:45 P	0	0	0	0	0
5:50 P	0	0	0	0	0
5:55 P	0	0	0	0	0
6:00 P	0	0	0	0	0
6:05 P	0	0	0	0	0
6:10 P	0	0	0	0	0
6:15 P	0	0	0	0	0
6:20 P	0	0	0	0	0
6:25 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:35 P	0	0	0	0	0
6:40 P	0	0	0	0	0
6:45 P	0	0	0	0	0
6:50 P	0	0	0	0	0
6:55 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>19</b>	<b>318</b>	<b>242</b>	<b>1346</b>	<b>1925</b>
Survey	8	181	161	878	1228
Peak Hour: 4:30 PM	8	181	161	878	1228
Approach	0	0	0	295	295
ADMT	0	0	0	1436	1436
ADMT	0	0	0	836	836
PHE	0	0	0	0.84	0.83





Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WB/DDE

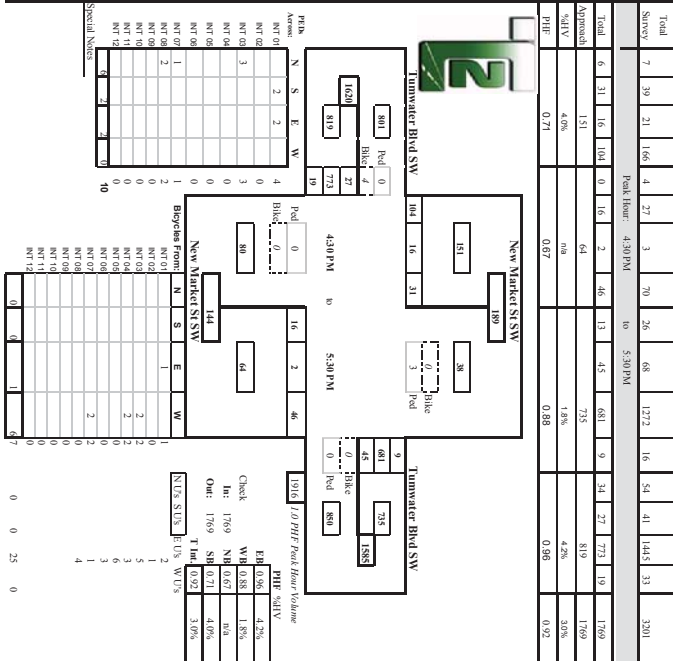
Location: New Market SW & Turnwater Blvd SW

Intersection: Turnwater, Washington

Date of Count: Tues 3/03/2015

Checked By: Jess

Time	From North on (SB)				From South on (NB)				From East on (WB)				From West on (EB)				Interval
Leading	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	Total
4:15 P	0	1	1	0	1	1	0	0	3	4	7	13	1	5	8	17	38
4:30 P	0	1	1	0	1	1	0	0	3	4	7	13	1	5	8	17	38
4:45 P	1	3	0	1	4	0	7	1	16	0	12	18	0	9	5	19	44
5:00 P	0	5	4	2	0	5	1	10	5	10	13	1	5	3	18	6	39
5:15 P	4	12	4	3	0	2	0	17	1	12	19	3	14	13	16	6	47
5:30 P	1	10	8	3	0	2	0	3	7	9	16	5	6	20	4	4	45
5:45 P	1	3	3	1	3	0	0	7	3	10	16	2	2	17	6	4	40
6:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	7	39	21	16	4	27	3	70	26	68	127	16	54	41	144	33	320
Summary	Peak Hour: 4:30 PM to 5:30 PM																
Total	6	31	16	10	0	16	2	46	13	45	68	9	54	27	77	19	176
Approach	%IV																
%IV	4.0%				18%				42%				30%				25%
PIF	0.21				0.87				0.88				0.96				0.92



Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WB/DDE

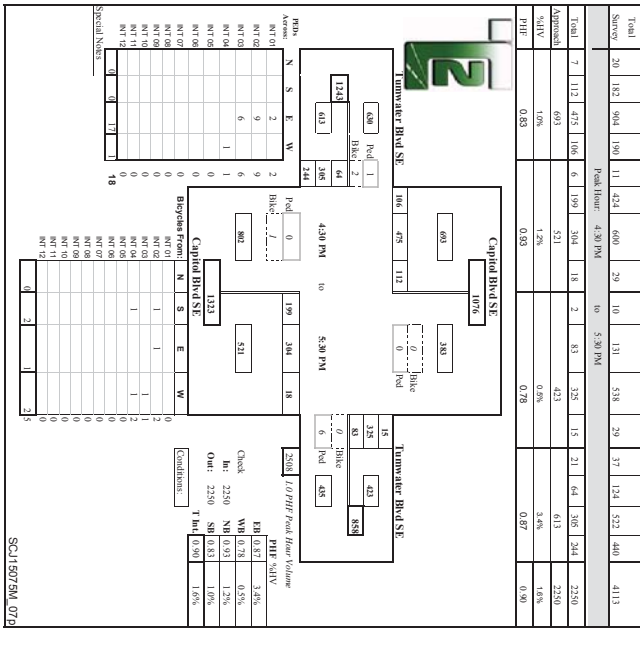
Location: Capital Blvd SE & Turnwater Blvd SE

Intersection: Turnwater, Washington

Date of Count: Wed 6/23/2015

Checked By: Jess

Time	From North on (SB)				From South on (NB)				From East on (WB)				From West on (EB)				Interval
Leading	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	Total
4:15 P	2	16	118	19	0	5	4	8	3	2	12	5	1	7	19	6	59
4:30 P	1	11	121	21	2	5	4	6	4	4	12	5	3	2	5	4	42
4:45 P	0	37	94	33	0	52	76	5	0	2	24	7	1	7	17	8	71
5:00 P	4	16	106	19	1	47	72	3	0	14	70	5	5	20	81	6	51
5:15 P	0	33	141	36	4	53	83	4	4	1	28	10	4	4	13	7	67
5:30 P	3	26	134	18	1	47	73	6	1	17	79	5	5	14	64	5	57
5:45 P	3	23	105	28	2	67	69	1	4	14	57	2	3	10	61	5	49
6:00 P	7	30	85	14	1	50	75	3	1	10	45	8	3	7	39	4	39
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	20	182	904	190	11	423	600	29	10	131	518	29	37	124	522	40	411
Summary	Peak Hour: 4:30 PM to 5:30 PM																
Total	7	112	473	106	6	199	304	18	2	83	325	15	21	64	301	24	250
Approach	%IV																
%IV	6.0%				4.5%				6.8%				5.4%				4.8%
PIF	0.82				0.82				0.78				0.87				0.90







Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**

Phone: (253)924-6099 FAX: (253)922-7211 E-Mail: Team@TC2inc.com

WBEDB/E

Date of Count: Wed 6/24/2015

Checked By: Jess

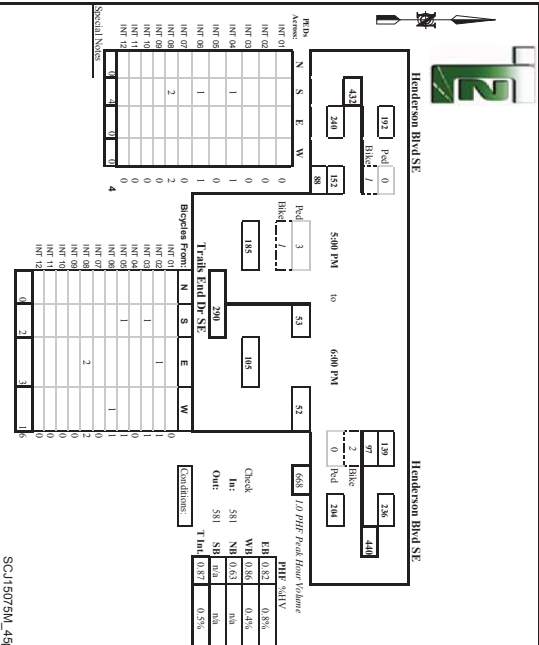
Location: Taha End Dr SE & Henderson Blvd SE

Time Interval: 15 min

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
4:15 P	0	0	0	0	0
4:30 P	0	0	0	0	0
4:45 P	0	0	0	0	0
5:00 P	0	0	0	0	0
5:15 P	0	0	0	0	0
5:30 P	0	0	0	0	0
5:45 P	0	0	0	0	0
6:00 P	0	0	0	0	0
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
4:15 P	0	0	0	0	0
4:30 P	0	0	0	0	0
4:45 P	0	0	0	0	0
5:00 P	0	0	0	0	0
5:15 P	0	0	0	0	0
5:30 P	0	0	0	0	0
5:45 P	0	0	0	0	0
6:00 P	0	0	0	0	0
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
4:15 P	0	0	0	0	0
4:30 P	0	0	0	0	0
4:45 P	0	0	0	0	0
5:00 P	0	0	0	0	0
5:15 P	0	0	0	0	0
5:30 P	0	0	0	0	0
5:45 P	0	0	0	0	0
6:00 P	0	0	0	0	0
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>



Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**

Phone: (253)924-6099 FAX: (253)922-7211 E-Mail: Team@TC2inc.com

WBEDB/E

Date of Count: Wed 6/24/2015

Checked By: Jess

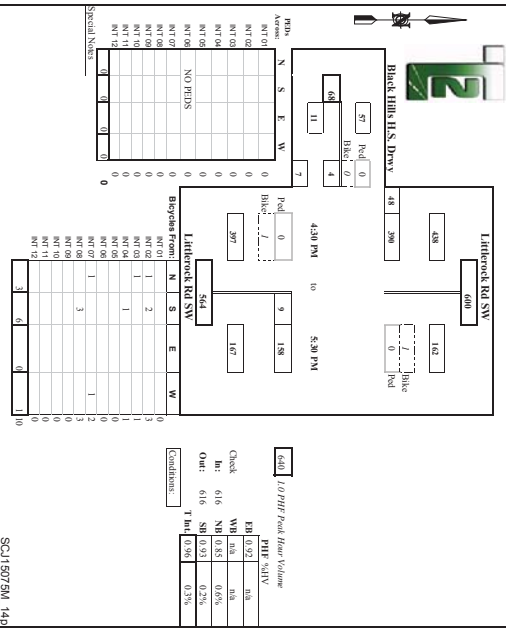
Location: Lathrop Rd SW & Black Hills High School Drwy

Time Interval: 15 min

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
4:15 P	1	0	0	0	1
4:30 P	0	0	0	0	0
4:45 P	1	0	0	0	1
5:00 P	0	0	0	0	0
5:15 P	0	0	0	0	0
5:30 P	0	0	0	0	0
5:45 P	0	0	0	0	0
6:00 P	0	0	0	0	0
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
4:15 P	1	0	0	0	1
4:30 P	0	0	0	0	0
4:45 P	1	0	0	0	1
5:00 P	0	0	0	0	0
5:15 P	0	0	0	0	0
5:30 P	0	0	0	0	0
5:45 P	0	0	0	0	0
6:00 P	0	0	0	0	0
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
4:15 P	1	0	0	0	1
4:30 P	0	0	0	0	0
4:45 P	1	0	0	0	1
5:00 P	0	0	0	0	0
5:15 P	0	0	0	0	0
5:30 P	0	0	0	0	0
5:45 P	0	0	0	0	0
6:00 P	0	0	0	0	0
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>

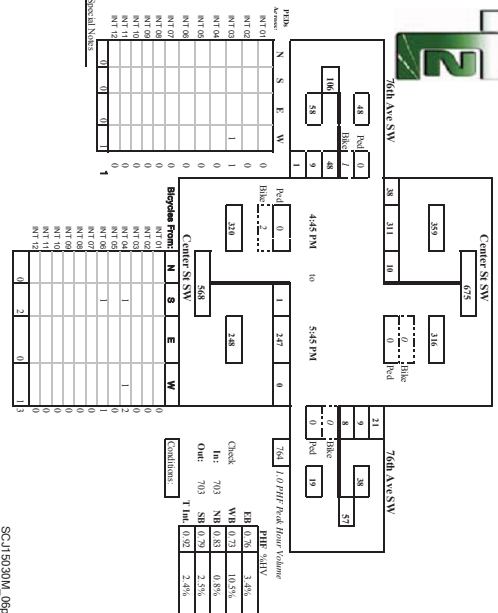




Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 925-5099 FAX: (253) 925-2211 E-Mail: Team@TCCinc.com  
 WBR/DRE

Intersection: Center St SW & 76th Ave SW  
 Location: Turnward, Washington  
 Date of Count: Tues 3/19/2015  
 Checked By: JSS

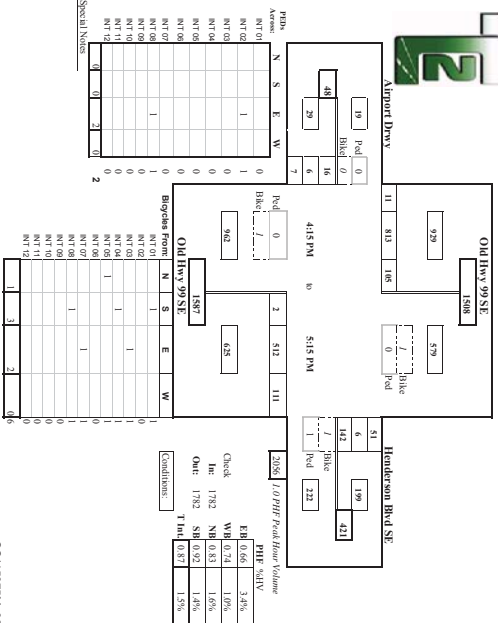
Time	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Internal
Interval	Center St SW	Center St SW	76th Ave SW	76th Ave SW	Total
4:15 P	7	1	0	0	113
4:30 P	9	0	0	0	113
4:45 P	4	2	0	0	159
5:00 P	3	5	1	0	177
5:15 P	3	1	0	0	159
5:30 P	1	2	0	0	191
5:45 P	2	2	0	0	176
6:00 P	2	2	0	0	97
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>31</b>	<b>15</b>	<b>0</b>	<b>0</b>	<b>185</b>
<b>Survey</b>	<b>13</b>	<b>105</b>	<b>813</b>	<b>11</b>	<b>1001</b>
<b>Approach</b>	<b>359</b>	<b>248</b>	<b>6296</b>	<b>58</b>	<b>7031</b>
<b>ADMT</b>	<b>2426</b>	<b>6486</b>	<b>64296</b>	<b>5296</b>	<b>24296</b>
<b>PHI</b>	<b>0.79</b>	<b>0.83</b>	<b>0.75</b>	<b>0.78</b>	<b>0.92</b>



Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 925-5099 FAX: (253) 925-2211 E-Mail: Team@TCCinc.com  
 WBR/DRE

Intersection: Old Hwy 99 SE & Henderson Blvd SE  
 Location: Turnward, Washington  
 Date of Count: Tues 6/23/2015  
 Checked By: JSS

Time	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Internal
Interval	Old Hwy 99 SE	Old Hwy 99 SE	Henderson Blvd SE	Airport Drwy	Total
4:15 P	11	20	0	0	410
4:30 P	3	26	0	0	410
4:45 P	2	26	0	0	410
5:00 P	3	24	1	0	410
5:15 P	5	29	2	0	410
5:30 P	2	26	2	0	410
5:45 P	6	17	1	0	311
6:00 P	3	26	2	0	311
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>35</b>	<b>194</b>	<b>159</b>	<b>14</b>	<b>3110</b>
<b>Survey</b>	<b>13</b>	<b>105</b>	<b>813</b>	<b>11</b>	<b>1001</b>
<b>Approach</b>	<b>146</b>	<b>625</b>	<b>189</b>	<b>29</b>	<b>1782</b>
<b>ADMT</b>	<b>1496</b>	<b>5496</b>	<b>5496</b>	<b>5496</b>	<b>5496</b>
<b>PHI</b>	<b>0.82</b>	<b>0.83</b>	<b>0.74</b>	<b>0.86</b>	<b>0.87</b>





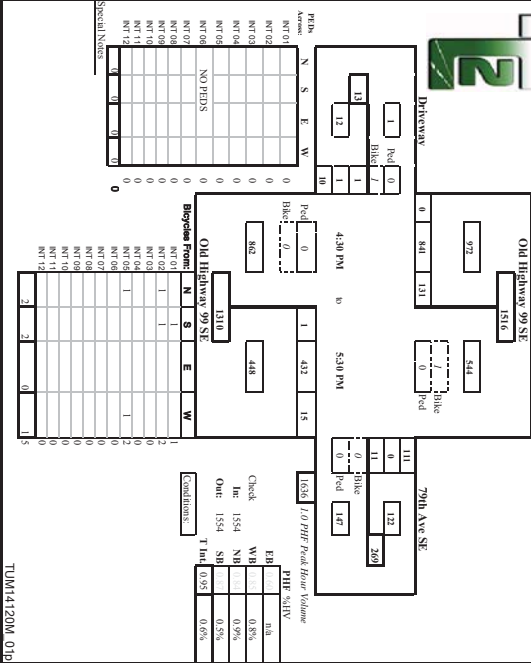


Prepared for: **City of Tumwater**  
 Traffic Count Consultants, Inc.  
 Phone: (253) 926-0009 FAX: (253) 922-7211 E-Mail: [Term@TCCinc.com](mailto:Term@TCCinc.com)  
 WBE/DBE

**Location:** Old Highway 99 SE & 79th Ave SE  
 Tumwater, Washington

**Date of Count:** Tues 10/28/2014  
 Checked By: Jess

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
4:30 P	1 252 172 0 0 0	1 101 2 0 0 0	1 0 0 0 0 0	1 0 0 0 0 0	315
4:30 P	3 31 179 0 1 1	2 0 0 0 0 0	3 0 0 0 0 0	1 0 0 0 0 0	312
4:30 P	3 31 184 0 1 0	108 5 0 2 0 0	34 0 1 1 1 1	3 0 0 0 0 0	367
5:00 P	2 27 209 0 2 0	104 1 1 1 3 0	25 0 0 0 0 0	3 0 0 0 0 0	372
5:15 P	0 40 201 0 1 1	130 2 0 2 0 0	29 0 0 0 0 0	1 0 0 0 0 0	409
5:30 P	0 33 247 0 0 0	90 7 0 4 0 0	23 0 0 0 0 0	5 0 0 0 0 0	499
5:45 P	1 36 205 0 1 0	85 6 0 2 0 0	26 0 0 0 1 1	0 0 0 0 0 0	361
6:00 P	3 29 160 0 1 0	78 3 0 1 0 0	19 0 0 0 0 0	1 0 0 0 0 0	291
6:15 P	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0
6:30 P	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0
6:45 P	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0
7:00 P	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0
<b>Total</b>	<b>12 252 1580 0 9 2</b>	<b>788 29 2 25</b>	<b>222 0 1 2 12</b>	<b>2881</b>	
<b>Survey</b> 12 252 1580 0 9 2 788 29 2 25 222 0 1 2 12 2881					
<b>Peak Hour: 4:30 PM to 5:30 PM</b>					
<b>Total</b>	<b>5 131 841 0 4 1</b>	<b>432 15 1 11</b>	<b>11 0 1 1 10</b>	<b>154</b>	
<b>Approach</b>	<b>972</b>	<b>448</b>	<b>122</b>	<b>12</b>	<b>154</b>
<b>SIHV</b>	<b>0.9%</b>	<b>0.9%</b>	<b>0.8%</b>	<b>0%</b>	<b>0.8%</b>
<b>PHE</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>

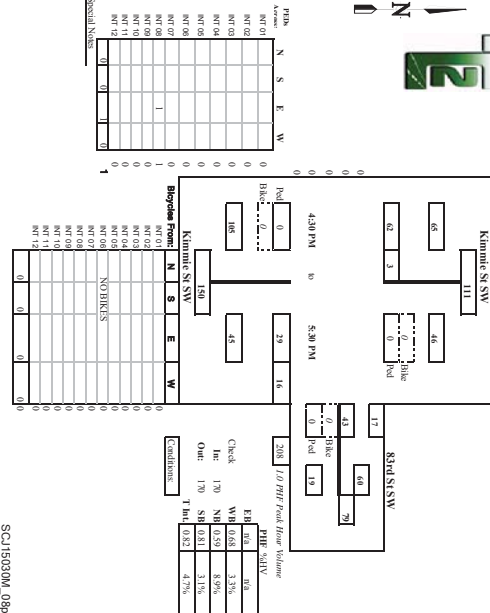


Prepared for: **SCJ Alliance**  
 Traffic Count Consultants, Inc.  
 Phone: (253) 926-0009 FAX: (253) 922-7211 E-Mail: [Term@TCCinc.com](mailto:Term@TCCinc.com)  
 WBE/DBE

**Location:** Kinnick S.W. & 83rd Ave SW  
 Tumwater, Washington

**Date of Count:** Tues 3/02/2015  
 Checked By: Jess

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
4:15 P	0 0 0 9 0 0	3 0 0 0 0 0	3 0 0 0 0 0	1 0 0 0 0 0	26
4:30 P	0 2 14 0 0	7 0 0 19 0 0	2 0 0 2 0 0	1 0 0 0 0 0	40
4:45 P	1 1 19 0 0	3 0 0 4 3 1	6 0 0 3 0 0	0 0 0 0 0 0	36
5:00 P	0 0 17 0 0	2 0 0 7 4 1	14 0 0 8 0 0	0 0 0 0 0 0	50
5:15 P	1 1 13 0 0	0 0 0 7 1 0	7 0 0 3 0 0	0 0 0 0 0 0	32
5:30 P	0 1 13 0 0	0 0 0 11 8 0	16 0 0 3 0 0	0 0 0 0 0 0	32
5:45 P	1 0 9 0 0	0 0 0 3 2 0	15 0 0 5 0 0	0 0 0 0 0 0	34
6:00 P	0 1 7 0 0	0 0 0 7 4 1	6 0 0 1 0 0	0 0 0 0 0 0	26
6:15 P	0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0
6:30 P	0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0
6:45 P	0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0
7:00 P	0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0
<b>Total</b>	<b>5 6 101 0 13 0</b>	<b>65 27 5 71</b>	<b>28 0 0 28 0 0</b>	<b>0 0 0 0</b>	<b>296</b>
<b>Survey</b> 5 6 101 0 13 0 65 27 5 71 28 0 0 28 0 0 296					
<b>Peak Hour: 4:30 PM to 5:30 PM</b>					
<b>Total</b>	<b>2 3 62 0 4 0</b>	<b>29 16 2 43</b>	<b>0 0 0 0 0 0</b>	<b>0 0 0 0</b>	<b>170</b>
<b>Approach</b>	<b>62</b>	<b>45</b>	<b>60</b>	<b>0</b>	<b>170</b>
<b>SIHV</b>	<b>0.3%</b>	<b>0.3%</b>	<b>0.3%</b>	<b>0%</b>	<b>0.3%</b>
<b>PHE</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>

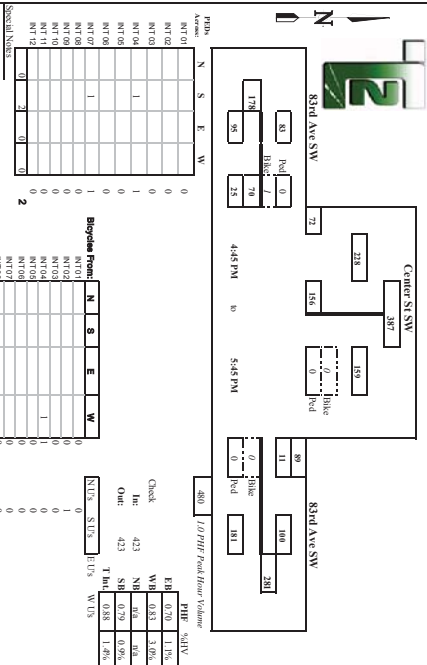




Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TCInc.com  
 WBE/DBE

Location: Center St SW & 83rd Ave SW  
 Date of Count: Tues 3/13/2015  
 Checked By: Jess

Time Interval	From North on (SB)				From South on (NB)				From East on (WB)				From West on (EB)				Internal
Interval	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	Total
4:30P	1	30	0	23	0	0	0	0	3	0	3	12	0	13	4	0	85
4:30P	0	13	0	15	0	0	0	0	4	9	0	10	0	2	0	0	51
4:45P	2	23	0	13	0	0	0	0	2	12	2	15	4	0	0	0	71
5:00P	1	31	0	16	0	0	0	0	4	17	1	28	6	0	0	0	104
5:15P	0	36	0	23	0	0	0	0	0	0	0	0	8	6	0	0	96
5:30P	1	56	0	16	0	0	0	0	2	0	4	36	0	16	2	0	120
5:45P	0	31	0	17	0	0	0	0	0	0	26	0	18	11	0	0	103
6:00P	1	15	0	13	0	0	0	0	0	0	13	0	0	3	0	0	49
6:15P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total Survey</b>	<b>6</b>	<b>239</b>	<b>0</b>	<b>138</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>6</b>	<b>28</b>	<b>13</b>	<b>3</b>	<b>114</b>	<b>38</b>	<b>682</b>
Peak Hour: 4:45 PM to 5:45 PM																	
<b>Total</b>	<b>156</b>	<b>0</b>	<b>72</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>11</b>	<b>89</b>	<b>1</b>	<b>70</b>	<b>23</b>	<b>0</b>	<b>423</b>
Approach	4:26																
SAIV	4:26																
PHI	0.93																



Vehicle	N	S	E	W	Other	Check	PHI	SAIV
NT01	0	0	0	0	0	0	0.00	1.00
NT02	0	0	0	0	0	0	0.00	1.00
NT03	0	0	0	0	0	0	0.00	1.00
NT04	1	0	0	0	0	0	0.00	1.00
NT05	0	0	0	0	0	0	0.00	1.00
NT06	0	0	0	0	0	0	0.00	1.00
NT07	1	0	0	0	0	0	0.00	1.00
NT08	0	0	0	0	0	0	0.00	1.00
NT09	0	0	0	0	0	0	0.00	1.00
NT10	0	0	0	0	0	0	0.00	1.00
NT11	0	0	0	0	0	0	0.00	1.00
NT12	0	0	0	0	0	0	0.00	1.00
Special Notes:	2							

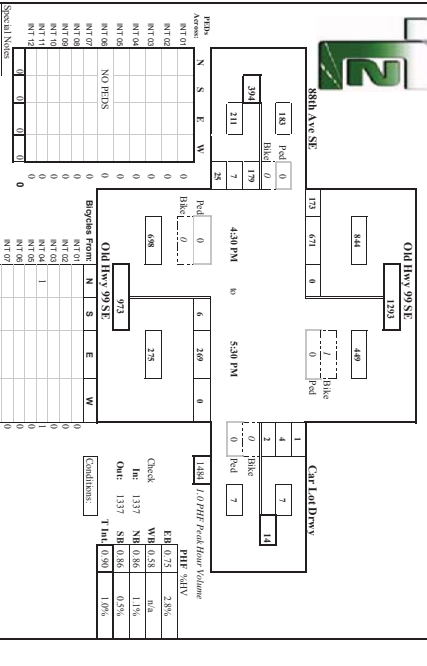
SCJ19250W\_09P



Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TCInc.com  
 WBE/DBE

Location: Old Hwy 99 SE & 88th Ave SE  
 Date of Count: Tues 6/23/2015  
 Checked By: Jess

Time Interval	From North on (SB)				From South on (NB)				From East on (WB)				From West on (EB)				Internal
Interval	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	Total
4:30P	5	1	144	43	4	1	65	0	0	0	0	0	0	0	3	29	304
4:30P	3	0	147	48	1	0	76	0	0	0	0	0	0	2	29	2	304
4:45P	1	0	166	33	0	2	66	0	0	0	1	1	53	1	2	324	
5:00P	0	0	138	43	1	1	64	0	0	0	1	1	0	2	41	2	284
5:15P	3	0	172	48	2	1	79	0	0	0	2	2	56	3	11	371	
5:30P	0	0	195	49	0	2	63	0	0	0	1	2	0	1	29	1	348
5:45P	2	0	142	42	1	1	59	0	0	0	0	0	0	0	28	0	4
6:00P	2	0	149	32	0	0	50	0	0	0	0	0	0	0	25	0	361
6:15P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total Survey</b>	<b>16</b>	<b>1</b>	<b>1251</b>	<b>338</b>	<b>9</b>	<b>8</b>	<b>519</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>1</b>	<b>11</b>	<b>301</b>	<b>12</b>	<b>41</b>	<b>2</b>	<b>2482</b>
Peak Hour: 4:30 PM to 5:30 PM																	
<b>Total</b>	<b>4</b>	<b>0</b>	<b>871</b>	<b>173</b>	<b>3</b>	<b>6</b>	<b>269</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>1</b>	<b>6</b>	<b>179</b>	<b>7</b>	<b>23</b>	<b>1337</b>
Approach	0.96																
SAIV	1.16																
PHI	0.96																



Vehicle	N	S	E	W	Other	Check	PHI	SAIV
NT01	0	0	0	0	0	0	0.00	1.00
NT02	0	0	0	0	0	0	0.00	1.00
NT03	0	0	0	0	0	0	0.00	1.00
NT04	0	0	0	0	0	0	0.00	1.00
NT05	0	0	0	0	0	0	0.00	1.00
NT06	0	0	0	0	0	0	0.00	1.00
NT07	0	0	0	0	0	0	0.00	1.00
NT08	0	0	0	0	0	0	0.00	1.00
NT09	0	0	0	0	0	0	0.00	1.00
NT10	0	0	0	0	0	0	0.00	1.00
NT11	0	0	0	0	0	0	0.00	1.00
NT12	0	0	0	0	0	0	0.00	1.00
Special Notes:	0							

SCJ15075W\_09P



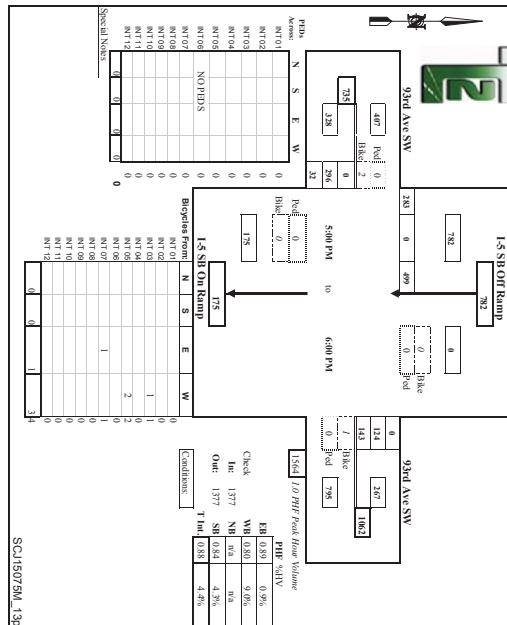
Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (251) 926-6099 FAX: (251) 925-7211 E-Mail: [Team@TC2inc.com](mailto:Team@TC2inc.com)

WB/BD/E Date of Count: Tues 6/23/2015

Intersection: I-5 SB Ramps & 51st Ave SW  
 Location: Tallapoosa, Washington  
 Checked By: Jess

Time Interval	From North on (SB)			From South on (NB)			From East on (WB)			From West on (EB)			Interval Total					
	T	L	S	T	L	S	T	L	S	T	L	S						
4:15 P	20	101	0	47	0	0	0	0	0	5	19	23	0	3	0	62	5	297
4:30 P	12	123	0	46	0	0	0	0	0	9	38	23	0	2	0	50	5	284
4:45 P	14	100	2	47	0	0	0	0	0	8	39	26	0	0	0	72	5	311
5:00 P	10	117	1	49	0	0	0	0	0	7	34	22	0	0	0	54	3	280
5:15 P	6	115	0	64	0	0	0	0	0	6	48	35	0	2	0	80	12	354
5:30 P	7	135	0	98	0	0	0	0	0	8	35	37	0	1	0	78	8	391
5:45 P	10	133	0	66	0	0	0	0	0	4	30	24	0	0	0	85	5	347
6:00 P	11	116	0	55	0	0	0	0	0	4	30	24	0	0	0	53	7	285
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>96</b>	<b>919</b>	<b>3</b>	<b>472</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>51</b>	<b>293</b>	<b>218</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>514</b>	<b>30</b>	<b>2595</b>

Approach	Peak Hour: 5:00 PM		Peak Hour: 6:00 PM		Total
	Vol	%IV	Vol	%IV	
Approach	34	40%	23	24%	137
%IV	4.3%	0%	6.9%	7.6%	137
PIF	0.84	0%	0.92	0.80	0.88



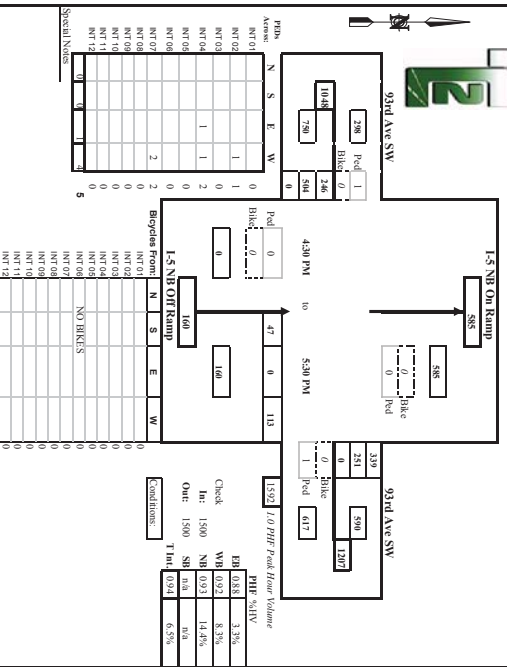
Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (251) 926-6099 FAX: (251) 925-7211 E-Mail: [Team@TC2inc.com](mailto:Team@TC2inc.com)

WB/BD/E Date of Count: Tues 6/23/2015

Intersection: I-5 NB Ramps & 93rd Ave SW  
 Location: Tallapoosa, Washington  
 Checked By: Jess

Time Interval	From North on (SB)			From South on (NB)			From East on (WB)			From West on (EB)			Interval Total				
	T	L	S	T	L	S	T	L	S	T	L	S					
4:15 P	0	0	0	0	8	5	2	24	15	0	42	77	15	44	119	0	313
4:30 P	0	0	0	0	11	4	0	33	12	0	52	88	9	46	126	0	349
4:45 P	0	0	0	0	7	14	0	27	17	0	70	88	10	47	125	0	371
5:00 P	0	0	0	0	4	9	0	28	9	0	47	83	7	54	117	0	343
5:15 P	0	0	0	0	8	16	0	27	16	0	67	94	5	67	107	0	398
5:30 P	0	0	0	0	4	8	0	31	7	0	67	69	3	58	155	0	388
5:45 P	0	0	0	0	4	7	0	17	11	0	48	71	11	69	149	0	361
6:00 P	0	0	0	0	2	7	0	23	11	0	47	73	12	39	130	0	319
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>48</b>	<b>70</b>	<b>2</b>	<b>210</b>	<b>98</b>	<b>0</b>	<b>440</b>	<b>648</b>	<b>72</b>	<b>444</b>	<b>1028</b>	<b>0</b>	<b>2842</b>	

Approach	Peak Hour: 4:30 PM		Peak Hour: 5:30 PM		Total
	Vol	%IV	Vol	%IV	
Approach	0	0%	23	47%	113
%IV	0	0%	160	83%	750
PIF	n/a	0.93	0.92	0.88	0.94





Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: [Team@TC2inc.com](mailto:Team@TC2inc.com)

WB/DR/RE

Location: Kinross St SW & 93rd Ave SW

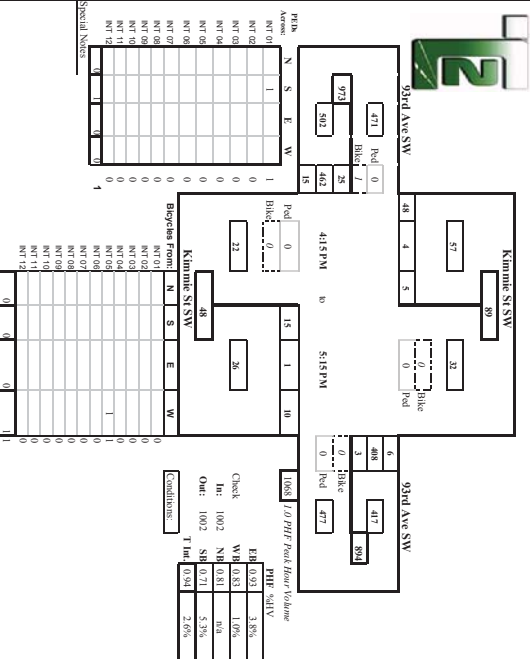
Time: Tamworth, Washington

Date of Count: Tues 6/23/2015

Checked By: Jess

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
4:15 P	1	2	1	1	5
4:30 P	1	2	1	1	5
4:45 P	0	2	0	0	2
5:00 P	1	1	1	1	4
5:15 P	1	1	1	1	4
5:30 P	1	2	1	1	5
5:45 P	1	3	1	1	6
6:00 P	2	0	3	0	5
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>10</b>	<b>14</b>	<b>8</b>	<b>8</b>	<b>40</b>
<b>Survey</b>	<b>10</b>	<b>14</b>	<b>8</b>	<b>8</b>	<b>40</b>

Time Interval	Approach	%IV	PIF
Total	57	5.3%	0.21
Approach	57	5.3%	0.21
%IV	5.3%	19%	0.83
PIF	0.21	0.81	0.93



Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: [Team@TC2inc.com](mailto:Team@TC2inc.com)

WB/DR/RE

Location: Case Rd SW & 93rd Ave SW

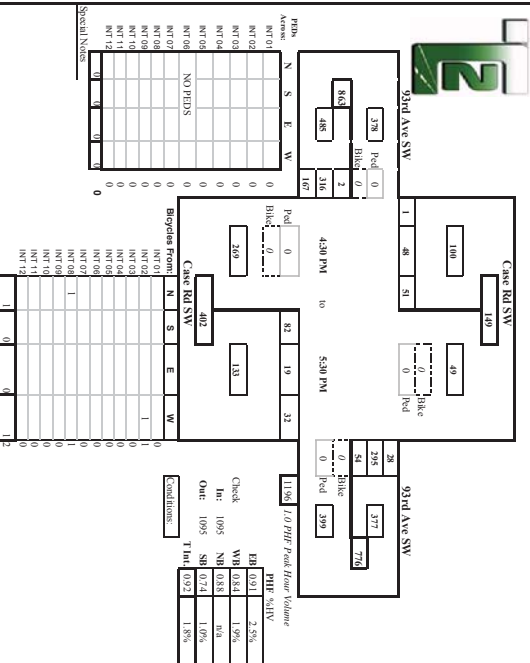
Time: Tamworth, Washington

Date of Count: Tues 6/23/2015

Checked By: Jess

Time Interval	From North on (SB)	From South on (NB)	From East on (WB)	From West on (EB)	Interval Total
4:15 P	1	8	9	9	27
4:30 P	0	10	7	0	17
4:45 P	0	10	10	1	21
5:00 P	1	9	8	0	18
5:15 P	0	22	12	0	34
5:30 P	0	10	18	0	28
5:45 P	0	9	9	0	18
6:00 P	0	9	9	0	18
6:15 P	0	0	0	0	0
6:30 P	0	0	0	0	0
6:45 P	0	0	0	0	0
7:00 P	0	0	0	0	0
<b>Total</b>	<b>3</b>	<b>91</b>	<b>85</b>	<b>1</b>	<b>179</b>
<b>Survey</b>	<b>3</b>	<b>91</b>	<b>85</b>	<b>1</b>	<b>179</b>

Time Interval	Approach	%IV	PIF
Total	131	1.0%	0.24
Approach	100	1.0%	0.24
%IV	1.0%	19%	0.88
PIF	0.24	0.88	0.91





Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TCCinc.com  
 WRE/DRE

Location: **Tilley Rd SW (South Leg) & 93rd Ave SW**

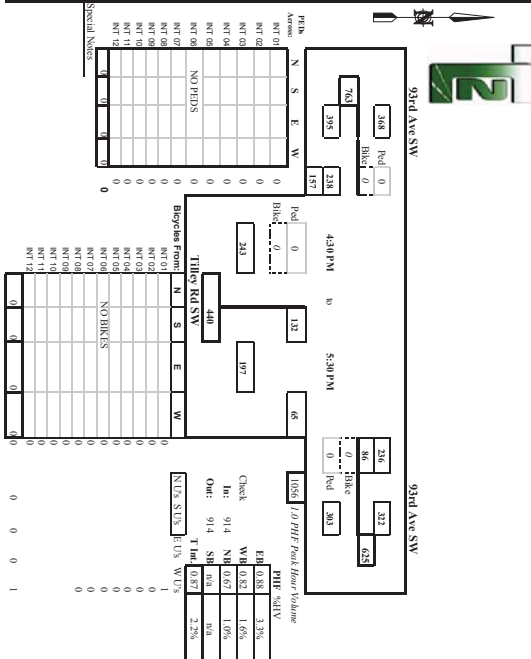
Date of Count:  **Tues 6/23/2015**

Checked By: **Jess**

Time Interval	From North on (SB)				From South on (NB)				From East on (WB)				From West on (EB)				Interval Total	
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R		
4:15 P	0	0	0	0	0	0	0	0	14	1	19	49	0	10	0	49	37	190
4:30 P	0	0	0	0	0	0	0	0	16	0	14	53	0	5	0	51	33	215
4:45 P	0	0	0	0	1	43	0	30	0	13	42	0	4	0	45	42	223	
5:00 P	0	0	0	0	0	20	0	14	0	21	45	0	3	0	49	36	208	
5:15 P	0	0	0	0	0	40	0	14	3	24	24	0	3	0	29	34	264	
5:30 P	0	0	0	0	1	29	0	7	2	25	55	0	3	0	56	45	217	
5:45 P	0	0	0	0	0	24	0	6	0	14	51	0	1	0	46	46	187	
6:00 P	0	0	0	0	0	16	0	5	0	18	35	0	1	0	39	33	166	
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>232</b>	<b>0</b>	<b>106</b>	<b>6</b>	<b>151</b>	<b>424</b>	<b>0</b>	<b>30</b>	<b>0</b>	<b>443</b>	<b>306</b>	<b>1672</b>	
<b>Survey</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>232</b>	<b>0</b>	<b>106</b>	<b>6</b>	<b>151</b>	<b>424</b>	<b>0</b>	<b>30</b>	<b>0</b>	<b>443</b>	<b>306</b>	<b>1672</b>	

Peak Hour: 4:30 PM to 5:30 PM

Total	0	0	0	0	2	151	0	65	5	86	236	0	13	0	248	157	914
Approach	0	0	0	0	197				322				395				914
%IV	n/a	n/a	n/a	n/a	13%				14%				33%				87%
PIF	n/a	n/a	n/a	n/a	0.87				0.82				0.88				0.87



Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**  
 Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TCCinc.com  
 WRE/DRE

Location: **Tilley Rd SW (North Leg) & 93rd Ave SW**

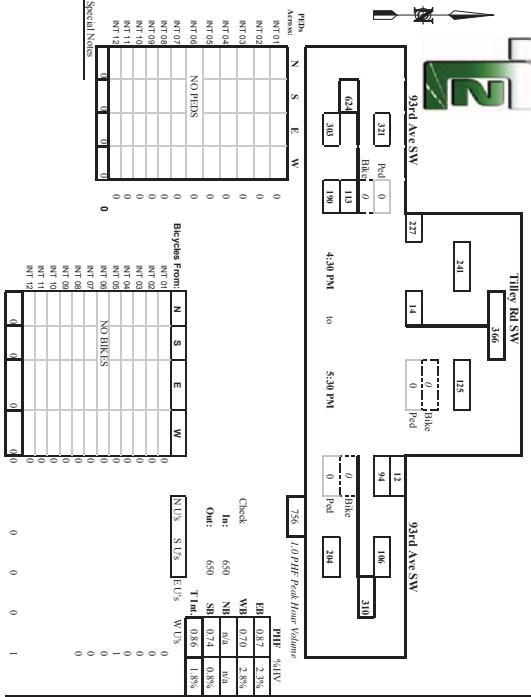
Date of Count:  **Tues 6/23/2015**

Checked By: **Jess**

Time Interval	From North on (SB)				From South on (NB)				From East on (WB)				From West on (EB)				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	1	4	0	0	0	0	0	0	18	5	8	22	43	0	142		
4:30 P	1	5	0	0	0	0	0	0	26	2	3	22	38	0	132		
4:45 P	0	4	0	0	0	0	0	0	15	4	2	39	45	0	147		
5:00 P	0	2	0	0	0	0	0	0	35	3	3	34	36	0	155		
5:15 P	1	3	0	0	0	0	0	0	18	3	2	25	62	0	189		
5:30 P	1	3	0	0	0	0	0	0	26	2	0	15	47	0	149		
5:45 P	0	3	0	0	0	0	0	0	22	4	0	21	34	0	128		
6:00 P	0	4	0	0	0	0	0	0	23	4	0	14	53	0	122		
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<b>Total</b>	<b>4</b>	<b>30</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>4</b>	<b>0</b>	<b>183</b>	<b>23</b>	<b>19</b>	<b>192</b>	<b>358</b>	<b>0</b>
<b>Survey</b>	<b>4</b>	<b>30</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>4</b>	<b>0</b>	<b>183</b>	<b>23</b>	<b>19</b>	<b>192</b>	<b>358</b>	<b>0</b>

Peak Hour: 4:30 PM to 5:30 PM

Total	2	14	0	0	227	0	0	0	3	0	0	94	12	7	113	190	650
Approach	241				0				106				303				650
%IV	28%				n/a				28%				22%				18%
PIF	0.74				n/a				0.70				0.87				0.86





Prepared for: **SCJ Alliance**  
**Traffic Count Consultants, Inc.**

Phone: (253) 924-6009 FAX: (253) 923-7211 E-Mail: [Tam@TC2inc.com](mailto:Tam@TC2inc.com)

WBED:08

Intersection: Old Hwy 99 SE & 59th Ave SW

Location: Tumwater, Washington

Date of Count: Tues 03/23/2015

Checked By: Jess

Time Interval	From North on (SB)				From South on (NB)				From East on (WB)				From West on (EB)				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	3	0	122	3	2	12	41	0	0	0	0	0	4	4	0	31	213
4:30 P	1	0	129	10	1	20	53	0	0	0	0	0	1	7	0	26	245
4:45 P	0	0	152	6	0	14	57	0	0	0	0	0	3	0	39	271	
5:00 P	0	0	130	8	0	21	59	0	0	0	0	0	0	3	0	26	247
5:15 P	2	0	170	7	2	13	48	0	0	0	0	2	4	0	31	293	
5:30 P	0	0	178	7	3	22	49	0	0	0	0	0	6	0	39	301	
5:45 P	1	0	121	6	1	16	52	0	0	0	0	0	4	0	26	234	
6:00 P	1	0	138	7	0	17	37	0	0	0	0	1	0	28	238		
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Total</b>	<b>8</b>	<b>0</b>	<b>1440</b>	<b>54</b>	<b>9</b>	<b>135</b>	<b>396</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>8</b>	<b>32</b>	<b>0</b>	<b>225</b>	<b>2022</b>

**Peak Hour: 4:30 PM to 5:30 PM**

Total	2	0	630	28	5	70	213	0	0	0	0	2	16	0	154	1112
Approach	638				283				0				171			1112
SATV	0.96				4.86				0.00				1.78			0.96
PHV	0.89				0.82				0.00				0.78			0.92

**Old Hwy 99 SE**  
 59th Ave SW

**Peak Hour: 4:30 PM to 5:30 PM**

**PHV - SATV**  
 PHV: 0.78, SATV: 1.26  
 CHUCK: WH: 5.0, NB: 0.0  
 IN: 1112, NH: 0.88, L: 8.0  
 OUT: 1112, SH: 0.89, R: 3.5  
 T: Ind: 0.92, 0.85

**Conditions:**

Time	N	S	E	W
INT 01	0	0	0	0
INT 02	0	0	0	0
INT 03	0	0	0	0
INT 04	0	0	0	0
INT 05	0	0	0	0
INT 06	0	0	0	0
INT 07	0	0	0	0
INT 08	0	0	0	0
INT 09	0	0	0	0
INT 10	0	0	0	0
INT 11	0	0	0	0
INT 12	0	0	0	0
INT 13	0	0	0	0
INT 14	0	0	0	0
INT 15	0	0	0	0

**Special Notes:**

SCJ15075M\_428

---

**APPENDIX A-2**  
**INTERSECTION CRASH DATA**

---

JURISDICTION	PRIMARY TRAFFICWAY	MILE POST	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	#FAT	#VEH	#PED S	#PED AL	JUNCTION RELATIONSHIP	FIRST COLLISION TYPE / OBJECT STRUCK
--------------	--------------------	-----------	--------------	-------------------------	------	------	-------------------------	-------	------	------	--------	---------	-----------------------	--------------------------------------

**1 - R W Johnson Blvd /Mottman Rd**

City Street	R W JOHNSON BLVD SW	2400		MOTTMAN RD SW	4/2/2010	11:40	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	R W JOHNSON BLVD SW	2400		MOTTMAN RD SW	9/8/2010	14:29	Possible Injury	1	0	1	0	0	At Intersection and Related	Vehicle overturned
City Street	R W JOHNSON BLVD SW	2400		MOTTMAN RD SW	11/3/2011	16:47	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - sideswipe
City Street	R W JOHNSON BLVD SW	2400		MOTTMAN RD SW	10/30/2013	14:50	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	R W JOHNSON BLVD SW	2400		MOTTMAN RD SW	6/25/2012	16:50	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	MOTTMAN RD SW	3100		R W JOHNSON BLVD SW	8/7/2014	11:58	Possible Injury	1	0	2	0	0	At Intersection and Related	Entering at angle
City Street	MOTTMAN RD SW	3200		R W JOHNSON BLVD SW	11/6/2012	16:12	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	MOTTMAN RD SW	3200		R W JOHNSON BLVD SW	11/4/2013	13:03	Evident Injury	2	0	2	0	0	At Intersection and Related	Entering at angle

**2 - Crosby Blvd /Mottman Rd**

City Street	CROSBY BLVD SW	1000		MOTTMAN RD SW	11/16/2011	13:00	Possible Injury	1	0	2	0	0	At Driveway within Major Intersection	Entering at angle
City Street	CROSBY BLVD SW	1000			9/9/2013	17:46	No Injury	0	0	3	0	0	Driveway Related but Not at Driveway	From same direction - both going straight - one stopped - rear-end
City Street	CROSBY BLVD SW	1000			12/26/2013	12:59	No Injury	0	0	2	0	0	At Driveway	Entering at angle
City Street	CROSBY BLVD SW	1000			6/27/2013	17:47	No Injury	0	0	2	0	0	At Driveway	From opposite direction - one left turn - one straight
City Street	CROSBY BLVD SW	1000			1/9/2014	22:50	No Injury	0	0	2	0	0	At Driveway	From same direction - one left turn - one straight
City Street	CROSBY BLVD SW	1000			6/16/2014	15:00	No Injury	0	0	1	0	0	At Driveway	Fire Hydrant
City Street	MOTTMAN RD SW	1700		CROSBY BLVD SW	10/9/2010	15:01	Evident Injury	2	0	2	0	0	At Intersection and Related	Entering at angle
City Street	MOTTMAN RD SW	1700			1/14/2010	15:51	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	MOTTMAN RD SW	1100			12/4/2014	7:51	No Injury	0	0	2	0	0	At Driveway	Entering at angle
State Route	101LX36642	0.24			11/18/2013	18:40	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	101LX36642	0.24			11/20/2013	17:50	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	101LX36642	0.24			11/3/2014	8:42	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	101LX36642	0.24			9/2/2014	16:40	Possible Injury	1	0	2	0	0	At Intersection and Related	Entering at angle
State Route	101LX36642	0.24			8/7/2014	17:10	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	101LX36642	0.24			1/23/2010	17:45	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	101LX36642	0.24			2/11/2011	12:56	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	101LX36642	0.24			12/2/2013	17:43	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	101LX36642	0.24			5/26/2010	18:59	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - both moving - sideswipe
State Route	101LX36642	0.24			10/15/2011	20:05	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	101LX36642	0.24			1/19/2013	13:22	No Injury	0	0	2	0	0	At Driveway within Major Intersection	Entering at angle
State Route	101LX36642	0.24			5/10/2010	13:23	No Injury	0	0	3	0	0	At Driveway within Major Intersection	From opposite direction - one left turn - one straight
State Route	101LX36642	0.24			6/1/2012	11:39	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	101LX36642	0.24			2/19/2010	14:53	No Injury	0	0	2	0	0	At Driveway within Major Intersection	From opposite direction - one left turn - one straight
State Route	101LX36642	0.24			6/9/2012	9:15	Possible Injury	2	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	101LX36642	0.24			9/4/2012	13:17	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	101LX36642	0.24			1/13/2010	12:23	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	101LX36642	0.24			11/21/2012	16:22	Possible Injury	2	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	101LX36642	0.24			5/24/2013	16:50	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	101LX36642	0.24			2/4/2010	19:08	Evident Injury	3	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end

**3 - Crosby Blvd/Irving St**

City Street	CROSBY BLVD SW	1000		IRVING ST SW	3/5/2010	13:24	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CROSBY BLVD SW	2800		IRVING ST SW	6/1/2014	17:04	Possible Injury	1	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CROSBY BLVD SW	2800		IRVING ST SW	11/22/2010	9:46	No Injury	0	0	1	0	0	At Intersection and Related	Signal Pole
City Street	CROSBY BLVD SW	2800		IRVING ST SW	11/17/2010	10:59	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CROSBY BLVD SW	2800		IRVING ST SW	7/23/2010	17:51	Possible Injury	1	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CROSBY BLVD SW			IRVING ST SW	7/2/2014	17:09	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	CROSBY BLVD SW	2800		IRVING ST SW	10/14/2014	7:33	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CROSBY BLVD SW	2800		IRVING ST SW	6/24/2010	20:07	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - sideswipe
City Street	CROSBY BLVD SW	2800		IRVING ST SW	12/11/2013	13:05	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	CROSBY BLVD SW	1000		IRVING ST SW	3/2/2010	16:35	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CROSBY BLVD SW	1000		IRVING ST SW	12/11/2012	10:39	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CROSBY BLVD SW	1000		IRVING ST SW	1/15/2013	17:09	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CROSBY BLVD SW	2800			8/2/2010	13:41	No Injury	0	0	2	0	0	Intersection Related but Not at Intersection	From same direction - all others
City Street	CROSBY LOOP			IRVING ST SW	2/23/2011	7:17	Evident Injury	1	0	2	0	0	At Intersection and Related	From opposite direction - all others
City Street	IRVING ST SW		1500	CROSBY BLVD SW	2/21/2013	18:10	No Injury	0	0	1	0	0	At Intersection and Related	Curb, Raised Traffic Island or Raised Median Curb
City Street	IRVING ST SW		1550		6/25/2014	13:23	No Injury	0	0	2	0	0	At Driveway	From same direction - both going straight - one stopped - rear-end
City Street	IRVING ST SW				9/2/2014	15:12	No Injury	0	0	2	0	0	At Driveway	From same direction - both going straight - both moving - rear-end
City Street	IRVING ST SW		1400		5/17/2013	14:39	No Injury	0	0	2	0	0	At Driveway	From opposite direction - one left turn - one straight
Miscellaneous Tr	SPSC DRIVEWAY				9/25/2012	13:14	No Injury	0	0	2	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - one stopped - rear-end

**4 - 7th Ave/Irving St**



JURISDICTION	PRIMARY TRAFFICWAY	MILE POST	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	#FAT	#VEH	#PED S	#PED AL	JUNCTION RELATIONSHIP	FIRST COLLISION TYPE / OBJECT STRUCK
--------------	--------------------	-----------	--------------	-------------------------	------	------	-------------------------	-------	------	------	--------	---------	-----------------------	--------------------------------------

**5 - Crosby Blvd/Barnes Blvd**

City Street	CROSBY BLVD SW	3000	BARNES BLVD SW		10/8/2012	14:37	No Injury	0	0	2	0	0	At Driveway within Major Intersection	From same direction - both going straight - one stopped - rear-end
-------------	----------------	------	----------------	--	-----------	-------	-----------	---	---	---	---	---	---------------------------------------	--

**6 - Black Lake Blvd/Black Lake Belmore Rd**

City Street	BLACK LAKE BLVD SW	3510			3/2/2012	14:21	No Injury	0	0	2	0	0	At Driveway	Entering at angle
City Street	BLACK LAKE BLVD SW	3400			7/7/2010	14:38	No Injury	0	0	2	0	0	At Driveway	From same direction - one left turn - one straight

**7 - R W Johnson Blvd /Sapp Rd**

City Street	R W JOHNSON BLVD SW	4600	SAPP RD SW		8/24/2012	2:34	No Injury	0	0	1	0	0	At Intersection and Related	Tree or Stump (stationary)
-------------	---------------------	------	------------	--	-----------	------	-----------	---	---	---	---	---	-----------------------------	----------------------------

**8 -Sapp Rd/Crosby Blvd**

City Street	SAPP RD SW	2000	CROSBY BLVD SW		4/25/2011	6:30	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
-------------	------------	------	----------------	--	-----------	------	-----------	---	---	---	---	---	-----------------------------	-------------------

**9 - 49th Ave/Black Lake Belmore Rd**

City Street	49TH AVE SW		BLACK LAKE BELMORE RD SW		8/8/2011	19:51	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - one left turn - one straight
City Street	49TH AVE SW	3700	BLACK LAKE BELMORE RD SW		11/1/2010	15:52	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle

**10 - Capitol Blvd at Carlyon Ave/Sunset Way**

City Street	CAPITOL BLVD S	3100	CARLYON AVE SE		7/24/2012	12:19	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
-------------	----------------	------	----------------	--	-----------	-------	-----------	---	---	---	---	---	-----------------------------	--

**11 -Deschutes Way / I-5 NB On-Ramp**

**12 -Deschutes Way /US 101 WB On-Ramp**

State Route	005P210402	0.00			7/1/2011	20:51	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
-------------	------------	------	--	--	----------	-------	-----------	---	---	---	---	---	-----------------------------	--

**13 -I-5/US 101 Off-Ramp at Desoto St/2nd Avenue**

State Route	005R110435	0.28			2/13/2012	17:07	No Injury	0	0	2	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - one stopped - rear-end
State Route	005R110435	0.29			9/25/2014	12:55	No Injury	0	0	3	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - one stopped - rear-end
State Route	005R110435	0.29			10/23/2010	13:20	Possible Injury	2	0	3	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - one stopped - rear-end
State Route	005R110435	0.29			1/20/2011	18:25	No Injury	0	0	3	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - one stopped - rear-end
State Route	005R110435	0.30			4/19/2013	13:55	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005R110435	0.30			3/12/2013	7:01	Possible Injury	1	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
State Route	005R110435	0.30			7/6/2012	12:08	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
State Route	005R110435	0.30			7/22/2012	11:38	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005R110435	0.30			5/28/2010	13:00	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005R110435	0.30			7/18/2014	11:05	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005R110435	0.30			10/31/2012	19:49	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005R110435	0.30			12/12/2013	15:16	Evident Injury	2	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005R110435	0.30			11/19/2012	7:01	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005R110435	0.30			12/9/2010	7:30	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005R110435	0.30			9/30/2014	18:47	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005R110435	0.30			2/19/2014	13:51	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005R110435	0.30			6/5/2012	13:54	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005S210373	0.22			6/3/2011	14:44	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end

**14 - 2nd Ave/Custer Way**

City Street	CUSTER WAY SW	100	N 2ND AVE SW		2/10/2010	7:02	Possible Injury	1	0	2	0	0	At Intersection and Related	Same direction -- both turning right -- one stopped -- rear end
City Street	CUSTER WAY SW	100	N 2ND AVE SW		7/31/2014	17:36	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	N 2 AV SW		CUSTER WY		11/2/2011	17:23	No Injury	0	0	1	0	0	At Intersection and Related	Bridge Rail - Face
City Street	N 2ND AVE SW	100	CUSTER WAY SW		10/14/2014	8:00	No Injury	0	0	1	0	0	At Intersection and Related	Curb, Raised Traffic Island or Raised Median Curb

**15 - Boston St /Custer Way**

City Street	CUSTER WAY SW	100	BOSTON ST SE		2/19/2012	12:48	No Injury	0	0	2	0	0	At Driveway within Major Intersection	From opposite direction - one left turn - one straight
City Street	CUSTER WAY SW	200	BOSTON ST SE		8/5/2013	21:20	Evident Injury	1	0	1	0	1	At Intersection and Related	Vehicle - Pedalcyclist
City Street	CUSTER WAY SW	200	BOSTON ST SE		5/24/2011	8:00	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CUSTER WAY SW	200	BOSTON ST SE		6/14/2012	7:51	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CUSTER WAY SW	200	BOSTON ST SE		1/21/2011	17:40	Possible Injury	1	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight

**16 - Deschutes Way/Boston St**

City Street	BOSTON ST SE	3600	DESCHUTES WAY SW		8/9/2013	12:25	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	BOSTON ST SE		DESCHUTES WAY SW		10/18/2011	21:09	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning right -- one stopped -- sideswipe
City Street	BOSTON ST SE	3600	DESCHUTES WAY SW		4/25/2012	17:24	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - one right turn - one straight
City Street	BOSTON ST SE	3600	DESCHUTES WAY SW		7/16/2013	18:29	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	BOSTON ST SE	3600	DESCHUTES WAY SW		4/1/2014	9:31	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	BOSTON ST SE	3600	DESCHUTES WAY SW		6/22/2011	17:29	No Injury	0	0	3	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - one stopped - rear-end
City Street	DESCHUTES WAY SW				10/29/2011	16:49	No Injury	0	0	2	0	0	At Driveway	Entering at angle

**17 - Cleveland Ave /Capitol Blvd**

JURISDICTION	PRIMARY TRAFFICWAY	MILE POST	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	#FAT	#VEH	#PED S	#PED AL	JUNCTION RELATIONSHIP	FIRST COLLISION TYPE / OBJECT STRUCK
City Street	CLEVELAND AVE			CAPITOL BLVD	9/10/2014	22:33	Evident Injury	1	0	1	1	0	At Intersection and Related	Vehicle turning right hits pedestrian
City Street	CLEVELAND AVE SE	500		CAPITOL BLVD S	11/15/2013	14:15	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CLEVELAND AVE SE	500		CAPITOL BLVD S	9/4/2013	17:20	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CLEVELAND AVE SE	500		CAPITOL BLVD S	9/26/2014	18:00	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end

**18 - Custer Way /Capitol Blvd**

City Street	CAPITOL BLVD S	3500		CUSTER WAY SE	2/8/2014	9:47	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD S			CUSTER WAY SE	1/6/2012	6:20	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	CAPITOL BLVD S	3300		CUSTER WAY SE	8/9/2010	13:47	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	CAPITOL BLVD S	3400		CUSTER WAY SE	9/19/2014	12:40	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning right -- one stopped -- rear end
City Street	CAPITOL BLVD S	3300		CUSTER WAY SW	9/22/2012	15:55	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - one right turn - one straight
City Street	CAPITOL BLVD S	3300		CUSTER WAY SW	1/22/2011	9:42	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD S			CUSTER WY SW	10/11/2011	12:08	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD S	3400			7/29/2010	15:55	No Injury	0	0	2	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - one stopped - rear-end
City Street	CUSTER WAY	300		CAPITOL BLVD S	8/20/2011	15:59	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - one stopped - rear-end
City Street	CUSTER WAY SE	400		CAPITOL BLVD S	9/11/2014	18:00	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - one left turn - one straight
City Street	CUSTER WAY SE	400		CAPITOL BLVD S	8/13/2013	13:09	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - one left turn - one straight
City Street	CUSTER WAY SE	400		CAPITOL BLVD S	12/18/2013	10:19	Possible Injury	1	0	3	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CUSTER WAY SE	400		CAPITOL BLVD S	5/20/2014	15:45	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CUSTER WAY SW	300		CAPITOL BLVD S	6/30/2010	7:33	No Injury	0	0	1	0	1	At Intersection and Related	Vehicle - Pedalcyclist
City Street	CUSTER WAY SW	300		CAPITOL BLVD S	9/15/2012	9:30	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - all others
City Street	CUSTER WAY SW	300		CAPITOL BLVD S	7/27/2013	14:45	Possible Injury	2	0	2	0	0	At Intersection and Related	From same direction - one left turn - one straight
City Street	CUSTER WAY SW	3500		CAPITOL BLVD S	11/25/2013	12:04	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CUSTER WAY SW	300		CAPITOL BLVD S	1/27/2013	16:50	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle

**19 - Custer Way /North St at Cleveland Ave**

City Street	CUSTER WAY SE	500		CLEVELAND AVE SE	10/11/2014	14:20	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - sideswipe
City Street	CUSTER WAY SE	500		CLEVELAND AVE SE	11/6/2014	17:18	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - sideswipe
City Street	CUSTER WAY SE	500		CLEVELAND AVE SE	12/22/2011	17:30	Possible Injury	1	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CUSTER WAY SE	500		CLEVELAND AVE SE	9/10/2012	18:27	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CUSTER WAY SE	500		CLEVELAND AVE SE	12/14/2014	8:43	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	CUSTER WAY SE	500		CLEVELAND AVE SE	10/22/2012	14:01	Possible Injury	2	0	2	0	0	At Intersection and Related	Entering at angle
City Street	CUSTER WAY SE	500		CLEVELAND AVE SE	5/21/2010	8:33	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - sideswipe
City Street	CUSTER WAY SE	500			2/11/2011	12:32	No Injury	0	0	2	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - one stopped - rear-end
City Street	NORTH ST SE			CLEVELAND AV SE	10/11/2011	11:40	Evident Injury	2	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	NORTH ST SE	300		CLEVELAND AVE SE	1/21/2011	7:59	Possible Injury	2	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	NORTH ST SE	200		CLEVELAND AVE SE	9/1/2011	18:06	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - sideswipe
City Street	NORTH ST SE			CLEVELAND AVE SE	3/14/2013	11:20	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	NORTH ST SE	300		CLEVELAND AVE SE	2/5/2013	16:03	Possible Injury	1	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CLEVELAND AVE SE	500		NORTH ST	9/24/2013	17:55	No Injury	0	0	2	0	0	At Driveway within Major Intersection	Entering at angle
City Street	CLEVELAND AVE SE	400		NORTH ST SE	9/25/2013	16:01	Possible Injury	1	0	2	0	0	At Intersection and Related	Entering at angle
City Street	CLEVELAND AVE SE	200		NORTH ST SE	9/16/2011	12:19	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	CLEVELAND AVE SE	400		NORTH ST SE	10/6/2013	15:36	Possible Injury	1	0	1	1	0	At Intersection and Related	Vehicle going straight hits pedestrian
City Street	CLEVELAND AVE SE			NORTH ST SE	3/17/2012	21:15	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	CLEVELAND AVE SE	400		NORTH ST SE	8/28/2013	18:43	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight

**20 - Hoody St /North St**

City Street	NORTH ST SE	800			5/23/2012	16:58	No Injury	0	0	2	0	0	At Driveway	From same direction - both going straight - one stopped - rear-end
City Street	NORTH ST SE	900			11/7/2012	7:30	Possible Injury	2	0	2	0	0	At Driveway	From same direction - both going straight - one stopped - rear-end

**21 - Deschutes Way / E Street / I-5 NB Off-Ramp**

**22 - Capitol Blvd / E St**

City Street	CAPITOL BLVD S	3700		E ST SW	5/18/2014	19:12	Possible Injury	3	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD S	0		E ST SW	12/15/2011	18:02	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD S	4100		E ST SW	11/12/2014	11:03	Possible Injury	1	0	1	1	0	At Intersection and Related	Vehicle turning left hits pedestrian
City Street	CAPITOL BLVD S	4100		E ST SW	9/12/2014	12:39	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD S	3700		E ST SW	3/25/2011	14:34	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD S	3700		E ST SW	7/3/2012	14:19	Possible Injury	1	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - both moving - rear-end
City Street	E ST SW	100		CAPITOL BLVD S	5/21/2010	15:13	Possible Injury	1	0	2	0	0	At Driveway within Major Intersection	Entering at angle
City Street	E ST SW	100		CAPITOL BLVD S	5/23/2014	12:36	Possible Injury	1	0	2	0	0	At Intersection and Related	Same direction -- both turning right -- one stopped -- rear end
City Street	E ST SW	100		CAPITOL BLVD S	11/4/2013	17:39	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	E ST SW	100		CAPITOL BLVD S	8/18/2010	18:29	No Injury	0	0	2	0	0	At Driveway within Major Intersection	Entering at angle
City Street	E ST SW	4100			4/7/2010	17:01	No Injury	0	0	2	0	0	At Driveway	Entering at angle

JURISDICTION	PRIMARY TRAFFICWAY	MILE POST	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	#FAT	#VEH	#PED S	#PED AL	JUNCTION RELATIONSHIP	FIRST COLLISION TYPE / OBJECT STRUCK
<b>23 - Cleveland Ave / South St</b>														
City Street	CLEVELAND AVE SE		4200	SOUTH ST SE	8/25/2014	18:37	Possible Injury	1	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	SOUTH ST SE		500	CLEVELAND AVE SE	6/4/2012	19:14	Evident Injury	2	0	2	0	0	At Intersection and Related	Entering at angle
<b>24 - 7th Ave / Linwood Ave</b>														
City Street	LINWOOD AVE SW		400	S 7TH AVE SW	4/28/2013	21:41	Possible Injury	1	0	2	0	0	At Intersection and Related	Entering at angle
City Street	LINWOOD AVE SW		400	S 7TH AVE SW	5/7/2010	17:36	Possible Injury	2	0	2	0	0	At Intersection and Related	Entering at angle
City Street	LINWOOD AVE SW			S 7TH AVE SW	5/12/2014	16:30	Unknown	0	0	1	0	0	At Intersection and Related	Fence
<b>25 - 2nd Ave / Linwood Ave</b>														
City Street	LINWOOD AVE SW			S 2ND AVE SW	12/20/2013	17:24	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	LINWOOD AVE SW			S 2ND AVE SW	10/10/2012	16:08	Possible Injury	1	0	2	0	0	At Intersection and Related	Entering at angle
City Street	LINWOOD AVE SW	300		S 2ND AVE SW	11/13/2012	9:09	No Injury	0	0	3	0	0	At Intersection and Related	Entering at angle
City Street	LINWOOD AVE SW	300		S 2ND AVE SW	3/27/2014	20:30	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one right turn
City Street	S 2ND AVE SW			LINWOOD AVE SW	4/10/2014	13:19	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	S 2ND AVE SW	1000		LINWOOD AVE SW	6/27/2010	12:05	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - sideswipe
City Street	S 2ND AVE SW	1000		LINWOOD AVE SW	10/19/2013	11:21	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	S 2ND AVE SW			LINWOOD AVE SW	4/12/2011	7:48	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	S 2ND AVE SW	1000		LINWOOD AVE SW	11/25/2014	11:54	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	S 2ND AVE SW	1000		LINWOOD AVE SW	10/31/2010	11:56	Possible Injury	1	0	2	0	0	At Intersection and Related	Entering at angle
City Street	S 2ND AVE SW	1000		LINWOOD AVE SW	12/3/2013	9:40	No Injury	0	0	2	0	0	At Driveway	Entering at angle
<b>26 - Capitol Blvd / Linwood Ave</b>														
City Street	CAPITOL BLVD SE		4000	LINWOOD AVE SW	11/1/2013	20:14	No Injury	0	0	1	0	0	At Intersection and Related	Bridge Abutment
City Street	CAPITOL BLVD SE		4700	LINWOOD AVE SW	3/2/2012	12:17	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SE			LINWOOD AVE SW	7/29/2011	15:16	No Injury	0	0	3	0	0	At Intersection and Related	From same direction - both going straight - one stopped - sideswipe
City Street	CAPITOL BLVD SW			LINWOOD AVE SW	3/30/2013	17:15	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CAPITOL BLVD SW	4100		LINWOOD AVE SW	11/21/2014	12:27	Possible Injury	1	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CAPITOL BLVD SW			LINWOOD AVE SW	5/3/2014	20:42	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	LINWOOD AVE SW			CAPITOL BLVD SE	8/3/2010	7:59	Possible Injury	1	0	2	0	0	At Intersection and Related	Entering at angle
City Street	LINWOOD AVE SW			CAPITOL BLVD SW	11/20/2012	14:42	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
<b>27 - Henderson Blvd / Yelm Hwy</b>														
City Street	HENDERSON BLVD SE	4600		YELM HWY SE	9/20/2014	21:22	Evident Injury	2	0	2	0	0	At Intersection and Related	Entering at angle
City Street	HENDERSON BLVD SE	4500		YELM HWY SE	8/31/2012	14:55	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	HENDERSON BLVD SE			YELM HWY SE	9/21/2014	10:35	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	HENDERSON BLVD SE	4500		YELM HWY SE	11/24/2010	13:40	No Injury	0	0	3	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	HENDERSON BLVD SE	4500		YELM HWY SE	4/4/2011	6:59	Evident Injury	1	0	2	0	0	At Intersection and Related	From same direction - all others
City Street	HENDERSON BLVD SE	4500		YELM HWY SE	8/2/2013	21:41	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning right -- one stopped -- rear end
City Street	HENDERSON BLVD SE	4500		YELM HWY SE	12/18/2012	9:13	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	HENDERSON BLVD SE	4500		YELM HWY SE	8/9/2012	19:01	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning right -- one stopped -- rear end
City Street	HENDERSON BLVD SE	4500		YELM HWY SE	12/31/2012	19:15	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	HENDERSON BLVD SE			YELM HWY SE	10/31/2014	14:46	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning right -- one stopped -- rear end
City Street	HENDERSON BLVD SE			YELM HWY SE	10/14/2013	18:00	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - one left turn - one straight
City Street	HENDERSON BLVD SE	1300		YELM HWY SE	11/19/2011	19:05	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	HENDERSON BLVD SE	4500		YELM HWY SE	4/23/2010	19:10	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	HENDERSON BLVD SE	4500		YELM HWY SE	10/19/2012	7:18	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	HENDERSON BLVD SE	4500		YELM HWY SE	4/17/2013	18:40	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	HENDERSON BLVD SE	4500		YELM HWY SE	2/5/2013	15:12	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	HENDERSON BLVD SE	4600		YELM HWY SE	7/7/2014	19:23	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning right -- one stopped -- rear end
City Street	HENDERSON BLVD SE	4600		YELM HWY SE	1/9/2014	17:40	Possible Injury	2	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	HENDERSON BLVD SE			YELM HWY SE	3/21/2014	15:20	Possible Injury	1	0	2	0	0	At Intersection and Related	Same direction -- both turning right -- one stopped -- rear end
City Street	HENDERSON BLVD SE	4500		YELM HWY SE	5/13/2010	8:08	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - rear-end
City Street	HENDERSON BLVD SE	4500		YELM HWY SE	6/30/2013	16:24	Possible Injury	1	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	YELM HWY			HENDERSON BLVD	7/21/2011	22:42	Possible Injury	2	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	YELM HWY SE	1700		HENDERSON BLVD SE	9/22/2010	18:08	Evident Injury	1	0	1	0	1	At Intersection and Related	Vehicle - Pedalcyclist
City Street	YELM HWY SE	1700		HENDERSON BLVD SE	4/30/2010	17:53	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - both moving - rear-end
City Street	YELM HWY SE			HENDERSON BLVD SE	10/17/2014	11:40	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	YELM HWY SE	1700		HENDERSON BLVD SE	3/7/2014	19:05	Evident Injury	2	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	YELM HWY SE			HENDERSON BLVD SE	3/21/2014	7:50	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	YELM HWY SE	1700		HENDERSON BLVD SE	7/11/2013	11:25	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	YELM HWY SE	1700		HENDERSON BLVD SE	3/17/2014	18:45	Possible Injury	2	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	YELM HWY SE	1700		HENDERSON BLVD SE	1/4/2010	21:20	Possible Injury	1	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	YELM HWY SE	1700		HENDERSON BLVD SE	12/10/2014	16:40	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle

JURISDICTION	PRIMARY TRAFFICWAY	MILE POST	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	#FAT	#VEH	#PED S	#PED AL	JUNCTION RELATIONSHIP	FIRST COLLISION TYPE / OBJECT STRUCK
City Street	YELM HWY SE		1700	HENDERSON BLVD SE	5/3/2013	13:38	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	YELM HWY SE		1700	HENDERSON BLVD SE	11/24/2010	13:28	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - rear-end
City Street	YELM HWY SE		1700	HENDERSON BLVD SE	9/25/2010	14:13	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	YELM HWY SE		1700	HENDERSON BLVD SE	9/21/2010	20:07	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	YELM HWY SE		1700	HENDERSON BLVD SE	7/12/2010	18:06	No Injury	0	0	3	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	YELM HWY SE		1700	HENDERSON BLVD SE	7/13/2012	13:44	Possible Injury	1	0	2	0	0	At Intersection and Related	Entering at angle

**28 - Rural Rd / Trospen Rd**

City Street	TROSPER RD SW		2100	RURAL RD SW	5/27/2010	17:46	Possible Injury	1	0	2	0	0	At Intersection and Related	Entering at angle
City Street	TROSPER RD SW		2100	RURAL RD SW	7/17/2012	15:48	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	TROSPER RD SW		2100	RURAL RD SW	1/8/2011	10:35	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	TROSPER RD SW		2100	RURAL RD SW	3/13/2012	8:14	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle

**29 - Lake Park Dr / Trospen Rd**

City Street	TROSPER RD SW		800	LAKE PARK DR SW	6/1/2012	17:35	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	TROSPER RD SW		800	LAKE PARK DR SW	11/11/2013	19:51	Possible Injury	2	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	TROSPER RD SW		800	LAKE PARK DR SW	9/17/2013	11:08	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	TROSPER RD SW		1000		4/28/2010	18:49	Serious Injury	1	0	1	0	1	At Driveway	Vehicle - Pedalcyclist

**30 - Littlerock Rd / Trospen Rd**

City Street	LITTLEROCK RD SW		5300	TROSPER RD SW	12/8/2013	17:09	Possible Injury	2	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one right turn
City Street	LITTLEROCK RD SW		5300	TROSPER RD SW	1/9/2013	17:16	No Injury	0	0	2	0	0	At Driveway within Major Intersection	From same direction - both going straight - both moving - sideswipe
City Street	LITTLEROCK RD SW		5300	TROSPER RD SW	12/6/2012	17:11	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - one stopped - rear-end
City Street	LITTLEROCK RD SW		5300	TROSPER RD SW	7/20/2013	13:13	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	LITTLEROCK RD SW		5300	TROSPER RD SW	10/7/2011	13:39	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - sideswipe
City Street	LITTLEROCK RD SW		5300	TROSPER RD SW	1/29/2010	8:18	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - sideswipe
City Street	LITTLEROCK RD SW		5300	TROSPER RD SW	5/18/2013	15:01	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	LITTLEROCK RD SW		5300	TROSPER RD SW	9/12/2012	14:37	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - sideswipe
City Street	LITTLEROCK RD SW		5300	TROSPER RD SW	2/3/2014	22:30	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - all others
City Street	LITTLEROCK RD SW		5300		3/18/2010	19:39	No Injury	0	0	2	0	0	At Driveway	Entering at angle
City Street	LITTLEROCK RD SW		5300		4/17/2012	16:49	No Injury	0	0	2	0	0	At Driveway	Entering at angle
City Street	TROSPER RD SW		600	LITTLEROCK RD SW	11/14/2013	13:23	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - all others
City Street	TROSPER RD SW		600	LITTLEROCK RD SW	1/11/2014	12:41	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	TROSPER RD SW			LITTLEROCK RD SW	1/10/2012	10:15	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	TROSPER RD SW		600	LITTLEROCK RD SW	8/25/2010	19:09	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	TROSPER RD SW		600	LITTLEROCK RD SW	4/16/2010	18:00	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	TROSPER RD SW		600	LITTLEROCK RD SW	10/25/2010	12:22	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	TROSPER RD SW		600	LITTLEROCK RD SW	9/27/2013	14:49	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	TROSPER RD SW		600	LITTLEROCK RD SW	8/14/2010	11:19	No Injury	0	0	2	0	0	At Driveway within Major Intersection	Entering at angle
City Street	LITTLEROCK RD SW		5300		12/30/2013	16:33	No Injury	0	0	2	0	0	At Driveway	From opposite direction - one left turn - one straight
City Street	LITTLEROCK RD SW		5300		11/10/2014	10:58	No Injury	0	0	2	0	0	At Driveway	Entering at angle
City Street	LITTLEROCK RD SW		5300		10/14/2012	19:24	No Injury	0	0	2	0	0	At Driveway	Entering at angle
City Street	LITTLEROCK RD SW		5300		11/9/2013	13:20	No Injury	0	0	2	0	0	At Driveway	Entering at angle
City Street	LITTLEROCK RD SW		5300		2/10/2010	15:51	Possible Injury	1	0	2	0	0	At Driveway	Entering at angle
City Street	LITTLEROCK RD SW		5300		11/6/2011	9:00	No Injury	0	0	2	0	0	At Driveway	Entering at angle
City Street	LITTLEROCK RD SW			S 2ND AVE SW	12/1/2014	17:00	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	LITTLEROCK RD SW		5300		9/24/2012	7:21	No Injury	0	0	1	0	0	At Driveway	Fence
City Street	LITTLEROCK RD SW		5300		7/26/2012	17:17	Possible Injury	1	0	2	0	0	At Driveway	Entering at angle
City Street	S 2ND AVE SW		500	TROSPER RD SW	11/24/2011	11:48	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	S 2ND AVE SW		1700		6/24/2010	11:36	No Injury	0	0	2	0	0	At Driveway	Same direction -- both turning right -- both moving -- sideswipe
City Street	TROSPER RD SW		600	S 2ND AVE SW	3/17/2010	16:21	No Injury	0	0	2	0	0	At Driveway within Major Intersection	Entering at angle
City Street	TROSPER RD SW		600	S 2ND AVE SW	8/26/2011	20:27	Possible Injury	3	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end

**31 - I-5 SB Ramps/Tyee Dr at Trospen Rd**

State Route	005LX10279	0.02			10/7/2014	13:36	Possible Injury	2	0	3	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.02			6/18/2012	22:44	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX10279	0.02			5/1/2013	17:30	Possible Injury	3	0	3	0	0	At Intersection and Related	From same direction - both going straight - both moving - rear-end
State Route	005LX10279	0.02			11/14/2014	13:58	No Injury	0	0	3	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.02			10/23/2010	18:24	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX10279	0.02			10/13/2012	14:35	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX10279	0.02			2/9/2012	17:38	Possible Injury	1	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - both moving - rear-end
State Route	005LX10279	0.02			10/1/2013	13:30	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - all others
State Route	005LX10279	0.02			11/9/2012	16:55	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - both moving - sideswipe
State Route	005LX10279	0.02			2/14/2014	11:38	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - one stopped - rear-end

JURISDICTION	PRIMARY TRAFFICWAY	MILE POST	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	#FAT	#VEH	#PED S	#PED AL	JUNCTION RELATIONSHIP	FIRST COLLISION TYPE / OBJECT STRUCK
State Route	005LX10279	0.02			5/18/2011	19:05	Possible Injury	1	0	4	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.02			10/29/2010	16:15	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - both moving - rear-end
State Route	005LX10279	0.02			10/28/2013	11:46	No Injury	0	0	2	0	0	At Driveway within Major Intersection	Entering at angle
State Route	005LX10279	0.02			2/24/2011	16:40	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.02			5/7/2014	11:54	Possible Injury	3	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.02			8/8/2012	13:23	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.02			9/25/2010	21:38	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
State Route	005LX10279	0.02			1/10/2014	13:10	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning left -- both moving -- sideswipe
State Route	005LX10279	0.02			8/17/2011	16:07	No Injury	0	0	2	0	0	At Driveway within Major Intersection	From opposite direction - one left turn - one straight
State Route	005LX10279	0.02			1/9/2011	11:17	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - sideswipe
State Route	005LX10279	0.02			2/1/2014	12:48	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.02			5/19/2014	16:01	Possible Injury	1	0	3	0	0	At Intersection and Not Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.02			5/5/2011	12:51	No Injury	0	0	2	0	0	At Driveway within Major Intersection	Entering at angle
State Route	005LX10279	0.02			11/26/2012	8:42	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX10279	0.02			12/21/2010	17:55	Possible Injury	1	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.02			6/16/2011	19:09	Possible Injury	1	0	2	0	0	At Intersection and Not Related	From opposite direction - both going straight - sideswipe
State Route	005LX10279	0.02			4/7/2010	15:46	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - one left turn - one straight
State Route	005LX10279	0.02			2/8/2013	14:23	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - sideswipe
State Route	005LX10279	0.02			8/3/2012	18:00	No Injury	0	0	3	0	0	At Intersection and Not Related	From same direction - both going straight - both moving - rear-end
State Route	005LX10279	0.02			9/16/2011	11:18	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - both moving - sideswipe
State Route	005LX10279	0.02			10/5/2010	16:47	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.02			8/25/2011	11:55	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX10279	0.02			7/30/2014	12:46	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.02			9/4/2013	15:43	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.02			3/29/2012	11:32	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - both moving - sideswipe
State Route	005LX10279	0.02			9/16/2013	18:05	No Injury	0	0	3	0	0	At Intersection and Not Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.02			12/23/2014	20:40	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX10279	0.02			8/28/2013	20:00	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - all others
State Route	005LX10279	0.02			9/6/2013	14:40	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.02			9/10/2014	17:31	Evident Injury	1	0	3	0	0	At Intersection and Not Related	From same direction - both going straight - one moving - rear-end
State Route	005LX10279	0.02			3/16/2012	16:28	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.02			9/15/2013	14:32	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.02			8/12/2014	17:20	Possible Injury	1	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - both moving - rear-end
State Route	005LX10279	0.02			3/20/2013	14:54	Possible Injury	2	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX10279	0.02			8/12/2014	18:29	Possible Injury	1	0	1	0	1	At Intersection and Related	Vehicle - Pedalcyclist
State Route	005LX10279	0.02			11/23/2013	12:55	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - both moving - sideswipe
State Route	005LX10279	0.02			9/14/2013	11:42	Possible Injury	2	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	0055510247	0.02			12/12/2013	17:07	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005R110303	0.28			7/11/2011	14:26	No Injury	0	0	2	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - both moving - rear-end
State Route	005R110303	0.30			2/1/2011	16:20	No Injury	0	0	2	0	0	Intersection Related but Not at Intersection	From same direction - all others
State Route	005R110303	0.30			8/18/2011	20:45	No Injury	0	0	1	0	0	Intersection Related but Not at Intersection	Vehicle overturned
State Route	005R110303	0.31			12/31/2014	10:35	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005R110303	0.32			4/1/2011	12:39	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - sideswipe
State Route	005R110303	0.32			3/7/2012	19:44	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005R110303	0.32			4/7/2011	16:22	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning right -- one stopped -- rear end
State Route	005R110303	0.32			10/5/2010	12:38	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - both moving - sideswipe
State Route	005R110303	0.32			10/7/2012	16:13	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning right -- one stopped -- rear end
State Route	005R110303	0.32			5/21/2012	14:25	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005R110303	0.32			4/19/2011	12:16	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning right -- one stopped -- rear end
State Route	005R110303	0.32			2/16/2011	18:06	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning right -- one stopped -- rear end
State Route	005R110303	0.32			8/24/2011	12:26	Possible Injury	1	0	2	0	0	At Intersection and Related	Same direction -- both turning right -- one stopped -- rear end
State Route	005R110303	0.32			10/21/2014	11:40	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005R110303	0.32			12/9/2011	9:26	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning right -- one stopped -- rear end
State Route	005R110303	0.32			5/7/2010	14:10	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - sideswipe
City Street	TROSPER RD SW		500		8/23/2014	11:35	No Injury	0	0	2	0	0	At Driveway	From opposite direction - one left turn - one straight
<b>32 - I-5 NB Ramps / Trospers Rd</b>														
State Route	005LX10279	0.12			10/28/2013	17:15	No Injury	0	0	3	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.12			12/27/2011	11:30	No Injury	0	0	2	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.12			12/28/2010	16:40	No Injury	0	0	2	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.16			3/6/2012	14:52	No Injury	0	0	2	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - both moving - rear-end
State Route	005LX10279	0.18			3/10/2010	11:50	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - one right turn - one straight

JURISDICTION	PRIMARY TRAFFICWAY	MILE POST	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	#FAT	#VEH	#PED S	#PED AL	JUNCTION RELATIONSHIP	FIRST COLLISION TYPE / OBJECT STRUCK
State Route	005LX10279	0.18			4/20/2010	8:03	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.18			1/13/2010	6:56	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.19			1/15/2010	15:13	Possible Injury	2	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.19			11/3/2010	11:00	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX10279	0.19			1/14/2010	18:00	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX10279	0.19			11/1/2014	20:48	Possible Injury	1	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX10279	0.19			8/13/2010	8:02	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - both moving - rear-end
State Route	005LX10279	0.19			4/14/2013	15:29	Possible Injury	2	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.19			3/31/2010	17:38	Unknown	0	0	3	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.19			7/1/2014	13:37	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX10279	0.19			5/24/2013	16:26	No Injury	0	0	3	0	0	At Intersection and Related	Entering at angle
State Route	005LX10279	0.19			7/22/2011	13:56	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - both moving - rear-end
State Route	005LX10279	0.19			5/25/2014	16:10	Possible Injury	1	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX10279	0.19			6/28/2014	14:29	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.19			7/28/2014	16:48	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX10279	0.19			3/16/2012	19:24	Possible Injury	1	0	4	0	0	At Intersection and Not Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10279	0.19			6/22/2014	16:58	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX10279	0.21			12/19/2011	17:55	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - sideswipe
State Route	005LX10279	0.21			12/5/2011	11:18	Possible Injury	1	0	4	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - one stopped - rear-end
State Route	005P110255	0.31			9/6/2013	18:00	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning right -- one stopped -- rear end
State Route	005P110255	0.31			6/2/2011	8:03	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005P110255	0.31			12/6/2010	12:40	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning right -- one stopped -- rear end
State Route	005P110255	0.31			4/26/2014	16:30	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning right -- one stopped -- rear end

**33 - Capitol Blvd / Trospen Rd**

City Street	TROSPER RD SW			CAPITOL BLVD SW	2/14/2013	18:44	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - both moving - sideswipe
City Street	TROSPER RD SW			CAPITOL BLVD SW	9/1/2014	9:30	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - both moving - sideswipe
City Street	TROSPER RD SW			CAPITOL BLVD SW	2/14/2013	18:44	No Injury	0	0	2	0	0	At Driveway within Major Intersection	Entering at angle
City Street	TROSPER RD SW			CAPITOL BLVD SW	9/5/2012	8:05	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning left -- both moving -- sideswipe
City Street	TROSPER RD SW			CAPITOL BLVD SW	2/10/2010	9:47	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - both moving - sideswipe
City Street	TROSPER RD SW			CAPITOL BLVD SW	10/29/2010	12:19	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	TROSPER RD SW			CAPITOL BLVD SW	3/21/2012	12:38	No Injury	0	0	3	0	0	At Intersection and Related	From same direction - both going straight - both moving - rear-end
City Street	TROSPER RD SW			CAPITOL BLVD SW	10/1/2013	12:13	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	TROSPER RD SW			CAPITOL BLVD SW	3/7/2014	8:29	Possible Injury	2	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	TROSPER RD SW			CAPITOL BLVD SW	7/7/2010	7:43	Possible Injury	2	0	3	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	TROSPER RD SW			CAPITOL BLVD SW	7/20/2010	11:11	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - sideswipe
City Street	CAPITOL BLVD SW	5200		TROSPER RD SW	9/26/2014	16:40	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning left -- both moving -- sideswipe
City Street	CAPITOL BLVD SW	5200		TROSPER RD SW	10/22/2013	12:11	Possible Injury	1	0	3	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW	5200		TROSPER RD SW	1/21/2011	13:53	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW	5200		TROSPER RD SW	8/23/2014	12:30	No Injury	0	0	2	0	0	At Driveway within Major Intersection	Entering at angle
City Street	CAPITOL BLVD SW	5200		TROSPER RD SW	12/28/2010	11:47	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - sideswipe
City Street	CAPITOL BLVD SW	5200		TROSPER RD SW	9/18/2014	19:59	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW	5200		TROSPER RD SW	4/26/2012	11:29	No Injury	0	0	2	0	0	At Driveway within Major Intersection	Entering at angle
City Street	CAPITOL BLVD SW	5200		TROSPER RD SW	8/7/2014	15:04	Possible Injury	2	0	2	0	0	At Intersection and Related	Entering at angle
City Street	CAPITOL BLVD SW	5200		TROSPER RD SW	6/13/2013	13:04	No Injury	0	0	2	0	0	At Driveway within Major Intersection	From opposite direction - one left turn - one straight
City Street	CAPITOL BLVD SW	5200		TROSPER RD SW	4/12/2014	13:24	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - sideswipe
City Street	CAPITOL BLVD SW	5200		TROSPER RD SW	4/10/2010	9:13	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - sideswipe
City Street	CAPITOL BLVD SW	5200		TROSPER RD SW	2/8/2012	16:37	Possible Injury	1	0	3	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW	5200		TROSPER RD SW	4/5/2014	16:11	Possible Injury	1	0	2	0	0	At Intersection and Related	Same direction -- both turning left -- both moving -- sideswipe
City Street	CAPITOL BLVD SW	5200		TROSPER RD SW	6/18/2012	10:58	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - one left turn - one straight
City Street	CAPITOL BLVD SW	5200		TROSPER RD SW	1/18/2014	12:11	Evident Injury	1	0	1	0	0	At Intersection and Related	Vehicle overturned
City Street	CAPITOL BLVD SW	5200		TROSPER RD SW	5/6/2011	15:54	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - one left turn - one straight
City Street	CAPITOL BLVD SW	5100		TROSPER RD SW	11/21/2014	13:20	No Injury	0	0	1	0	0	At Intersection and Related	Signal Pole
City Street	CAPITOL BLVD SW	5200		TROSPER RD SW	6/26/2012	14:53	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW	5200		TROSPER RD SW	7/21/2010	21:57	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - one right turn - one straight
City Street	CAPITOL BLVD SW	5200		TROSPER RD SW	11/17/2014	15:31	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one right turn
City Street	CAPITOL BLVD SW	5200		TROSPER RD SW	10/15/2014	12:21	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning left -- both moving -- sideswipe
City Street	CAPITOL BLVD SW	5200		TROSPER RD SW	3/10/2011	16:04	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	CAPITOL BLVD SW	5200		TROSPER RD SW	8/29/2014	23:30	Serious Injury	1	0	2	0	0	At Driveway	From opposite direction - one left turn - one straight
City Street	CAPITOL BLVD SW	1000		TROSPER RD SW	12/12/2010	14:15	No Injury	0	0	2	0	0	At Driveway	Entering at angle

**34 - Capitol Blvd / Lee St**

JURISDICTION	PRIMARY TRAFFICWAY	MILE POST	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	#FAT	#VEH	#PED S	#PED AL	JUNCTION RELATIONSHIP	FIRST COLLISION TYPE / OBJECT STRUCK
City Street	CAPITOL BLVD SE			LEE ST SE	10/26/2011	12:01	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	CAPITOL BLVD SW	5400		LEE ST SE	2/6/2013	11:26	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW	5600		LEE ST SE	9/25/2014	12:19	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW	5600		LEE ST SE	9/4/2014	20:48	No Injury	0	0	2	0	0	Driveway Related but Not at Driveway	From same direction - both going straight - both moving - sideswipe
City Street	CAPITOL BLVD SW	5400		LEE ST SE	11/5/2012	16:50	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW	5400		LEE ST SE	12/21/2013	10:36	Possible Injury	1	0	2	0	0	At Intersection and Related	Entering at angle
City Street	CAPITOL BLVD SW	5400		LEE ST SE	3/29/2011	15:16	Possible Injury	1	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW	5400		LEE ST SE	11/27/2013	13:47	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW			LEE ST SE	10/30/2011	21:53	Possible Injury	1	0	2	0	0	From opposite direction - one left turn - one straight	
City Street	CAPITOL BLVD SW	100		LEE ST SE	3/7/2012	16:04	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - both moving - rear-end
City Street	CAPITOL BLVD SW	5400		LEE ST SE	6/21/2012	10:39	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW	5400		LEE ST SE	8/9/2012	13:12	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW	5400		LEE ST SE	11/1/2012	14:29	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW	5400		LEE ST SE	2/24/2010	16:10	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW	5400		LEE ST SW	4/21/2012	11:35	No Injury	0	0	2	0	0	At Driveway within Major Intersection	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW	5400		LEE ST SW	1/31/2014	12:42	No Injury	0	0	1	0	0	At Intersection and Related	Signal Pole
City Street	CAPITOL BLVD SW	5400		LEE ST SW	2/8/2010	16:13	Possible Injury	4	0	3	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW	5400		LEE ST SW	5/21/2012	13:36	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW			LEE ST SW	5/7/2013	10:32	Possible Injury	2	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CAPITOL BLVD SW	5400		LEE ST SW	1/11/2010	16:49	Evident Injury	1	0	1	1	0	At Intersection and Related	Vehicle going straight hits pedestrian
City Street	CAPITOL BLVD SW	5400		LEE ST SW	2/2/2010	16:08	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW	5400		LEE ST SW	10/8/2012	13:55	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW	5600		LEE ST SW	9/2/2014	16:36	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW	5400		LEE ST SW	11/15/2013	16:55	Evident Injury	1	0	1	1	0	At Intersection and Related	Vehicle going straight hits pedestrian
City Street	CAPITOL BLVD SW	5400		LEE ST SW	6/14/2011	8:52	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW	5600		LEE ST SW	12/15/2014	11:57	No Injury	0	0	1	0	0	At Intersection and Related	Signal Pole
City Street	CAPITOL BLVD SW	5400		LEE ST SW	8/18/2010	15:50	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW	5600		LEE ST SW	10/12/2014	13:14	Possible Injury	1	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - both moving - sideswipe
City Street	CAPITOL BLVD SW	5500			8/12/2010	17:08	No Injury	0	0	2	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - both moving - rear-end
City Street	CAPITOL BLVD SW	5600			1/15/2013	12:24	No Injury	0	0	2	0	0	Driveway Related but Not at Driveway	From same direction - both going straight - one stopped - rear-end
City Street	LEE ST SE			CAPITOL BLVD SE	3/30/2010	10:59	No Injury	0	0	2	0	0	At Driveway within Major Intersection	From opposite direction - one left turn - one straight
City Street	LEE ST SE	100		CAPITOL BLVD SW	4/3/2012	15:30	Possible Injury	1	0	1	1	0	At Intersection and Related	Vehicle turning left hits pedestrian
City Street	LEE ST SE	100			6/15/2013	19:38	No Injury	0	0	2	0	0	At Driveway	Entering at angle
City Street	LEE ST SE	100			5/10/2011	17:27	No Injury	0	0	2	0	0	At Driveway	Entering at angle
City Street	LEE ST SE	100			7/16/2013	11:45	No Injury	0	0	2	0	0	At Driveway	Entering at angle
City Street	LEE ST SW	200		CAPITOL BLVD SW	8/27/2013	12:14	No Injury	0	0	3	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	LEE ST SW	100		MCDONALDS	10/6/2010	12:26	No Injury	0	0	2	0	0	At Driveway	Entering at angle
City Street	LEE ST SW	200			9/20/2010	16:37	No Injury	0	0	2	0	0	At Driveway	From opposite direction - one left turn - one straight
City Street	LEE ST SW	200			3/20/2013	10:38	No Injury	0	0	2	0	0	At Driveway	From opposite direction - one left turn - one straight
City Street	LEE ST SW	200			2/20/2012	15:37	No Injury	0	0	2	0	0	At Driveway	From same direction - one right turn - one straight
City Street	LEE ST SW	200			8/26/2013	12:23	No Injury	0	0	2	0	0	At Driveway	Entering at angle
City Street	LEE ST SW	200			8/17/2012	12:19	No Injury	0	0	1	0	0	At Driveway	Utility Pole

**35 - Littlerock Rd at Fred Meyer / Costco Drwy**

City Street	LITTLEROCK RD SW	5700		FRED MEYER COSTCO	12/2/2013	17:02	Possible Injury	1	0	1	1	0	At Intersection and Related	Vehicle turning left hits pedestrian
City Street	LITTLEROCK RD SW	5400		FRED MEYER COSTCO ENTRAN	5/24/2014	9:35	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end

**36 - Littlerock Rd / Costco Drwy**

City Street	LITTLEROCK RD SW	5400		COSTCO	10/25/2014	11:19	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	LITTLEROCK RD SW	5600		COSTCO DR	11/10/2014	15:45	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	LITTLEROCK RD SW	5700		COSTCO DRVWY	11/14/2012	22:00	Evident Injury	1	0	1	1	0	At Intersection and Related	Vehicle going straight hits pedestrian

**37 - Littlerock Rd / Kingswood Dr**

City Street	LITTLEROCK RD SW	6300		KINGSWOOD DR SW	5/14/2012	14:24	No Injury	0	0	1	0	0	Circulating Roundabout	Street Light Pole or Base
City Street	LITTLEROCK RD SW	5700		KINGSWOOD DR SW	6/6/2012	14:55	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	LITTLEROCK RD SW	5700		KINGSWOOD DR SW	12/31/2014	18:11	Possible Injury	1	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	LITTLEROCK RD SW	5900		KINGSWOOD DR SW	1/23/2014	17:23	Possible Injury	1	0	2	0	0	Entering Roundabout	From same direction - both going straight - both moving - rear-end
City Street	LITTLEROCK RD SW	5900		KINGSWOOD DR SW	12/9/2014	7:28	No Injury	0	0	2	0	0	Circulating Roundabout	From same direction - both going straight - both moving - sideswipe
City Street	LITTLEROCK RD SW	6300		KINGSWOOD DR SW	11/14/2011	16:04	No Injury	0	0	2	0	0	Exiting Roundabout	From same direction - both going straight - both moving - rear-end
City Street	LITTLEROCK RD SW	6300		KINGSWOOD DR SW	8/16/2011	13:37	Evident Injury	1	0	1	0	0	Circulating Roundabout	Street Light Pole or Base
City Street	LITTLEROCK RD SW	6300		KINGSWOOD DR SW	7/7/2010	12:20	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - all others
City Street	LITTLEROCK RD SW	5900		KINGSWOOD DR SW	11/4/2014	12:43	Possible Injury	1	0	2	0	0	Entering Roundabout	From same direction - both going straight - both moving - rear-end
City Street	LITTLEROCK RD SW	5700		KINGSWOOD DR SW	11/10/2014	16:05	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end

JURISDICTION	PRIMARY TRAFFICWAY	MILE POST	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	#FAT	#VEH	#PED S	#PED AL	JUNCTION RELATIONSHIP	FIRST COLLISION TYPE / OBJECT STRUCK
City Street	LITTLEROCK RD SW		6000		3/8/2010	13:39	No Injury	0	0	2	0	0	Driveway Related but Not at Driveway	From same direction - both going straight - both moving - rear-end
City Street	LITTLEROCK RD SW		6000		10/30/2012	12:22	No Injury	0	0	2	0	0	Driveway Related but Not at Driveway	From same direction - both going straight - both moving - rear-end
City Street	LITTLEROCK RD SW		5700		7/28/2012	12:05	Evident Injury	1	0	1	0	1	At Driveway	Vehicle - Pedalcyclist
City Street	LITTLEROCK RD SW		5700		10/1/2011	13:29	Possible Injury	1	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	LITTLEROCK RD SW		5700		9/21/2011	19:43	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
<b>38 - Capitol Blvd / X St</b>														
City Street	CAPITOL BLVD SW		6200	X ST SE	10/6/2014	17:17	Possible Injury	1	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CAPITOL BLVD SW		6200	X ST SE	5/11/2013	11:24	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CAPITOL BLVD SW		6200	X ST SW	4/26/2011	17:57	Possible Injury	1	0	2	0	0	At Intersection and Related	Entering at angle
City Street	CAPITOL BLVD SW		6200		9/11/2013	13:59	Possible Injury	1	0	2	0	0	Driveway Related but Not at Driveway	From same direction - both going straight - both moving - rear-end
<b>39 - Elm St / X St</b>														
City Street	ELM ST SE		6200	X ST SE	12/14/2012	11:24	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
<b>40 - Capitol Blvd /Dennis St</b>														
City Street	CAPITOL BLVD S		6600	DENNIS ST SE	4/21/2012	10:37	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	CAPITOL BLVD S		6600		7/9/2014	17:09	No Injury	0	0	2	0	0	At Driveway	Entering at angle
City Street	CAPITOL BLVD SW		6500	DENNIS ST SE	2/2/2011	18:12	Possible Injury	2	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CAPITOL BLVD SW		6500	DENNIS ST SE	2/24/2012	11:37	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW		6500	DENNIS ST SE	3/2/2012	17:32	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD SW		6500	DENNIS ST SE	1/15/2010	14:28	Possible Injury	2	0	2	0	0	At Intersection and Related	Entering at angle
City Street	CAPITOL BLVD SW		6500	DENNIS ST SW	8/9/2012	23:15	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - rear-end
City Street	CAPITOL BLVD SW		6500	DENNIS ST SW	5/7/2014	17:50	Serious Injury	1	0	1	0	0	At Intersection and Not Related	Curb, Raised Traffic Island or Raised Median Curb
City Street	CAPITOL BLVD SW		6500		5/13/2014	16:05	No Injury	0	0	2	0	0	At Driveway	Entering at angle
<b>41 - Capitol Blvd /Israel Rd</b>														
City Street	CAPITOL BLVD S		6700	ISRAEL RD SE	6/28/2013	16:27	Serious Injury	2	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CAPITOL BLVD S		6700	ISRAEL RD SE	12/4/2013	12:54	Possible Injury	1	0	2	0	0	At Intersection and Related	Entering at angle
City Street	CAPITOL BLVD S			ISRAEL RD SE	1/24/2012	11:51	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	CAPITOL BLVD S		6700	ISRAEL RD SE	5/25/2010	7:41	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CAPITOL BLVD S			ISRAEL RD SE	3/26/2012	20:24	Evident Injury	1	0	2	0	0	At Intersection and Related	Entering at angle
City Street	CAPITOL BLVD S		6700	ISRAEL RD SE	6/13/2013	9:09	Evident Injury	1	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CAPITOL BLVD S		6800	ISRAEL RD SE	10/11/2014	0:16	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CAPITOL BLVD S		6700	ISRAEL RD SE	2/12/2013	18:01	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD S		6800	ISRAEL RD SE	10/23/2014	13:44	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD S		6700	ISRAEL RD SE	3/5/2011	18:18	No Injury	0	0	2	0	0	At Driveway within Major Intersection	From same direction - one right turn - one straight
City Street	CAPITOL BLVD S		6700	ISRAEL RD SE	5/16/2013	18:12	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	CAPITOL BLVD S		6700	ISRAEL RD SE	6/18/2013	13:06	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CAPITOL BLVD S			ISRAEL RD SE	11/17/2011	16:02	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CAPITOL BLVD S		6700	ISRAEL RD SE	3/1/2010	8:25	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CAPITOL BLVD S		6800	ISRAEL RD SE	9/25/2014	0:00	Possible Injury	1	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CAPITOL BLVD S		6700	ISRAEL RD SE	7/26/2012	13:55	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	ISRAEL RD SE			CAPITOL BLVD S	1/30/2014	19:41	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	ISRAEL RD SE		0	CAPITOL BLVD S	6/15/2010	17:16	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - rear-end
City Street	ISRAEL RD SE		0	CAPITOL BLVD S	5/8/2010	13:36	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	ISRAEL RD SE		200		6/17/2011	8:31	No Injury	0	0	2	0	0	At Driveway	Entering at angle
<b>42 - Black Lake Belmore Rd /66th Ave</b>														
City Street	66TH AVE SW		3800	BLACK LAKE BELMORE RD SW	3/27/2014	7:29	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	BLACK LAKE BELMORE RD S		6400	66TH AVE SW	12/5/2014	14:54	Possible Injury	1	0	2	0	0	At Intersection and Related	Entering at angle
City Street	BLACK LAKE BELMORE RD S		6400	66TH AVE SW	11/16/2012	23:52	Evident Injury	1	0	1	0	0	At Intersection and Related	Tree or Stump (stationary)
City Street	BLACK LAKE BELMORE RD S		6400	66TH AVE SW	7/12/2012	17:49	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - all others
City Street	BLACK LAKE BELMORE RD S		6400	66TH AVE SW	9/12/2014	21:28	No Injury	0	0	1	0	0	At Intersection and Related	Over Embankment - No Guardrail Present
<b>43 - Kirsop Rd /66th Ave</b>														
City Street	66TH AVE SW		3100	KIRSOP RD SW	8/1/2011	17:33	No Injury	0	0	1	0	0	At Intersection and Related	Utility Pole
City Street	KIRSOP RD SW		3100	66TH AVE SW	1/6/2012	22:00	Possible Injury	2	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	KIRSOP RD SW		6200		7/24/2010	18:38	Evident Injury	1	0	1	0	0	At Intersection and Not Related	Tree or Stump (stationary)
City Street	KIRSOP RD SW		6200		5/25/2012	1:13	No Injury	0	0	2	0	0	At Driveway	Entering at angle
<b>44 - Littlerock Rd / Odegard Rd</b>														
City Street	LITTLEROCK RD SW			ODEGARD RD SW	10/25/2013	12:17	No Injury	0	0	2	0	0	Entering Roundabout	From same direction - both going straight - both moving - rear-end
City Street	LITTLEROCK RD SW		6500	ODEGARD RD SW	11/21/2012	14:41	No Injury	0	0	2	0	0	Entering Roundabout	From same direction - both going straight - one stopped - rear-end
City Street	LITTLEROCK RD SW		6400		9/11/2014	17:40	Possible Injury	1	0	2	0	0	Roundabout Related but not at Roundabout	From same direction - both going straight - both moving - rear-end
City Street	LITTLEROCK RD SW		6500		11/10/2011	14:58	No Injury	0	0	2	0	0	Driveway Related but Not at Driveway	From same direction - both going straight - both moving - rear-end



JURISDICTION	PRIMARY TRAFFICWAY	MILE POST	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	#FAT	#VEH	#PED S	#PED AL	JUNCTION RELATIONSHIP	FIRST COLLISION TYPE / OBJECT STRUCK
City Street	LITTLE ROCK RD SW		6600		7/3/2013	15:32	No Injury	0	0	1	0	1	At Driveway	Vehicle - Pedalcyclist

#### 45 - Littlerock Rd at Israel Rd / 70th Ave

City Street	ISRAEL RD SW			LITTLE ROCK RD SW	4/14/2014	15:04	No Injury	0	0	1	0	0	At Intersection and Related	Metal Sign Post
City Street	LITTLE ROCK RD SW	3300		ISRAEL RD SW	8/11/2013	18:59	No Injury	0	0	1	0	0	Circulating Roundabout	Curb, Raised Traffic Island or Raised Median Curb
City Street	LITTLE ROCK RD SW			ISRAEL RD SW	10/12/2012	13:32	No Injury	0	0	1	0	0	Exiting Roundabout	Wood Sign Post
City Street	LITTLE ROCK RD SW			ISRAEL RD SW	6/19/2013	17:57	No Injury	0	0	2	0	0	Entering Roundabout	Entering at angle
City Street	LITTLE ROCK RD SW			ISRAEL RD SW	2/23/2013	3:04	No Injury	0	0	1	0	0	Circulating Roundabout	Curb, Raised Traffic Island or Raised Median Curb
City Street	LITTLE ROCK RD SW	0			7/5/2014	16:45	No Injury	0	0	1	0	0	Driveway Related but Not at Driveway	Curb, Raised Traffic Island or Raised Median Curb
City Street	LITTLE ROCK RD SW	1200			12/21/2014	20:45	Unknown	0	0	1	0	0	Circulating Roundabout	Wood Sign Post
City Street	LITTLE ROCK RD SW			70TH AVE SW	10/15/2014	19:11	No Injury	0	0	2	0	0	Entering Roundabout	Entering at angle
City Street	LITTLE ROCK RD SW	6900		70TH AVE SW	12/13/2014	16:57	Possible Injury	1	0	1	0	0	Exiting Roundabout	Over Embankment - No Guardrail Present
City Street	LITTLE ROCK RD SW			70TH AVE SW	10/7/2014	15:39	No Injury	0	0	2	0	0	Circulating Roundabout	Same direction -- both turning left -- both moving -- sideswipe
City Street	70TH AVE SW			LITTLE ROCK RD SW	6/28/2010	13:35	No Injury	0	0	2	0	0	Entering Roundabout	Entering at angle
City Street	70TH AVE SW			LITTLE ROCK RD SW	4/5/2010	11:34	No Injury	0	0	1	0	0	Exiting Roundabout	Retaining Wall (concrete, rock, brick, etc.)

#### 46 - Linderson Way / Israel Rd

City Street	ISRAEL RD SW	900		LINDERSON WAY SW	10/2/2013	7:40	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	ISRAEL RD SW	900		LINDERSON WAY SW	10/23/2013	17:04	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	ISRAEL RD SW	900		LINDERSON WAY SW	10/31/2012	14:24	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	ISRAEL RD SW			LINDERSON WAY SW	11/18/2011	18:05	Possible Injury	1	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	ISRAEL RD SW	900		LINDERSON WAY SW	12/10/2010	14:35	Possible Injury	1	0	2	0	0	Driveway Related but Not at Driveway	From same direction - both going straight - both moving - rear-end
City Street	LINDERSON WAY SW	6900			5/6/2014	14:24	No Injury	0	0	2	0	0	At Driveway	Entering at angle
City Street	LINDERSON WAY SW	6800			11/23/2011	7:27	No Injury	0	0	2	0	0	At Driveway	From same direction - one left turn - one straight

#### 47 - Littlerock Rd /Tumwater Blvd

City Street	LITTLE ROCK RD SW	7200		TUMWATER BLVD SW	10/14/2014	14:20	No Injury	0	0	2	0	0	Circulating Roundabout	From same direction - both going straight - both moving - rear-end
City Street	LITTLE ROCK RD SW			TUMWATER BLVD SW	8/29/2013	11:27	No Injury	0	0	2	0	0	Circulating Roundabout	From same direction - both going straight - both moving - sideswipe
City Street	LITTLE ROCK RD SW	1700		TUMWATER BLVD SW	4/3/2014	10:31	Possible Injury	1	0	2	0	0	Entering Roundabout	From same direction - both going straight - one stopped - rear-end
City Street	LITTLE ROCK RD SW	7200		TUMWATER BLVD SW	11/5/2013	11:59	No Injury	0	0	2	0	0	Exiting Roundabout	From same direction - both going straight - one stopped - rear-end
City Street	LITTLE ROCK RD SW	7200		TUMWATER BLVD SW	8/7/2014	10:46	No Injury	0	0	2	0	0	Circulating Roundabout	Same direction -- both turning left -- both moving -- sideswipe
City Street	LITTLE ROCK RD SW			TUMWATER BLVD SW	3/2/2011	12:28	No Injury	0	0	2	0	0	Exiting Roundabout	From same direction - both going straight - both moving - sideswipe
City Street	LITTLE ROCK RD SW			TUMWATER BLVD SW	3/26/2013	23:50	No Injury	0	0	1	0	0	Entering Roundabout	Concrete Barrier/Jersey Barrier - Face
City Street	LITTLE ROCK RD SW			TUMWATER BLVD SW	3/26/2010	17:04	Possible Injury	1	0	2	0	0	Entering Roundabout	From same direction - both going straight - one stopped - rear-end
City Street	LITTLE ROCK RD SW			TUMWATER BLVD SW	12/15/2010	17:22	No Injury	0	0	2	0	0	Exiting Roundabout	From same direction - one left turn - one straight
City Street	LITTLE ROCK RD SW			TUMWATER BLVD SW	5/19/2010	17:12	No Injury	0	0	2	0	0	Circulating Roundabout	From same direction - both going straight - both moving - sideswipe
City Street	LITTLE ROCK RD SW	5100		TUMWATER BLVD SW	2/27/2014	7:29	No Injury	0	0	2	0	0	At Intersection and Related	Curb, Raised Traffic Island or Raised Median Curb
City Street	LITTLE ROCK RD SW			TUMWATER BLVD SW	5/25/2013	14:50	No Injury	0	0	1	0	0	Exiting Roundabout	Metal Sign Post
City Street	LITTLE ROCK RD SW	100			8/7/2013	13:11	No Injury	0	0	2	0	0	Circulating Roundabout	Wood Sign Post
City Street	LITTLE ROCK RD SW				1/10/2011	8:41	No Injury	0	0	2	0	0	Entering Roundabout	From same direction - both going straight - both moving - rear-end
City Street	LITTLE ROCK RD SW	7100			12/6/2014	16:10	No Injury	0	0	1	0	0	Entering Roundabout	Curb, Raised Traffic Island or Raised Median Curb
City Street	LITTLE ROCK RD SW				10/27/2012	13:30	No Injury	0	0	2	0	0	Roundabout Related but not at Roundabout	From same direction - both going straight - both moving - sideswipe
City Street	TUMWATER BLVD SW			LITTLE ROCK RD SW	1/29/2010	5:15	No Injury	0	0	1	0	0	Exiting Roundabout	Metal Sign Post
City Street	TUMWATER BLVD SW	5500		LITTLE ROCK RD SW	9/13/2014	16:25	Evident Injury	1	0	1	0	0	Exiting Roundabout	Vehicle overturned
City Street	TUMWATER BLVD SW			LITTLE ROCK RD SW	9/17/2010	18:40	No Injury	0	0	2	0	0	Entering Roundabout	From same direction - one right turn - one straight

#### 48 - I-5 SB Ramps /Tumwater Blvd

State Route	005R110162	0.36			11/20/2014	6:59	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10130	0.00			2/14/2013	14:30	No Injury	0	0	3	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10130	0.00			10/23/2014	19:01	Possible Injury	1	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
State Route	005LX10130	0.00			12/7/2012	7:29	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10130	0.00			4/6/2010	17:09	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10130	0.00			1/24/2014	18:11	No Injury	0	0	3	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
State Route	005LX10130	0.00			2/22/2014	17:21	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
State Route	005LX10130	0.00			3/3/2014	10:00	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning left -- both moving -- sideswipe
State Route	005LX10130	0.00			1/25/2012	17:06	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX10130	0.00			3/5/2014	7:17	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX10130	0.00			12/4/2012	18:14	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
State Route	005LX10130	0.00			11/3/2012	16:58	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX10130	0.00			10/20/2011	15:47	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - all others
State Route	005LX10130	0.00			5/15/2014	12:25	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning left -- both moving -- sideswipe
State Route	005LX10130	0.00			7/24/2014	16:26	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end

#### 49 - I-5 SB Ramps /Tumwater Blvd

State Route	005LX10130	0.16			6/15/2012	14:18	Possible Injury	1	0	2	0	0	At Intersection and Related	Entering at angle
-------------	------------	------	--	--	-----------	-------	-----------------	---	---	---	---	---	-----------------------------	-------------------

JURISDICTION	PRIMARY TRAFFICWAY	MILE POST	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	#FAT	#VEH	#PED S	#PED AL	JUNCTION RELATIONSHIP	FIRST COLLISION TYPE / OBJECT STRUCK
State Route	005LX10130	0.16			1/7/2013	16:19	No Injury	0	0	1	0	0	At Intersection and Related	Guardrail - Face
State Route	005LX10130	0.16			5/10/2011	20:36	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
State Route	005LX10130	0.16			3/1/2014	9:44	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX10130	0.16			2/5/2014	14:44	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
State Route	005LX10130	0.16			11/27/2014	17:12	Possible Injury	1	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
State Route	005LX10130	0.16			10/25/2010	10:46	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX10130	0.16			7/21/2014	11:03	Evident Injury	3	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX10130	0.16			1/23/2013	11:47	Evident Injury	2	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
State Route	005LX10130	0.16			6/24/2014	22:33	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX10130	0.16			9/23/2014	16:28	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005P110093	0.39			12/7/2010	7:35	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005P110093	0.39			3/3/2013	15:15	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005P110093	0.39			6/10/2011	14:02	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end

**50 - Linderson Way / Tumwater Blvd**

City Street	CENTER ST SW		7500	TUMWATER BLVD SW	1/24/2014	7:15	No Injury	0	0	1	0	0	At Intersection and Related	Curb, Raised Traffic Island or Raised Median Curb
City Street	TUMWATER BLVD SW			CENTER ST SW	9/26/2014	7:53	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	TUMWATER BLVD SW			CENTER ST SW	4/26/2012	17:12	Possible Injury	1	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	TUMWATER BLVD SW			CENTER ST SW	1/27/2014	9:54	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	TUMWATER BLVD SW			CENTER ST SW	3/15/2013	18:04	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	TUMWATER BLVD SW			CENTER ST SW	12/12/2013	17:00	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	LINDERSON WAY SW	7400		TUMWATER BLVD SW	12/6/2013	17:01	Possible Injury	1	0	2	0	0	At Intersection and Related	Same direction -- both turning right -- one stopped -- rear end
City Street	LINDERSON WAY SW	7400		TUMWATER BLVD SW	3/5/2014	8:22	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	TUMWATER BLVD SW			LINDERSON WAY SW	1/21/2010	10:55	Possible Injury	2	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - rear-end
City Street	TUMWATER BLVD SW	1000		LINDERSON WAY SW	12/10/2014	16:29	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	TUMWATER BLVD SW			LINDERSON WAY SW	10/26/2012	15:45	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	TUMWATER BLVD SW			LINDERSON WAY SW	7/12/2012	14:42	Possible Injury	1	0	2	0	0	At Intersection and Related	Entering at angle
City Street	TUMWATER BLVD SW			LINDERSON WAY SW	2/17/2011	6:32	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	TUMWATER BLVD SW			LINDERSON WAY SW	3/19/2013	18:01	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	TUMWATER BLVD SW			LINDERSON WAY SW	3/27/2012	18:15	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning right -- one stopped -- rear end

**51 - New Market St / Tumwater Blvd**

City Street	NEW MARKET ST SW			TUMWATER BLVD SW	7/17/2013	10:50	Possible Injury	1	0	1	0	0	Circulating Roundabout	Street Light Pole or Base
City Street	TUMWATER BLVD SW	200		NEW MARKET ST SW	10/1/2010	7:11	No Injury	0	0	2	0	0	Entering Roundabout	From same direction - one right turn - one straight
City Street	TUMWATER BLVD SW			NEW MARKET ST SW	7/2/2011	7:21	Possible Injury	1	0	1	0	0	Entering Roundabout	Curb, Raised Traffic Island or Raised Median Curb
City Street	TUMWATER BLVD SW			NEW MARKET ST SW	7/26/2012	7:31	No Injury	0	0	2	0	0	Circulating Roundabout	From same direction - one left turn - one straight
City Street	TUMWATER BLVD SW			NEW MARKET ST SW	2/18/2010	14:12	No Injury	0	0	2	0	0	Exiting Roundabout	From same direction - both going straight - both moving - sideswipe
City Street	TUMWATER BLVD SW			NEW MARKET ST SW	12/30/2012	1:40	No Injury	0	0	1	0	0	Entering Roundabout	Curb, Raised Traffic Island or Raised Median Curb
City Street	TUMWATER BLVD SW			NEW MARKET ST SW	6/5/2012	11:43	No Injury	0	0	2	0	0	Exiting Roundabout	From same direction - both going straight - both moving - sideswipe
City Street	TUMWATER BLVD SW				9/28/2012	12:35	No Injury	0	0	3	0	0	Driveway Related but Not at Driveway	From same direction - both going straight - one stopped - rear-end

**52 - Capitol Blvd / Tumwater Blvd**

City Street	CAPITOL BLVD S			TUMWATER BLVD SE	9/3/2013	15:47	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD S			TUMWATER BLVD SE	8/21/2014	17:18	Possible Injury	1	0	3	0	0	At Intersection and Related	Entering at angle
City Street	CAPITOL BLVD S			TUMWATER BLVD SE	1/29/2013	22:01	Possible Injury	1	0	2	0	0	At Driveway within Major Intersection	From opposite direction - one left turn - one straight
City Street	CAPITOL BLVD S			TUMWATER BLVD SE	10/20/2014	13:47	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD S			TUMWATER BLVD SE	3/11/2014	17:51	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one right turn
City Street	CAPITOL BLVD S			TUMWATER BLVD SE	10/1/2012	12:44	No Injury	0	0	3	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD S			TUMWATER BLVD SE	5/3/2014	13:30	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD S			TUMWATER BLVD SW	2/15/2010	20:05	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning left -- both moving -- sideswipe
City Street	CAPITOL BLVD S			TUMWATER BLVD SW	9/12/2010	13:55	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD S			TUMWATER BLVD SW	5/25/2010	18:46	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD S			TUMWATER BLVD SW	7/15/2012	11:12	Evident Injury	2	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CAPITOL BLVD S				1/12/2011	11:59	No Injury	0	0	3	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD S	7200			5/30/2014	7:23	No Injury	0	0	2	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - one stopped - rear-end
City Street	CAPITOL BLVD S				2/11/2012	16:18	Possible Injury	2	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	CAPITOL BLVD S				2/25/2012	6:36	Possible Injury	1	0	1	0	0	At Intersection and Not Related	Metal Sign Post
City Street	TUMWATER BLVD SE			CAPITOL BLVD S	10/24/2012	11:50	Possible Injury	1	0	1	0	0	At Intersection and Not Related	Street Light Pole or Base
City Street	TUMWATER BLVD SE			CAPITOL BLVD S	1/16/2013	7:58	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	TUMWATER BLVD SE				3/23/2011	12:30	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	TUMWATER BLVD SE	100			8/28/2010	17:18	No Injury	0	0	2	0	0	At Driveway	From same direction - both going straight - one stopped - rear-end
City Street	TUMWATER BLVD SE	100			2/1/2011	14:30	No Injury	0	0	2	0	0	At Driveway	From opposite direction - one left turn - one straight
City Street	TUMWATER BLVD SE	0			1/9/2010	17:54	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle

JURISDICTION	PRIMARY TRAFFICWAY	MILE POST	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	#FAT	#VEH	#PED S	#PED AL	JUNCTION RELATIONSHIP	FIRST COLLISION TYPE / OBJECT STRUCK
City Street	TUMWATER BLVD SW	7200		CAPITOL BLVD S	7/24/2011	10:58	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning right -- one stopped -- rear end
City Street	TUMWATER BLVD SW	100		CAPITOL BLVD S	9/29/2014	7:59	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	TUMWATER BLVD SW			CAPITOL BLVD S	2/9/2013	15:03	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	TUMWATER BLVD SW			CAPITOL BLVD S	2/19/2010	4:05	Possible Injury	1	0	2	0	0	At Driveway within Major Intersection	Entering at angle
City Street	TUMWATER BLVD SW			CAPITOL BLVD S	9/24/2012	12:55	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - sideswipe
City Street	TUMWATER BLVD SW			CAPITOL BLVD S	11/1/2012	7:03	No Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - one stopped - rear-end
<b>53 - 65th Ave / Henderson Blvd</b>														
County Road	12120	1.280		16620	9/6/2012	16:40	No Injury	0	0	3	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - one stopped - rear-end
County Road	12120	1.280		16620	9/11/2014	8:55	Possible Injury	3	0	3	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
<b>54 - Tumwater Blvd/ Henderson Blvd</b>														
City Street	HENDERSON BLVD SE	6900		TUMWATER BLVD SE	3/30/2010	15:34	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	HENDERSON BLVD SE	7000		TUMWATER BLVD SE	12/31/2012	12:19	No Injury	0	0	1	0	0	At Intersection and Related	Fence
City Street	TUMWATER BLVD SE	1100		HENDERSON BLVD SE	8/8/2013	17:16	No Injury	0	0	3	0	0	At Intersection and Related	From same direction - both going straight - both moving - rear-end
City Street	TUMWATER BLVD SE	1100		HENDERSON BLVD SE	6/23/2012	13:45	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	TUMWATER BLVD SE	1100		HENDERSON BLVD SE	7/9/2010	15:08	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
<b>55 - Trails End Dr / Henderson Blvd</b>														
City Street	HENDERSON BLVD SE	7500			10/25/2012	7:24	Possible Injury	2	0	2	0	0	At Driveway	From same direction - both going straight - one stopped - rear-end
<b>56 - Littlerock Rd / Black Hills School Drwy</b>														
City Street	LITTLEROCK RD SW	7741		THS	1/8/2014	12:45	No Injury	0	0	1	0	0	At Intersection and Related	Signal Pole
<b>57 - Old Hwy 99 / Henderson Blvd</b>														
City Street	OLD HIGHWAY 99 SE	7600		HENDERSON BLVD SE	5/15/2014	11:45	Possible Injury	2	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	OLD HIGHWAY 99 SE	7600		HENDERSON BLVD SE	6/27/2013	18:03	Possible Injury	2	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	OLD HIGHWAY 99 SE	7600		HENDERSON BLVD SE	7/11/2013	11:15	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	OLD HIGHWAY 99 SE	7600		HENDERSON BLVD SE	7/20/2010	19:24	Possible Injury	1	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	OLD HIGHWAY 99 SE	7600		HENDERSON BLVD SE	11/24/2012	14:35	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	OLD HIGHWAY 99 SE	7700		HENDERSON BLVD SE	12/1/2014	16:30	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	OLD HIGHWAY 99 SE	7700		HENDERSON BLVD SE	9/20/2011	16:44	No Injury	0	0	3	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	OLD HIGHWAY 99 SE	7600		HENDERSON BLVD SE	10/13/2013	15:18	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	OLD HIGHWAY 99 SE			HENDERSON BLVD SE	1/16/2013	22:22	No Injury	0	0	1	0	0	At Intersection and Related	Utility Pole
City Street	OLD HIGHWAY 99 SE	7700		HENDERSON BLVD SE	1/9/2012	9:21	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	OLD HIGHWAY 99 SE	7600		HENDERSON BLVD SE	2/22/2010	8:44	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	OLD HIGHWAY 99 SE	7600		HENDERSON BLVD SE	5/15/2011	13:20	Possible Injury	2	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	OLD HIGHWAY 99 SE	7600			5/7/2011	14:21	Possible Injury	1	0	2	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - one stopped - rear-end
City Street	OLD HIGHWAY 99 SE	7700			11/12/2010	7:34	No Injury	0	0	3	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - both moving - rear-end
City Street	OLD HWY 99 SE			HENDERSON BLVD SE	3/8/2010	8:33	Possible Injury	2	0	2	0	0	Driveway Related but Not at Driveway	From same direction - both going straight - both moving - rear-end
<b>58 - Old Hwy 99 / 79th Ave</b>														
City Street	OLD HIGHWAY 99 SE	7900		79TH AVE SE	8/17/2013	13:15	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
City Street	OLD HIGHWAY 99 SE	7900		79TH AVE SE	3/13/2010	15:19	Possible Injury	1	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	OLD HIGHWAY 99 SE	8000			5/27/2011	15:58	No Injury	0	0	3	0	0	At Driveway	From same direction - both going straight - one stopped - rear-end
City Street	OLD HIGHWAY 99 SE	8000			9/16/2011	15:03	No Injury	0	0	2	0	0	At Driveway	From same direction - both going straight - both moving - rear-end
<b>59 - Kimmie St / 83rd Ave</b>														
<b>60 - Center St / 83rd Ave</b>														
City Street	83RD AVE SW	1300		CENTER ST SW	8/26/2014	17:34	Possible Injury	2	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	83RD AVE SW	800		CENTER ST SW	6/5/2014	11:10	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
<b>61 - Old Hwy 99 / 88th Ave</b>														
County Road	13765	19.722			5/20/2013	15:35	No Injury	0	0	2	0	0	At Driveway	From same direction - one right turn - one straight
County Road	13765	19.730			7/3/2010	15:25	No Injury	0	0	3	0	0	Driveway Related but Not at Driveway	From same direction - both going straight - one stopped - rear-end
County Road	13765	19.741			3/28/2012	10:35	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
<b>62 - I-5 SB Ramps / 93rd Ave</b>														
State Route	005LX09928	0.00			1/22/2011	13:39	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX09928	0.00			6/21/2011	12:55	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX09928	0.00			9/18/2010	22:17	No Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
State Route	005LX09928	0.00			4/22/2010	11:54	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX09928	0.00			11/1/2010	18:41	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX09928	0.00			8/22/2011	12:15	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX09928	0.00			7/21/2011	13:06	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning right -- both moving -- sideswipe
State Route	005LX09928	0.00			3/3/2011	6:55	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle

JURISDICTION	PRIMARY TRAFFICWAY	MILE POST	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	#FAT	#VEH	#PED S	#PED AL	JUNCTION RELATIONSHIP	FIRST COLLISION TYPE / OBJECT STRUCK
State Route	005LX09928	0.00			7/15/2011	18:05	Possible Injury	2	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005LX09928	0.00			9/27/2010	13:36	Evident Injury	2	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005LX09928	0.00			4/13/2012	17:23	Possible Injury	1	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight
State Route	005LX09928	0.00			11/22/2011	16:38	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	005R109958	0.31			3/7/2011	15:15	No Injury	0	0	2	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - one stopped - rear-end
State Route	005R109958	0.32			1/5/2011	16:15	Possible Injury	2	0	3	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - both moving - rear-end
State Route	005R109958	0.33			7/13/2010	15:50	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - one right turn - one straight
State Route	005R109958	0.33			3/30/2010	16:18	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - sideswipe
State Route	005R109958	0.33			1/3/2011	18:25	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - one right turn - one straight
State Route	005R109958	0.33			2/17/2011	18:03	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005R109958	0.33			8/30/2010	10:02	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - one left turn - one straight
State Route	005R109958	0.33			8/24/2010	13:32	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - one left turn - one straight
State Route	005R109958	0.33			4/27/2011	15:27	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005R109958	0.33			9/16/2011	13:13	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - one right turn - one straight

**63 - I-5 NB Ramps / 93rd Ave**

State Route	005P109890	0.40			4/17/2012	12:55	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005P109890	0.40			9/17/2010	16:18	Evident Injury	2	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	005Q109977	0.00			11/21/2014	19:05	No Injury	0	0	1	0	0	At Intersection and Related	All other non-collision
State Route	005Q109977	0.01			9/22/2014	17:29	No Injury	0	0	2	0	0	At Intersection and Related	Same direction -- both turning right -- both moving -- rear end
State Route	005Q109977	0.02			11/22/2014	23:26	No Injury	0	0	1	0	0	At Intersection and Related	Roadway Ditch

**64 - Kimmie St / 93rd Ave**

State Route	121	7.24			1/21/2013	7:26	Evident Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	121	7.24			4/25/2013	7:00	Possible Injury	2	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - rear-end
State Route	121	7.24			9/27/2013	10:20	Possible Injury	2	0	2	0	0	At Intersection and Related	From same direction - both going straight - both moving - rear-end
State Route	121	7.24			5/4/2014	17:08	Evident Injury	1	0	1	0	0	At Intersection and Related	Utility Pole
State Route	121	7.25			5/8/2013	14:42	Possible Injury	1	0	3	0	0	Intersection Related but Not at Intersection	From same direction - both going straight - both moving - rear-end

**65 - Case Rd / 93rd Ave**

**66 - Tilley Rd (south) / 93rd Ave**

State Route	121	6.24			5/26/2012	13:08	Evident Injury	1	0	1	0	0	At Intersection and Related	Vehicle overturned
State Route	121	6.24			1/22/2010	19:57	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	121	6.24			2/11/2011	5:25	No Injury	0	0	1	0	0	At Intersection and Related	Fence
State Route	121	6.24			7/5/2011	18:23	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
State Route	121	6.24			12/3/2011	6:48	No Injury	0	0	1	0	0	At Intersection and Related	Fence
State Route	121	6.24			7/19/2012	17:19	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	121	6.24			9/3/2013	9:49	No Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
State Route	121	6.24			9/11/2014	0:00	No Injury	0	0	1	0	0	At Intersection and Related	Utility Pole
State Route	121	6.24			12/3/2014	18:38	No Injury	0	0	2	0	0	At Driveway within Major Intersection	Other Objects

**67 - Tilley Rd (north) / 93rd Ave**

City Street	88TH AVE SE	800			5/14/2010	12:01	Possible Injury	2	0	2	0	0	At Driveway	From same direction - one right turn - one straight
City Street	93RD AVE SE	300			9/26/2012	20:30	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	From same direction - both going straight - both moving - rear-end
City Street	TILLEY RD SE	400	93RD AVE SE		12/11/2013	7:45	Unknown	0	0	1	0	0	At Intersection and Related	Utility Pole
City Street	TILLEY RD SE	8900			5/10/2014	0:01	Evident Injury	1	0	1	0	0	Not at Intersection and Not Related	Street Light Pole or Base

**68 - Old Highway 99 / 93rd Ave**

County Road	17010	16.065	13765		8/30/2013	19:23	Possible Injury	1	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
County Road	13765	18.610	17010		8/5/2010	15:44	Evident Injury	1	0	2	0	0	At Intersection and Related	Vehicle overturned
County Road	13765	18.610	17010		12/1/2010	16:48	No Injury	0	0	2	0	0	At Intersection and Related	Entering at angle
County Road	13765	18.610	17010		4/12/2013	19:43	Evident Injury	1	0	1	0	0	At Intersection and Related	Wood Sign Post

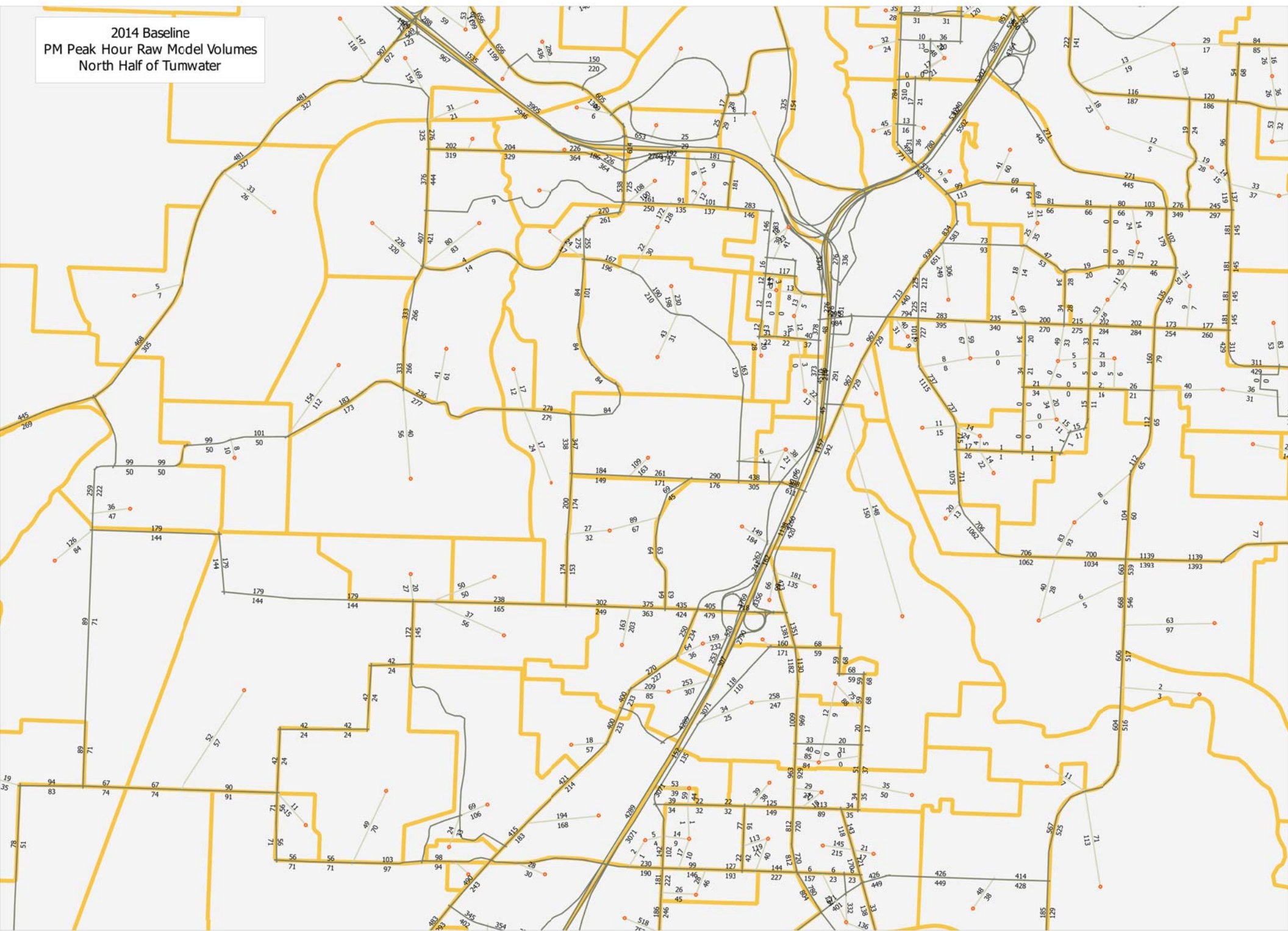
**69 - Center / 76th**

---

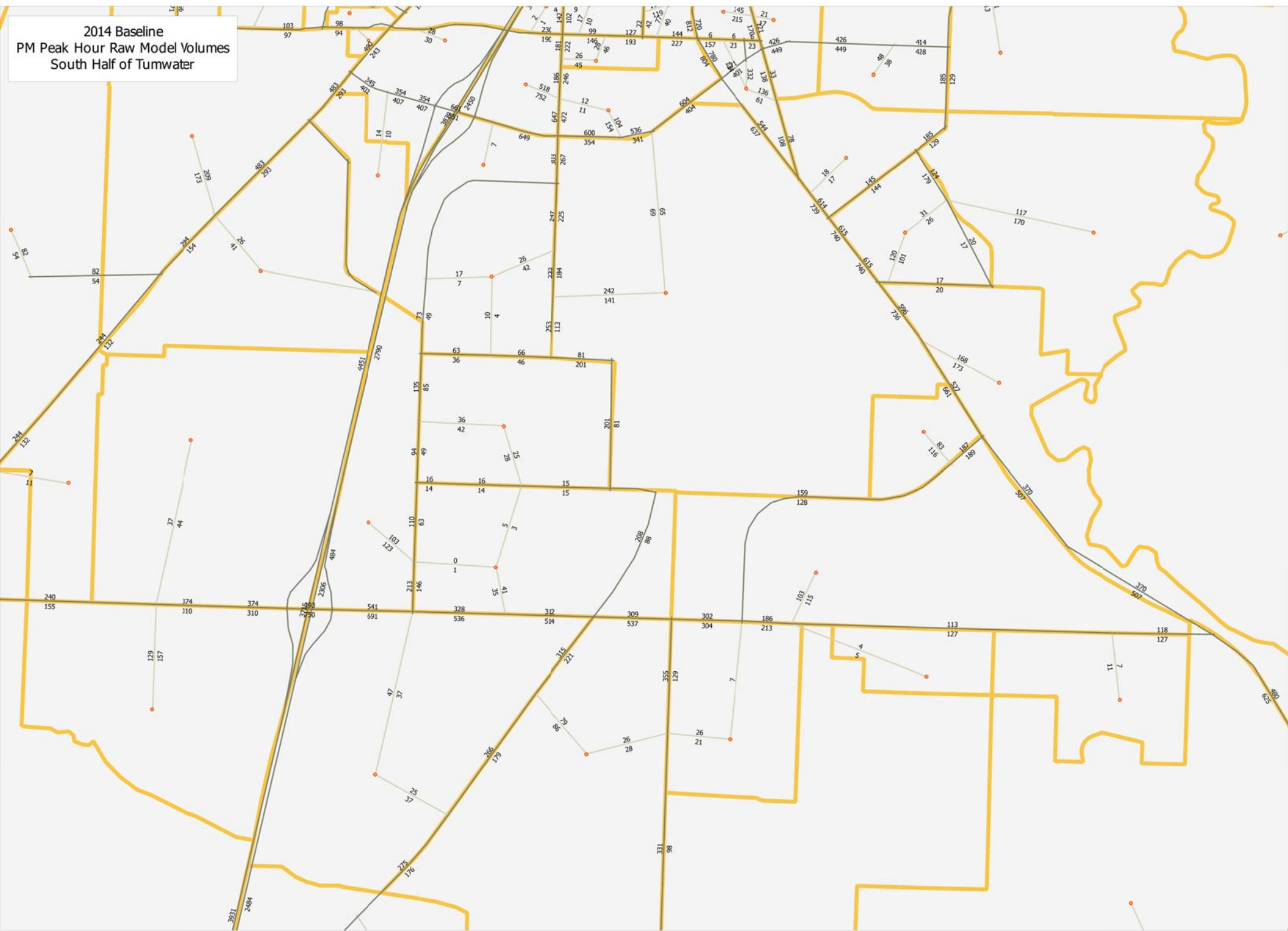
**APPENDIX A-3**  
**TRAVEL DEMAND MODEL PLOTS**

---

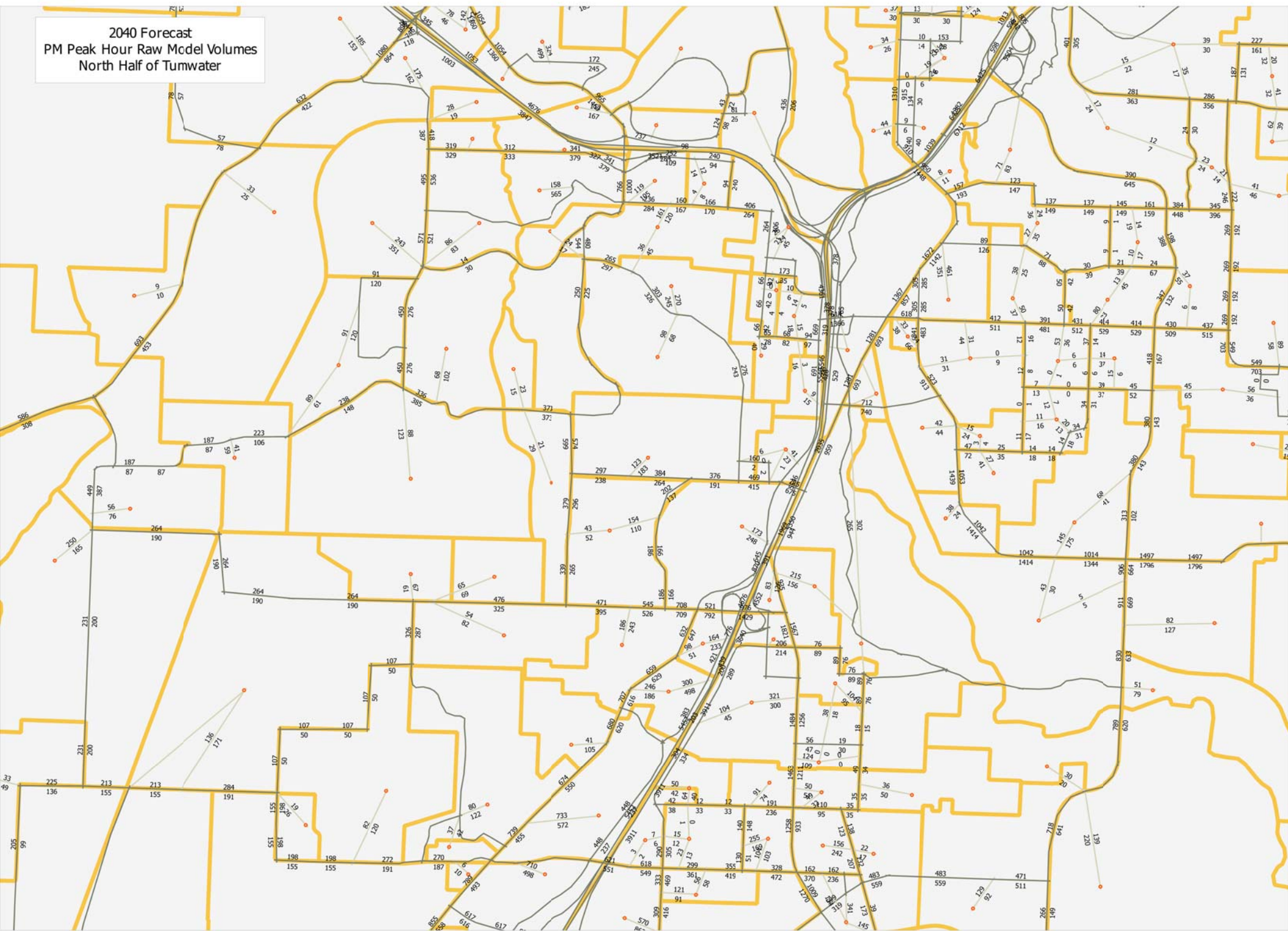
2014 Baseline  
PM Peak Hour Raw Model Volumes  
North Half of Tumwater



2014 Baseline  
PM Peak Hour Raw Model Volumes  
South Half of Tumwater

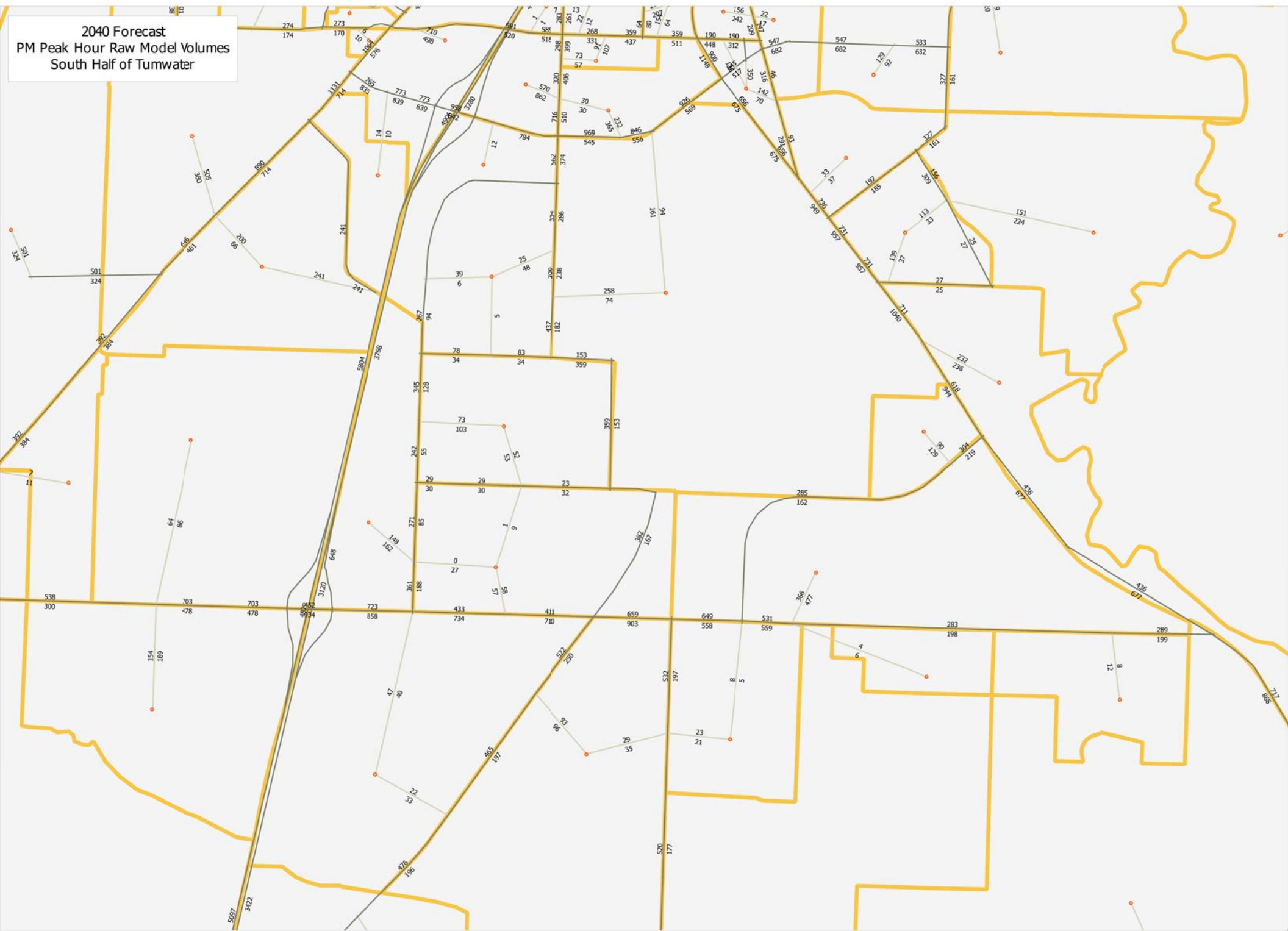


2040 Forecast  
PM Peak Hour Raw Model Volumes  
North Half of Tumwater





2040 Forecast  
PM Peak Hour Raw Model Volumes  
South Half of Tumwater



---

**APPENDIX A-4**  
**TRAFFIC VOLUME CALCULATION WORKSHEETS**

---



Traffic Volume Calculation Worksheet  
 Tumwater Transportation Master Plan  
 PM Peak Hour Volumes

Intersection	Movement	2022 Volumes										2040 Base Model			
		EXISTING 2015	EXISTING MODEL	2040 EXISTING MODEL	BASE MODEL	7 YEAR	BASE MODEL	PROJECTED 2022	2040 BASE MODEL	BASE MODEL	BASE MODEL	PROJECTED 2040			
		VOLUMES	VOLUMES	VOLUMES	Δ GROWTH	GROWTH	ADJUST	VOLUMES	VOLUMES	Δ GROWTH	ADJUST	VOLUMES			
1 RW Johnson Blvd SW Mottman Rd SW  TMC Date: 06/30/15  Peak Hour: 4:15 - 5:15 PHF: .92	L	43	-	-	-	0	3	46	-	0	12	55			
	EB T	79	-	-	-	0	5	84	-	0	22	101			
	R	7	-	-	-	0	0	7	-	0	2	9			
	L	106	158	215	57	15		121	218	60		166			
	WB T	43	-	-	-	0	3	46	-	0	12	55			
	R	67	44	102	58	16		83	101	57		124			
	L	4	-	-	-	0	0	4	-	0	1	5			
	NB T	155	232	314	82	22		177	317	85		240			
	R	135	212	218	6	2		137	219	7		142			
	L	45	107	111	4	1		46	110	3		48			
	SB T	93	217	280	63	17		110	277	60		153			
	R	18	-	-	-	0	1	19	-	0	5	23			
		795	970	1,240	270	28%	6%	880	1,242	272	28%	1,121			
2 Crosby Blvd SW Mottman Rd SW  TMC Date: 10/08/2014  Peak Hour: 4:30 - 5:30 PHF: .89	L	176	184	203	19	5		181	211	27		203			
	EB T	252	168	157	-11	-3		249	148	-20		232			
	R	25	12	20	8	2		27	20	8		33			
	L	4	0	0	0	0		4	0	0		4			
	WB T	31	21	23	2	1		32	21	0		31			
	R	67	165	225	60	16		83	225	60		127			
	L	42	15	23	8	2		44	20	5		47			
	NB T	348	509	804	295	79		427	825	316		664			
	R	166	201	167	-34	-9		157	155	-46		120			
	L	120	16	63	47	13		133	84	68		188			
	SB T	630	526	740	214	58		688	746	220		850			
	R	425	189	293	104	28		453	299	110		535			
		2,286	2,006	2,718				2,754							
3 Crosby Blvd SW Irving St SW  TMC Date: 10/08/2014  Peak Hour: 4:45 - 5:45 PHF: .89	L	73	299	304	5	1		74	301	2		75			
	EB T	19	82	112	30	8		27	112	30		49			
	R	16	29	54	25	7		23	56	27		43			
	L	26	6	17	11	3		29	19	13		39			
	WB T	36	25	34	9	2		38	35	10		46			
	R	166	200	271	71	19		185	256	56		222			
	L	26	14	19	5	1		27	21	7		33			
	NB T	290	226	420	194	52		342	443	217		507			
	R	14	20	56	36	10		24	32	12		26			
	L	161	209	201	-8	-2		159	199	-10		151			
	SB T	424	235	458	223	60		484	470	235		659			
	R	96	94	100	6	2		98	97	3		99			
		1,347	1,439	2,046	607	42%	10%	2,041	602	42%	550				
4 7th Ave SW Irving St  TMC Date: 06/30/15  Peak Hour: 4:45 - 5:45 PHF: .92	L	5	0	0	0	0	0	5	0	0	2	7			
	EB T	12	0	0	0	0	1	13	0	0	5	17			
	R	165	0	0	0	0	11	176	0	0	69	234			
	L	1	0	0	0	0	0	1	0	0	0	1			
	WB T	18	0	0	0	0	1	19	0	0	8	26			
	R	1	0	0	0	0	0	1	0	0	0	1			
	L	173	0	0	0	0	11	184	0	0	72	245			
	NB T	4	0	0	0	0	0	4	0	0	2	6			
	R	1	0	0	0	0	0	1	0	0	0	1			
	L	0	0	0	0	0	0	0	0	0	0	0			
	SB T	4	0	0	0	0	0	4	0	0	2	6			
	R	4	0	0	0	0	0	4	0	0	2	6			
		388	0	0			10%	413	0	42%	550				
5 Crosby Blvd SW Barnes Blvd SW  TMC Date: 06/30/15  Peak Hour: 5:00 - 6:00 PHF: .91	L	9	12	12	0	0		9	12	0		9			
	EB T	1	2	2	0	0		1	2	0		1			
	R	0	2	2	0	0		0	3	1		1			
	L	10	10	9	-1	0		10	11	1		11			
	WB T	3	4	4	0	0		3	4	0		3			
	R	189	153	246	93	25		214	249	96		285			
	L	1	2	2	0	0		1	2	0		1			
	NB T	79	90	207	117	32		111	219	129		208			
	R	4	9	4	-5	-1		3	4	-5	5	4			
	L	237	185	282	97	26		263	291	106		343			
	SB T	112	71	230	159	43		155	235	164		276			
	R	22	19	18	-1	0		22	18	-1		21			
		667	559	1,018				792	1,050		1,163				
6 Black Lake Belmore Rd SW Black Lake Blvd SW  TMC Date: 06/30/15  Peak Hour: 4:30 - 5:30 PHF: .94	L	0	-	-	-	0		0	-	0		0			
	EB T	170	183	206	23	6		176	205	22		192			
	R	69	86	102	16	4		73	103	17		86			
	L	130	174	303	129	35		165	292	118		248			
	WB T	303	293	398	105	28		331	401	108		411			
	R	0	-	-	-	0		0	-	0		0			
	L	178	152	191	39	11		189	185	33		211			
	NB T	0	-	-	-	0		0	-	0		0			
	R	105	122	239	117	32		137	248	126		231			
	L	0	-	-	-	0		0	-	0		0			
	SB T	0	-	-	-	0		0	-	0		0			
	R	0	-	-	-	0		0	-	0		0			
		955	1,010	1,439				1,071	1,434		1,379				
7 RW Johnson Blvd SW Sapp Rd SW  TMC Date: 06/30/15  Peak Hour: 4:45 - 5:45 PHF: .85	L	15	103	41	-62	-17	1	16	46	-57	5	20			
	EB T	21	67	95	28	8		29	97	30		51			
	R	1	2	5	3	1		2	6	4		5			
	L	6	21	45	24	6		12	46	25		31			
	WB T	35	74	107	32	9		44	109	35		70			
	R	68	141	182	41	11		79	182	41		109			
	L	0	2	6	4	1		1	6	4		4			
	NB T	1	22	48	26	7		8	48	26		27			
	R	3	16	34	18	5		8	33	17		20			
	L	86	194	235	41	11		97	256	62		148			
	SB T	3	33	72	39	11		14	71	38		41			
	R	31	106	126	20	5		36	123	17		48			
		270	781	996	215	28%	6%	346	1,023	242	31%	574			



Traffic Volume Calculation Worksheet  
 Tumwater Transportation Master Plan  
 PM Peak Hour Volumes

Intersection	Movement	2022 Volumes						2040 Base Model				
		EXISTING 2015	EXISTING MODEL	2040 EXISTING MODEL	BASE MODEL	7 YEAR GROWTH	BASE MODEL ADJUST	PROJECTED 2022 VOLUMES	2040 BASE MODEL VOLUMES	BASE MODEL Δ GROWTH	BASE MODEL ADJUST	PROJECTED 2040 VOLUMES
		VOLUMES	VOLUMES	VOLUMES	Δ GROWTH	GROWTH	ADJUST	VOLUMES	VOLUMES	Δ GROWTH	ADJUST	VOLUMES
8 Sapp Rd SW Crosby Blvd SW  TMC Date: 06/30/15  Peak Hour: 5:00 - 6:00 PHF: .91	L	0	-	-	-	0		0	-	0		0
	EB T	0	-	-	-	0		0	-	0		0
	R	0	-	-	-	0		0	-	0		0
	L	60	71	227	156	42		102	234	163		223
	WB T	0	-	-	-	0		0	-	0		0
	R	17	13	13	0	0		17	16	3		20
	L	0	-	-	-	0		0	-	0		0
	NB T	129	258	362	104	28		157	358	100		229
	R	71	89	205	116	31		102	217	128		199
	L	18	12	8	-4	-1		17	8	-4		14
	SB T	109	267	348	81	22		131	365	98		207
	R	0	-	-	-	0		0	-	0		0
		404	710	1,163			526	1,198			892	
9 Black Lake Belmore Rd SW 49th Ave SW  TMC Date: 06/30/15  Peak Hour: 4:15 - 5:15 PHF: .90	L	8	38	65	27	7		15	65	27		35
	EB T	12	43	80	37	10		22	82	39		51
	R	13	3	21	18	5		18	17	14		27
	L	39	0	0	0	0		39	0	0		39
	WB T	14	60	106	46	12		26	105	45		59
	R	141	119	160	41	11		152	159	40		181
	L	9	5	29	24	6		15	30	25		34
	NB T	128	66	166	100	27		155	170	104		232
	R	25	0	0	0	0		25	0	0		25
	L	74	101	90	-11	-3		71	108	7		81
	SB T	132	86	249	163	44		176	213	127		259
	R	10	61	115	54	15		25	115	54		64
		605	582	1,081			739	1,064			1,087	
10 Capitol Blvd SE Carlyon Ave SE/Sunset Way SE  TMC Date: 06/25/15  Peak Hour: 4:30 - 5:30 PHF: .85	SB Cap	33	196	281	85	23	3	36	281	85	-75	43
	NB Cap	13	93	146	53	14	1	14	146	53	-45	21
	Carlyon	2	33	34	1	0		2	35	2		4
	Sunset	1	12	21	9	2		3	22	10		11
	Carlyon	56	33	34	1	0		56	35	2	75	133
	NB Cap	39	28	32	4	1		40	32	4	45	88
	NB Cap	438	462	937	475	128		566	884	422		860
	Carlyon	88	44	54	10	3		91	50	6	54	148
	Sunset	15	145	209	64	17	1	16	209	64	-54	25
	SB Cap	816	710	1,367	657	177		993	1,356	646		1,462
	SB Sunset	8	92	120	28	8	1	9	120	28	-18	18
	Carlyon	45	32	43	11	3		48	43	11	18	74
		1,554	1,880	3,278	266	38%	9%	1,874	3,213			2,887
11 Deschutes Way SW I-5 NB On Ramp  TMC Date: 07/01/15  Peak Hour: 4:30 - 5:30 PHF: .79	L	0	-	-	-	0		0	-	0		0
	EB T	0	-	-	-	0		0	-	0		0
	R	0	-	-	-	0		0	-	0		0
	L	0	-	-	-	0		0	-	0		0
	WB T	0	-	-	-	0		0	-	0		0
	R	0	-	-	-	0		0	-	0		0
	L	0	-	-	-	0		0	-	0		0
	NB T	223	154	227	73	20		243	206	52		275
	R	147	182	159	-23	-6		141	175	-7		140
	L	158	49	63	14	4		162	58	9		167
	SB T	303	276	362	86	23		326	378	102		405
	R	0	-	-	-	0		0	-	0		0
		831	661	811			872	817			987	
12 Deschutes Way SW US 101 WB On Ramp  TMC Date: 07/01/15  Peak Hour: 5:00 - 6:00 PHF: .92	L	0	-	-	-	0		0	-	0		0
	EB T	0	-	-	-	0		0	-	0		0
	R	0	-	-	-	0		0	-	0		0
	L	0	-	-	-	0		0	-	0		0
	WB T	0	-	-	-	0		0	-	0		0
	R	0	-	-	-	0		0	-	0		0
	L	428	316	391	75	20		448	403	87		515
	NB T	385	336	386	50	13		398	381	45		430
	R	0	-	-	-	0		0	-	0		0
	L	0	-	-	-	0		0	-	0		0
	SB T	260	276	362	86	23		283	378	102		362
	R	19	0	0	0	0		19	0	0	10	29
		1,092	928	1,139				1,162		50%	1,336	
13 I-5 SB/US 101 EB Off Ramps/N 2nd Ave SW Desoto St SW  TMC Date: 06/30/15  Peak Hour: 4:30 - 5:30 PHF: .89	L	0	-	-	-	0		0	-	0		0
	EB T	0	-	-	-	0		0	-	0		0
	R	151	145	218	73	20		171	200	55		206
	L	0	-	-	-	0		0	-	0		0
	WB T	0	-	-	-	0		0	-	0		0
	R	0	-	-	-	0		0	-	0		0
	L	172	276	382	106	29		201	378	102		274
	NB T	0	-	-	-	0		0	-	0		0
	R	0	-	-	-	0		0	-	0		0
	L	0	-	-	-	0		0	-	0		0
	SB T	804	1151	1274	123	33		837	1280	129		933
	R	43	40	29	-11	-3		40	27	-13		30
		1,170	1,612	1,903				1,885				
14 N 2nd Ave SW Custer Way SW  TMC Date: 02/10/15  Peak Hour: 4:45 - 5:45 PHF: .88	L	0	-	-	-	0		0	-	0		0
	EB T	0	-	-	-	0		0	-	0		0
	R	0	-	-	-	0		0	-	0		0
	L	124	28	219	191	51		175	237	209	-96	237
	WB T	0	-	-	-	0		0	-	0		0
	R	151	267	382	115	31		182	378	111		262
	L	0	-	-	-	0		0	-	0		0
	NB T	23	9	0	-9	-2		21	0	-9		14
	R	149	39	269	230	62		211	319	280	-110	319
	L	814	945	1,039	94	25		839	1,047	102		916
	SB T	229	350	452	102	27		256	433	83		312
	R	0	-	-	-	0		0	-	0		0
		1,490	1,638	2,361			1,684	2,414			2,060	



Traffic Volume Calculation Worksheet  
 Tumwater Transportation Master Plan  
 PM Peak Hour Volumes

Intersection	Movement		2022 Volumes										2040 Base Model				
			EXISTING 2015	EXISTING MODEL	Z040 EXISTING MODEL	BASE MODEL	7 YEAR GROWTH	BASE MODEL ADJUST	PROJECTED 2022 VOLUMES	Z040 BASE MODEL	BASE MODEL	BASE MODEL ADJUST	PROJECTED 2040 VOLUMES				
			VOLUMES	VOLUMES	VOLUMES	Δ GROWTH	GROWTH	ADJUST	VOLUMES	VOLUMES	Δ GROWTH	ADJUST	VOLUMES				
15 Boston St SW Custer Way SW TMC Date: 06/25/15 Peak Hour: 4:30 - 5:30 PHF: .95	EB	L	0	-	-	-	0	-	0	-	0	-	0	-	0		
		T	709	917	1,208	291	78	-	787	1,203	286	-	995				
	WB	L	167	67	101	34	9	-	176	164	97	-	264				
		T	371	368	401	33	9	-	380	234	-134	-	237				
	NB	L	258	247	530	283	76	-	334	529	282	-	540				
		T	3	-	-	-	0	-	3	-	0	-	3				
	SB	L	0	48	71	23	6	-6	0	85	37	-37	0				
		T	1	-	-	-	0	-	1	-	0	-1	0				
	R	L	150	126	179	53	14	-	164	92	-34	-	116				
		T	0	-	-	-	0	-	0	-	0	-	0				
	T	L	1	-	-	-	0	-	1	-	0	-	1				
		R	4	-	-	-	0	-	4	-	0	-	4				
			1,664	1,773	2,490	-	-	1,850	2,307	-	-	2,160					
16 Deschutes Way SW Boston St SW TMC Date: 07/01/15 Peak Hour: 4:30 - 5:30 PHF: .93	EB	L	0	-	-	-	0	-	0	-	0	-	0				
		T	0	-	-	-	0	-	0	-	0	-	0				
	WB	L	95	64	135	71	19	-	114	148	84	-	179				
		T	0	-	-	-	0	-	0	-	0	-	0				
	NB	L	413	371	366	-5	-1	-	412	250	-121	-	292				
		T	0	-	-	-	0	-	0	-	0	-	0				
	SB	L	363	281	410	129	35	-	398	535	254	-	617				
		T	61	75	121	46	12	-	73	83	8	-	69				
	R	L	102	98	129	31	8	-	110	95	-3	-	99				
		T	186	178	234	56	15	-	201	283	105	-	291				
				0	-	-	-	0	0	-	0	-	0				
				1,220	1,067	1,395	328	31%	7%	1,308	1,394	-	-	1,547			
17 Cleveland Ave SE Capitol Blvd SE TMC Date: 06/25/15 Peak Hour: 4:30 - 5:30 PHF: .88	EB	L	0	-	-	-	0	-	0	-	0	-	0				
		T	332	440	916	476	128	-	460	857	417	-	749				
	WB	L	18	0	0	0	0	-	18	0	0	-	18				
		T	363	225	342	117	32	-	395	305	80	-	443				
	NB	L	551	713	1341	628	169	-	720	1367	654	-	1,205				
		T	0	-	-	-	0	-	0	-	0	-	0				
	SB	L	0	0	0	0	0	-	0	0	0	-	0				
		T	0	-	-	-	0	-	0	-	0	-	0				
	R	L	224	212	284	72	19	-	243	285	73	-	297				
		T	0	-	-	-	0	-	0	-	0	-	0				
				0	-	-	-	0	0	-	0	-	0				
				1,488	1,590	2,883	-	-	1,836	2,814	-	-	2,712				
18 Custer Way SE Capitol Blvd SE TMC Date: 02/10/15 Peak Hour: 4:45 - 5:45 PHF: .90	EB	L	137	116	270	154	41	-	178	337	221	-	358				
		T	648	880	1,084	204	55	-	703	915	36	-	684				
	WB	L	80	47	33	-14	-4	-	76	42	-5	-	75				
		T	344	337	534	197	53	-	397	182	-155	-	189				
	NB	L	440	491	700	209	56	-	496	469	-22	-	418				
		T	6	7	17	10	3	-	9	0	-7	6	5				
	SB	L	18	0	0	0	0	-	18	4	4	-	22				
		T	332	317	629	312	84	-	416	520	203	-	535				
	R	L	426	412	624	212	57	-	483	169	-243	-	183				
		T	18	5	22	17	5	-	23	20	15	-	33				
				392	584	1088	504	136	528	1057	473	-	865				
				135	124	231	107	29	164	290	166	-	301				
			2,976	3,320	5,232	-	-	3,491	4,006	-	-	3,668					
19 Custer Way SE/North St SE Cleveland Ave SE TMC Date: 02/10/15 Peak Hour: 4:45 - 5:45 PHF: .93	EB	L	50	0	0	0	0	-	55	0	0	21	71				
		T	332	375	572	197	53	-	385	510	135	-	467				
	WB	L	643	892	1,099	207	56	-	699	557	-335	-	308				
		T	14	1	4	3	1	-	15	4	3	-	17				
	NB	L	245	265	465	200	54	-	299	412	147	-	392				
		T	70	16	16	0	0	-	70	16	0	-	70				
	SB	L	481	529	706	177	48	-	529	205	-324	-	157				
		T	133	195	269	74	20	-	153	269	74	-	207				
	R	L	15	2	6	4	1	-	16	9	7	-	22				
		T	106	18	27	9	2	-	108	26	8	-	114				
				279	208	315	107	29	308	279	71	-	350				
				106	0	0	0	0	116	0	0	44	150				
			2,474	2,501	3,479	978	39%	9%	2,752	2,287	445	41%	2,324				
20 Hoadley St SE North St SE TMC Date: 06/24/15 Peak Hour: 5:00 - 6:00 PHF: .87	EB	L	48	51	36	-15	-4	-	44	36	-15	28	76				
		T	268	255	485	230	62	-	330	463	208	-	476				
	WB	L	2	33	26	-7	-2	-	0	12	-21	1	3				
		T	10	0	0	0	0	-	10	0	0	6	16				
	NB	L	395	183	404	221	60	-	455	378	195	-	590				
		T	50	18	14	-4	-1	-	49	14	-4	29	79				
	SB	L	1	20	18	-2	-1	-	0	7	-13	1	2				
		T	2	0	0	0	0	-	2	0	0	1	3				
	R	L	6	0	15	15	4	-	10	8	8	3	9				
		T	27	14	10	-4	-1	-	26	10	-4	16	43				
				1	0	0	0	0	1	0	0	1	2				
				15	32	27	-5	-1	14	27	-5	9	24				
			825	606	1,035	-	-	941	955	349	58%	1,321					
21 Deschutes Way SW/-5 NB Off Ramp E St SW TMC Date: 06/25/15 Peak Hour: 4:45 - 5:45 PHF: .85	EB	L	0	-	-	-	0	-	0	-	0	-	0				
		T	0	-	-	-	0	-	0	-	0	-	0				
	WB	L	0	-	-	-	0	-	0	-	0	-	0				
		T	0	-	-	-	0	-	0	-	0	-	0				
	NB	L	328	162	273	111	30	-	358	424	262	-	590				
		T	0	-	-	-	0	-	0	-	0	-	0				
	SB	L	79	129	114	-15	-4	-	75	105	-24	-	55				
		T	136	326	444	118	32	-	168	483	157	-	293				
	R	L	278	214	303	89	24	-	302	420	206	-	484				
		T	0	-	-	-	0	-	0	-	0	-	0				
				0	-	-	-	0	0	-	0	-	0				
				821	831	1,134	-	-	903	1,432	-	-	1,422				



Traffic Volume Calculation Worksheet  
 Tumwater Transportation Master Plan  
 PM Peak Hour Volumes

Intersection	Movement		2022 Volumes							2040 Base Model				
			EXISTING 2015	EXISTING MODEL	2040 EXISTING MODEL	BASE MODEL	7 YEAR	BASE MODEL	PROJECTED 2022	2040 BASE MODEL	BASE MODEL	BASE MODEL	PROJECTED 2040	
			VOLUMES	VOLUMES	VOLUMES	Δ GROWTH	GROWTH	ADJUST	VOLUMES	VOLUMES	Δ GROWTH	ADJUST	VOLUMES	
22 Capitol Blvd SE E St SE TMC Date: 06/25/15 Peak Hour: 4:45 - 5:45 PHF: .86	EB	L	90	295	399	104	28		118	264	-31		59	
		T	88	37	54	17	5		93	363	326		414	
	WB	L	255	209	294	85	23		278	277	68		323	
		T	115	63	145	82	22		137	589	526		641	
	NB	L	91	50	90	40	11		102	326	276		367	
		T	131	35	67	32	9		140	42	7		138	
	SB	L	216	112	183	71	19		235	98	-14		202	
		T	444	399	788	389	105		549	387	-12		432	
	Total	L	132	32	76	44	12		144	475	443		575	
		T	191	82	134	52	14		205	111	29		220	
	Grand Total	L	587	886	1521	635	171		758	1169	283		870	
		T	72	0	0	0	0	12	84	0	0	62	134	
				2,412	2,200	3,751	1,551	71%	16%	4,101	1,901	86%	4,375	
	23 Cleveland Ave SE South St SE TMC Date: 06/25/15 Peak Hour: 4:30 - 5:30 PHF: .88	EB	L	0	-	-	-	0		0	-	0		0
T			0	-	-	-	0		0	-	0		0	
WB		L	0	-	-	-	0		0	-	0		0	
		T	7	6	7	1	0		7	5	-1		6	
NB		L	0	-	-	-	0		0	-	0		0	
		T	14	11	21	10	3		17	42	31		45	
SB		L	0	-	-	-	0		0	-	0		0	
		T	571	703	931	228	61		632	1,046	343		914	
Total		L	11	8	8	0	0		11	7	-1		10	
		T	15	18	33	15	4		19	65	47		62	
Grand Total		L	854	1069	1356	287	77		931	1434	365		1,219	
		T	0	-	-	-	0		0	-	0		0	
			1,472	1,815	2,356			2,599				2,256		
24 7th Ave SW Linwood Ave SW TMC Date: 06/30/15 Peak Hour: 5:00 - 6:00 PHF: .93		EB	L	21	5	8	3	1		22	9	4		25
	T		142	171	163	-8	-2		140	182	11		153	
	WB	L	0	-	-	-	0		0	-	0		0	
		T	1	-	-	-	0		1	-	0		1	
	NB	L	261	284	374	90	24		285	366	82		343	
		T	224	154	95	-59	-16		208	103	-51		173	
	SB	L	0	-	-	-	0		0	-	0		0	
		T	0	-	-	-	0		0	-	0		0	
	Total	L	1	-	-	-	0		1	-	0		1	
		T	122	134	227	93	25		147	233	99		221	
	Grand Total	L	0	-	-	-	0		0	-	0		0	
		T	17	6	10	4	1		18	10	4		21	
				789	754	877			822	903			938	
	25 2nd Ave SW Linwood Ave SW TMC Date: 06/30/15 Peak Hour: 4:45 - 5:45 PHF: .89	EB	L	30	3	86	83	22		52	104	101		131
T			163	258	228	-30	-8		155	241	-17		146	
WB		L	100	43	74	31	8		108	71	28		128	
		T	170	170	308	138	37		137	320	150		250	
NB		L	247	309	371	62	17		264	368	59		306	
		T	58	28	28	0	0		58	37	9		67	
SB		L	104	47	115	68	18		122	123	76		180	
		T	116	15	166	151	41		157	202	187		303	
Total		L	94	163	150	-13	-4		90	132	-31		63	
		T	66	190	304	114	31		97	302	112		178	
Grand Total		L	164	78	202	124	33		197	246	168		332	
		T	125	81	146	65	18		143	137	56		181	
			1,367	1,385	2,178			1,580	2,283			2,265		
26 Capitol Blvd SE Linwood Ave SW TMC Date: 06/25/15 Peak Hour: 4:45 - 5:45 PHF: .84		EB	L	165	291	260	-31	-8		157	243	-48		117
	T		0	-	-	-	0	5	5	-	0	5	5	
	WB	L	146	320	423	103	28		174	431	111		257	
		T	0	-	-	-	0	15	15	-	0	15	15	
	NB	L	0	-	-	-	0	5	5	-	0	5	5	
		T	0	-	-	-	0	10	10	-	0	10	10	
	SB	L	155	169	212	43	12		167	228	59		214	
		T	627	251	788	537	145		772	716	465		1,092	
	Total	L	0	-	-	-	0	15	15	-	0	15	15	
		T	0	-	-	-	0	10	10	-	0	10	10	
	Grand Total	L	706	818	1464	646	174		880	1538	720		1,426	
		T	240	339	495	156	42		282	497	158		398	
				2,039	2,188	3,642			2,492	3,653			3,564	
	27 Henderson Blvd Yelm Hwy SE TMC Date: 06/25/15 Peak Hour: 4:45 - 5:45 PHF: .91	EB	L	7	2	5	3	1		8	5	3		10
T			681	942	1,156	214	58		739	1,214	272		953	
WB		L	158	90	130	40	11		169	125	35		193	
		T	429	488	607	119	32		461	567	79		508	
NB		L	503	635	814	179	48		551	911	276		779	
		T	80	15	19	4	1		81	19	4		84	
SB		L	109	62	102	40	11		120	94	32		141	
		T	166	42	78	36	10		176	78	36		202	
Total		L	644	435	516	81	22		666	491	56		700	
		T	154	16	108	92	25		179	90	74		228	
Grand Total		L	207	85	188	103	28		235	214	129		336	
		T	22	3	8	5	1		23	9	6		28	
			3,160	2,815	3,731			3,408	3,817			4,162		
28 Rural Rd SW Trosper Rd SW TMC Date: 06/25/15 Peak Hour: 4:30 - 5:30 PHF: .92		EB	L	35	36	108	72	19		54	110	74		109
	T		177	129	232	103	28		205	215	86		263	
	WB	L	0	-	-	-	0		0	-	0		0	
		T	0	-	-	-	0		0	-	0		0	
	NB	L	294	185	330	135	36		330	317	132		426	
		T	99	117	149	32	9		108	154	37		136	
	SB	L	0	-	-	-	0		0	-	0		0	
		T	0	-	-	-	0		0	-	0		0	
	Total	L	0	-	-	-	0		0	-	0		0	
		T	89	121	150	29	8		97	180	59		148	
	Grand Total	L	0	-	-	-	0		0	-	0		0	
		T	60	54	194	140	38		98	159	105		165	
				754	642	1,153			892	1,135			1,247	



Traffic Volume Calculation Worksheet  
 Tumwater Transportation Master Plan  
 PM Peak Hour Volumes

Intersection	Movement	2022 Volumes							2040 Base Model				
		EXISTING 2015	EXISTING MODEL	2040 EXISTING MODEL	BASE MODEL	7 YEAR	BASE MODEL	PROJECTED 2022	2040 BASE MODEL	BASE MODEL	BASE MODEL	PROJECTED 2040	
		VOLUMES	VOLUMES	VOLUMES	Δ GROWTH	GROWTH	ADJUST	VOLUMES	VOLUMES	Δ GROWTH	ADJUST	VOLUMES	
29 Lake Park Dr Trospers Rd SW  TMC Date: 03/05/14  Peak Hour: 4:45 - 5:45 PHF: .98	L	11	2	2	0	0		11	2	0		11	
	EB T	251	361	511	150	40		291	524	163		414	
	R	44	-	-	-	0	3	47	-	0	11	55	
	L	51	-	-	-	0	3	54	-	0	12	63	
	WB T	369	373	542	169	46		415	544	171		540	
	R	52	61	155	94	25		77	164	103		155	
	L	62	-	-	-	0	4	66	-	0	15	77	
	NB T	25	-	-	-	0	2	27	-	0	6	31	
	R	56	-	-	-	0	3	59	-	0	13	69	
	L	40	63	176	113	30		70	185	122		162	
	SB T	19	-	-	-	0	1	20	-	0	5	24	
	R	13	1	1	0	0		13	1	0		13	
			993	861	1,387			6%	1,149	1,420	559	24%	1,614
	30 2nd Ave SW/Littlerock Rd SW Trospers Rd SW  TMC Date: 03/05/14  Peak Hour: 4:00 - 5:00 PHF: .98	L	40	60	95	35	9		49	107	47		87
EB T		264	313	505	192	52		316	483	170		434	
R		109	51	86	35	9		118	118	67		176	
L		368	90	192	102	27		395	153	63		431	
WB T		297	282	390	108	29		326	351	69		366	
R		32	32	38	6	2		34	18	-14		18	
L		187	75	171	96	26		213	215	140		327	
NB T		216	69	251	182	49		265	266	197		413	
R		396	90	257	167	45		441	167	77		473	
L		100	77	138	61	16		116	142	65		165	
SB T		236	108	338	230	62		298	361	253		489	
R		44	77	137	60	16		60	142	65		109	
			2,289	1,324	2,598				2,631	2,523			3,488
31 I-5 SB Ramps/Tyee Dr Trospers Rd SW  TMC Date: 03/05/14  Peak Hour: 4:30 - 5:30 PHF: .95		L	156	182	234	52	14		170	233	51		207
	EB T	540	297	666	369	99		639	559	262		802	
	R	19	0	0	0	0		19	0	0	6	25	
	L	244	205	277	72	19		263	238	33		277	
	WB T	322	216	285	69	19		341	233	17		339	
	R	191	298	483	185	50		241	505	207		398	
	L	25	0	0	0	0		25	0	0	8	33	
	NB T	158	40	157	117	32		190	38	-2		156	
	R	335	463	495	32	9		344	564	101		436	
	L	460	380	266	-114	-31		429	306	-74		386	
	SB T	327	172	182	10	3		330	277	105		432	
	R	377	189	336	147	40		417	287	98		475	
			3,154	2,442	3,381				3,408	3,240	798	33%	3,966
	32 I-5 NB Ramps Trospers Rd SW  TMC Date: 03/05/14  Peak Hour: 4:30 - 5:30 PHF: .93	L	0	0	0	0	0		0	0	0		0
EB T		816	575	913	338	91		907	788	213		1,029	
R		524	566	647	81	22		546	707	141		665	
L		0	-	-	-	0		0	-	0		0	
WB T		588	550	817	267	72		660	976	426		1,014	
R		617	903	899	-4	-1		616	798	-105	-100		412
L		172	169	228	59	16		188	0	-169	-3		0
NB T		0	0	-	-	0		0	-	0		0	
R		79	112	133	21	6		85	178	66		145	
L		0	-	-	-	0		0	-	0		0	
SB T		0	-	-	-	0		0	-	0		0	
R		0	-	-	-	0		0	-	0		0	
			2,796	2,875	3,637				3,223	3,447			3,265
33 Capitol Blvd SE Trospers Rd SW  TMC Date: 03/05/14  Peak Hour: 4:30 - 5:30 PHF: .99		L	282	77	228	151	41		323	391	314		596
	EB T	47	-	-	-	0	5	52	-	0	20	67	
	R	579	611	685	74	20		599	510	-101	-20	458	
	L	29	-	-	-	0	3	32	-	0	21	50	
	WB T	70	-	-	-	0	7	77	-	0	180	250	
	R	33	-	-	-	0	3	36	-	0	17	50	
	L	771	1,005	1,088	83	22		793	1,023	18	-100	689	
	NB T	574	347	730	383	103		677	544	197		771	
	R	11	-	-	-	0	1	12	-	0		11	
	L	13	-	-	-	0	1	14	-	0	20	33	
	SB T	466	771	1,320	549	148		614	1,311	540	-20	986	
	R	348	448	628	180	48		396	750	302		650	
			3,223	3,259	4,679	1,420	44%	10%	3,011	4,529			4,611
	34 Capitol Blvd SE Lee St SW  TMC Date: 03/05/14  Peak Hour: 4:30 - 5:30 PHF: .93	L	261	159	307	148	40		301	136	-23		238
EB T		5	0	0	0	0	0	5	12	12		17	
R		40	12	19	7	2	4	46	65	53		93	
L		13	0	0	0	0	1	14	0	0		13	
WB T		7	0	0	0	0	1	8	4	4		11	
R		81	68	69	1	0		81	72	4		85	
L		23	6	10	4	1		24	80	74	100	197	
NB T		1,025	1,124	1,442	318	86		1,111	1,359	235	-100	1,160	
R		21	0	0	0	0	2	23	0	0		21	
L		50	59	83	24	6		56	77	18		68	
SB T		816	1,170	1,638	468	126		942	1,622	452		1,268	
R		151	153	284	131	35		186	122	-31		120	
			2,493	2,751	3,852	1,101	40%	9%	2,797	3,549			3,291
35 Littlerock Rd SW Fred Meyer/Costco Drwy  TMC Date: 06/24/15  Peak Hour: 4:30 - 5:30 PHF: .96		L	0	-	-	-	0		0	-	0		0
	EB T	0	-	-	-	0		0	-	0		0	
	R	0	-	-	-	0		0	-	0		0	
	L	129	37	46	9	2		131	47	10		139	
	WB T	3	-	-	-	0		3	-	0		3	
	R	114	27	32	5	1		115	50	23		137	
	L	0	-	-	-	0		0	-	0		0	
	NB T	652	207	647	440	118		770	597	390		1,042	
	R	95	20	36	16	4		99	32	12		107	
	L	103	17	19	2	1		104	20	3		106	
	SB T	584	233	598	365	98		682	612	379		963	
	R	0	-	-	-	0		0	-	0		0	
			1,680	541	1,378				1,904	1,358			2,497



Traffic Volume Calculation Worksheet  
 Tumwater Transportation Master Plan  
 PM Peak Hour Volumes

Intersection	Movement		2022 Volumes							2040 Base Model				
			EXISTING 2015	EXISTING MODEL	2040 EXISTING MODEL	BASE MODEL	7 YEAR GROWTH	BASE MODEL ADJUST	PROJECTED 2022 VOLUMES	2040 BASE MODEL	BASE MODEL	BASE MODEL ADJUST	PROJECTED 2040 VOLUMES	
			VOLUMES	VOLUMES	VOLUMES	Δ GROWTH	GROWTH	ADJUST	VOLUMES	VOLUMES	Δ GROWTH	ADJUST	VOLUMES	
36 Littlerock Rd SW Costco Drwy TMC Date: 06/24/15 Peak Hour: 4:30 - 5:30 PHF: .95	EB	L	80	-	-	-	0	-	80	-	0	20	100	
		T	23	-	-	-	0	-	23	-	0	6	29	
	WB	L	15	-	-	-	0	-	15	-	0	4	19	
		T	125	160	170	10	3	-	128	131	-29	-	96	
	NB	L	5	-	-	-	0	-	5	-	0	1	6	
		T	194	49	142	93	25	-	219	115	66	-	260	
	SB	L	51	-	-	-	0	-	51	-	0	13	64	
		T	491	178	541	363	98	-	589	514	336	-	827	
	T	L	98	55	108	53	14	-	112	103	48	-	146	
		T	214	31	45	14	4	-	218	83	52	-	266	
	R	L	398	240	599	359	97	-	495	577	337	-	735	
		T	80	-	-	-	0	-	80	-	0	20	100	
				1,774	713	1,605	170	58%	13%	2,015	1,523	810	25%	2,648
	37 Littlerock Rd SW Kingswood Dr SW TMC Date: 06/24/15 Peak Hour: 4:30 - 5:30 PHF: .93	EB	L	0	-	-	-	0	-	0	-	0	0	0
T			0	-	-	-	0	-	0	-	0	0	0	
WB		L	0	-	-	-	0	-	0	-	0	0	0	
		T	178	0	0	0	0	24	202	5	5	-	183	
NB		L	0	-	-	-	0	-	0	-	0	0	0	
		T	75	0	0	0	0	10	85	29	29	-	104	
SB		L	0	-	-	-	0	-	0	-	0	0	0	
		T	496	233	649	416	112	-	608	587	354	-	850	
T		L	125	0	0	0	0	17	142	33	33	-	158	
		T	59	0	0	0	0	8	67	32	32	-	91	
R		L	519	400	769	369	99	-	618	675	275	-	794	
		T	0	-	-	-	0	-	0	-	0	0	0	
			1,452	633	1,418	-	-	13%	1,721	1,361	-	2,180		
38 Capitol Blvd SE X St SE TMC Date: 03/05/14 Peak Hour: 4:15 - 5:15 PHF: .89		EB	L	22	-	-	-	0	2	24	-	0	8	30
	T		1	-	-	-	0	0	1	-	0	0	1	
	WB	L	16	-	-	-	0	1	17	-	0	6	22	
		T	10	11	37	26	7	-	17	36	25	-	35	
	NB	L	1	-	-	-	0	0	1	-	0	0	1	
		T	21	21	21	0	0	-	21	20	-1	-	20	
	SB	L	20	-	-	-	0	2	22	-	0	7	27	
		T	904	948	1,218	270	73	-	977	1,236	288	-	1,192	
	T	L	12	8	17	9	2	-	14	16	8	-	20	
		T	36	32	31	-1	0	-	36	31	-1	-	35	
	R	L	712	977	1,448	471	127	-	839	1,453	476	-	1,188	
		T	35	-	-	-	0	3	38	-	0	13	48	
				1,790	1,997	2,772	775	39%	9%	2,008	2,792	-	36%	2,619
	39 Elm St SE X St SE TMC Date: 06/25/15 Peak Hour: 5:00 - 6:00 PHF: .74	EB	L	6	0	0	0	0	0	6	0	0	2	8
T			12	-	-	-	0	0	12	-	0	4	16	
WB		L	9	31	30	-1	0	-	9	30	-1	3	12	
		T	4	-	-	-	0	0	4	-	0	1	5	
NB		L	4	-	-	-	0	0	4	-	0	1	5	
		T	4	-	-	-	0	0	4	-	0	1	5	
SB		L	2	-	-	-	0	0	2	-	0	1	3	
		T	2	20	19	-1	0	-	2	19	-1	1	3	
T		L	66	17	20	3	1	-	67	15	-2	24	90	
		T	6	-	-	-	0	0	6	-	0	2	8	
R		L	0	-	-	-	0	0	0	-	0	0	0	
		T	44	20	25	5	1	-	45	18	-2	16	60	
			160	88	94	6	7%	2%	163	82	-	36%	218	
40 Capitol Blvd SE Dennis St SE/SW TMC Date: 03/05/14 Peak Hour: 4:30 - 5:15 PHF: .91		EB	L	147	113	194	81	22	-	169	190	77	-	224
	T		41	2	3	1	0	-	41	3	1	-	42	
	WB	L	28	35	53	18	5	-	33	42	7	-	35	
		T	28	15	31	16	4	-	32	28	13	-	41	
	NB	L	22	2	3	1	0	-	22	3	1	-	23	
		T	75	105	106	1	0	-	75	104	-1	-	74	
	SB	L	12	23	36	13	4	-	16	33	10	-	22	
		T	688	682	867	185	50	-	738	867	185	-	873	
	T	L	23	16	25	9	2	-	25	33	17	-	40	
		T	52	74	71	-3	-1	-	51	69	-5	-	47	
	R	L	576	763	1,198	435	117	-	693	1,187	424	-	1,000	
		T	71	100	165	65	18	-	89	156	56	-	127	
				1,763	1,930	2,752	101	55	15	1,984	2,715	-	50%	2,548
	41 Capitol Blvd SE Israel Rd SE/SW TMC Date: 06/25/15 Peak Hour: 4:30 - 5:30 PHF: .90	EB	L	80	46	101	55	15	-	95	43	-3	-	77
T			131	32	144	112	30	-	161	183	151	-	282	
WB		L	121	150	266	116	31	-	152	246	96	-	217	
		T	94	0	0	0	0	10	104	0	0	47	141	
NB		L	193	6	111	105	28	21	214	98	92	-	290	
		T	135	0	79	79	21	15	150	64	64	68	203	
SB		L	106	106	153	47	13	-	119	183	77	-	183	
		T	317	675	748	73	20	-	337	826	151	-	468	
T		L	25	0	0	0	0	-	25	0	0	13	38	
		T	71	125	304	179	48	-	119	187	62	-	133	
R		L	514	654	882	228	61	-	575	1024	370	-	884	
		T	88	33	96	63	17	-	105	47	14	-	102	
			1,875	1,827	2,884	873	48%	11%	2,157	2,901	918	50%	3,018	
42 Black Lake Belmore Rd SW 66th Ave SW TMC Date: 06/30/15 Peak Hour: 4:30 - 5:30 PHF: .95		EB	L	49	46	73	27	7	-	56	74	28	-	77
	T		79	37	62	25	7	-	86	63	26	-	105	
	WB	L	0	-	-	-	0	-	0	-	0	-	0	
		T	0	-	-	-	0	-	0	-	0	-	0	
	NB	L	90	42	88	46	12	-	102	87	45	-	135	
		T	107	25	122	97	26	-	133	126	101	-	208	
	SB	L	0	-	-	-	0	-	0	-	0	-	0	
		T	0	-	-	-	0	-	0	-	0	-	0	
	T	L	69	37	89	52	14	-	83	92	55	-	124	
		T	0	-	-	-	0	-	0	-	0	-	0	
	R	L	53	52	180	128	34	-	87	139	87	-	140	
		T	447	239	614	-	-	-	581	-	-	-	789	









Traffic Volume Calculation Worksheet  
 Tumwater Transportation Master Plan  
 PM Peak Hour Volumes

Intersection	Movement	2022 Volumes					2040 Base Model					
		EXISTING 2015	EXISTING MODEL	2040 EXISTING MODEL	BASE MODEL	7 YEAR GROWTH	BASE MODEL ADJUST	PROJECTED 2022 VOLUMES	2040 BASE MODEL	BASE MODEL	BASE MODEL ADJUST	PROJECTED 2040 VOLUMES
		VOLUMES	VOLUMES	VOLUMES	Δ GROWTH	GROWTH		VOLUMES	VOLUMES	Δ GROWTH	ADJUST	VOLUMES
57 Center St SW 76th Ave SW  TMC Date: 03/03/15  Peak Hour: 4:45 - 5:45 PHF: .92	L	48	42	88	46	12		60	78	36		84
	EB T	9	-	-	-	0		9	-	0	5	14
	R	1	0	0	0	0		1	0	0	1	2
	L	8	-	-	-	0		8	-	0	5	13
	WB T	9	-	-	-	0		9	-	0	5	14
	R	21	-	-	-	0		21	-	0	12	33
	L	1	0	0	0	0		1	0	0	1	2
	NB T	247	225	286	61	16		263	279	54		301
	R	0	-	-	-	0		0	-	0	0	0
	L	10	-	-	-	0		10	-	0	6	16
	SB T	311	247	334	87	23		334	361	114		425
	R	38	56	228	172	46		84	183	127		165
			703	570	936			800	901	331	58%	1,068
	58 Old Hwy 99 Henderson Blvd SE  TMC Date: 06/23/15  Peak Hour: 4:15 - 5:15 PHF: .87	L	16	-	-	-	0		16	-	0	9
EB T		6	-	-	-	0		6	-	0	3	9
R		7	-	-	-	0		7	-	0	4	11
L		142	75	102	27	7		149	140	65		207
WB T		6	-	-	-	0		6	-	0	3	9
R		51	70	95	25	7		58	100	30		81
L		2	-	-	-	0		2	-	0	1	3
NB T		512	544	640	96	26		538	755	211		723
R		111	71	91	20	5		116	87	16		127
L		105	73	94	21	6		111	127	54		159
SB T		813	666	855	189	51		864	1205	539		1,352
R		11	-	-	-	0		11	-	0	6	17
			1,782	1,499	1,877			1,884	2,414	165	57%	2,724
59 Old Hwy 99 79th Ave SE  TMC Date: 10/28/14  Peak Hour: 4:30 - 5:30 PHF: .95		L	1	-	-	-	0		1	-	0	0
	EB T	1	-	-	-	0		1	-	0	0	1
	R	10	-	-	-	0		10	-	0	1	11
	L	11	64	84	20	5		16	83	19		30
	WB T	0	-	-	-	0		0	-	0	0	0
	R	111	73	82	9	2		113	86	13		124
	L	1	-	-	-	0		1	-	0	0	1
	NB T	432	543	650	107	29		461	756	213		645
	R	15	53	61	8	2		17	60	7		22
	L	131	68	1	-67	-18		113	67	-1		130
	SB T	841	672	956	284	76		917	1279	607		1,448
	R	0	-	-	-	0		0	-	0	0	0
			1,554	1,473	1,834			1,650	2,331	38	15%	2,414
	60 Kimmie St SW 83rd Ave SW  TMC Date: 03/03/15  Peak Hour: 4:30 - 5:30 PHF: .82	L	0	-	-	-	0		0	-	0	0
EB T		0	-	-	-	0		0	-	0	0	0
R		0	-	-	-	0		0	-	0	0	0
L		43	63	78	15	4		47	73	10		53
WB T		0	-	-	-	0		0	-	0	0	0
R		17	0	0	0	0		17	0	0	0	17
L		0	-	-	-	0		0	-	0	0	0
NB T		29	49	94	45	12		41	84	35		64
R		16	36	34	-2	-1		15	34	-2		14
L		3	0	0	0	0		3	0	0	0	3
SB T		62	73	267	194	52		114	221	148		210
R		0	-	-	-	0		0	-	0	0	0
			170	221	473			237	412			361
61 Center St SW 83rd Ave SW  TMC Date: 03/03/15  Peak Hour: 4:45 - 5:45 PHF: .88		L	70	36	34	-2	-1		69	34	-2	
	EB T	25	10	0	-10	-3		22	0	-10		15
	R	0	-	-	-	0		0	-	0	0	0
	L	0	-	-	-	0		0	-	0	0	0
	WB T	11	4	5	1	0		11	5	1		12
	R	89	77	148	71	19		108	126	49		138
	L	0	-	-	-	0		0	-	0	0	0
	NB T	0	-	-	-	0		0	-	0	0	0
	R	0	-	-	-	0		0	-	0	0	0
	L	156	191	359	168	45		201	309	118		274
	SB T	0	-	-	-	0		0	-	0	0	0
	R	72	63	78	15	4		76	73	10		82
			423	381	624			487	547			589
	62 Old Hwy 99 88th Ave SE  TMC Date: 06/23/15  Peak Hour: 4:30 - 5:30 PHF: .90	L	179	170	201	31	8	18	205	230	60	
EB T		7	-	-	-	0	1	8	-	0		7
R		25	19	18	-1	0	2	27	18	-1		24
L		2	-	-	-	0	0	2	-	0		2
WB T		4	-	-	-	0	0	4	-	0		4
R		1	-	-	-	0	0	1	-	0		1
L		6	13	18	5	1	1	8	14	1		7
NB T		269	357	417	60	16	27	312	486	129		398
R		0	-	-	-	0	0	0	-	0	0	0
L		0	-	-	-	0	0	0	-	0	0	0
SB T		671	487	659	172	46	67	784	748	261		932
R		173	174	285	111	30	17	220	510	336		509
			1,337	1,220	1,598			1,506	2,006			2,123
63 I-5 SB Ramps 93rd Ave SW  TMC Date: 06/23/15  Peak Hour: 5:00 - 6:00 PHF: .88		L	0	-	-	-	0		0	-	0	
	EB T	296	259	371	112	30		326	376	117		413
	R	32	51	107	56	15		47	115	64		96
	L	143	166	111	-55	-15		128	107	-59		84
	WB T	124	127	341	214	58		182	309	182		306
	R	0	-	-	-	0		0	-	0	0	0
	L	0	-	-	-	0		0	-	0	0	0
	NB T	0	-	-	-	0		0	-	0	0	0
	R	0	-	-	-	0		0	-	0	0	0
	L	499	491	563	72	19		518	466	-25		474
	SB T	0	0	0	0	0		0	0	0	0	0
	R	283	246	362	116	31		314	386	140		423
			1,377	1,340	1,855			1,496	1,759			1,796



Traffic Volume Calculation Worksheet  
 Tumwater Transportation Master Plan  
 PM Peak Hour Volumes

Intersection	Movement		2022 Volumes							2040 Base Model				
			EXISTING 2015	EXISTING MODEL	2040 EXISTING MODEL	BASE MODEL	7 YEAR	BASE MODEL	PROJECTED 2022	2040 BASE MODEL	BASE MODEL	BASE MODEL	PROJECTED 2040	
			VOLUMES	VOLUMES	VOLUMES	Δ GROWTH	GROWTH	ADJUST	VOLUMES	VOLUMES	Δ GROWTH	ADJUST	VOLUMES	
64 I-5 NB Ramps 93rd Ave SW  TMC Date: 06/23/15  Peak Hour: 4:30 - 5:30 PHF: .94	EB	L	246	190	248	58	16	262	233	43	289			
		T	504	560	686	126	34	538	609	49	553			
		R	0	-	-	-	0	0	-	0	0			
		L	0	-	-	-	0	0	-	0	0			
	WB	T	251	247	323	76	20	271	286	39	290			
		R	339	294	400	106	29	368	382	88	427			
		L	47	46	129	83	22	69	129	83	130			
		NB	T	0	0	0	0	0	0	0	0			
		R	113	131	172	41	11	124	171	40	153			
		L	0	-	-	-	0	0	-	0	0			
	SB	T	0	-	-	-	0	0	-	0	0			
		R	0	-	-	-	0	0	-	0	0			
				1,500	1,468	1,958			1,632	1,810		1,842		
	65 Kimmie St SW 93rd Ave SW  TMC Date: 06/23/15  Peak Hour: 4:15 - 5:15 PHF: .94	EB	L	25	134	164	30	8	33	162	28	53		
T			462	518	662	144	39	501	591	73	535			
		R	15	39	32	-7	-2	13	27	-12	3			
		L	3	0	0	0	0	3	0	0	3			
WB		T	408	317	414	97	26	434	382	65	473			
		R	6	11	18	7	2	8	18	7	13			
		L	15	36	34	-2	-1	14	34	-2	13			
		NB	T	1	1	6	5	1	2	1	0			
		R	10	0	0	0	0	10	0	0	10			
		L	5	18	72	54	15	20	41	23	28			
SB		T	4	8	15	7	2	6	19	11	15			
		R	48	188	274	86	23	71	252	64	112			
			1,002	1,270	1,691			1,115	1,527		1,259			
66 Case Rd SW 93rd Ave SW  TMC Date: 06/23/15  Peak Hour: 4:30 - 5:30 PHF: .92		EB	L	2	0	0	0	0	2	0	0	2		
	T		316	355	550	195	53	369	475	120	436			
		R	167	159	160	1	0	167	134	-25	142			
		L	54	71	262	191	51	105	255	184	238			
	WB	T	295	190	282	92	25	320	253	63	358			
		R	28	48	115	67	18	46	87	39	67			
		L	82	122	128	6	2	84	123	1	83			
		NB	T	19	40	51	11	3	22	58	18	37		
		R	32	59	71	12	3	35	78	19	51			
		L	51	122	282	160	43	94	212	90	141			
	SB	T	48	86	100	14	4	52	120	34	82			
		R	1	0	0	0	0	1	0	0	1			
				1,095	1,252	2,001			1,297	1,795		1,638		
	67 Tilley Rd SW (south leg) 93rd Ave SW  TMC Date: 06/23/15  Peak Hour: 4:30 - 5:30 PHF: .87	EB	L	0	-	-	-	0	0	-	0			
T			238	247	490	243	65	303	395	148	386			
		R	157	290	413	123	33	190	370	80	237			
		L	86	66	119	53	14	100	245	179	265			
WB		T	236	236	531	295	79	315	485	249	485			
		R	0	-	-	-	0	0	-	0	0			
		L	132	73	129	56	15	147	110	37	169			
		NB	T	0	-	-	-	0	0	-	0			
		R	65	57	68	11	3	68	79	22	87			
		L	0	-	-	-	0	0	-	0	0			
SB		T	0	-	-	-	0	0	-	0	0			
		R	0	-	-	-	0	0	-	0	0			
			914	969	1,750			1,123	1,684		1,629			
68 Tilley Rd SW (north leg) 93rd AVE SW  TMC Date: 06/23/15  Peak Hour: 4:30 - 5:30 PHF: .86		EB	L	113	114	108	-6	-2	111	116	2	115		
	T		190	190	450	260	70	260	358	168	358			
		R	0	0	0	0	0	0	0	0	0			
		L	0	3	3	0	0	0	3	0	0			
	WB	T	94	169	477	308	83	177	415	246	340			
		R	12	14	51	37	10	22	68	54	66			
		L	0	0	0	0	0	0	0	0	0			
		NB	T	0	0	3	3	1	1	3	3			
		R	0	0	2	2	1	1	2	2	2			
		L	14	23	108	85	23	37	179	156	170			
	SB	T	0	4	5	1	0	0	7	3	3			
		R	227	133	172	39	11	238	315	182	409			
				650	650	1,379			847	1,466		1,466		
	69 Old Hwy 99 SE 93rd Ave SW  TMC Date: 06/23/15  Peak Hour: 4:30 - 5:30 PHF: .92	EB	L	16	4	3	-1	0	16	5	1	17		
T			0	-	-	-	0	0	-	0	0			
		R	155	123	196	73	20	175	171	48	203			
		L	0	-	-	-	0	0	-	0	0			
WB		T	0	-	-	-	0	0	-	0	0			
		R	0	-	-	-	0	0	-	0	0			
		L	70	114	284	170	46	116	236	122	192			
		NB	T	213	366	433	67	18	231	495	129	342		
		R	0	-	-	-	0	0	-	0	0			
		L	0	-	-	-	0	0	-	0	0			
SB		T	630	503	672	169	46	676	761	258	888			
		R	28	4	5	1	0	28	6	2	30			
			1,112	1,114	1,593	479	43%	1,242	1,674	10%	1,672			









































---

**APPENDIX A-5**  
**CAPACITY ANALYSIS WORKSHEETS**

---

HCM 2010 AWSC  
1: RW Johnson Rd & Mottman Rd

Existing 2015  
PM Peak Hour

Intersection												
Intersection Delay, s/veh	11.7											
Intersection LOS	B											
Movement	EBS	EBL	EBT	EBR	WBS	WBL	WBT	WBR	NBS	NBL	NBT	NBR
Traffic Vol, veh/h	0	45	80	5	0	105	45	65	0	5	155	135
Future Vol, veh/h	0	45	80	5	0	105	45	65	0	5	155	135
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	6	6	6	2	9	9	9	2	4	4	4
Mvmt Flow	0	49	87	5	0	114	49	71	0	5	168	147
Number of Lanes	0	1	1	0	0	1	1	1	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	NB
Opposing Lanes	2	2	2
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	2	2	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	2	2
HCM Control Delay	10.4	10.8	13.7
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	53%	0%	94%	0%	41%	0%	83%
Vol Right, %	0%	47%	0%	6%	0%	59%	0%	17%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	290	45	85	105	110	45	115
LT Vol	5	0	45	0	105	0	45	0
Through Vol	0	155	0	80	0	45	0	95
RT Vol	0	135	0	5	0	65	0	20
Lane Flow Rate	5	315	49	92	114	120	49	125
Geometry Crp	7	7	7	7	7	7	7	7
Degree of Util(X)	0.01	0.495	0.094	0.164	0.217	0.196	0.091	0.21
Departure Headway (Hd)	6.488	5.652	6.937	6.387	6.832	5.906	6.67	6.04
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	552	637	516	561	525	606	537	594
Service Time	4.227	3.391	4.687	4.138	4.578	3.651	4.415	3.785
HCM Lane V/C Ratio	0.009	0.495	0.095	0.164	0.217	0.198	0.091	0.21
HCM Control Delay	9.3	13.8	10.4	10.4	11.5	10.1	10.1	10.4
HCM Lane LOS	A	B	B	B	B	B	B	B
HCM 95th-ile Q	0	2.8	0.3	0.6	0.8	0.7	0.3	0.8

HCM 2010 AWSC  
1: RW Johnson Rd & Mottman Rd

Existing 2015  
PM Peak Hour

Intersection					
Intersection Delay, s/veh					
Intersection LOS					
Movement	SBU	SBL	SBT	SBR	
Traffic Vol, veh/h	0	45	95	20	
Future Vol, veh/h	0	45	95	20	
Peak Hour Factor	0.92	0.92	0.92	0.92	
Heavy Vehicles, %	2	3	3	3	
Mvmt Flow	0	49	103	22	
Number of Lanes	0	1	1	0	

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	10.3
HCM LOS	B

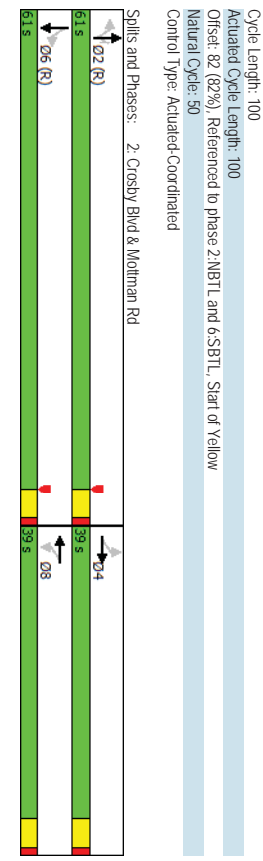
Lane	
Vol Left, %	0%
Vol Thru, %	53%
Vol Right, %	47%
Sign Control	Stop
Traffic Vol by Lane	5
LT Vol	5
Through Vol	0
RT Vol	0
Lane Flow Rate	5
Geometry Crp	7
Degree of Util(X)	0.01
Departure Headway (Hd)	6.488
Convergence, Y/N	Yes
Cap	552
Service Time	4.227
HCM Lane V/C Ratio	0.009
HCM Control Delay	9.3
HCM Lane LOS	A
HCM 95th-ile Q	0



Lanes, Volumes, Timings  
2: Crosby Blvd & Mottman Rd

Existing 2015  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	175	250	25	5	30	65	40	350	165	120	630	425
Traffic Volume (vph)	175	250	25	5	30	65	40	350	165	120	630	425
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vph)	200	200	0	0	200	0	200	0	100	0	100	0
Storage Length (ft)	1	0	0	0	0	0	1	1	1	1	1	0
Storage Lanes	25	25	0	0	25	0	25	0	25	0	25	0
Taper Length (ft)												
Right Turn on Red		Yes			Yes		Yes		Yes		Yes	
Link Speed (mph)		30			30		30		30		30	
Link Distance (ft)		940			1116		645		417		417	
Travel Time (s)		21.4			25.4		14.7		9.5		9.5	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	1%	1%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	NA
Protected Phases		4			8		8		2		6	
Permitted Phases	4	4	8	8	8	8	2	2	2	6	6	6
Detector Phase												
Switch Phase												
Minimum Inhibit (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Spill (s)	2.05	20.5	39.0	39.0	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Total Spill (s)	39.0	39.0	39.0	39.0	61.0	61.0	61.0	61.0	61.0	61.0	61.0	61.0
Total Spill (%)	39.0%	39.0%	39.0%	39.0%	61.0%	61.0%	61.0%	61.0%	61.0%	61.0%	61.0%	61.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Area Type:	Other											
Cycle Length:	100											
Activated Cycle Length:	100											
Offset:	82 (82%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow											
Natural Cycle:	50											
Control Type:	Actuated-Coordinated											



HCM 2010 Signalized Intersection Summary  
2: Crosby Blvd & Mottman Rd

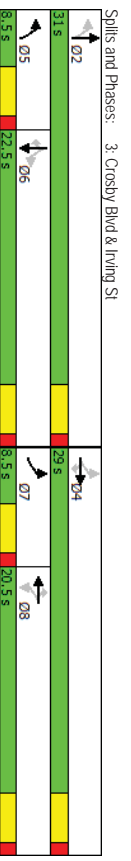
Existing 2015  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	175	250	25	5	30	65	40	350	165	120	630	425
Traffic Volume (veh/h)	175	250	25	5	30	65	40	350	165	120	630	425
Future Volume (veh/h)	175	250	25	5	30	65	40	350	165	120	630	425
Number	7	4	14	3	8	18	5	2	12	1	6	16
Ped/Bike Adj (Adj)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h	1845	1845	1900	1900	1900	1900	1881	1881	1881	1845	1845	1900
Adj Flow Rate, veh/h	197	281	28	6	34	73	45	393	185	135	708	0
Adj No of Lanes	1	1	0	0	1	0	1	1	1	1	1	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh	3	3	3	0	0	0	1	1	3	3	3	3
Cap, veh/h	357	358	36	44	123	236	517	1304	1108	561	2430	0
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.69	0.69	0.69	0.69	0.69	0.00
Sat Flow, veh/h	1289	1651	165	29	567	1089	745	1881	1599	824	3597	0
Gp Volume (v)	197	0	309	113	0	0	45	393	185	135	708	0
Gp Sat Flow (s)	1269	0	1816	1686	0	0	745	1881	1599	824	1752	0
O Served (s)	9.0	0.0	16.1	0.0	0.0	0.0	2.6	8.1	4.0	8.0	7.8	0.0
Cycle O Clear (g-c)	13.5	0.0	16.1	5.6	0.0	0.0	12.2	8.1	4.0	17.9	7.8	0.0
Prop In Lane	1.00	0.00	0.09	0.05	0.65	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Lane Grp Cap (c)	357	0	394	403	0	0	517	1304	1108	561	2430	0.00
V/C Ratio (X)	0.95	0.00	0.78	0.28	0.00	0.00	0.19	0.30	0.17	0.24	0.29	0.00
Avail Cap (c)	519	0	626	615	0	0	517	1304	1108	561	2430	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Filler (f)	1.00	0.00	1.00	1.00	0.00	0.00	0.96	0.96	0.96	1.00	1.00	0.00
Uniform Delay (d) s/veh	35.7	0.0	37.0	32.8	0.0	0.0	8.6	5.9	5.3	9.9	5.9	0.0
Incr Delay (d2) s/veh	1.3	0.0	3.5	0.4	0.0	0.0	0.3	0.6	0.3	1.0	0.3	0.0
Initial Q Delay (d3) s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back (Q50%) s/veh	5.1	0.0	8.4	2.6	0.0	0.0	0.6	4.4	1.8	2.0	3.8	0.0
LnGrp Delay (d) s/veh	37.1	0.0	40.4	33.2	0.0	0.0	8.9	6.5	5.6	10.9	6.2	0.0
LnGrp LOS	D		D	C			A	A	A	B	A	A
Approach Vol, veh/h	506											
Approach Delay, s/veh	39.1											
Approach LOS	D											
Timer	1	2	3	4	5	6	7	8				
Assigned Pns	2	2	2	2	2	2	2	2				
Pns Duration (G+Y+Rc), s	74.1	74.1	25.9	4.5	74.1	74.1	25.9	4.5				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	56.5	56.5	34.5	14.2	56.5	56.5	34.5	14.2				
Max O Clear Time (G+Ch1), s	14.2	14.2	18.1	3.0	14.2	14.2	18.1	3.0				
Green Ext Time (G+Ch1), s	12.7	12.7	3.0	3.0	12.2	12.2	3.4	3.4				
Intersection Summary	HCM 2010 LOS											
HCM 2010 Cnt Delay	16.0											
HCM 2010 LOS	B											

Lanes, Volumes, Timings  
3: Crosby Blvd & Irving St

Existing 2015  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	20	15	165	35	25	290	15	160	425	95	95
Future Volume (vph)	75	20	15	165	35	25	290	15	160	425	95	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	200	0	150	200	0	0	0	250	250
Storage Length (ft)	0	0	1	0	0	1	1	0	0	1	1	1
Taper Length (ft)	25			25			25			25		
Right Turn on Red				Yes			Yes			Yes		
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	468			2725			1710			645		
Travel Time (s)	10.6			61.9			38.9			14.7		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	8%	8%	8%	1%	1%	1%	1%	1%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Turn Type	pm+pl	NA	Perm	Perm	NA	Perm	pm+pl	NA	Perm	NA	Perm	Perm
Protected Phases	7	4	4	8	8	8	5	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	8	2	2	6	6	6
Detector Phase	7	4	4	8	8	8	8	5	2	6	6	6
Switch Phase												
Minimum Inhibit (s)	40	40	40	40	40	40	40	40	40	40	40	40
Minimum Spill (s)	85	20.5	20.5	20.5	20.5	20.5	85	20.5	20.5	20.5	20.5	20.5
Total Spill (s)	85	29.0	29.0	20.5	20.5	20.5	85	31.0	22.5	22.5	22.5	22.5
Total Split (%)	14.2%	48.3%	48.3%	34.2%	34.2%	34.2%	14.2%	51.7%	37.5%	37.5%	37.5%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
AllRed Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	None	None	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max	Max	Max
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	60											
Actuated Cycle Length:	51.7											
Natural Cycle:	60											
Control Type:	Actuated-Uncoordinated											



HCM 2010 Signalized Intersection Summary  
3: Crosby Blvd & Irving St

Existing 2015  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	20	15	165	35	25	290	15	160	425	95	95
Future Volume (veh/h)	75	20	15	165	35	25	290	15	160	425	95	95
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Q <sub>0</sub> ) veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped/Bike Adj (Adj <sub>b</sub> )	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1900	1759	1759	1900	1881	1881	1881	1900	1863	1863	1863	1863
Adj Flow Rate, veh/h	84	22	17	185	39	28	28	326	17	180	478	0
Adj No of Lanes	0	1	1	1	1	1	1	1	0	1	1	1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh %	8	8	8	1	1	1	1	1	1	2	2	2
Cap. veh/h	137	20	387	370	61	414	416	980	51	598	807	686
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.03	0.55	0.55	0.43	0.43	0.00
Sat Flow, veh/h	11	77	1495	898	236	1599	1792	1772	92	1033	1863	1583
Gp Volume (V <sub>l</sub> ) veh/h	106	0	17	224	0	28	28	0	343	180	478	0
Gp Sat Flow (S <sub>l</sub> ) veh/hln	88	0	1495	1134	0	1599	1792	0	1865	1033	1863	1583
Q Serve (S <sub>l</sub> ) s	3.1	0.0	0.4	6.6	0.0	0.6	0.4	0.0	4.8	5.7	9.4	0.0
Cycle Q Clear (C <sub>l</sub> ) s	3.1	0.0	0.4	9.7	0.0	0.6	0.4	0.0	4.8	5.7	9.4	0.0
Prop In Lane	0.79	0	1.00	0.83	1.00	1.00	1.00	0.05	1.00	1.00	1.00	1.00
Lane Grp Cap (C <sub>l</sub> ) veh/h	0	0	387	431	0	414	416	0	1032	598	807	686
V/C Ratio (X)	0.00	0.00	0.04	0.52	0.00	0.07	0.07	0.00	0.33	0.30	0.59	0.00
Avail Cap (C <sub>a</sub> ) veh/h	0	0	765	539	0	534	519	0	1032	598	807	686
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Filler (f)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d) s/veh	0.0	0.0	13.3	17.8	0.0	13.4	7.5	0.0	5.9	9.3	10.3	0.0
Incr Delay (d <sub>2</sub> ) s/veh	0.0	0.0	0.0	1.0	0.0	0.1	0.1	0.0	0.9	1.3	3.2	0.0
Initial Q Delay (d <sub>1</sub> ) s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back (Q <sub>0</sub> /50%) s/vehln	0.0	0.0	0.2	2.9	0.0	0.3	0.2	0.0	2.7	1.8	5.5	0.0
LnGrp Delay (d <sub>l</sub> ) s/veh	0.0	0.0	13.4	18.8	0.0	13.5	7.5	0.0	6.7	10.6	13.5	0.0
<b>Approach LOS</b>												
Approach Vol, veh/h	123			252			371			658		
Approach Delay, s/veh	1.8			18.2			12.7			12.7		
Approach LOS	A			B			A			B		
<b>Timer</b>												
Assigned Pns	1	2	3	4	5	6	7	8				
Pns Duration (G+Y+R <sub>0</sub> ) s		2		4	5	6		8				
Change Period (Y+R <sub>0</sub> ) s		31.0		16.9	5.7	25.3		16.9				
Max Green Setting (G <sub>max</sub> ) s		4.5		4.5	4.5	4.5		4.5				
Max O Clear Time (Q <sub>0</sub> +C <sub>1</sub> ) s		26.5		24.5	4.0	18.0		16.0				
Green Ext Time (P <sub>0</sub> +C <sub>1</sub> ) s		6.1		2.0	0.0	3.2		0.8				
<b>Intersection Summary</b>												
HCM 2010 Cnt Delay	11.2											
HCM 2010 LOS	B											

HCM 2010 AWSC  
4: Irving St & 7th Ave

Existing 2015  
PM Peak Hour

Intersection												
Intersection Delay, s/veh	8.5											
Intersection LOS	A											
Movement	EBS	EBL	EBT	EBR	WBS	WBL	WBT	WBR	NBS	NBL	NBT	NBR
Traffic Vol, veh/h	0	5	10	165	0	1	20	1	0	175	5	1
Future Vol, veh/h	0	5	10	165	0	1	20	1	0	175	5	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	1	1	1	2	0	0	0	2	1	1	1
Mvmt Flow	0	5	11	179	0	1	22	1	0	190	5	1
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB										
Opposing Approach	WB	EB										
Opposing Lanes	1	1										
Conflicting Approach Left	SB	NB										
Conflicting Lanes Left	1	1										
Conflicting Approach Right	NB	SB										
Conflicting Lanes Right	1	1										
HCM Control Delay	8	7.7										
HCM LOS	A	A										

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	97%	3%	5%	0%
Vol Thru, %	3%	6%	91%	50%
Vol Right, %	1%	92%	5%	50%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	181	180	22	10
LT Vol	175	5	1	0
Through Vol	5	10	20	5
RT Vol	1	165	1	5
Lane Flow Rate	197	196	24	11
Geometry Crp	1	1	1	1
Degree of Lvl (X)	0.246	0.212	0.03	0.013
Departure Headway (Hd)	4.497	3.901	4.579	4.282
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	787	925	785	837
Service Time	2.59	1.904	2.588	2.3
HCM Lane V/C Ratio	0.25	0.212	0.031	0.013
HCM Control Delay	9.1	8	7.7	7.4
HCM Lane LOS	A	A	A	A
HCM 95th-ile-Q	1	0.8	0.1	0

HCM 2010 AWSC  
4: Irving St & 7th Ave

Existing 2015  
PM Peak Hour

Intersection						
Intersection Delay, s/veh						
Intersection LOS						
Movement	SBU	SBL	SBT	SBR		
Traffic Vol, veh/h	0	0	5	5		
Future Vol, veh/h	0	0	5	5		
Peak Hour Factor	0.92	0.92	0.92	0.92		
Heavy Vehicles, %	2	0	0	0		
Mvmt Flow	0	0	5	5		
Number of Lanes	0	0	1	0		

Approach	SB	SB			
Opposing Approach	NB	NB			
Opposing Lanes	1	1			
Conflicting Approach Left	WB	WB			
Conflicting Lanes Left	1	1			
Conflicting Approach Right	EB	EB			
Conflicting Lanes Right	1	1			
HCM Control Delay	7.4	7.4			
HCM LOS	A	A			

Lane					
Vol Left, %					
Vol Thru, %					
Vol Right, %					
Sign Control					
Traffic Vol by Lane					
LT Vol					
Through Vol					
RT Vol					
Lane Flow Rate					
Geometry Crp					
Degree of Lvl (X)					
Departure Headway (Hd)					
Convergence, Y/N					
Cap					
Service Time					
HCM Lane V/C Ratio					
HCM Control Delay					
HCM Lane LOS					
HCM 95th-ile-Q					

HCM 2010 TWSC  
5: Crosby Blvd & Bames Rd

Existing 2015  
PM Peak Hour

Intersection												
Int Delay, s/veh												
	6.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	10	1	0	10	5	190	1	80	5	235	110	20
Future Vol, veh/h	10	1	0	10	5	190	1	80	5	235	110	20
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	0	-	-	175
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	0
Grade, %	-	0	-	-	0	-	-	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	10	10	10	2	2	2	4	4	4	2	2	2
Mvmt Flow	11	1	0	11	5	209	1	88	5	258	121	22

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	744	744	132	742
Stage 1	648	648	-	93
Stage 2	96	96	-	649
Critical Hdwy	7.2	6.6	6.3	7.12
Critical Hdwy Sig 1	6.2	5.6	-	6.12
Critical Hdwy Sig 2	6.2	5.6	-	6.12
Follow-up Hdwy	3.59	4.09	3.39	3.518
Poi Cap-1 Maneuver	321	333	896	332
Stage 1	446	454	-	914
Stage 2	891	800	-	458
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	215	215	896	287
Mov Cap-2 Maneuver	215	215	-	287
Stage 1	446	376	-	913
Stage 2	693	799	-	378

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.4	10.3	0.1	5.1
HCM LOS	C	B	-	-

HCM 2010 TWSC  
6: Black Lake Belmore Rd & Black Lake Blvd

Existing 2015  
PM Peak Hour

Intersection												
Int Delay, s/veh												
	11.9											
Movement	EBT	EBR	WBL	WBT	NBL	NBR						
Traffic Vol, veh/h	170	70	130	305	180	105						
Future Vol, veh/h	170	70	130	305	180	105						
Conflicting Peds. #/hr	0	0	0	0	0	0						
Sign Control	Free	Free	Free	Free	Stop	Stop						
RT Channelized	-	None	-	None	-	None						
Storage Length	-	-	250	-	0	-						
Veh in Median Storage, #	0	-	0	-	0	-						
Grade, %	0	-	-	0	-	-						
Peak Hour Factor	94	94	94	94	94	94						
Heavy Vehicles, %	3	3	0	0	1	1						
Mvmt Flow	181	74	138	324	191	112						

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	295
Stage 1	-	-	218
Stage 2	-	-	601
Critical Hdwy	-	-	4.1
Critical Hdwy Sig 1	-	-	6.41
Critical Hdwy Sig 2	-	-	5.41
Follow-up Hdwy	-	-	2.2
Poi Cap-1 Maneuver	-	-	1322
Stage 1	-	-	821
Stage 2	-	-	549
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1322
Mov Cap-2 Maneuver	-	-	310
Stage 1	-	-	821
Stage 2	-	-	492

Approach	EB	WB	NB
HCM Control Delay, s	0	2.4	36.5
HCM LOS	-	E	-

HCM 2010 TWSC  
7: RW Johnson Rd & Sapp Rd

Existing 2015  
PM Peak Hour

Intersection												
Int Delay, s/veh 5.2												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	15	20	1	5	35	70	0	1	5	85	5	30
Future Vol, veh/h	15	20	1	5	35	70	0	1	5	85	5	30
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	0
Grade, %	-	-	-	-	-	-	-	-	-	-	-	-
Peak Hour Factor	85	86	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	3	3	3	1	1	1	0	0	0	3	3	3
Mvmt Flow	18	24	1	6	41	82	0	1	6	100	6	35

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	124	0	174	194
Stage 1	-	-	59	59
Stage 2	-	-	115	135
Critical Hdwy	4.13	-	7.1	6.5
Critical Hdwy Sig 1	-	4.11	-	6.2
Critical Hdwy Sig 2	-	-	6.1	5.5
Follow-up Hdwy	2.227	-	6.1	5.5
Pol Cap-1/Maneuver	1457	-	3.5	4
Stage 1	-	2.209	-	3.3
Stage 2	-	-	793	705
Platoon blocked, %	-	-	938	850
Mov Cap-1/Maneuver	1457	-	910	815
Mov Cap-2/Maneuver	-	-	895	789
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Approach	EB	WB	NB	SB
HCM Control Delay, s	3.1	0.3	8.7	10.2
HCM LOS	A	B	A	B

Minor Lane/Major Mvmt	NBLr1	EBL	EBT	EBR	WBL	WBT	WBR	SBLr1	NB	SB
Capacity (veh/h)	973	1457	-	-	1596	-	-	827	-	-
HCM Lane V/C Ratio	0.007	0.012	-	-	0.004	-	-	0.171	-	-
HCM Control Delay (s)	8.7	7.5	0	-	7.3	0	-	10.2	-	-
HCM Lane LOS	A	A	A	-	A	A	-	B	-	-
HCM 95th %ile Q(veh)	0	0	-	-	0	-	-	0.6	-	-

HCM 2010 TWSC  
8: Sapp Rd & Crosby Blvd

Existing 2015  
PM Peak Hour

Intersection										
Int Delay, s/veh 5.6										
Movement	WBL	WBR	NBT	NBR	SBL	SBT				
Traffic Vol, veh/h	60	15	130	70	20	110				
Future Vol, veh/h	60	15	130	70	20	110				
Conflicting Peds. #/hr	0	0	0	0	0	0				
Sign Control	Stop	Stop	Free	Free	Stop	Stop				
RT Channelized	-	None	-	None	-	None				
Storage Length	250	0	-	-	0	-				
Veh in Median Storage, #	0	-	0	-	-	0				
Grade, %	-	-	-	-	-	-				
Peak Hour Factor	91	91	91	91	91	91				
Heavy Vehicles, %	1	1	1	1	1	0				
Mvmt Flow	66	16	143	77	22	121				

Major/Minor	Minor1	Major1	Minor2
Conflicting Flow All	241	181	181
Stage 1	181	-	0
Stage 2	60	-	181
Critical Hdwy	7.11	6.21	7.1
Critical Hdwy Sig 1	6.11	-	6.1
Critical Hdwy Sig 2	-	-	5.5
Follow-up Hdwy	3.509	3.309	3.5
Pol Cap-1/Maneuver	715	864	785
Stage 1	823	-	825
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1/Maneuver	618	864	770
Mov Cap-2/Maneuver	618	-	770
Stage 1	823	-	823
Stage 2	-	-	809
Approach	WB	NB	SB
HCM Control Delay, s	11	0	11.2
HCM LOS	B	B	B

Minor Lane/Major Mvmt	NBT	NBR	WBLr1	WBLr2	SBLr1	SBLr2
Capacity (veh/h)	-	618	864	770	682	-
HCM Lane V/C Ratio	-	0.107	0.019	0.029	0.177	-
HCM Control Delay (s)	-	11.5	9.2	9.8	11.4	-
HCM Lane LOS	-	B	A	A	B	-
HCM 95th %ile Q(veh)	-	0.4	0.1	0.1	0.6	-

Existing 2015  
PM Peak Hour

SimTraffic Performance Report  
9. Black Lake Belmore Rd & 49th Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total Del/Veh (s)	5.9	6.9	3.4	7.0	8.7	4.6	6.2	8.3	4.7	0.8	1.1	0.8

9. Black Lake Belmore Rd & 49th Ave Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	4.4

Existing 2015  
PM Peak Hour

Lanes, Volumes, Timings  
10. Capitol Blvd & Sunset Way & Carlyon Ave

Lane Group	WBL2	WBL	WBR	NBL	NBR	NBR2	NET	NER	NER2	SWL2	SWL	SWT
Lane Configurations		W	W	W	W	W	T	T	T	T	T	T
Traffic Volume (vph)	1	55	40	35	15	2	440	90	15	45	10	815
Future Volume (vph)	1	55	40	35	15	2	440	90	15	45	10	815
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	0	0	0	0	0	0	0	150
Storage Lanes	1	0	0	1	0	0	0	0	0	0	0	1
Taper Length (ft)	25	0	0	25	0	0	0	0	0	0	0	25
Right Turn on Red		Yes				Yes				Yes		
Link Speed (mph)		30		30			30			30		
Link Distance (ft)		840		629			731			791		
Travel Time (s)		19.1		14.3			16.6			18.0		
Peak Hour Factor		0.85		0.85			0.85			0.85		
Heavy Vehicles (%)		0%		0%			2%			2%		
Shaded Lane Traffic (%)		Prot		Prot			NA			Prot		NA
Turn Type		Prot		Prot			2			Prot		1
Protected Phases		8		8			4			2		6
Permitted Phases		8		8			4			2		6
Detector Phase		8		8			4			2		6
Switch Phase												
Minimum Initial (s)		6.0		6.0			10.0			6.0		10.0
Minimum Spill (s)		29.5		29.5			29.5			10.5		20.0
Total Split (s)		29.5		29.5			30.5			13.5		44.0
Total Split (%)		31.1%		31.1%			22.6%			14.2%		46.3%
Yellow Time (s)		3.5		3.5			3.5			3.5		3.5
All-Red Time (s)		1.0		1.0			1.0			1.0		1.0
Lost Time Adjust (s)		0.0		0.0			0.0			0.0		0.0
Total Lost Time (s)		4.5		4.5			4.5			4.5		4.5
LeadLag							Lag			Lead		
Lead-Lag Optimize?							Yes			Yes		
Recall Mode		None		None			Max			None		Max

Intersection Summary

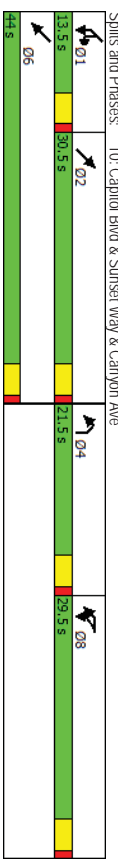
Area Type: Other

Cycle Length: 95

Actuated Cycle Length: 62.3

Natural Cycle: 95

Control Type: Actuated-Uncoordinated



HCM Signalized Intersection Capacity Analysis  
10: Capitol Blvd & Sunset Way & Carlyon Ave

Existing 2015  
PM Peak Hour

Movement	WBL2	WBL	WBR	NBL	NBR	NBR2	NET	NER	NER2	SWL2	SWL	SWT
Lane Configurations												
Traffic Volume (vph)	1	55	40	35	15	2	440	90	15	45	10	815
Future Volume (vph)	1	55	40	35	15	2	440	90	15	45	10	815
Ideal Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		4.5		4.5		4.5		4.5		4.5
Lane Util. Factor		1.00		1.00		0.95		0.95		1.00		0.95
Fit		0.94		0.96		0.97		1.00		1.00		1.00
Fit Protected		0.97		0.97		1.00		1.00		1.00		1.00
Satd. Flow (vph)	1742	1742	1757	1757	3437	3437	1787	3574		1787	3574	
Fit Permitted		0.97		0.97		1.00		0.95		1.00		1.00
Satd. Flow (perm)	1742	1742	1757	1757	3437	3437	1787	3574		1787	3574	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	1	65	47	41	18	2	518	106	18	53	12	959
RTOR Reduction (vph)	0	104	0	58	0	0	1	0	0	0	0	0
Lane Group Flow (vph)	0	9	0	3	0	0	641	0	0	0	0	65
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	1%	1%	1%
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	NA	NA	NA	Prot	Prot	NA
Protected Phases	8	8		4			2			1	1	6
Permitted Phases												
Actuated Green, G(s)		5.3		3.4			35.6			4.8	44.9	
Effective Green, g(s)		5.3		3.4			35.6			4.8	44.9	
Actuated g/C Ratio		0.08		0.05			0.53			0.07	0.67	
Clearance Time (s)		4.5		4.5			4.5			4.5	4.5	
Vehicle Extension (s)		3.0		3.0			3.0			3.0	3.0	
Lane Cap Cap (vph)		137		89			1823			127	2391	
v/s Ratio Prot		0.01		0.00			0.19			0.04	0.27	
v/s Ratio Perm												
V/C Ratio		0.07		0.03			0.35			0.51	0.40	
Uniform Delay, d1		28.6		30.3			9.1			30.0	5.0	
Progression Factor		1.00		1.00			1.00			1.00	1.00	
Incremental Delay, d2		0.2		0.2			0.5			3.5	0.5	
Delay (s)		28.8		30.4			9.6			33.5	5.5	
Level of Service		C		C			A			C	A	
Approach Delay (s)		28.8		30.4			9.6			7.3	7.3	
Approach LOS		C		C			A			A	A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay		10.2									B	
HCM 2000 Volume to Capacity ratio		0.38										
Actuated Cycle Length (s)		67.1									18.0	
Intersection Capacity Utilization		46.1%									A	
Analysis Period (min)		15										
<b>c Critical Lane Group</b>												

HCM 2010 TWSC  
11: Deschutes Way & I-5 NB On-Ramp

Existing 2015  
PM Peak Hour

Intersection	Int Delay s/veh	1.7	Major1		Major2		Minor2	
Movement	SEL	SET	NWT	NWR	SWL	SWR		
Traffic Vol, veh/h	160	305	225	145	0	0		
Future Vol, veh/h	160	305	225	145	0	0		
Conflicting Peds. #/hr	0	0	0	0	0	0		
Sign Control	Free	Free	Free	Free	Stop	Stop		
RT Channelized	-	None	-	None	-	None		
Storage Length	-	-	-	-	-	-		
Veh in Median Storage, #	-	0	0	0	0	0		
Grade, %	-	-	-	-	-	-		
Peak Hour Factor	79	79	79	79	79	79		
Heavy Vehicles, %	0	0	1	1	0	0		
Mvmt Flow	203	386	285	184	0	0		

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	468	0	1168
Stage 1	-	-	377
Stage 2	-	-	791
Critical Hdwy	4.1	-	6.4
Critical Hdwy Sig 1	-	-	5.4
Critical Hdwy Sig 2	-	-	5.4
Follow-up Hdwy	2.2	-	3.5
Plat Cap-1 Maneuver	1104	-	216
Stage 1	-	-	698
Stage 2	-	-	450
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1104	-	165
Mov Cap-2 Maneuver	-	-	165
Stage 1	-	-	698
Stage 2	-	-	345

Approach	SE	NW	SW
HCM Control Delay, s	3.1	0	0
HCM LOS	A	A	A

HCM 2010 TWSC  
12: Beschtales Way & US 101 WB On-Ramp

Existing 2015  
PM Peak Hour

Intersection								
Int Delay, s/veh	3.7							
<b>Movement</b>	<b>EBL</b>	<b>EBR</b>	<b>NBL</b>	<b>NBT</b>	<b>SBT</b>	<b>SBR</b>		
Traffic Vol, veh/h	0	0	430	385	260	20		
Future Vol, veh/h	0	0	430	385	260	20		
Conflicting Peds, #/hr	0	0	0	0	0	0		
Sign Control	Stop	Stop	Free	Free	Free	Free		
RT Channelized	-	None	-	None	-	None		
Storage Length	0	-	-	-	-	-		
Veh in Median Storage, #	0	-	-	0	-	-		
Grade, %	0	-	-	0	-	-		
Peak Hour Factor	92	92	92	92	92	92		
Heavy Vehicles, %	0	0	1	1	1	0		
Mvmt Flow	0	0	467	418	283	22		

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1646	304	0
Stage 1	293	-	-
Stage 2	1353	-	-
Critical Hdwy	6.4	4.11	-
Critical Hdwy, Sig 1	5.4	-	-
Critical Hdwy, Sig 2	5.4	-	-
Follow-up Hdwy	3.5	2.209	-
Pl Cap-1 Maneuver	111	0	1263
Stage 1	762	0	-
Stage 2	243	0	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	70	-	1263
Mov Cap-2 Maneuver	70	-	-
Stage 1	762	-	-
Stage 2	153	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	5	0
HCM LOS	A		
<b>Minor Lane/Major Mvmt</b>	<b>NBL</b>	<b>NBT</b>	<b>EBLT</b>
Capacity (veh/h)	1263	-	-
HCM Lane V/C Ratio	0.37	-	-
HCM Control Delay (s)	9.5	0	-
HCM Lane LOS	A	A	-
HCM 95th %ile Q(veh)	1.7	-	-

SimTraffic Performance Report  
13: 2nd Ave/US 101/I-5 Off-Ramps Performance by movement

Existing 2015  
PM Peak Hour

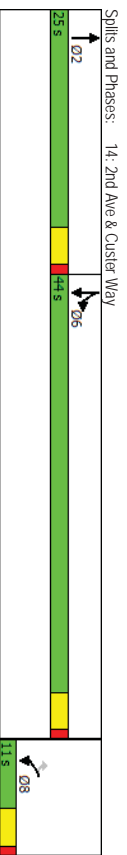
Movement	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.5	0.5	0.4
Total Del/Veh (s)	0.7	1.0	0.9	32.0	12.2	22.6



Lanes, Volumes, Timings  
14: 2nd Ave & Custer Way

Existing 2015  
PM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	125	150	25	150	815	230
Traffic Volume (vph)	125	150	25	150	815	230
Future Volume (vph)	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	0	225	0	0	0	0
Storage Length (ft)	1	1	0	0	1	1
Storage Lanes	25	1	1	1	25	1
Taper Length (ft)						
Right Turn on Red		Yes		Yes		
Link Speed (mph)	30		30		30	
Link Distance (ft)	662		2035		505	
Travel Time (s)	15.0		46.3		11.5	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%
Shared Lane Traffic (%)						
Turn Type	Prot	Perm	NA	NA	Spill	NA
Protected Phases	8		2		6	6
Permitted Phases	8	8	2		6	6
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0		4.0	4.0
Minimum Spill (s)	100	10.0	24.5		20.0	20.0
Total Spill (s)	11.0	11.0	29.0		44.0	44.0
Total Spill (%)	13.8%	13.8%	31.3%		55.0%	55.0%
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None		Max	Max
<b>Intersection Summary</b>						
Area Type:	Other					
Cycle Length:	80					
Actuated Cycle Length:	66.3					
Natural Cycle:	90					
Control Type:	Actuated-Uncoordinated					



HCM 2010 Signalized Intersection Summary  
14: 2nd Ave & Custer Way

Existing 2015  
PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	125	150	25	150	815	230
Traffic Volume (veh/h)	125	150	25	150	815	230
Future Volume (veh/h)	125	150	25	150	815	230
Number	3	18	2	12	1	6
Initial Q (Ob.) veh	0	0	0	0	0	0
Ped Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1881	1881	1900	1900	1900
Adj Flow Rate, veh/h	142	5	28	5	926	261
Adj No. of Lanes	1	1	1	0	1	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh. %	1	1	1	1	1	1
Cap. veh/h	181	162	44	8	1174	1233
Arrive On Green	0.10	0.10	0.03	0.03	0.65	0.65
Sat Flow, veh/h	1792	1599	1555	278	1810	1900
Gp Volume(v), veh/h	142	5	0	33	926	261
Gp Sat Flow(s), veh/hln	1792	1599	0	1832	1810	1900
Q Serve(g), s	4.7	0.2	0.0	1.1	22.4	3.4
Cycle Q Clear(g_c), s	1.00	1.00	0.15	1.00		
Prop. In Lane	1.00	1.00	0	0.64	0.79	0.21
Lane Gp Cap(c), veh/h	181	162	0	51	1174	1233
V/C Ratio(X)	0.78	0.03	0.00	0.64	0.79	0.21
Avail Cap(C_a), veh/h	191	171	0	617	1174	1233
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.7	24.7	0.0	29.3	7.7	4.3
Incr Delay (d2), s/veh	16.3	0.0	0.0	4.9	5.4	0.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%),veh/hln	3.1	0.1	0.0	0.6	12.6	1.9
LnGrp Delay(d), s/veh	43.0	24.7	0.0	34.1	13.1	4.7
LnGrp LOS	D	C	C	C	B	A
Approach Vol, veh/h	147		33		1187	
Approach Delay, s/veh	42.4		34.1		11.2	
Approach LOS	D		C		B	
Timer	1	2	3	4	5	6
Assigned Pts		2				8
Pts Duration (G+Y+R), s		6.2				44.0
Change Period (Y+R), s		4.5				4.5
Max Green Setting (Gmax), s		20.5				39.5
Max O Clear Time (G+CH1), s		3.1				24.4
Green Ext Time (P.C.), s		0.1				5.0
Green Ext Time (P.C.), s						0.0
<b>Intersection Summary</b>						
HCM 2010 Cnt Delay	15.1					
HCM 2010 LOS	B					

HCM 2010 TWSC  
15: Boston St & Custer Way

Existing 2015  
PM Peak Hour

Intersection												
Int Delay, s/veh	4.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	710	165	370	260	5	0	1	150	0	1	5
Future Vol, veh/h	0	710	165	370	260	5	0	1	150	0	1	5
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	425	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	-	0
Grade, %	-	0	-	-	-	0	-	-	-	-	-	0
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	1	1	1	1	1	1	0	0	0	0	0	0
Mvmt Flow	0	747	174	389	274	5	0	1	158	0	1	5

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	219	0	0	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.115	-	-	-
Critical Hdwy Spt 1	-	-	-	-
Critical Hdwy Spt 2	-	-	-	-
Follow-up Hdwy	2.2095	-	2.2095	-
Plat Cap-1 Maneuver	1289	-	744	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platnon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1289	-	744	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Approach	EB	WB	NB	SB
HCM Control Delay, s	0	8.8	15.5	29.9
HCM LOS	C	C	C	D
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR
Capacity (veh/h)	502	1289	-	744
HCM Lane V/C Ratio	0.317	-	0.523	-
HCM Control Delay (s)	15.5	0	15	-
HCM Lane LOS	C	A	C	-
HCM 95th %ile Q(veh)	1.3	0	3.1	-

HCM 2010 AWSC  
16: Deschutes Way & Boston St

Existing 2015  
PM Peak Hour

Intersection										
Intersection Delay, s/veh	2.9									
Intersection LOS	D									
Movement	WBU	WBL	WBR	NBU	NBL	NBR	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	95	415	0	365	60	0	100	185	0
Future Vol, veh/h	0	95	415	0	365	60	0	100	185	0
Peak Hour Factor	0.92	0.93	0.92	0.92	0.93	0.93	0.92	0.93	0.93	0
Heavy Vehicles, %	2	1	1	2	0	0	2	0	0	0
Mvmt Flow	0	102	446	0	392	65	0	108	199	0
Number of Lanes	0	1	1	0	1	0	0	1	1	0

Approach	WB	NB	SB
Opposing Approach	0	SB	NB
Opposing Lanes	NB	1	WB
Conflicting Approach Left	1	0	1
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	1	WB	NB
Conflicting Lanes Right	1	1	1
HCM Control Delay	36	28	17.8
HCM LOS	E	D	C
Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	19%	35%
Vol Thru, %	86%	0%	65%
Vol Right, %	14%	81%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	425	510	285
LT Vol	0	95	100
Through Vol	365	0	185
RT Vol	60	415	0
Lane Flow Rate	457	548	306
Geometry Grp	1	1	1
Degree of Util (X)	0.783	0.875	0.561
Departure Headway (Hd)	6.167	5.742	6.587
Convergence, Y/N	Yes	Yes	Yes
Cap	585	631	545
Service Time	4.216	3.782	4.642
HCM Lane V/C Ratio	0.781	0.868	0.561
HCM Control Delay	28	36	17.8
HCM Lane LOS	D	E	C
HCM 95th-ile Q	7.4	10.2	3.4

HCM 2010 TWSC  
17: Capitol Blvd & Cleveland Ave

Existing 2015  
PM Peak Hour

Intersection	Int Delay, s/veh	4.1				
Movement	NBL	NBR	NET	NER	SWL	SWT
Traffic Vol, veh/h	0	225	330	20	365	550
Future Vol, veh/h	0	225	330	20	365	550
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Yield	-	None
Storage Length	0	0	0	0	150	0
Veh in Median Storage, #	0	0	0	0	0	0
Grade, %	0	0	0	0	0	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	4	4	1	1	1	1
Wmnt Flow	0	256	375	23	415	625

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	188	0	375
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy, Sig 1	6.98	-	4.12
Critical Hdwy, Sig 2	-	-	-
Follow-up Hdwy	3.34	-	2.21
Plat Cap-1 Maneuver	0	816	1187
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	816	1187
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	NB	NE	SW
HCM Control Delay, s	11.4	0	3.9
HCM LOS	B		

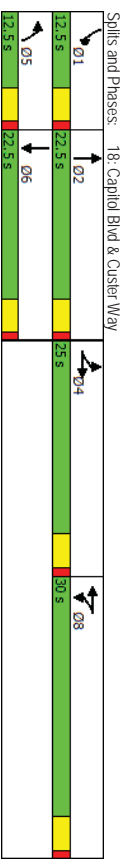
Minor Lane/Major Wmnt	NET	NER/NBL/1	SWL	SWT
Capacity (veh/h)	-	816	1187	-
HCM Lane V/C Ratio	-	0.313	0.349	-
HCM Control Delay (s)	-	11.4	9.7	-
HCM Lane LOS	-	B	A	-
HCM 95th %ile Q(veh)	-	1.3	1.6	-

Lanes, Volumes, Timings  
18: Capitol Blvd & Custer Way

Existing 2015  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	135	650	80	345	440	5	20	330	425	20	390	135
Future Volume (vph)	135	650	80	345	440	5	20	330	425	20	390	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150	0	0	0	0	0	100	0	100	0	100	0
Storage Lanes	1	1	0	1	1	0	1	1	1	0	1	0
Taper Length (ft)	25	0	0	25	0	0	25	0	25	0	25	0
Right Turn on Red	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Link Speed (mph)	30	684	30	631	30	631	30	2019	30	631	30	631
Link Distance (ft)	15.5	15.5	15.5	14.3	14.3	14.3	14.3	45.9	14.3	14.3	14.3	14.3
Travel Time (s)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Peak Hour Factor	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Shared Lane Traffic (%)	Split	NA	Split	Split	NA	Split	Split	NA	Split	NA	Split	NA
Turn Type	4	4	4	8	8	8	8	5	2	8	6	6
Protected Phases	4	4	4	8	8	8	8	5	2	8	6	6
Detector Phase	4	4	4	8	8	8	8	5	2	8	6	6
Switch Phase	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Initial (s)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	12.5	22.0	12.5	22.0	22.0
Minimum Spill (s)	25.0	25.0	30.0	30.0	30.0	30.0	12.5	22.5	12.5	22.5	22.5	22.5
Total Split (s)	27.8%	27.8%	33.3%	33.3%	33.3%	33.3%	13.9%	25.0%	13.9%	25.0%	13.9%	25.0%
Total Split (%)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Yellow Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	None	None	None	None	None	None	None	None	None	None	None	None
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None

Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 82.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	



HCM 2010 Signalized Intersection Summary

Existing 2015  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	41b	41b	41b	41b	41b	41b	41b	41b	41b	41b	41b	41b
Traffic Volume (veh/h)	135	650	80	345	440	5	20	330	425	20	390	135
Future Volume (veh/h)	135	650	80	345	440	5	20	330	425	20	390	135
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Q0), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped/Bike Adj.(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj'l Sat Flow, veh/hln	1881	1881	1900	1881	1881	1900	1881	1881	1900	1900	1900	1900
Adj'l Flow Rate, veh/h	150	722	0	383	489	6	22	367	189	22	433	150
Adj'l No. of Lanes	1	2	0	1	1	0	1	1	0	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh. %	1	1	1	1	1	1	1	1	1	1	1	1
Arrive On Green	0.23	0.23	0.00	0.29	0.29	0.29	0.04	0.22	0.22	0.04	0.22	0.22
Sat Flow, veh/h	1792	3762	0	1792	1854	23	1792	2298	1165	1810	2639	906
Grip Volume (V), veh/hln	150	722	0	383	0	495	22	284	212	22	295	288
Grip Sat Flow(s), veh/hln	1792	1881	0	1792	1787	1792	1787	1616	1810	1805	1740	1740
Q Serve(q_s), s	5.8	15.0	0.0	15.7	0.0	20.7	1.0	12.1	12.4	1.0	12.5	12.7
Cycle Q Clean(q_c), s	5.8	15.0	0.0	15.7	0.0	20.7	1.0	12.1	12.4	1.0	12.5	12.7
Prop In Lane	1.00	1.00	0.00	1.00	0.01	1.00	0.01	1.00	0.70	1.00	0.52	0.52
Lane Grp Cap(c), veh/h	410	861	0	525	0	550	69	393	368	70	397	383
AVL Ratio(X)	0.37	0.84	0.00	0.73	0.00	0.90	0.32	0.72	0.74	0.32	0.74	0.75
Avali Cap(c_a), veh/h	449	942	0	558	0	585	175	393	368	177	397	383
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.6	30.1	0.0	26.0	0.0	27.8	38.3	29.6	29.7	38.3	29.8	29.9
Incr Delay (d2), s/veh	0.5	6.3	0.0	4.5	0.0	16.4	2.6	11.0	12.4	2.6	11.9	12.9
Initial Q Delay(d0), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%Late BackOf(50%), veh/hln	2.9	8.5	0.0	8.4	0.0	13.2	0.5	7.1	7.0	0.5	7.5	7.5
LnGrp Delay(d), s/veh	27.1	36.5	0.0	30.6	0.0	44.2	40.9	40.6	42.2	40.9	41.7	42.7
LnGrp LOS	C	D	D	C	D	D	D	D	D	D	D	D
Approach Vol, veh/h	872											
Approach Delay, s/veh	34.9											
Approach LOS	C											
Timer	1	2	3	4	5	6	7	8				

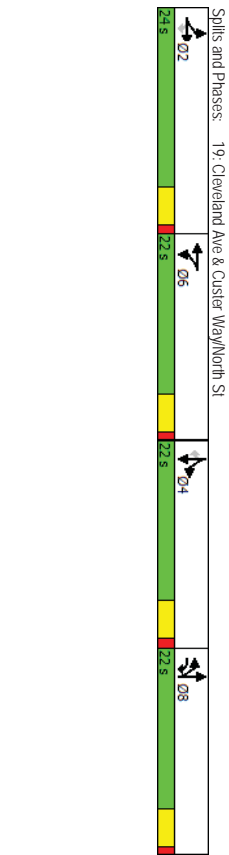
Assigned PIs	1	2	3	4	5	6	7	8
Pls Duration (G+Y+R0), s	7.6	22.5		4.5	7.6	22.5		28.5
Change Period (Y+R0), s	4.5	4.5		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s	8.0	18.0		20.5	8.0	18.0		25.5
Max Q Clear Time (G+CH1), s	3.0	14.4		17.0	3.0	14.7		22.7
Green Ext Time (G_C), s	0.0	2.2		1.7	0.0	2.1		1.3

Intersection Summary  
HCM 2010 Ctrl Delay 38.7  
HCM 2010 LOS D  
Notes

Lanes, Volumes, Timings

Existing 2015  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	41b	41b	41b	41b	41b	41b	41b	41b	41b	41b	41b	41b
Traffic Volume (vph)	50	330	645	15	245	70	480	135	15	105	280	105
Future Volume (vph)	50	330	645	15	245	70	480	135	15	105	280	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100	0	0	200	0	300	0	150	0	150	150	0
Storage Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Taper Length (ft)	25			25		25		25		25		25
Right Turn on Red Link Speed (mph)			Yes			Yes		Yes		Yes		Yes
Link Distance (ft)		30			30			2207		30		341
Travel Time (s)		14.3			50.2			66.4		7.8		7.8
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Shared Lane Traffic (%)	50%											
Turn Type	Split	NA	pm+ov	Split	NA	Split	Split	NA	Split	NA	Split	NA
Protected Phases	2	2	8	6	6	6	8	8	8	8	8	4
Permitted Phases	2	2	2	8	6	6	8	8	8	8	8	4
Detector Phase	2	2	8	6	6	6	8	8	8	8	4	4
Switch Phase												
Minimum Initial (s)	6.0	6.0	8.0	6.0	6.0	6.0	8.0	8.0	6.0	6.0	8.0	6.0
Minimum Spill (s)	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
Total Spill (s)	2.40	2.40	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
Total Spill (%)	26.7%	26.7%	24.4%	24.4%	24.4%	24.4%	24.4%	24.4%	24.4%	24.4%	24.4%	24.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust(s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Loss Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Leadlag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	88.6											
Natural Cycle:	90											
Control Type:	Actuated-Uncoordinated											



HCM 2010 Signalized Intersection Summary  
19: Cleveland Ave & Custer Way/North St

Existing 2015  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (veh/h)	50	330	645	15	245	70	480	135	15	105	280	105
Future Volume (veh/h)	50	330	645	15	245	70	480	135	15	105	280	105
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Q0), veh	0	0	0	0	0	0	0	0	0	0	0	0
Peak Bike Adj/(A <sub>pb</sub> )	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sd Flow, veh/hln	1881	1881	1881	1881	1881	1900	1881	1881	1900	1863	1863	1863
Adj Flow Rate, veh/h	54	355	586	16	263	75	516	145	16	113	301	22
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh. %	1	1	1	1	1	1	1	1	1	2	2	2
Cap. veh/h	391	411	625	350	275	79	619	287	32	325	342	290
Arrive On Green	0.22	0.22	0.22	0.20	0.20	0.20	0.17	0.17	0.17	0.18	0.18	0.18
Sat Flow, veh/h	1792	1881	1599	1792	1409	402	3583	1665	184	1774	1863	1583
Srv Volume (V), veh/h	54	355	586	16	0	338	516	0	161	113	301	22
Grp Sat Flow(s), veh/hln	1792	1881	1599	1792	0	1810	1792	0	1849	1774	1863	1583
Q Serve(s), s	2.1	15.8	19.0	0.6	0.0	16.1	12.1	0.0	6.9	4.8	13.7	1.0
Cycle Q Clear(q,c), s	2.1	15.8	19.0	0.6	0.0	16.1	12.1	0.0	6.9	4.8	13.7	1.0
Prop In Lane	1.00	1.00	1.00	0.22	1.00	0.22	1.00	0.10	1.00	0.10	1.00	1.00
Lane Grp Cap(c), veh/h	391	411	625	350	0	354	619	0	319	325	342	290
Vavl Ratio(X)	0.14	0.86	0.94	0.05	0.00	0.96	0.83	0.00	0.50	0.35	0.88	0.08
Avail Cap(c), veh/h	391	411	625	350	0	354	700	0	361	347	364	310
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.4	32.7	21.9	28.4	0.0	34.6	34.8	0.0	32.6	31.0	34.6	29.4
Incr Delay (d2), s/veh	0.2	17.1	21.8	0.1	0.0	36.1	7.8	0.0	1.2	0.5	20.1	0.1
Initial Q Delay(d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%alle BackQ(50%), veh/h	1.1	10.1	17.8	0.3	0.0	11.5	6.6	0.0	3.6	2.4	8.9	0.4
Lngrp Delay(d), s/veh	27.5	49.8	43.7	28.5	0.0	70.7	42.6	0.0	33.8	31.4	54.7	29.5
Lngrp LOS	C	D	D	C	D	E	D	C	C	C	D	C
Approach Vol, veh/h	995	450	354	688	405	436	47.4	405	47.4	405	47.4	405
Approach Delay, s/veh	45.0	D	D	68.8	E	D	D	D	D	D	D	D
Approach LOS	D	D	D	E	E	D	D	D	D	D	D	D
Timer	1	2	3	4	5	6	7	8				
Assigned PIs	2	2	2	2	2	2	2	2				
Pis Duration (G+Y+R), s	24.0	24.0	21.0	22.0	22.0	20.0	20.0	20.0				
Change Period (Y+R), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	19.0	17.0	17.0	17.0	18.1	17.0	17.0	14.1				
Max Q Clear Time (Q-Ch1), s	21.0	15.7	15.7	18.1	18.1	14.1	14.1	0.9				
Green Ext Time (Q-Ch1), s	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0				
<b>Intersection Summary</b>												
HCM 2010 C/IH Delay	47.6											
HCM 2010 LOS	D											
<b>Notes</b>												

HCM 2010 TWSC  
20: Hoady St & North St

Existing 2015  
PM Peak Hour

Intersection	1.7												
Int Delay, s/veh													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Traffic Vol, veh/h	50	270	2	10	395	50	1	2	5	25	1	15	
Future Vol, veh/h	50	270	2	10	395	50	1	2	5	25	1	15	
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	
RT Channelized	-	None	-	-	None	-	-	None	-	-	None	-	
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-	
Veh in Median Storage, #	0	0	0	0	0	0	0	0	0	0	0	0	
Grade, %	-	-	-	-	-	-	-	-	-	-	-	-	
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87	
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	0	0	0	
Mmnt Flow	57	310	2	11	454	57	1	2	6	29	1	17	

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	511	313	0	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.11	4.11	7.1	6.5
Critical Hdwy Stg 1	-	-	6.1	5.5
Critical Hdwy Stg 2	-	-	6.1	5.5
Follow-up Hdwy	2.209	2.209	3.5	4
Pl Cap-1/Maneuver	1059	1253	245	259
Stage 1	-	-	610	589
Stage 2	-	-	546	528
Platoon blocked, %	-	-	-	-
Mov Cap-1/Maneuver	1059	1253	223	239
Mov Cap-2/Maneuver	-	-	223	239
Stage 1	-	-	570	551
Stage 2	-	-	523	522

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	0.2	14.1	19.5
HCM LOS	B	B	B	C
Minor Lane/Major Mmnt	NBLn1	EBL	EBT	EBR
Capacity (veh/h)	407	1059	-	1253
HCM Lane V/C Ratio	0.023	0.054	-	0.009
HCM Control Delay (s)	14.1	8.6	-	7.9
HCM Lane LOS	B	A	A	A
HCM 95th %ile Q(veh)	0.1	0.2	-	0

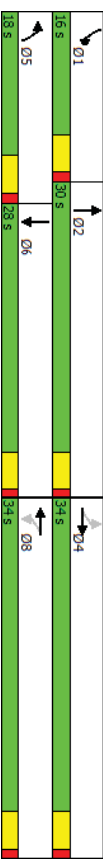
21: I-5 NB Off-Ramp/Deschutes Way & E St Performance by movement

Movement	WBR	NBT	NBR	SBL	All
Denied Del/Veh (s)	0.3	0.2	0.2	0.2	0.2
Total Del/Veh (s)	1.3	12.2	2.7	0.8	2.4

Lanes, Volumes, Timings  
22: E St & Capitol Blvd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	90	255	115	90	130	215	445	130	190	585	70
Future Volume (vph)	90	90	255	115	90	130	215	445	130	190	585	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	0	0	175	0	150	0	0	0
Storage Lanes	0	0	0	0	0	0	1	0	1	0	0	0
Taper Length (ft)	25			25				25			25	
Right Turn on Red		Yes			Yes			Yes			Yes	
Link Speed (mph)	30	282		30	479		30	1902		30	2019	
Link Distance (ft)	282		6.4	10.9		43.2		45.9		45.9		
Travel Time (s)	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Peak Hour Factor	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Shaded Lane Traffic (%)												
Turn Type	Perm	NA	Perm	NA	Perm	Prot	NA	Prot	NA	Prot	NA	NA
Protected Phases	4	4	8	8	8	5	2	6		1	6	
Detector Phase	4	4	8	8	8	5	2	1		6		
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	5.0	8.0	5.0	8.0	5.0	8.0	8.0
Minimum Spill (s)	29.5	29.5	29.5	29.5	29.5	9.5	26.5	9.5	26.5	9.5	26.5	26.5
Total Spill (s)	34.0	34.0	34.0	34.0	34.0	18.0	30.0	16.0	28.0	16.0	28.0	28.0
Total Split (%)	42.5%	42.5%	42.5%	42.5%	42.5%	22.5%	37.5%	20.0%	35.0%	20.0%	35.0%	35.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
LeadLag						Lead	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min	None	Min	Min
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	80											
Actuated Cycle Length:	74.9											
Natural Cycle:	80											
Control Type:	Actuated-Uncoordinated											

Splits and Phases: 22: E St & Capitol Blvd



HCM 2010 Signalized Intersection Summary  
22: E St & Capitol Blvd

Existing 2015  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	90	90	255	115	90	130	215	445	130	190	585	70
Future Volume (veh/h)	90	90	255	115	90	130	215	445	130	190	585	70
Number	7	4	14	3	8	18	5	12	1	6	16	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1900	1881	1900	1900	1900	1881	1881	1900	1881	1881	1900	1900
Adj Flow Rate, veh/h	105	105	0	134	105	151	250	517	151	221	680	81
Adj No. of Lanes	0	1	0	0	1	0	1	2	0	1	2	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh. %	1	1	1	0	0	0	1	1	1	1	1	1
Cap. veh/h	258	231	0	223	156	190	302	906	263	269	1008	120
Arrive On Green	0.30	0.30	0.00	0.30	0.30	0.30	0.17	0.33	0.33	0.15	0.31	0.31
Sat Flow, veh/h	567	767	0	483	516	631	1792	2734	795	1792	3218	383
Grp Volume(V), veh/hln	210	0	0	390	0	0	250	337	331	221	377	384
Grp Sat Flow(s), veh/hln	1333	0	0	1630	0	0	1792	1787	1741	1792	1787	1814
Q Serve(g.s), s	0.0	0.0	0.0	5.5	0.0	0.0	8.4	9.7	9.8	7.4	11.4	11.5
Cycle Q Clear(g.c), s	7.9	0.0	0.0	13.3	0.0	0.0	8.4	9.7	9.8	7.4	11.4	11.5
Prop In Lane	0.50	0.00	0.00	0.34	0.00	0.39	1.00	0.46	1.00	0.46	1.00	0.21
Lane Grp Cap(c), veh/h	489	0	0	569	0	0	302	592	577	269	560	568
V/C Ratio(x)	0.43	0.00	0.00	0.69	0.00	0.00	0.83	0.57	0.57	0.82	0.67	0.68
Avail Cap(c), veh/h	732	0	0	837	0	0	399	732	713	331	675	685
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.6	0.0	0.0	19.7	0.0	0.0	25.0	17.2	17.2	25.6	18.6	18.6
Incr Delay (d2), s/veh	0.6	0.0	0.0	1.5	0.0	0.0	11.1	0.9	0.9	12.6	2.0	2.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/hln	3.1	0.0	0.0	6.3	0.0	0.0	5.1	4.9	4.8	4.6	5.9	6.1
LnGrp Delay(d), s/veh	18.2	0.0	0.0	21.1	0.0	0.0	36.2	18.0	18.1	38.2	20.6	20.6
LnGrp LOS	B			C			D	B	B	D	C	C
Approach Vol, veh/h		210			390			918			982	
Approach Delay, s/veh		18.2			21.1			23.0			24.6	
Approach LOS		B			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned PIs	1	2		4	5	6		8				
Pis Duration (G+Y+R), s	139	25.1		23.3	15.0	24.0		23.3				
Change Period (Y+R), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	11.5	25.5		29.5	13.5	23.5		29.5				
Max Q Clear Time (Q_cH1), s	9.4	11.8		9.9	10.4	13.5		15.3				
Green Ext Time (Q_c), s	0.1	7.5		3.9	0.2	6.0		3.4				
<b>Intersection Summary</b>												
HCM 2010 C/H Delay			22.9									
HCM 2010 LOS			C									

HCM 2010 TWSC  
23: Cleveland Ave & South St

Existing 2015  
PM Peak Hour

Intersection	Int Delay, s/veh	0.4				
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	5	15	570	10	15	855
Future Vol, veh/h	5	15	570	10	15	855
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	-	-	-
Grade, %	0	-	-	-	-	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	1	1	1
Mmnt Flow	6	17	648	11	17	972
<b>Major/Minor</b>						
Conflicting Flow All	Minor1	330	Major1	0	Major2	0
Stage 1	653	-	-	-	-	-
Stage 2	520	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.12	-
Critical Hdwy Sig 1	5.8	-	-	-	-	-
Critical Hdwy Sig 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.21	-
Pln Cap-1 Maneuver	188	672	-	-	932	-
Stage 1	485	-	-	-	-	-
Platoon blocked, %	567	-	-	-	-	-
Mov Cap-1 Maneuver	180	672	-	-	932	-
Mov Cap-2 Maneuver	180	-	-	-	-	-
Stage 1	485	-	-	-	-	-
Stage 2	544	-	-	-	-	-
<b>Approach</b>						
HCM Control Delay, s	WB	14.6	NB	0	SB	0.4
HCM LOS	B					
<b>Minor Lane/Major Mmnt</b>						
Capacity (veh/h)	-	399	932	-	-	-
HCM Lane V/C Ratio	-	0.057	0.018	-	-	-
HCM Control Delay (s)	-	14.6	8.9	0.2	-	-
HCM Lane LOS	-	B	A	A	-	-
HCM 95th %ile (Qveh)	-	0.2	0.1	-	-	-

HCM 2010 TWSC  
24: Linwood Ave & 7th Ave

Existing 2015  
PM Peak Hour

Intersection	3.3											
Int Delay, s/veh	C											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	20	140	0	1	260	225	0	0	1	120	0	15
Future Vol, veh/h	20	140	0	1	260	225	0	0	1	120	0	15
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	3	3	3	1	1	1	0	0	0	1	1	1
Mvmt Flow	22	151	0	1	280	242	0	0	1	129	0	16

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	522	0	605	718
Stage 1	-	-	194	194
Stage 2	-	-	411	524
Critical Hdwy	4.13	-	7.1	6.5
Critical Hdwy Spt 1	-	-	6.1	5.5
Critical Hdwy Spt 2	-	-	6.1	5.5
Follow-up Hdwy	2.227	-	2.209	-
Poi Cap-1 Maneuver	1039	-	413	357
Stage 1	-	-	812	744
Stage 2	-	-	622	533
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1039	-	395	348
Mov Cap-2 Maneuver	-	-	395	348
Stage 1	-	-	793	727
Stage 2	-	-	606	532
Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0	9	17.8
HCM LOS	-	-	A	C
Minor Lane/Major Mvmt	NBLr1	EBL	EBT	EBR
Capacity (veh/h)	901	1039	-	1436
HCM Lane V/C Ratio	0.001	0.021	-	0.001
HCM Control Delay (s)	9	85	0	7.5
HCM Lane LOS	A	A	A	A
HCM 95th %ile Q(veh)	0	0.1	-	0

HCM 2010 AWSC  
25: Linwood Ave & 2nd Ave

Existing 2015  
PM Peak Hour

Intersection	25											
Intersection LOS	C											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	30	165	100	0	100	245	60	0	105	115	95
Future Vol, veh/h	0	30	165	100	0	100	245	60	0	105	115	95
Conflicting Peds. #/hr	0.92	0.89	0.89	0.89	0.92	0.89	0.89	0.89	0.92	0.89	0.89	0.89
Sign Control	2	1	1	1	2	1	1	1	2	0	0	0
RT Channelized	0	34	185	112	0	112	275	67	0	118	129	107
Number of Lanes	0	1	1	0	0	1	1	1	0	1	1	0

Approach	EB	WB	NB					
Opposing Approach	WB	EB	NB					
Opposing Lanes	2	2	2					
Conflicting Approach Left	SB	NB	EB					
Conflicting Lanes Left	2	2	2					
Conflicting Approach Right	NB	SB	WB					
Conflicting Lanes Right	2	2	2					
HCM Control Delay	25.2	28.5	18.5					
HCM LOS	D	D	C					
lane	NBLr1	NBLr2	EBLr1	EBLr2	WBLr1	WBLr2	SBLr1	SBLr2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	55%	0%	62%	0%	80%	0%	57%
Vol Right, %	0%	45%	0%	38%	0%	20%	0%	43%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	105	210	30	265	100	305	65	290
LT Vol	105	0	30	0	100	0	65	0
Through Vol	0	115	0	165	0	245	0	165
RT Vol	0	95	0	100	0	60	0	125
Lane Flow Rate	118	236	34	298	112	343	73	326
Geometry Grip	7	7	7	7	7	7	7	7
Degree of Util (X)	0.296	0.536	0.084	0.678	0.272	0.768	0.18	0.728
Departure Headway (Hd)	9.024	8.176	8.986	8.193	8.73	8.07	8.874	8.043
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	398	441	399	441	411	449	405	450
Service Time	6.782	5.933	6.742	5.948	6.487	5.826	6.629	5.797
HCM Lane V/C Ratio	0.296	0.535	0.085	0.676	0.273	0.764	0.18	0.724
HCM Control Delay	15.6	20	12.6	26.6	14.7	33	13.6	29.6
HCM Lane LOS	C	C	B	D	B	D	B	D
HCM 95th %ile Q	1.2	3.1	0.3	4.9	1.1	6.6	0.6	5.8



HCM 2010 AWSC  
25: Linwood Ave & 2nd Ave

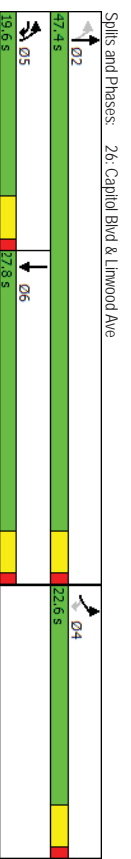
Existing 2015  
PM Peak Hour

Intersection	EBL	EBR	NBL	NBT	SBT	SBR
Intersection Delay, s/veh						
Intersection LOS						
Movement	SBU	SBL	SBT	SBR		
Traffic Vol, veh/h	0	65	165	125		
Future Vol, veh/h	0	65	165	125		
Peak Hour Factor	0.92	0.89	0.89	0.89		
Heavy Vehicles, %	2	1	1	1		
Wvnt Flow	0	73	165	140		
Number of Lanes	0	1	1	1		
Approach	SB					
Opposing Approach	NB					
Opposing Lanes	2					
Conflicting Approach Left	WB					
Conflicting Lanes Left	2					
Conflicting Approach Right	EB					
Conflicting Lanes Right	2					
HCM Control Delay	26.7					
HCM LOS	D					
Lane						

Lanes, Volumes, Timings  
26: Capitol Blvd & Linwood Ave

Existing 2015  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	165	145	155	625	705	240
Future Volume (vph)	165	145	155	625	705	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150	0	150	0	1900	0
Storage Lanes	1	1	1	1	1	0
Taper Length (ft)	25			25		
Right Turn on Red			Yes			Yes
Link Speed (mph)	30			30		30
Link Distance (ft)	489			2664		1902
Travel Time (s)	11.1			60.5		43.2
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)						
Turn Type	Prot	pm+ov	pm+pl	NA	NA	NA
Permitted Phases	4	5	5	2	6	6
Detector Phase	4	5	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	15.0	15.0	15.0	15.0	15.0
Minimum Spill (s)	22.5	19.5	19.5	20.0	21.5	21.5
Total Spill (s)	22.6	19.6	19.6	47.4	27.8	27.8
Total Split (%)	32.3%	28.0%	28.0%	67.7%	39.7%	39.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	Max	Max	Max
Intersection Summary						
Area Type:	Other					
Cycle Length:	70					
Actuated Cycle Length:	63.3					
Natural Cycle:	70					
Control Type:	Actuated-Uncoordinated					



HCM 2010 Signalized Intersection Summary  
26: Capitol Blvd & Linwood Ave

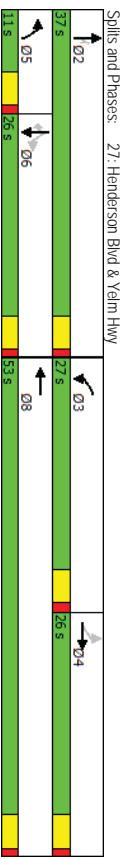
Existing 2015  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (veh/h)	165	145	155	625	705	240
Future Volume (veh/h)	165	145	155	625	705	240
Number	7	14	5	2	6	16
Initial Q (Ob), veh	0	0	0	0	0	0
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1881	1881	1881	1881	1900
Adj Flow Rate, veh/h	196	173	185	744	839	286
Adj No of Lanes	1	1	1	2	2	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh. %	1	1	1	1	1	1
Cap. veh/h	260	610	598	2526	1038	353
Arrive On Green	0.15	0.15	0.24	0.71	0.40	0.40
Sat Flow, veh/h	1792	1599	1792	3668	2713	892
Grp Volume(V), veh/hln	196	173	185	744	572	553
Grp Sat Flow(s), veh/hln	1792	1599	1792	1787	1787	1724
Q Serve(g,s), s	6.4	4.6	2.3	4.7	17.3	17.3
Cycle Q Clear(g,c), s	1.00	1.00	1.00	4.7	17.3	0.52
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	260	610	598	2526	708	683
V/C Ratio(X)	0.75	0.28	0.31	0.29	0.81	0.81
Avail Cap(c), veh/h	534	854	620	2526	708	683
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.9	13.0	8.4	3.3	16.3	16.3
Incr Delay (d2), s/veh	1.7	0.1	0.1	0.3	9.6	10.0
Initial Q Delay(d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/hln	3.3	4.7	1.4	2.4	10.3	10.0
Lngrp Delay(d), s/veh	26.6	13.1	8.5	3.6	25.9	26.3
Lngrp LOS	C	B	A	A	C	C
Approach Vol, veh/h	369		929	1125		
Approach Delay, s/veh	20.3		4.6	26.1		
Approach LOS	C		A	C		
Timer	1	2	3	4	5	6
Assigned Phs						
Phs Duration (G+Y+R), s	47.4	13.3	18.8	28.6		
Change Period (Y+R), s	4.5	4.5	4.5	4.5		
Max Green Setting (Gmax), s	42.9	18.1	15.1	23.3		
Max Q Clear Time (Q_c+I), s	6.7	8.4	4.3	19.3		
Green Ext Time (Q_c), s	15.1		0.5	0.2	3.2	
Intersection Summary						
HCM 2010 C/H Delay			16.9			
HCM 2010 LOS			B			

Lanes, Volumes, Timings  
27: Henderson Blvd & Yelm Hwy

Existing 2015  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	5	680	160	430	505	80	110	165	645	155	205	20
Future Volume (vph)	5	680	160	430	505	80	110	165	645	155	205	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	0	0	450	0	200	0	100	0	150		
Storage Lanes	1	0	0	1	0	1	0	1	0	1		
Taper Length (ft)	25			25			25			25		
Right Turn on Red				Yes			Yes			Yes		
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1947			1645			3441			1606	
Travel Time (s)		44.3			37.4			78.2			36.5	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA	NA	Prot	NA	Prot	NA	Prot	NA	Perm	Perm	NA
Protected Phases		4		4		8		5		2		6
Permitted Phases	4		4		3	8		5		2		6
Detector Phase												
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	5.0	6.0	5.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.5	24.5	24.5	9.5	24.5	11.0	37.0	26.0	26.0	26.0	26.0	26.0
Total Split (s)	26.0	26.0	26.0	27.0	53.0	11.0	37.0	31.0	26.0	26.0	26.0	26.0
Total Split (%)	28.9%	28.9%	28.9%	30.0%	58.9%	12.2%	41.1%	41.1%	28.9%	28.9%	28.9%	28.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust(s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max	None	None	None	None	None	None	None
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	85.2											
Natural Cycle:	100											
Control Type:	Actuated-Uncoordinated											



HCM 2010 Signalized Intersection Summary  
27: Henderson Blvd & Yelm Hwy

Existing 2015  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (veh/h)	5	680	160	430	505	80	110	165	645	155	205	20
Future Volume (veh/h)	5	680	160	430	505	80	110	165	645	155	205	20
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Q0), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj/(A_pbt)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1881	1900	1881	1881	1881	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	5	747	176	473	555	88	121	181	0	170	225	22
Adj No. of Lanes	1	2	0	1	2	0	1	1	1	1	1	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh. %	1	1	1	1	1	1	1	1	1	1	1	1
Cap. veh/h	289	738	174	482	1792	283	139	589	501	306	342	291
Arrive On Green	0.26	0.26	0.26	0.27	0.58	0.58	0.08	0.31	0.00	0.18	0.18	0.18
Sat Flow, veh/h	791	2872	677	1792	3093	489	1792	1881	1599	1210	1881	1599
Grp Volume(V), veh/hln	5	465	458	473	320	323	121	181	0	170	225	22
Grp Sat Flow(s), veh/hln	791	1787	1762	1792	1787	1795	1792	1881	1599	1210	1881	1599
Q Serve(g.s), s	0.4	21.5	21.5	22.0	7.7	7.7	5.6	6.1	0.0	11.2	9.3	1.0
Cycle Q Clear(g.c), s	0.4	21.5	21.5	22.0	7.7	7.7	5.6	6.1	0.0	11.2	9.3	1.0
Prop In Lane	1.00	0.88	1.00	1.00	0.27	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	289	459	452	482	1035	1040	139	589	501	306	342	291
V/C Ratio(X)	0.02	1.01	1.01	0.98	0.31	0.31	0.87	0.31	0.00	0.56	0.66	0.08
Avail Cap(c), veh/h	289	459	452	482	1035	1040	139	589	501	306	342	291
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.3	31.1	31.1	30.4	9.0	9.0	38.2	21.9	0.0	32.6	31.8	28.4
Incr Delay (d2), s/veh	0.1	45.2	45.5	36.3	0.8	0.8	40.6	0.3	0.0	1.6	2.2	0.1
Initial Q Delay(d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/hln	0.1	16.2	16.0	15.6	4.0	4.0	4.3	3.2	0.0	3.9	5.0	0.4
LnGrp Delay(d), s/veh	23.4	76.3	76.7	66.7	9.8	9.8	78.8	22.1	0.0	34.2	34.0	28.5
LnGrp LOS	C	F	F	E	A	A	E	C	C	C	C	C
Approach Vol, veh/h	928	1116	417	1116	339	448	338	338	338	338	338	338
Approach Delay, s/veh	76.2	33.9	44.8	33.9	76.2	76.2	76.2	76.2	76.2	76.2	76.2	76.2
Approach LOS	E	C	D	C	E	E	E	E	E	E	E	E
Timer	1	2	3	4	5	6	7	8	8	8	8	8
Assigned Pns	2	3	4	5	6	6	7	8	8	8	8	8
Pns Duration (G+Y+R), s	30.7	27.0	26.0	11.0	19.7	19.7	53.0	4.5	4.5	4.5	4.5	4.5
Change Period (Y+R), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	32.5	22.5	21.5	6.5	21.5	21.5	48.5	8.1	24.0	23.5	9.7	9.7
Max O Clear Time (G+CH1), s	8.1	24.0	23.5	7.6	23.5	23.5	9.7	3.1	0.0	0.0	2.0	14.0
Green Ext Time (G+CH1), s	3.1	0.0	0.0	0.0	0.0	0.0	2.0	14.0	14.0	14.0	14.0	14.0
Intersection Summary												
HCM 2010 Ctrl Delay	49.3											
HCM 2010 LOS	D											

HCM 2010 TWSC  
28: Trospen Rd & Rural Rd

Existing 2015  
PM Peak Hour

Intersection	Int Delay, s/veh	3.2				
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	35	175	295	100	90	60
Future Vol, veh/h	35	175	295	100	90	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	150	0
Veh in Median Storage, #	-	0	0	0	0	0
Grade, %	-	-	-	-	-	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	1	1	2
Mvmt Flow	38	190	321	109	98	65
Major/Minor	Major1	Major2	Minor2	Minor2	Minor2	Minor2
Conflicting Flow All	429	0	0	641	375	375
Stage 1	-	-	-	266	375	-
Stage 2	-	-	-	6.42	5.42	6.22
Critical Hdwy Stg 1	4.1	-	-	5.42	-	-
Critical Hdwy Stg 2	-	-	-	3.518	3.318	-
Follow-up Hdwy	2.2	-	-	439	671	-
Pol Cap-1 Maneuver	1141	-	-	695	779	-
Stage 1	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1141	-	-	423	671	-
Mov Cap-2 Maneuver	-	-	-	423	-	-
Stage 1	-	-	-	695	-	-
Stage 2	-	-	-	750	-	-
Approach	EB	WB	SB	SB	SB	SB
HCM Control Delay, s	1.4	0	14	14	14	14
HCM LOS	B	B	B	B	B	B
Minor Lane/Minor Mvmt	EBL	EBT	WBT	WBR	SBL	SBR
Capacity (veh/h)	1141	-	-	423	671	671
HCM Lane V/C Ratio	0.033	-	-	0.231	0.097	0.097
HCM Control Delay (s)	8.3	0	-	16.1	10.9	10.9
HCM Lane LOS	A	A	-	C	B	B
HCM 95th %ile Q(veh)	0.1	-	-	0.9	0.3	0.3



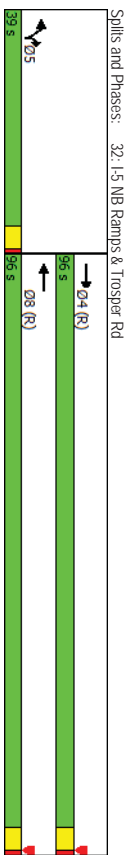




Lanes, Volumes, Timings  
32: I-5 NB Ramps & Trospier Rd

Existing 2015  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL2	NBL	NBR	SEL	SER
Lane Configurations		AAA			BB		BB		BB		
Traffic Volume (vph)	0	815	525	0	590	615	170	0	80	0	0
Future Volume (vph)	0	815	525	0	590	615	170	0	80	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	300	0	0	0	0	0	200	0	0	0
Storage Lanes	1	0	0	0	0	0	1	1	1	0	0
Taper Length (ft)	25	0	0	25	0	0	25	0	0	25	0
Right Turn on Red		Yes			Yes		Yes		Yes		
Link Speed (mph)		30			30		30		30		
Link Distance (ft)		883			397		785		593		
Travel Time (s)		20.1			9.0		17.8		13.5		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Shared Lane Traffic (%)		NA			NA		Prot		Prot		
Turn Type		4			8		5		5		
Protected Phases		4			8		5		5		
Permitted Phases		4			8		5		5		
Detector Phase		4			8		5		5		
Switch Phase		10.0			10.0		6.0		6.0		
Minimum Initial (s)		21.5			21.5		10.6		10.6		
Minimum Spill (s)		96.0			96.0		39.0		39.0		
Total Spill (s)		71.1%			71.1%		28.9%		28.9%		
Yellow Time (s)		3.6			3.6		3.6		3.6		
All-Red Time (s)		1.0			1.0		1.0		1.0		
Lost Time Adjust (s)		0.0			0.0		0.0		0.0		
Total Lost Time (s)		4.6			4.6		4.6		4.6		
Lead-Lag Optimize?											
Recall Mode		C-Max			C-Max		None		None		
Area Type:	Other										
Cycle Length:	135										
Activated Cycle Length:	135										
Offset:	103 (76%), Referenced to phase 4:EBT and 8:WBT, Start of Red										
Natural Cycle:	40										
Control Type:	Actuated-Coordinated										



HCM 2010 Signalized Intersection Summary  
32: I-5 NB Ramps & Trospier Rd

Existing 2015  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL2	NBL	NBR	SEL	SER
Lane Configurations		AAA			BB		BB		BB		
Traffic Volume (veh/h)	0	815	525	0	590	615	170	0	80	0	0
Future Volume (veh/h)	0	815	525	0	590	615	170	0	80	0	0
Number	7	4	14	3	8	18	5	5	12		
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0		
Ped/Bike Adj (AdjB), %	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Parking Bus Adj (AdjP), %	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/hln	0	1881	1900	0	1881	1900	1881	1881	1881		
Adj Flow Rate, veh/h	0	876	0	0	634	0	183	183	0		
Adj No of Lanes	0	3	0	0	2	0	1	1	1		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93		
Percent Heavy Veh. %	0	1	1	0	1	1	1	1	1		
Cap. veh/h	0	4186	0	0	2913	0	209	209	187		
Arrive On Green	0.00	1.00	0.00	0.00	1.00	0.00	0.12	0.12	0.00		
Sat Flow, veh/h	0	5474	0	0	3762	0	1792	1792	1599		
Grp Volume (V), veh/h	0	876	0	0	634	0	183	183	0		
Grp Sat Flow (S), veh/hln	0	1712	0	0	1787	0	1792	1792	1599		
Q Serve (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	13.6	13.6	0.0		
Cycle Q Clear (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	13.6	13.6	0.0		
Prop In Lane	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00		
Lane Grp Cap (c), veh/h	0	4186	0	0	2913	0	209	209	187		
V/C Ratio (X)	0.00	0.21	0.00	0.00	0.22	0.00	0.87	0.87	0.00		
Avail Cap (C_a), veh/h	0	4186	0	0	2913	0	457	457	407		
HCM Platoon Ratio	1.00	2.00	2.00	1.00	1.67	1.67	1.00	1.00	1.00		
Upstream Filter (f)	0.00	0.70	0.00	0.00	0.61	0.00	1.00	1.00	0.00		
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	58.6	58.6	0.0		
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.1	0.0	4.4	4.4	0.0		
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
%ile Band (Q50%), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	7.0	7.0	0.0		
LnGrp Delay (d), s/veh	0.0	0.1	0.0	0.0	0.1	0.0	63.1	63.1	0.0		
LnGrp LOS		A			A		E	E	E		
Approach Vol, veh/h		876			634		183	183			
Approach Delay, s/veh		0.1			0.1		63.1	63.1			
Approach LOS		A			A		E	E			
Timer	1	2	3	4	5	6	7	8			
Assigned Pts		2						8			
Pts Duration (G+Y+R), s		20.4						114.6			
Change Period (Y+R), s		4.6						4.6			
Max Green Setting (Gmax), s		34.4						91.4			
Max O Clear Time (G+CH1), s		15.6						2.0			
Green Ext Time (P.C.), s		0.2						12.9			
Intersection Summary											
HCM 2010 Cnt Delay					6.9						
HCM 2010 LOS					A						





Lanes, Volumes, Timings  
34: Capitol Blvd & Lee St

Existing 2015  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	260	5	40	15	5	80	25	1025	20	50	815	150
Future Volume (vph)	260	5	40	15	5	80	25	1025	20	50	815	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	125	0	0	100	250	0	200	0	0	0
Storage Lanes	0	0	1	0	0	1	1	0	1	0	0	0
Taper Length (ft)	25			25			25			25		
Right Turn on Red				Yes		Yes		Yes		Yes		
Link Speed (mph)	30			30		30		30		30		
Link Distance (ft)	718			814		814		621		735		
Travel Time (s)	16.3			18.5		18.5		14.1		16.7		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	NA	Prot	NA	
Permitted Phases		4	4	8	8	8	8	5	2		1	6
Detector Phase		4	4	4	8	8	8	5	2		1	6
Switch Phase		6.0	6.0	6.0	6.0	6.0	6.0	12.0		6.0	12.0	
Minimum Spill (s)	29.0	29.0	29.0	30.0	30.0	30.0	11.0	25.0		11.0	25.0	
Total Spill (s)	53.0	53.0	53.0	53.0	53.0	53.0	12.0	67.0		15.0	70.0	
Total Spill (%)	39.3%	39.3%	39.3%	39.3%	39.3%	39.3%	8.9%	49.6%		11.1%	51.9%	
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6		3.6	3.6	
AllRed Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.6		4.6		4.6		4.6		4.6		4.6
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	135											
Activated Cycle Length:	135											
Offset:	130 (96%), Referenced to phase 2:NBT and 6:SBT Start of Red											
Natural Cycle:	70											
Control Type:	Actuated-Coordinated											

HCM Signalized Intersection Capacity Analysis  
34: Capitol Blvd & Lee St

Existing 2015  
PM Peak Hour

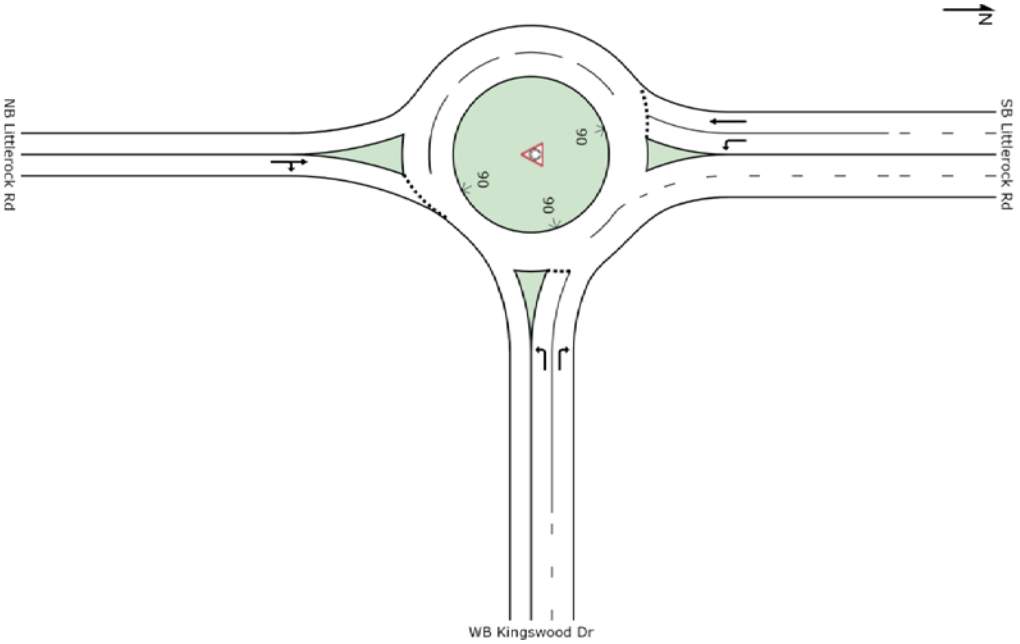
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	260	5	40	15	5	80	25	1025	20	50	815	150
Future Volume (vph)	260	5	40	15	5	80	25	1025	20	50	815	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total lost time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6		4.6	4.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Fit	1.00	0.85	1.00	0.85	1.00	0.85	1.00	1.00		1.00	0.98	
Fit Protected	0.95	1.00	0.96	1.00	0.95	1.00	0.95	1.00		0.95	1.00	
Sat'd Flow (vphpl)	1793	1599	1830	1615	1787	3564	1787	3491		1787	3491	
Phi Permitted	0.71	1.00		0.74	1.00	0.95	1.00			0.95	1.00	
Sat'd Flow (vphpl)	1344	1599		1414	1615	1787	3564			1787	3491	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93		0.93	0.93	0.93
Adj. Flow (vph)	280	5	43	16	5	86	27	1102		22	54	161
RTOR Reduction (vph)	0	0	32	0	0	65	0	1		0	0	8
Lane Group Flow (vph)	0	285	11	0	21	21	27	1123		0	54	1029
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%		1%	1%	1%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	
Permitted Phases		4		8	8	8	5	2			1	6
Actuated Green, G (s)		33.6		33.6		33.6	4.3	80.4		7.2	83.3	
Effective Green, g (s)		33.6		33.6		33.6	4.3	80.4		7.2	83.3	
Actuated g/C Ratio		0.25		0.25		0.25	0.03	0.60		0.05	0.62	
Clearance Time (s)		4.6		4.6		4.6	4.6	4.6		4.6	4.6	
Vehicle Extension (s)		2.0		2.0		2.0	1.5	3.0		1.6	3.0	
Lane Grp Cap (vph)		334		397		351	401	56		95	2154	
W/s Ratio Prot		0.02		0.02		0.02	0.32			0.03	0.29	
W/s Ratio Perm		0.021		0.01		0.01	0.01			0.01	0.32	
v/c Ratio		0.85		0.03		0.06	0.05	0.48		0.57	0.48	
Uniform Delay, d1		48.3		38.3		38.7	38.6	64.3		62.4	14.0	
Progression Factor		1.00		1.00		1.00	1.00	1.00		0.83	0.98	
Incremental Delay, d2		18.0		0.0		0.0	0.0	2.4		0.9	0.7	
Delay (s)		66.3		38.3		38.7	38.6	66.6		55.9	14.3	
Level of Service		E		D		D	D	E		B	B	
Approach Delay (s)		62.7				38.6		18.2			16.4	
Approach LOS		E				D		B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay	23.7											
HCM 2000 Volume to Capacity ratio	0.62											
Activated Cycle Length (s)	135.0											
Intersection Capacity Utilization	66.8%											
Analysis Period (min)	15											
Critical Lane Group	C											
HCM 2000 Level of Service	C											
Sum of lost time (s)	13.8											
ICU Level of Service	C											





## SITE LAYOUT

Site: 37) Litterock Rd at Kingswood Dr  
 Existing 2015  
 PM Peak Hour  
 Roundabout



## MOVEMENT SUMMARY

Site: 37) Litterock Rd at Kingswood Dr  
 Existing 2015  
 PM Peak Hour  
 Roundabout

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Total HV/veh/h	Flows HV %	W/C	Deg. Satm	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Litterock Rd												
8	T1	532	1.0	0.614		4.9	LOS A	5.4	136.6	0.38	0.44	36.5
18	R2	134	1.0	0.614		4.7	LOS A	5.4	136.6	0.38	0.44	35.5
Approach		667	1.0	0.614		4.8	LOS A	5.4	136.6	0.38	0.44	36.3
East: WB Kingswood Dr												
1	L2	194	1.0	0.198		12.3	LOS B	1.2	31.0	0.64	0.75	33.3
16	R2	81	1.0	0.049		4.2	LOS A	0.0	0.0	0.00	0.49	36.5
Approach		274	1.0	0.198		9.9	LOS A	1.2	31.0	0.45	0.67	34.2
North: SB Litterock Rd												
7	L2	65	1.0	0.082		11.3	LOS B	0.4	10.7	0.44	0.65	33.8
4	T1	559	1.0	0.448		5.2	LOS A	3.5	89.2	0.53	0.52	36.0
Approach		624	1.0	0.448		5.8	LOS A	3.5	89.2	0.52	0.53	35.8
All Vehicles		1965	1.0	0.614		6.1	LOS A	5.4	136.6	0.45	0.52	35.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
 Roundabout LOS Method: Same as Signalised Intersections.  
 Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
 LOS F will result if v/c > 1 (respective of movement delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).  
 Roundabout Capacity Model: SIDRA Standard.  
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.  
 Gap-Acceptance Capacity: SIDRA Standard (Akegik M3D).  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Processed: Friday, October 23, 2015 3:49:29 PM  
 SIDRA INTERSECTION 6.0.24.4877  
 Project: N:\Projects\0625 City of Tumwater\0625\_17 Tumwater Transportation Master Plan\TrafficOperations\sidra Existing 2015 PM.sp6  
 8001450\_6017302\_SCA ALLIANCE\_PLUS / 1PC



Intersection	2.3											
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	5	10	10	5	5	5	2	65	5	2	45	5
Future Vol, veh/h	5	10	10	5	5	2	2	65	5	0	45	5
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	-	-	-	-	-	-	-	-	-	-
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	74	74	74	74	74	74	74	74	74	74	74	74
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	7	14	14	7	7	3	3	88	7	0	61	7

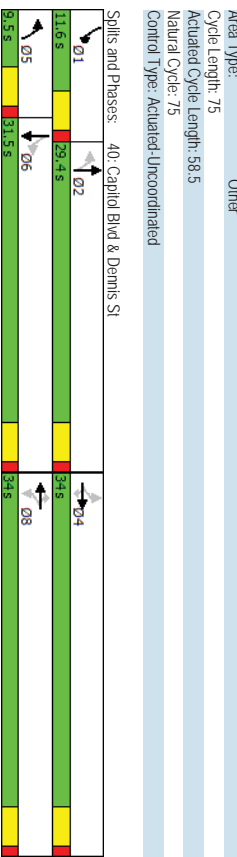
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	165	164	64	175	165	91	68	0	0	95	0	0
Stage 1	64	64	-	97	97	-	-	-	-	-	-	-
Stage 2	101	100	-	78	68	-	-	-	-	-	-	-
Critical Hdwy Spt 1	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.12	-	-
Critical Hdwy Spt 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.218	-	-
Pol Cap-1 Maneuver	804	732	1006	792	731	972	1546	-	-	1499	-	-
Stage 1	952	846	-	914	819	-	-	-	-	-	-	-
Stage 2	910	816	-	936	842	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	795	731	1006	769	730	972	1546	-	-	1499	-	-
Mov Cap-2 Maneuver	795	731	-	769	730	-	-	-	-	-	-	-
Stage 1	950	846	-	912	817	-	-	-	-	-	-	-
Stage 2	898	814	-	909	842	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	9.5	-	-	9.7	-	-	0.2	-	-	0	-	-
HCM LOS	A	-	-	A	-	-	-	-	-	-	-	-

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBL	WB	NBL	SBL	SBT	SBR
Capacity (veh/h)	1546	-	-	836	779	1499	-	-	-
HCM Lane V/C Ratio	0.002	-	-	0.04	0.021	-	-	-	-
HCM Control Delay (s)	7.3	0	-	9.5	9.7	0	-	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-	-
HCM 95th %ile Q(veh)	0	-	-	0.1	0.1	0	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	145	40	30	30	20	75	10	690	25	50	575	70
Future Volume (vph)	145	40	30	30	20	75	10	690	25	50	575	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	125	0	100	175	0	225	0	0	225	0
Storage Lanes	0	0	1	0	1	1	0	1	0	0	1	0
Taper Length (ft)	25	-	-	25	-	-	25	-	-	25	-	-
Right Turn on Red	-	-	-	-	-	-	-	-	-	-	-	-
Link Speed (mph)	30	834	834	700	1337	1300	30	1300	30	1300	1300	1300
Link Distance (ft)	19.0	19.0	15.9	15.9	30.4	29.5	30.4	29.5	30.4	29.5	30.4	29.5
Travel Time (s)	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Peak Hour Factor	1%	1%	1%	0%	0%	1%	1%	1%	1%	1%	1%	1%
Heavy Vehicles (%)	1%	1%	1%	0%	0%	1%	1%	1%	1%	1%	1%	1%
Shaded Lane Traffic (%)	Perm	NA	Perm	Perm	NA	Perm	pm+pl	NA	pm+pl	NA	pm+pl	NA
Turn Type	4	4	4	8	8	8	5	2	6	6	6	6
Permitted Phases	4	4	4	8	8	8	5	2	6	6	6	6
Detector Phase	4	4	4	8	8	8	5	2	6	6	6	6
Switch Phase	7.0	7.0	7.0	7.0	7.0	7.0	5.0	8.0	7.0	8.0	8.0	8.0
Minimum Initial (s)	335	335	335	335	335	335	9.5	27.5	11.5	27.5	27.5	27.5
Minimum Spill (s)	34.0	34.0	34.0	34.0	34.0	34.0	9.5	29.4	11.6	31.5	31.5	31.5
Total Spill (s)	45.3%	45.3%	45.3%	45.3%	45.3%	45.3%	12.7%	39.2%	15.5%	42.0%	42.0%	42.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	
Lead-Lag Optimizer?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	None	Max	None	Max	Max	

Intersection Summary	Other											
Area Type:	Other											
Cycle Length:	75											
Actuated Cycle Length:	58.5											
Natural Cycle:	75											
Control Type:	Actuated-Uncoordinated											





HCM 2010 Signalized Intersection Summary  
41: Israel Rd & Capitol Blvd

Existing 2015  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	2	3	4	5	6	7	8				
Traffic Volume (veh/h)	80	130	120	95	195	135	105	315	25	70	515	90
Future Volume (veh/h)	80	130	120	95	195	135	105	315	25	70	515	90
Number	3	8	8	7	4	14	1	6	16	5	2	12
Initial Q (Q <sub>0</sub> ), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj(A <sub>pb</sub> )	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1900	1900	1863	1863	1900	1881	1881	1900	1881	1881	1900	1900
Adj Flow Rate, veh/h	89	144	66	106	217	150	117	350	28	78	572	100
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh. %	0	0	0	0	2	2	1	1	1	1	1	1
Cap. veh/h	295	314	144	420	266	184	379	1147	91	493	1009	176
Arrive On Green	0.07	0.25	0.25	0.08	0.26	0.26	0.08	0.34	0.34	0.07	0.33	0.33
Sat Flow, veh/h	1810	1234	566	1774	1027	710	1792	3394	267	1792	3044	531
Grp Volume(V), veh/hln	89	0	210	106	0	367	117	186	192	78	335	337
Grp Sat Flow(S), veh/hln	1810	0	1800	1774	0	1737	1792	1787	1834	1792	1787	1788
Q Serve(Q <sub>s</sub> ), s	2.4	0.0	6.8	2.9	0.0	13.7	2.9	5.3	5.3	1.9	10.7	10.7
Cycle Q Clear(Q <sub>c</sub> ), s	2.4	0.0	6.8	2.9	0.0	13.7	2.9	5.3	5.3	1.9	10.7	10.7
Prop In Lane	1.00	0.31	1.00	1.00	0.41	1.00	0.15	1.00	0.15	1.00	0.30	0.30
Lane Grp Cap(c), veh/h	295	0	458	420	0	450	379	611	627	493	593	593
V/C Ratio(X)	0.30	0.00	0.46	0.25	0.00	0.82	0.31	0.30	0.31	0.16	0.57	0.57
Avl Cap(c <sub>a</sub> ), veh/h	324	0	573	441	0	554	398	611	627	528	593	593
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay(d), s/veh	17.9	0.0	21.7	16.9	0.0	24.0	13.9	16.7	13.2	19.0	19.0	19.0
Incr Delay(d <sub>2</sub> ), s/veh	0.7	0.0	0.9	0.4	0.0	8.1	0.6	1.3	0.2	3.9	3.9	3.9
Initial Q Delay(d <sub>0</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/h	1.2	0.0	3.5	1.5	0.0	7.5	1.5	2.8	2.9	1.0	5.9	5.9
LnGrp Delay(d <sub>g</sub> ), s/veh	18.6	0.0	22.6	17.2	0.0	32.1	14.4	18.0	13.4	22.9	22.9	22.9
LnGrp LOS	B		C	B		C	B	B	B	B	C	C
Approach Vol, veh/h	299			473			495			750		
Approach Delay, s/veh	21.4			28.8			17.1			21.9		
Approach LOS	C			C			B			C		
Timer	1	2	3	4	5	6	7	8				
Assigned PIs	1	2	3	4	5	6	7	8				
Pis Duration (G+Y+R <sub>0</sub> ), s	99	27.4	9.4	22.4	9.2	28.1	9.7	22.1				
Change Period (Y+R <sub>0</sub> ), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (G <sub>max</sub> ), s	6.1	22.9	6.0	22.0	6.0	23.0	6.0	22.0				
Max Q Clear Time (Q <sub>clear</sub> ), s	4.9	12.7	4.4	15.7	3.9	7.3	4.9	8.8				
Green Ext Time (Q <sub>ext</sub> ), s	0.0	5.2	0.0	2.2	0.0	6.8	0.0	3.5				
<b>Intersection Summary</b>												
HCM 2010 Cdt Delay	22.3											
HCM 2010 LOS	C											

HCM 2010 TWSC  
42: 66th Ave & Black Lake Belmore Rd

Existing 2015  
PM Peak Hour

Intersection	Int Delay, s/veh	3.9				
<b>Movement</b>						
Traffic Vol, veh/h	EBL	EBT	WBT	WBR	SBL	SBR
50	80		90	105	70	55
Future Vol, veh/h	50	80		90	105	70
Conflicting Peds, #/hr	0	0		0	0	0
Sign Control	Free	Free		Free	Free	Stop
RT Channelized	-	None		-	None	Stop
Storage Length	-	-		-	-	None
Veh in Median Storage, #	-	0		0	-	0
Grade, %	-	-		-	-	-
Peak Hour Factor	95	95		95	95	95
Heavy Vehicles, %	1	1		1	1	0
Mmnt Flow	53	84		95	111	74
58						
<b>Major/Minor</b>						
Major1	205	0	Major2	0	Minor2	150
Conflicting Flow All	-	-	-	-	-	339
Stage 1	-	-	-	-	-	150
Stage 2	-	-	-	-	-	189
Critical Hdwy	4.11	-	-	-	-	6.4
Critical Hdwy Sig 1	-	-	-	-	-	5.4
Critical Hdwy Sig 2	-	-	-	-	-	3.3
Follow-up Hdwy	2.209	-	-	-	-	661
Pol Cap-1 Maneuver	1372	-	-	-	-	883
Stage 1	-	-	-	-	-	848
Platoon Blocked, %	-	-	-	-	-	634
Mov Cap-1 Maneuver	1372	-	-	-	-	634
Mov Cap-2 Maneuver	-	-	-	-	-	883
Stage 1	-	-	-	-	-	813
Stage 2	-	-	-	-	-	-
<b>Approach</b>						
HCM Control Delay, s	EB	3	WB	0	SB	11
HCM LOS						B
<b>Minor Lane/Minor Mmnt</b>						
Capacity (veh/h)	EBL	EBT	WBT	WBR	SBL	SBR
1372	-	-	-	-	729	-
HCM Lane V/C Ratio	0.038	-	-	-	0.18	-
HCM Control Delay (s)	7.7	0	-	-	11	-
HCM Lane LOS	A	A	-	-	B	-
HCM 95th %ile Q(veh)	0.1	-	-	-	0.7	-



Intersection												
Int Delay, s/veh	7.7											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	15	5	130	2	0	2	205	15	2	5	5	30
Future Vol, veh/h	15	5	130	2	0	2	205	15	2	5	5	30
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	1	1	1	0	0	0	1	1	1	1	1	0
Mvmt Flow	18	6	155	2	0	2	244	18	2	6	6	36

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	544	544	24	623
Stage 1	36	36	507	507
Stage 2	508	508	116	54
Critical Hdwy	7.11	6.51	6.21	7.1
Critical Hdwy, Sig 1	6.11	5.51	-	6.1
Critical Hdwy, Sig 2	6.11	5.51	-	6.1
Follow-up Hdwy	3.509	4.009	3.309	3.5
Pol Cap-1/Maneuver	451	448	1055	401
Stage 1	982	867	-	552
Stage 2	549	540	-	894
Platoon blocked, %	-	-	-	-
Mov Cap-1/Maneuver	395	376	1055	297
Mov Cap-2/Maneuver	395	376	-	297
Stage 1	828	864	-	465
Stage 2	462	455	-	755

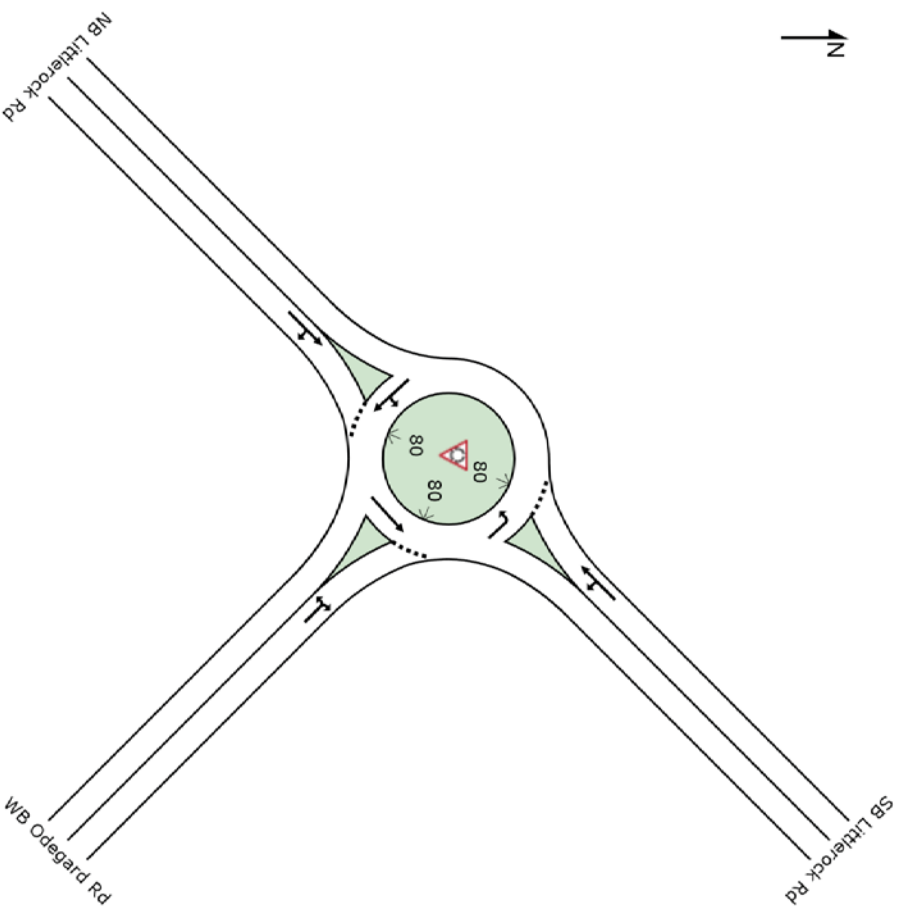
Approach	EB	WB	NB	SB
HCM Control Delay, s	10.3	12.8	7.1	0.9
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBL	WBL	SBL	SBR
Capacity (veh/h)	1573	-	860	464	1609	-	-
HCM Lane V/C Ratio	0.155	-	0.208	0.01	0.004	-	-
HCM Control Delay (s)	7.7	0	10.3	12.8	7.2	0	-
HCM Lane LOS	A	A	B	B	A	A	-
HCM 95th %ile Q(veh)	0.5	-	0.8	0	0	-	-

**SITE LAYOUT**

Site: 44) Littlerock Rd at Odegard Rd

Existing 2015  
PM Peak Hour  
Roundabout



## MOVEMENT SUMMARY

Site: 44) Litterock Rd at Oddegard Rd

Existing 2015  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total Veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Veh	Distance ft	Pop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: WB Oddegard Rd											
3x	L2	16	0.0	0.030	13.6	LOS B	0.2	3.9	0.64	0.70	33.2
18x	R2	5	0.0	0.030	8.2	LOS A	0.2	3.9	0.64	0.70	32.4
Approach											
		22	0.0	0.030	12.2	LOS B	0.2	3.9	0.64	0.70	33.0
NorthEast: SB Litterock Rd											
1x	L2	11	1.0	0.594	9.6	LOS A	6.8	172.4	0.21	0.39	36.7
6x	T1	720	1.0	0.594	4.4	LOS A	6.8	172.4	0.21	0.39	36.8
Approach											
		731	1.0	0.594	4.4	LOS A	6.8	172.4	0.21	0.39	36.8
SouthWest: NB Litterock Rd											
2x	T1	667	1.0	0.541	4.3	LOS A	5.0	127.2	0.14	0.39	37.1
12x	R2	5	1.0	0.541	4.2	LOS A	5.0	127.2	0.14	0.39	36.1
Approach											
		672	1.0	0.541	4.3	LOS A	5.0	127.2	0.14	0.39	37.1
All Vehicles		1425	1.0	0.594	4.5	LOS A	6.8	172.4	0.18	0.39	36.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement. LOS F will result if v/c > 1.0 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akceik MSD).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

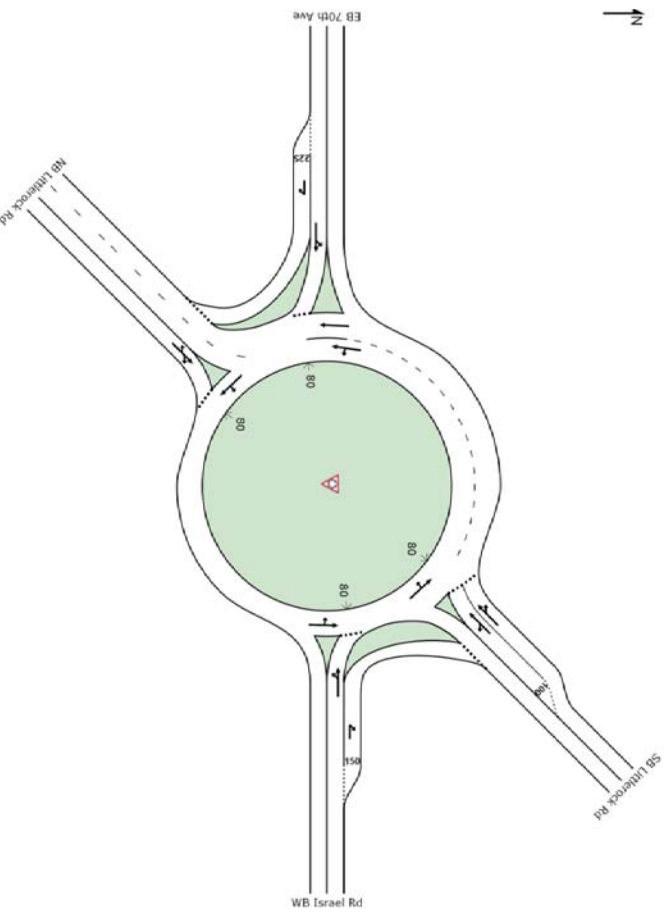
Processed: Friday, October 23, 2015 3:53:42 PM  
SIDRA INTERSECTION 6.0.24.4877  
Project: N:\Projects\0625\_City of Tumwater\0625.17 Tumwater Transportation Master Plan\TrafficOperations\sidra\_Existing\_2015 PM.sfb  
8001450\_6017302\_SCA\ALLIANCE\_PLUS / 1PC

SIDRA  
INTERSECTION 6

## SITE LAYOUT

Site: 45) Litterock Rd at Israel Rd

Existing 2015  
PM Peak Hour  
Roundabout



Created: Thursday, October 29, 2015 2:27:13 PM  
SIDRA INTERSECTION 6.0.24.4877  
Project: N:\Projects\0625\_City of Tumwater\0625.17 Tumwater Transportation Master Plan\TrafficOperations\sidra\_Existing\_2015 PM.sfb  
8001450\_6017302\_SCA\ALLIANCE\_PLUS / 1PC

SIDRA  
INTERSECTION 6

# MOVEMENT SUMMARY

Site: 45) Litterlock Rd at Israel Rd

Existing 2015  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total Vehln	HY %	Deg. Satn W/C	Average Delay sec	Level of Service	95% Back of Queue Veh	Distance ft	Pop. Queued	Effective Stop Rate per veh	Average Speed mph
<b>East WB Israel Rd</b>											
1a	L1	58	1.0	0.259	12.0	LOS B	1.8	44.8	0.76	0.76	34.2
6	T1	158	1.0	0.259	7.8	LOS A	1.8	44.8	0.76	0.76	34.5
16b	R3	274	1.0	0.258	6.1	LOS A	1.7	41.6	0.59	0.66	34.9
<b>Approach</b>											
		489	1.0	0.259	7.4	LOS A	1.8	44.8	0.66	0.71	34.7
<b>NorthEast SB Litterlock Rd</b>											
1bx	L3	137	1.0	0.364	13.8	LOS B	2.4	60.0	0.69	0.76	34.3
6x	T1	426	1.0	0.364	7.3	LOS A	2.5	62.2	0.68	0.72	34.8
16ax	R1	121	1.0	0.364	6.6	LOS A	2.5	62.2	0.68	0.68	35.0
<b>Approach</b>											
		684	1.0	0.364	8.5	LOS A	2.5	62.2	0.68	0.72	34.7
<b>West EB 70th Ave</b>											
5a	L1	105	1.0	0.221	10.5	LOS B	1.0	25.7	0.58	0.73	34.3
2	T1	84	1.0	0.221	6.5	LOS A	1.0	25.7	0.58	0.73	34.7
12b	R3	79	1.0	0.085	5.6	LOS A	0.3	8.8	0.48	0.65	35.3
<b>Approach</b>											
		268	1.0	0.221	7.8	LOS A	1.0	25.7	0.55	0.71	34.7
<b>SouthWest NB Litterlock Rd</b>											
5ix	L3	253	1.0	0.606	14.9	LOS B	5.6	140.5	0.75	0.81	33.9
2x	T1	268	1.0	0.606	8.5	LOS A	5.6	140.5	0.75	0.81	33.6
12ax	R1	32	1.0	0.606	8.1	LOS A	5.6	140.5	0.75	0.81	33.4
<b>Approach</b>											
		553	1.0	0.606	11.4	LOS B	5.6	140.5	0.75	0.81	33.7
<b>All Vehicles</b>											
		1995	1.0	0.606	8.9	LOS A	5.6	140.5	0.68	0.74	34.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
 Roundabout LOS Method: Same as Signalized Intersections.  
 Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
 LOS F will result if v/c > 1.1 respectively of movement delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all movements v/c not used as specified in HCM 2010).  
 Roundabout Capacity Model: SIDRA Standard.  
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.  
 Gap-Acceptance Capacity: SIDRA Standard (Akceik MSD).  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Processd: Thursday, October 29, 2015 2:27:34 PM Copyright © 2000-2014 Akceik and Associates Pty Ltd  
 SIDRA INTERSECTION 6.0.24.4877 www.sidrasolutions.com  
 Project: N:\projects\0625\_City of Tumwater\0625.17 Tumwater Transportation Master Plan\Traffic\Operations\sida  
 Existing 2015 PM.sp6  
 8001450\_6017302\_SCA ALLIANCE\_PLUS\_1.PC



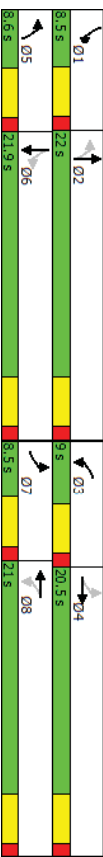
## Lanes, Volumes, Timings

Existing 2015  
PM Peak Hour

46: Linderon Way & Israel Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	40	165	30	135	260	25	110	85	110	40	80	50
Future Volume (vph)	40	165	30	135	260	25	110	85	110	40	80	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	0	200	0	150	0	100	0	100	0	0	0
Storage Lanes	1	0	1	0	1	0	1	0	1	0	0	0
Taper Length (ft)	25	0	25	0	25	0	25	0	25	0	0	0
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3505			2751			2073			847	
Travel Time (s)		79.7			62.5			47.1			19.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA
Protected Phases	7	4	3	8	5	2	6	2	6	1	6	6
Permitted Phases	4	4	8	8	8	2	6	2	6	1	6	6
Detector Phase	7	4	3	8	8	5	2	6	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	5.0	4.0	5.0	5.0	4.0	6.0	4.0	6.0	4.0	6.0	6.0
Minimum Split (s)	8.5	20.5	8.5	20.5	21.0	8.5	21.5	8.5	21.5	8.5	21.5	21.5
Total Split (s)	8.5	20.5	9.0	21.0	8.6	22.0	8.5	21.9	8.5	21.9	8.5	21.9
Total Split (%)	14.2%	34.2%	15.0%	35.0%	14.3%	36.7%	14.2%	36.5%	14.2%	36.5%	14.2%	36.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimizer?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	60											
Actuated Cycle Length:	52.4											
Natural Cycle:	60											
Control Type:	Actuated-Uncoordinated											

Spills and Phases: 46: Linderon Way & Israel Rd



HCM 2010 Signalized Intersection Summary  
46: Linderson Way & Israel Rd

Existing 2015  
PM Peak Hour

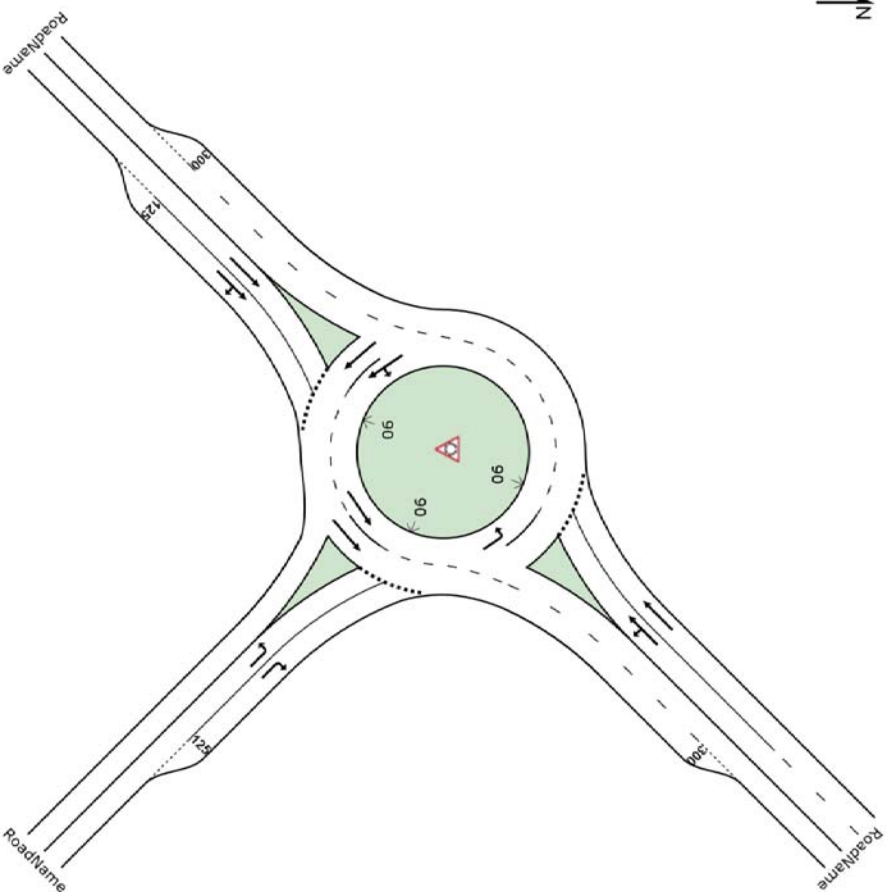
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (veh/h)	40	165	30	135	260	25	110	85	110	40	80	50
Future Volume (veh/h)	40	165	30	135	260	25	110	85	110	40	80	50
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qd), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1881	1900	1881	1881	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	42	174	32	142	274	26	116	89	42	84	53	53
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh. %	1	1	1	1	1	1	1	1	1	1	1	1
Cap. veh/h	286	277	51	378	388	37	597	435	205	590	356	224
Arrive On Green	0.03	0.18	0.18	0.09	0.23	0.23	0.07	0.36	0.36	0.03	0.33	0.33
Sat Flow, veh/h	1792	1547	284	1792	1692	161	1792	1210	571	1792	1080	681
Grp Volume(V), veh/h	42	0	206	142	0	300	116	0	131	42	0	137
Grp Sat Flow(s), veh/hln	1792	0	1831	1792	0	1853	1792	0	1780	1792	0	1761
Q Serve(s), s	1.0	0.0	5.5	3.3	0.0	7.9	2.2	0.0	2.7	0.8	0.0	3.0
Cycle Q Clear(c), s	1.0	0.0	5.5	3.3	0.0	7.9	2.2	0.0	2.7	0.8	0.0	3.0
Prop In Lane	1.00	0.16	1.00	0.09	1.00	0.32	1.00	0.32	1.00	0.32	1.00	0.39
Lane Grp Cap(c), veh/h	286	0	328	378	0	425	597	0	641	590	0	580
V/C Ratio(X)	0.15	0.00	0.63	0.38	0.00	0.71	0.19	0.00	0.20	0.07	0.00	0.24
Avail Cap(c), veh/h	360	0	555	378	0	579	619	0	641	663	0	580
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.0	0.0	20.0	15.7	0.0	18.7	10.4	0.0	11.7	10.9	0.0	12.9
Incr Delay (d2), s/veh	0.1	0.0	2.0	0.2	0.0	2.4	0.1	0.0	0.7	0.0	0.0	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/h	0.5	0.0	2.9	1.6	0.0	4.3	1.1	0.0	1.4	0.4	0.0	1.6
LnGrp Delay(d), s/veh	17.1	0.0	22.0	16.0	0.0	21.1	10.5	0.0	12.4	11.0	0.0	13.8
LnGrp LOS	B		C	B		C	B		B		B	B
Approach Vol, veh/h		248			442			247			179	
Approach Delay, s/veh		21.2			19.5			11.5			13.2	
Approach LOS		C			B			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Pks	1	2	3	4	5	6	7	8				
Pks Duration (G+Y+R), s	6.3	23.5	9.0	14.0	7.9	21.9	6.3	16.6				
Change Period (Y+R), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	4.0	17.5	4.5	16.0	4.1	17.4	4.0	16.5				
Max Q Clear Time (Q_cH1), s	2.8	4.7	5.3	7.5	4.2	5.0	3.0	9.9				
Green Ext Time (Q_c), s	0.0	1.2	0.0	2.0	0.0	1.2	0.0	1.7				
Intersection Summary												
HCM 2010 Cnt Delay			17.1									
HCM 2010 LOS			B									

Tumwater Transportation Master Plan  
SCJ Alliance

Synchro 9 Report  
6/10/2016

SITE LAYOUT

Site: 47) Littlerock Rd at Tumwater Blvd  
Existing 2015  
PM Peak Hour  
Roundabout



Created: Thursday, October 29, 2015 2:27:54 PM  
SIDRA INTERSECTION 6.0.24.4877  
Project: N:\Projects\0625 City of Tumwater\0625.17 Tumwater Transportation Master Plan\TrafficOperations\sidra  
Existing 2015 PM.sp6  
8001450, 8017302, SCJ ALLIANCE, PLUS / 1PC

SIDRA  
INTERSECTION 6

Copyright © 2000-2014 Alcatel and Associates Pty Ltd  
www.sidrasolutions.com

# MOVEMENT SUMMARY

Site: 47) Litterlock Rd at Turnwater Blvd

Existing 2015  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total	Flows HV %	Deg Satn %	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Distance Queued ft	Pop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: RoadName											
3x	L2	239	1.0	0.212	10.4	LOS B	1.1	26.8	0.32	0.64	34.2
18x	R2	298	1.0	0.251	4.9	LOS A	1.3	39.2	0.33	0.51	35.8
Approach											
		537	1.0	0.251	7.3	LOS A	1.3	33.2	0.32	0.57	35.0
NorthEast: RoadName											
1x	L2	324	1.0	0.365	11.0	LOS B	2.1	52.2	0.45	0.67	34.4
6x	T1	303	1.0	0.365	5.6	LOS A	2.1	52.2	0.43	0.56	35.8
Approach											
		628	1.0	0.365	8.4	LOS A	2.1	52.2	0.44	0.62	35.1
SouthWest: RoadName											
2x	T1	144	0.0	0.137	5.6	LOS A	0.7	16.7	0.44	0.52	36.3
12x	R2	112	0.0	0.115	5.6	LOS A	0.5	13.5	0.44	0.58	35.5
Approach											
		255	0.0	0.137	5.6	LOS A	0.7	16.7	0.44	0.55	35.9
All Vehicles		1420	0.8	0.365	7.5	LOS A	2.1	52.2	0.40	0.59	35.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
 Roundabout LOS Method: Same as Signalized Intersections.  
 Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
 LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all movements v/c not used as specified in HCM 2010).  
 Roundabout Capacity Model: SIDRA Standard.  
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.  
 Gap-Acceptance Capacity: SIDRA Standard (Akceik MSD).  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Process: Friday, October 23, 2015 4:14:06 PM  
 SIDRA INTERSECTION 6.0.24.4877  
 Project: N:\Projects\0625\_City of Turnwater\0625:17 Turnwater Transportation Master Plan\TrafficOperations\sidra  
 Existing 2015 PM.sip6  
 8001450\_6017302\_SCI ALLIANCE\_PLUS / 1PC



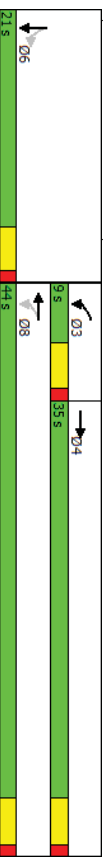
## Lanes, Volumes, Timings

48-1-5 SB Ramps & Turnwater Blvd

Existing 2015  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	0	340	70	320	275	0	0	0	0	405	30	235
Future Volume (vph)	0	340	70	320	275	0	0	0	0	405	30	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	0	0	0	0	0	350	0	0
Storage Lanes	0	0	0	0	0	0	0	0	0	1	0	0
Taper Length (ft)	25	0	0	25	0	0	25	0	0	25	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30		30		30		30		30		30
Link Distance (ft)		1843		807		1457		331		1571		1571
Travel Time (s)		41.9		18.3		33.1		33.1		35.7		35.7
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	1%	1%	1%	1%	0%	0%	0%	0%	4%	4%	4%
Shared Lane Traffic (%)	NA	NA	pm+pt	NA	NA	NA	NA	NA	NA	NA	NA	NA
Turn Type		4		3		8		8		6		6
Protected Phases		4		8		8		8		6		6
Permitted Phases		4		8		8		8		6		6
Detector Phase		4		3		8		8		6		6
Switch Phase												
Minimum Initial (s)	4.0	20.5	4.0	4.0	8.5	20.5	4.0	4.0	4.0	20.5	4.0	4.0
Minimum Split (s)	36.0	36.0	9.0	44.0	21.0	21.0	4.0	4.0	4.0	21.0	4.0	4.0
Total Split (s)	53.8%	53.8%	67.7%	67.7%	32.3%	32.3%	3.5	3.5	3.5	32.3%	3.5	3.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lead	Lead	Yes	Yes	None	None	Max	None	None	None
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	None	None	Max	None	None	None
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	65											
Actuated Cycle Length:	64.6											
Natural Cycle:	65											
Control Type:	Actuated-Uncoordinated											

Splits and Phases: 48-1-5 SB Ramps & Turnwater Blvd



Turnwater Transportation Master Plan  
 SCI Alliance

Synchro 9 Report  
 6/10/2016

HCM 2010 Signalized Intersection Summary  
 48: I-5 SB Ramps & Turnwater Blvd

Existing 2015  
 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (veh/h)	0	340	70	320	275	0	0	0	405	30	235	
Future Volume (veh/h)	0	340	70	320	275	0	0	0	405	30	235	
Number	7	4	14	3	8	18	0	0	1	6	16	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj Sat Flow, veh/hln	0	1881	1900	1900	1881	0	0	0	1827	1827	1900	
Adj Flow Rate, veh/h	0	362	74	340	293	0	0	0	269	259	74	
Adj In Lane	0	2	0	0	1	0	0	0	1	1	0	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Percent Heavy Veh. %	0	1	1	1	1	0	0	0	4	4	4	
Cap. veh/h	0	1864	377	90	26	0	0	0	396	311	89	
Arrive On Green	0.00	0.63	0.63	0.63	0.63	0.00	0.00	0.23	0.23	0.23	0.23	
Sat Flow, veh/h	0	3057	599	2	42	0	0	1740	1367	391		
Grp Volume(V), veh/hln	0	217	219	633	0	0	0	0	269	0	333	
Grp Sat Flow(s), veh/hln	0	1787	1775	44	0	0	0	0	1740	0	1758	
Q Serve(g,s), s	0.0	3.2	3.3	17.2	0.0	0.0	0.0	0.0	8.9	0.0	11.3	
Cycle Q Clear(g,c), s	0.0	3.2	3.3	17.2	0.0	0.0	0.0	0.0	8.9	0.0	11.3	
Prop In Lane	0.00	0.34	0.54	0	0.00	0.00	0.00	1.00	1.00	0.22		
Lane Grp Cap(c), veh/h	0	1124	1117	0	0	0	0	0	396	0	400	
W/C Ratio(X)	0.00	0.19	0.20	0.00	0.00	0.00	0.00	0.00	0.68	0.00	0.83	
Avail Cap(c), veh/h	0	1124	1117	0	0	0	0	0	457	0	462	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(f)	0.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00	
Uniform Delay (d), s/veh	0.0	4.9	4.9	0.0	0.0	0.0	0.0	0.0	22.2	0.0	23.1	
Incr Delay (d2), s/veh	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	3.3	0.0	11.0	
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackQ(50%),veh/hln	0.0	1.6	1.6	0.0	0.0	0.0	0.0	0.0	4.6	0.0	6.7	
LnGrp Delay(d), s/veh	0.0	5.0	5.0	0.0	0.0	0.0	0.0	0.0	25.5	0.0	34.1	
LnGrp LOS	A	A	A	A	A	A	A	A	C	C	C	
Approach Vol, veh/h	436	633	602									
Approach Delay, s/veh	5.0	0.0	30.3									
Approach LOS	A	A	C									
Timer	1	2	3	4	5	6	7	8				
Assigned Phs												
Phs Duration (G+Y+R), s			4			6		8				
Change Period (Y+R), s			44.0			18.8		44.0				
Max Green Setting (Gmax), s			4.5			4.5		4.5				
Max Q Clear Time (QcH1), s			30.5			16.5		39.5				
Green Ext Time (Qc), s			5.3			13.3		19.2				
Green Ext Time (Qc), s			9.0			0.9		8.2				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay	12.2											
HCM 2010 LOS	B											
Notes												

HCM 2010 TWSC  
 49: I-5 NB Ramps & Turnwater Blvd

Existing 2015  
 PM Peak Hour

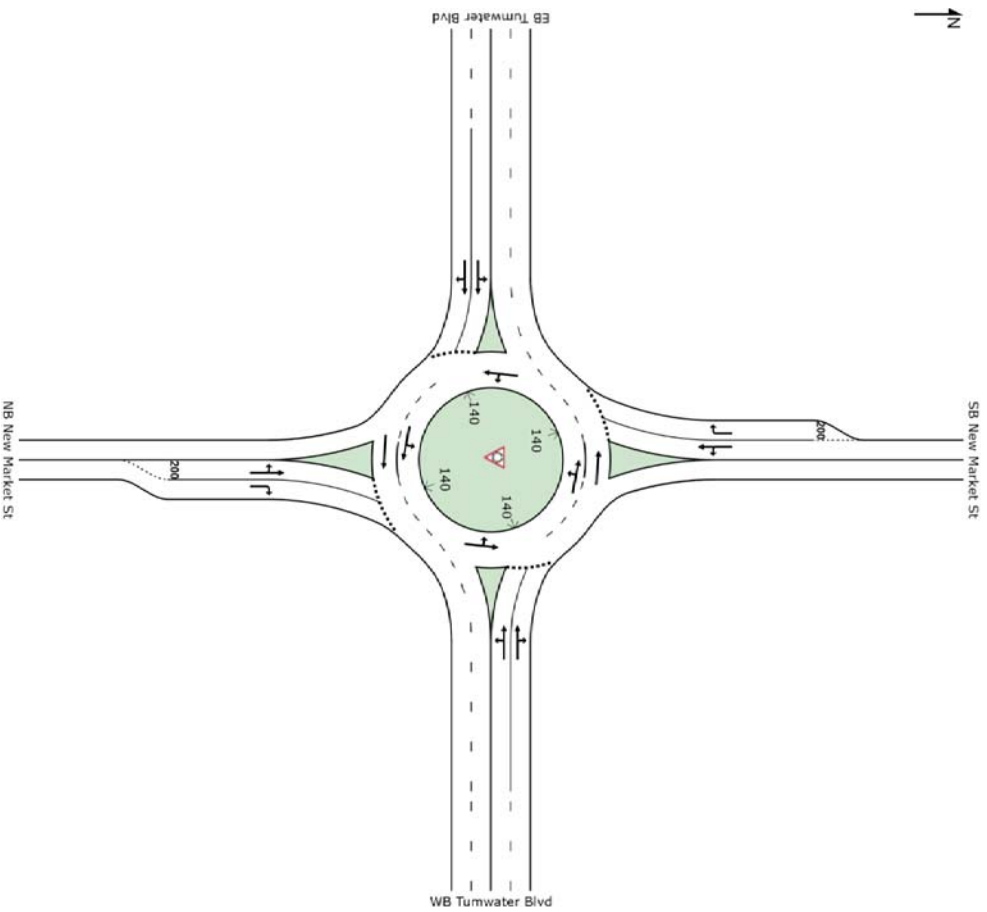
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	135	610	0	0	550	1210	45	5	135	0	0	0
Future Vol, veh/h	135	610	0	0	550	1210	45	5	135	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	None
Storage Length	150	-	-	-	-	-	-	-	150	-	-	-
Veh in Median Storage, #	-	0	0	0	0	0	0	0	0	0	0	0
Grade, %	-	-	-	-	-	-	-	-	-	-	-	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mmnt Flow	153	693	0	0	625	1375	51	6	153	0	0	0
Major/Minor	Major1	Major1	Major2	Minor1	Minor1	Minor1	Minor1	Minor1	Minor1	Minor1	Minor1	Minor1
Conflicting Flow All	625	0	-	-	0	0	1625	1625	347			
Stage 1	-	-	-	-	-	-	1000	1000	-			
Stage 2	-	-	-	-	-	-	625	625	-			
Critical Hdwy	4.145	-	-	-	-	-	6.645	6.545	6.945			
Critical Hdwy Stg 1	-	-	-	-	-	-	5.845	5.545	-			
Critical Hdwy Stg 2	-	-	-	-	-	-	5.445	5.545	-			
Follow-up Hdwy	2.2285	-	-	-	-	-	3.52854	0.2853	3.285			
Plat Cap-1 Maneuver	949	-	0	0	-	0	102	101	647			
Stage 1	-	0	0	0	0	0	316	318	-			
Stage 2	-	0	0	0	0	0	530	474	-			
Platoon blocked, %	-	-	-	-	-	-	-	-	-			
Mov Cap-1 Maneuver	949	-	-	-	-	-	86	0	647			
Mov Cap-2 Maneuver	-	-	-	-	-	-	86	0	-			
Stage 1	-	-	-	-	-	-	265	0	-			
Stage 2	-	-	-	-	-	-	530	0	-			
Approach	EB	WB	WB	NB								
HCM Control Delay, s	1.7	0	0	37.5								
HCM LOS	E	E	E	E								
Minor Lane/Minor Mvmt	NBL	NBL	NBL	EBL	EBT	WBT						
Capacity (veh/h)	86	647	949	-	-	-						
HCM Lane V/C Ratio	0.661	0.237	0.162	-	-	-						
HCM Control Delay (s)	105.7	12.3	9.5	-	-	-						
HCM Lane LOS	F	B	A	-	-	-						
HCM 95th %ile Q(veh)	3.1	0.9	0.6	-	-	-						
Notes												



## SITE LAYOUT

Site: 51) New Market Rd at Tumwater Blvd

Existing 2015  
PM Peak Hour  
Roundabout



Created: Thursday, October 29, 2015 2:28:24 PM  
SIDRA INTERSECTION 6.0.24.4877

Copyright © 2000-2014 Akceik and Associates Pty Ltd  
www.sidrasolutions.com

## MOVEMENT SUMMARY

Site: 51) New Market Rd at Tumwater Blvd

Existing 2015  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Sat W/C	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance Queued ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB New Market St											
3	L2	16	0.0	0.029	13.3	LOS B	0.1	2.6	0.57	0.76	34.6
8	T1	2	0.0	0.029	6.2	LOS A	0.1	2.6	0.57	0.76	34.2
18	R2	49	0.0	0.052	5.6	LOS A	0.2	5.1	0.54	0.55	36.0
Approach											
		67	0.0	0.082	7.5	LOS A	0.2	5.1	0.55	0.58	35.6
East WB Tumwater Blvd											
1	L2	49	2.0	0.271	10.5	LOS B	1.7	42.4	0.20	0.38	38.5
6	T1	739	2.0	0.271	3.4	LOS A	1.7	42.7	0.19	0.34	38.4
16	R2	11	2.0	0.271	3.8	LOS A	1.7	42.7	0.19	0.32	37.0
Approach											
		799	2.0	0.271	3.8	LOS A	1.7	42.7	0.19	0.35	38.4
North: SB New Market St											
7	L2	33	4.0	0.072	13.3	LOS B	0.3	6.6	0.54	0.76	35.2
4	T1	16	4.0	0.072	6.2	LOS A	0.3	6.6	0.54	0.76	34.8
14	R2	114	4.0	0.121	5.7	LOS A	0.5	12.0	0.52	0.66	36.0
Approach											
		163	4.0	0.121	7.2	LOS A	0.5	12.0	0.53	0.69	35.7
West: EB Tumwater Blvd											
5	L2	27	4.0	0.323	10.8	LOS B	2.1	54.2	0.32	0.39	38.2
2	T1	842	4.0	0.323	3.7	LOS A	2.1	54.9	0.31	0.38	38.0
12	R2	22	4.0	0.323	4.1	LOS A	2.1	54.9	0.30	0.36	36.5
Approach											
		891	4.0	0.323	3.9	LOS A	2.1	54.9	0.31	0.38	37.9
All Vehicles											
		1921	3.0	0.323	4.3	LOS A	2.1	54.9	0.29	0.40	37.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
 Roundabout LOS Method: Same as Signalised Intersections.  
 Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
 LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).  
 Roundabout Capacity Model: SIDRA Standard.  
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.  
 Gap-Acceptance Capacity: SIDRA Standard (Akceik M3D).  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Processed: Friday, October 23, 2015 4:21:53 PM  
 SIDRA INTERSECTION 6.0.24.4877  
 Project: N:\Projects\0625 City of Tumwater\Transportation Master Plan\TrafficOperations\sidra Existing 2015 PM.sip6  
 8001450\_6017302\_SCA ALLIANCE\_PLUS / 1PC

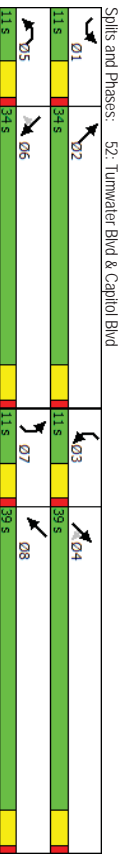
Copyright © 2000-2014 Akceik and Associates Pty Ltd  
 www.sidrasolutions.com  
**SIDRA INTERSECTION 6**



Lanes, Volumes, Timings  
52: Tumwater Blvd & Capitol Blvd

Existing 2015  
PM Peak Hour

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	MER	SWL	SWT
Lane Configurations	110	475	105	200	305	20	65	305	245	85	325
Traffic Volume (vph)	110	475	105	200	305	20	65	305	245	85	325
Future Volume (vph)	1900	1900	1900	1900	1900	0	275	1900	1900	1900	1900
Ideal Flow (vph)	250	0	200	1900	1900	0	275	1900	1900	200	0
Storage Length (ft)	1	1	2	2	2	0	1	1	1	1	0
Taper Length (ft)	25										
Right Turn on Red			Yes				Yes			Yes	
Link Speed (mph)	50				50			30			30
Link Distance (ft)	934				3620			2404			1729
Travel Time (s)	12.7				49.4			54.6			39.3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)	Prot	NA	Perm	Prot	NA	Prot	NA	Perm	Prot	NA	Prot
Turn Type	1	6	6	5	2	7	4	4	4	3	8
Protected Phases	1	6	6	5	2	7	4	4	4	3	8
Detector Phase	1	6	6	5	2	7	4	4	4	3	8
Switch Phase											
Minimum Infill (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Spill (s)	11.0	34.0	34.0	11.0	34.0	11.0	39.0	39.0	11.0	39.0	11.0
Total Spill (s)	11.0	34.0	34.0	11.0	34.0	11.0	39.0	39.0	11.0	39.0	11.0
Total Spill (%)	11.6%	35.8%	35.8%	11.6%	35.8%	11.6%	41.1%	41.1%	11.6%	41.1%	11.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
AllRed Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	None	None	None	None	None	None
<b>Intersection Summary</b>											
Area Type:	Other										
Cycle Length:	95										
Activated Cycle Length:	82.1										
Natural Cycle:	95										
Control Type:	Actuated-Uncoordinated										



HCM 2010 Signalized Intersection Summary  
52: Tumwater Blvd & Capitol Blvd

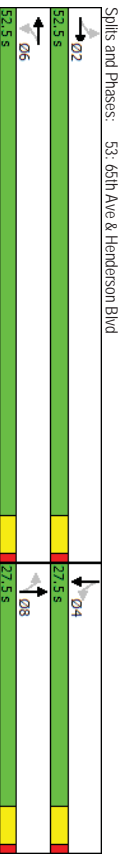
Existing 2015  
PM Peak Hour

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	MER	SWL	SWT
Lane Configurations	110	475	105	200	305	20	65	305	245	85	325
Traffic Volume (veh/h)	110	475	105	200	305	20	65	305	245	85	325
Future Volume (veh/h)	110	475	105	200	305	20	65	305	245	85	325
Number	1	6	16	5	2	12	7	4	14	3	8
Initial Q (Q <sub>0</sub> ) veh	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj (Adj <sub>b</sub> )	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/m	1845	1845	1881	1881	1900	1881	1881	1881	1881	1881	1900
Adj Flow Rate, veh/h	122	528	39	222	339	22	72	339	33	94	361
Adj No of Lanes	1	1	1	2	2	0	1	1	1	1	2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh %	3	3	3	1	1	1	1	1	1	1	1
Cap. veh/h	132	669	569	261	1237	80	107	461	392	120	877
Arrive On Green	0.08	0.36	0.36	0.08	0.36	0.36	0.06	0.24	0.24	0.07	0.25
Sat Flow, veh/h	1757	1845	1568	3476	3409	220	1792	1881	1599	1792	3476
Gp Volume (V <sub>i</sub> ) veh/h	122	528	39	222	177	184	72	339	33	94	185
Gp Sat Flow (S <sub>i</sub> ) veh/h	1757	1845	1568	1738	1787	1842	1792	1881	1599	1792	1852
Q Serve (S <sub>i</sub> ) s	5.5	20.4	1.3	5.0	5.6	5.7	3.1	13.3	1.3	4.1	6.9
Cycle Q Clear (C <sub>i</sub> ) s	5.5	20.4	1.3	5.0	5.6	5.7	3.1	13.3	1.3	4.1	6.9
Prop In Lane	1.00	1.00	1.00	1.00	1.00	0.12	1.00	1.00	1.00	1.00	0.09
Lane Grp Cap (C <sub>i</sub> ) veh/h	132	669	569	261	648	668	107	461	392	120	451
V/C Ratio (X)	0.93	0.79	0.07	0.85	0.27	0.28	0.67	0.74	0.08	0.78	0.41
Aval Cap (C <sub>a</sub> ) veh/h	132	669	569	261	648	668	134	800	134	760	788
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter (f <sub>i</sub> )	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d) s/veh	36.8	22.7	16.6	36.5	18.0	18.0	36.8	27.8	23.3	36.7	24.9
Incr Delay (d <sub>2</sub> ) s/veh	56.0	9.2	0.2	22.6	1.0	1.0	4.8	2.3	0.1	19.8	0.6
Initial Q Delay (d <sub>1</sub> ) s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back (Q <sub>0</sub> /50%) s/veh/h	4.7	12.1	0.6	3.2	2.9	3.1	1.7	7.2	0.6	2.7	3.5
LnGrp Delay (d <sub>1</sub> ) s/veh	92.8	31.9	16.9	59.1	19.1	19.1	41.6	30.1	23.4	56.6	25.5
LnGrp LOS	F	C	B	E	B	B	D	C	C	E	C
Approach Vol, veh/h	689										
Approach Delay, s/veh	41.8										
Approach LOS	D										
Timer	1	2	3	4	5	6	7	8			
Assigned Pns	1	2	3	4	5	6	7	8			
Pns Duration (G+Y+R <sub>0</sub> ) s	11.0	34.0	10.4	24.6	11.0	34.0	9.8	25.2			
Change Period (Y+R <sub>0</sub> ) s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0			
Max Green Setting (G <sub>max</sub> ) s	6.0	29.0	6.0	34.0	6.0	29.0	6.0	34.0			
Max O Clear Time (G <sub>0</sub> +C <sub>1</sub> ) s	7.5	7.7	6.1	15.3	7.0	22.4	5.1	9.0			
Green Ext Time (P <sub>0</sub> +C <sub>1</sub> ) s	0.0	6.1	0.0	4.3	0.0	3.1	0.0	4.7			
<b>Intersection Summary</b>											
HCM 2010 Cnt Delay	35.5										
HCM 2010 LOS	D										

Lanes, Volumes, Timings  
53.65th Ave & Henderson Blvd

Existing 2015  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	2	845	55	65	525	1	25	0	45	1	0	0
Traffic Volume (vph)	2	845	55	65	525	1	25	0	45	1	0	0
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	0
Ideal Flow (vphpl)	100	0	150	0	0	0	0	0	0	0	0	0
Storage Length (ft)	1	0	1	0	0	0	0	0	0	0	0	0
Storage Lanes	25	0	25	0	0	0	0	0	0	0	0	0
Taper Length (ft)												
Right Turn on Red			Yes		Yes			Yes		Yes		Yes
Link Speed (mph)		30			30			30		30		30
Link Distance (ft)		2111			1760			704		354		8.0
Travel Time (s)		48.0			40.0			16.0		8.0		0.91
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Shield Lane Traffic (%)												
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	2				6			8		8		4
Permitted Phases	2	2	2	6	6	6	8	8	8	4	4	4
Detector Phase												
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Spill (s)	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
Total Spill (s)	52.5	52.5	52.5	52.5	52.5	52.5	27.5	27.5	27.5	27.5	27.5	27.5
Total Spill (%)	65.6%	65.6%	65.6%	65.6%	65.6%	65.6%	34.4%	34.4%	34.4%	34.4%	34.4%	34.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead-Lag Optimize?												
Recall Mode	Max	Max	Max	Max	Max	Max	None	None	None	None	None	None
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	80											
Activated Cycle Length:	74.1											
Natural Cycle:	80											
Control Type:	Actuated-Uncoordinated											



HCM 2010 Signalized Intersection Summary  
53.65th Ave & Henderson Blvd

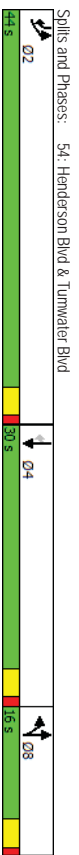
Existing 2015  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	2	845	55	65	525	1	25	0	45	1	0	0
Traffic Volume (veh/h)	2	845	55	65	525	1	25	0	45	1	0	0
Future Volume (veh/h)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	0
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Q <sub>0</sub> ) veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped/Bike Adj (Adj <sub>b</sub> )	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1881	1900	1881	1881	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	2	929	60	71	577	1	27	0	49	1	0	0
Adj No of Lanes	1	1	1	1	1	1	0	0	0	0	0	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh	1%	1%	1%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Cap. veh/h	667	1334	86	397	1432	2	116	14	96	263	0	0
Arrive On Green	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.09	0.09	0.09	0.00	0.00
Sat Flow, veh/h	840	1748	113	573	1877	3	414	150	1023	1581	0	0
Grp Volume (V <sub>l</sub> ) veh/h	2	0	989	71	0	578	76	0	1	0	0	0
Grp Sat Flow (S <sub>l</sub> ) veh/hln	840	0	1869	573	0	1881	1587	0	0	1581	0	0
Q Serve (S <sub>l</sub> ) s	0.1	0.0	16.9	4.5	0.0	6.6	1.3	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear (C <sub>l</sub> ) s	6.7	0.0	16.9	21.4	0.0	6.6	2.8	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00	0.06	1.00	0.06	1.00	0.00	0.36	0.64	1.00	0.00	0.00	0.00
Lane Grp Cap (C <sub>l</sub> ) veh/h	667	0	1420	397	0	1435	227	0	0	263	0	0
V/C Ratio (X)	0.00	0.00	0.70	0.18	0.00	0.40	0.34	0.00	0.00	0.00	0.00	0.00
Avail Cap (C <sub>a</sub> ) veh/h	667	0	1420	397	0	1435	647	0	0	637	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Filler (f)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d) s/veh	3.7	0.0	3.8	9.2	0.0	2.6	21.0	0.0	0.0	25.8	0.0	0.0
Incr Delay (d <sub>2</sub> ) s/veh	0.0	0.0	2.8	1.0	0.0	0.8	1.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay (d <sub>3</sub> ) s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back (Q <sub>0</sub> /50%) s/veh	0.0	0.0	9.4	0.8	0.0	3.7	1.3	0.0	0.0	0.0	0.0	0.0
LnGrp Delay (d <sub>4</sub> ) s/veh	3.7	0.0	6.6	10.2	0.0	3.4	28.1	0.0	0.0	25.8	0.0	0.0
LnGrp LOS	A		A	B		A	C		C		C	
Approach Vol, veh/h	991											
Approach Delay, s/veh	6.6											
Approach LOS	A											
Timer	1	2	3	4	5	6	7	8				
Assigned Pns	2	2	4	4	4	6	8					
Pns Duration (G+Y+R <sub>0</sub> ) s	52.5	52.5	10.4	10.4	10.4	52.5	10.4					
Change Period (Y+R <sub>0</sub> ) s	4.5	4.5	4.5	4.5	4.5	4.5	4.5					
Max Green Setting (G <sub>max</sub> ) s	48.0	48.0	23.0	23.0	23.0	48.0	23.0					
Max O Clear Time (Q <sub>0</sub> +C <sub>1</sub> ) s	18.9	18.9	2.0	2.0	2.0	23.4	4.8					
Green Ext Time (P <sub>0</sub> +C <sub>1</sub> ) s	18.6	18.6	0.4	0.4	0.4	16.5	0.4					
<b>Intersection Summary</b>												
HCM 2010 CnI Delay	6.6											
HCM 2010 LOS	A											

Lanes, Volumes, Timings  
54: Henderson Blvd & Turnwater Blvd

Existing 2015  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	650	10	20	165	195	325
Future Volume (vph)	650	10	20	165	195	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	0	100
Storage Lanes	1	0	0	0	0	1
Taper Length (ft)	25		25			
Right Turn on Red			Yes			Yes
Link Speed (mph)	35		35		35	
Link Distance (ft)	3122		2394		2111	
Travel Time (s)	60.8		46.6		41.1	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)						
Turn Type	Prot		Split	NA	NA	pm+ov
Permitted Phases	2		8	8	4	2
Detector Phase	2		8	8	4	2
Switch Phase						
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Spill (s)	20.5	10.5	10.5	30.0	20.5	20.5
Total Spill (s)	44.0	16.0	16.0	30.0	44.0	44.0
Total Spill (%)	48.9%	17.8%	17.8%	33.3%	48.9%	48.9%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0		4.0		4.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max		None	None	Max	Max
<b>Intersection Summary</b>						
Area Type:	Other					
Cycle Length:	90					
Actuated Cycle Length:	89.8					
Natural Cycle:	90					
Control Type:	Actuated-Uncoordinated					



HCM 2010 Signalized Intersection Summary  
54: Henderson Blvd & Turnwater Blvd

Existing 2015  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	650	10	20	165	195	325
Future Volume (veh/h)	650	10	20	165	195	325
Number	5	12	3	8	4	14
Initial Q (Ob.) veh	0	0	0	0	0	0
Ped Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1900	1900	1881	1881	1881
Adj Flow Rate, veh/h	714	11	22	181	214	236
Adj No of Lanes	0	0	0	0.91	0.91	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh. %	0	0	1	1	1	1
Cap. veh/h	786	12	26	214	547	1179
Arrive On Green	0.45	0.45	0.13	0.13	0.29	0.29
Sat Flow, veh/h	1759	27	203	1668	1881	1599
Gp Volume(v), veh/h	726	0	203	0	214	236
Gp Sat Flow(s), veh/hln	1788	0	1871	0	1881	1599
Q Serve(g.-s), s	33.8	0.0	9.5	0.0	8.1	4.1
Cycle Q Clear(g.-c), s	33.8	0.0	9.5	0.0	8.1	4.1
Prop In Lane	0.98	0.02	0.11		1.00	
Lane Gp Cap(c), veh/h	800	0	200	0	547	1179
V/C Ratio(X)	0.91	0.00	0.85	0.00	0.39	0.20
Avail Cap(C_a), veh/h	800	0	251	0	547	1179
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	23.0	0.0	38.1	0.0	25.4	3.6
Incr Delay (d2), s/veh	16.0	0.0	22.3	0.0	2.1	0.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%),veh/hln	20.1	0.0	6.4	0.0	4.5	5.0
LnGrp Delay(d),s/veh	39.1	0.0	60.5	0.0	27.5	4.0
LnGrp LOS	D		E		C	A
Approach Vol, veh/h	726		203		450	
Approach Delay, s/veh	39.1		60.5		15.2	
Approach LOS	D		E		B	
Timer	1	2	3	4	5	6
Assigned Pns		2		4		8
Pns Duration (G+Y+R), s		44.0		30.0		15.5
Change Period (Y+R), s		4.0		4.0		4.0
Max Green Setting (Gmax), s		40.0		26.0		12.0
Max O Clear Time (G+CH), s		35.8		10.1		11.5
Green Ext Time (p.c.), s		1.4		2.2		0.1
<b>Intersection Summary</b>						
HCM 2010 Cnt Delay	34.4					
HCM 2010 LOS	C					

Notes

HCM 2010 TWSC  
55: Henderson Blvd & Trails End Dr

Existing 2015  
PM Peak Hour

Int Delay, s/veh	3.8			
Movement	NWL	NWR	NET_NER	SWL_SWT
Traffic Vol, veh/h	55	50	150	90
Future Vol, veh/h	55	50	150	90
Conflicting Peds. #/hr	0	0	0	0
Sign Control	Stop	Stop	Free	Free
RT Channelized	-	None	-	None
Storage Length	0	-	-	-
Veh in Median Storage, #	0	-	0	-
Grade, %	0	-	0	-
Peak Hour Factor	87	87	87	87
Heavy Vehicles, %	0	0	1	1
Wmnt Flow	63	57	172	103
			109	161

Major/Minor	Minor1	Major1	Major2	Minor2
Conflicting Flow All	603	224	0	276
Stage 1	224	-	-	-
Stage 2	379	-	-	-
Critical Hdwy	6.4	6.2	-	4.11
Critical Hdwy Sig 1	5.4	-	-	-
Critical Hdwy Sig 2	5.4	-	-	-
Follow-up Hdwy	3.5	3.3	-	2.209
Pol Cap-1 Maneuver	4.65	8.20	-	12.93
Stage 1	818	-	-	-
Stage 2	696	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	4.22	8.20	-	12.93
Mov Cap-2 Maneuver	4.22	-	-	-
Stage 1	818	-	-	-
Stage 2	631	-	-	-

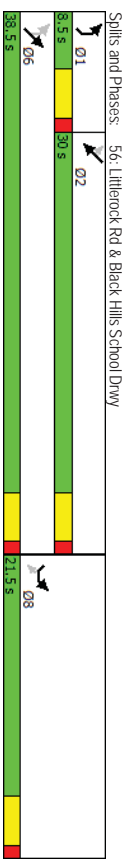
Approach	NW	NE	SW
HCM Control Delay, s	13.4	0	3.3
HCM LOS	B		

Minor Lane/Major Wmnt	NET	NER	WLn1	SWL	SWT
Capacity (veh/h)	-	549	1293	-	-
HCM Lane V/C Ratio	-	0.22	0.084	-	-
HCM Control Delay (s)	-	13.4	8	0	-
HCM Lane LOS	-	B	A	A	-
HCM 95th %ile Q(veh)	-	0.8	0.3	-	-

Lanes, Volumes, Timings  
56: Littlerock Rd & Black Hills School Drwy

Existing 2015  
PM Peak Hour

Lane Group	SER	SER	NEL	NET	SWT	SWR
Lane Configurations	5	5	10	160	390	50
Traffic Volume (vph)	5	5	10	160	390	50
Future Volume (vph)	5	5	10	160	390	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	0	175	1900	350	350
Storage Lanes	1	1	1	1	1	1
Taper Length (ft)	25	-	25	-	-	-
Right Turn on Red	-	Yes	-	-	Yes	-
Link Speed (mph)	30	-	30	-	30	-
Link Distance (ft)	1065	-	1067	-	3970	-
Travel Time (s)	24.2	-	24.3	-	90.2	-
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	1%	1%	1%	1%
Shared Lane Traffic (%)	-	-	-	-	-	-
Turn Type	Prot	Perm	pm+pl	NA	NA	Perm
Protected Phases	8	8	1	6	2	2
Permitted Phases	8	8	1	6	2	2
Detector Phase	8	8	1	6	2	2
Switch Phase	-	-	-	-	-	-
Minimum Initial (s)	7.0	7.0	4.0	7.0	7.0	7.0
Minimum Spill (s)	21.5	21.5	8.5	24.5	27.5	27.5
Total Spill (s)	21.5	21.5	8.5	38.5	30.0	30.0
Total Split (%)	35.8%	35.8%	14.2%	64.2%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	-	-	Lead	-	Lag	Lag
Lead-Lag Optimize?	-	-	Yes	-	Yes	Yes
Recall Mode	None	None	None	Max	None	None



HCM 2010 Signalized Intersection Summary  
56: Litterock Rd & Black Hills School Drwy

Existing 2015  
PM Peak Hour

Movement	SEL	SER	MEL	NET	SWT	SWR
Lane Configurations	1	1	1	1	1	1
Traffic Volume (veh/h)	5	5	10	160	390	50
Future Volume (veh/h)	5	5	10	160	390	50
Number	3	18	1	6	2	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1900	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	5	5	11	168	411	53
Adj No of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh. %	0	0	1	1	1	1
Cap. veh/h	33	30	715	1460	1245	1059
Arrive On Green	0.02	0.02	0.01	0.78	0.66	0.66
Sat Flow, veh/h	1810	1615	1792	1881	1881	1599
Grp Volume(V), veh/hln	5	5	11	168	411	53
Grp Sat Flow(S), veh/hln	1810	1615	1792	1881	1881	1599
Q Serve(Q_s), s	0.1	0.1	0.1	1.0	4.1	0.5
Cycle Q Clear(Q_c), s	0.1	0.1	0.1	1.0	4.1	0.5
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	33	30	715	1460	1245	1059
V/C Ratio(X)	0.15	0.17	0.02	0.12	0.33	0.05
Avail Cap(c), veh/h	702	627	858	1460	1245	1059
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.2	21.2	2.2	1.2	3.2	2.6
Incr Delay (d2), s/veh	2.1	2.7	0.0	0.2	0.2	0.0
Initial Q Delay(d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/hln	0.1	0.1	0.0	0.5	2.1	0.2
LnGrp Delay(d), s/veh	23.2	23.8	2.2	1.4	3.4	2.6
LnGrp LOS	C	C	A	A	A	A
Approach Vol, veh/h	10			179	464	
Approach Delay, s/veh	23.5			1.4	3.3	
Approach LOS	C			A	A	
Timer	1	2	3	4	5	6
Assigned Pns	1	2				
Pns Duration (G+Y+R), s	5.0	33.5				38.5
Change Period (Y+R), s	4.5	4.5				4.5
Max Green Setting (Gmax), s	4.0	25.5				34.0
Max Q Clear Time (Q_c+I), s	2.1	6.1				3.0
Green Ext Time (Q_c), s	0.0	4.4				5.0
Intersection Summary						
HCM 2010 Ctrl Delay			3.1			
HCM 2010 LOS			A			

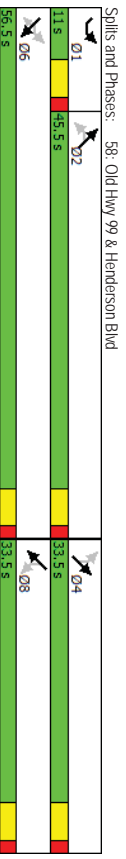
HCM 2010 TWSC  
57: Center St & 76th Ave

Existing 2015  
PM Peak Hour

Intersection	Int Delay, s/veh	2.3											
Movement		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h		50	10	1	10	10	20	1	245	1	10	310	40
Future Vol, veh/h		50	10	1	10	10	20	1	245	1	10	310	40
Conflicting Peds. #/hr		0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized		-	-	None	-	-	None	-	-	None	-	-	None
Storage Length		-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #		-	0	-	-	-	0	-	-	-	-	-	0
Grade, %		-	-	-	-	-	-	-	-	-	-	-	-
Peak Hour Factor		92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %		3	3	3	11	11	11	11	11	11	11	3	3
Mmnt Flow		54	11	1	11	11	22	1	266	1	11	337	43
Major/Minor		Minor2	Minor2	Minor1	Minor1	Minor1	Minor1	Major1	Major1	Major2			
Conflicting Flow All		665	650	359	655	671	267	380	0	0	267	0	0
Stage 1		380	380	-	269	269	-	-	-	-	-	-	-
Stage 2		285	270	-	386	402	-	-	-	-	-	-	-
Critical Hdwy		7.13	6.53	6.23	7.21	6.61	6.31	4.11	-	-	-	-	-
Critical Hdwy Sig 1		6.13	5.53	-	6.21	5.61	-	-	-	-	-	-	-
Critical Hdwy Sig 2		6.13	5.53	-	6.21	5.61	-	-	-	-	-	-	-
Follow-up Hdwy		3.527	4.027	3.327	3.599	4.099	3.399	2.209	-	2.227	-	-	-
Plat Cap-1 Maneuver		372	387	683	367	366	750	1184	-	1291	-	-	-
Stage 1		640	612	-	717	610	-	-	-	-	-	-	-
Stage 2		720	684	-	620	585	-	-	-	-	-	-	-
Platoon blocked, %													
Mov Cap-1 Maneuver		350	382	683	355	362	750	1184	-	1291	-	-	-
Mov Cap-2 Maneuver		350	382	-	355	362	-	-	-	-	-	-	-
Stage 1		639	605	-	716	669	-	-	-	-	-	-	-
Stage 2		687	683	-	601	579	-	-	-	-	-	-	-
Approach		EB			WB			NB		SB			
HCM Control Delay, s		17.3			13.2			0		0.2			
HCM LOS		C			B								
Minor Lane/Minor Mmnt		NBL	NBT	NBR	EBL	TWBL	NBL	SBL	SBT	SBR			
Capacity (veh/h)		1184	-	-	358	485	1291	-	-	-	-	-	-
HCM Lane V/C Ratio		0.001	-	-	0.185	0.09	0.008	-	-	-	-	-	-
HCM Control Delay (s)		8	0	-	17.3	13.2	7.8	0	-	-	-	-	-
HCM Lane LOS		A	A	-	C	B	A	A	-	-	-	-	-
HCM 95th %ile Q(veh)		0	-	-	0.7	0.3	0	-	-	-	-	-	-

Lanes, Volumes, Timings  
 58: Old Hwy 99 & Henderson Blvd  
 Existing 2015  
 PM Peak Hour

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	105	815	10	2	510	110	15	5	5	140	5	50
Future Volume (vph)	105	815	10	2	510	110	15	5	5	140	5	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150	50	50	50	0	0	0	0	150	0	0	0
Storage Lanes	25	1	1	1	1	0	0	0	1	1	1	0
Taper Length (ft)					25					25		
Right Turn on Red					Yes				Yes			
Link Speed (mph)		50			50				30			30
Link Distance (ft)		3620			1682				415			2274
Travel Time (s)		49.4			22.5				9.4			51.7
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	1%	1%	1%	2%	2%	3%	3%	3%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	pm+pl	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	1	6						4				8
Permitted Phases	6	6	6	2	2	2	4	4	4	8	8	8
Detector Phase	1	6	6	2	2	2	4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	50	100	100	100	100	100	50	50	50	50	50	50
Minimum Spill (s)	105	25.5	25.5	26.5	26.5	26.5	33.5	33.5	33.5	33.5	33.5	33.5
Total Spill (s)	110	56.5	56.5	45.5	45.5	45.5	33.5	33.5	33.5	33.5	33.5	33.5
Total Spill (%)	12.2%	62.8%	62.8%	50.6%	50.6%	50.6%	37.2%	37.2%	37.2%	37.2%	37.2%	37.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
AllRed Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead			Lag			Lag			Yes		
Lead-Lag Optimize?	Yes			Yes			Yes			Yes		
Recall Mode	None	Max	Max	Max	Max	Max	None	None	None	None	None	None
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	77.7											
Natural Cycle:	90											
Control Type:	Actuated-Uncoordinated											



HCM 2010 Signalized Intersection Summary  
 58: Old Hwy 99 & Henderson Blvd  
 Existing 2015  
 PM Peak Hour

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	105	815	10	2	510	110	15	5	5	140	5	50
Future Volume (veh/h)	105	815	10	2	510	110	15	5	5	140	5	50
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped/Bike Adj (AdjB), pb/h	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1881	1881	1863	1863	1900	1845	1900	1881	1881	1900	1900
Adj Flow Rate, veh/h	121	937	11	2	586	126	17	6	161	6	57	57
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh. %	1	1	1	2	2	3	3	3	1	1	1	1
Cap. veh/h	433	1342	1141	353	851	183	163	57	37	302	21	195
Arrive On Green	0.06	0.71	0.71	0.57	0.57	0.57	0.13	0.13	0.13	0.13	0.13	0.13
Sat Flow, veh/h	1792	1881	1599	589	1487	320	627	428	275	1410	154	1468
Gp Volume (v), veh/h	121	937	11	2	510	110	15	5	5	140	5	50
Gp Sat Flow (s), veh/hln	1792	1881	1599	589	1487	320	627	428	275	1410	154	1468
Q Serve (s), s	1.7	20.3	0.1	0.1	0.0	19.9	0.0	0.0	4.7	0.0	0.0	2.5
Cycle Q Clear (g-c), s	1.7	20.3	0.1	0.1	0.0	19.9	0.0	0.0	7.2	0.0	0.0	2.5
Prop. In Lane	1.00	1.00	1.00	1.00	1.00	0.18	0.59	0.21	1.00	0.21	1.00	0.90
Lane Grp Cap (c), veh/h	433	1342	1141	353	0	1035	257	0	302	0	216	216
V/C Ratio (X)	0.28	0.70	0.01	0.01	0.00	0.69	0.11	0.00	0.53	0.00	0.29	0.29
Avail Cap (c-a), veh/h	457	1342	1141	353	0	1035	633	0	666	0	635	635
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter (f)	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	8.3	5.9	3.0	11.7	0.0	10.8	21.3	0.0	29.8	0.0	28.0	28.0
Incr Delay (d2), s/veh	0.1	3.0	0.0	0.0	0.0	3.7	0.1	0.0	0.5	0.0	0.3	0.3
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back (Q/50%), veh/hln	0.9	11.5	0.1	0.0	0.0	10.8	0.5	0.0	3.1	0.0	1.1	1.1
LnGrp Delay (d), s/veh	8.4	8.9	3.0	11.7	0.0	14.5	21.4	0.0	30.4	0.0	28.2	28.2
LnGrp LOS	A	A	A	B	C	B	C	C	C	C	C	C
Approach Vol, veh/h	1069											
Approach Delay, s/veh	8.8											
Approach LOS	A											
Timer	1	2	3	4	5	6	7	8				
Assigned Pns	1	2	3	4	5	6	7	8				
Pns Duration (G+Y+R), s	100	46.5	150	150	56.5	150	150	150				
Change Period (Y+R), s	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5				
Max Green Setting (Gmax), s	5.5	40.0	28.0	28.0	51.0	28.0	28.0	28.0				
Max O Clear Time (G+CH1), s	3.7	21.9	4.5	4.5	22.3	4.5	4.5	4.5				
Green Ext Time (P.C.), s	0.0	10.5	0.4	0.4	13.5	0.4	0.4	0.3				
<b>Intersection Summary</b>												
HCM 2010 Cnt Delay	13.4											
HCM 2010 LOS	B											

HCM 2010 TWSC  
59: Old Hwy 99 & 79th Ave

Existing 2015  
PM Peak Hour

Intersection												
Int Delay: s/veh 2.2												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Traffic Vol, veh/h	1	1	10	10	0	110	130	840	0	1	430	15
Future Vol, veh/h	1	1	10	10	0	110	130	840	0	1	430	15
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	300	250	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	0
Grade, %	-	0	-	-	-	0	-	0	-	-	-	0
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	1	1	1	1	1	1	1	1	1
Mvmt Flow	1	1	11	11	0	116	137	884	0	1	453	16

Major/Minor	Minor1	Minor2	Major1	Major2
Conflicting Flow All	1621	1629	884	1627
Stage 1	1158	1158	463	463
Stage 2	463	471	1164	1158
Critical Hdwy	7.12	6.52	6.22	7.11
Critical Hdwy Sig 1	6.12	5.52	-	6.11
Critical Hdwy Sig 2	6.12	5.52	-	6.11
Follow-up Hdwy	3.518	4.018	3.318	3.509
Plat Cap-1 Maneuver	83	102	344	82
Stage 1	239	270	-	581
Stage 2	579	560	-	238
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	61	89	344	71
Mov Cap-2 Maneuver	61	89	-	71
Stage 1	209	236	-	509
Stage 2	467	559	-	201

Approach	EB	WB	SE	NW
HCM Control Delay, s	23.1	16.7	1.2	0
HCM LOS	C	C		

Minor Lane/Major Mvmt	NWL	NWT	NWR	EBL	WBL	WBR	SEL	SET	SER
Capacity (veh/h)	770	-	-	212	71	603	1099	-	-
HCM Lane V/C Ratio	0.001	-	-	0.06	0.148	0.192	0.125	-	-
HCM Control Delay (s)	9.7	0	-	23.1	64.3	12.4	8.7	-	-
HCM Lane LOS	A	A	-	C	F	B	A	-	-
HCM 95th %ile (Q)veh	0	-	-	0.2	0.5	0.7	0.4	-	-

HCM 2010 TWSC  
60: Kimmie St & 83rd Ave

Existing 2015  
PM Peak Hour

Intersection												
Int Delay: s/veh 3.5												
Movement	WBL	WBR	NBT	NBR	SBL	SBT						
Traffic Vol, veh/h	45	15	30	15	5	60						
Future Vol, veh/h	45	15	30	15	5	60						
Conflicting Peds. #/hr	0	0	0	0	0	0						
Sign Control	Stop	Stop	Free	Free	Free	Free						
RT Channelized	-	None	-	None	-	None						
Storage Length	0	-	0	-	-	0						
Veh in Median Storage, #	0	-	0	-	-	0						
Grade, %	0	-	0	-	-	0						
Peak Hour Factor	82	82	82	82	82	82						
Heavy Vehicles, %	3	3	9	9	3	3						
Mvmt Flow	55	18	37	18	6	73						

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	131	46	55
Stage 1	46	-	-
Stage 2	85	-	-
Critical Hdwy	6.43	6.23	4.13
Critical Hdwy Sig 1	5.43	-	-
Critical Hdwy Sig 2	5.43	-	-
Follow-up Hdwy	3.527	3.327	2.227
Plat Cap-1 Maneuver	861	1021	1544
Stage 1	974	-	-
Stage 2	936	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	858	1021	1544
Mov Cap-2 Maneuver	858	-	-
Stage 1	974	-	-
Stage 2	932	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	0.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	SBL	SBT
Capacity (veh/h)	-	894	1544	-
HCM Lane V/C Ratio	-	0.082	0.004	-
HCM Control Delay (s)	-	9.4	7.3	0
HCM Lane LOS	-	A	A	A
HCM 95th %ile (Q)veh	-	0.3	0	-

Intersection	7.8			
Int Delay, s/veh	EBL	EBT	WBT	WBR
Movement	70	25	10	90
Traffic Vol, veh/h	70	25	10	90
Future Vol, veh/h	0	0	0	0
Conflicting Peds. #/hr	0	0	0	0
Sign Control	Free	Free	Free	Free
RT Channelized	-	None	-	None
Storage Length	-	0	-	0
Veh in Median Storage, #	-	0	-	0
Grade, %	-	0	-	0
Peak Hour Factor	88	88	88	88
Heavy Vehicles, %	1	1	3	3
Mvmt Flow	80	28	11	102
				176
				80

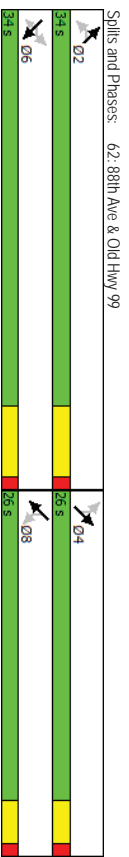
Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	114	0	251
Stage 1	-	-	63
Stage 2	-	-	188
Critical Hdwy	4.11	-	7.11
Critical Hdwy, Sig 1	-	-	6.11
Critical Hdwy, Sig 2	-	-	6.11
Follow-up Hdwy	2.209	-	3.509
Pol Cap-1 Maneuver	1.481	-	704
Stage 1	-	-	950
Stage 2	-	-	816
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1.481	-	674
Mov Cap-2 Maneuver	-	-	674
Stage 1	-	-	898
Stage 2	-	-	771

Approach	EB	WB	SB
HCM Control Delay, s	5.6	0	12.2
HCM LOS	B	B	B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLr1	SBR
Capacity (veh/h)	1481	-	-	-	751	-
HCM Lane V/C Ratio	0.054	-	-	-	0.34	-
HCM Control Delay (s)	7.6	0	-	-	12.2	-
HCM Lane LOS	A	A	-	-	B	-
HCM 95th %ile Q(veh)	0.2	-	-	-	1.5	-

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	MER	SWL	SWT	SWR
Lane Configurations	0	6/0	175	5	270	0	180	5	25	2	5	1
Traffic Volume (vph)	0	6/0	175	5	270	0	180	5	25	2	5	1
Future Volume (vph)	0	6/0	175	5	270	0	180	5	25	2	5	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100	150	150	150	150	0	150	0	0	0	0	0
Storage Lanes	1	1	1	1	1	0	1	0	0	0	0	0
Taper Length (ft)	25				25		25			25		
Right Turn on Red			Yes			Yes		Yes			Yes	
Link Speed (mph)	50		3849		1410		30		1160		30	
Link Distance (ft)	52.5		52.5		19.2		26.4		26.4		6.0	
Travel Time (s)	0.92	0.90	0.90	0.90	0.90	0.92	0.90	0.92	0.90	0.92	0.92	0.92
Peak Hour Factor	2%	1%	1%	1%	1%	2%	3%	2%	3%	2%	2%	2%
Heavy Vehicles (%)	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Shared Lane Traffic (%)	6	6	6	2	2	2	4	4	4	8	8	8
Turn Type	6	6	6	2	2	2	4	4	4	8	8	8
Protected Phases	6	6	6	2	2	2	4	4	4	8	8	8
Permitted Phases	6	6	6	2	2	2	4	4	4	8	8	8
Detector Phase	6	6	6	2	2	2	4	4	4	8	8	8
Switch Phase	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Initial (s)	26.0	26.0	26.0	26.0	26.0	26.0	24.0	24.0	26.0	26.0	26.0	26.0
Minimum Spill (s)	34.0	34.0	34.0	34.0	34.0	34.0	26.0	26.0	26.0	26.0	26.0	26.0
Total Split (s)	56.7%	56.7%	56.7%	56.7%	56.7%	56.7%	43.3%	43.3%	43.3%	43.3%	43.3%	43.3%
Total Split (%)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0
Yellow Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	6.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead-lag Optimizer?												
Recall Mode	Max	Max	Max	Max	Max	Max	None	None	None	None	None	None

Area Type:	Other
Cycle Length: 60	
Actuated Cycle Length: 55.2	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	





### HCM 2010 Signalized Intersection Summary

Existing 2015  
PM Peak Hour

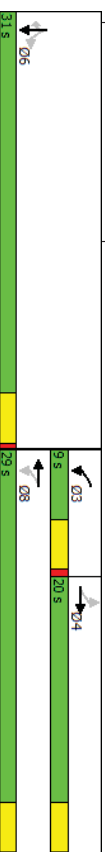
Movement	SEL	SET	SER	NWL	NWT	NWR	NEI	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	0	670	175	5	270	0	180	5	25	2	5	1
Future Volume (veh/h)	0	670	175	5	270	0	180	5	25	2	5	1
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Q <sub>i</sub> ) veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj(A <sub>pb</sub> )	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1863	1881	1881	1881	1881	1845	1847	1900	1900	1863	1900	1863
Adj Flow Rate, veh/h	0	744	194	6	300	0	200	5	28	2	5	1
Adj No. of Lanes	1	1	1	1	1	0	1	1	0	0	1	0
Peak Hour Factor	0.92	0.90	0.90	0.90	0.92	0.90	0.92	0.90	0.92	0.92	0.92	0.92
Cap. veh/h	155	1131	961	359	1131	0	412	45	251	136	243	40
Arrive On Green	0.00	0.60	0.60	0.60	0.60	0.00	0.18	0.18	0.18	0.18	0.18	0.18
Sat Flow, veh/h	1075	1881	1599	601	1881	0	1391	243	1363	211	1319	219
Gpr Volume(V <sub>g</sub> ) veh/hln	0	744	194	6	300	0	200	0	33	8	0	0
Gpr Sat Flow(s) veh/hln	1075	1881	1599	601	1881	0	1391	0	1607	1748	0	0
Q Serve(s) s	0.0	12.2	2.6	0.3	3.5	0.0	6.2	0.0	0.8	0.0	0.0	0.0
Cycle Q Clear(q <sub>c</sub> ) s	0.0	12.2	2.6	12.5	3.5	0.0	6.3	0.0	0.8	0.2	0.0	0.12
Prop In Lane	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.85	0.25	0.0	0.0	0.12
Lane Grp Cap(c <sub>i</sub> ) veh/h	155	1131	961	359	1131	0	412	0	296	419	0	0.00
V/C Ratio(X)	0.00	0.66	0.20	0.02	0.27	0.00	0.49	0.00	0.11	0.02	0.00	0.00
Aval Cap(c <sub>a</sub> ) veh/h	155	1131	961	359	1131	0	813	0	759	901	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d <sub>i</sub> ) s/veh	0.0	6.1	4.2	10.2	4.4	0.0	18.1	0.0	15.8	15.6	0.0	0.0
Incr Delay (d <sub>2</sub> ) s/veh	0.0	3.0	0.5	0.1	0.6	0.0	0.9	0.0	0.2	0.0	0.0	0.0
Initial Q Delay(d <sub>3</sub> ) s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
% Late BackOf(50%) veh/hln	0.0	7.1	1.3	0.1	1.9	0.0	2.5	0.0	0.4	0.1	0.0	0.0
LnGrp Delay(d <sub>3</sub> ) s/veh	0.0	9.1	4.7	10.3	5.0	0.0	18.9	0.0	16.0	15.6	0.0	0.0
LnGrp LOS	A	A	B	A	A	B	B	B	B	B	B	B
Approach Vol. veh/h	938					306						233
Approach Delay, s/veh	8.2					5.1						15.6
Approach LOS	A					A						B
Timer	1	2	3	4	5	6	7	8				
Assigned Pts	2											8
Pts Duration (G+Y+R <sub>0</sub> ) s	34.0			12.6		34.0		12.6				
Change Period (Y+R <sub>0</sub> ) s	6.0			4.0		6.0		4.0				
Max Green Setting (G <sub>max</sub> ) s	28.0			22.0		28.0		22.0				
Max Q Clear Time (G+CH1) s	14.5			8.3		14.2		2.2				
Green Ext Time (φ <sub>C</sub> ) s	5.8			0.6		5.9		0.7				
Intersection Summary												
HCM 2010 CH Delay						9.2						
HCM 2010 LOS						A						

### Lanes, Volumes, Timings

Existing 2015  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	295	30	145	125	0	0	0	0	500	0	285
Future Volume (vph)	0	295	30	145	125	0	0	0	0	500	0	285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	150	0	0	0	0	0	0	0	300
Storage Lanes	0	0	0	1	0	0	0	0	0	0	0	1
Taper Length (ft)	25			25			25			25		25
Right Turn on Red												
Link Speed (mph)		30		Yes			Yes		Yes		Yes	
Link Distance (ft)		1124			936				1099			1644
Travel Time (s)		25.5			16.0				25.0			37.4
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	1%	1%	1%	9%	9%	0%	0%	0%	0%	4%	4%	4%
Shared Lane Traffic (%)												
Turn Type		NA		pm+pt	NA				NA		NA	NA
Protected Phases		4		3	8				8		6	6
Permitted Phases		4		3	8				8		6	6
Detector Phase		4		4	3				8		6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0				4.0		4.0	4.0
Minimum Spill (s)	20.0	20.0		8.0	20.0				20.0		20.0	20.0
Total Spill (s)	20.0	20.0		9.0	29.0				31.0		31.0	31.0
Total Split (%)	33.3%	33.3%		15.0%	48.3%				51.7%		51.7%	51.7%
Yellow Time (s)	3.5	3.5		3.5	3.5				3.5		3.5	3.5
All-Red Time (s)	0.5	0.5		0.5	0.5				0.5		0.5	0.5
Lost Time Adjust(s)	0.0	0.0		0.0	0.0				0.0		0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0				4.0		4.0	4.0
Lead/Lag	Lag	Lag		Lead	Lead				Lead		Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes				Yes		Yes	Yes
Recall Mode	None	None		None	None				None		Max	Max
Intersection Summary												
Area Type:	Other											
Cycle Length:	60											
Actuated Cycle Length:	56.6											
Natural Cycle:	60											
Control Type:	Actuated-Uncoordinated											

Spills and Phases: 63-1-5 SB Ramps & 93rd Ave



HCM 2010 Signalized Intersection Summary  
63: I-5 SB Ramps & 93rd Ave

Existing 2015  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	295	30	145	125	0	0	0	0	500	0	285
Future Volume (veh/h)	0	295	30	145	125	0	0	0	0	500	0	285
Number	7	4	14	3	8	18	1	6	16	0	0	0
Initial Q (Ob.) veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1900	1881	1900	1743	1743	0	1900	1827	1827	568	0	131
Adj Flow Rate, veh/h	0	335	34	165	142	0	0	0	0	131	0	0
Adj No of Lanes	0	1	1	1	1	1	0	0	1	1	0	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh. %	1	1	1	9	9	0	4	4	4	4	4	4
Cap. veh/h	0	402	41	315	689	0	812	0	725	0	0	0
Arrive On Green	0.00	0.24	0.24	0.09	0.40	0.00	0.47	0.00	0.47	0.00	0.47	0.47
Sat Flow, veh/h	0	1681	171	1660	1743	0	1740	0	1553	0	0	1553
Grp Volume(V), veh/hln	0	369	165	142	0	0	568	0	131	0	0	131
Grp Sat Flow(s), veh/hln	0	0	1851	1660	1743	0	1740	0	1553	0	0	1553
Q Serve(q,s), s	0.0	0.0	11.0	4.1	3.1	0.0	15.0	0.0	2.8	0.0	0.0	2.8
Cycle Q Clear(q,c), s	0.0	0.0	11.0	4.1	3.1	0.0	15.0	0.0	2.8	0.0	0.0	2.8
Prop In Lane	0.00	0.09	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00
Lane Grp Cap(c), veh/h	0	0	443	315	689	0	812	0	725	0	0	725
V/C Ratio(X)	0.00	0.00	0.33	0.52	0.21	0.00	0.70	0.00	0.18	0.00	0.00	0.18
Aval Cap(c, a), veh/h	0	0	512	315	753	0	812	0	725	0	0	725
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	0.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	20.9	14.9	11.5	0.0	12.2	0.0	9.0	0.0	0.0	9.0
Incr Delay (d2), s/veh	0.0	0.0	10.0	1.6	0.1	0.0	5.0	0.0	0.5	0.0	0.0	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/hln	0.0	0.0	6.8	2.0	1.5	0.0	8.2	0.0	1.3	0.0	0.0	1.3
LnGrp Delay(d), s/veh	0.0	0.0	30.9	16.5	11.7	0.0	17.2	0.0	9.5	0.0	0.0	9.5
LnGrp LOS			C	B	B		B		B			A
Approach Vol, veh/h		369			307				699			
Approach Delay, s/veh		30.9			14.3				15.8			
Approach LOS		C			B				B			
Timer	1	2	3	4	5	6	7	8				
Assigned Pts		3		4		6		8				
Pts Duration (G+Y+R), s		9.0		17.9		31.0		26.9				
Change Period (Y+R), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		5.0		16.0		27.0		25.0				
Max Q Clear Time (Q_cH1), s		6.1		13.0		17.0		5.1				
Green Ext Time (Q_c), s		0.0		0.9		3.1		3.0				
<b>Intersection Summary</b>												
HCM 2010 Ctrl Delay										19.5		
HCM 2010 LOS										B		

HCM 2010 TWSC  
64: I-5 NB Ramps & 93rd Ave

Existing 2015  
PM Peak Hour

Intersection	26											
Int Delay, s/veh	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	245	505	0	0	250	340	45	0	115	0	0	0
Future Vol, veh/h	245	505	0	0	250	340	45	0	115	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Yield	-	-	Yield	-	-	None
Storage Length	125	-	-	-	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	-	-
Grade, %	-	-	-	-	-	-	-	-	-	-	-	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	3	3	3	8	8	8	14	14	14	14	14	14
Mmnt Flow	261	537	0	0	266	362	48	0	122	0	0	0

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	266	0	1325 1325 537
Stage 1	-	-	1059 1059
Stage 2	-	-	266 266
Critical Hdwy	4.13	-	6.54 6.64 6.34
Critical Hdwy Sig 1	-	-	5.54 5.64
Critical Hdwy Sig 2	-	-	5.54 5.64
Follow-up Hdwy	2.227	-	3.626 4.126 3.426
Plat Cap-1 Maneuver	1292	0	162 147 521
Stage 1	-	0	316 287
Stage 2	-	0	752 667
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1292	-	129 0 521
Mov Cap-2 Maneuver	-	-	129 0
Stage 1	-	-	252 0
Stage 2	-	-	752 0

Approach	EB	WB	NB
HCM Control Delay, s	2.8	0	11.5
HCM LOS			B

HCM 2010 TWSC  
65: Kimmie St & 93rd Ave

Existing 2015  
PM Peak Hour

Intersection	1.6																			
Int Delay, s/veh	1.6																			
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR								
Traffic Vol, veh/h	25	460	15	5	410	5	15	1	10	5	5	50								
Future Vol, veh/h	25	460	15	5	410	5	15	1	10	5	5	50								
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0								
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop								
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None								
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-								
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	-	-								
Grade, %	-	0	-	-	0	-	-	-	-	-	-	-								
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94								
Heavy Vehicles, %	4	4	4	1	1	1	0	0	0	5	5	5								
Mvmt Flow	27	489	16	5	436	5	16	1	11	5	5	53								

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	441	0	0	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.14	-	4.11	-
Critical Hdwy Sig 1	-	-	6.1	5.5
Critical Hdwy Sig 2	-	-	6.1	5.5
Follow-up Hdwy	2.236	-	2.209	-
Platoon blocked, %	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Major Cap-1 Maneuver	1108	-	1065	-
Major Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.1	20.9	13.9
HCM LOS	C	C	C	B

HCM 2010 AWSC  
66: Case Rd & 93rd Ave

Existing 2015  
PM Peak Hour

Intersection	20.3																			
Intersection Delay, s/veh	20.3																			
Intersection LOS	C																			
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NEU	NEL	NET	NER								
Traffic Vol, veh/h	0	2	315	165	0	55	295	30	0	80	20	30								
Future Vol, veh/h	0	2	315	165	0	55	295	30	0	80	20	30								
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92								
Heavy Vehicles, %	2	3	3	3	2	2	2	2	2	2	0	0								
Mvmt Flow	0	2	342	179	0	60	321	33	0	87	22	33								
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0								

Approach	EB	WB	WB	NE
Opposing Approach	WB	EB	WB	NE
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SW	NE	EB	EB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NE	SW	WB	WB
Conflicting Lanes Right	1	1	1	2
HCM Control Delay	25.4	18.8	12.2	12.2
HCM LOS	D	C	C	B

lane	NELn1	EBLn1	WBLn1	WBLn2	SWLn1
Vol Left, %	62%	0%	16%	0%	90%
Vol Thru, %	15%	65%	84%	0%	50%
Vol Right, %	23%	34%	0%	100%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	130	482	350	30	101
LT Vol	80	2	55	0	50
Through Vol	20	315	295	0	50
RT Vol	30	165	0	30	1
Lane Flow Rate	141	524	380	33	110
Geometry Grip	2	5	7	3	2
Degree of Utilit (X)	0.266	0.784	0.648	0.048	0.213
Departure Headway (Hd)	6.769	5.388	6.132	5.341	7
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	534	665	582	663	515
Service Time	4.775	3.476	3.926	3.134	5.008
HCM Lane V/C Ratio	0.264	0.788	0.653	0.05	0.214
HCM Control Delay	12.2	25.4	19.7	8.4	11.9
HCM Lane LOS	B	D	C	A	B
HCM 95th %ile Q	1.1	7.6	4.7	0.2	0.8

HCM 2010 AWSC  
66 : Case Rd & 93rd Ave

Existing 2015  
PM Peak Hour

Intersection				
Intersection Delay, s/vch				
Intersection LOS				
Movement	SWU	SWL	SWT	SWR
Traffic Vol, veh/h	0	50	50	1
Future Vol, veh/h	0	50	50	1
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	1	1	1
Mvmt Flow	0	54	54	1
Number of Lanes	0	0	1	0
Approach	SW			
Opposing Approach	NE			
Opposing Lanes	1			
Conflicting Approach Left	WB			
Conflicting Lanes Left	2			
Conflicting Approach Right	EB			
Conflicting Lanes Right	1			
HCM Control Delay	11.9			
HCM LOS	B			
Lane				

HCM 2010 AWSC  
67 : Tilley Rd (South) & 93rd Ave

Existing 2015  
PM Peak Hour

Intersection										
Intersection Delay, s/vch	14.5									
Intersection LOS	B									
Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR	NBR
Traffic Vol, veh/h	0	240	155	0	85	235	0	130	65	65
Future Vol, veh/h	0	240	155	0	85	235	0	130	65	65
Peak Hour Factor	0.92	0.87	0.87	0.92	0.87	0.87	0.92	0.87	0.87	0.87
Heavy Vehicles, %	2	3	3	2	2	2	2	1	1	1
Mvmt Flow	0	276	178	0	98	270	0	149	75	75
Number of Lanes	0	1	0	0	0	1	0	1	0	0
Approach	EB		WB		WB		NB		NB	
Opposing Approach	WB		EB		WB		NB		NB	
Opposing Lanes	1		1		1		0		0	
Conflicting Approach Left	0		NB		1		EB		1	
Conflicting Lanes Left	0		1		1		WB		1	
Conflicting Approach Right	NB		1		0		1		WB	
Conflicting Lanes Right	1		1		0		1		1	
HCM Control Delay	15.8		14.4		12.2		12.2		12.2	
HCM LOS	C		B		B		B		B	
Lane										
Vol Left, %	67%	0%	27%							
Vol Thru, %	0%	61%	73%							
Vol Right, %	33%	39%	0%							
Sign Control	Stop	Stop	Stop							
Traffic Vol by Lane	195	395	320							
LT Vol	130	0	85							
Through Vol	0	240	235							
RT Vol	65	155	0							
Lane Flow Rate	224	454	368							
Geometry Grp	1	1	1							
Degree of Util (X)	0.364	0.622	0.54							
Departure Headway (Hd)	5.849	4.933	5.287							
Convergence, Y/N	Yes	Yes	Yes							
Cap	614	731	680							
Service Time	3.889	2.965	3.321							
HCM Lane V/C Ratio	0.365	0.621	0.541							
HCM Control Delay	12.2	15.8	14.4							
HCM Lane LOS	B	C	B							
HCM 95th-ile-Q	1.7	4.4	3.3							

HCM 2010 TWSC  
68: 93rd Ave & Tilley Rd (North)

Existing 2015  
PM Peak Hour

Intersection		EBL		EBT		WBT		WBR		SBL		SBR	
Int Delay, s/veh		5.2											
Movement		EBL	EBT	WBT	WBR	SBL	SBR						
Traffic Vol, veh/h		115	190	95	10	15	225						
Future Vol, veh/h		115	190	95	10	15	225						
Conflicting Peds, #/hr		0	0	0	0	0	0						
Sign Control		Free	Free	Free	Free	Stop	Stop						
RT Channelized		-	None	-	None	-	None						
Storage Length		-	-	-	-	250	0						
Veh in Median Storage, #		-	0	0	0	-	-						
Grade, %		-	0	0	0	-	-						
Peak Hour Factor		86	86	86	86	86	86						
Heavy Vehicles, %		2	2	3	3	1	1						
Mvmt Flow		134	221	110	12	17	262						

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	122	0	604
Stage 1	-	-	116
Stage 2	-	-	488
Critical Hdwy	4.12	-	6.41
Critical Hdwy Sig 1	-	-	5.41
Critical Hdwy Sig 2	-	-	5.41
Follow-up Hdwy	2.218	-	3.509
Plat Cap-1 Maneuver	1465	-	463
Stage 1	-	-	911
Stage 2	-	-	619
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1465	-	415
Mov Cap-2 Maneuver	-	-	415
Stage 1	-	-	911
Stage 2	-	-	555

Approach	EB	WB	SB
HCM Control Delay, s	2.9	0	10.5
HCM LOS	B	B	B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBL	SBR
Capacity (veh/h)	1465	-	-	415	939	-
HCM Lane V/C Ratio	0.091	-	-	0.042	0.279	-
HCM Control Delay (s)	7.7	0	-	14.1	10.3	-
HCM Lane LOS	A	A	-	B	B	-
HCM 95th %ile Q(veh)	0.3	-	-	0.1	1.1	-

HCM 2010 TWSC  
69: 93rd Ave & Old Hwy 99

Existing 2015  
PM Peak Hour

Intersection		EBT		EBR		WBL		WBT		NEL		NER	
Int Delay, s/veh		3.2											
Movement		EBT	EBR	WBL	WBT	NEL	NER						
Traffic Vol, veh/h		630	30	70	215	15	155						
Future Vol, veh/h		630	30	70	215	15	155						
Conflicting Peds, #/hr		0	0	0	0	0	0						
Sign Control		Free	Free	Free	Free	Stop	Stop						
RT Channelized		-	None	-	None	-	None						
Storage Length		-	450	300	-	300	0						
Veh in Median Storage, #		0	-	-	0	-	2						
Grade, %		0	-	-	0	-	-						
Peak Hour Factor		92	92	92	92	92	92						
Heavy Vehicles, %		1	1	2	2	1	1						
Mvmt Flow		685	33	76	234	16	168						

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	685
Stage 1	-	-	685
Stage 2	-	-	386
Critical Hdwy	-	-	4.12
Critical Hdwy Sig 1	-	-	6.41
Critical Hdwy Sig 2	-	-	5.41
Follow-up Hdwy	-	-	5.41
Plat Cap-1 Maneuver	-	-	2.218
Stage 1	-	-	3.509
Stage 2	-	-	246
Platoon blocked, %	-	-	689
Mov Cap-1 Maneuver	-	-	225
Mov Cap-2 Maneuver	-	-	419
Stage 1	-	-	502
Stage 2	-	-	631

Approach	EB	WB	NE
HCM Control Delay, s	0	2.3	17.4
HCM LOS	C	C	C

Minor Lane/Major Mvmt	NEL	NEL2	EBT	EBR	WBL	WBT
Capacity (veh/h)	419	450	-	-	908	-
HCM Lane V/C Ratio	0.039	0.374	-	-	0.084	-
HCM Control Delay (s)	13.9	17.7	-	-	9.3	-
HCM Lane LOS	B	C	-	-	A	-
HCM 95th %ile Q(veh)	0.1	1.7	-	-	0.3	-

HCM 2010 AWSC  
 1: RW Johnson Rd & Mottman Rd  
 Projected 2040 No Build  
 PM Peak Hour

Intersection												
Intersection Delay, s/veh	17.4											
Intersection LOS	C											
Movement												
Traffic Vol, veh/h	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Future Vol, veh/h	0	55	100	10	0	165	55	125	0	5	240	140
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	6	6	6	2	9	9	9	2	4	4	4
Wmnt Flow	0	58	105	11	0	174	58	132	0	5	253	147
Number of Lanes	0	1	1	0	0	1	1	1	0	1	1	0

Approach			EB			WB			NB		
Opposing Approach	WB	EB	WB	EB	WB	WB	EB	WB	WB	EB	SB
Opposing Lanes	2		2		2	2		2	2		2
Conflicting Approach Left	SB		SB		NB			NB			EB
Conflicting Lanes Left	2		2		2			2			2
Conflicting Approach Right	NB		NB		SB			SB			WB
Conflicting Lanes Right	2		2		2			2			2
HCM Control Delay	12.4		12.4		14			14			25.1
HCM LOS	B		B		B			B			D

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	63%	0%	91%	0%	31%	0%	86%
Vol Right, %	0%	37%	0%	9%	0%	69%	0%	14%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	390	55	110	165	180	50	180
LT Vol	5	0	55	0	165	0	50	0
Through Vol	0	240	0	100	0	55	0	155
RT Vol	0	140	0	10	0	125	0	25
Lane Flow Rate	5	400	58	116	174	189	53	189
Geometry Crp	7	7	7	7	7	7	7	7
Degree of Lilt(X)	0.011	0.732	0.13	0.241	0.372	0.353	0.112	0.372
Departure Headway (Hd)	7.36	6.588	8.061	7.482	7.712	6.704	7.671	7.059
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	486	548	445	479	467	536	467	510
Service Time	5.101	4.328	5.813	5.234	5.459	4.45	5.419	4.807
HCM Lane V/C Ratio	0.01	0.73	0.13	0.242	0.373	0.353	0.113	0.371
HCM Control Delay	10.2	25.3	12	12.6	15	13.1	11.4	14
HCM Lane LOS	B	D	B	B	B	B	B	B
HCM 95th-ile Q	0	6.1	0.4	0.9	1.7	1.6	0.4	1.7

HCM 2010 AWSC  
 1: RW Johnson Rd & Mottman Rd  
 Projected 2040 No Build  
 PM Peak Hour

Intersection						
Intersection Delay, s/veh	17.4					
Intersection LOS	C					
Movement						
Traffic Vol, veh/h	SBU	SBL	SBT	SBR		
Future Vol, veh/h	0	50	185	25		
Peak Hour Factor	0.95	0.95	0.95	0.95		
Heavy Vehicles, %	2	3	3	3		
Wmnt Flow	0	53	163	26		
Number of Lanes	0	1	1	0		

Approach		SB	
Opposing Approach	NB	SB	SBR
Opposing Lanes	2	2	2
Conflicting Approach Left	WB		
Conflicting Lanes Left	2		
Conflicting Approach Right	EB		
Conflicting Lanes Right	2		
HCM Control Delay	13.4		
HCM LOS	B		

Lane	SBLn1	SBLn2	SBLn3	SBLn4	SBLn5	SBLn6
Vol Left, %	0%	0%	0%	0%	0%	0%
Vol Thru, %	0%	63%	0%	91%	0%	31%
Vol Right, %	0%	37%	0%	9%	0%	69%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	390	55	110	165	180
LT Vol	5	0	55	0	165	0
Through Vol	0	240	0	100	0	55
RT Vol	0	140	0	10	0	125
Lane Flow Rate	5	400	58	116	174	189
Geometry Crp	7	7	7	7	7	7
Degree of Lilt(X)	0.011	0.732	0.13	0.241	0.372	0.353
Departure Headway (Hd)	7.36	6.588	8.061	7.482	7.712	6.704
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	486	548	445	479	467	536
Service Time	5.101	4.328	5.813	5.234	5.459	4.45
HCM Lane V/C Ratio	0.01	0.73	0.13	0.242	0.373	0.353
HCM Control Delay	10.2	25.3	12	12.6	15	13.1
HCM Lane LOS	B	D	B	B	B	B
HCM 95th-ile Q	0	6.1	0.4	0.9	1.7	1.6

Lanes, Volumes, Timings  
2: Crosby Blvd & Mottman Rd

Projected 2040 No Build  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	205	230	35	5	30	125	45	665	120	190	850	535
Traffic Volume (vph)	205	230	35	5	30	125	45	665	120	190	850	535
Future Volume (vph)	1900	1900	0	0	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vph)	200	200	0	0	200	200	200	200	200	200	200	200
Storage Length (ft)	1	1	0	0	1	1	1	1	1	1	1	1
Storage Lanes	25	25	0	0	25	25	25	25	25	25	25	25
Taper Length (ft)												
Right Turn on Red					Yes	Yes		Yes	Yes		Yes	Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		940			1116			645			417	
Travel Time (s)		21.4			25.4			14.7			9.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	1%	1%	1%	3%	3%	3%
Shield Lane Traffic (%)												
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	NA
Protected Phases	4	4	8	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	8	8	2	2	2	6	6	6
Detector Phase												
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Spill (s)	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05
Total Spill (s)	39.0	39.0	39.0	39.0	39.0	39.0	61.0	61.0	61.0	61.0	61.0	61.0
Total Spill (%)	39.0%	39.0%	39.0%	39.0%	39.0%	39.0%	61.0%	61.0%	61.0%	61.0%	61.0%	61.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
AllRed Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
<b>Area Type: Other</b>												
Cycle Length: 100												
Activated Cycle Length: 100												
Offset: 82 (62%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow												
Natural Cycle: 60												
Control Type: Actuated-Coordinated												

Splits and Phases: 2: Crosby Blvd & Mottman Rd



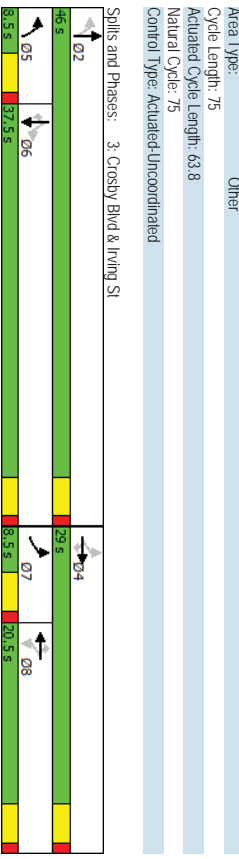
HCM 2010 Signalized Intersection Summary  
2: Crosby Blvd & Mottman Rd

Projected 2040 No Build  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	205	230	35	5	30	125	45	665	120	190	850	535
Traffic Volume (veh/h)	205	230	35	5	30	125	45	665	120	190	850	535
Future Volume (veh/h)	205	230	35	5	30	125	45	665	120	190	850	535
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qd), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped/Bike Adj (AdjB), %	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h	1845	1845	1900	1900	1900	1900	1881	1881	1881	1845	1845	1900
Adj Flow Rate, veh/h	216	242	37	5	32	132	47	700	126	200	895	0
Adj No of Lanes	1	1	0	0	1	0	1	1	1	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	0	0	0	1	1	1	3	3	3
Cap, veh/h	337	388	59	41	87	322	413	1245	1058	374	2319	0
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.25	0.66	0.66	0.66	0.66	0.66	0.00
Sat Flow, veh/h	1205	1563	239	15	349	1297	625	1881	1599	654	3597	0
Grp Volume (V), veh/h	216	0	279	169	0	0	47	700	126	200	895	0
Grp Sat Flow (S), veh/h	1205	0	1802	1661	0	0	625	1881	1599	654	1752	0
Q Serve (g, s)	11.4	0.0	13.8	0.0	0.0	0.0	3.7	20.1	2.9	23.7	11.6	0.0
Cycle Q Clear (g, c), s	19.9	0.0	13.8	8.5	0.0	0.0	15.3	20.1	2.9	43.8	11.6	0.0
Prop In Lane	1.00	0.00	0.13	0.03	0.00	0.78	1.00	1.00	1.00	1.00	1.00	0.00
Lane Grp Cap (c), veh/h	337	0	448	450	0	0	413	1245	1058	374	2319	0.00
V/C Ratio (X)	0.64	0.00	0.62	0.38	0.00	0.00	0.11	0.56	0.12	0.54	0.39	0.00
Avail Cap (C-a), veh/h	454	0	622	608	0	0	413	1245	1058	374	2319	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter (f)	1.00	0.00	1.00	1.00	0.00	0.00	0.89	0.89	0.89	1.00	1.00	0.00
Uniform Delay (d), s/veh	36.6	0.00	33.4	31.4	0.00	0.00	11.2	9.1	6.2	20.9	7.7	0.00
Incr Delay (d2), s/veh	2.0	0.00	1.4	0.5	0.00	0.00	0.5	1.6	0.2	5.4	0.5	0.00
Initial Q Delay (d3), s/veh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
%ile Back (Q50%), veh/h	5.8	0.00	7.0	4.0	0.00	0.00	0.7	10.9	1.3	4.8	5.8	0.00
LnGrp Delay (d), s/veh	38.7	0.00	34.8	31.9	0.00	0.00	11.7	10.8	6.4	26.3	8.2	0.00
LnGrp LOS	D		C	C			B	B	A	C	A	
Approach Vol, veh/h	495											
Approach Delay, s/veh	36.5											
Approach LOS	D											
Timer	1	2	3	4	5	6	7	8				
Assigned Pks	2	2	4	4	4	6	8					
Pks Duration (G+Y+R), s	70.7	70.7	29.3	70.7	70.7	29.3	70.7					
Change Period (Y+R), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5					
Max Green Setting (Gmax), s	56.5	56.5	34.5	56.5	56.5	34.5	56.5					
Max O Clear Time (G+CH1), s	22.1	22.1	21.9	22.1	22.1	21.9	22.1					
Green Ext Time (G+C), s	19.7	19.7	3.0	19.7	19.7	3.0	19.7					
<b>Intersection Summary</b>												
HCM 2010 Cnt Delay	17.1											
HCM 2010 LOS	B											

Lanes, Volumes, Timings  
3: Crosby Blvd & Irving St  
Projected 2040 No Build  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	75	50	45	40	45	220	35	505	25	150	660	100
Traffic Volume (vph)	75	50	45	40	45	220	35	505	25	150	660	100
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	0	0	200	0	150	200	0	0	0	0	250	250
Storage Length (ft)	0	1	0	0	1	1	0	1	0	1	1	1
Storage Length (ft)	25	1	0	25	1	25	1	25	1	25	1	1
Taper Length (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red		Yes			Yes		Yes			Yes		Yes
Link Speed (mph)	30	30	30	30	30	30	30	30	30	30	30	30
Link Distance (ft)	468	468	468	468	468	468	468	468	468	468	468	468
Travel Time (s)	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
Shared Lane Traffic (%)												
Turn Type	pm+pl	NA	Perm	Perm	NA	pm+pl	NA	Perm	NA	Perm	NA	Perm
Protected Phases	7	4	4	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	5	2	2	6	6	6
Detector Phase	7	4	4	8	8	8	5	2	2	6	6	6
Switch Phase												
Minimum Inhibit (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Spill (s)	8.5	20.5	20.5	20.5	20.5	20.5	8.5	20.5	20.5	20.5	20.5	20.5
Total Spill (s)	8.5	29.0	29.0	20.5	20.5	20.5	8.5	46.0	37.5	37.5	37.5	37.5
Total Split (%)	11.3%	38.7%	38.7%	27.3%	27.3%	27.3%	11.3%	61.3%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
AllRed Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	None	None	Lag	Lag	Lag	Lead	Lead	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	None	None	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max	Max	Max



Turnwater Transportation Master Plan  
SCJ Alliance  
Synchro 9 Report  
6/10/2016

HCM 2010 Signalized Intersection Summary  
3: Crosby Blvd & Irving St  
Projected 2040 No Build  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	75	50	45	40	45	220	35	505	25	150	660	100
Traffic Volume (veh/h)	75	50	45	40	45	220	35	505	25	150	660	100
Future Volume (veh/h)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow Rate (veh/h)	0	0	200	0	150	200	0	0	0	0	250	250
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qd), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped/Bike Adj (AdjB), %	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1900	1759	1759	1900	1881	1881	1881	1900	1863	1863	1863	1863
Adj Flow Rate, veh/h	79	53	47	42	47	232	37	532	26	158	695	0
Adj No of Lanes	0	1	1	0	1	1	1	1	1	1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	8	8	8	8	8	8	8	8	8	8	8	8
Cap. veh/h	94	39	282	153	141	301	400	1186	58	561	1051	893
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.03	0.67	0.67	0.56	0.56	0.00
Sat Flow, veh/h	9	207	1495	357	750	1599	1792	1779	87	848	1863	1583
Gp Volume (V), veh/h	132	0	47	89	0	232	37	0	558	158	695	0
Gp Sat Flow (S), veh/hln	216	0	1495	1108	0	1599	1792	0	1866	848	1863	1583
Q Serve (S), s	6.0	0.0	1.6	0.6	0.0	8.6	0.5	0.0	8.8	6.8	16.1	0.0
Cycle Q Clear (g-c), s	6.0	0.0	1.6	6.6	0.0	8.6	0.5	0.0	8.8	9.2	16.1	0.0
Prop In Lane	0.60	1.00	0.47	1.00	0.47	1.00	1.00	0.05	1.00	1.00	1.00	1.00
Lane Grp Cap (c), veh/h	0	0	282	294	0	301	400	0	1244	561	1051	893
V/C Ratio (X)	0.00	0.00	0.17	0.30	0.00	0.77	0.09	0.00	0.45	0.28	0.66	0.00
Avail Cap (C-a), veh/h	0	0	589	401	0	411	461	0	1244	561	1051	893
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter (f)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	21.2	22.1	0.0	24.0	1.00	0.0	4.9	8.6	9.4	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.3	0.6	0.0	6.0	0.1	0.0	1.2	1.3	3.3	0.0
Incr Q Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/h	0.0	0.0	0.7	1.5	0.0	4.2	0.2	0.0	4.9	1.8	9.1	0.0
LnGrp Delay(d), s/veh	0.0	0.0	21.4	22.6	0.0	29.9	7.3	0.0	6.1	9.9	12.7	0.0

Approach Vol, veh/h	179	321	595					
Approach Delay, s/veh	5.6	27.9	6.2					
Approach LOS	A	C	A					
Timer	1	2	3	4	5	6	7	8
Assigned Pns	2	2	4	5	6	6	8	8
Pns Duration (G+Y+R), s	46.0	16.2	6.4	39.6	16.2	16.2	16.2	16.2
Change Period (Y+R), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	41.5	24.5	4.0	33.0	16.0	16.0	16.0	16.0
Max O Clear Time (G+CH1), s	10.8	8.0	2.5	18.1	10.6	10.6	10.6	10.6
Green Ext Time (G+CH1), s	12.1	2.1	0.0	8.3	1.2	1.2	1.2	1.2

Tunwater Transportation Master Plan  
SCJ Alliance  
Synchro 9 Report  
6/10/2016



HCM 2010 AWSC  
4: Irving St & 7th Ave

Projected 2040 No Build  
PM Peak Hour

Intersection												
Intersection Delay, s/veh	9.5											
Intersection LOS	A											
Movement												
Traffic Vol, veh/h	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Future Vol, veh/h	0	5	15	235	0	1	25	1	0	245	5	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	1	1	1	2	0	0	0	2	1	1	1
Wmnt Flow	0	5	16	247	0	1	26	1	0	258	5	1
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach												
Approach	EB						WB					
Opposing Approach	WB						EB					
Opposing Lanes	1						1					
Conflicting Approach Left	SB						NB					
Conflicting Lanes Left	1						1					
Conflicting Approach Right	NB						SB					
Conflicting Lanes Right	1						1					
HCM Control Delay	8.9						8.1					
HCM LOS	A						A					

Lane												
Lane	NBLn1	EBLn1	WBLn1	SBLn1	NBLn1	EBLn1	WBLn1	SBLn1	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	98%	2%	4%	0%	98%	2%	4%	0%	98%	2%	4%	0%
Vol Thru, %	2%	6%	93%	50%	2%	6%	93%	50%	2%	6%	93%	50%
Vol Right, %	0%	92%	4%	50%	0%	92%	4%	50%	0%	92%	4%	50%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	251	255	27	10	251	255	27	10	251	255	27	10
LT Vol	245	5	1	0	245	5	1	0	245	5	1	0
Through Vol	5	15	25	5	5	15	25	5	5	15	25	5
RT Vol	1	235	1	5	1	235	1	5	1	235	1	5
Lane Flow Rate	264	268	28	11	264	268	28	11	264	268	28	11
Geometry Crp	1	1	1	1	1	1	1	1	1	1	1	1
Degree of Liltl(X)	0.349	0.305	0.038	0.013	0.349	0.305	0.038	0.013	0.349	0.305	0.038	0.013
Departure Headway (Hd)	4.752	4.069	4.859	4.56	4.752	4.069	4.859	4.56	4.752	4.069	4.859	4.56
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	756	880	736	781	756	880	736	781	756	880	736	781
Service Time	2.788	2.109	2.895	2.608	2.788	2.109	2.895	2.608	2.788	2.109	2.895	2.608
HCM Lane V/C Ratio	0.349	0.305	0.038	0.014	0.349	0.305	0.038	0.014	0.349	0.305	0.038	0.014
HCM Control Delay	10.3	8.9	8.1	7.7	10.3	8.9	8.1	7.7	10.3	8.9	8.1	7.7
HCM Lane LOS	B	A	A	A	B	A	A	A	B	A	A	A
HCM 95th-ile-Q	1.6	1.3	0.1	0	1.6	1.3	0.1	0	1.6	1.3	0.1	0

HCM 2010 AWSC  
4: Irving St & 7th Ave

Projected 2040 No Build  
PM Peak Hour

Intersection												
Intersection Delay, s/veh												
Intersection LOS												
Movement												
Traffic Vol, veh/h	SBU	SBL	SBT	SBR	SBU	SBL	SBT	SBR	SBU	SBL	SBT	SBR
Future Vol, veh/h	0	0	5	5	0	0	5	5	0	0	5	5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	0	0	0	2	0	0	0	2	0	0	0
Wmnt Flow	0	0	5	5	0	0	5	5	0	0	5	5
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

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

Lane												
Lane	SBLn1	SBLn1	SBLn1	SBLn1	SBLn1	SBLn1	SBLn1	SBLn1	SBLn1	SBLn1	SBLn1	SBLn1
Vol Left, %												
Vol Thru, %												
Vol Right, %												
Sign Control												
Traffic Vol by Lane												
LT Vol												
Through Vol												
RT Vol												
Lane Flow Rate												
Geometry Crp												
Degree of Liltl(X)												
Departure Headway (Hd)												
Convergence, Y/N												
Cap												
Service Time												
HCM Lane V/C Ratio												
HCM Control Delay												
HCM Lane LOS												
HCM 95th-ile-Q												

HCM 2010 TWSC  
5: Crosby Blvd & Bames Rd

Projected 2040 No Build  
PM Peak Hour

Intersection												
Int Delay, s/veh 6.6												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	10	1	1	10	5	285	1	210	5	345	275	20
Future Vol, veh/h	10	1	1	10	5	285	1	210	5	345	275	20
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	175
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	0
Grade, %	-	0	-	-	0	-	-	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	10	10	10	2	2	2	4	4	4	2	2	2
Mvmt Flow	11	1	1	11	5	300	1	221	5	363	289	21

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	1294	1254	300	1293
Stage 1	1026	1026	-	226
Stage 2	228	228	-	1027
Critical Hdwy	7.2	6.6	6.3	7.12
Critical Hdwy Sig 1	6.2	5.6	-	6.12
Critical Hdwy Sig 2	6.2	5.6	-	6.12
Follow-up Hdwy	3.59	4.09	3.39	3.518
Plat Cap-1 Maneuver	143	166	721	149
Stage 1	214	302	-	777
Stage 2	757	701	-	283
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	69	121	721	117
Mov Cap-2 Maneuver	69	121	-	117
Stage 1	274	220	-	776
Stage 2	474	700	-	205

Approach	EB	WB	NB	SB
HCM Control Delay, s	599	13.4	0	4.7
HCM LOS	F	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBT	SBR
Capacity (veh/h)	1238	-	-	78	119	815	1342	-	-	-	-	-
HCM Lane V/C Ratio	0.001	-	-	0.162	0.133	0.368	0.271	-	-	-	-	-
HCM Control Delay (s)	7.9	0	-	59.9	39.8	12	8.7	-	-	-	-	-
HCM Lane LOS	A	A	-	F	E	B	A	-	-	-	-	-
HCM 95th %ile Q(veh)	0	-	-	0.5	0.4	1.7	1.1	-	-	-	-	-

HCM 2010 TWSC  
6: Black Lake Belmore Rd & Black Lake Blvd

Projected 2040 No Build  
PM Peak Hour

Intersection												
Int Delay, s/veh 111.8												
Movement	EBT	EBR	WBL	WBT	NBL	NBR						
Traffic Vol, veh/h	190	85	250	410	210	230						
Future Vol, veh/h	190	85	250	410	210	230						
Conflicting Peds. #/hr	0	0	0	0	0	0						
Sign Control	Free	Free	Free	Free	Stop	Stop						
RT Channelized	-	None	-	None	-	None						
Storage Length	-	-	250	-	0	-						
Veh in Median Storage, #	0	-	-	0	0	-						
Grade, %	0	-	-	0	-	-						
Peak Hour Factor	95	95	95	95	95	95						
Heavy Vehicles, %	3	3	0	0	1	1						
Mvmt Flow	200	89	263	432	221	242						

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	289
Stage 1	-	-	245
Stage 2	-	-	958
Critical Hdwy	-	-	4.1
Critical Hdwy Sig 1	-	-	6.41
Critical Hdwy Sig 2	-	-	5.41
Follow-up Hdwy	-	-	2.2
Plat Cap-1 Maneuver	-	-	1284
Stage 1	-	-	798
Stage 2	-	-	374
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1284
Mov Cap-2 Maneuver	-	-	~163
Stage 1	-	-	~163
Stage 2	-	-	798

Approach	EB	WB	NB
HCM Control Delay, s	0	3.2	\$ 344.5
HCM LOS			F

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	279	-	-	1284	-	-	-	-	-
HCM Lane V/C Ratio	1.66	-	-	0.205	-	-	-	-	-
HCM Control Delay (s)	\$ 344.5	-	-	8.5	-	-	-	-	-
HCM Lane LOS	F	-	-	A	-	-	-	-	-
HCM 95th %ile Q(veh)	29	-	-	0.8	-	-	-	-	-

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

HCM 2010 TWSC  
7: RW Johnson Rd & Sapp Rd

Projected 2040 No Build  
PM Peak Hour

Intersection  
Int Delay, s/veh 7.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	20	50	5	30	70	110	5	25	20	150	40	50
Future Vol, veh/h	20	50	5	30	70	110	5	25	20	150	40	50
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	0	-	-	0	-	-	0
Grade, %	-	0	-	-	-	0	-	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	3	3	3	1	1	1	0	0	0	3	3	3
Mvmt Flow	21	53	5	32	74	116	5	26	21	158	42	53

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	189	58	0	0
Stage 1	-	-	97	97
Stage 2	-	-	242	253
Critical Hdwy	4.13	4.11	7.1	6.5
Critical Hdwy Sig 1	-	-	6.1	5.5
Critical Hdwy Sig 2	-	-	6.1	5.53
Follow-up Hdwy	2.227	2.209	3.5	4
Platoon blocked %	-	-	619	577
Platoon blocked %	-	-	914	819
Platoon blocked %	-	-	766	701
Mov Cap-1/Maneuver	1379	1553	536	555
Mov Cap-2/Maneuver	-	-	536	555
Stage 1	-	-	899	806
Stage 2	-	-	664	685

Approach	EB	WB	NB	SB
HCM Control Delay, s	2	1.1	10.8	14.5
HCM LOS	B	B	B	B

Minor Lane/Major Mvmt	NBLr1	EBL	EBT	EBR	WBL	WBT	WBR	SBLr1
Capacity (veh/h)	675	1379	-	-	1553	-	-	631
HCM Lane V/C Ratio	0.078	0.015	-	-	0.02	-	-	0.4
HCM Control Delay (s)	10.8	7.7	0	0	7.4	0	0	14.5
HCM Lane LOS	B	A	A	A	A	A	A	B
HCM 95th %ile (Q)veh	0.3	0	-	-	0.1	-	-	1.9

HCM 2010 TWSC  
8: Sapp Rd & Crosby Blvd

Projected 2040 No Build  
PM Peak Hour

Intersection  
Int Delay, s/veh 5.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	225	20	230	200	15	205
Future Vol, veh/h	225	20	230	200	15	205
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	250	0	0	0	0	0
Veh in Median Storage, #	0	-	-	-	-	-
Grade, %	0	-	-	-	-	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	237	21	242	211	16	216

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	594	347	0
Stage 1	347	-	453
Stage 2	247	-	-
Critical Hdwy	6.41	6.21	4.1
Critical Hdwy Sig 1	5.41	-	-
Critical Hdwy Sig 2	5.41	-	-
Follow-up Hdwy	3.509	3.309	2.2
Platoon blocked %	469	698	1118
Platoon blocked %	718	-	-
Platoon blocked %	796	-	-
Mov Cap-1/Maneuver	462	698	1118
Mov Cap-2/Maneuver	462	-	-
Stage 1	718	-	-
Stage 2	785	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.9	0	0.6
HCM LOS	C	-	-

Minor Lane/Major Mvmt	NBT	NBR	WBLr1	WBLr2	SBL	SBT
Capacity (veh/h)	-	462	698	1118	-	-
HCM Lane V/C Ratio	-	0.513	0.03	0.014	-	-
HCM Control Delay (s)	-	20.7	10.3	8.3	-	-
HCM Lane LOS	-	C	B	A	-	-
HCM 95th %ile (Q)veh	-	2.9	0.1	0	-	-

SimTraffic Performance Report

Projected 2040 Baseline  
PM Peak Hour

9: Black Lake Belmore Rd & 49th Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3
Total Del/Veh (s)	8.2	9.5	5.0	10.7	12.0	7.2	10.8	11.7	7.4	1.8	2.2	1.2

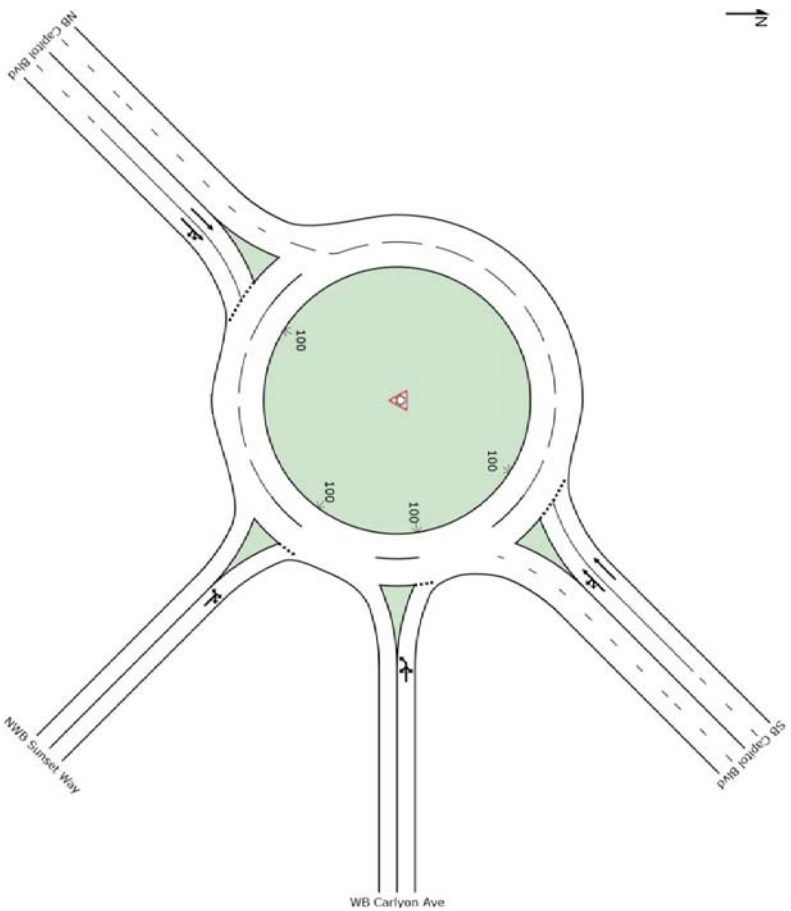
9: Black Lake Belmore Rd & 49th Ave Performance by movement

Movement	All
Denied Del/Veh (s)	0.3
Total Del/Veh (s)	6.7

SITE LAYOUT

Site: 10) Carlyon Ave at Capitol Blvd

Projected 2040 Baseline  
PM Peak Hour  
Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Alcekl and Associates Pty Ltd | sidrasolutions.com  
 Organisation: SCJ ALLIANCE | Created: Tuesday, February 16, 2016 5:44:03 PM  
 Project: N:\Projects\025 City of Turnwater\025\_17 Turnwater Transportation Master Plan\Traffic\Operations\sidra\2040 Baseline\10) Carlyon Ave at Capitol Blvd.sip

# MOVEMENT SUMMARY

## Site: 10) Carlyon Ave at Capitol Blvd

Projected 2040 Baseline  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total Veh/h	HV %	Deg. Satn W/C	Average Delay sec	Level of Service	95% Back of Queue Veh	Queue Distance ft	Pop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: NWB Sunset Way											
3x	L2	47	2.0	0.130	7.9	LOS A	0.5	12.8	0.65	0.65	32.2
18x	R2	21	2.0	0.130	7.9	LOS A	0.5	12.8	0.65	0.65	31.2
18bx	R3	5	2.0	0.130	7.9	LOS A	0.5	12.8	0.65	0.65	30.8
Approach		74	2.0	0.130	7.9	LOS A	0.5	12.8	0.65	0.65	31.8
East WB Carlyon Ave											
1b	L3	11	2.0	0.476	15.4	LOS B	2.5	62.8	0.74	0.80	29.7
1a	L1	142	2.0	0.476	15.4	LOS B	2.5	62.8	0.74	0.80	29.0
16b	R3	95	2.0	0.476	15.4	LOS B	2.5	62.8	0.74	0.80	28.2
Approach		247	2.0	0.476	15.4	LOS B	2.5	62.8	0.74	0.80	28.7
NorthEast: SB Capitol Blvd											
1bx	L3	79	2.0	0.728	15.0	LOS B	8.0	203.6	0.71	0.54	30.7
1x	L2	21	2.0	0.728	15.0	LOS B	8.0	203.6	0.71	0.54	30.4
6x	T1	1537	2.0	0.728	14.9	LOS B	8.0	203.6	0.71	0.53	30.5
Approach		1637	2.0	0.728	14.9	LOS B	8.0	203.6	0.71	0.53	30.5
SouthWest: NB Capitol Blvd											
2x	T1	905	2.0	0.450	7.6	LOS A	3.2	80.2	0.38	0.21	33.9
12ax	R1	158	2.0	0.450	7.6	LOS A	3.2	80.2	0.38	0.21	33.6
12x	R2	26	2.0	0.450	7.6	LOS A	3.2	80.2	0.38	0.21	32.9
Approach		1089	2.0	0.450	7.6	LOS A	3.2	80.2	0.38	0.21	33.9
All Vehicles		3047	2.0	0.728	12.2	LOS B	8.0	203.6	0.59	0.44	31.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
Roundabout LOS Method: Same as Signalized Intersections.  
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
LOS F will result if v/c > 1.1 (respective of movement delay value (does not apply for approaches and intersection).  
Intersection and Approach LOS values are based on average delay for all movements v/c not used as specified in HCM 2010).  
Roundabout Capacity Model: SIDRA Standard.  
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.  
Gap-Acceptance Capacity: SIDRA Standard (Akgelik MSD).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arkelik and Associates Pty Ltd | sidrasolutions.com  
Organization: SCJ ALLIANCE | Processed: Wednesday, February 17, 2016 1:52:36 PM  
Project: N:\projects\0625\_17\_Turnwater\_Transportation\_Master\_Plan\Traffic\Operations\sidra\2040\_Baseline\10) Carlyon Ave at Capitol Blvd.sip

## HCM 2010 TWSC 11: Deschutes Way & I-5 NB On-Ramp

Projected 2040 No Build  
PM Peak Hour

Intersection	Inlt Delay s/veh	1.4		
Movement	SEL SET	NWT NWR	SWL	SWR
Traffic Vol, veh/h	165 405	275 140	0	0
Future Vol, veh/h	165 405	275 140	0	0
Conflicting Peds. #/hr	0 0	0 0	0	0
Sign Control	Free Free	Free Free	Stop	Stop
RT Channelized	- None	- None	-	-
Storage Length	-	-	-	-
Veh in Median Storage, #	- 0	0 -	0	0
Grade, %	-	0	-	-
Peak Hour Factor	95 95	95 95	95	95
Heavy Vehicles, %	0 0	1 1	0	0
Mmnt Flow	174 426	289 147	0	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	437 0	- 0	1137 363

Stage 1	-	-	363
Stage 2	-	-	774

Critical Hdwy	4.1	-	7.1
Critical Hdwy Sig 1	-	-	6.1
Critical Hdwy Sig 2	-	-	6.1

Follow-up Hdwy	2.2	-	3.5
Pol Cap-1 Maneuver	1134	-	181
Stage 1	-	-	660
Stage 2	-	-	394

Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1134	-	153
Mov Cap-2 Maneuver	-	-	153
Stage 1	-	-	527
Stage 2	-	-	315

Approach	SE	NW	SW
HCM Control Delay, s	2.5	0	0
HCM LOS			A

Minor Lane/Major Mmnt	NWT	NWR	SEL	SET	SWL	SWR
Capacity (veh/h)	-	1134	-	-	-	-
HCM Lane V/C Ratio	-	0.133	-	0	0	0
HCM Control Delay (s)	-	8.7	A	A	A	A
HCM Lane LOS	-	A	A	A	A	A
HCM 95th Xltile (Veh)	-	0.5	-	-	-	-

HCM 2010 TWSC  
12: Beschules Way & US 101 WB On-Ramp

Projected 2040 No Build  
PM Peak Hour

Intersection	Intersection							
Int Delay, s/veh	4.2							
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Traffic Vol, veh/h	0	0	515	430	360	30		
Future Vol, veh/h	0	0	515	430	360	30		
Conflicting Peds, #/hr	0	0	0	0	0	0		
Sign Control	Stop	Stop	Free	Free	Free	Free		
RT Channelized	-	None	-	None	-	None		
Storage Length	0	-	-	0	-	-		
Veh in Median Storage, #	0	-	-	0	-	-		
Grade, %	0	-	-	0	-	-		
Peak Hour Factor	95	95	95	95	95	95		
Heavy Vehicles, %	0	0	1	1	1	0		
Mvmt Flow	0	0	542	453	379	32		

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1932	411	0
Stage 1	395	-	-
Stage 2	1537	-	-
Critical Hdwy	6.4	4.11	-
Critical Hdwy, Sig 1	5.4	-	-
Critical Hdwy, Sig 2	5.4	-	-
Follow-up Hdwy	3.5	2.209	-
Platoon blocked, %	74	1153	-
Stage 1	685	0	-
Stage 2	198	0	-
Mov Cap-1 Maneuver	39	1153	-
Mov Cap-2 Maneuver	39	-	-
Stage 1	685	-	-
Stage 2	105	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	5.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBL	SBT	SBR
Capacity (veh/h)	1153	-	-	-	-
HCM Lane V/C Ratio	0.47	-	-	-	-
HCM Control Delay (s)	10.9	-	0	-	-
HCM Lane LOS	B	-	A	-	-
HCM 95th %ile Q(veh)	2.6	-	-	-	-

SimTraffic Performance Report  
13: 2nd Ave/US 101/I-5 Off-Ramps Performance by movement

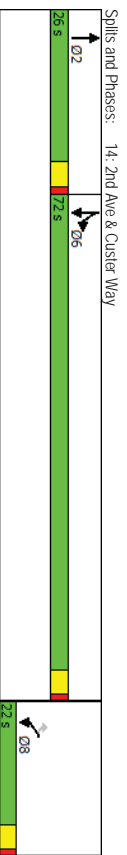
Projected 2040 Baseline  
PM Peak Hour

Movement	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.2	0.0	0.0	518.6	471.9	349.2
Total Del/Veh (s)	1.0	0.9	1.4	117.1	41.7	70.1

Lanes, Volumes, Timings  
14: 2nd Ave & Custer Way

Projected 2040 No Build  
PM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBR
Lane Configurations	235	260	15	320	915	310
Traffic Volume (vph)	235	260	15	320	915	310
Future Volume (vph)	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	0	225	0	0	0	0
Storage Length (ft)	1	1	1	0	1	1
Storage Lanes	1	1	1	0	1	1
Taper Length (ft)	25				25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	30		30		30	
Link Distance (ft)	662		2035		505	
Travel Time (s)	15.0		46.3		11.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%
Shared Lane Traffic (%)						
Turn Type	Prot	Perm	NA	Spill	NA	NA
Protected Phases	8		2	6	6	6
Permitted Phases	8	8	2	6	6	6
Detector Phase						
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Spill (s)	100	10.0	24.5	20.0	20.0	20.0
Total Spill (s)	22.0	22.0	26.0	72.0	72.0	72.0
Total Spill (%)	18.3%	18.3%	21.7%	60.0%	60.0%	60.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	Max	Max	Max
<b>Intersection Summary</b>						
Area Type:	Other					
Cycle Length:	120					
Actuated Cycle Length:	107.8					
Natural Cycle:	100					
Control Type:	Actuated-Uncoordinated					



HCM 2010 Signalized Intersection Summary  
14: 2nd Ave & Custer Way

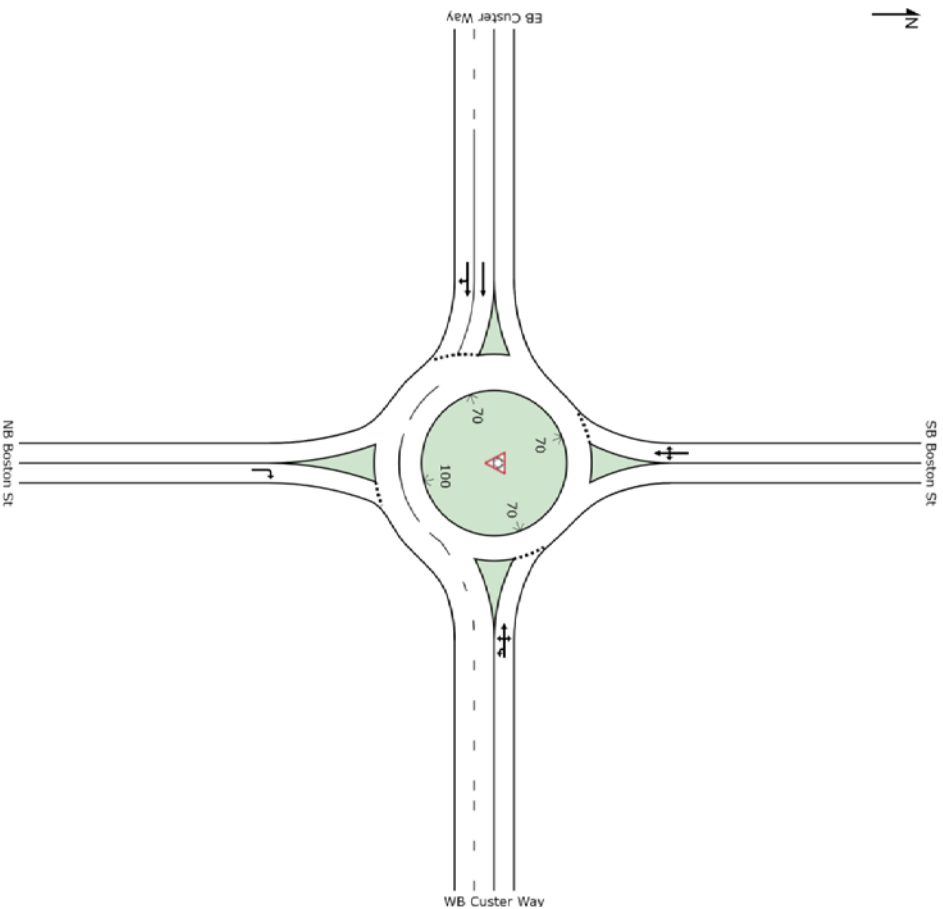
Projected 2040 No Build  
PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBR
Lane Configurations	235	260	15	320	915	310
Traffic Volume (veh/h)	235	260	15	320	915	310
Future Volume (veh/h)	235	260	15	320	915	310
Number	3	18	2	12	1	6
Initial Q (Ob.) veh	0	0	0	0	0	0
Ped Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1881	1881	1900	1900	1900
Adj Flow Rate, veh/h	247	121	16	184	96.3	326
Adj No. of Lanes	1	1	1	0	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh. %	1	1	1	1	0	0
Cap. veh/h	273	244	18	211	106.5	1118
Arrive On Green	0.15	0.15	0.14	0.14	0.59	0.59
Sat Flow, veh/h	1792	1599	129	1489	1810	1900
Gp Volume(v), veh/h	247	121	0	200	96.3	326
Gp Sat Flow(s), veh/hln	1792	1599	0	1618	1810	1900
Q Serve(s), s	15.5	8.0	0.0	13.9	53.7	9.8
Cycle Q Clear(g-c), s	15.5	8.0	0.0	13.9	53.7	9.8
Prop. In Lane	1.00	1.00	0.92	1.00		
Lane Gp Cap(c), veh/h	273	244	0	229	106.5	1118
V/C Ratio(X)	0.90	0.50	0.00	0.87	0.90	0.29
Avail Cap(C_a), veh/h	273	244	0	303	106.5	1118
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.8	44.6	0.0	48.2	20.8	11.7
Incr Delay (d2), s/veh	30.1	0.6	0.0	15.9	12.4	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%),veh/hln	100	3.6	0.0	7.2	30.2	5.3
LnGrp Delay(d),s/veh	77.8	45.1	0.0	64.2	33.2	12.4
LnGrp LOS	E	D		E	C	B
Approach Vol, veh/h	368		200		1289	
Approach Delay, s/veh	67.1		64.2		27.9	
Approach LOS	E		E		C	
Timer	1	2	3	4	5	6
Assigned Pts						8
Pts Duration (G+Y+R), s		20.7				72.0
Change Period (Y+R), s		4.5				4.5
Max Green Setting (Gmax), s		21.5				67.5
Max O Clear Time (G+CH), s		15.9				55.7
Green Ext Time (P.C.), s		0.4				4.9
Green Ext Time (P.C.), s						0.0
<b>Intersection Summary</b>						
HCM 2010 Cnt Delay	39.6					
HCM 2010 LOS	D					

## SITE LAYOUT

Site: 15) Cluster Way at Boston St

Projected 2040 Baseline  
Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: SCJ ALLIANCE | Created: Friday, February 5, 2016 4:32:00 PM  
Project: N:\Projects\0625\_City of Tumwater\0625\_17\_Tumwater\_Transportation\_Master\_Plan\Traffic\Operations\sidra\2040\_Baseline\15-Cluster\_Way at Boston St.sipb

## MOVEMENT SUMMARY

Site: 15) Cluster Way at Boston St

Projected 2040 Baseline  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back-of-Queue Vehicles veh	Distance Queued ft	Pop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Boston St											
18	R2	121	2.0	0.234	10.2	LOS B	1.1	26.8	0.72	0.72	31.7
Approach											
East: WB Cluster Way											
10	U	26	2.0	0.697	13.0	LOS B	0.0	0.0	0.00	0.00	37.1
1	L2	247	2.0	0.697	13.0	LOS B	0.0	0.0	0.00	0.00	36.1
6	T1	568	2.0	0.697	13.0	LOS B	0.0	0.0	0.00	0.00	36.3
16	R2	5	2.0	0.697	13.0	LOS B	0.0	0.0	0.00	0.00	35.4
Approach											
North: SB Boston St											
7	L2	5	2.0	0.027	6.5	LOS A	0.1	3.6	0.70	0.54	33.0
4	T1	5	2.0	0.027	6.5	LOS A	0.1	3.6	0.70	0.54	32.8
14	R2	5	2.0	0.027	6.5	LOS A	0.1	3.6	0.70	0.54	32.1
Approach											
West: EB Cluster Way											
2	T1	1047	2.0	0.609	11.4	LOS B	5.4	136.1	0.67	0.55	31.7
12	R2	279	2.0	0.609	11.1	LOS B	5.3	134.8	0.67	0.53	30.7
Approach											
All Vehicles											
		2311	2.0	0.697	11.9	LOS B	5.4	136.1	0.43	0.35	33.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
Roundabout LOS Method: Same as Signalised Intersections.  
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
LOS F will result if v/c > 1.1 (respective of movement delay value (does not apply for approaches and intersection).  
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).  
Roundabout Capacity Model: SIDRA Standard.  
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.  
Gap-Acceptance Capacity: SIDRA Standard (Arceik M3D).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arcelik and Associates Pty Ltd | sidrasolutions.com  
Organisation: SCJ ALLIANCE | Processed: Tuesday, February 16, 2016 5:16:04 PM  
Project: N:\Projects\0625\_City of Tumwater\0625\_17\_Tumwater\_Transportation\_Master\_Plan\Traffic\Operations\sidra\2040\_Baseline\15-Cluster\_Way at Boston St.sipb

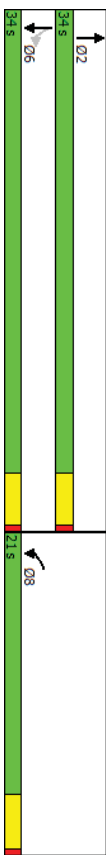


Lanes, Volumes, Timings  
16: Deschutes Way & Boston St

Projected 2040 No Build  
PM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	T	L	L
Traffic Volume (vph)	180	290	615	70	100	290
Future Volume (vph)	180	290	615	70	100	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Right Turn on Red	Yes	Yes	Yes	Yes	Yes	Yes
Link Speed (mph)	30	30	30	30	30	30
Link Distance (ft)	679	1427	324	324	1098	25.0
Travel Time (s)	15.4	32.4	0.95	0.95	0.95	0.95
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	0%	0%	0%	0%
Shared Lane Traffic (%)						
Turn Type	Prot	NA	NA	Perm	NA	NA
Protected Phases	8	2	2	6	6	6
Permitted Phases	8	2	2	6	6	6
Detector Phase	8	2	2	6	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Spill (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Spill (s)	21.0	34.0	34.0	34.0	34.0	34.0
Total Spill (%)	38.2%	61.8%	61.8%	61.8%	61.8%	61.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
AllRed Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	Min	Min	Min	Min	Min
Intersection Summary	Other					
Area Type:	Other					
Cycle Length:	55					
Actuated Cycle Length:	45.1					
Natural Cycle:	55					
Control Type:	Actuated-Uncoordinated					

Splits and Phases: 16: Deschutes Way & Boston St



HCM 2010 Signalized Intersection Summary  
16: Deschutes Way & Boston St

Projected 2040 No Build  
PM Peak Hour

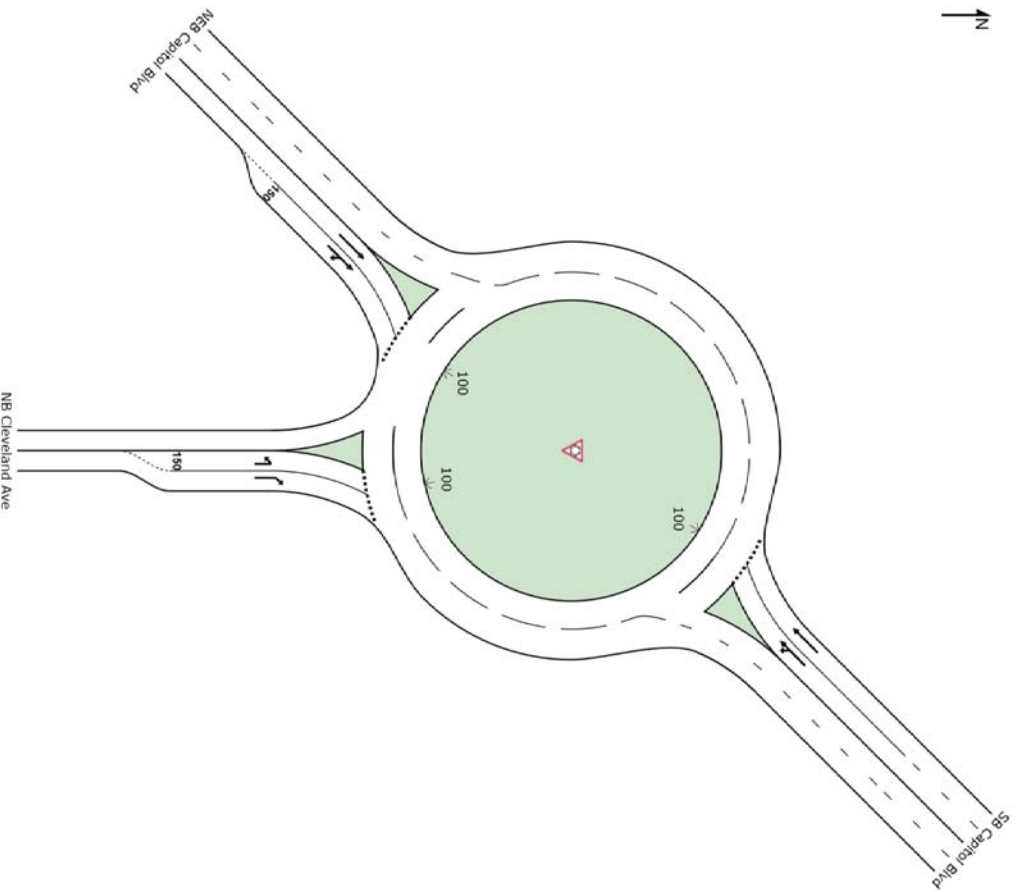
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	T	L	L
Traffic Volume (veh/h)	180	290	615	70	100	290
Future Volume (veh/h)	180	290	615	70	100	290
Number	3	18	2	12	1	6
Initial Q (Ob.) veh	0	0	0	0	0	0
Ped Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	189	305	647	74	105	305
Adj No. of Lanes	0	0	1	0	0	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh.	0	0	0	0	0	0
Cap. veh/h	206	332	880	101	165	435
Arrive On Green	0.32	0.32	0.53	0.53	0.53	0.53
Sat Flow, veh/h	637	1028	1675	192	150	828
Gp Volume(v), veh/h	495	0	0	721	410	0
Gp Sat Flow(s), veh/hln	1668	0	0	1866	978	0
Q Serve(g_s), s	15.1	0.0	0.0	15.7	6.2	0.0
Cycle Q Clear(g_c), s	15.1	0.0	0.0	15.7	21.9	0.0
Prop In Lane	0.38	0.62	0.10	0.26		
Lane Gp Cap(c), veh/h	538	0	0	980	600	0
V/C Ratio(X)	0.92	0.00	0.00	0.74	0.68	0.00
Avail Cap(C_a), veh/h	538	0	0	1063	660	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	17.2	0.0	0.0	9.7	10.1	0.0
Incr Delay (d2), s/veh	21.1	0.0	0.0	2.5	2.6	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), s/veh	100	0.0	0.0	8.7	5.7	0.0
LnGrp Delay(d), s/veh	38.3	0.0	0.0	12.1	12.7	0.0
LnGrp LOS	D			B	B	
Approach Vol, veh/h	495		721		410	
Approach Delay, s/veh	38.3		12.1		12.7	
Approach LOS	D		B		B	
Assigned Pks	1	2	3	4	5	6
Pks Duration (G+Y+Rc), s		2				8
Change Period (Y+Rc), s		31.7				21.0
Max Green Setting (Gmax), s		4.0				4.0
Max Q Clear Time (q_c+H), s		30.0				17.0
Green Ext Time (p_c), s		17.7				23.9
		6.4				3.8
						0.0
Intersection Summary	HCM 2010 C/D Delay					
HCM 2010 C/D Delay	20.2					
HCM 2010 LOS	C					

Notes

## SITE LAYOUT

Site: 17) Cleveland Ave at Capitol Blvd

Projected 2040 Baseline Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Alcaik and Associates Pty Ltd | sidrasolutions.com

## MOVEMENT SUMMARY

Site: 17) Cleveland Ave at Capitol Blvd

Projected 2040 Baseline Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total HV/veh/h	Flow %	Deg. Satm w/c	Average Delay sec	Level of Service	95% Back-of-Queue Vehicles	Queue Distance ft	Pop. Queued	Effective Stop Rate Per veh	Average Speed mph
South: NB Cleveland Ave											
3b	L3	26	2.0	0.059	8.8	LOS A	0.2	5.5	0.61	0.59	30.9
18a	R1	311	2.0	0.382	9.0	LOS A	1.9	49.2	0.67	0.68	33.0
Approach		337	2.0	0.382	9.0	LOS A	1.9	49.2	0.67	0.68	32.9
NorthEast: SB Capitol Blvd											
1ax	L1	468	2.0	0.663	11.3	LOS B	7.4	187.8	0.27	0.09	30.9
6x	T1	1268	2.0	0.663	11.3	LOS B	7.4	187.8	0.27	0.09	31.8
Approach		1737	2.0	0.663	11.3	LOS B	7.4	187.8	0.27	0.09	31.6
SouthWest: NEB Capitol Blvd											
2x	T1	789	2.0	0.434	8.9	LOS A	2.6	66.7	0.64	0.56	33.3
12bx	R3	21	2.0	0.434	8.8	LOS A	2.6	66.7	0.64	0.55	31.9
Approach		811	2.0	0.434	8.9	LOS A	2.6	66.7	0.64	0.56	33.2
All Vehicles		2884	2.0	0.663	10.4	LOS B	7.4	187.8	0.42	0.29	32.2

Level of Service (LOS) Method: Delay & w/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and w/c ratio (degree of saturation) per movement.

LOS F will result if w/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements w/c not used as specified in HCM 2010.

Roundabout Capacity Model: SIDRA Standard.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik MAD).

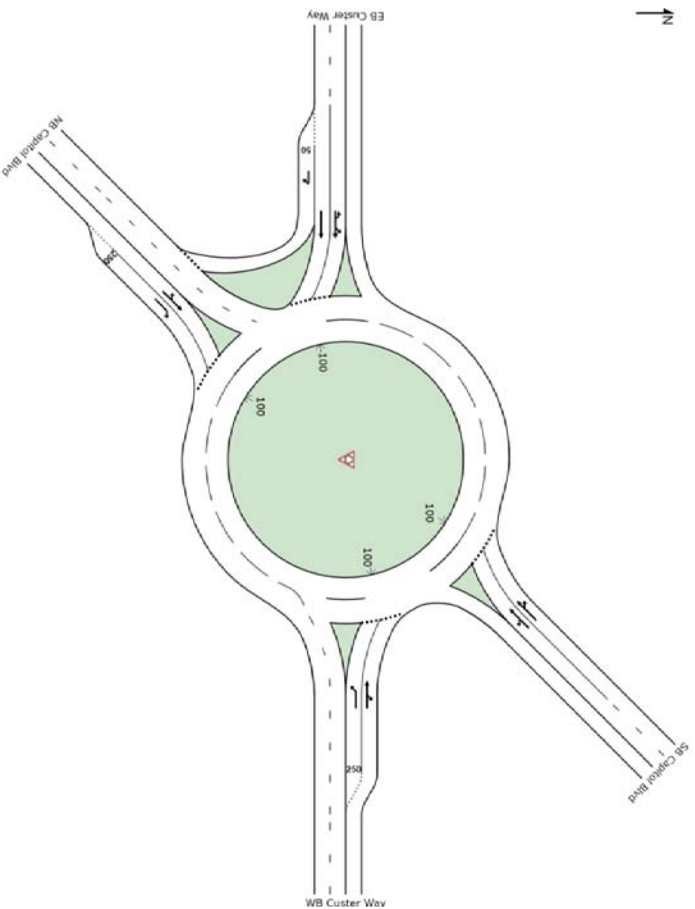
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Alcaik and Associates Pty Ltd | sidrasolutions.com

Organisation: SCI ALLIANCE | Processed: Wednesday, February 17, 2016 2:04:20 PM  
Project: N:\Projects\0625 City of Turmwater\0625\_17 Turmwater Transportation Master Plan\Traffic\Operations\sidra\2040 Baseline\17-Cleveland Ave at Capitol Blvd.sp6

## SITE LAYOUT

Site: 18) Cluster Way at Capitol Blvd  
 Projected 2040 Baseline  
 Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arcecik and Associates Pty Ltd | sidrasolutions.com  
 Organisation: SCJ ALLIANCE | Created: Friday, February 5, 2016 4:32:47 PM  
 Project: N:\Projects\0625\_City of Tumwater\0625\_17\_Tumwater\_Transportation\_Master\_Plan\Traffic\_Operations\sidra2040\_Baseline\18-Cluster\_Way\_at\_Capitol\_Bld.sip6

## MOVEMENT SUMMARY

Site: 18) Cluster Way at Capitol Blvd  
 Projected 2040 Baseline  
 Roundabout

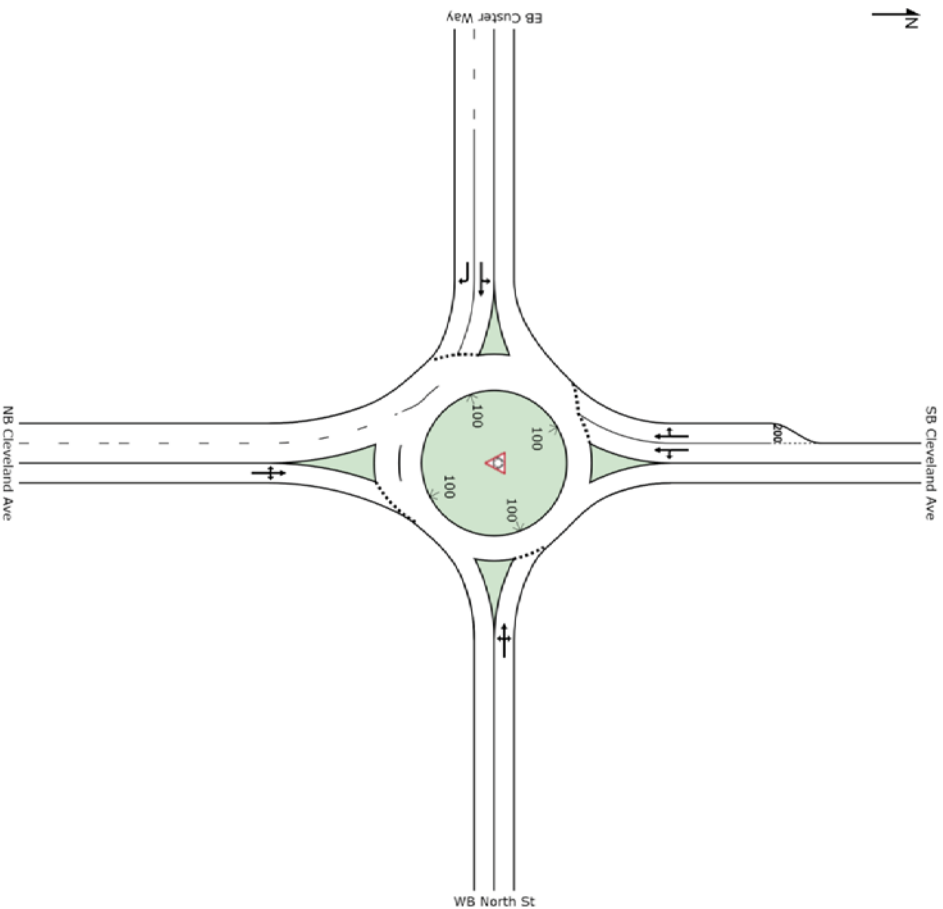
Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total HV/veh/h	Flows %	Deg. Satm v/c	Average Delay sec	Level of Service	95% Back-of-Queue Vehicles	Distance ft	Pop. Queued	Effective Stop Rate Per veh	Average Speed mph	
East WB Cluster Way												
1a	L1	200	2.0	0.508	20.8	LOS C	3.7	94.1	0.92	1.00	26.8	
6	T1	442	2.0	0.841	37.2	LOS D	12.5	317.8	1.00	1.38	23.6	
16b	R3	5	2.0	0.841	37.2	LOS D	12.5	317.8	1.00	1.38	22.9	
Approach												
		647	2.0	0.841	32.1	LOS C	12.5	317.8	0.97	1.26	24.5	
NorthEast: SB Capitol Blvd												
1bx	L3	37	2.0	0.830	28.4	LOS C	9.3	236.5	0.95	1.15	26.1	
6x	T1	911	2.0	0.830	27.7	LOS C	9.6	244.8	0.95	1.15	26.1	
16ax	R1	316	2.0	0.830	26.5	LOS C	9.6	244.8	0.96	1.15	26.3	
Approach												
		1263	2.0	0.830	27.4	LOS C	9.6	244.8	0.95	1.15	26.1	
West: EB Cluster Way												
5u	U	26	2.0	0.850	36.4	LOS D	9.1	230.8	0.99	1.25	23.4	
5a	L1	379	2.0	0.850	36.4	LOS D	9.1	230.8	0.99	1.25	22.8	
2	T1	721	2.0	0.850	30.5	LOS C	10.3	261.1	1.00	1.27	25.2	
12b	R3	79	2.0	0.099	5.5	LOS A	0.6	14.2	0.75	0.55	33.4	
Approach												
		1205	2.0	0.850	30.8	LOS C	10.3	261.1	0.98	1.22	24.7	
SouthWest: NB Capitol Blvd												
50x	L3	21	2.0	1.032	73.4	LOS F	20.8	528.5	1.00	1.78	17.3	
2x	T1	563	2.0	1.032	73.4	LOS F	20.8	528.5	1.00	1.78	17.2	
12ax	R1	195	2.0	0.538	23.6	LOS C	2.9	73.8	0.84	0.90	27.2	
Approach												
		779	2.0	1.032	60.9	LOS E	20.8	528.5	0.96	1.56	18.9	
All Vehicles												
		3895	2.0	1.032	36.0	LOS D	20.8	528.5	0.97	1.27	23.6	

Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
 Roundabout LOS Method: Same as Signalised Intersections.  
 Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
 LOS F will result if v/c > 1.1 (respective of movement delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).  
 Roundabout Capacity Model: SIDRA Standard.  
 HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.  
 Gap-Acceptance Capacity: SIDRA Standard (Arcecik M3D).  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arcecik and Associates Pty Ltd | sidrasolutions.com  
 Organisation: SCJ ALLIANCE | Processed: Monday, February 1, 2016 4:14:41 PM  
 Project: N:\Projects\0625\_City of Tumwater\0625\_17\_Tumwater\_Transportation\_Master\_Plan\Traffic\_Operations\sidra2040\_Baseline\18-Cluster\_Way\_at\_Capitol\_Bld.sip6

## SITE LAYOUT

Site: 19) Cluster Way at Cleveland Ave/North St  
 Projected 2040 Baseline  
 Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akceik and Associates Pty Ltd | sidrasolutions.com  
 Organisation: SCJ ALLIANCE | Created: Friday, February 5, 2016 4:33:41 PM  
 Project: N:\Projects\0625\_City of Tumwater\0625\_17\_Tumwater\_Transportation\_Master\_Plan\Traffic\Operations\sidra\2040\_Baseline\19-Cluster\_Way\_at\_Cleveland\_Bvd.sip6

## MOVEMENT SUMMARY

Site: 19) Cluster Way at Cleveland Ave/North St  
 Projected 2040 Baseline  
 Roundabout

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Sam v/c	Deg. Delay	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Distance ft	Pop. Queue	Effective Stop Rate per veh	Average Speed mph
South: NB Cleveland Ave												
3	L2	163	2.0	0.683	21.8	21.8	LOS C	6.5	166.3	0.93	1.06	27.3
8	T1	216	2.0	0.683	21.8	21.8	LOS C	6.5	166.3	0.93	1.06	27.3
18	R2	21	2.0	0.683	21.8	21.8	LOS C	6.5	166.3	0.93	1.06	26.7
Approach												
		400	2.0	0.683	21.8	21.8	LOS C	6.5	166.3	0.93	1.06	27.3
East: WB North St												
1	L2	16	2.0	0.636	15.4	15.4	LOS B	6.5	165.5	0.88	0.88	30.3
6	T1	411	2.0	0.636	15.4	15.4	LOS B	6.5	165.5	0.88	0.88	30.3
16	R2	74	2.0	0.636	15.4	15.4	LOS B	6.5	165.5	0.88	0.88	29.5
Approach												
		500	2.0	0.636	15.4	15.4	LOS B	6.5	165.5	0.88	0.88	30.2
North: SB Cleveland Ave												
7	L2	121	2.0	0.397	9.9	9.9	LOS A	2.8	70.4	0.80	0.73	31.8
4	T1	368	2.0	0.397	9.3	9.3	LOS A	3.0	75.1	0.80	0.71	32.5
14	R2	158	2.0	0.397	8.7	8.7	LOS A	3.0	75.1	0.80	0.69	32.2
Approach												
		647	2.0	0.397	9.3	9.3	LOS A	3.0	75.1	0.80	0.71	32.3
West: EB Cluster Way												
5	L2	74	2.0	0.587	11.9	11.9	LOS B	5.8	146.5	0.85	0.80	31.6
2	T1	489	2.0	0.587	11.9	11.9	LOS B	5.8	146.5	0.85	0.80	31.6
12	R2	326	2.0	0.427	10.3	10.3	LOS B	3.0	75.6	0.77	0.70	31.3
Approach												
		889	2.0	0.587	11.3	11.3	LOS B	5.8	146.5	0.82	0.76	31.5
All Vehicles		2437	2.0	0.683	13.3	13.3	LOS B	6.5	166.3	0.84	0.82	30.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
 Roundabout LOS Method: Same as Signalised Intersections.  
 Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
 LOS F will result if v/c > 1 (irrespective of movement delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all movements v/c not used as specified in HCM 2010).  
 Roundabout Capacity Model: SIDRA Standard.  
 HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.  
 Gap Acceptance Capacity: SIDRA Standard (Akceik, MJD).  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akceik and Associates Pty Ltd | sidrasolutions.com  
 Organisation: SCJ ALLIANCE | Processed: Tuesday, February 16, 2016 5:27:32 PM  
 Project: N:\Projects\0625\_City of Tumwater\0625\_17\_Tumwater\_Transportation\_Master\_Plan\Traffic\Operations\sidra\2040\_Baseline\19-Cluster\_Way\_at\_Cleveland\_Bvd.sip6

Intersection												
Int Delay, s/veh												
3.8												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	75	4/75	5	15	590	80	2	5	10	45	2	25
Future Vol, veh/h	75	4/75	5	15	590	80	2	5	10	45	2	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	0
Grade, %	-	0	-	-	0	-	-	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	1	1	1	1	1	1	0	0	0	0	0	0
Mvmt Flow	79	500	5	16	621	84	2	5	11	47	2	26

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	705	0	0	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.11	-	4.11	-
Critical Hdwy, Sig 1	-	-	6.1	5.5
Critical Hdwy, Sig 2	-	-	6.1	5.5
Follow-up Hdwy	2.209	-	2.209	-
Poi Cap-1/Maneuver	898	-	1065	-
Stage 1	-	-	428	428
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1/Maneuver	898	-	1065	-
Mov Cap-2/Maneuver	-	-	104	122
Stage 1	-	-	399	407
Stage 2	-	-	392	417

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	0.2	22.9	53.6
HCM LOS	C	F	C	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	219	898	-	-	1065	-	-	146
HCM Lane V/C Ratio	0.082	0.088	-	-	0.015	-	-	0.519
HCM Control Delay (s)	22.9	9.4	0	0	8.4	0	0	53.6
HCM Lane LOS	C	A	A	A	A	A	A	F
HCM 95th %ile Q(veh)	0.3	0.3	-	-	0	-	-	2.5

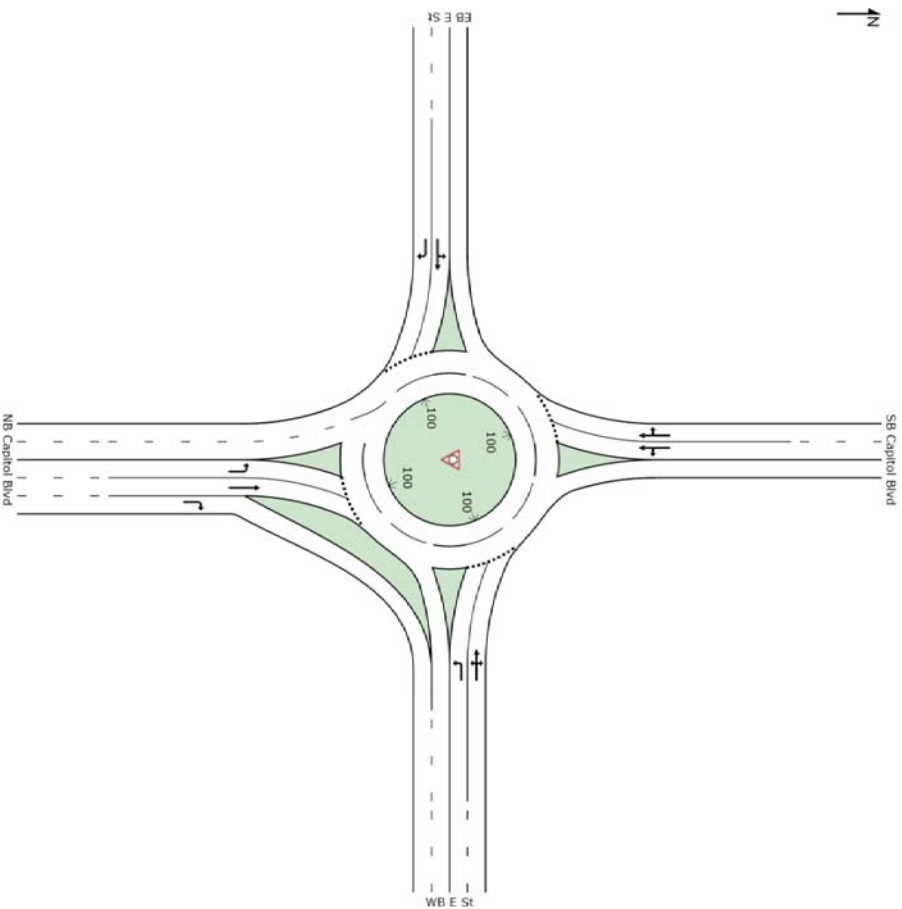
SimTraffic Performance Report  
21: I-5 NB Off-Ramp/Deschutes Way & E St Performance by movement

Movement	WBR	NBT	NBR	SBL	All
Denied Del/Veh (s)	0.5	0.3	0.3	0.4	0.4
Total Del/Veh (s)	2.3	30.3	4.8	1.2	3.5

## SITE LAYOUT

Site: 22) E St at Capitol Blvd

Projected 2040 Baseline Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akceik and Associates Pty Ltd | sidrasolutions.com  
 Organisation: SCI ALLIANCE | Created: Friday, February 5, 2016 3:51:59 PM  
 Project: N:\Projects\0625\_City of Tumwater\0625\_17\_Tumwater Transportation Master Plan\Traffic\Operations\sidra2040 Baseline\22-E St-Cap.sip6

## MOVEMENT SUMMARY

Site: 22) E St at Capitol Blvd

Projected 2040 Baseline Roundabout

Movement Performance - Vehicles												
Mov ID	OD	Demand Flows Total	Flows HV	%	Deg. Satm	Average Delay	Level of Service	95% Back of Queue	Pop. Queue	Effective Stop Rate	Average Speed	
		veh/h		v/c		sec		Vehicles	Distance	Per veh	mph	
South: NB Capitol Blvd												
3	L2	211	2.0	0.274	7.8	LOS A	1.8	46.3	0.78	0.69	31.4	
8	T1	453	2.0	0.439	8.4	LOS A	3.7	92.8	0.86	0.74	33.5	
18	R2	605	2.0	0.369	0.1	LOS A	0.0	0.0	0.00	0.00	37.1	
Approach												
		1268	2.0	0.439	4.3	LOS A	3.7	92.8	0.44	0.38	34.7	
East: WB E St												
1	L2	674	2.0	0.710	18.3	LOS B	6.6	168.0	0.86	0.98	27.8	
6	T1	384	2.0	0.710	16.4	LOS B	6.6	168.0	0.86	0.97	29.6	
16	R2	147	2.0	0.710	16.4	LOS B	6.6	168.0	0.86	0.97	28.8	
Approach												
		1205	2.0	0.710	17.4	LOS B	6.6	168.0	0.86	0.97	28.5	
North: SB Capitol Blvd												
7	L2	232	2.0	1.062	85.0	LOS F	23.7	601.8	1.00	1.96	15.7	
4	T1	916	2.0	1.062	79.3	LOS F	29.1	740.3	1.00	2.05	16.3	
14	R2	142	2.0	1.062	76.1	LOS F	29.1	740.3	1.00	2.10	16.5	
Approach												
		1289	2.0	1.062	79.9	LOS E	29.1	740.3	1.00	2.04	16.2	
West: EB E St												
5	L2	63	2.0	0.917	47.9	LOS D	12.6	319.5	1.00	1.49	21.2	
2	T1	437	2.0	0.917	47.9	LOS D	12.6	319.5	1.00	1.49	21.1	
12	R2	342	2.0	0.895	56.2	LOS E	9.2	232.9	0.97	1.35	19.1	
Approach												
		842	2.0	0.917	51.3	LOS D	12.6	319.5	0.99	1.44	20.3	
All Vehicles												
		4805	2.0	1.062	37.5	LOS D	29.1	740.3	0.81	1.19	23.0	

Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
 Roundabout LOS Method: Same as Signalised Intersections.  
 Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
 LOS F will result if v/c > 1 (irrespective of movement delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).  
 Roundabout Capacity Model: SIDRA Standard.  
 HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.  
 Gap Acceptance Capacity: SIDRA Standard (Akceik, MGD).  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akceik and Associates Pty Ltd | sidrasolutions.com  
 Organisation: SCI ALLIANCE | Processed: Tuesday, February 16, 2016 5:34:25 PM  
 Project: N:\Projects\0625\_City of Tumwater\0625\_17\_Tumwater Transportation Master Plan\Traffic\Operations\sidra2040 Baseline\22-E St-Cap.sip6

HCM 2010 TWSC  
 23: Cleveland Ave & South St  
 Projected 2040 No Build  
 PM Peak Hour

Intersection									
Int Delay, s/veh		1.5							
Movement	WBL	WBR	NBT	NBR	SBL	SBR			
Traffic Vol, veh/h	5	45	915	10	60	1220			
Future Vol, veh/h	5	45	915	10	60	1220			
Conflicting Peds, #/hr	0	0	0	0	0	0			
Sign Control	Stop	Stop	Free	Free	Free	Free			
RT Channelized	-	None	-	None	-	None			
Storage Length	0	-	-	-	-	-			
Veh in Median Storage, #	0	-	0	-	-	0			
Grade, %	0	-	-	-	-	-			
Peak Hour Factor	95	95	95	95	95	95			
Heavy Vehicles, %	0	0	1	1	1	1			
Mvmt Flow	5	47	963	11	63	1284			

Major/Minor	Minor1	Major1	Major2	Minor2
Conflicting Flow All	736	487	0	974
Stage 1	968	-	-	-
Stage 2	768	-	-	-
Critical Hdwy	6.8	6.9	-	4.12
Critical Hdwy Sig 1	5.8	-	-	-
Critical Hdwy Sig 2	5.8	-	-	-
Follow-up Hdwy	3.5	3.3	-	2.21
Platoon blocked %	80	532	-	710
Stage 1	334	-	-	-
Stage 2	424	-	-	-
Mov Cap-1/Maneuver	55	532	-	710
Mov Cap-2/Maneuver	55	-	-	-
Stage 1	334	-	-	-
Stage 2	293	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.5	0	1.9
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR/WBL	SBL	SBR
Capacity (veh/h)	-	285	710	-
HCM Lane V/C Ratio	-	0.185	0.089	-
HCM Control Delay (s)	-	20.5	10.6	1.5
HCM Lane LOS	-	C	B	A
HCM 95th %ile Q(veh)	-	0.7	0.3	-

HCM 2010 TWSC  
 24: Linwood Ave & 7th Ave  
 Projected 2040 No Build  
 PM Peak Hour

Intersection									
Int Delay, s/veh		8.5							
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Traffic Vol, veh/h	25	155	0	1	345	175	0	0	1
Future Vol, veh/h	25	155	0	1	345	175	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	None	-	-	-	None	-	None	-
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	-	-	-	-	-	-	-	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	3	3	3	1	1	1	0	0	0
Mvmt Flow	26	163	0	1	363	184	0	0	1

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	547	163	684	765
Stage 1	-	-	216	216
Stage 2	-	-	468	549
Critical Hdwy	4.13	4.11	7.1	6.5
Critical Hdwy Sig 1	-	-	6.1	5.5
Critical Hdwy Sig 2	-	-	6.1	5.5
Follow-up Hdwy	2.227	2.209	3.5	4
Platoon blocked %	1017	1422	365	336
Stage 1	791	-	791	728
Stage 2	-	-	579	520
Mov Cap-1/Maneuver	1017	1422	345	326
Mov Cap-2/Maneuver	-	-	345	326
Stage 1	-	-	769	708
Stage 2	-	-	558	519

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	0	9.1	32.5
HCM LOS			A	D

Minor Lane/Major Mvmt	NBL	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR
Capacity (veh/h)	887	1017	-	-	1422	-	-	374	-
HCM Lane V/C Ratio	0.001	0.026	-	-	0.001	-	-	0.675	-
HCM Control Delay (s)	9.1	8.6	0	0	7.5	0	0	32.5	-
HCM Lane LOS	A	A	A	A	A	A	A	D	D
HCM 95th %ile Q(veh)	0	0.1	-	-	0	-	-	4.8	-

HCM 2010 AWSC  
25: Linwood Ave & 2nd Ave

Projected 2040 No Build  
PM Peak Hour

Intersection	57.6													
Intersection Delay, s/veh	F													
Intersection LOS	F													
Movement	EBS	EBL	EBT	EBR	WBS	WBL	WBT	WBR	NBS	NBL	NBT	NBR		
Traffic Vol, veh/h	0	130	145	130	0	250	305	65	0	180	305	65		
Future Vol, veh/h	0	130	145	130	0	250	305	65	0	180	305	65		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
Heavy Vehicles, %	2	1	1	1	2	1	1	1	2	0	0	0		
Wght Flow	0	137	153	137	0	263	321	68	0	189	321	68		
Number of Lanes	0	1	1	1	0	1	1	1	0	1	1	1		

Approach	EB	WB												NB
Opposing Approach	WB	EB												SB
Opposing Lanes	2	2												2
Conflicting Approach Left	SB	NB												EB
Conflicting Lanes Left	2	2												2
Conflicting Approach Right	NB	SB												WB
Conflicting Lanes Right	2	2												2
HCM Control Delay	35	62												61
HCM LOS	D	F												F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2							
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%							
Vol Thru, %	0%	82%	0%	53%	0%	82%	0%	65%							
Vol Right, %	0%	18%	0%	47%	0%	18%	0%	35%							
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop							
Traffic Vol by Lane	180	370	130	275	250	370	180	510							
LT Vol	180	0	130	0	250	0	180	0							
Through Vol	0	305	0	145	0	305	0	330							
RT Vol	0	65	0	130	0	65	0	180							
Lane Flow Rate	189	389	137	289	263	389	189	537							
Geometry Crp	7	7	7	7	7	7	7	7							
Degree of Lilt(X)	0.543	1	0.407	0.795	0.749	1	0.549	1							
Departure Headway (Hd)	10.324	9.703	10.717	9.888	10.242	9.621	10.429	9.644							
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes							
Cap	351	378	338	368	355	378	351	381							
Service Time	8.049	7.428	8.428	7.599	7.964	7.343	8.062	7.317							
HCM Lane V/C Ratio	0.538	1.029	0.405	0.785	0.741	1.029	0.538	1.409							
HCM Control Delay	24.7	78.6	20.6	41.8	38	78.2	25	78.1							
HCM Lane LOS	C	F	C	E	E	F	C	F							
HCM 95th-ile Q	3.1	11.8	1.9	6.7	5.8	11.8	3.1	11.8							

HCM 2010 AWSC  
25: Linwood Ave & 2nd Ave

Projected 2040 No Build  
PM Peak Hour

Intersection	57.6													
Intersection Delay, s/veh	F													
Intersection LOS	F													
Movement	SBU	SBL	SBT	SBR										
Traffic Vol, veh/h	0	180	330	180										
Future Vol, veh/h	0	180	330	180										
Peak Hour Factor	0.95	0.95	0.95	0.95										
Heavy Vehicles, %	2	1	1	1										
Wght Flow	0	189	347	189										
Number of Lanes	0	1	1	0										

Approach	SB	SB											
Opposing Approach	NB	NB											
Opposing Lanes	2	2											
Conflicting Approach Left	WB	WB											
Conflicting Lanes Left	2	2											
Conflicting Approach Right	EB	EB											
Conflicting Lanes Right	2	2											
HCM Control Delay	64.2	64.2											
HCM LOS	F	F											

Lane														
Vol Left, %														
Vol Thru, %														
Vol Right, %														
Sign Control														
Traffic Vol by Lane														
LT Vol														
Through Vol														
RT Vol														
Lane Flow Rate														
Geometry Crp														
Degree of Lilt(X)														
Departure Headway (Hd)														
Convergence, Y/N														
Cap														
Service Time														
HCM Lane V/C Ratio														
HCM Control Delay														
HCM Lane LOS														
HCM 95th-ile Q														







HCM 2010 TWSC  
 28: Trospers Rd & Rural Rd  
 Projected 2040 No Build  
 PM Peak Hour

Intersection	EBL	EBT	WBT	WBR	SBL	SBR
Int Delay, s/veh	9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	110	265	425	135	150	165
Future Vol, veh/h	110	265	425	135	150	165
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	150	0
Veh in Median Storage, #	-	0	-	-	-	0
Grade, %	-	-	-	-	-	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	1	1	2	2
Wmnt Flow	116	279	447	142	158	174

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	589	0	1029
Stage 1	-	-	511
Stage 2	-	-	-
Critical Hdwy	4.1	-	6.42
Critical Hdwy Sg1	-	-	5.42
Critical Hdwy Sg2	-	-	-
Follow-up Hdwy	2.2	-	3.518
Pol Cap-1 Maneuver	996	-	259
Stage 1	-	-	598
Stage 2	-	-	602
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	996	-	223
Mov Cap-2 Maneuver	-	-	223
Stage 1	-	-	598
Stage 2	-	-	519

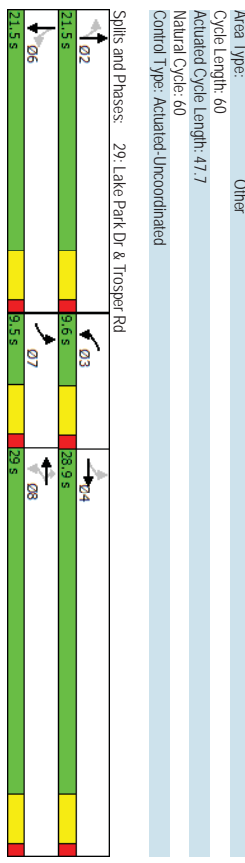
Approach	EB	WB	SB
HCM Control Delay, s	2.7	0	32.6
HCM LOS	D	D	D

Minor Lane/Major Wmnt	EBL	EBT	WBT	WBR	SBL	SBR
Capacity (veh/h)	996	-	-	223	558	-
HCM Lane V/C Ratio	0.116	-	-	0.708	0.311	-
HCM Control Delay (s)	9.1	0	-	52.7	14.3	-
HCM Lane LOS	A	A	-	F	B	-
HCM 95th %ile Q(veh)	0.4	-	-	4.6	1.3	-

Lanes, Volumes, Timings  
 29: Lake Park Dr & Trospers Rd  
 Projected 2040 No Build  
 PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	10	415	55	65	540	155	75	30	70	160	25	15
Future Volume (vph)	10	415	55	65	540	155	75	30	70	160	25	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125	150	225	1	1	1	1	1	1	1	1	0
Storage Lanes	1	1	1	1	1	1	1	1	1	1	1	0
Taper Length (ft)	25			25						25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30				30			30
Link Distance (ft)		2012			652				269			583
Travel Time (s)		45.7			14.8				6.1			13.3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Shaded Lane Traffic (%)												
Turn Type	pm+pl	NA	pm+pl	NA	Perm	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8	8	8	2	2	2	6	6	6
Permitted Phases	4	7	4	3	8	8	2	2	2	6	6	6
Detector Phase	7	4	3	8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Spill (s)	9.5	26.5	9.5	26.5	26.5	21.5	21.5	21.5	21.5	21.5	21.5	21.5
Total Spill (s)	9.5	28.9	9.6	29.0	29.0	21.5	21.5	21.5	21.5	21.5	21.5	21.5
Total Split (%)	15.8%	48.2%	16.0%	48.3%	35.8%	35.8%	35.8%	35.8%	35.8%	35.8%	35.8%	35.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None

Area Type:	Other
Cycle Length: 60	
Activated Cycle Length: 47.7	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	



Projected 2040 No Build  
PM Peak Hour  
29: Lake Park Dr & Trospers Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (veh/h)	10	415	55	65	540	155	75	30	70	160	25	15
Future Volume (vph)	10	415	55	65	540	155	75	30	70	160	25	15
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1881	1900	1881	1881	1881	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	11	437	58	68	568	163	79	32	74	168	26	16
Adj No of Lanes	1	2	0	1	1	1	1	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh. %	1	1	1	1	1	1	1	1	1	1	1	1
Cap. veh/h	261	1102	146	468	740	629	575	169	390	513	364	224
Arrive On Green	0.01	0.35	0.35	0.06	0.39	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	1792	3175	419	1792	1881	1599	1386	511	1181	1308	1102	678
Gpr Volume(V), veh/h	11	245	250	68	568	163	79	0	106	168	0	42
Gpr Sat Flow(s), veh/hln	1792	1787	1807	1792	1881	1599	1386	0	1692	1308	0	1780
Q Serve(s), s	0.2	5.3	5.4	1.2	13.5	3.5	2.1	0.0	2.3	5.4	0.0	0.8
Cycle Q Clean(q,c), s	0.2	5.3	5.4	1.2	13.5	3.5	3.0	0.0	2.3	7.7	0.0	0.8
Prop In Lane	1.00	0.23	1.00	1.00	1.00	1.00	1.00	0.70	1.00	1.00	0.38	0.38
Lane Grp Cap(c), veh/h	261	621	628	468	740	629	575	0	559	513	0	588
Aval Cap(c), veh/h	0.04	0.39	0.40	0.15	0.77	0.26	0.14	0.00	0.19	0.33	0.00	0.07
WC Ratio(X)	409	847	856	537	895	761	575	0	559	513	0	588
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.8	12.7	12.7	9.7	13.6	10.5	12.8	0.0	12.3	15.1	0.0	11.8
Incr Delay (d2), s/veh	0.1	0.4	0.4	0.1	3.3	0.2	0.5	0.0	0.8	1.7	0.0	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/h	0.1	2.7	2.7	0.6	7.6	1.6	0.9	0.0	1.2	2.2	0.0	0.4
Lngrp Delay(d), s/veh	11.9	13.1	13.1	9.8	16.9	10.8	13.3	0.0	13.1	16.8	0.0	12.1
Lngrp LOS	B	B	B	A	B	B	B	B	B	B	B	B
Approach Vol, veh/h	506			799			185			210		
Approach Delay, s/veh	13.1			15.0			13.2			15.8		
Approach LOS	B			B			B			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Pks	2	2	3	4	5	6	7	8				
Pks Duration (G*Y+R), s	21.5	7.6	22.4	4	21.5	5.2	24.8					
Change Period (Y+R), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5					
Max Green Sdting (Gmax), s	17.0	5.1	24.4	17.0	5.0	24.5						
Max Q Clear Time (Q_cH1), s	5.0	3.2	7.4	9.7	2.2	15.5						
Green Ext Time (Q_c), s	1.3	0.0	7.0		1.0	0.0	4.8					
<b>Intersection Summary</b>												
HCM 2010 Crt Delay	14.4											
HCM 2010 LOS	B											

Projected 2040 No Build  
PM Peak Hour  
30: Littlerock Rd/2nd Ave & Trospers Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	85	435	175	430	365	20	325	415	475	165	490	110
Future Volume (vph)	85	435	175	430	365	20	325	415	475	165	490	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100	0	150	0	150	0	250	0	150	250	0	250
Storage Lanes	1	0	1	0	1	0	1	0	1	2	0	0
Taper Length (ft)	25	0	25	0	25	0	25	0	25	0	0	0
Right Turn on Red	Yes											
Link Speed (mph)	30											
Link Distance (ft)	652											
Travel Time (s)	14.8											
Peak Hour Factor	0.95											
Heavy Vehicles (%)	1%											
Shared Lane Traffic (%)	38%											
Turn Type	Split											
Protected Phases	4				8				8			
Permitted Phases	4				8				8			
Detector Phase	4				8				8			
Switch Phase	4				8				8			
Minimum Initial (s)	4.0				4.0				4.0			
Minimum Spill (s)	35.6				35.6				35.6			
Total Spill (s)	35.6				35.6				35.6			
Total Spill (%)	27.4%				25.8%				22.5%			
Yellow Time (s)	3.6				3.6				3.6			
All-Red Time (s)	1.0				1.0				1.0			
Lost Time Adjust (s)	0.0				0.0				0.0			
Total Lost Time (s)	4.6				4.6				4.6			
Lead/Lag	Lead				Lead				Lead			
Lead/Lag Optimize?	Yes				Yes				Yes			
Recall Mode	Max				Max				Max			
Area Type	Other				C-Max				C-Max			
<b>Intersection Summary</b>												
Area Type	Other											
Cycle Length: 130												
Activated Cycle Length: 130												
Offset: 126 (97%), Referenced to phase 8/WBTL, Start of Red												
Natural Cycle: 130												
Control Type: Actuated-Coordinated												
<b>Spills and Phases: 30: Littlerock Rd/2nd Ave &amp; Trospers Rd</b>												
02	01	04	08 (R)									
22.5 s	18.3 s	35.6 s	33.6 s									
05	06											
29.7 s	31.6 s											

HCM 2010 Signalized Intersection Summary  
30: Littlerock Rd/2nd Ave & Trospier Rd

Projected 2040 No Build  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	[Diagrammatic icons]											
Traffic Volume (veh/h)	85	435	175	430	365	20	325	415	475	165	490	110
Future Volume (vph)	85	435	175	430	365	20	325	415	475	165	490	110
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Q0), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped/Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj'l Sat Flow, veh/hln	1881	1881	1900	1881	1881	1900	1881	1881	1881	1881	1900	1900
Adj'l Flow Rate, veh/h	89	458	121	286	618	21	342	437	379	174	516	116
Adj'l No of Lanes	1	2	0	1	2	0	1	1	1	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh. %	1	1	1	1	1	1	1	1	1	1	1	1
Cap. veh/h	427	668	175	400	807	27	339	548	823	189	603	135
Arrive On Green	0.24	0.24	0.24	0.37	0.37	0.37	0.19	0.29	0.29	0.11	0.21	0.21
Sat Flow, veh/h	1792	2803	735	1792	3618	123	1792	1881	1599	1792	2904	650
Grp Volume(V), veh/h	89	291	288	321	318	342	437	379	174	317	315	315
Grp Sat Flow(s), veh/hln	1792	1787	1751	1792	1881	1860	1792	1881	1599	1792	1787	1767
Q Serve(g.s), s	5.2	19.2	19.5	17.8	19.5	19.5	24.6	27.9	19.6	12.5	22.2	22.4
Cycle Q Clear(g.c.), s	5.2	19.2	19.5	17.8	19.5	19.5	24.6	27.9	19.6	12.5	22.2	22.4
Prop In Lane	1.00	0.42	1.00	0.42	1.00	0.07	1.00	1.00	1.00	1.00	0.37	0.37
Lane Grp Cap(c), veh/h	427	426	418	400	420	415	339	548	823	189	371	367
V/C Ratio(X)	0.21	0.68	0.69	0.72	0.77	0.77	1.01	0.80	0.46	0.92	0.85	0.86
Avail Cap(c), veh/h	427	426	418	400	420	415	339	548	823	189	371	367
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	0.92	0.92	0.92	0.72	0.72	0.72	0.79	0.79	0.79	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.7	45.0	45.1	37.3	37.8	52.7	42.5	20.1	57.6	49.6	49.7	49.7
Incr Delay (d2), s/veh	1.0	7.9	8.3	7.7	9.3	9.4	45.7	9.2	1.5	43.8	21.3	22.2
Initial Q Delay(d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q)(50%), veh/h	2.7	10.5	10.4	9.6	11.2	11.1	16.5	15.9	13.0	8.5	13.1	13.2
Lngrp Delay(d), s/veh	40.7	52.9	53.5	45.0	47.1	47.2	98.4	51.7	21.5	101.4	70.9	71.9
Lngrp LOS	D	D	D	D	D	D	F	D	C	F	E	E
Approach Vol, veh/h	668											
Approach Delay, s/veh	51.5											
Approach LOS	D											
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+R), s	183	42.5		35.6	29.2	31.6		33.6				
Change Period (Y+R), s	4.6	4.6		4.6	4.6	4.6		4.6				
Max Green Setting (Gmax), s	13.7	37.9		31.0	24.6	27.0		29.0				
Max O Clear Time (G+CH1), s	14.5	29.9		21.5	26.6	24.4		21.5				
Green Ext Time (G-C), s	0.0	2.2		2.3	0.0	1.1		2.9				
Intersection Summary												
HCM 2010 Cnt Delay	57.5											
HCM 2010 LOS	E											

Notes

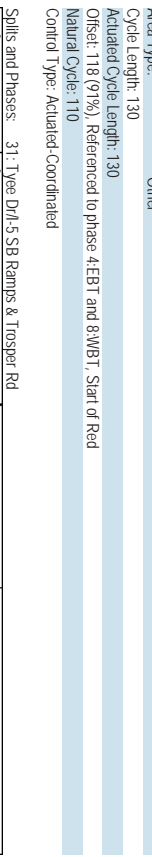
Turnwater Transportation Master Plan  
SCJ Alliance

Synchro 9 Report  
6/10/2016

Lanes, Volumes, Timings  
31: Tyee Dr/I-5 SB Ramps & Trospier Rd

Projected 2040 No Build  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	[Diagrammatic icons]											
Traffic Volume (vph)	205	800	25	275	340	400	35	155	435	385	430	475
Future Volume (vph)	205	800	25	275	340	400	35	155	435	385	430	475
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			100	275	0	75	125	400	400		
Storage Lanes	1			1	1	0	1	1	1	1		
Taper Length (ft)	25				25	0		25		25		
Right Turn on Red	Yes											
Link Speed (mph)	30											
Link Distance (ft)	520											
Travel Time (s)	11.8											
Peak Hour Factor	0.95											
Heavy Vehicles (%)	1%											
Shielded Lane Traffic (%)	Prot											
Turn Type	Prot				Perm				Prot			
Protected Phases	7				4				8			
Permitted Phases	7				4				3			
Detector Phase	7				4				3			
Switch Phase	4											
Minimum Initial (s)	4.0											
Minimum Spill (s)	8.6											
Total Spill (s)	41.0											
Total Spill (%)	19.2%											
All-Red Time (s)	3.6											
Lost Time Adjust (s)	1.0											
Total Lost Time (s)	4.6											
Lead/Lag	Lag			Lag			Lag			Lead		
Lead-Lag Optimizer?	Yes			Yes			Yes			Yes		
Recall Mode	None			C-Max			C-Max			None		
Area Type:	Other											
Cycle Length: 130												
Actuated Cycle Length: 130												
Offset: 118 (97%), Referenced to phase 4:EBT and 8:WBT, Start of Red												
Natural Cycle: 110												
Control Type: Actuated-Coordinated												



Notes

Turnwater Transportation Master Plan  
SCJ Alliance

Synchro 9 Report  
6/10/2016

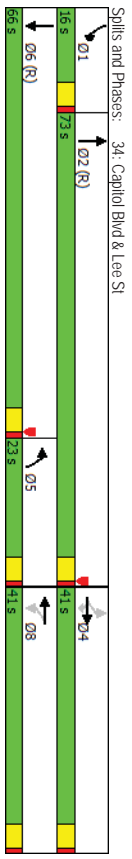




Lanes, Volumes, Timings  
34: Capitol Blvd & Lee St

Projected 2040 No Build  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	240	15	95	15	10	85	195	1160	20	70	1270	120
Future Volume (vph)	240	15	95	15	10	85	195	1160	20	70	1270	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	125	0	100	250	0	200	0	200	0	0
Storage Lanes	0	0	1	1	1	1	0	1	0	1	0	0
Taper Length (ft)	25			25			25			25		
Right Turn on Red		Yes			Yes			Yes			Yes	
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	718			814			621			735		
Travel Time (s)	16.3			18.5			14.1			16.7		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm	Perm	NA	Prot	NA	Prot	NA	Prot	NA	Prot
Protected Phases	4	4	4	8	8	8	5	2	1	6	6	6
Detector Phase	4	4	4	8	8	8	5	2	1	6	6	6
Switch Phase												
Minimum Inhibit (s)	6.0	6.0	6.0	6.0	6.0	6.0	12.0	12.0	6.0	12.0	12.0	12.0
Minimum Spill (s)	29.0	29.0	29.0	30.0	30.0	30.0	11.0	25.0	11.0	25.0	25.0	25.0
Total Spill (s)	41.0	41.0	41.0	41.0	41.0	41.0	23.0	73.0	16.0	66.0	66.0	66.0
Total Spill (%)	31.5%	31.5%	31.5%	31.5%	31.5%	31.5%	17.7%	56.2%	12.3%	50.8%	50.8%	50.8%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Lead/Lag							Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max	None	C-Max
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	130											
Activated Cycle Length:	130											
Offset:	116 (89%), Referenced to phase 2:NBT and 6:SBT Start of Red											
Natural Cycle:	90											
Control Type:	Actuated-Coordinated											



HCM Signalized Intersection Capacity Analysis  
34: Capitol Blvd & Lee St

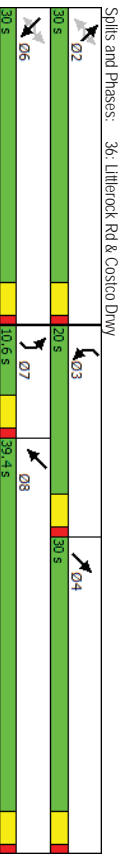
Projected 2040 No Build  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	240	15	95	15	10	85	195	1160	20	70	1270	120
Future Volume (vph)	240	15	95	15	10	85	195	1160	20	70	1270	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total lost time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Flt	1.00	0.85	1.00	0.87	1.00	0.87	1.00	1.00	1.00	0.99	1.00	0.99
Flt Protected	0.96	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd Flow (vph)	1797	1599	1805	1646	1787	1805	1787	3565	1787	3528	1787	3528
Flt Permitted	0.64	1.00	0.36	1.00	0.36	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd Flow (vph)	1208	1599	675	1646	675	1646	1787	3565	1787	3528	1787	3528
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)	253	16	100	16	11	89	205	1221	21	74	1337	126
RTOR Reduction (vph)	0	0	69	0	67	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	269	31	16	33	0	205	1241	0	74	1458	5
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Turn Type	Perm	NA	Perm	Perm	NA	Prot	NA	Prot	NA	Prot	NA	Prot
Protected Phases	4	4	4	8	8	8	5	2	1	6	6	6
Activated Green, G (s)	31.6	31.6	31.6	31.6	31.6	31.6	19.3	76.7	7.9	65.3	65.3	65.3
Effective Green, g (s)	31.6	31.6	31.6	31.6	31.6	31.6	19.3	76.7	7.9	65.3	65.3	65.3
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24	0.24	0.15	0.59	0.06	0.50	0.50	0.50
Clearance Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	1.5	3.0	1.6	3.0	3.0	3.0
Lane Grp Cap (vph)	293	388	164	400	400	400	265	2103	108	1772	108	1772
W/S Ratio Prot				0.02			c0.11	0.35	0.04	0.41	0.04	0.41
W/S Ratio Perm	60.22	0.02	0.02									
UIC Ratio	0.92	0.08	0.10	0.08	0.08	0.08	0.77	0.59	0.69	0.82	0.82	0.82
Uniform Delay, d1	47.9	38.0	38.1	38.0	38.0	38.0	53.2	16.8	59.8	27.4	27.4	27.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.43	0.37	0.37	0.37
Incremental Delay, d2	31.2	0.0	0.1	0.0	0.0	0.0	12.0	1.2	1.3	0.4	0.4	0.4
Delay (s)	79.2	38.0	38.2	38.0	38.0	38.0	65.3	18.0	87.0	10.7	10.7	10.7
Level of Service	E	D	D	D	D	D	E	B	B	F	B	B
Approach Delay (s)	68.0			38.1			24.7		14.3			
Approach LOS	E			D			C		B			
<b>Intersection Summary</b>												
HCM 2000 Control Delay	25.2											
HCM 2000 Volume to Capacity ratio	0.84											
Activated Cycle Length (s)	130.0											
Intersection Capacity Utilization	82.0%											
Analysis Period (min)	15											
Critical Lane Group	C											
HCM 2000 Level of Service	C											
Sum of lost time (s)	13.8											
ICU Level of Service	D											

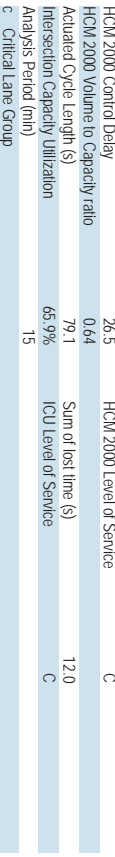




Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT
Lane Configurations	100	30	20	95	5	260	65	825	145	265	735
Traffic Volume (vph)	100	30	20	95	5	260	65	825	145	265	735
Future Volume (vph)	100	30	20	95	5	260	65	825	145	265	735
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	0	0	100	0	100	150	0	150	0	150	0
Storage Lanes	0	0	1	0	1	1	1	1	0	1	1
Taper Length (ft)	25			25			25			25	
Right Turn on Red	Yes			Yes			Yes			Yes	
Link Speed (mph)	30			30			30			30	
Link Distance (ft)	325			608			995			713	
Travel Time (s)	7.4			13.8			22.6			16.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)											
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA	NA
Protected Phases	6	6	6	2	2	2	7	4	3	8	8
Permitted Phases	6	6	6	2	2	2	7	4	3	8	8
Detector Phase	6	6	6	2	2	2	7	4	3	8	8
Switch Phase											
Minimum Inhibit (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Spill (s)	30.0	30.0	30.0	30.0	30.0	30.0	9.5	30.0	9.5	30.0	30.0
Total Spill (s)	30.0	30.0	30.0	30.0	30.0	30.0	10.6	30.0	20.0	39.4	39.4
Total Split (%)	37.5%	37.5%	37.5%	37.5%	37.5%	37.5%	13.3%	37.5%	25.0%	49.3%	25.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
AllRed Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag							Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	None	None	None	None	None
<b>Intersection Summary</b>											
Area Type:	Other										
Cycle Length:	80										
Actuated Cycle Length:	78.3										
Natural Cycle:	80										
Control Type:	Actuated-Uncoordinated										

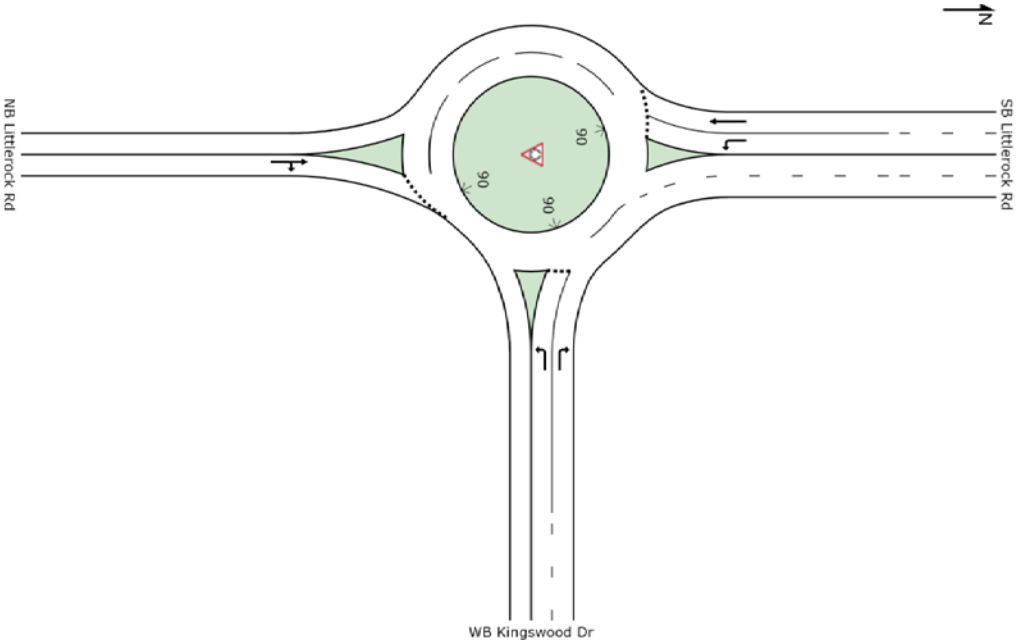


Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT
Lane Configurations	100	30	20	95	5	260	65	825	145	265	735
Traffic Volume (vph)	100	30	20	95	5	260	65	825	145	265	735
Future Volume (vph)	100	30	20	95	5	260	65	825	145	265	735
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	0	0	100	0	100	150	0	150	0	150	0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Fit	1.00	0.85	1.00	1.00	0.85	1.00	0.98	1.00	0.98	1.00	0.98
Fit Protected	0.96	1.00	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd Flow (vph)	1830	1615	1814	1615	1787	3494	1787	3510	1787	3510	1787
Fit Permitted	0.73	1.00	0.67	1.00	0.67	1.00	0.95	1.00	0.95	1.00	0.95
Satd Flow (vph)	1389	1615	1278	1615	1787	3494	1787	3510	1787	3510	1787
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
Adj. Flow (vph)	105	32	21	100	5	274	68	868	153	279	774
RTOR Reduction (vph)	0	0	14	0	0	184	0	18	0	13	0
Lane Group Flow (vph)	0	137	7	0	105	90	68	1003	0	279	866
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	1%	1%	1%	1%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA	NA
Protected Phases	6	6	6	2	2	2	7	4	3	8	8
Permitted Phases	6	6	6	2	2	2	7	4	3	8	8
Actuated Green, G (s)	26.0	26.0	26.0	26.0	26.0	26.0	5.2	26.1	15.0	35.9	35.9
Effective Green, g (s)	26.0	26.0	26.0	26.0	26.0	26.0	5.2	26.1	15.0	35.9	35.9
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33	0.33	0.07	0.33	0.19	0.45	0.45
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Crp Cap (vph)	456	530	420	530	530	117	1152	338	1593	1593	1593
W/s Ratio Prot						0.04	0.29		0.16		0.25
W/s Ratio Perm		60.10	0.00		0.08	0.06					
V/C Ratio		0.30	0.01		0.25	0.17	0.88	0.87	0.83	0.54	0.54
Uniform Delay, d1		19.8	17.9		19.4	18.9	35.9	24.9	30.8	15.7	15.7
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.7	0.0		1.4	0.7	7.2	7.4	15.0	0.4	0.4
Delay (s)		21.5	17.9		20.8	19.6	43.1	32.3	45.8	16.0	16.0
Level of Service		C	B		C	B	D	D	D	B	B
Approach Delay (s)		21.0			19.9		33.0		23.2		
Approach LOS		C			B		C		C		
<b>Intersection Summary</b>											
HCM 2000 Control Delay	26.5										
HCM 2000 Volume to Capacity ratio	0.64										
Actuated Cycle Length (s)	79.1										
Intersection Capacity Utilization	65.9%										
Analysis Period (min)	15										
C Critical Lane Group	C										



## SITE LAYOUT

Site: 37) Littlerock Rd at Kingswood Dr  
 Projected 2040 Baseline  
 PM Peak Hour  
 Roundabout



## MOVEMENT SUMMARY

Site: 37) Littlerock Rd at Kingswood Dr  
 Projected 2040 Baseline  
 PM Peak Hour  
 Roundabout

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Satm v/c	Deg. Delay %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Littlerock Rd												
8	T1	895	1.0	1.009		22.0	LOS F	48.8	1229.0	1.00	0.81	29.2
18	R2	168	1.0	1.009		21.9	LOS F	48.8	1229.0	1.00	0.81	28.5
Approach		1063	1.0	1.009		22.0	LOS C	48.8	1229.0	1.00	0.81	29.1
East: WB Kingswood Dr												
1	L2	195	1.0	0.364		16.1	LOS B	3.0	75.4	0.99	0.93	31.7
16	R2	111	1.0	0.067		4.2	LOS A	0.0	0.0	0.00	0.49	36.5
Approach		305	1.0	0.364		11.8	LOS B	3.0	75.4	0.63	0.77	33.2
North: SB Littlerock Rd												
7	L2	95	1.0	0.123		11.4	LOS B	0.7	17.4	0.48	0.66	33.7
4	T1	837	1.0	0.684		5.7	LOS A	7.7	195.2	0.75	0.57	35.2
Approach		932	1.0	0.684		6.3	LOS A	7.7	195.2	0.73	0.58	35.1
All Vehicles		2300	1.0	1.009		14.3	LOS B	48.8	1229.0	0.84	0.71	31.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
 Roundabout LOS Method: Same as Signalised Intersections.  
 Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
 LOS F will result if  $v/c > 1$  (respective of movement delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).  
 Roundabout Capacity Model: SIDRA Standard.  
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.  
 Gap-Acceptance Capacity: SIDRA Standard (Akegik M3D).  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Intersection	2.3											
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	10	15	10	5	5	5	5	90	10	5	60	5
Future Vol, veh/h	10	15	10	5	5	5	5	90	10	0	60	5
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	-	-	-	-	-	-	-	-	-	-
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	2	2	2
Wmnt Flow	11	16	11	5	5	5	5	95	11	0	63	5

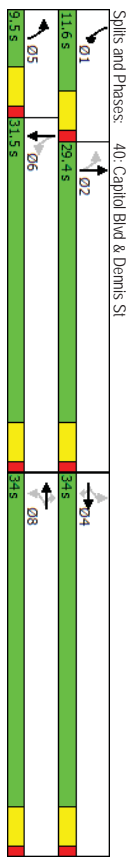
Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	182	182	66	68
Stage 1	66	66	111	111
Stage 2	116	116	79	68
Critical Hdwy, Sig 1	7.1	6.5	7.1	6.5
Critical Hdwy, Sig 2	6.1	5.5	6.1	5.5
Follow-up Hdwy	3.5	4	3.3	4
Pol Cap-1 Maneuver	784	716	1003	2.2
Stage 1	930	844	899	807
Stage 2	894	803	935	842
Platoon blocked, %	-	-	-	-
Moar Cap-1 Maneuver	774	714	1003	751
Moar Cap-2 Maneuver	774	714	751	716
Stage 1	947	844	896	805
Stage 2	881	801	908	842

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.7	9.6	0.3	0
HCM LOS	A	A		

Minor Lane/Major Wmnt	NBL	NBT	NBR	EBL	WBL	SBL	SBT	SBR
Capacity (veh/h)	1546	-	-	797	796	1486	-	-
HCM Lane V/C Ratio	0.003	-	-	0.046	0.02	-	-	-
HCM Control Delay (s)	7.3	0	-	9.7	9.6	0	-	-
HCM Lane LOS	A	A	-	A	A	-	-	-
HCM 95th %ile Q(veh)	0	-	-	0.1	0.1	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	225	40	35	40	25	75	20	875	40	45	1000	125
Future Volume (vph)	225	40	35	40	25	75	20	875	40	45	1000	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	125	0	100	175	0	225	0	0	225	0
Storage Lanes	0	0	1	0	1	1	0	1	0	0	1	0
Taper Length (ft)	25	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Link Speed (mph)	30	30	30	30	30	30	30	30	30	30	30	30
Link Distance (ft)	834	834	834	700	700	1337	1337	1300	1300	1300	1300	1300
Travel Time (s)	19.0	19.0	15.9	15.9	15.9	30.4	30.4	29.5	29.5	29.5	29.5	29.5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)	Perm	NA	Perm	Perm	NA	Perm	pm+pl	NA	pm+pl	NA	pm+pl	NA
Turn Type	4	4	4	4	4	4	4	4	4	4	4	4
Protected Phases	4	4	4	8	8	8	8	8	8	8	8	8
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Detector Phase	4	4	4	8	8	8	8	8	8	8	8	8
Switch Phase	7.0	7.0	7.0	7.0	7.0	7.0	5.0	8.0	7.0	8.0	7.0	8.0
Minimum Initial (s)	335	335	335	335	335	335	9.5	27.5	11.5	27.5	11.5	27.5
Minimum Spill (s)	34.0	34.0	34.0	34.0	34.0	34.0	9.5	29.4	11.6	29.4	11.6	29.4
Total Spill (s)	45.3%	45.3%	45.3%	45.3%	45.3%	45.3%	12.7%	39.2%	15.5%	42.0%	15.5%	42.0%
All-Red Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Yellow Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None

Intersection Summary	Other
Area Type:	Other
Cycle Length: 75	
Actuated Cycle Length: 61.1	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	





HCM 2010 Signalized Intersection Summary  
411: Israel Rd & Capitol Blvd

Projected 2040 No Build  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	2	3	4	5	6	7	8				
Traffic Volume (veh/h)	75	280	215	140	290	205	185	470	40	135	885	100
Future Volume (veh/h)	75	280	215	140	290	205	185	470	40	135	885	100
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Q0), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj/(A <sub>pb</sub> )	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1900	1900	1900	1863	1863	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	79	295	163	147	305	216	195	495	42	142	932	105
Adj No of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh. %	0	0	0	2	2	2	1	1	1	1	1	1
Cap. veh/h	215	328	181	276	305	216	261	1051	89	405	1001	113
Arrive On Green	0.07	0.29	0.08	0.08	0.30	0.30	0.08	0.31	0.31	0.08	0.31	0.31
Sat Flow, veh/h	1810	1151	636	1774	1016	720	1792	3336	282	1792	3239	365
Gpr Volume(V), veh/hln	79	0	488	147	0	521	195	265	272	142	514	523
Gpr Sat Flow(s), veh/hln	1810	0	1788	1774	0	1736	1792	1787	1831	1792	1787	1817
Q Serve(g.s), s	2.2	0.0	18.2	4.2	0.0	22.2	5.5	8.8	8.9	3.9	20.7	20.7
Cycle Q Clear(g.c), s	2.2	0.0	18.2	4.2	0.0	22.2	5.5	8.8	8.9	3.9	20.7	20.7
Prop In Lane	1.00	0.36	1.00	1.00	0.41	1.00	0.15	1.00	0.15	1.00	0.20	0.20
Lane Gpr Cap(c), veh/h	215	0	510	276	0	521	261	563	577	405	553	562
V/C Ratio(x)	0.37	0.00	0.90	0.53	0.00	1.00	0.75	0.47	0.47	0.35	0.93	0.93
Avail Cap(c), veh/h	244	0	531	277	0	521	261	563	577	413	553	562
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.4	0.0	28.4	18.9	0.0	25.9	18.8	20.4	20.4	15.7	24.8	24.8
Incr Delay (d2), s/veh	1.3	0.0	17.9	2.3	0.0	39.2	11.5	2.8	2.8	0.6	24.5	24.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%alle BackQ(50%), veh/hln	1.2	0.0	11.4	2.2	0.0	16.2	3.5	4.8	4.9	2.0	13.9	14.1
LnGpr Delay(d), s/veh	20.6	0.0	43.3	21.2	0.0	65.1	30.4	23.2	23.2	16.4	49.3	49.0
LnGpr LOS	C	D	D	C	D	E	C	C	C	B	D	D
Approach Vol, veh/h	537			668			732			1179		
Approach Delay, s/veh	40.0			55.5			25.1			45.2		
Approach LOS	D			E			C			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Pns	1	2	3	4	5	6	7	8				
Pns Duration (G+Y+R0), s	106	27.4	9.3	26.7	10.2	27.8	10.4	25.6				
Change Period (Y+R0), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	6.1	22.9	6.0	22.0	6.0	23.0	6.0	22.0				
Max Q Clear Time (Q <sub>clear</sub> ), s	7.5	22.7	4.2	24.2	5.9	10.9	6.2	20.2				
Green Ext Time (Q <sub>ext</sub> ), s	0.0	0.2	0.0	0.0	0.0	8.4	0.0	0.9				
Intersection Summary												
HCM 2010 Cntrl Delay	41.8											
HCM 2010 LOS	D											

HCM 2010 TWSC  
42: 66th Ave & Black Lake Belmore Rd

Projected 2040 No Build  
PM Peak Hour

Intersection	Int Delay, s/veh	EBL	EBT	WBT	WBR	SBL	SBR
Major/Minor	6.1	Major1	Minor2	Major2	Minor2	Minor2	Minor2
Conflicting Flow All	363	0	0	0	0	521	253
Stage 1	-	-	-	-	-	253	-
Stage 2	-	-	-	-	-	268	-
Critical Hdwy	4.11	-	-	-	-	6.4	6.2
Critical Hdwy Sig 1	-	-	-	-	-	5.4	-
Critical Hdwy Sig 2	-	-	-	-	-	5.4	-
Follow-up Hdwy	2.209	-	-	-	-	3.5	3.3
Pol Cap-1 Maneuver	1201	-	-	-	-	519	791
Stage 1	-	-	-	-	-	794	-
Platoon Blocked %	-	-	-	-	-	782	-
Mov Cap-1 Maneuver	1201	-	-	-	-	483	791
Mov Cap-2 Maneuver	-	-	-	-	-	483	-
Stage 1	-	-	-	-	-	794	-
Stage 2	-	-	-	-	-	727	-
Approach	EB	WB	WB	SB			
HCM Control Delay, s	3.4	0	0	15.8			
HCM LOS	C			C			
Minor Lane/Minor Mvmt	EBL	EBT	WBT	WBR	SBL	SBR	
Capacity (veh/h)	1201	-	-	-	-	608	-
HCM Lane V/C Ratio	0.066	-	-	-	-	0.459	-
HCM Control Delay (s)	8.2	-	-	-	-	15.8	-
HCM Lane LOS	A	A	-	-	-	C	-
HCM 95th %ile Q(veh)	0.2	-	-	-	-	2.4	-

Intersection												
Int Delay, s/veh	9.2											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	40	5	205	5	2	5	340	15	5	5	15	85
Future Vol, veh/h	40	5	205	5	2	5	340	15	5	5	15	85
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	1	1	1	0	0	0	1	1	1	0	0	0
Wmnt Flow	42	5	216	5	2	5	358	16	5	5	16	89

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	809	808	61	916
Stage 1	71	71	734	734
Stage 2	738	737	182	116
Critical Hdwy	7.11	6.51	6.21	7.1
Critical Hdwy, Sig 1	6.11	5.51	-	6.1
Critical Hdwy, Sig 2	6.11	5.51	-	6.1
Follow-up Hdwy	3.509	4.009	3.309	3.5
Pol Cap-1/Maneuver	300	316	1007	255
Stage 1	941	838	-	415
Stage 2	411	426	-	824
Platoon blocked, %	-	-	-	-
Mov Cap-1/Maneuver	240	238	1007	160
Mov Cap-2/Maneuver	240	238	-	160
Stage 1	712	835	-	314
Stage 2	308	322	-	641

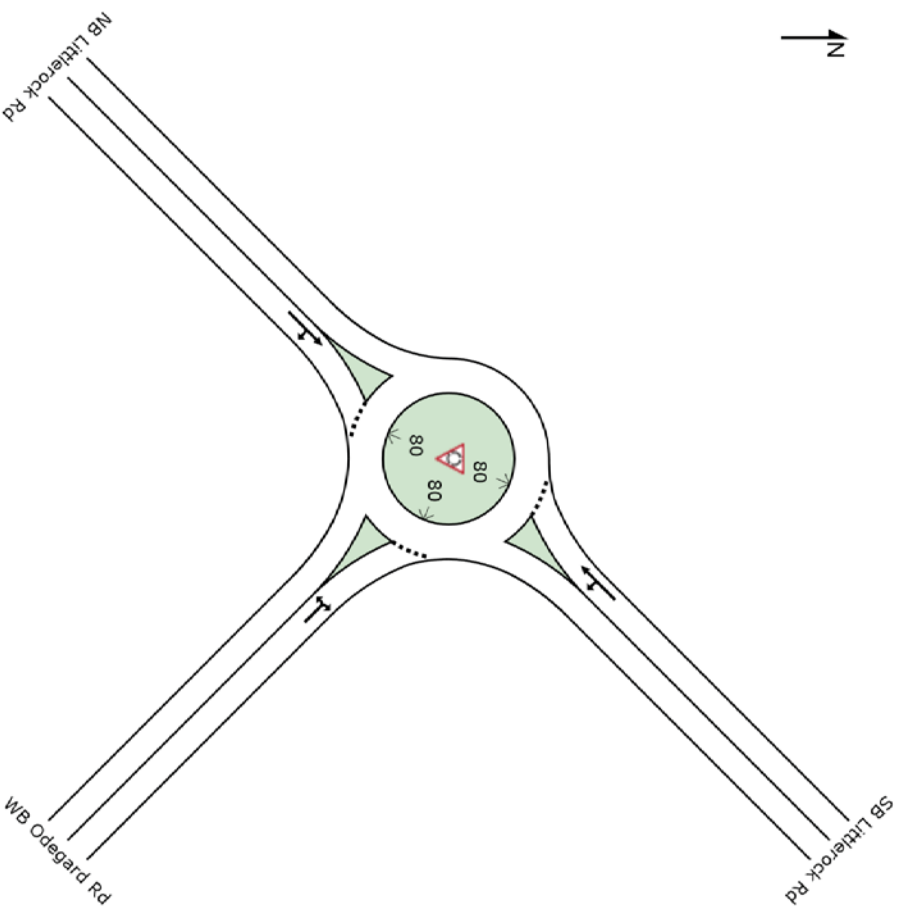
Approach	EB	WB	NB	SB
HCM Control Delay, s	14.5	19.1	7.7	0.3
HCM LOS	B	C		

Minor Lane/Major Wmnt	NBL	NBT	NBR	EBL	WBL	SBL	SBT	SBR
Capacity (veh/h)	1493	-	-	639	268	1608	-	-
HCM Lane V/C Ratio	0.24	-	-	0.412	0.047	0.003	-	-
HCM Control Delay (s)	8.2	0	-	14.5	19.1	7.2	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %ile Q(veh)	0.9	-	-	2	0.1	0	-	-

**SITE LAYOUT**

Site: 44) Littlerock Rd at Odegard Rd

Projected 2040 Baseline  
PM Peak Hour  
Roundabout





## MOVEMENT SUMMARY

### Site: 44) Littlerock Rd at Oddegard Rd

Projected 2040 Baseline  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total Veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Queue Distance ft	Pop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: WB Oddegard Rd											
3x	L2	26	0.0	0.082	18.7	LOS B	0.5	12.5	0.85	0.84	31.0
18x	R2	11	0.0	0.082	13.4	LOS B	0.5	12.5	0.85	0.84	30.3
Approach											
		37	0.0	0.082	17.2	LOS B	0.5	12.5	0.85	0.84	30.8
NorthEast: SB Littlerock Rd											
1x	L2	11	1.0	0.829	10.2	LOS B	19.5	491.0	0.57	0.38	35.5
6x	T1	995	1.0	0.829	4.9	LOS A	19.5	491.0	0.57	0.38	35.6
Approach											
		1005	1.0	0.829	4.9	LOS A	19.5	491.0	0.57	0.38	35.6
SouthWest: NB Littlerock Rd											
2x	T1	1026	1.0	0.832	4.5	LOS A	20.5	517.5	0.35	0.36	36.3
12x	R2	5	1.0	0.832	4.4	LOS A	20.5	517.5	0.35	0.36	35.4
Approach											
		1032	1.0	0.832	4.5	LOS A	20.5	517.5	0.35	0.36	36.3
All Vehicles											
		2074	1.0	0.832	4.9	LOS A	20.5	517.5	0.47	0.38	35.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement. LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik MSD).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com

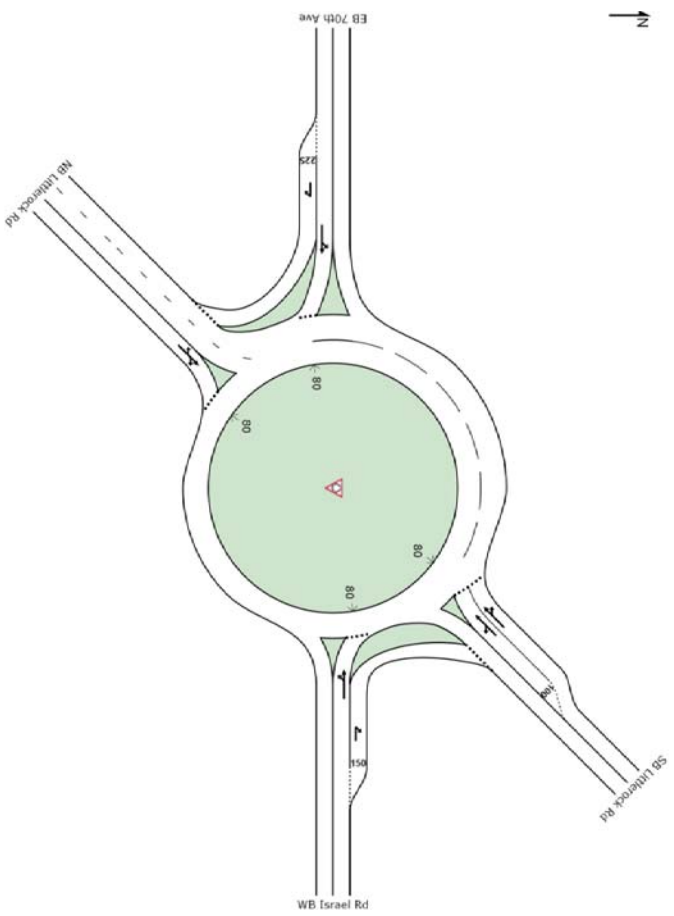
Organisation: SCU ALLIANCE | Processed: Wednesday, February 17, 2016 2:15:48 PM

Project: N:\Projects\0625\_City of Tumwater\0625\_17 Tumwater Transportation Master Plan\Traffic\Operations\sidra\2040 Baseline\Projected 2040 Baseline PM.sip6

## SITE LAYOUT

### Site: 45) Littlerock Rd at Israel Rd

Projected 2040 Baseline  
PM Peak Hour  
Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: SCU ALLIANCE | Created: Friday, February 5, 2016 4:27:42 PM

Project: N:\Projects\0625\_City of Tumwater\0625\_17 Tumwater Transportation Master Plan\Traffic\Operations\sidra\2040 Baseline\Projected 2040 Baseline PM.sip6

# MOVEMENT SUMMARY

Site: 45) Litterock Rd at Israel Rd

Projected 2040 Baseline  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total Veh/h	HV %	Deg. Satn W/C	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Distance ft	Pop. Queued	Effective Stop Rate per veh	Average Speed mph
<b>East WB Israel Rd</b>											
1a	L1	116	1.0	0.581	17.9	LOS B	5.9	148.5	1.00	1.06	31.6
6	T1	247	1.0	0.581	13.7	LOS B	5.9	148.5	1.00	1.06	31.8
16b	R3	447	1.0	0.504	8.3	LOS A	4.3	108.2	0.83	0.84	33.9
<b>Approach</b>											
		811	1.0	0.581	11.3	LOS B	5.9	148.5	0.91	0.94	32.9
<b>NorthEast SB Litterock Rd</b>											
1bx	L3	232	1.0	0.694	21.0	LOS C	7.7	193.8	0.95	1.10	31.1
6x	T1	647	1.0	0.694	13.9	LOS B	8.2	205.5	0.96	1.08	32.0
16ax	R1	179	1.0	0.694	12.8	LOS B	8.2	205.5	0.96	1.06	32.5
<b>Approach</b>											
		1058	1.0	0.694	15.2	LOS B	8.2	205.5	0.96	1.08	31.9
<b>West EB 70th Ave</b>											
5a	L1	132	1.0	0.415	12.4	LOS B	2.4	59.3	0.79	0.89	33.6
2	T1	132	1.0	0.415	8.4	LOS A	2.4	59.3	0.79	0.89	34.0
12b	R3	121	1.0	0.159	6.3	LOS A	0.7	18.2	0.62	0.78	35.0
<b>Approach</b>											
		384	1.0	0.415	9.1	LOS A	2.4	59.3	0.73	0.86	34.1
<b>SouthWest NB Litterock Rd</b>											
5ix	L3	289	1.0	1.055	63.4	LOS F	39.7	1001.2	1.00	2.01	19.8
2x	T1	426	1.0	1.055	57.0	LOS F	39.7	1001.2	1.00	2.01	19.7
12ax	R1	100	1.0	1.055	56.7	LOS F	39.7	1001.2	1.00	2.01	19.6
<b>Approach</b>											
		816	1.0	1.055	59.2	LOS E	39.7	1001.2	1.00	2.01	19.7
All Vehicles		3088	1.0	1.055	25.1	LOS C	39.7	1001.2	0.93	1.26	27.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
Roundabout LOS Method: Same as Signalised Intersections.  
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).  
Intersection and Approach LOS values are based on average delay for all movements v/c not used as specified in HCM 2010).  
Roundabout Capacity Model: SIDRA Standard.  
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.  
Gap-Acceptance Capacity: SIDRA Standard (Akçelik, MSD).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arcelik and Associates Pty Ltd | sidrasolutions.com  
Organisation: SCJ ALLIANCE | Processed: Wednesday, February 17, 2016 2:17:41 PM  
Project: N:\Projects\0625\_025\_17\_Turnwater\_Transportation\_Master\_Plan\Traffic\Operations\sidra\_2040\_Baseline\Projected\_2040\_Baseline\_PM.sp6

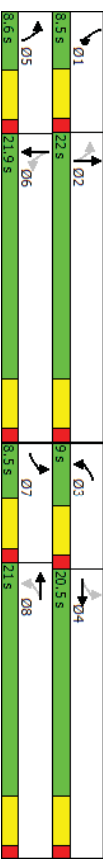
## Lanes, Volumes, Timings

Projected 2040 No Build  
PM Peak Hour

46: Linderon Way & Israel Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	70	400	125	135	465	25	200	260	90	40	140	140
Future Volume (vph)	70	400	125	135	465	25	200	260	90	40	140	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	0	200	0	150	0	100	0	100	0	0	0
Storage Lanes	1	0	1	0	1	0	1	0	1	0	1	0
Taper Length (ft)	25	0	25	0	25	0	25	0	25	0	25	0
Right Turn on Red		Yes		Yes		Yes		Yes		Yes		Yes
Link Speed (mph)		30		30		30		30		30		30
Link Distance (ft)		3505		2751		2073		847		19.3		847
Travel Time (s)		79.7		62.5		47.1		19.3		0.95		0.95
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA
Protected Phases	7	4	3	8	5	2	6	1	6	1	6	1
Permitted Phases	4	4	8	8	2	2	6	6	6	6	6	6
Detector Phase	7	4	3	8	5	2	6	1	6	1	6	1
Switch Phase												
Minimum Initial (s)	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Minimum Split (s)	8.5	20.5	8.5	20.5	8.5	21.5	8.5	21.5	8.5	21.5	8.5	21.5
Total Split (s)	8.5	20.5	9.0	21.0	8.6	22.0	8.5	21.9	8.5	21.9	8.5	21.9
Total Split (%)	14.2%	34.2%	15.0%	35.0%	14.3%	36.7%	14.2%	36.5%	14.2%	36.5%	14.2%	36.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimizer?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	60											
Actuated Cycle Length:	58.3											
Natural Cycle:	70											
Control Type:	Actuated-Uncoordinated											

Spills and Phases: 46: Linderon Way & Israel Rd



HCM 2010 Signalized Intersection Summary  
46: Linderson Way & Israel Rd

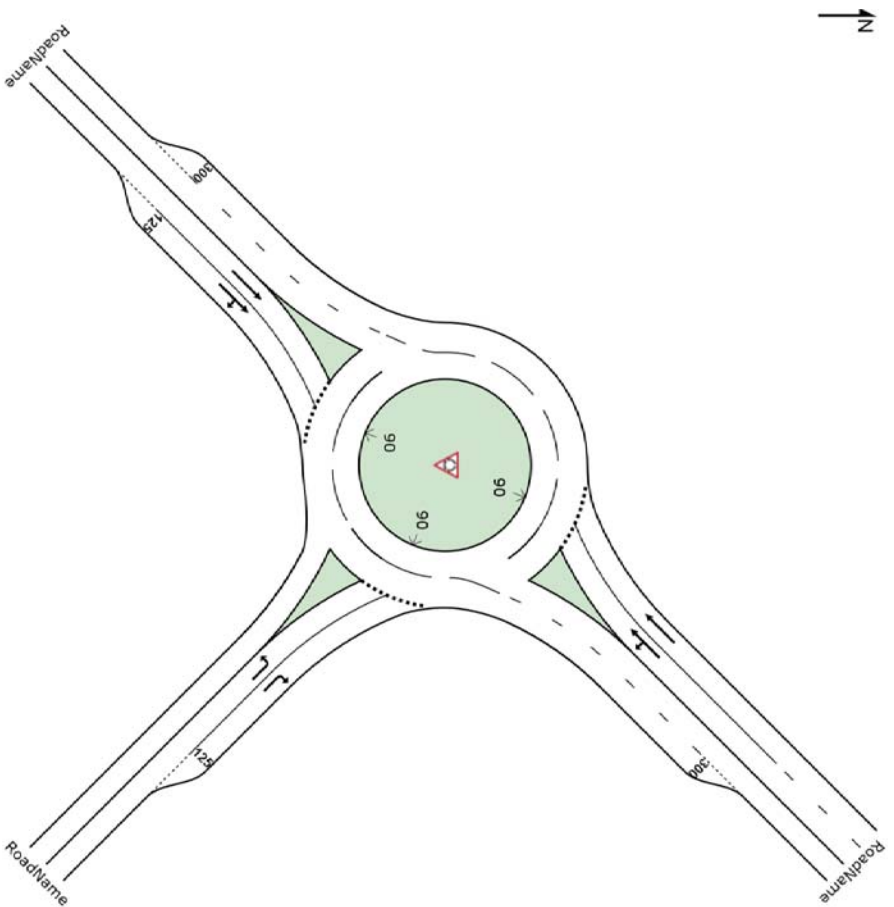
Projected 2040 No Build  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	7	4	7	7	4	7	7	4	7	7	7
Traffic Volume (veh/h)	70	400	125	135	465	25	200	260	90	40	140	140
Future Volume (veh/h)	70	400	125	135	465	25	200	260	90	40	140	140
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qd), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1881	1900	1881	1881	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	74	421	132	142	489	26	211	274	21	42	147	147
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh. %	1	1	1	1	1	1	1	1	1	1	1	1
Cap. veh/h	227	366	115	254	521	28	400	560	43	395	251	251
Arrive On Green	0.05	0.27	0.27	0.08	0.29	0.29	0.07	0.32	0.32	0.03	0.29	0.29
Sat Flow, veh/h	1792	1374	431	1792	1770	94	1792	1726	132	1792	864	864
Grp Volume(V), veh/hln	74	0	553	142	0	515	211	0	295	42	0	294
Grp Sat Flow(s), veh/hln	1792	0	1805	1792	0	1865	1792	0	1858	1792	0	1729
Q Serve(s), s	1.8	0.0	16.0	3.4	0.0	16.2	4.1	0.0	7.6	1.0	0.0	8.7
Cycle Q Clear(c), s	1.8	0.0	16.0	3.4	0.0	16.2	4.1	0.0	7.6	1.0	0.0	8.7
Prop In Lane	1.00	0.24	1.00	0.24	1.00	0.05	1.00	0.07	1.00	0.07	1.00	0.50
Lane Grp Cap(c), veh/h	227	0	481	254	0	549	400	0	603	395	0	501
V/C Ratio(X)	0.33	0.00	1.15	0.56	0.00	0.94	0.53	0.00	0.49	0.11	0.00	0.59
Avail Cap(c), veh/h	262	0	481	254	0	549	400	0	603	455	0	501
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.6	0.0	22.0	16.3	0.0	20.6	16.2	0.0	16.3	14.3	0.0	18.2
Incr Delay (d2), s/veh	0.3	0.0	88.7	1.7	0.0	24.1	0.7	0.0	2.8	0.0	0.0	5.0
Initial Q Delay(d1), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/h	0.9	0.0	19.8	1.7	0.0	12.0	1.2	0.0	4.4	0.5	0.0	4.9
LnGrp Delay(d), s/veh	16.9	0.0	110.7	17.9	0.0	44.7	16.9	0.0	19.1	14.4	0.0	23.2
LnGrp LOS	B		F	B		D	B		B	B		C
Approach Vol, veh/h		627			657			506			336	
Approach Delay, s/veh		99.7			38.9			18.2			22.1	
Approach LOS		F			D			B			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+R), s	6.5	24.0	9.0	20.5	8.6	21.9	7.3	22.2				
Change Period (Y+R), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	4.0	17.5	4.5	16.0	4.1	17.4	4.0	16.5				
Max Q Clear Time (Q_cH1), s	3.0	9.6	5.4	18.0	6.1	10.7	3.8	18.2				
Green Ext Time (Q_c), s	0.0	2.3	0.0	0.0	0.0	2.0	0.0	0.0				
Intersection Summary												
HCM 2010 Cnt Delay			49.2									
HCM 2010 LOS			D									

Turnwater Transportation Master Plan  
SCJ Alliance  
Synchro 9 Report  
6/10/2016

SITE LAYOUT

Site: 47) Littlerock Rd at Turnwater Blvd  
Projected 2040 Baseline  
PM Peak Hour  
Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2004-2015 Alcekl and Associates Pty Ltd | sidrasolutions.com  
Organisation: SCJ ALLIANCE | Created: Friday, February 5, 2016 4:28:39 PM  
Project: N:\Projects\0625 City of Turnwater\Transportation Master Plan\TrafficOperations\sidra2040 Baseline\Projected 2040 Baseline PM.sp9

## MOVEMENT SUMMARY

### Site: 47) Litterock Rd at Tumwater Blvd

Projected 2040 Baseline  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Total	Flows HV %	Sat W/C	Deg. of Sat	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Queue Distance ft	Pop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: RoadName												
3x	L2	416	1.0	0.396	11.3	LOS B	2.5	62.2	0.54	0.72	33.7	
18x	R2	400	1.0	0.390	5.8	LOS A	2.4	60.5	0.54	0.63	35.2	
Approach												
		816	1.0	0.396	8.6	LOS A	2.5	62.2	0.54	0.68	34.4	
NorthEast: RoadName												
1x	L2	426	1.0	0.640	14.1	LOS B	6.0	150.6	0.77	0.87	33.5	
6x	T1	511	1.0	0.640	7.7	LOS A	6.0	150.6	0.69	0.75	34.7	
Approach												
		937	1.0	0.640	10.6	LOS B	6.0	150.6	0.73	0.80	34.1	
SouthWest: RoadName												
2x	T1	295	0.0	0.314	6.4	LOS A	1.9	47.9	0.62	0.59	35.6	
12x	R2	232	0.0	0.288	6.4	LOS A	1.5	38.5	0.60	0.69	35.1	
Approach												
		526	0.0	0.314	6.4	LOS A	1.9	47.9	0.61	0.64	35.4	
All Vehicles												
		2279	0.8	0.640	8.9	LOS A	6.0	150.6	0.63	0.72	34.5	

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement. LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik MSD).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com

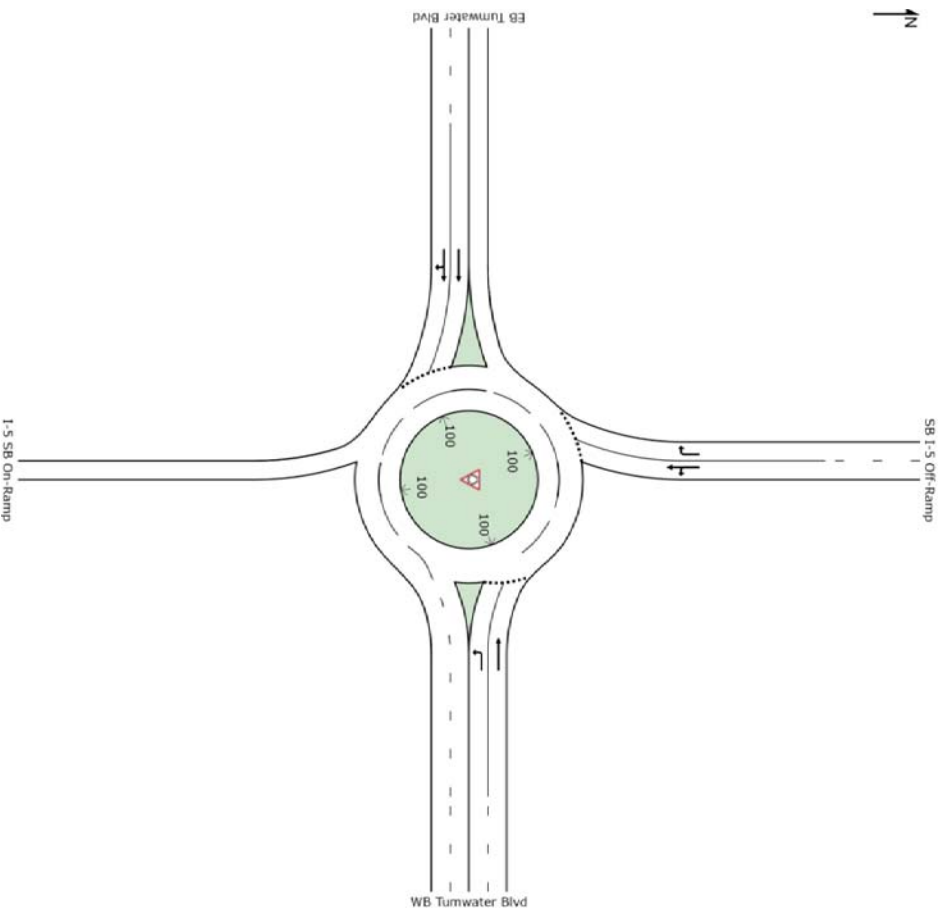
Organisation: SCU ALLIANCE | Processed: Wednesday, February 17, 2016 2:18:34 PM

Project: N:\Projects\0625\_City of Tumwater\0625\_17 Tumwater Transportation Master Plan\Traffic\Operations\sidra\2040 Baseline\Projected 2040 Baseline PM.sp6

## SITE LAYOUT

### Site: 48) Tumwater Blvd at I-5 SB Ramps

Projected 2040 Baseline  
Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: SCU ALLIANCE | Created: Friday, February 5, 2016 4:36:18 PM

Project: N:\Projects\0625\_City of Tumwater\0625\_17 Tumwater Transportation Master Plan\Traffic\Operations\sidra\2040 Baseline\48-Tumwater Blvd at I-5 SB Ramps.sp6

## MOVEMENT SUMMARY

### Site: 48) Tumwater Blvd at I-5 SB Ramps

Projected 2040 Baseline Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total Veh/h	Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	99% Back of Queue Vehicles	Distance ft	Pop. Queued	Effective Stop Rate per veh	Average Speed mph
East WB Tumwater Blvd											
1	L2	363	2.0	0.243	4.4	LOS A	0.0	0.0	0.00	0.00	28.0
6	T1	563	2.0	0.315	4.5	LOS A	0.0	0.0	0.00	0.00	26.0
Approach		926	2.0	0.315	4.5	LOS A	0.0	0.0	0.00	0.00	26.8
North: SB I-5 Off-Ramp											
7	L2	405	2.0	0.588	13.5	LOS B	3.4	87.4	0.71	0.80	24.6
4	T1	32	2.0	0.568	13.5	LOS B	3.4	87.4	0.71	0.80	27.1
14	R2	542	2.0	0.600	12.8	LOS B	4.0	101.0	0.72	0.81	24.6
Approach		979	2.0	0.600	13.1	LOS B	4.0	101.0	0.71	0.81	24.7
West: EB Tumwater Blvd											
2	T1	753	2.0	0.988	37.4	LOS D	26.8	681.7	0.96	1.64	18.2
12	R2	363	2.0	0.988	54.4	LOS D	26.8	681.7	1.00	2.17	17.0
Approach		1116	2.0	0.988	42.9	LOS D	26.8	681.7	0.98	1.81	17.8
All Vehicles		3021	2.0	0.988	21.5	LOS C	26.8	681.7	0.59	0.93	22.1

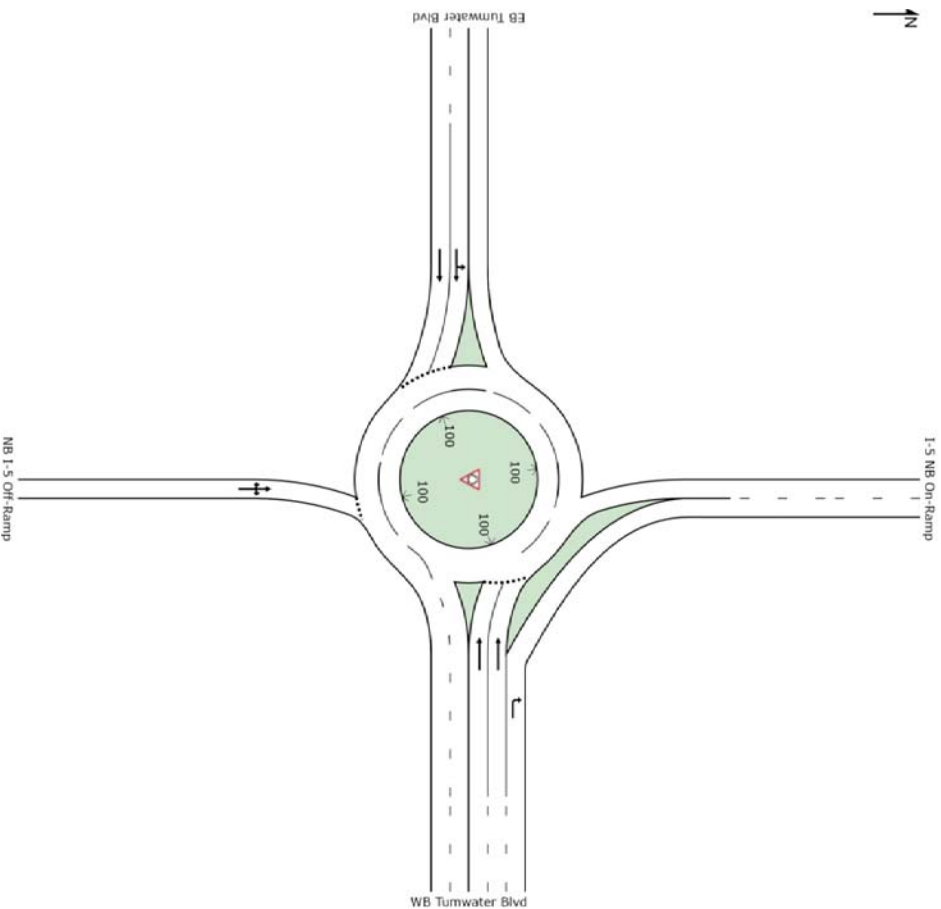
Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
 Roundabout LOS Method: Same as Signalised Intersections.  
 Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
 LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).  
 Roundabout Capacity Model: SIDRA Standard.  
 HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.  
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik MSD).  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com  
 Organisation: SCU ALLIANCE | Processed: Wednesday, February 17, 2016 2:10:57 PM  
 Project: N:\Projects\0625\_City of Tumwater\0625\_17 Tumwater Transportation Master Plan\Traffic\Operations\sidra2040 Baseline\48-Tumwater Blvd at I-5 SB Ramps.sp6

## SITE LAYOUT

### Site: 49) Tumwater Blvd at I-5 NB Ramps

Projected 2040 Baseline Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com  
 Organisation: SCU ALLIANCE | Created: Thursday, June 9, 2016 1:25:05 PM  
 Project: N:\Projects\0625\_City of Tumwater\0625\_17 Tumwater Transportation Master Plan\Traffic\Operations\sidra2040 Baseline\49-Tumwater Blvd at I-5 NB Ramps.sp6

# MOVEMENT SUMMARY

Site: 49) Turnwater Blvd at I-5 NB Ramps

Projected 2040 Baseline Roundabout

Movement Performance - Vehicles												
Mov	OD	Demand Flows	Deg	Average	Level of	99% Back of Queue	Pop	Effective	Average			
ID	Mov	Total HV	%	Delay	Service	Vehicles Distance	Queued	Stop Rate	Speed			
		veh/h		sec		veh	ft	per veh	mph			
South: NB I-5 Off-Ramp												
3	L2	182	2.0	0.571	LOS B	3.4	86.8	0.75	0.86	24.5		
8	T1	5	2.0	0.571	LOS B	3.4	86.8	0.75	0.86	27.0		
18	R2	182	2.0	0.571	LOS B	3.4	86.8	0.75	0.86	23.4		
Approach												
		369	2.0	0.571	LOS B	3.4	86.8	0.75	0.86	24.0		
East: WB Turnwater Blvd												
6	T1	737	2.0	0.654	LOS B	7.3	185.2	0.85	0.90	22.7		
16	R2	1101	2.0	0.671	LOS A	0.0	0.0	0.00	0.00	25.0		
Approach												
		1838	2.0	0.671	LOS A	7.3	185.2	0.34	0.36	24.0		
West: EB Turnwater Blvd												
5	L2	394	2.0	0.294	LOS A	0.0	0.0	0.00	0.00	28.1		
2	T1	747	2.0	0.420	LOS A	0.0	0.0	0.00	0.00	26.1		
Approach												
		1141	2.0	0.420	LOS A	0.0	0.0	0.00	0.00	26.7		
All Vehicles		3348	2.0	0.671	LOS A	7.3	185.2	0.27	0.29	24.9		

Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
 Roundabout LOS Method: Same as Signalised Intersections.  
 Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
 LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).  
 Roundabout Capacity Model: SIDRA Standard.  
 HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.  
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik MSD).  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arcaitek and Associates Pty Ltd | sidrasolutions.com  
 Organisation: SCJ ALLIANCE | Processed: Thursday, June 9, 2016 1:25:37 PM  
 Project: N:\Projects\0625\_City of Tumwater\0625.17\_Tumwater\_Transportation\_Master\_Plan\Traffic\_Operations\sdras\2040\_Baseline\49-Tumwater Blvd at I-5 NB Ramps.sip6

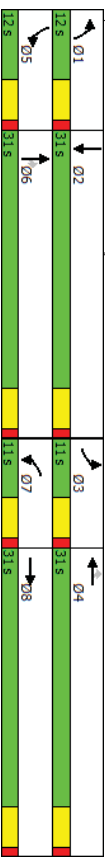
## Lanes, Volumes, Timings

50: Linderson Way & Turnwater Blvd

Projected 2040 No Build Pk1 Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	90	655	245	130	805	30	175	135	75	210	235	790
Future Volume (vph)	90	655	245	130	805	30	175	135	75	210	235	790
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300	0	350	0	250	250	150	300	700			
Storage Lanes	2	0	1	1	1	1	1	1	1			
Taper Length (ft)	25			25			25					
Right Turn on Red				Yes			Yes			Yes		
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		895			1275			1018			2073	
Travel Time (s)		20.3			29.0			23.1			47.1	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shaded Lane Traffic (%)												
Turn Type	Prot	NA	NA	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Free
Protected Phases	3	8	7	4	4	4	1	6	6	5	2	
Permitted Phases												
Detector Phase	3	8	7	4	4	4	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	31.0	11.0	31.0	31.0	11.0	31.0	31.0	11.0	31.0	11.0	31.0
Total Split (s)	11.0	31.0	11.0	31.0	31.0	12.0	31.0	31.0	12.0	31.0	11.0	31.0
Total Split (%)	12.9%	36.5%	12.9%	36.5%	14.1%	36.5%	14.1%	36.5%	14.1%	36.5%	12.9%	36.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimizer?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None	None
Intersection Summary												
Area Type:	Other											
Cycle Length:	85											
Actuated Cycle Length:	74											
Natural Cycle:	85											
Control Type:	Actuated-Uncoordinated											

### Splits and Phases: 50: Linderson Way & Turnwater Blvd



HCM 2010 Signalized Intersection Summary  
50: Linderson Way & Turnwater Blvd

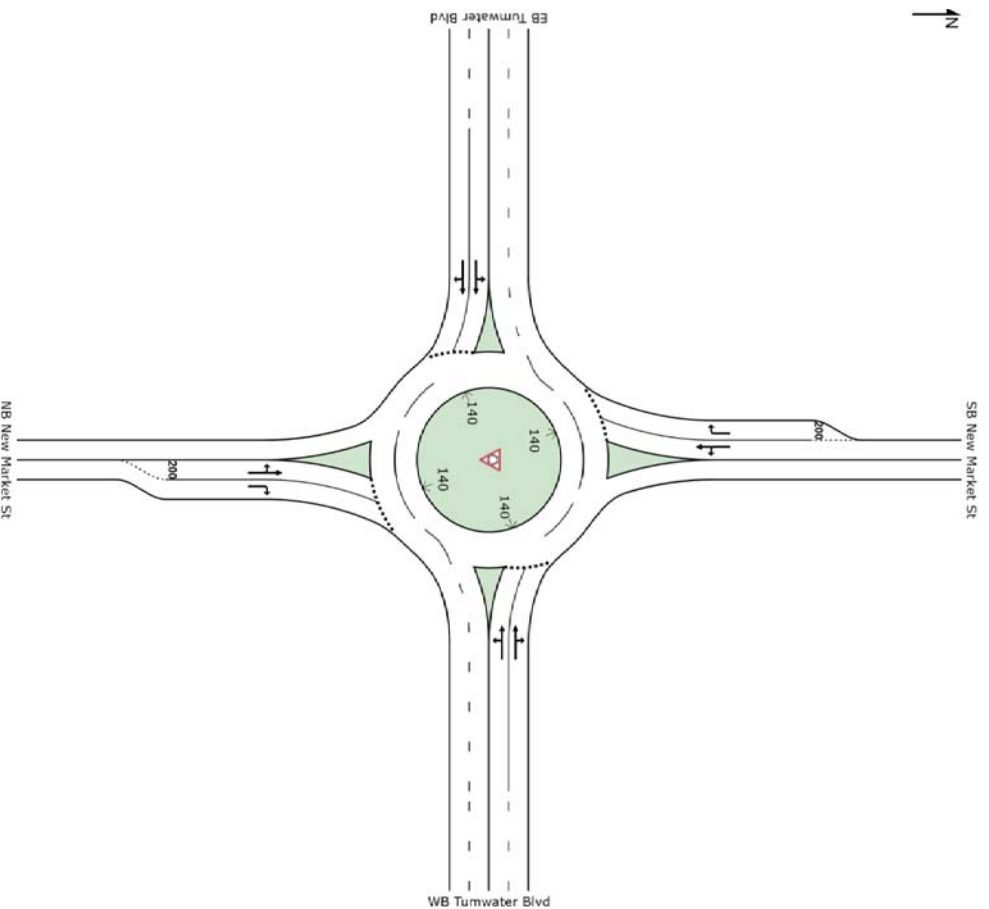
Projected 2040 No Build  
PM Peak Hour

Movement	EBL	EBT	EER	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	RB	RB		RB	RB		RB	RB		RB	RB	RB
Traffic Volume (veh/h)	90	655	245	130	805	30	175	135	75	210	235	790
Future Volume (veh/h)	90	655	245	130	805	30	175	135	75	210	235	790
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Q <sub>0</sub> ), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj(A <sub>pb</sub> )	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1863	1863	1900	1881	1881	1881	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	95	689	258	137	847	32	184	142	79	221	247	0
Adj No of Lanes	2	2	0	1	2	1	1	1	1	1	1	1
Peak Hour Factor %	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh %	2	2	2	1	1	1	1	1	1	1	1	1
Cap. veh/h	244	909	340	149	1333	596	174	342	291	174	342	291
Arrive On Green	0.07	0.36	0.36	0.08	0.37	0.37	0.10	0.18	0.18	0.10	0.18	0.00
Sat Flow, veh/h	3442	2522	944	1792	3574	1599	1792	1881	1599	1792	1881	1599
Grp Volume(V), veh/hln	95	484	443	137	847	32	184	142	79	221	247	0
Grp Sat Flow(S), veh/hln	1721	1770	1696	1792	1787	1599	1792	1881	1599	1792	1881	1599
Q Serve(Q <sub>s</sub> ), s	1.9	17.3	17.3	5.5	14.0	0.9	7.0	4.8	3.1	7.0	8.9	0.0
Cycle Q Clear(Q <sub>c</sub> ), s	1.9	17.3	17.3	5.5	14.0	0.9	7.0	4.8	3.1	7.0	8.9	0.0
Prop In Lane	1.00	0.56	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	244	638	611	149	1333	596	174	342	291	174	342	291
V/C Ratio(X)	0.39	0.76	0.76	0.92	0.64	0.05	1.06	0.41	0.27	1.27	0.72	0.00
Avail Cap(c), veh/h	286	638	611	149	1333	596	174	342	291	174	342	291
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay(d), s/veh	32.0	20.3	20.3	32.8	18.6	14.5	32.6	26.1	25.4	32.6	27.8	0.0
Incr Delay(d <sub>2</sub> ), s/veh	1.0	8.2	8.6	50.3	2.3	0.2	84.5	0.8	0.5	159.2	2.9	0.0
Initial Q Delay(d <sub>0</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/hln	0.9	9.9	9.6	4.8	7.4	0.4	7.5	2.6	1.4	11.1	4.9	0.0
Lngrp Delay(d <sub>l</sub> ), s/veh	33.0	28.5	28.9	83.2	20.9	14.6	117.1	26.9	25.9	191.7	30.7	0.0
Lngrp LOS	C	C	C	F	C	B	F	C	C	F	C	C
Approach Vol, veh/h		1042			1016			405		468		
Approach Delay, s/veh		29.1			29.1			67.7		106.7		
Approach LOS		C			C			E		F		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+R), s	120	18.1	10.1	31.9	12.0	18.1	11.0	31.0				
Change Period (Y+R), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (G <sub>max</sub> ), s	7.0	26.0	6.0	26.0	7.0	26.0	6.0	26.0				
Max Q Clear Time (Q <sub>ch1</sub> ), s	9.0	10.9	3.9	16.0	9.0	6.8	7.5	19.3				
Green Ext Time (Q <sub>c</sub> ), s	0.0	2.2	0.0	7.4	0.0	2.4	0.0	5.3				
<b>Intersection Summary</b>												
HCM 2010 C/H Delay	468											
HCM 2010 LOS	D											

**SITE LAYOUT**

Site: 51) New Market Rd at Turnwater Blvd

Projected 2040 Baseline  
PM Peak Hour  
Roundabout



# MOVEMENT SUMMARY

Site: 51) New Market Rd at Turnwater Blvd

Projected 2040 Baseline  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total Veh/h	HY %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Veh	Distance ft	Pop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB New Market St											
3	L2	26	0.0	0.055	13.9	LOS B	0.2	5.4	0.65	0.82	34.5
8	T1	5	0.0	0.055	6.8	LOS A	0.2	5.4	0.65	0.82	34.1
18	R2	68	0.0	0.085	6.2	LOS A	0.4	9.4	0.65	0.72	35.7
Approach											
		100	0.0	0.085	8.2	LOS A	0.4	9.4	0.65	0.75	35.3
East: WB Turnwater Blvd											
1	L2	68	2.0	0.335	11.0	LOS B	2.3	57.4	0.38	0.44	37.7
6	T1	784	2.0	0.335	3.8	LOS A	2.3	58.6	0.37	0.41	37.6
16	R2	63	2.0	0.335	4.2	LOS A	2.3	58.6	0.36	0.38	36.3
Approach											
		916	2.0	0.335	4.4	LOS A	2.3	58.6	0.37	0.41	37.5
North: SB New Market St											
7	L2	126	4.0	0.215	13.4	LOS B	0.9	22.7	0.61	0.84	34.6
4	T1	26	4.0	0.215	6.3	LOS A	0.9	22.7	0.61	0.84	34.3
14	R2	232	4.0	0.282	6.1	LOS A	1.1	29.7	0.61	0.71	35.7
Approach											
		384	4.0	0.282	8.5	LOS A	1.1	29.7	0.61	0.76	35.2
West: EB Turnwater Blvd											
5	L2	95	4.0	0.420	11.8	LOS B	3.0	77.5	0.54	0.52	36.9
2	T1	911	4.0	0.420	4.5	LOS A	3.1	80.0	0.52	0.47	36.9
12	R2	32	4.0	0.420	4.8	LOS A	3.1	80.0	0.51	0.44	35.7
Approach											
		1037	4.0	0.420	5.2	LOS A	3.1	80.0	0.53	0.48	36.9
All Vehicles											
		2437	3.1	0.420	5.5	LOS A	3.1	80.0	0.48	0.51	36.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
Roundabout LOS Method: Same as Signalized Intersections.  
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).  
Intersection and Approach LOS values are based on average delay for all movements v/c not used as specified in HCM 2010).  
Roundabout Capacity Model: SIDRA Standard.  
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.  
Gap-Acceptance Capacity: SIDRA Standard (Akçelik MSD).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arcelik and Associates Pty Ltd | sidrasolutions.com  
Organization: SCJ ALLIANCE | Processed: Wednesday, February 17, 2016 2:48:46 PM  
Project: N:\Projects\0625\_City of Turnwater\0625\_17 Turnwater Transportation Master Plan\Traffic\Operations\sidra\_2040 Baseline\Projected\_2040 Baseline PM.sp6

## Lanes, Volumes, Timings

Projected 2040 No Build  
PM Peak Hour

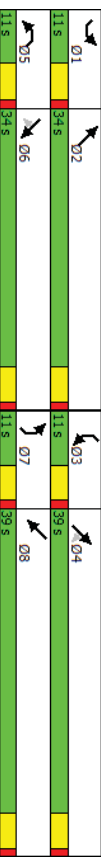
### 52: Turnwater Blvd & Capitol Blvd

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	MER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	150	980	195	225	515	20	175	350	300	110	345	20
Future Volume (vph)	150	980	195	225	515	20	175	350	300	110	345	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	0	275	1900	1900	1900	1900	0
Storage Length (ft)	250	0	0	200	0	0	275	0	200	0	200	0
Storage Lanes	1	1	1	2	2	0	1	1	1	1	1	0
Taper Length (ft)	25			25			25				25	
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)	50			50			30				30	
Link Distance (ft)	934			3620			2404				1729	
Travel Time (s)	12.7			49.4			54.6				39.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)	Prot	NA	Perm	Prot	NA	Prot	NA	Perm	Prot	NA	Perm	Prot
Turn Type	1	6	6	5	2	7	4	4	4	3	8	8
Protected Phases												
Permitted Phases	1	6	6	5	2	7	4	4	3	8	8	8
Detector Phase	1	6	6	5	2	7	4	4	3	8	8	8
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	34.0	34.0	11.0	34.0	11.0	39.0	39.0	11.0	39.0	11.0	39.0
Total Split (s)	11.0	34.0	34.0	11.0	34.0	11.0	39.0	39.0	11.0	39.0	11.0	39.0
Total Split (%)	11.6%	35.8%	35.8%	11.6%	35.8%	11.6%	41.1%	41.1%	11.6%	41.1%	11.6%	41.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	None	None	None	None	None	None	None

#### Intersection Summary

Area Type:	Other
Cycle Length: 95	
Actuated Cycle Length: 84.3	
Natural Cycle: 95	
Control Type: Actuated-Uncoordinated	

#### Splits and Phases: 52: Turnwater Blvd & Capitol Blvd





### HCM 2010 Signalized Intersection Summary

PM Peak Hour

### Lanes, Volumes, Timings

PM Peak Hour

### Projected 2040 No Build

Movement	SEL	SET	SER	NWL	NWT	NWR	NEI	NET	MER	SWL	SWT	SWR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (veh/h)	150	980	195	225	515	20	175	350	300	110	345	20
Future Volume (veh/h)	150	980	195	225	515	20	175	350	300	110	345	20
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (QI), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped. Bike Adj./A (pb7)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj'l Sat Flow, veh/h/ln	1845	1845	1845	1881	1881	1900	1881	1881	1881	1881	1900	1900
Adj'l Flow Rate, veh/h	158	1032	131	237	542	21	184	368	90	116	363	21
Adj'l No. of Lanes	1	2	1	2	2	0	1	1	1	1	2	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Heavy Veh. %	3	3	3	3	1	1	1	1	1	1	1	1
Cap. veh/h	128	1233	552	253	1234	48	130	489	416	130	893	51
Arrive On Green	0.07	0.35	0.35	0.07	0.35	0.35	0.07	0.26	0.26	0.07	0.26	0.26
Sat Flow, veh/h	1757	3505	1568	3476	3509	136	1792	1881	1599	1792	3435	198
Grip Volume (V), veh/h/ln	158	1032	131	237	287	184	368	90	116	188	196	196
Grip Sat Flow(s), veh/h/ln	1757	1752	1568	1738	1787	1792	1881	1599	1792	1787	1846	1846
Q Serve(q.s), s	6.0	22.3	4.9	5.6	9.8	9.8	6.0	14.8	3.6	5.3	7.2	7.2
Cycle Q Clear(q.c), s	6.0	22.3	4.9	5.6	9.8	9.8	6.0	14.8	3.6	5.3	7.2	7.2
Prop In Lane	1.00	1.00	1.00	1.00	0.07	1.00	1.00	1.00	1.00	1.00	0.11	0.11
Lane Grp Cap(c), veh/h	128	1233	552	253	629	653	130	489	416	130	465	480
V/C Ratio(X)	1.28	0.84	0.24	0.94	0.44	0.44	0.75	0.22	0.89	0.89	0.41	0.41
Avail Cap(c), veh/h	128	1233	552	253	629	653	130	489	416	130	465	480
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.2	24.5	18.9	38.0	20.5	20.5	38.2	28.1	23.9	37.9	25.2	25.2
Incr Delay (d2), s/veh	156.2	6.9	1.0	39.7	2.2	2.1	224.1	2.4	0.3	46.0	0.6	0.6
Initial Q Delay(dI), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/ln	8.4	11.9	2.2	4.1	5.2	5.4	11.1	8.0	1.6	4.3	3.6	3.8
Lngrp Delay(d), s/veh	194.4	31.4	19.9	77.7	22.7	22.6	262.3	30.4	24.2	83.9	25.8	25.8
Lngrp LOS	F	C	B	E	C	C	F	C	C	F	C	C
Approach Vol, veh/h	1321	800	642	390	642	500	960	390	390	642	500	500
Approach Delay, s/veh	49.8	39.0	6.0	49.8	39.0	39.3	6.0	39.3	39.3	6.0	39.3	39.3
Approach LOS	D	D	F	D	D	D	F	D	D	F	D	D
Timer	1	2	3	4	5	6	7	8				
Assigned PIs	1	2	3	4	5	6	7	8				
Pls Duration (G+Y+R), s	11.0	34.0	11.0	26.4	11.0	34.0	11.0	26.4				
Change Period (Y+R), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	6.0	29.0	6.0	34.0	6.0	29.0	6.0	34.0				
Max Q Clear Time (Qch1), s	8.0	11.8	7.3	16.8	7.6	24.3	8.0	9.2				
Green Ext Time (Qch), s	0.0	10.8	0.0	4.6	0.0	3.7	0.0	5.2				
<b>Intersection Summary</b>												
HCM 2010 C/H Delay	54.6											
HCM 2010 LOS	D											

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	10	900	105	120	645	10	55	0	85	10	0	5
Future Volume (vph)	10	900	105	120	645	10	55	0	85	10	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100	0	0	150	0	0	0	0	0	0	0	0
Storage Lanes	1	0	0	1	0	0	0	0	0	0	0	0
Storage Length (ft)	25	0	0	25	0	0	0	0	0	0	0	0
Taper Length (ft)												
Right Turn on Red Link Speed (mph)												
Link Distance (ft)		30			30				30			
Travel Time (s)		2111			1760				704			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Shaded Lane Traffic (%)												
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6				8			
Permitted Phases		2			6				8			
Detector Phase		2			6				8			
Switch Phase												
Minimum Initial (s)		8.0			8.0				8.0			
Minimum Spill (s)		27.5			27.5				12.5			
Total Split (s)		52.5			52.5				27.5			
Total Split (%)		65.6%			65.6%				34.4%			
Yellow Time (s)		3.5			3.5				3.5			
All-Red Time (s)		1.0			1.0				1.0			
Lost Time Adjust (s)		0.0			0.0				0.0			
Total Lost Time (s)		4.5			4.5				4.5			
Leadlag Optimizer?												
Recall Mode	Max	Max	Max	Max	Max	Max	None	None	None	None	None	None
<b>Area Type: Other</b>												
Cycle Length: 90												
Actuated Cycle Length: 71.9												
Natural Cycle: 90												
Control Type: Actuated-Uncoordinated												
<b>Splits and Phases: 53.65th Ave &amp; Henderson Blvd</b>												

HCM 2010 Signalized Intersection Summary  
53: 65th Ave & Henderson Blvd

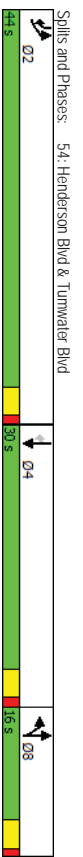
Projected 2040 No Build  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (veh/h)	10	900	105	120	645	10	55	0	85	10	0	5
Future Volume (veh/h)	10	900	105	120	645	10	55	0	85	10	0	5
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1881	1900	1881	1881	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	11	947	111	126	679	11	58	0	89	11	0	5
Adj No of Lanes	1	1	0	1	1	0	1	0	1	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh. %	1	1	1	1	1	1	1	1	1	1	1	1
Arrive On Green	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Sat Flow, veh/h	757	1653	194	536	1846	30	504	115	950	945	135	491
Gpr Volume (V), veh/hln	11	0	1058	126	0	690	147	0	0	16	0	0
Gpr Sat Flow(s), veh/hln	757	0	1847	536	0	1876	1568	0	0	1571	0	0
Q Serve(g.s), s	0.4	0.0	23.2	12.4	0.0	10.0	4.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g.c), s	10.4	0.0	23.2	35.6	0.0	10.0	5.8	0.0	0.0	0.5	0.0	0.0
Prop In Lane	1.00	0.10	1.00	1.00	0.02	0.39	0.61	0.69	0.61	0.69	0.31	0.31
Lane Gpr Cap(c), veh/h	551	0	1358	315	0	1380	276	0	292	0	0.00	0.00
V/C Ratio(X)	0.02	0.00	0.78	0.40	0.00	0.50	0.53	0.00	0.05	0.00	0.00	0.00
Avail Cap(c), veh/h	551	0	1358	315	0	1380	623	0	610	0	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	5.8	0.0	5.3	16.4	0.0	3.6	27.4	0.0	0.0	25.1	0.0	0.0
Incrt Delay (d2), s/veh	0.1	0.0	4.5	3.8	0.0	1.3	1.9	0.0	0.1	0.1	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/hln	0.1	0.0	13.1	2.1	0.0	5.5	2.7	0.0	0.3	0.0	0.0	0.0
Lngrp Delay(d), s/veh	5.9	0.0	9.8	20.1	0.0	4.9	29.3	0.0	25.2	0.0	0.0	0.0
Lngrp LOS	A	A	A	C	A	A	C	C	C	C	C	C
Approach Vol, veh/h		1069			816			147			16	
Approach Delay, s/veh		9.8			7.3			29.3			25.2	
Approach LOS		A			A			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Pts	2	2	2	2	2	2	2	2				
Pts Duration (G+Y+R), s	52.5	52.5	12.8	12.8	52.5	12.8	12.8	52.5				
Change Period (Y+R), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	48.0	48.0	23.0	23.0	48.0	23.0	23.0	48.0				
Max Q Clear Time (Q_cH1), s	25.2	25.2	2.5	2.5	37.6	2.5	2.5	37.6				
Green Ext Time (Q_c), s	17.9	17.9	1.0	1.0	9.1	1.0	1.0	9.1				
Intersection Summary												
HCM 2010 C/H Delay												
HCM 2010 LOS												

Lanes, Volumes, Timings  
54: Henderson Blvd & Turnwater Blvd

Projected 2040 No Build  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBL	SBR
Lane Configurations	1	1	1	1	1	1
Traffic Volume (vph)	755	5	30	180	300	375
Future Volume (vph)	755	5	30	180	300	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	0	100
Storage Lanes	1	0	0	0	0	1
Taper Length (ft)	25			25		
Right Turn on Red		Yes			Yes	
Link Speed (mph)	35			35		35
Link Distance (ft)	3122			2394		2111
Travel Time (s)	60.8			46.6		41.1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)						
Turned Lane Traffic (%)						
Signal Type	Prot		Split	NA	NA	pm+ov
Protected Phases	2		8	8	4	2
Permitted Phases						
Detector Phase	2		8	8	4	2
Switch Phase						
Minimum Initial (s)	6.0		6.0	6.0	6.0	6.0
Minimum Spill (s)	20.5		10.5	10.5	30.0	20.5
Total Spill (s)	44.0		16.0	16.0	30.0	44.0
Total Split (%)	48.9%		17.8%	17.8%	33.3%	48.9%
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0		4.0	4.0	4.0	4.0
Leadlag						
Lead-Lag Optimize?						
Recall Mode	Max		None	None	Max	Max
Area Type:	Other					
Cycle Length:	90					
Actuated Cycle Length:	90					
Natural Cycle:	90					
Control Type:	Actuated-Uncoordinated					



HCM 2010 Signalized Intersection Summary  
 54: Henderson Blvd & Turnwater Blvd

Projected 2040 No Build  
 PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T	T	T	T	T	T
Traffic Volume (veh/h)	755	5	30	180	300	375
Future Volume (veh/h)	755	5	30	180	300	375
Number	5	12	3	8	4	14
Initial Q (Qb), veh	0	0	0	0	0	0
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1900	1900	1881	1881	1881
Adj Flow Rate, veh/h	795	5	32	189	316	279
Adj No of Lanes	0	0	0	1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh. %	0	0	1	1	1	1
Cap. veh/h	790	5	36	213	543	1173
Arrive On Green	0.44	0.44	0.13	0.13	0.29	0.29
Sat Flow, veh/h	1777	11	270	1597	1881	1599
Grp Volume(V), veh/h	801	0	221	0	316	279
Grp Sat Flow(S), veh/hln	1790	0	1868	0	1881	1599
Q Serve(g,s), s	40.0	0.0	10.5	0.0	12.9	5.1
Cycle Q Clear(q,c), s	40.0	0.0	10.5	0.0	12.9	5.1
Prop In Lane	0.99	0.01	0.14	0.00	1.00	1.00
Lane Grp Cap(c), veh/h	796	0	249	0	543	1173
V/C Ratio(X)	1.01	0.00	0.89	0.00	0.58	0.24
Avail Cap(c), veh/h	796	0	249	0	543	1173
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	25.0	0.0	38.3	0.0	21.3	3.9
Incr Delay (d2), s/veh	33.5	0.0	29.9	0.0	4.5	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q)(50%), veh/hln	27.1	0.0	7.5	0.0	7.3	6.1
LnGrp Delay(d), s/veh	58.6	0.0	68.2	0.0	31.8	4.4
LnGrp LOS	F	E	E	C	A	A
Approach Vol, veh/h	801		221		595	
Approach Delay, s/veh	58.6		68.2		19.0	
Approach LOS	E		E		B	
Timer	1	2	3	4	5	6
Assigned Pks		2		4		7
Pks Duration (G+Y+R), s		44.0		30.0		16.0
Change Period (Y+R), s		4.0		4.0		4.0
Max Green Setting (Gmax), s		40.0		26.0		12.0
Max Q Clear Time (Q_c+H1), s		42.0		14.9		12.5
Green Ext Time (Q_c), s		0.0		2.6		0.0
<b>Intersection Summary</b>						
HCM 2010 Ctrl Delay				45.3		
HCM 2010 LOS				D		

HCM 2010 TWSC  
 55: Henderson Blvd & Trails End Dr

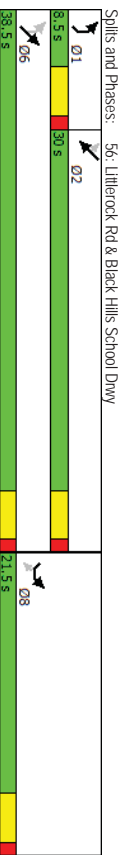
Projected 2040 No Build  
 PM Peak Hour

Intersection	Int Delay, s/veh				
	4				
Movement	NWL	NWR	NET NER	SWL SWT	
Traffic Vol, veh/h	80	55	170	140	110
Future Vol, veh/h	80	55	170	140	110
Conflicting Peds. #/hr	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free
RT Channelized	-	None	-	None	-
Storage Length	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-
Grade, %	0	-	0	-	0
Peak Hour Factor	95	95	95	95	95
Heavy Vehicles, %	0	0	1	1	1
Mmnt Flow	84	58	179	147	116
					221
<b>Major/Minor</b>					
Conflicting Flow All	Major1		Major1	Major2	
Stage 1	706	253	0	0	326
Stage 2	253	-	-	-	-
Critical Hdwy	453	-	-	-	-
Critical Hdwy Stg 1	6.4	6.2	-	-	4.11
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.209
Pot Cap-1 Maneuver	405	791	-	-	1239
Stage 1	794	-	-	-	-
Stage 2	645	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	362	791	-	-	1239
Mov Cap-2 Maneuver	362	-	-	-	-
Stage 1	794	-	-	-	-
Stage 2	576	-	-	-	-
Approach	NW		NE	SW	
HCM Control Delay, s	16.1		0	2.8	
HCM LOS	C				
<b>Minor Lane/Major Mmnt</b>					
Capacity (veh/h)	NET	NER	NWL	SWL	SWT
	-	465	1239	-	-
HCM Lane V/C Ratio	-	-	0.306	0.093	-
HCM Control Delay (s)	-	-	16.1	8.2	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %ile Q(veh)	-	-	1.3	0.3	-

Lanes, Volumes, Timings  
56: Litterock Rd & Black Hills School Drwy

Projected 2040 No Build  
PM Peak Hour

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations	5	10	15	275	535	70
Traffic Volume (vph)	5	10	15	275	535	70
Future Volume (vph)	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	200	0	175	1900	350	
Storage Length (ft)	1	1	1		1	
Storage Lanes	1	1	1	25		
Taper Length (ft)						
Right Turn on Red	Yes				Yes	
Link Speed (mph)	30			30	30	
Link Distance (ft)	1065			1067	3970	
Travel Time (s)	24.2			24.3	90.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	1%	1%	1%	1%
Shared Lane Traffic (%)						
Turn Type	Prot	Perm	pm+pl	NA	NA	Perm
Protected Phases	8	1	6	6	2	2
Permitted Phases	8	8	6	6	2	2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	4.0	7.0	7.0	7.0
Minimum Spill (s)	21.5	21.5	8.5	24.5	27.5	27.5
Total Spill (s)	21.5	21.5	8.5	38.5	30.0	30.0
Total Spill (%)	35.8%	35.8%	14.2%	64.2%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?	Yes		Yes		Yes	Yes
Recall Mode	None	None	None	Max	None	None
Area Type:	Other					
Cycle Length:	60					
Actuated Cycle Length:	53.4					
Natural Cycle:	60					
Control Type:	Actuated-Uncoordinated					



HCM 2010 Signalized Intersection Summary  
56: Litterock Rd & Black Hills School Drwy

Projected 2040 No Build  
PM Peak Hour

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations	5	10	15	275	535	70
Traffic Volume (veh/h)	5	10	15	275	535	70
Future Volume (veh/h)	1900	1900	1900	1900	1900	1900
Number	3	18	1	6	2	12
Initial Q (Ob.) veh	0	0	0	0	0	0
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1900	1900	1881	1881	1881	1881
Adj Flow Rate, veh/h	5	11	16	289	563	74
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh. %	0	0	1	1	1	1
Cap. veh/h	51	46	590	1445	1224	1040
Arrive On Green	0.03	0.03	0.02	0.77	0.65	0.65
Sat Flow, veh/h	1810	1615	1792	1881	1881	1599
Gp Volume(v), veh/h	5	11	16	289	563	74
Gp Sat Flow(s), veh/hln	1810	1615	1792	1881	1881	1599
Q Serve(g.-s), s	0.1	0.3	0.1	1.9	6.6	0.8
Cycle Q Clear(g.-c), s	0.1	0.3	0.1	1.9	6.6	0.8
Prop. In Lane	1.00	1.00	1.00	1.00	1.00	1.00
Lane Gp Cap(c), veh/h	51	46	590	1445	1224	1040
V/C Ratio(X)	0.10	0.24	0.03	0.20	0.46	0.07
Avail Cap(c), veh/h	695	620	724	1445	1224	1040
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	210	210	2.7	1.4	3.9	2.8
Incr Delay (d2), s/veh	0.8	2.7	0.0	0.3	0.3	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%),veh/hln	0.1	0.2	0.1	1.0	3.4	0.3
LnGrp Delay(d),s/veh	218	237	2.7	1.7	4.2	2.9
LnGrp LOS	C	C	A	A	A	A
Approach Vol, veh/h	16			305	637	
Approach Delay, s/veh	23.1			1.8	4.0	
Approach LOS	C			A	A	
Timer	1	2	3	4	5	6
Assigned Pts	1	2				8
Pts Duration (G+Y+R), s	5.2	33.3				5.7
Change Period (Y+R), s	4.5	4.5				4.5
Max Green Setting (Gmax), s	4.0	25.5				17.0
Max O Clear Time (G-c+I), s	2.1	8.6				2.3
Green Ext Time (p.c.), s	0.0	6.4				8.0
Intersection Summary	HCM 2010 Cnt Delay 3.6					
HCM 2010 LOS	A					

HCM 2010 TWSC  
57: Center St & 76th Ave

Projected 2040 No Build  
PM Peak Hour

Intersection	4.3											
Int Delay, s/veh	4.3											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	85	15	2	15	15	35	2	300	0	15	425	165
Future Vol, veh/h	85	15	2	15	15	35	2	300	0	15	425	165
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	3	3	3	11	11	11	1	1	1	3	3	3
Mvmt Flow	89	16	2	16	16	37	2	316	0	16	447	174

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	912	886	534	895
Stage 1	566	566	-	320
Stage 2	346	320	-	575
Critical Hdwy	7.13	6.53	6.23	7.21
Critical Hdwy Sig 1	6.13	5.53	-	6.21
Critical Hdwy Sig 2	6.13	5.53	-	5.61
Follow-up Hdwy	3.527	4.027	3.327	3.599
Pol Cap-1 Maneuver	254	282	544	252
Stage 1	507	506	-	673
Stage 2	668	651	-	488
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	224	216	544	236
Mov Cap-2 Maneuver	224	216	-	236
Stage 1	505	496	-	671
Stage 2	615	649	-	461

Approach	EB	WB	NB	SB
HCM Control Delay, s	33	17	0.1	0.2
HCM LOS	D	C		

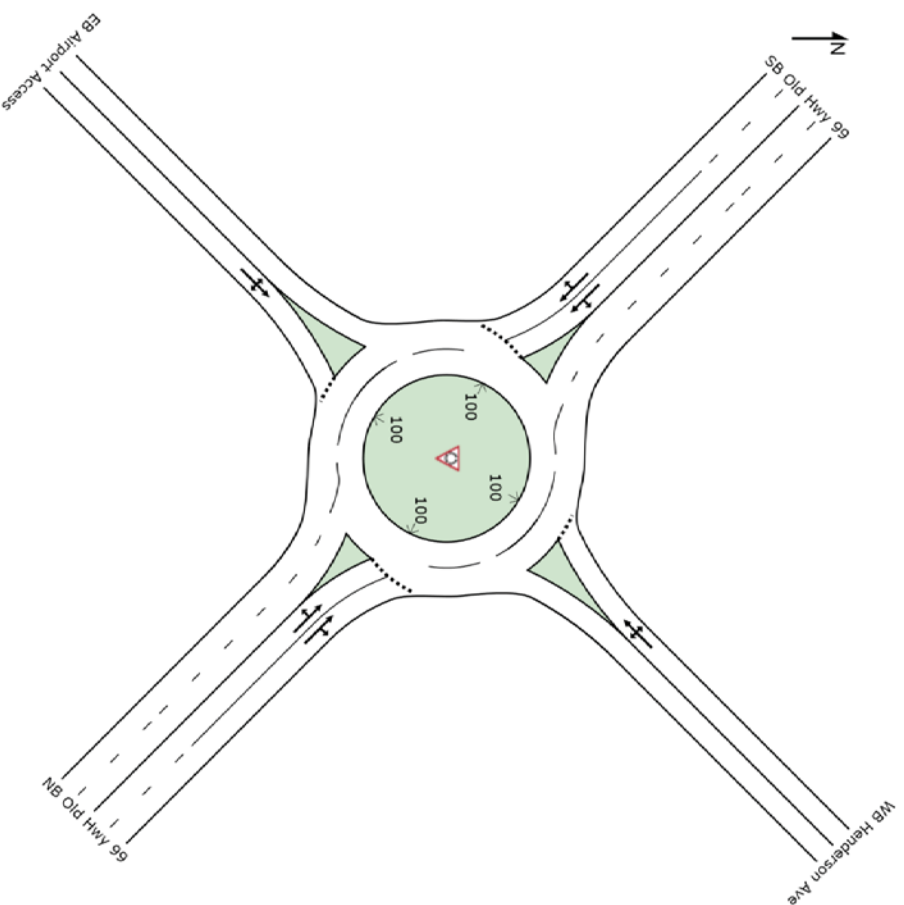
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBL	WBL	SBL	SBT	SBR
Capacity (veh/h)	965	-	-	233	368	1239	-	-
HCM Lane V/C Ratio	0.002	-	-	0.461	0.186	0.013	-	-
HCM Control Delay (s)	8.7	0	-	33	17	7.9	0	-
HCM Lane LOS	A	A	-	D	C	A	A	-
HCM 95th %ile Q(veh)	0	-	-	2.2	0.7	0	-	-

Turnwater Transportation Master Plan  
SCJ Alliance

Synchro 9 Report  
6/10/2016

### SITE LAYOUT

Site: 58) Henderson Ave at Old Hwy 99  
Projected 2040 Baseline  
PM Peak Hour  
Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Alcolik and Associates Pty Ltd | sidrasolutions.com  
Organisation: SCJ ALLIANCE | Created: Thursday, June 9, 2016 1:50:01 PM  
Project: N:\projects\0625 City of Turnwater\Transportation Master Plan\Traffic\Operations\sidra\2040 Baseline\58) Henderson Ave at Old Hwy 99.sps

**MOVEMENT SUMMARY**

**Site: 58) Henderson Ave at Old Hwy 99**

Projected 2040 Baseline  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total Veh/h	HV %	Deg. Satn W/C	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Queue Distance ft	Pop. Queued	Effective Stop Rate per/veh	Average Speed mph
<b>SouthEast: NB Old Hwy 99</b>											
3x	L2	5	2.0	0.381	7.1	LOS A	2.7	69.3	0.52	0.35	34.2
8x	T1	763	2.0	0.381	6.8	LOS A	2.8	70.9	0.52	0.34	34.2
18x	R2	132	2.0	0.381	6.6	LOS A	2.8	70.9	0.51	0.33	33.2
Approach		900	2.0	0.381	6.8	LOS A	2.8	70.9	0.51	0.34	34.1
<b>NorthEast: WB Henderson Ave</b>											
1x	L2	216	1.0	0.488	12.5	LOS B	2.5	63.9	0.71	0.75	30.1
6x	T1	11	1.0	0.488	12.5	LOS B	2.5	63.9	0.71	0.75	30.0
16x	R2	84	1.0	0.488	12.5	LOS B	2.5	63.9	0.71	0.75	29.3
Approach		311	1.0	0.488	12.5	LOS B	2.5	63.9	0.71	0.75	29.9
<b>NorthWest: SB Old Hwy 99</b>											
7x	L2	168	1.0	0.690	13.6	LOS B	7.9	199.3	0.78	0.80	30.7
4x	T1	1421	1.0	0.690	13.1	LOS B	7.9	199.3	0.77	0.57	31.2
14x	R2	16	1.0	0.690	12.7	LOS B	7.8	197.2	0.76	0.56	30.6
Approach		1605	1.0	0.690	13.1	LOS B	7.9	199.3	0.77	0.58	31.1
<b>SouthWest: EB Airport Access</b>											
5x	L2	26	3.0	0.146	13.7	LOS B	0.6	16.5	0.81	0.81	29.9
2x	T1	11	3.0	0.146	13.7	LOS B	0.6	16.5	0.81	0.81	29.8
12x	R2	11	3.0	0.146	13.7	LOS B	0.6	16.5	0.81	0.81	29.1
Approach		47	3.0	0.146	13.7	LOS B	0.6	16.5	0.81	0.81	29.7
All Vehicles		2863	1.3	0.690	11.1	LOS B	7.9	199.3	0.68	0.52	31.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
Roundabout LOS Method: Same as Signalized Intersections.  
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
LOS F will result if v/c > 1 (respective of movement delay value (does not apply for approaches and intersection).  
Intersection and Approach LOS values are based on average delay for all movements v/c not used as specified in HCM 2010).  
Roundabout Capacity Model: SIDRA Standard.  
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.  
Gap-Acceptance Capacity: SIDRA Standard (Akçelik MSD).  
HV (%) Values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

**SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arceik and Associates Pty Ltd | sidrasolutions.com**  
Organisation: SCJ ALLIANCE | Processed: Thursday, June 9, 2016 1:49:59 PM  
Project: N:\Projects\0625.025.17 Turmwater Transportation Master Plan\TrafficOperations\sidra2040 Baseline58) Henderson Ave at Old Hwy 99.sp5

**HCM 2010 TWSC**

**59: Old Hwy 99 & 79th Ave**

Projected 2040 No Build

PM Peak Hour

Intersection	In/Delay s/veh	3.6												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR		
Traffic Vol, veh/h	1	1	10	30	0	125	130	1450	0	1	645	20		
Future Vol, veh/h	1	1	10	30	0	125	130	1450	0	1	645	20		
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0		
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free		
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None		
Storage Length	-	-	-	-	-	300	250	-	-	-	-	-		
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	-	-		
Grade, %	-	0	-	-	0	-	-	-	-	-	-	-		
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95		
Heavy Vehicles, %	2	2	2	1	1	1	1	1	1	1	1	1		
Mvmt Flow	1	1	11	32	0	132	137	1526	0	1	679	21		

Major/Minor	Minor1	Minor2	Major1	Major2												
Conflicting Flow All	2142	2502	763	1729	2492	350	700	0	0	1526	0	0				
Stage 1	1800	1800	-	692	692	-	-	-	-	-	-	-				
Stage 2	342	702	-	1037	1800	-	-	-	-	-	-	-				
Critical Hdwy	754	654	694	752	652	692	412	-	-	412	-	-				
Critical Hdwy Sig 1	654	554	-	652	552	-	-	-	-	-	-	-				
Critical Hdwy Sig 2	654	554	-	652	552	-	-	-	-	-	-	-				
Follow-up Hdwy	352	402	332	351	401	331	221	-	-	221	-	-				
Plat Cap-1 Maneuver	28	28	347	57	29	649	899	-	-	438	-	-				
Stage 1	83	130	-	403	446	-	-	-	-	-	-	-				
Platoon blocked, %	646	439	-	249	132	-	-	-	-	-	-	-				
Mov Cap-1 Maneuver	20	24	347	47	24	649	899	-	-	438	-	-				
Mov Cap-2 Maneuver	20	24	-	47	24	-	-	-	-	-	-	-				
Stage 1	70	110	-	342	444	-	-	-	-	-	-	-				
Stage 2	513	437	-	203	112	-	-	-	-	-	-	-				

Approach	EB	WB	SE	NW												
HCM Control Delay, s	46.1	43.9	0.8	0												
HCM LOS	E	E														
Minor Lane/Minor Mvmt	NWL	NWT	NWR	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER				
Capacity (veh/h)	438	-	-	100	47	649	899	-	-	-	-	-				
HCM Lane V/C Ratio	0.002	-	-	0.126	0.672	0.203	0.152	-	-	-	-	-				
HCM Control Delay (s)	13.2	0	-	46.1	176.9	12	9.7	-	-	-	-	-				
HCM Lane LOS	B	A	-	E	F	B	A	-	-	-	-	-				
HCM 95th Xile (Veh)	0	-	-	0.4	2.6	0.8	0.5	-	-	-	-	-				

HCM 2010 TWSC  
60: Kimmie St & 83rd Ave

Projected 2040 No Build  
PM Peak Hour

Intersection						
Int Delay, s/veh	2.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	55	15	65	15	5	210
Future Vol, veh/h	55	15	65	15	5	210
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	-	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	3	3	9	9	3	3
Mvmt Flow	58	16	68	16	5	221

Major/Minor	Minor1	Major1	Major2	Minor2
Conflicting Flow All	308	76	0	84
Stage 1	76	-	-	-
Stage 2	232	-	-	-
Critical Hdwy	6.43	6.23	-	4.13
Critical Hdwy Sig 1	5.43	-	-	-
Critical Hdwy Sig 2	5.43	-	-	-
Follow-up Hdwy	3.527	3.327	-	2.227
Plat Cap-1 Maneuver	682	982	-	1506
Stage 1	944	-	-	-
Stage 2	804	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	679	982	-	1506
Mov Cap-2 Maneuver	679	-	-	-
Stage 1	944	-	-	-
Stage 2	801	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.5	0	0.2
HCM LOS	B		C

Minor Lane/Major Mvmt	NBT	NBR/WBL	SBL	SBT
Capacity (veh/h)	-	727	1506	-
HCM Lane V/C Ratio	-	0.101	0.003	-
HCM Control Delay (s)	-	10.5	7.4	0
HCM Lane LOS	-	B	A	A
HCM 95th %ile Q(veh)	-	0.3	0	-

HCM 2010 TWSC  
61: 83rd Ave & Center St

Projected 2040 No Build  
PM Peak Hour

Intersection						
Int Delay, s/veh	9.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	70	15	10	140	275	80
Future Vol, veh/h	70	15	10	140	275	80
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	0
Grade, %	-	-	-	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	1	1	3	3	1	1
Mvmt Flow	74	16	11	147	289	84

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	158	0	247
Stage 1	-	-	84
Stage 2	-	-	163
Critical Hdwy	4.11	-	7.11
Critical Hdwy Sig 1	-	-	6.11
Critical Hdwy Sig 2	-	-	6.11
Follow-up Hdwy	2.209	-	3.509
Plat Cap-1 Maneuver	1428	-	709
Stage 1	-	-	927
Stage 2	-	-	841
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1428	-	681
Mov Cap-2 Maneuver	-	-	681
Stage 1	-	-	879
Stage 2	-	-	797

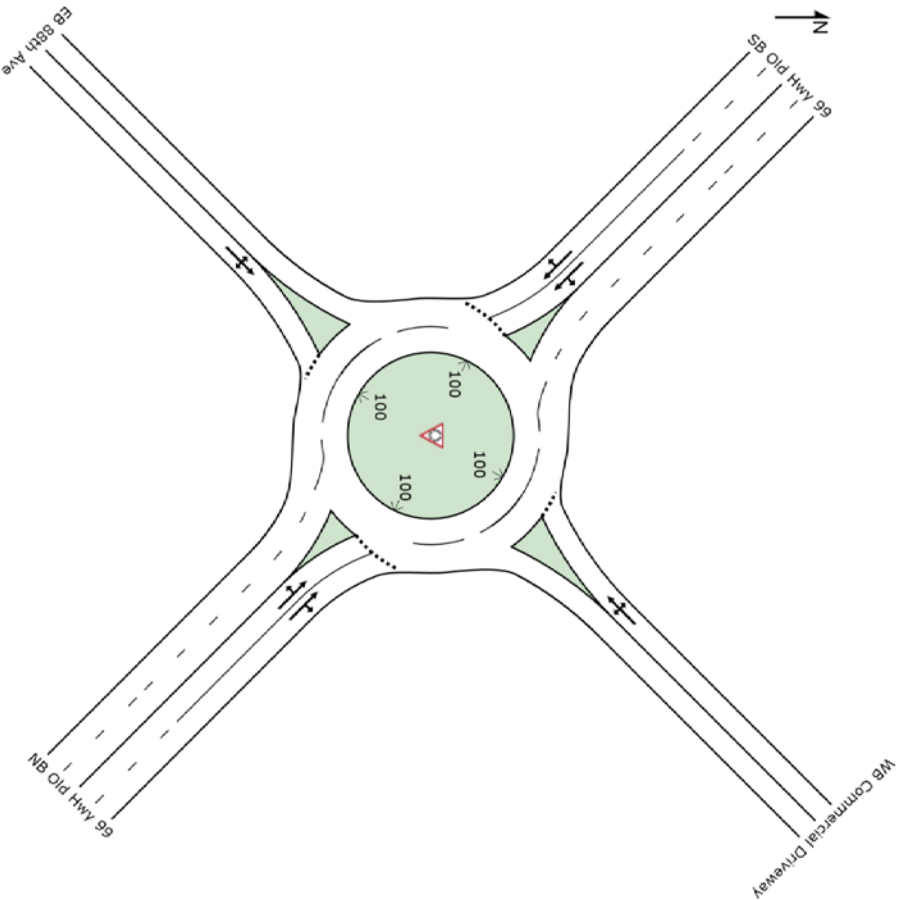
Approach	EB	WB	SB
HCM Control Delay, s	6.3	0	15
HCM LOS	C		C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR/SBL	SBT
Capacity (veh/h)	1428	-	-	731	-
HCM Lane V/C Ratio	0.052	-	-	0.511	-
HCM Control Delay (s)	7.7	0	-	15	-
HCM Lane LOS	A	A	-	C	-
HCM 95th %ile Q(veh)	0.2	-	-	2.9	-

## SITE LAYOUT

Site: 62) 88th Ave at Old Hwy 99  
 Projected 2040 Baseline  
 PM Peak Hour  
 Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arcelik and Associates Pty Ltd | sidrasolutions.com  
 Organisation: SCU ALLIANCE | Created: Thursday, June 9, 2016 1:59:17 PM  
 Project: N:\Projects\0625 City of Tumwater\0625\_17 Tumwater Transportation Master Plan\Traffic\Operations\sidra\2040 Baseline\62) 88th Ave at Old Hwy 99.sps

## MOVEMENT SUMMARY

Site: 62) 88th Ave at Old Hwy 99  
 Projected 2040 Baseline  
 PM Peak Hour  
 Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satm v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance Queued ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: NB Old Hwy 99											
3x	L2	5	1.0	0.189	5.1	LOS A	1.2	29.3	0.50	0.34	35.2
8x	T1	421	1.0	0.189	4.9	LOS A	1.2	30.2	0.50	0.33	35.3
18x	R2	1	1.0	0.189	4.7	LOS A	1.2	30.2	0.49	0.32	34.3
Approach		427	1.0	0.189	4.9	LOS A	1.2	30.2	0.50	0.33	35.3
NorthEast: WB Commercial Drive											
1x	L2	5	2.0	0.016	5.2	LOS A	0.1	1.6	0.53	0.39	33.9
6x	T1	5	2.0	0.016	5.2	LOS A	0.1	1.6	0.53	0.39	33.8
16x	R2	1	2.0	0.016	5.2	LOS A	0.1	1.6	0.53	0.39	32.9
Approach		12	2.0	0.016	5.2	LOS A	0.1	1.6	0.53	0.39	33.8
NorthWest: SB Old Hwy 99											
7x	L2	1	1.0	0.525	8.0	LOS A	4.9	123.9	0.16	0.04	33.8
4x	T1	979	1.0	0.525	7.9	LOS A	4.9	123.9	0.16	0.04	33.7
14x	R2	537	1.0	0.525	7.7	LOS A	4.9	123.8	0.15	0.04	32.6
Approach		1517	1.0	0.525	7.8	LOS A	4.9	123.9	0.16	0.04	33.3
SouthWest: EB 88th Ave											
6x	L2	253	3.0	0.482	13.1	LOS B	2.5	64.5	0.73	0.79	29.5
2x	T1	5	3.0	0.482	13.1	LOS B	2.5	64.5	0.73	0.79	29.4
12x	R2	26	3.0	0.482	13.1	LOS B	2.5	64.5	0.73	0.79	28.7
Approach		284	3.0	0.482	13.1	LOS B	2.5	64.5	0.73	0.79	29.4
All Vehicles		2240	1.3	0.525	7.9	LOS A	4.9	123.9	0.30	0.19	33.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
 Roundabout LOS Method: Same as Signalised Intersections.  
 Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
 LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).  
 Roundabout Capacity Model: SIDRA Standard.  
 HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.  
 Gap-Acceptance Capacity: SIDRA Standard (Arceik M3D).  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

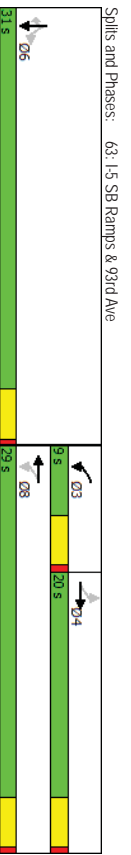
SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arcelik and Associates Pty Ltd | sidrasolutions.com  
 Organisation: SCU ALLIANCE | Processed: Thursday, June 9, 2016 1:58:16 PM  
 Project: N:\Projects\0625 City of Tumwater\0625\_17 Tumwater Transportation Master Plan\Traffic\Operations\sidra\2040 Baseline\62) 88th Ave at Old Hwy 99.sps



Lanes, Volumes, Timings  
63 : I-5 SB Ramps & 93rd Ave

Projected 2040 No Build  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	0	415	95	85	305	0	0	0	0	475	0	425
Traffic Volume (vph)	0	415	95	85	305	0	0	0	0	475	0	425
Future Volume (vph)	0	415	95	85	305	0	0	0	0	475	0	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	300
Storage Length (ft)	0	0	0	150	0	0	0	0	0	0	0	1
Storage Lanes	0	0	0	1	0	0	0	0	0	0	0	1
Taper Length (ft)	25	0	0	25	0	0	25	0	0	25	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)	30	30	30	40	40	30	30	30	30	30	30	30
Link Distance (ft)	1124	1124	1099	936	936	1099	1099	1099	1099	1644	1644	1644
Travel Time (s)	25.5	25.5	25.0	16.0	16.0	25.0	25.0	25.0	25.0	37.4	37.4	37.4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	9%	9%	0%	0%	0%	0%	4%	4%	4%
Shared Lane Traffic (%)												
Turn Type	NA	pm+pl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Protected Phases	3	8	8	8	8	8	8	8	8	6	6	6
Permitted Phases	4	4	4	3	3	3	3	3	3	6	6	6
Detector Phase	4	4	4	3	3	3	3	3	3	6	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Spill (s)	2.0	2.0	2.0	8.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Total Spill (s)	20.0	20.0	9.0	29.0	9.0	29.0	31.0	31.0	31.0	31.0	31.0	31.0
Total Split (%)	33.3%	33.3%	15.0%	48.3%	15.0%	48.3%	51.7%	51.7%	51.7%	51.7%	51.7%	51.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	None	Max	Max	Max



HCM 2010 Signalized Intersection Summary  
63 : I-5 SB Ramps & 93rd Ave

Projected 2040 No Build  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	0	415	95	85	305	0	0	0	0	475	0	425
Traffic Volume (veh/h)	0	415	95	85	305	0	0	0	0	475	0	425
Future Volume (veh/h)	0	415	95	85	305	0	0	0	0	475	0	425
Number	7	4	14	3	8	18	1	6	16	0	0	0
Initial Q (Ob.) veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1900	1881	1900	1743	1743	0	0	0	0	1827	1827	1827
Adj Flow Rate, veh/h	0	437	100	89	321	0	0	0	0	500	0	268
Adj No. of Lanes	0	1	1	1	1	0	0	0	0	1	0	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh. %	1	1	1	1	1	9	9	0	0	4	4	4
Cap. veh/h	0	408	93	213	694	0	0	0	0	808	0	721
Arrive On Green	0.00	0.28	0.28	0.05	0.40	0.00	0.00	0.00	0.00	0.46	0.00	0.46
Sat Flow, veh/h	0	1482	339	1660	1743	0	0	0	0	1740	0	1553
Gp Volume(v), veh/h	0	537	89	321	0	500	0	268	0	0	0	0
Gp Sat Flow(s), veh/hln	0	1821	1660	1743	0	1740	0	1553	0	0	0	0
Q Serve(g.-s), s	0.0	0.0	16.0	2.1	7.9	0.0	0.0	12.6	0.0	6.5	0.0	6.5
Cycle Q Clear(g.-c.) s	0.0	0.0	16.0	2.1	7.9	0.0	0.0	12.6	0.0	6.5	0.0	6.5
Prop. In Lane	0.00	0.00	0.19	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00
Lane Grp Cap(c), veh/h	0	501	213	694	0	808	0	721	0	0	0	721
V/C Ratio(X)	0.00	0.00	1.07	0.42	0.46	0.00	0.00	0.62	0.00	0.37	0.00	0.37
Aval Cap(c-a), veh/h	0	501	267	750	0	808	0	721	0	0	0	721
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	0.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	21.1	15.2	12.9	0.0	0.0	11.7	0.0	10.1	0.0	10.1
Incr Delay (d2), s/veh	0.0	0.0	60.6	1.3	0.5	0.0	0.0	3.5	0.0	1.5	0.0	1.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%),s/vehln	0.0	0.0	16.4	1.0	3.8	0.0	0.0	6.8	0.0	3.0	0.0	3.0
LnGrp Delay(d),s/veh	0.0	0.0	81.7	16.5	13.4	0.0	0.0	15.2	0.0	11.5	0.0	11.5
LnGrp LOS			F	B	B			B		B		B
Approach Vol, veh/h	537	817	14.1	768	14.0			14.0		768		768
Approach Delay, s/veh	F	F	B	B	B			B		B		B
Approach LOS												
Timer	1	2	3	4	5	6	7	8				
Assigned Pns			3	4	6	8						
Pns Duration (G+Y+R), s			7.1	2.0	3.10	27.1						
Change Period (Y+R), s			4.0	4.0	4.0	4.0						
Max Green Setting (Gmax), s			5.0	16.0	27.0	25.0						
Max O Clear Time (q_c+I1), s			4.1	18.0	14.6	9.9						
Green Ext Time (p_c), s			0.0	0.0	3.5	4.9						

HCM 2010 TWSC  
64: I-5 NB Ramps & 93rd Ave

Projected 2040 No Build  
PM Peak Hour

Intersection												
Int Delay s/veh	18.6											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	290	555	0	0	290	425	130	0	155	0	0	0
Future Vol, veh/h	290	555	0	0	290	425	130	0	155	0	0	0
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Yield	-	-	Yield	-	-	None
Storage Length	125	-	-	-	-	300	-	-	-	-	-	-
Veh in Median Storage, #	0	0	-	0	0	-	0	0	-	0	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	3	3	3	8	8	8	14	14	14	0	0	0
Mvmt Flow	305	584	0	0	305	447	137	0	163	0	0	0

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	305	0	1500	1500
Stage 1	-	-	1195	1195
Stage 2	-	-	305	305
Critical Hdwy	4.13	-	6.54	6.64
Critical Hdwy Sig 1	-	-	5.54	5.64
Critical Hdwy Sig 2	-	-	5.54	5.64
Follow-up Hdwy	2.227	-	3.626	4.126
Plat Cap-1 Maneuver	1250	0	~126	115
Stage 1	-	0	271	246
Stage 2	-	0	721	641
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1250	-	-	95
Mov Cap-2 Maneuver	-	-	-	95
Stage 1	-	-	205	0
Stage 2	-	-	721	0

Approach	EB	WB	NB
HCM Control Delay, s	3	0	111.6
HCM LOS	F	F	F

Minor Lane/Major Mvmt NBL/NT EBL/EBT EBR/WBL/WBT/WBR  
Capacity (veh/h) 282 1250  
HCM Lane V/C Ratio 1.064 0.244  
HCM Control Delay (s) 111.6 88  
HCM Lane LOS F A  
HCM 95th %ile Q(veh) 118 1

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

HCM 2010 TWSC  
65: Kimmie St & 93rd Ave

Projected 2040 No Build  
PM Peak Hour

Intersection												
Int Delay s/veh	4.6											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	55	535	5	5	475	15	15	1	10	30	15	110
Future Vol, veh/h	55	535	5	5	475	15	15	1	10	30	15	110
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	0	-	-	-	-	-	-	-
Veh in Median Storage, #	0	0	-	0	0	-	0	0	-	0	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	4	4	4	1	1	1	0	0	0	5	5	5
Mvmt Flow	58	563	5	5	500	16	16	1	11	32	16	116

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	516	0	1266	1208
Stage 1	-	-	682	682
Stage 2	-	-	584	526
Critical Hdwy	4.14	-	7.1	6.5
Critical Hdwy Sig 1	-	4.11	6.1	5.5
Critical Hdwy Sig 2	-	-	6.1	5.5
Follow-up Hdwy	2.236	-	3.5	4
Plat Cap-1 Maneuver	1040	1009	147	185
Stage 1	-	-	443	453
Stage 2	-	-	501	532
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1040	1009	101	169
Mov Cap-2 Maneuver	-	-	101	169
Stage 1	-	-	407	416
Stage 2	-	-	383	528

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0.1	34.3	28.4
HCM LOS	D	D	D	D

Minor Lane/Major Mvmt NBL/NT EBL/EBT EBR/WBL/WBT/WBR  
Capacity (veh/h) 150 1040  
HCM Lane V/C Ratio 0.182 0.056  
HCM Control Delay (s) 34.3 8.7  
HCM Lane LOS D A  
HCM 95th %ile Q(veh) 0.6 0.2

HCM 2010 AWSC  
66: Case Rd & 93rd Ave

Projected 2040 No Build  
PM Peak Hour

Intersection												
Intersection Delay, s/veh	53.3											
Intersection LOS	F											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NEU	NEL	NET	NER
Traffic Vol, veh/h	0	2	435	140	0	240	360	65	0	85	35	50
Future Vol, veh/h	0	2	435	140	0	240	360	65	0	85	35	50
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	3	3	2	2	2	2	2	0	0	0
Mvmt Flow	0	2	488	147	0	253	379	68	0	89	37	53
Number of Lanes	0	0	1	0	0	0	1	1	0	0	1	0

Approach	EB	WB	NE
Opposing Approach	WB	EB	WB
Opposing Lanes	2	1	1
Conflicting Approach Left	SW	NE	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NE	SW	WB
Conflicting Lanes Right	1	1	2
HCM Control Delay	65.8	62.9	16.9
HCM LOS	F	F	C

Lane	NE/L1	EB/L1	WB/L1	WB/L2	SW/L1
Vol Left, %	50%	0%	40%	0%	63%
Vol Thru, %	21%	75%	60%	0%	36%
Vol Right, %	29%	24%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	170	577	600	65	221
LT Vol	85	2	240	0	140
Through Vol	35	435	360	0	80
RT Vol	50	140	0	65	1
Lane Flow Rate	179	607	632	68	233
Geometry Crp	2	5	7	7	2
Degree of Liltl (X)	0.408	1	1	0.127	0.526
Departure Headway (Hd)	8.218	6.931	7.562	6.66	8.139
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	437	528	486	542	442
Service Time	6.286	4.931	5.262	4.36	6.196
HCM Lane V/C Ratio	0.41	1.15	1.3	0.125	0.527
HCM Control Delay	16.9	65.8	68.6	10.3	19.9
HCM Lane LOS	C	F	F	B	C
HCM 95th-ile Q	1.9	14	13.4	0.4	3

HCM 2010 AWSC  
66: Case Rd & 93rd Ave

Projected 2040 No Build  
PM Peak Hour

Intersection						
Intersection Delay, s/veh						
Intersection LOS						
Movement	SWU	SWL	SWT	SWR		
Traffic Vol, veh/h	0	140	80	1		
Future Vol, veh/h	0	140	80	1		
Peak Hour Factor	0.95	0.95	0.95	0.95		
Heavy Vehicles, %	2	1	1	1		
Mvmt Flow	0	147	84	1		
Number of Lanes	0	0	1	0		

Approach	SW
Opposing Approach	NE
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	19.9
HCM LOS	C

Lane	SW
Vol Left, %	0%
Vol Thru, %	21%
Vol Right, %	79%
Sign Control	Stop
Traffic Vol by Lane	140
LT Vol	0
Through Vol	140
RT Vol	1
Lane Flow Rate	140
Geometry Crp	1
Degree of Liltl (X)	0.127
Departure Headway (Hd)	6.66
Convergence, Y/N	Yes
Cap	542
Service Time	4.36
HCM Lane V/C Ratio	0.125
HCM Control Delay	10.3
HCM Lane LOS	B
HCM 95th-ile Q	0.4

HCM 2010 AWSC  
67: Tilley Rd (South) & 93rd Ave

Projected 2040 No Build  
PM Peak Hour

Intersection										
Intersection Delay, s/veh	53.5									
Intersection LOS	F									
Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR	
Traffic Vol, veh/h	0	385	235	0	265	485	0	170	85	
Future Vol, veh/h	0	385	235	0	265	485	0	170	85	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Heavy Vehicles, %	2	3	3	2	2	2	2	1	1	
Mvmt Flow	0	405	247	0	279	511	0	179	89	
Number of Lanes	0	1	0	0	0	1	0	1	0	
Approach	EB			WB			NB			
Opposing Approach	WB			EB			NB			
Opposing Lanes	1			1			0			
Conflicting Approach Left	NB			NB			EB			
Conflicting Lanes Left	0			1			1			
Conflicting Approach Right	NB			1			WB			
Conflicting Lanes Right	1			0			1			
HCM Control Delay	59.4			61			17.2			
HCM LOS	F			F			C			
Lane	NBLn1	EBLn1	WBLn1	WBLn1	WBLn1	WBLn1	NBLn1	NBLn1	NBLn1	
Vol Left, %	67%	0%	35%							
Vol Thru, %	0%	62%	65%							
Vol Right, %	33%	38%	0%							
Sign Control	Stop	Stop	Stop							
Traffic Vol by Lane	255	620	750							
LT Vol	170	0	265							
Through Vol	0	385	485							
RT Vol	85	235	0							
Lane Flow Rate	268	653	789							
Geometry Crp	1	1	1							
Degree of Liltl (X)	0.518	1	1							
Departure Headway (Hd)	6.947	5.692	5.973							
Convergence, Y/N	Yes	Yes	Yes							
Cap	523	640	616							
Service Time	4.947	3.717	3.998							
HCM Lane V/C Ratio	0.512	1.02	1.281							
HCM Control Delay	17.2	59.4	61							
HCM Lane LOS	C	F	F							
HCM 95th-ile Q	2.9	15.4	15							

HCM 2010 TWSC  
68: 93rd Ave & Tilley Rd (North)

Projected 2040 No Build  
PM Peak Hour

Intersection										
Int Delay, s/veh	13.4									
Movement	EBL	EBT	WBL	WBR	SBL	SBR				
Traffic Vol, veh/h	115	360	340	65	170	410				
Future Vol, veh/h	115	360	340	65	170	410				
Conflicting Peds, #/hr	0	0	0	0	0	0				
Sign Control	Free	Free	Free	Free	Stop	Stop				
RT Channelized	-	None	-	None	-	None				
Storage Length	-	-	-	-	250	0				
Veh in Median Storage, #	-	0	0	0	0	0				
Grade, %	-	0	-	0	0	0				
Peak Hour Factor	95	95	95	95	95	95				
Heavy Vehicles, %	2	2	3	3	1	1				
Mvmt Flow	121	379	358	68	179	432				
Major/Minor	Major1	Major2	Minor2							
Conflicting Flow All	426	0	1013			392				
Stage 1	-	-	392			-				
Stage 2	-	-	621			-				
Critical Hdwy	4.12	-	6.41			6.21				
Critical Hdwy Sig 1	-	-	5.41			-				
Critical Hdwy Sig 2	-	-	5.41			-				
Follow-up Hdwy	2.218	-	3.509			3.309				
Pl Cap-1 Maneuver	1133	-	266			659				
Stage 1	-	-	665			-				
Stage 2	-	-	538			-				
Platoon blocked, %	-	-	-			-				
Mov Cap-1 Maneuver	1133	-	230			659				
Mov Cap-2 Maneuver	-	-	230			-				
Stage 1	-	-	685			-				
Stage 2	-	-	465			-				
Approach	EB		WB		SB					
HCM Control Delay, s	2.1		0		31.9					
HCM LOS	D		D		D					
Minor Lane/Major Mvmt	EBL	EBT	WBL	WBR	SBLn1	SBLn2				
Capacity (veh/h)	1133	-	-	230	659	-				
HCM Lane V/C Ratio	0.107	0	-	0.778	0.655	-				
HCM Control Delay (s)	8.6	0	-	60	20.2	-				
HCM Lane LOS	A	A	-	F	C	-				
HCM 95th %ile Q(veh)	0.4	-	-	5.6	4.9	-				

HCM 2010 TWSC  
69. :93rd Ave & Old Hwy 99

Projected 2040 No Build  
PM Peak Hour

Intersection										
Int Delay, s/veh	6									

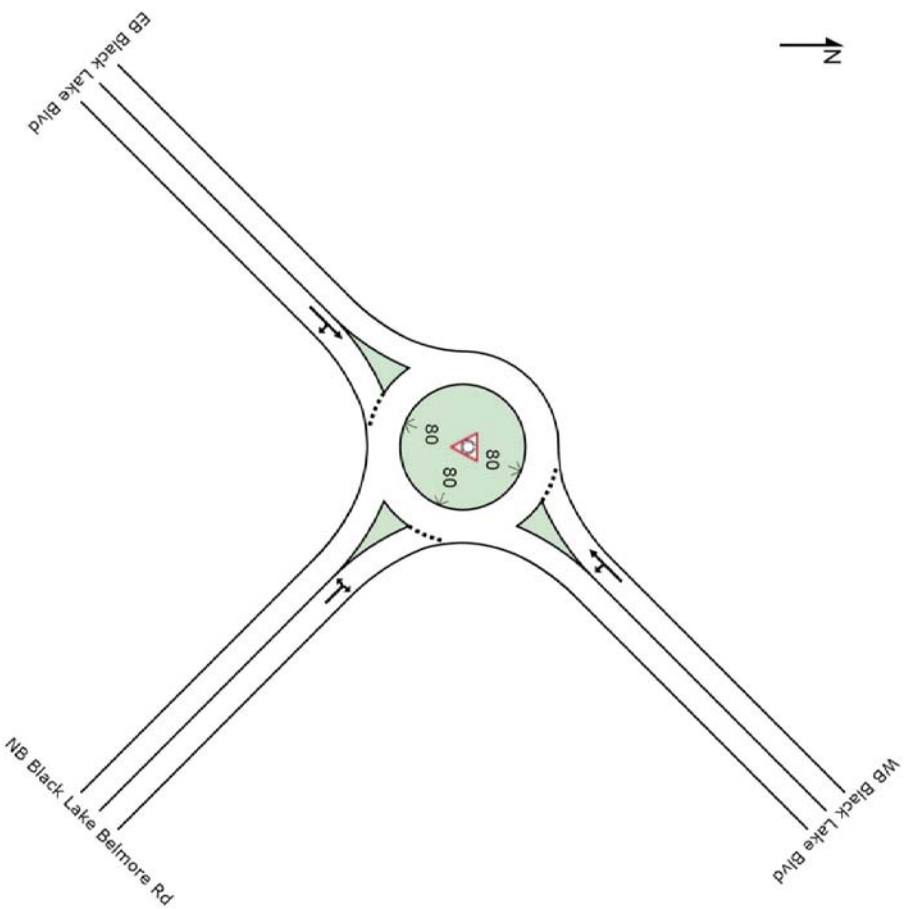
Movement	EBT	EBR	WBL	WBT	NEL	NER
Traffic Vol, veh/h	890	30	190	340	15	205
Future Vol, veh/h	890	30	190	340	15	205
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	450	-	300	-	300
Veh in Median Storage, #	0	-	-	0	-	0
Grade, %	0	-	-	0	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	1	1	2	2	1	1
Wmnt Flow	937	32	200	358	16	216

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	937	0
Stage 1	-	-	1695
Stage 2	-	-	937
Critical Hdwy	-	-	758
Critical Hdwy, Sig 1	-	4.12	-
Critical Hdwy, Sig 2	-	-	6.41
Follow-up Hdwy	-	-	5.41
Platoon blocked, %	-	2.218	-
Stage 1	-	-	3.509
Stage 2	-	-	103
Platoon blocked, %	-	-	383
Mov Cap-1 Maneuver	-	-	465
Mov Cap-2 Maneuver	-	7.31	-
Stage 1	-	-	75
Stage 2	-	-	322
Approach	EB	WB	NE
HCM Control Delay, s	0	4.2	35.1
HCM LOS			E

Minor Lane/Major Wmnt	NEL	NEL2	EBT	EBR	WBL	WBT
Capacity (veh/h)	290	322	-	-	731	-
HCM Lane V/C Ratio	0.063	0.67	-	-	0.274	-
HCM Control Delay (s)	20.4	36.2	-	-	11.8	-
HCM Lane LOS	C	E	-	-	B	-
HCM 95th %ile D(veh)	0.2	4.5	-	-	1.1	-

### SITE LAYOUT

Site: 6) Black Lake Belmore Rd at Black Lake Blvd  
Projected 2040 with Improvements  
PM Peak Hour  
Roundabout



## MOVEMENT SUMMARY

### Site: 6) Black Lake Belmore Rd at Black Lake Blvd

Projected 2040 with Improvements  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total Veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Queue Distance ft	Pop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: NB Black Lake Belmore Rd											
3x	L2	221	1.0	0.457	8.8	LOS A	3.4	86.2	0.57	0.40	31.7
18x	R2	242	1.0	0.457	8.8	LOS A	3.4	86.2	0.57	0.40	30.9
Approach											
		463	1.0	0.457	8.8	LOS A	3.4	86.2	0.57	0.40	31.3
NorthEast: WB Black Lake Blvd											
1x	L2	263	0.0	0.674	13.8	LOS B	7.3	182.6	0.75	0.58	29.9
6x	T1	432	0.0	0.674	13.8	LOS B	7.3	182.6	0.75	0.58	29.9
Approach											
		695	0.0	0.674	13.8	LOS B	7.3	182.6	0.75	0.58	29.9
SouthWest: EB Black Lake Blvd											
2x	T1	200	3.0	0.313	7.2	LOS A	2.1	52.5	0.57	0.42	33.5
12x	R2	89	3.0	0.313	7.2	LOS A	2.1	52.5	0.57	0.42	32.7
Approach											
		289	3.0	0.313	7.2	LOS A	2.1	52.5	0.57	0.42	33.2
All Vehicles											
		1447	0.9	0.674	10.9	LOS B	7.3	182.6	0.66	0.49	30.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement. LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: SIDRA-Standard (Akçelik, M&D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arcaitek and Associates Pty Ltd | sidrasolutions.com

Organisation: SCJ ALLIANCE | Processed: Friday, February 12, 2016 2:08:55 PM

Project: N:\Projects\0625\_City of Tumwater\0625:17 Tumwater Transportation Master Plan\Traffic\Operations\sldra\2040 With Imp\6) Black Lake Belmore Rd at Black Lake Blvd.sldp

Projected 2040 With Improvements  
PM Peak Hour

### SimTraffic Performance Report

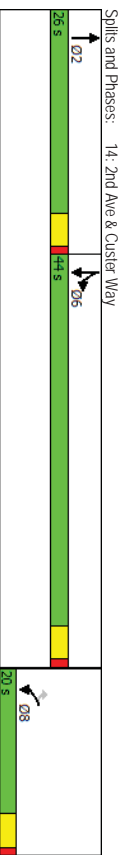
#### 13. 2nd Ave/US 101/1-5 Off-Ramps Performance by movement

Movement	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.2	0.0	0.0	1.3	1.8	0.9
Total Del/Veh (s)	0.7	0.9	0.8	49.8	43.1	33.1

Lanes, Volumes, Timings  
14: 2nd Ave & Custer Way

Projected 2040 with Imp  
PM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBR
Lane Configurations	1	1	1	1	1	1
Traffic Volume (vph)	235	260	15	320	915	310
Future Volume (vph)	235	260	15	320	915	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	225	0	0	0	0
Storage Lanes	1	1	1	0	1	1
Taper Length (ft)	25				25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	30		30		30	
Link Distance (ft)	662		2035		505	
Travel Time (s)	15.0		46.3		11.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%
Shared Lane Traffic (%)					34%	
Turn Type	Prot	Perm	NA	NA	Spill	NA
Protected Phases	8		2		6	6
Permitted Phases	8	8	2		6	6
Detector Phase						
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0		4.0	4.0
Minimum Spill (s)	100	10.0	24.5		20.0	20.0
Total Spill (s)	20.0	20.0	26.0		44.0	44.0
Total Spill (%)	22.2%	28.9%			48.9%	48.9%
Yellow Time (s)	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5		4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None		Max	Max
<b>Intersection Summary</b>						
Area Type:	Other					
Cycle Length:	90					
Actuated Cycle Length:	74.5					
Natural Cycle:	80					
Control Type:	Actuated-Uncoordinated					



HCM 2010 Signalized Intersection Summary  
14: 2nd Ave & Custer Way

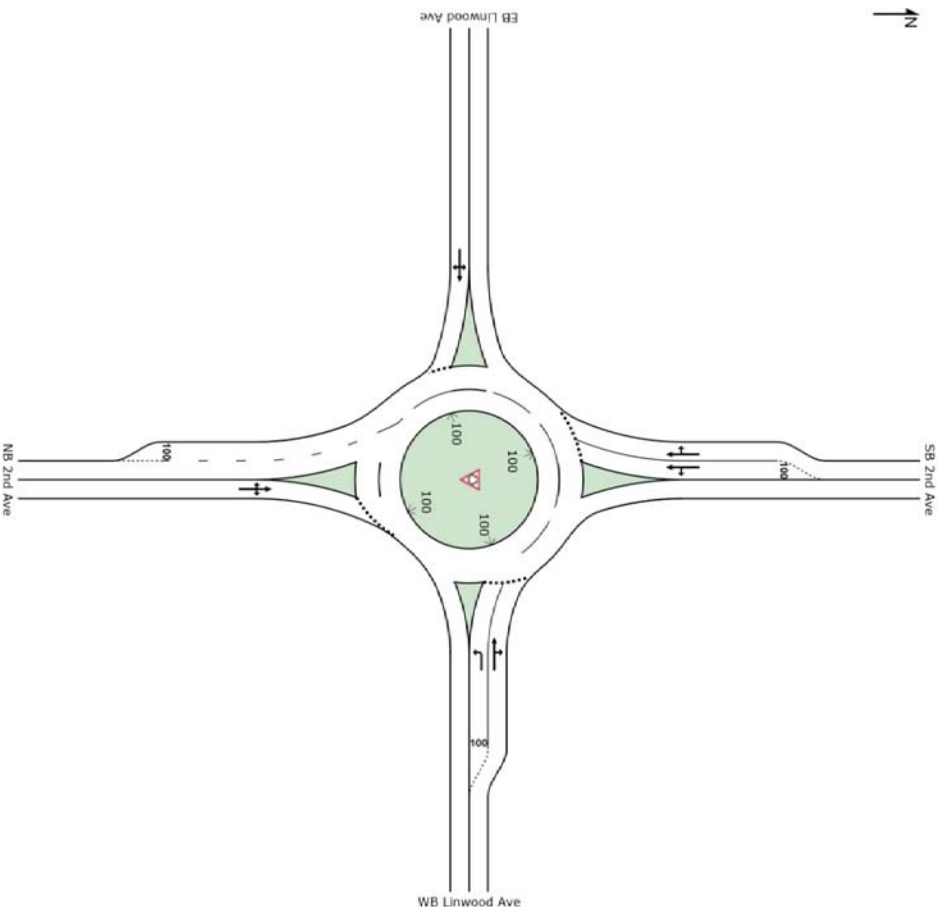
Projected 2040 with Imp  
PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBR
Lane Configurations	1	1	1	1	1	1
Traffic Volume (veh/h)	235	260	15	320	915	310
Future Volume (veh/h)	235	260	15	320	915	310
Number	3	18	2	12	1	6
Initial Q (Ob) veh	0	0	0	0	0	0
Ped Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1881	1881	1900	1900	1900
Adj Flow Rate, veh/h	247	121	16	184	644	772
Adj No of Lanes	1	1	1	0	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh. %	1	1	1	1	0	0
Cap. veh/h	291	260	20	224	926	972
Arrive On Green	0.16	0.16	0.15	0.15	0.51	0.51
Sat Flow, veh/h	1792	1599	129	1489	1810	1900
Gp Volume(v), veh/h	247	121	0	200	644	772
Gp Sat Flow(s), veh/hln	1792	1599	0	1618	1810	1900
Q Serve(g.-s), s	10.3	5.3	0.0	9.2	20.8	25.8
Cycle Q Clear(g.-c), s	10.0	5.3	0.0	9.2	20.8	25.8
Prop In Lane	1.00	1.00		0.92	1.00	
Lane Gp Cap(c), veh/h	291	260	0	244	926	972
V/C Ratio(X)	0.85	0.47	0.00	0.82	0.70	0.79
Avail Cap(C-a), veh/h	360	321	0	451	926	972
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.4	29.3	0.0	31.8	14.3	15.5
Incr Delay (d2), s/veh	12.3	0.5	0.0	2.6	4.3	6.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%),veh/hln	6.1	2.4	0.0	4.3	11.3	15.1
LnGrp Delay(d), s/veh	43.7	29.8	0.0	34.4	18.6	22.1
LnGrp LOS	D	C	C	C	B	C
Approach Vol, veh/h	368		200		1416	
Approach Delay, s/veh	39.1		34.4		20.5	
Approach LOS	D		C		C	
Timer	1	2	3	4	5	6
Assigned Pts		2				8
Pts Duration (G+Y+R), s		16.1				44.0
Change Period (Y+R), s		4.5				4.5
Max Green Setting (Gmax), s		21.5				39.5
Max Q Clear Time (Q_c+I1), s		11.2				27.8
Green Ext Time (P.C.), s		0.5				6.1
Green Ext Time (P.C.), s						0.2
<b>Intersection Summary</b>						
HCM 2010 C/I Delay	25.4					
HCM 2010 LOS	C					
<b>Notes</b>						

## SITE LAYOUT

Site: 25) Linwood Ave at 2nd Ave

Projected 2040 with Improvements  
PM Peak Hour  
Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com  
Organisation: SCJ ALLIANCE | Created: Friday, February 5, 2016 6:08:20 PM  
Project: N:\Projects\0625 City of Tumwater\0625.17 Tumwater Transportation Master Plan\Traffic\Operations\sidra\2040 With Imp\25) Linwood Ave at 2nd Ave.sip6

## MOVEMENT SUMMARY

Site: 25) Linwood Ave at 2nd Ave

Projected 2040 with Improvements  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB 2nd Ave											
3	L2	189	2.0	0.780	23.6	LOS C	9.4	239.8	0.93	1.07	26.9
8	T1	321	2.0	0.780	23.6	LOS C	9.4	239.8	0.93	1.07	26.8
18	R2	68	2.0	0.780	23.6	LOS C	9.4	239.8	0.93	1.07	26.2
Approach											
		579	2.0	0.780	23.6	LOS C	9.4	239.8	0.93	1.07	26.8
East: WB Linwood Ave											
1	L2	263	2.0	0.401	11.1	LOS B	2.8	72.4	0.84	0.79	30.1
6	T1	321	2.0	0.479	10.8	LOS B	4.1	103.6	0.88	0.82	32.3
16	R2	68	2.0	0.479	10.8	LOS B	4.1	103.6	0.88	0.82	31.3
Approach											
		653	2.0	0.479	10.9	LOS B	4.1	103.6	0.87	0.81	31.2
North: SB 2nd Ave											
7	L2	189	2.0	0.679	17.0	LOS B	5.5	140.7	0.84	0.94	29.2
4	T1	347	2.0	0.679	17.0	LOS B	5.5	140.7	0.84	0.94	29.1
14	R2	189	2.0	0.359	12.4	LOS B	1.7	43.8	0.71	0.72	30.6
Approach											
		726	2.0	0.679	15.8	LOS B	5.5	140.7	0.81	0.88	29.5
West: EB Linwood Ave											
5	L2	137	2.0	0.803	33.0	LOS C	9.7	246.5	1.00	1.27	24.2
2	T1	153	2.0	0.803	33.0	LOS C	9.7	246.5	1.00	1.27	24.2
12	R2	137	2.0	0.803	33.0	LOS C	9.7	246.5	1.00	1.27	23.7
Approach											
		426	2.0	0.803	33.0	LOS C	9.7	246.5	1.00	1.27	24.0
All Vehicles											
		2384	2.0	0.803	19.4	LOS B	9.7	246.5	0.89	0.98	28.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
Roundabout LOS Method: Same as Signalised Intersections.  
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
LOS F will result if  $w/c > 1$  irrespective of movement delay value (does not apply for approaches and intersection).  
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).  
Roundabout Capacity Model: SIDRA Standard.  
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.  
Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

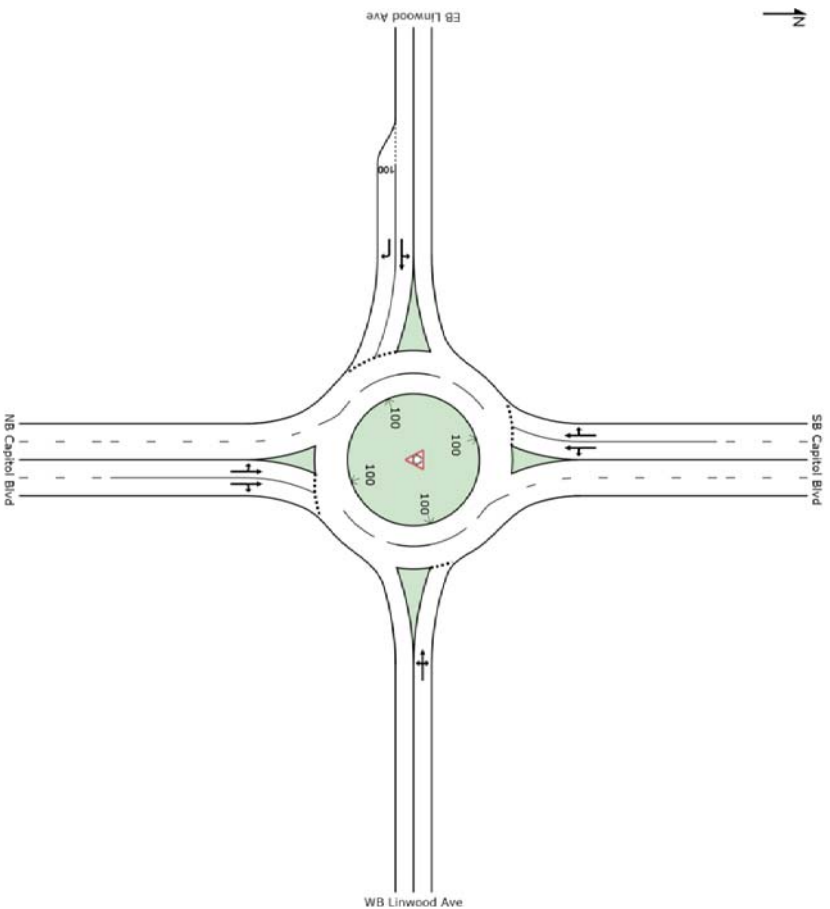
SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com  
Organisation: SCJ ALLIANCE | Processed: Wednesday, February 17, 2016 3:08:27 PM  
Project: N:\Projects\0625 City of Tumwater\0625.17 Tumwater Transportation Master Plan\Traffic\Operations\sidra\2040 With Imp\25) Linwood Ave at 2nd Ave.sip6



## SITE LAYOUT

Site: 26) Linwood Ave at Capitol Blvd

Projected 2040 With Improvements  
PM Peak Hour  
Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arceik and Associates Pty Ltd | sidrasolutions.com  
Organisation: SCU ALLIANCE | Created: Friday, February 5, 2016 6:09:32 PM  
Project: N:\Projects\0625\_City of Tumwater\0625\_17 Tumwater Transportation Master Plan\TrafficOperations\sidra\2040 With Imp\26) Linwood Ave at Capitol Blvd.sip6

## MOVEMENT SUMMARY

Site: 26) Linwood Ave at Capitol Blvd

Projected 2040 With Improvements  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satm v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph	
South: NB Capitol Blvd												
3	L2	226	2.0	0.556	9.5	LOS A	5.3	133.8	0.56	0.34	32.2	
8	T1	1147	2.0	0.556	9.1	LOS A	5.4	136.3	0.55	0.33	32.8	
18	R2	16	2.0	0.556	8.9	LOS A	5.4	136.3	0.54	0.32	32.2	
Approach												
		1389	2.0	0.556	9.2	LOS A	5.4	136.3	0.55	0.33	32.7	
East WB Linwood Ave												
1	L2	16	2.0	0.071	9.1	LOS A	0.3	7.4	0.72	0.72	32.0	
6	T1	5	2.0	0.071	9.1	LOS A	0.3	7.4	0.72	0.72	31.8	
16	R2	11	2.0	0.071	9.1	LOS A	0.3	7.4	0.72	0.72	31.1	
Approach												
		32	2.0	0.071	9.1	LOS A	0.3	7.4	0.72	0.72	31.6	
North: SB Capitol Blvd												
7	L2	11	2.0	0.843	22.3	LOS C	15.5	393.4	0.98	0.88	27.8	
4	T1	1500	2.0	0.843	21.7	LOS C	15.5	393.4	0.97	0.86	28.0	
14	R2	421	2.0	0.843	20.7	LOS C	15.5	393.2	0.96	0.82	27.5	
Approach												
		1932	2.0	0.843	21.5	LOS C	15.5	393.4	0.97	0.85	27.9	
West: EB Linwood Ave												
5	L2	121	2.0	0.427	23.1	LOS C	2.2	57.1	0.87	0.91	26.1	
2	T1	5	2.0	0.427	23.1	LOS C	2.2	57.1	0.87	0.91	26.0	
12	R2	268	2.0	0.648	26.5	LOS C	4.5	115.5	0.95	1.05	25.6	
Approach												
		395	2.0	0.648	25.4	LOS C	4.5	115.5	0.92	1.00	25.8	
All Vehicles		3747	2.0	0.843	17.2	LOS B	15.5	393.4	0.81	0.67	29.3	

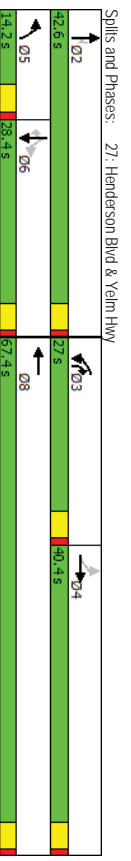
Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
Roundabout LOS Method: Same as Signalised Intersections.  
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
LOS F will result if v/c > 1 (respective of movement delay value (does not apply for approaches and intersection).  
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).  
Roundabout Capacity Model: SIDRA Standard.  
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.  
Gap-Acceptance Capacity: SIDRA Standard (Arceik M2D).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arceik and Associates Pty Ltd | sidrasolutions.com  
Organisation: SCU ALLIANCE | Processed: Friday, February 5, 2016 6:09:08 PM  
Project: N:\Projects\0625\_City of Tumwater\0625\_17 Tumwater Transportation Master Plan\TrafficOperations\sidra\2040 With Imp\26) Linwood Ave at Capitol Blvd.sip6

Lanes, Volumes, Timings  
 27: Henderson Blvd & Yelm Hwy

Projected 2040 with Imp  
 PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Traffic Volume (vph)	10	955	195	510	780	85	140	200	700	230	335
Future Volume (vph)		10	955	195	510	780	85	140	200	700	230	335
Ideal Flow (vphpl)		1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		200		0	450		0	200		100	0	150
Storage Length (ft)		1		0	2		0	1		1		1
Taper Length (ft)		25			25			25				25
Right Turn on Red				Yes			Yes		Yes			Yes
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1947			1645			444				1606
Travel Time (s)		44.3			37.4			10.1				36.5
Peak Hour Factor		0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)		1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Prot	NA		Prot	NA	pm+ov	Perm	NA	Perm
Protected Phases		4		3	8		5	2	2	6		6
Permitted Phases		4		4	8		5	2	3	6		6
Detector Phase		4		4	8		5	2	3	6		6
Switch Phase												
Minimum Inital (s)		6.0	6.0		5.0	6.0		5.0	6.0	6.0		6.0
Minimum Spill (s)		24.5	24.5		9.5	24.5		9.5	24.5	24.5		24.5
Total Spill (s)		40.4	40.4		27.0	67.4		14.2	42.6	27.0	28.4	28.4
Total Spill (%)		36.7%	36.7%		24.5%	61.3%		12.9%	38.7%	24.5%	25.8%	25.8%
Yellow Time (s)		3.5	3.5		3.5	3.5		3.5	3.5	3.5		3.5
All-Red Time (s)		1.0	1.0		1.0	1.0		1.0	1.0	1.0		1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0	0.0	0.0		0.0
Lost Time (s)		4.5	4.5		4.5	4.5		4.5	4.5	4.5		4.5
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max		None	Max		None	None	None	None	None	None
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	110											
Activated Cycle Length:	109.3											
Natural Cycle:	110											
Control Type:	Actuated-Uncoordinated											



HCM 2010 Signalized Intersection Summary  
 27: Henderson Blvd & Yelm Hwy

Projected 2040 with Imp  
 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Traffic Volume (veh/h)	10	955	195	510	780	85	140	200	700	230	335
Future Volume (veh/h)		10	955	195	510	780	85	140	200	700	230	335
Number		7	4	14	3	8	18	5	2	12	1	6
Ped/Bike Adj (Adj)		0	0	0	0	0	0	0	0	0	0	0
Parking Bus Adj		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln		1881	1881	1900	1881	1881	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h		10	974	184	520	796	82	143	204	736	235	342
Adj No of Lanes		1	2	2	2	2	0	1	1	1	1	1
Peak Hour Factor		0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh %		1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h		274	983	185	515	1876	193	158	648	879	320	405
Arrive On Green		0.33	0.33	0.33	0.21	0.57	0.57	0.09	0.34	0.00	0.22	0.22
Sat Flow, veh/h		635	3002	566	2508	3272	337	1792	1881	1599	1185	1599
Gp Volume (V), veh/hln		10	579	579	520	435	443	143	204	736	235	342
Gp Sat Flow (S), veh/hln		635	1787	1781	1254	1787	1822	1792	1881	1599	1185	1599
O Serve (S), s		1.2	36.4	35.5	22.5	15.0	15.0	8.7	8.7	0.0	21.3	19.1
Cycle O Clear (C), s		1.2	35.4	35.5	22.5	15.0	15.0	8.7	8.7	0.0	21.3	19.1
Prop In Lane		1.00	0.32	1.00	0.18	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap (C), veh/h		274	585	583	515	1025	1045	158	648	879	320	405
V/C Ratio (X)		0.04	0.99	0.99	1.01	0.42	0.42	0.90	0.31	0.00	0.73	0.85
Avail Cap (C), veh/h		274	585	583	515	1025	1045	158	648	879	320	405
HCM Platoon Ratio		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter (f)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh		25.2	36.7	36.8	43.6	13.2	13.2	41.3	26.4	0.0	42.2	41.3
Incr Delay (d2), s/veh		0.2	35.0	35.5	42.4	1.3	1.3	44.3	0.3	0.0	8.2	14.8
Incr O Delay (d3), s/veh		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Band O (50%), s/veh/h		0.2	23.1	23.1	10.7	7.7	7.9	6.2	4.6	0.0	7.7	11.6
LnGrp Delay (d), s/veh		25.5	71.7	72.2	86.0	14.5	14.5	49.9	26.7	0.0	50.4	56.1
LnGrp LOS		C	E	E	F	B	B	F	C	D	E	C
Approach Vol, veh/h		1168			1398			347			582	
Approach Delay, s/veh		71.6			41.1			54.4			53.6	
Approach LOS		E			D			D			D	
Timer		1	2	3	4	5	6	7	8			
Assigned Pns		2	2	3	4	5	6	8				
Pns Duration (G+Y+R), s		42.3	27.0	40.4	14.2	28.1		67.4				
Change Period (Y+R), s		4.5	4.5	4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s		38.1	22.5	35.9	9.7	23.9		62.9				
Max O Clear Time (G+CH1), s		10.7	24.5	37.5	10.7	23.3		17.0				
Green Ext Time (P,C), s		4.5	0.0	0.0	0.0	0.3		22.4				
<b>Intersection Summary</b>												
HCM 2010 Cnt Delay	54.7											
HCM 2010 LOS	D											

HCM 2010 TWSC  
28: Trosper Rd & Rural Rd

Projected 2040 with Imp  
PM Peak Hour

Intersection	EBL	EBT	WBT	WBR	SBL	SBR
Int Delay, s/veh	4.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	110	265	425	135	150	165
Future Vol, veh/h	110	265	425	135	150	165
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	150	0
Veh in Median Storage, #	-	0	0	-	2	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	1	1	2	2
Mvmt Flow	116	279	447	142	158	174

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	589	0	1029
Stage 1	-	-	511
Stage 2	-	-	511
Critical Hdwy	4.1	-	6.42
Critical Hdwy Sfg 1	-	-	5.42
Critical Hdwy Sfg 2	-	-	5.42
Follow-up Hdwy	2.2	-	3.518
Pl Cap-1 Maneuver	996	-	259
Stage 1	-	-	598
Stage 2	-	-	602
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	996	-	229
Mov Cap-2 Maneuver	-	-	427
Stage 1	-	-	598
Stage 2	-	-	532

Approach	EB	WB	SB
HCM Control Delay, s	2.7	0	16.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBL	SBR
Capacity (veh/h)	996	-	-	427	558	-
HCM Lane V/C Ratio	0.116	-	-	0.37	0.31	-
HCM Control Delay (s)	9.1	-	-	18.3	14.3	-
HCM Lane LOS	A	-	-	C	B	-
HCM 95th %ile Q(veh)	0.4	-	-	1.7	1.3	-

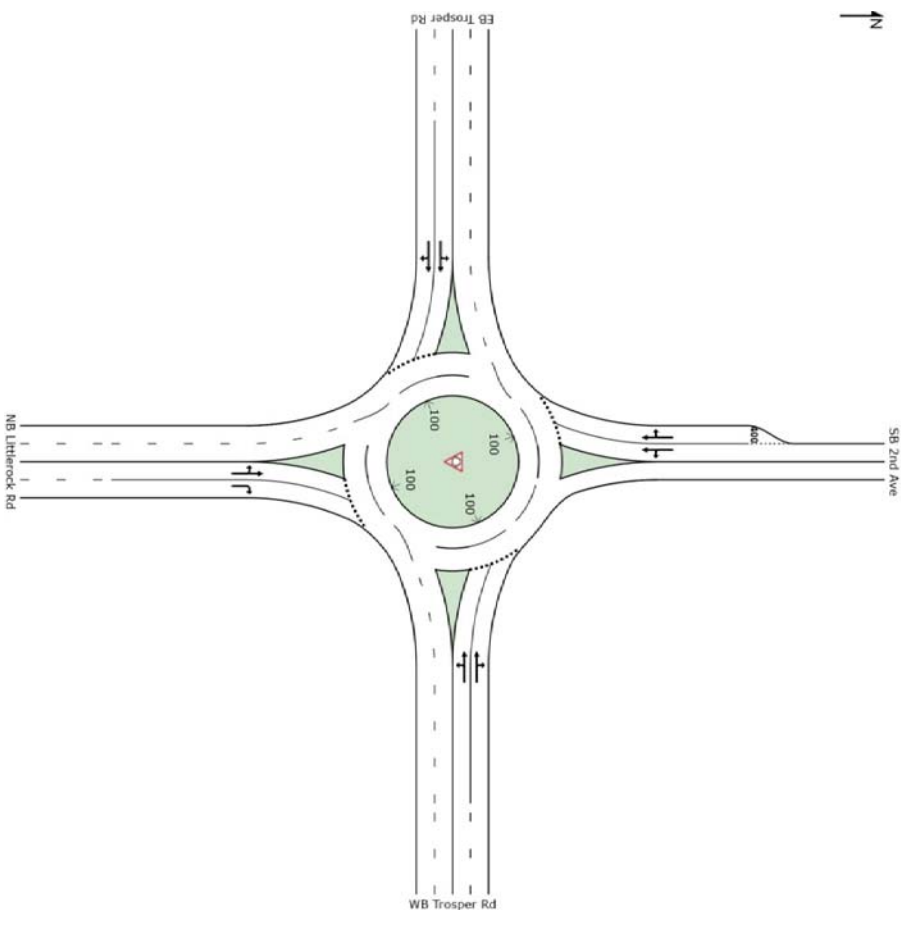
Turnwater Transportation Master Plan  
SCJ Alliance

Synchro 9 Report  
6/10/2016

**SITE LAYOUT**

Site: 30) Trosper Rd at 2nd Ave/Littlerock Rd

Projected 2040 with Imp  
PM Peak Hour  
Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arceik and Associates Pty Ltd | sidrasolutions.com  
Organisation: SCJ ALLIANCE | Created: Thursday, February 25, 2016 7:17:12 PM  
Project: N:\Projects\0625 Only of Turnwater\0625\_17 Turnwater Transportation Master Plan\TrafficOperations\sidra2040 Trosper.sip6

## MOVEMENT SUMMARY

### Site: 30) Trosper Rd at 2nd Ave/Litterock Rd

Projected 2040 With Imp  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total Veh/h	HV %	Deg. Satn W/C	Average Delay sec	Level of Service	95% Back of Queue Veh	Distance ft	Pop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Litterock Rd											
3	L2	342	2.0	0.961	45.2	LOS D	18.5	469.2	1.00	1.50	21.4
8	T1	437	2.0	0.961	45.2	LOS D	18.5	469.2	1.00	1.50	21.4
18	R2	500	2.0	0.738	22.5	LOS C	6.5	164.8	0.88	1.01	26.9
Approach											
		1279	2.0	0.961	36.3	LOS D	18.5	469.2	0.95	1.31	23.2
East: WB Trosper Rd											
1	L2	453	2.0	0.853	38.8	LOS D	12.5	317.3	1.00	1.33	22.2
6	T1	384	2.0	0.853	42.1	LOS D	12.5	317.3	1.00	1.32	22.4
16	R2	21	2.0	0.853	42.1	LOS D	11.6	294.9	1.00	1.32	22.0
Approach											
		858	2.0	0.853	40.4	LOS D	12.5	317.3	1.00	1.32	22.3
North: SB 2nd Ave											
7	L2	174	2.0	0.751	30.1	LOS C	6.0	152.6	0.93	1.09	24.9
4	T1	516	2.0	0.751	27.7	LOS C	6.5	165.1	0.93	1.10	25.8
14	R2	116	2.0	0.751	26.2	LOS C	6.5	165.1	0.94	1.10	25.9
Approach											
		805	2.0	0.751	28.0	LOS C	6.5	165.1	0.93	1.10	25.6
West: EB Trosper Rd											
5	L2	89	2.0	0.636	21.2	LOS C	4.5	114.2	0.88	0.99	27.9
2	T1	458	2.0	0.636	20.0	LOS B	4.8	122.3	0.88	0.99	28.4
12	R2	184	2.0	0.636	18.5	LOS B	4.8	122.3	0.89	1.00	28.3
Approach											
		732	2.0	0.636	19.7	LOS B	4.8	122.3	0.88	0.99	28.3
All Vehicles											
		3674	2.0	0.961	32.1	LOS C	18.5	469.2	0.94	1.20	24.3

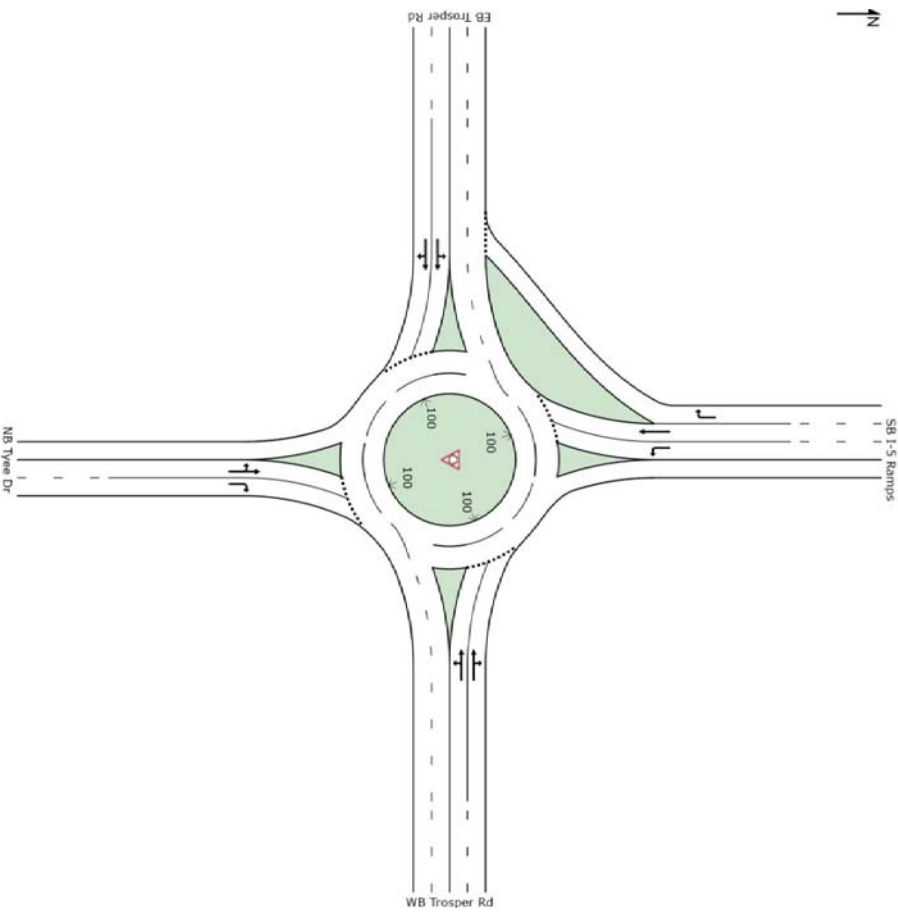
Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
 Roundabout LOS Method: Same as Signalised Intersections.  
 Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
 LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all movements v/c not used as specified in HCM 2010).  
 Roundabout Capacity Model: SIDRA Standard.  
 HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.  
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik, MSD).  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com  
 Organisation: SCJ ALLIANCE | Created: Thursday, February 25, 2016 7:17:22 PM  
 Project: N:\projects\0625\_017\_Turnwater\_Transportation\_Master\_Plan\TrafficOperations\sida\2040\_Trosper.sipb

## SITE LAYOUT

### Site: 31) Trosper Rd at Tye Dr/SB I-5 Ramps

Projected 2040 With Imp  
PM Peak Hour  
Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com  
 Organisation: SCJ ALLIANCE | Created: Thursday, February 25, 2016 7:19:37 PM  
 Project: N:\projects\0625\_017\_Turnwater\_Transportation\_Master\_Plan\TrafficOperations\sida\2040\_Trosper.sipb

## MOVEMENT SUMMARY

Site: 31) Trossper Rd at Tyeer Dr/SB I-5 Ramps

Projected 2040 With Imp  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Veh	Queue Distance ft	Pop. Queued	Effective Stop Rate per/veh	Average Speed mph
South: NB Tyeer Dr											
3	L2	37	2.0	0.571	25.9	LOS C	3.3	83.3	0.87	0.96	26.5
8	T1	163	2.0	0.571	25.9	LOS C	3.3	83.3	0.87	0.96	26.4
18	R2	458	2.0	0.918	50.9	LOS D	11.0	279.7	1.00	1.40	20.0
Approach											
		658	2.0	0.918	43.3	LOS D	11.0	279.7	0.96	1.26	21.6
East: WB Trossper Rd											
1	L2	289	2.0	0.564	11.6	LOS B	4.5	113.3	0.72	0.66	30.8
6	T1	358	2.0	0.564	11.5	LOS B	4.5	114.2	0.71	0.66	31.2
16	R2	421	2.0	0.564	11.2	LOS B	4.5	114.2	0.71	0.65	31.1
Approach											
		1068	2.0	0.564	11.4	LOS B	4.5	114.2	0.71	0.65	31.1
North: SB I-5 Ramps											
7	L2	405	2.0	0.472	10.2	LOS B	3.0	77.1	0.73	0.74	30.4
4	T1	453	2.0	0.426	8.0	LOS A	2.7	68.2	0.70	0.64	33.7
14	R2	500	2.0	0.399	6.8	LOS A	2.3	59.2	0.54	0.43	33.2
Approach											
		1358	2.0	0.472	8.2	LOS A	3.0	77.1	0.65	0.59	32.5
West: EB Trossper Rd											
5	L2	216	2.0	0.898	44.3	LOS D	10.4	264.7	0.96	1.33	21.6
2	T1	842	2.0	0.898	41.1	LOS D	11.3	288.1	0.97	1.34	22.5
12	R2	26	2.0	0.898	39.5	LOS D	11.3	288.1	0.98	1.35	22.5
Approach											
		1084	2.0	0.898	41.7	LOS D	11.3	288.1	0.97	1.34	22.3
All Vehicles											
		4188	2.0	0.918	23.3	LOS C	11.3	288.1	0.80	0.91	26.9

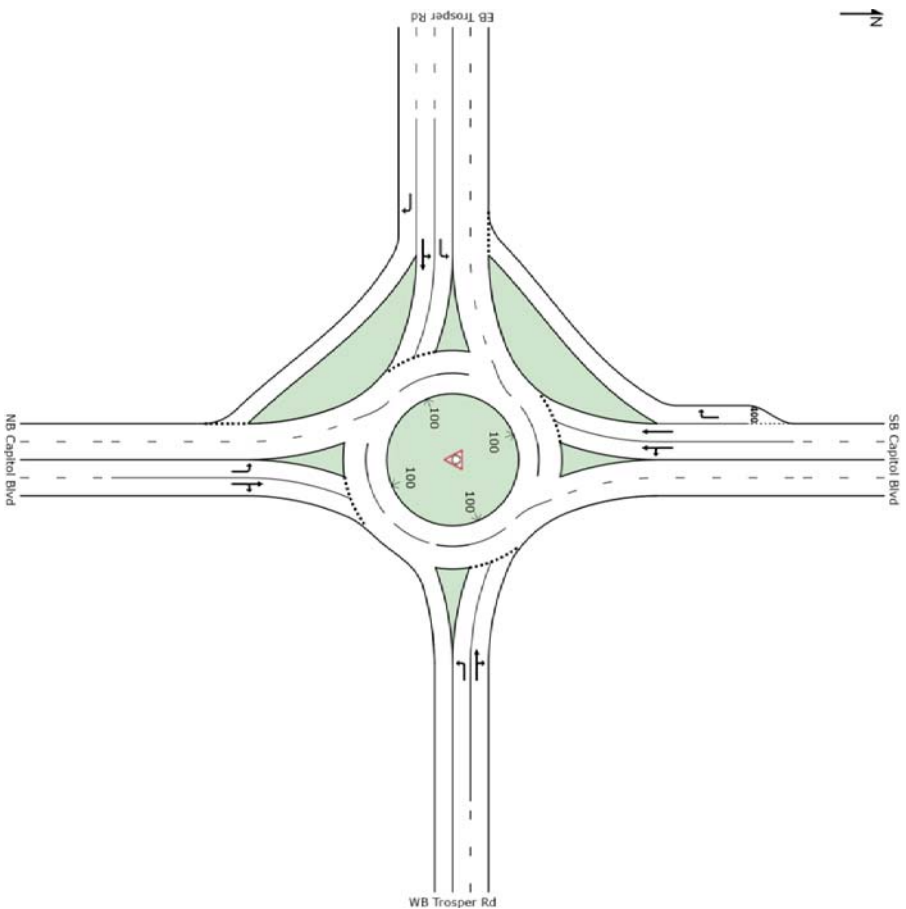
Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
 Roundabout LOS Method: Same as Signalised Intersections.  
 Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
 LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all movements v/c not used as specified in HCM 2010).  
 Roundabout Capacity Model: SIDRA Standard.  
 HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.  
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik, MSD).  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arceik and Associates Pty Ltd | sidrasolutions.com  
 Organisation: SCJ ALLIANCE | Processed: Wednesday, February 24, 2016 1:59:30 PM  
 Project: N:\projects\0625 City of Tumwater\0625:17 Tumwater Transportation Master Plan\Traffic\Operations\sidra\2040 Trossper.sipb

## SITE LAYOUT

Site: 33) Trossper Rd at Capitol Blvd

Projected 2040 With Improvements  
PM Peak Hour  
Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arceik and Associates Pty Ltd | sidrasolutions.com  
 Organisation: SCJ ALLIANCE | Created: Friday, February 5, 2016 6:11:04 PM  
 Project: N:\projects\0625 City of Tumwater\0625:17 Tumwater Transportation Master Plan\Traffic\Operations\sidra\2040 With Imp\33) Trossper Rd at Capitol Blvd.sipb

## MOVEMENT SUMMARY

### Site: 33) Trosper Rd at Capitol Blvd

Projected 2040 With Improvements  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total Veh/h	HV %	Deg. Satn	Average Delay sec	Level of Service	95% Back of Queue Veh	Distance ft	Pop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Capitol Blvd											
3	L2	697	2.0	0.933	41.9	LOS D	15.0	380.4	1.00	1.44	18.9
8	T1	778	2.0	0.944	41.0	LOS D	16.7	424.4	1.00	1.47	21.4
18	R2	10	2.0	0.944	41.0	LOS D	16.7	424.4	1.00	1.47	19.0
Approach											
		1485	2.0	0.944	41.4	LOS D	16.7	424.4	1.00	1.46	20.1
East: WB Trosper Rd											
1	L2	51	2.0	0.208	19.7	LOS B	1.0	24.1	0.87	0.87	22.7
6	T1	253	2.0	0.805	43.2	LOS D	7.0	176.9	0.98	1.36	17.4
16	R2	51	2.0	0.805	43.2	LOS D	7.0	176.9	0.98	1.36	18.7
Approach											
		354	2.0	0.805	39.8	LOS D	7.0	176.9	0.96	1.29	18.2
North: SB Capitol Blvd											
7	L2	35	2.0	0.695	21.1	LOS C	5.9	149.7	0.93	1.06	23.8
4	T1	995	2.0	0.695	18.5	LOS B	6.7	170.6	0.94	1.07	27.0
14	R2	657	2.0	0.782	21.7	LOS C	8.7	221.1	0.99	1.17	22.4
Approach											
		1687	2.0	0.782	19.8	LOS B	8.7	221.1	0.96	1.11	25.0
West: EB Trosper Rd											
5	L2	601	2.0	0.516	11.1	LOS B	3.6	91.4	0.82	0.87	24.9
2	T1	66	2.0	0.516	11.2	LOS B	3.6	91.4	0.84	0.90	22.3
12	R2	465	2.0	0.533	11.4	LOS B	3.8	96.6	0.84	0.91	25.0
Approach											
		1131	2.0	0.533	11.2	LOS B	3.8	96.6	0.83	0.89	24.8
All Vehicles											
		4657	2.0	0.944	26.1	LOS C	16.7	424.4	0.94	1.18	22.5

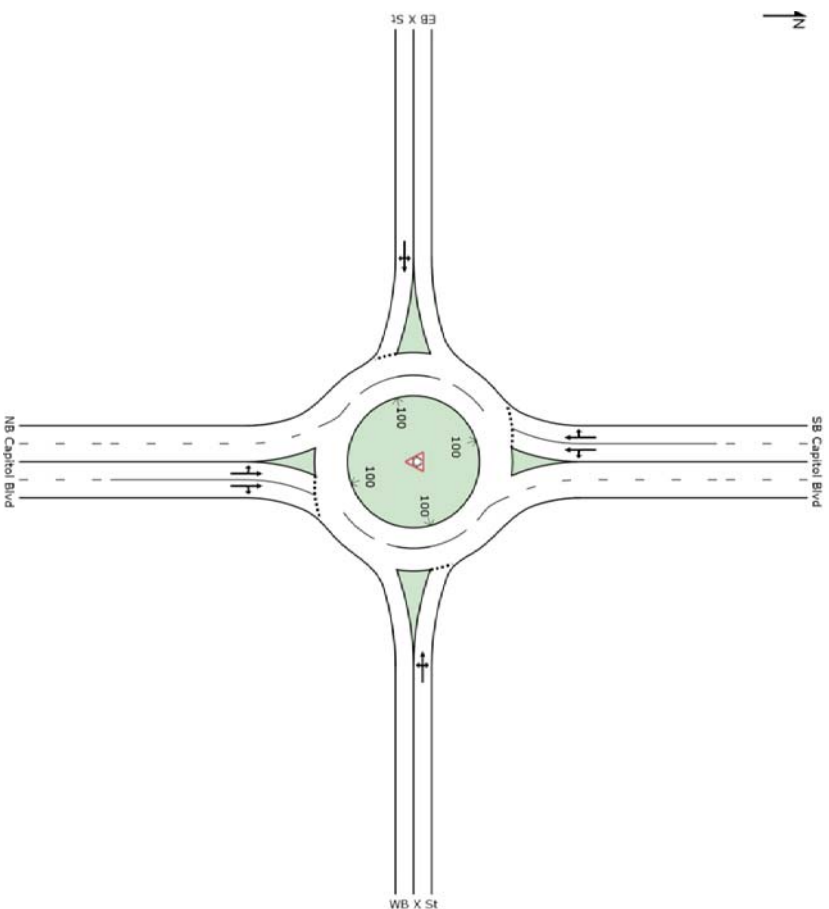
Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
Roundabout LOS Method: Same as Signalised Intersections.  
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).  
Intersection and Approach LOS values are based on average delay for all movements v/c not used as specified in HCM 2010).  
Roundabout Capacity Model: SIDRA Standard.  
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.  
Gap-Acceptance Capacity: SIDRA Standard (Akçelik, MSD).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com  
Organisation: SCI ALLIANCE | Processed: Tuesday, February 16, 2016 5:51:12 PM  
Project: N:\Projects\0625\_City of Tumwater\0625\_17 Tumwater Transportation Master Plan\Traffic\Operations\sida2040 With Imp\33) Trosper Rd at Capitol Blvd.sp6

## SITE LAYOUT

### Site: 38) X St at Capitol Blvd

Projected 2040 with Improvements  
PM Peak Hour  
Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com  
Organisation: SCI ALLIANCE | Created: Wednesday, February 10, 2016 10:55:35 AM  
Project: N:\Projects\0625\_City of Tumwater\0625\_17 Tumwater Transportation Master Plan\Traffic\Operations\sida2040 With Imp\38) X St at Capitol Blvd.sp6

## MOVEMENT SUMMARY

### Site: 38) X St at Capitol Blvd

Projected 2040 with Improvements  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total Veh/h	HV %	Deg. Satn W/C	Average Delay sec	Level of Service	95% Back of Queue Veh	Queue Distance ft	Pop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Capitol Blvd											
3	L2	26	2.0	0.481	7.7	LOS A	3.9	99.9	0.35	0.17	33.8
8	T1	1263	2.0	0.481	7.5	LOS A	4.0	100.5	0.34	0.16	33.9
18	R2	21	2.0	0.481	7.3	LOS A	4.0	100.5	0.33	0.16	32.9
Approach											
		1300	2.0	0.481	7.5	LOS A	4.0	100.5	0.34	0.16	33.9
East: WB X St											
1	L2	37	2.0	0.118	8.2	LOS A	0.5	11.5	0.66	0.66	32.2
6	T1	5	2.0	0.118	8.2	LOS A	0.5	11.5	0.66	0.66	32.0
16	R2	21	2.0	0.118	8.2	LOS A	0.5	11.5	0.66	0.66	31.2
Approach											
		63	2.0	0.118	8.2	LOS A	0.5	11.5	0.66	0.66	31.8
North: SB Capitol Blvd											
7	L2	37	2.0	0.495	7.9	LOS A	4.2	107.4	0.35	0.16	33.6
4	T1	1263	2.0	0.495	7.7	LOS A	4.3	108.1	0.34	0.16	33.8
14	R2	53	2.0	0.495	7.5	LOS A	4.3	108.1	0.33	0.15	32.8
Approach											
		1342	2.0	0.495	7.7	LOS A	4.3	108.1	0.34	0.16	33.7
West: EB X St											
5	L2	32	2.0	0.110	8.2	LOS A	0.4	10.8	0.66	0.66	32.3
2	T1	5	2.0	0.110	8.2	LOS A	0.4	10.8	0.66	0.66	32.1
12	R2	21	2.0	0.110	8.2	LOS A	0.4	10.8	0.66	0.66	31.3
Approach											
		58	2.0	0.110	8.2	LOS A	0.4	10.8	0.66	0.66	31.9
All Vehicles											
		2763	2.0	0.495	7.6	LOS A	4.3	108.1	0.35	0.18	33.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
Roundabout LOS Method: Same as Signalised Intersections.  
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
LOS F will result if v/c > 1 (respective of movement delay value (does not apply for approaches and intersection).  
Intersection and Approach LOS values are based on average delay for all movements v/c not used as specified in HCM 2010).  
Roundabout Capacity Model: SIDRA Standard.  
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.  
Gap-Acceptance Capacity: SIDRA Standard (Akçelik, MSD).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

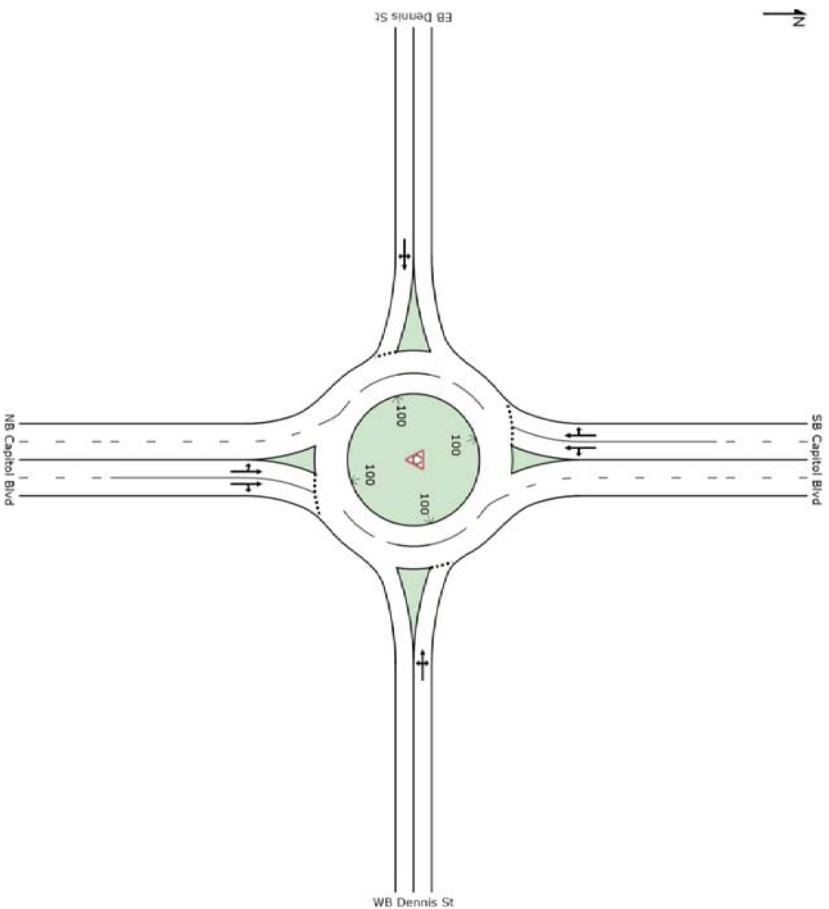
SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: SCI ALLIANCE | Processed: Wednesday, February 17, 2016 3:11:20 PM  
Project: N:\Projects\0625\_City of Tumwater\0625\_17 Tumwater Transportation Master Plan\Traffic\Operations\sida2040 With Imp\38) X St at Capitol Blvd.sip6

## SITE LAYOUT

### Site: 40) Dennis St at Capitol Blvd

Projected 2040 with Improvements  
PM Peak Hour  
Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: SCI ALLIANCE | Created: Wednesday, February 10, 2016 10:56:37 AM  
Project: N:\Projects\0625\_City of Tumwater\0625\_17 Tumwater Transportation Master Plan\Traffic\Operations\sida2040 With Imp\40) Dennis St at Capitol Blvd.sip6

# MOVEMENT SUMMARY

## Site: 40) Dennis St at Capitol Blvd

Projected 2040 with Improvements  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total Veh/h	HV %	Deg. Satn W/C	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Distance Queued ft	Pop. Queued	Effective Stop Rate per veh	Average Speed mph
<b>South: NB Capitol Blvd</b>											
3	L2	21	2.0	0.467	9.1	LOS A	3.5	89.4	0.68	0.54	33.1
8	T1	921	2.0	0.467	8.7	LOS A	3.6	92.6	0.67	0.52	33.3
18	R2	42	2.0	0.467	8.4	LOS A	3.6	92.6	0.67	0.51	32.4
Approach											
		984	2.0	0.467	8.7	LOS A	3.6	92.6	0.67	0.52	33.2
<b>East: WB Dennis St</b>											
1	L2	42	2.0	0.293	11.5	LOS B	1.3	33.6	0.74	0.74	31.4
6	T1	26	2.0	0.293	11.5	LOS B	1.3	33.6	0.74	0.74	31.3
16	R2	79	2.0	0.293	11.5	LOS B	1.3	33.6	0.74	0.74	30.5
Approach											
		147	2.0	0.293	11.5	LOS B	1.3	33.6	0.74	0.74	30.9
<b>North: SB Capitol Blvd</b>											
7	L2	47	2.0	0.466	7.6	LOS A	3.9	98.8	0.39	0.20	33.7
4	T1	1053	2.0	0.466	7.4	LOS A	3.9	99.9	0.39	0.20	33.9
14	R2	132	2.0	0.466	7.2	LOS A	3.9	99.9	0.38	0.19	32.9
Approach											
		1232	2.0	0.466	7.4	LOS A	3.9	99.9	0.39	0.20	33.8
<b>West: EB Dennis St</b>											
5	L2	237	2.0	0.562	17.1	LOS B	3.2	81.9	0.78	0.86	28.3
2	T1	42	2.0	0.562	17.1	LOS B	3.2	81.9	0.78	0.86	28.2
12	R2	37	2.0	0.562	17.1	LOS B	3.2	81.9	0.78	0.86	27.6
Approach											
		316	2.0	0.562	17.1	LOS B	3.2	81.9	0.78	0.86	28.2
<b>All Vehicles</b>											
		2679	2.0	0.562	9.3	LOS A	3.9	99.9	0.56	0.42	32.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
 Roundabout LOS Method: Same as Signalized Intersections.  
 Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
 LOS F will result if v/c > 1.0 respectively of movement delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all movements v/c not used as specified in HCM 2010).  
 Roundabout Capacity Model: SIDRA Standard.  
 HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.  
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik, MGD).  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arcaitek and Associates Pty Ltd | sidrasolutions.com  
 Organisation: SCJ ALLIANCE | Processed: Tuesday, February 9, 2016 6:05:09 PM  
 Project: N:\Projects\0625\_025\_17\_Turnwater\_Transportation Master Plan\TrafficOperations\sidra\2040 With Imp40) Dennis St at Capitol Blvd.sips

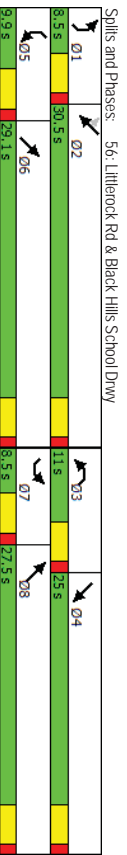
# Lanes, Volumes, Timings

Projected 2040 with Imp  
PM Peak Hour

## 56: Litterock Rd & Black Hills School Drwy

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	MER	SWL	SWT	SWR
Lane Configurations	5	25	10	100	50	25	15	275	50	25	535	70
Traffic Volume (vph)	5	25	10	100	50	25	15	275	50	25	535	70
Future Volume (vph)	5	25	10	100	50	25	15	275	50	25	535	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	200	0	0	0	175	0	100	0	100	350	0
Storage Lanes	1	1	0	1	1	1	0	1	0	1	1	1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1065			515			1067			3970	
Travel Time (s)		24.2			11.7			24.3			90.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	2%	0%	2%	2%	1%	1%	2%	2%	1%	1%	1%
Shared Lane Traffic (%)	Prot	NA		Prot	NA		Prot	NA		Prot	NA	Perm
Turn Type	7	4		3	8		1	6		5	2	2
Permitted Phases	7	4		3	8		1	6		5	2	2
Detector Phase	7	4		3	8		1	6		5	2	2
Switch Phase												
Minimum Initial (s)	4.0	7.0		4.0	7.0		4.0	7.0		4.0	7.0	7.0
Minimum Split (s)	8.5	24.5		8.5	27.5		8.5	24.5		8.5	27.5	27.5
Total Split (s)	8.5	25.0		11.0	27.5		8.5	29.1		9.9	30.5	30.5
Total Split (%)	11.3%	33.3%		14.7%	36.7%		11.3%	38.8%		13.2%	40.7%	40.7%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimizer?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	Max		None	Max		None	Max		None	Max	None

Intersection Summary  
 Area Type: Other  
 Cycle Length: 75  
 Actuated Cycle Length: 67.1  
 Natural Cycle: 75  
 Control Type: Actuated-Uncoordinated





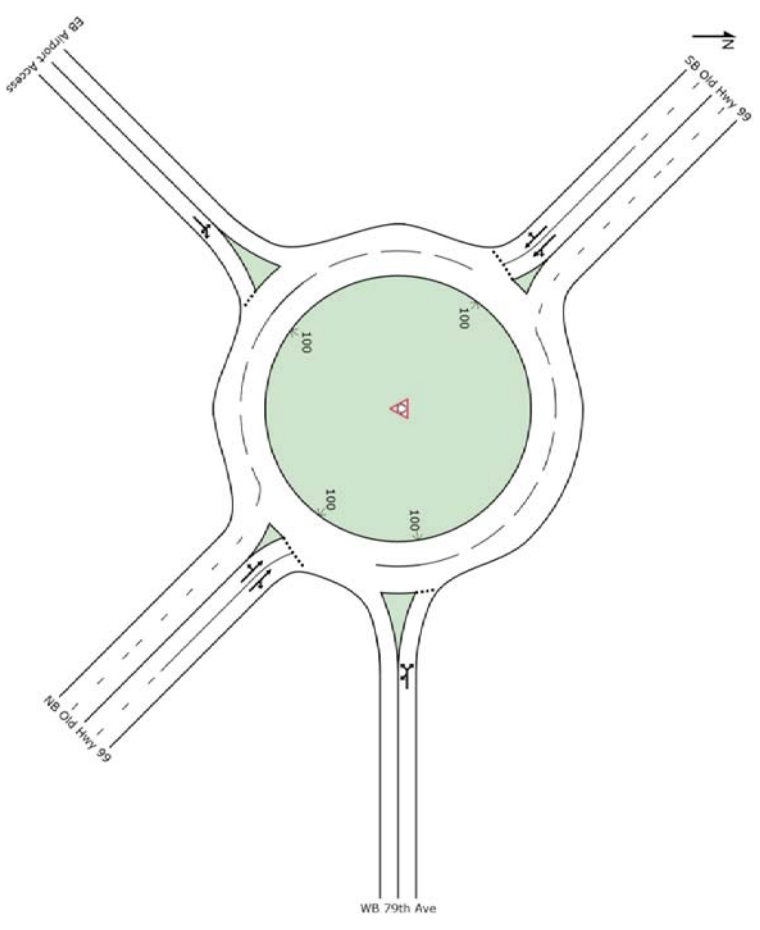
HCM 2010 Signalized Intersection Summary  
 56: Litterock Rd & Black Hills School Drwy

Projected 2040 with Imp  
 PM Peak Hour

Movement	SEL	SET	SER	NWL	NWT	NWR	NEI	NET	NER	SWL	SWT	SWR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (veh/h)	5	25	10	100	50	25	15	275	50	25	535	70
Future Volume (veh/h)	5	25	10	100	50	25	15	275	50	25	535	70
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1900	1874	1900	1863	1863	1900	1881	1878	1900	1863	1881	1881
Adj Flow Rate, veh/h	5	26	11	105	53	26	16	289	53	26	563	74
Adj No of Lanes	1	1	0	1	1	0	1	1	0	1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh. %	0	2	2	2	2	2	2	1	1	2	1	1
Cap. veh/h	97	366	155	134	372	182	27	543	100	40	675	574
Arrive On Green	0.05	0.29	0.29	0.08	0.31	0.31	0.02	0.35	0.35	0.02	0.36	0.36
Sat Flow, veh/h	1810	1251	529	1774	1181	579	1792	1545	283	1774	1881	1599
Grp Volume(V), veh/hln	5	37	105	0	79	16	0	342	26	563	74	
Grp Sat Flow(s), veh/hln	1810	0	1780	1774	0	1760	1792	0	1828	1774	1881	1599
Q Serve(g.s), s	0.2	0.0	1.1	4.1	0.0	2.3	0.6	0.0	10.4	1.0	19.2	2.2
Cycle Q Clear(g.c), s	1.00	0.0	1.1	4.1	0.0	2.3	0.6	0.0	10.4	1.0	19.2	2.2
Prop In Lane	1.00	0.30	1.00	1.00	0.33	1.00	0.15	1.00	1.00	0.15	1.00	
Lane Grp Cap(c), veh/h	97	0	522	134	0	554	27	0	643	40	675	574
V/C Ratio(X)	0.05	0.00	0.07	0.78	0.00	0.14	0.58	0.00	0.53	0.65	0.83	0.13
Avail Cap(c, a), veh/h	103	0	522	165	0	579	102	0	643	137	699	594
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	0.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.4	0.0	17.9	31.8	0.0	17.2	34.2	0.0	18.1	33.9	20.5	15.1
Incr Delay (d2), s/veh	0.2	0.0	0.3	17.7	0.0	0.1	7.1	0.0	3.1	16.0	8.5	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/hln	0.1	0.0	0.6	2.6	0.0	1.1	0.4	0.0	5.8	0.7	11.5	1.0
Lngrp Delay(d), s/veh	31.6	0.0	18.1	49.5	0.0	17.3	41.4	0.0	21.2	50.0	29.1	15.2
Lngrp LOS	C		B	D		B	D		C	D	C	B
Approach Vol, veh/h		42			184			358		663		
Approach Delay, s/veh		19.7			35.7			22.1		28.3		
Approach LOS		B			D			C		C		
Timer	1	2	3	4	5	6	7	8				
Assigned Pks	1	2	3	4	5	6	7	8				
Pks Duration (G+Y+R), s	56	29.6	9.8	25.0	6.1	29.1	8.3	26.5				
Change Period (++R), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Sealing (GmX), s	4.0	26.0	6.5	20.5	5.4	24.6	4.0	23.0				
Max Q Clear Time (Q-clear), s	2.6	21.2	6.1	3.1	3.0	12.4	2.2	4.3				
Green Ext Time (g-c), s	0.0	2.8	0.0	0.6	0.0	5.6	0.0	0.6				
<b>Intersection Summary</b>												
HCM 2010 Cnt Delay	21.4											
HCM 2010 LOS	C											

**SITE LAYOUT**

Site: 59) 79th Ave at Old Hwy 99  
 Projected 2040 with Improvements  
 PM Peak Hour  
 Roundabout



SIDA INTERSECTION 6.4 | Copyright © 2008-2015 Arcelik and Associates, Pw. Ltd | sidasolutions.com  
 17015 34th St, Suite 200, Burnaby, BC V5A 2R4, Canada  
 Project: N:\Projects\0625 City of Turnwater\0625\_17 Turnwater Transportation Master Plan\TrafficOperations\sidra\2040 With Imp\59) 79th Ave at Old Hwy 99.ap6

# MOVEMENT SUMMARY

Site: 59) 79th Ave at Old Hwy 99

Projected 2040 with Improvements  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total Veh/h	HV %	Deg. Satn W/C	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Distance Queued ft	Pop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: NB Old Hwy 99											
3x	L2	1	1.0	0.272	5.4	LOS A	1.7	41.8	0.36	0.21	35.2
8x	T1	679	1.0	0.272	5.2	LOS A	1.7	42.3	0.36	0.20	35.2
18x	R3	21	1.0	0.272	5.0	LOS A	1.7	42.3	0.35	0.19	33.7
Approach		701	1.0	0.272	5.2	LOS A	1.7	42.3	0.36	0.20	35.1
East WB 79th Ave											
1b	L3	32	1.0	0.224	7.5	LOS A	0.9	23.0	0.57	0.56	34.0
1a	L1	1	1.0	0.224	7.5	LOS A	0.9	23.0	0.57	0.56	33.1
16a	R2	132	1.0	0.224	7.5	LOS A	0.9	23.0	0.57	0.56	33.2
Approach		164	1.0	0.224	7.5	LOS A	0.9	23.0	0.57	0.56	33.3
NorthWest: SB Old Hwy 99											
7ax	L1	137	1.0	0.588	9.3	LOS A	6.4	160.8	0.29	0.10	32.4
4x	T1	1526	1.0	0.588	9.0	LOS A	6.4	161.3	0.28	0.10	33.0
14x	R2	1	1.0	0.588	8.9	LOS A	6.4	161.3	0.28	0.10	32.2
Approach		1664	1.0	0.588	9.1	LOS A	6.4	161.3	0.28	0.10	33.0
SouthWest: EB Airport Access											
5x	L2	1	2.0	0.027	8.1	LOS A	0.1	2.6	0.69	0.65	33.5
12ax	R1	1	2.0	0.027	8.1	LOS A	0.1	2.6	0.69	0.65	33.0
12x	R2	11	2.0	0.027	8.1	LOS A	0.1	2.6	0.69	0.65	32.5
Approach		13	2.0	0.027	8.1	LOS A	0.1	2.6	0.69	0.65	32.6
All Vehicles		2542	1.0	0.588	7.9	LOS A	6.4	161.3	0.32	0.16	33.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
Roundabout LOS Method: Same as Signalised Intersections.  
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).  
Intersection and Approach LOS values are based on average delay for all movements v/c not used as specified in HCM 2010).  
Roundabout Capacity Model: SIDRA Standard.  
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.  
Gap-Acceptance Capacity: SIDRA Standard (Akçelik, MSD).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arkitel and Associates Pty Ltd | sidrasolutions.com  
Organisation: SCJ ALLIANCE | Processed: Wednesday, February 17, 2016 3:14:11 PM  
Project: N:\projects\0625\_17\_Turnwater\_Transportation\_Master\_Plan\Traffic\Operations\sidra\2040\With Imp\59) 79th Ave at Old Hwy 99.sps

## Lanes, Volumes, Timings

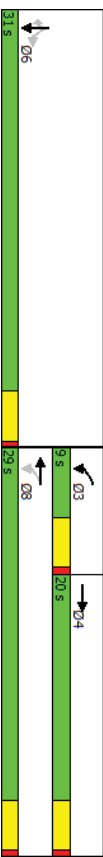
Projected 2040 with Imp  
PM Peak Hour

63: I-5 SB Ramps & 93rd Ave

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	0	415	95	85	305	0	0	0	0	475	0	425
Future Volume (vph)	0	415	95	85	305	0	0	0	0	475	0	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	150	0	0	0	0	0	0	0	300
Storage Lanes	0	0	0	1	0	0	0	0	0	0	0	1
Taper Length (ft)	25			25			25			25		25
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			40			30				30
Link Distance (ft)		732			936			1099				1644
Travel Time (s)		16.6			16.0			25.0				37.4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	9%	9%	0%	0%	0%	0%	4%	4%	4%
Shared Lane Traffic (%)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Turn Type	4	pm+pt	3	8	8	8	8	8	8	6	6	6
Protected Phases	4	3	3	8	8	8	8	8	8	6	6	6
Permitted Phases	4	3	3	8	8	8	8	8	8	6	6	6
Detector Phase	4	3	3	8	8	8	8	8	8	6	6	6
Switch Phase	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Initial (s)	200	80	20.0	80	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	200	9.0	29.0	9.0	29.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0
Total Split (s)	33.3%	15.0%	48.3%	15.0%	48.3%	51.7%	51.7%	51.7%	51.7%	51.7%	51.7%	51.7%
All-Red Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None

Area Type: Other  
Cycle Length: 60  
Actuated Cycle Length: 55.5  
Natural Cycle: 55  
Control Type: Actuated-Uncoordinated

Splits and Phases: 63: I-5 SB Ramps & 93rd Ave



HCM 2010 Signalized Intersection Summary  
63: I-5 SB Ramps & 93rd Ave

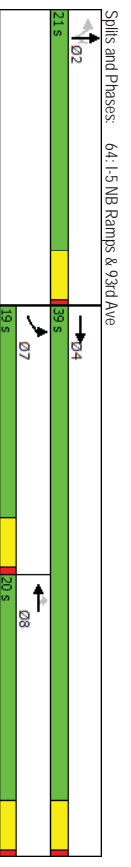
Projected 2040 with Imp  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (veh/h)	0	415	95	85	305	0	0	0	475	0	4	425
Future Volume (veh/h)	0	415	95	85	305	0	0	0	475	0	4	425
Number	7	4	14	3	8	18	1	6	16	0	0	16
Initial Q (Ob), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	0	1881	1900	1743	321	0	1900	1827	1827	0	268	0
Adj Flow Rate, veh/h	0	437	100	89	321	0	500	0	268	0	0	0
Adj No. of Lanes	0	2	0	1	2	0	0	0	1	0	0	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh. %	0	1	1	9	9	0	0	4	4	4	4	4
Cap. veh/h	0	657	149	296	1180	0	864	0	771	0	0	0
Arrive On Green	0.00	0.23	0.23	0.06	0.36	0.00	0.50	0.00	0.50	0.00	0.50	0.50
Sat Flow, veh/h	0	2989	657	1660	3399	0	1740	0	1553	0	0	0
Grp Volume(V), veh/hln	0	268	269	89	321	0	500	0	268	0	0	268
Grp Sat Flow(s), veh/hln	0	1787	1765	1660	1656	0	1740	0	1553	0	0	1553
Q Serve(g.s), s	0.0	7.4	7.5	2.1	3.8	0.0	11.0	0.0	5.7	0.0	0.0	5.7
Cycle Q Clear(g.c), s	0.0	7.4	7.5	2.1	3.8	0.0	11.0	0.0	5.7	0.0	0.0	5.7
Prop In Lane	0.00	0.37	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Lane Grp Cap(c), veh/h	0	405	400	296	1180	0	864	0.00	0.35	0.00	0.00	0.35
V/C Ratio(X)	0.00	0.66	0.67	0.30	0.27	0.00	0.58	0.00	0.35	0.00	0.00	0.35
Avail Cap(c), veh/h	0	526	519	356	1523	0	864	0	771	0	0	771
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	19.1	19.2	14.2	12.5	0.0	9.7	0.0	8.3	0.0	0.0	8.3
Incr Delay (d2), s/veh	0.0	2.0	2.2	0.6	0.1	0.0	2.8	0.0	1.2	0.0	0.0	1.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/h	0.0	3.9	3.9	1.0	1.7	0.0	6.0	0.0	2.6	0.0	0.0	2.6
LnGrp Delay(d), s/veh	0.0	21.1	21.4	14.8	12.6	0.0	12.5	0.0	9.6	0.0	0.0	9.6
LnGrp LOS	C	C	C	B	B	B	B	B	B	B	B	A
Approach Vol, veh/h	537			410			768					
Approach Delay, s/veh	21.2			13.1			11.5					
Approach LOS	C			B			B					
Timer	1	2	3	4	5	6	7	8				
Assigned PIs												
Phs Duration (G+Y+R), s		7.0	16.3			31.0		23.4				
Change Period (Y+R), s		4.0	4.0			4.0		4.0				
Max Green Setting (Gmax), s		5.0	16.0			27.0		25.0				
Max Q Clear Time (G+CH1), s		4.1	9.5			13.0		5.8				
Green Ext Time (G+CH1), s		0.0	2.8			3.7		5.2				
Intersection Summary												
HCM 2010 CH Delay							14.9					
HCM 2010 LOS							B					

Lanes, Volumes, Timings  
64: I-5 NB Ramps & 93rd Ave

Projected 2040 with Imp  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←	←	←	←	←	←	←	←	←	←	←
Traffic Volume (vph)	290	555	0	0	290	425	130	0	155	0	0	0
Future Volume (vph)	290	555	0	0	290	425	130	0	155	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125	0	0	0	0	300	0	200	0	0	0	0
Storage Lanes	1	0	0	0	0	1	0	1	0	0	0	0
Taper Length (ft)	25	0	0	0	0	25	0	25	0	0	0	0
Right Turn on Red												
Link Speed (mph)		40			40		30		30			30
Link Distance (ft)		936			1635		1212		1212			341
Travel Time (s)		16.0			27.9		27.5		27.5			7.8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	3%	8%	8%	8%	14%	14%	14%	14%	0%	0%
Shared Lane Traffic (%)												
Turn Type	Prot	NA	NA	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	7	4			8	8	2	2	2			2
Permitted Phases	7	4			8	8	2	2	2			2
Detector Phase	7	4			8	8	2	2	2			2
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			4.0
Minimum Spill (s)	8.0	20.0			20.0	20.0	20.0	20.0	20.0			20.0
Total Spill (s)	19.0	39.0			20.0	20.0	21.0	21.0	21.0			21.0
Total Split (%)	31.7%	65.0%			33.3%	33.3%	35.0%	35.0%	35.0%			35.0%
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			3.5
All-Red Time (s)	0.5	0.5			0.5	0.5	0.5	0.5	0.5			0.5
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			0.0
Total Lost Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			4.0
Lead/Lag	Lead	Lead			Lag	Lag	Lag	Lag	Lag			Lag
Lead-Lag Optimize?	Yes	Yes			Yes	Yes	Yes	Yes	Yes			Yes
Recall Mode	None	None			None	None	Min	Min	Min			Min
Area Type:	Other											
Cycle Length:	60											
Actuated Cycle Length:	45.7											
Natural Cycle:	60											
Control Type:	Actuated-Uncoordinated											



HCM 2010 Signalized Intersection Summary  
64: -5 NB Ramps & 93rd Ave

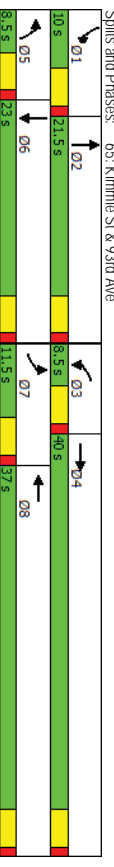
Projected 2040 with Imp  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (veh/h)	290	555	0	0	290	425	130	155	0	0	0	0
Future Volume (veh/h)	290	555	0	0	290	425	130	155	0	0	0	0
Number	7	4	14	3	8	18	5	2	12			
Initial Q (Q <sub>0</sub> ) veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj(A <sub>pb</sub> )	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1845	1845	0	0	1759	1759	1900	1667	1667	0	0	0
Adj Flow Rate, veh/h	305	584	0	0	305	0	137	0	0	0	0	0
Adj No of Lanes	1	2	0	0	2	1	1	1	1	1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh %	3	3	0	0	8	8	14	14	14	14	14	14
Cap. veh/h	395	2124	0	0	875	391	246	0	219	0	0	0
Arrive On Green	0.22	0.61	0.00	0.00	0.26	0.00	0.15	0.00	0.00	0.00	0.00	0.00
Sat Flow, veh/h	1757	3597	0	0	3431	1495	1587	0	1417			
Grp Volume(V), veh/hln	305	584	0	0	305	0	137	0	0	0	0	0
Grp Sat Flow(s), veh/hln	1757	1752	0	0	1671	1495	1587	0	1417			
Q Serve(s), s	5.5	2.6	0.0	0.0	2.5	0.0	2.7	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(q,c), s	5.5	2.6	0.0	0.0	2.5	0.0	2.7	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	395	2124	0	0	875	391	246	0	219			
W/C Ratio(X)	0.77	0.27	0.00	0.00	0.35	0.00	0.56	0.00	0.00			
Avail Cap(c, a), veh/h	787	3665	0	0	1598	715	806	0	719			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	12.2	3.1	0.0	0.0	10.0	0.0	13.1	0.0	0.0	0.0	0.0	0.0
Incr Delay (d <sub>2</sub> ), s/veh	3.2	0.1	0.0	0.0	0.2	0.0	2.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d <sub>0</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%alle BackQ(50%), veh/hln	3.0	1.2	0.0	0.0	1.2	0.0	1.3	0.0	0.0	0.0	0.0	0.0
Lngrp Delay(d <sub>0</sub> ), s/veh	15.4	3.2	0.0	0.0	10.3	0.0	15.1	0.0	0.0	0.0	0.0	0.0
Lngrp LOS	B	A			B		B					
Approach Vol, veh/h		889			305		137					137
Approach Delay, s/veh		7.4			10.3		15.1					15.1
Approach LOS		A			B		B					B
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2										
Phs Duration (G+Y+R <sub>0</sub> ), s		9.2			24.3		11.5	12.8				
Change Period (Y+R <sub>0</sub> ), s		4.0			4.0		4.0	4.0				
Max Green Setting (G <sub>max</sub> ), s		17.0			35.0		15.0	16.0				
Max Q Clear Time (G+CH1), s		4.7			4.6		7.5	4.5				
Green Ext Time (φ <sub>c</sub> ), s		0.5			6.3		0.5	4.3				
<b>Intersection Summary</b>												
HCM 2010 CH Delay	8.8											
HCM 2010 LOS	A											

Lanes, Volumes, Timings  
65: Kimmie St & 93rd Ave

Projected 2040 with Imp  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	55	535	5	5	475	15	15	1	10	30	15	110
Future Volume (vph)	55	535	5	5	475	15	15	1	10	30	15	110
Ideal Flow (vphpl)	1900	1900	0	1000	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)												
Storage Lanes	1	1	0	1	1	1	1	1	0	100	0	0
Taper Length (ft)												
Right Turn on Red												
Link Speed (mph)												
Link Distance (ft)		40			40		40		30			30
Travel Time (s)		1635			3676		627		860			5320
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	4%	4%	1%	1%	1%	0%	0%	0%	5%	5%	5%
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA	Prot	NA		Prot
Protected Phases	7	4		3	8		5	2	1			6
Permitted Phases	7	4		3	8		5	2	1			6
Detector Phase	7	4		3	8		5	2	1			6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0			4.0
Minimum Spill (s)	8.5	20.5		8.5	20.5		8.5	20.5	8.5			20.5
Total Split (s)	11.5	40.0		8.5	37.0		8.5	21.5	10.0			23.0
Total Split (%)	14.4%	50.0%		10.6%	46.3%		10.6%	26.9%	12.5%			28.8%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5			3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0			1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0			0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5			4.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead			Lag
Lead-Lag Optimizer?	Yes	Yes		Yes	Yes		Yes	Yes	Yes			Yes
Recall Mode	None	None		None	None		None	Min	None			Min
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	80											
Actuated Cycle Length:	40.5											
Natural Cycle:	65											
Control Type:	Actuated-Uncoordinated											



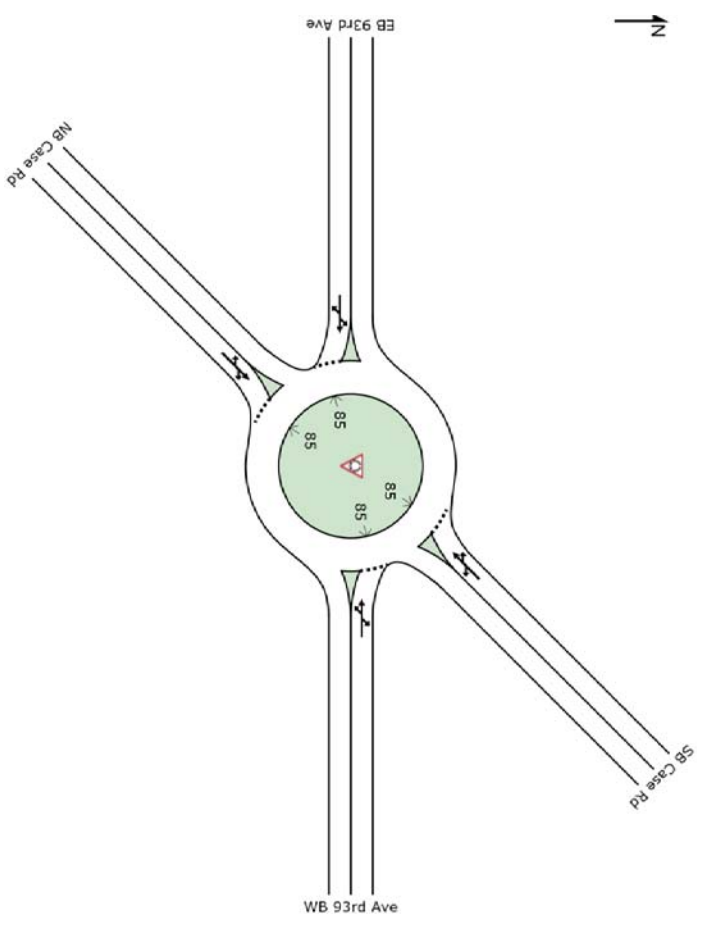
HCM 2010 Signalized Intersection Summary  
 65: Kimmie St & 93rd Ave

Projected 2040 with Imp  
 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (veh/h)	55	535	5	5	475	15	15	1	10	30	15	110
Future Volume (veh/h)	55	535	5	5	475	15	15	1	10	30	15	110
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1827	1827	1900	1881	1881	1900	1900	1900	1810	1810	1900	1900
Adj Flow Rate, veh/h	58	563	5	5	500	16	16	1	11	32	16	116
Adj No. of Lanes	1	1	0.95	0.95	1	2	0	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh. %	4	4	4	4	1	1	0	0	5	5	5	5
Arrive On Green	80	803	7	10	1428	46	29	17	185	50	26	188
Cap. veh/h	0.05	0.44	0.44	0.01	0.40	0.40	0.02	0.12	0.12	0.03	0.14	0.14
Sat Flow, veh/h	1740	1808	16	1792	3535	113	1810	136	1499	1723	190	1377
Grp Volume(V), veh/hln	58	0	568	5	252	264	16	0	12	32	0	132
Grp Sat Flow(s), veh/hln	1740	0	1824	1792	1787	1861	1810	0	1635	1723	0	1567
Q Serve(s), s	1.5	0.0	11.4	0.1	4.4	4.5	0.4	0.0	0.3	0.8	0.0	3.6
Cycle Q Clear(c), s	1.5	0.0	11.4	0.1	4.4	4.5	0.4	0.0	0.3	0.8	0.0	3.6
Prop In Lane	1.00	0.01	1.00	1.00	0.06	1.00	0.92	1.00	0.88	1.00	0.88	1.00
Lane Grp Cap(c), veh/h	80	0	810	10	722	752	29	0	202	50	0	214
W/C Ratio(X)	0.73	0.00	0.70	0.52	0.35	0.35	0.55	0.00	0.06	0.63	0.00	0.62
Avail Cap(c), veh/h	269	0	1430	158	1283	1336	160	0	614	209	0	640
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.3	0.0	10.2	22.5	9.4	9.4	22.1	0.0	17.5	21.7	0.0	18.4
Incr Delay (d2), s/veh	11.9	0.0	1.1	37.0	0.3	0.3	15.1	0.0	0.1	12.4	0.0	2.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/hln	1.0	0.0	5.9	0.2	2.2	2.3	0.3	0.0	0.1	0.6	0.0	1.7
LnGrp Delay(d), s/veh	33.3	0.0	11.3	59.5	9.7	9.7	31.2	0.0	17.6	34.2	0.0	21.3
LnGrp LOS	C		B	E	A	A	D		B	C		C
Approach Vol, veh/h		626			521			28		164		
Approach Delay, s/veh		13.3			10.1			28.8		23.8		
Approach LOS		B			B			C		C		
Timer	1	2	3	4	5	6	7	8				
Assigned Pns	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+R), s	5.8	10.1	4.7	24.6	5.2	10.7	6.6	22.8				
Change Period (Y+R), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.5	17.0	4.0	35.5	4.0	18.5	7.0	32.5				
Max Q Clear Time (QcH1), s	2.8	2.3	2.1	13.4	2.4	5.6	3.5	6.5				
Green Ext Time (Qc), s	0.0	0.6	0.0	6.7	0.0	0.6	0.0	7.1				
Intersection Summary												
HCM 2010 Ctrl Delay			13.7									
HCM 2010 LOS			B									

SITE LAYOUT

Site: 66) Case Rd at 93rd Ave  
 Projected 2040 With Improvements  
 PM Peak Hour  
 Roundabout



## MOVEMENT SUMMARY

### Site: 66) Case Rd at 93rd Ave

Projected 2040 With Improvements  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total Vehln	Flows HV %	Deg. Satn	Average Delay sec	Level of Service	95% Back of Queue Veh	Distance ft	Pop. Queued	Effective Stop Rate per veh	Average Speed mph
East WB 93rd Ave											
1a	L1	253	2.0	0.659	13.0	LOS B	7.1	179.9	0.66	0.42	30.1
6	T1	379	2.0	0.659	13.0	LOS B	7.1	179.9	0.66	0.42	30.4
16b	R3	68	2.0	0.659	13.0	LOS B	7.1	179.9	0.66	0.42	29.4
Approach											
		700	2.0	0.659	13.0	LOS B	7.1	179.9	0.66	0.42	30.2
NorthEast: SB Case Rd											
1bx	L3	147	2.0	0.407	12.4	LOS B	2.9	72.4	0.85	0.85	30.0
6x	T1	84	2.0	0.407	12.4	LOS B	2.9	72.4	0.85	0.85	29.8
16ax	R1	5	2.0	0.407	12.4	LOS B	2.9	72.4	0.85	0.85	29.6
Approach											
		237	2.0	0.407	12.4	LOS B	2.9	72.4	0.85	0.85	29.9
West: EB 93rd Ave											
5a	L1	5	2.0	0.789	23.7	LOS C	11.1	282.6	0.98	1.14	26.7
2	T1	458	2.0	0.789	23.7	LOS C	11.1	282.6	0.98	1.14	27.0
12b	R3	147	2.0	0.789	23.7	LOS C	11.1	282.6	0.98	1.14	26.2
Approach											
		611	2.0	0.789	23.7	LOS C	11.1	282.6	0.98	1.14	26.8
SouthWest: NB Case Rd											
5bx	L3	89	2.0	0.280	9.2	LOS A	1.8	45.8	0.78	0.71	31.6
2x	T1	37	2.0	0.280	9.2	LOS A	1.8	45.8	0.78	0.71	31.4
12ax	R1	53	2.0	0.280	9.2	LOS A	1.8	45.8	0.78	0.71	31.2
Approach											
		179	2.0	0.280	9.2	LOS A	1.8	45.8	0.78	0.71	31.4
All Vehicles											
		1726	2.0	0.789	16.3	LOS B	11.1	282.6	0.81	0.76	29.0

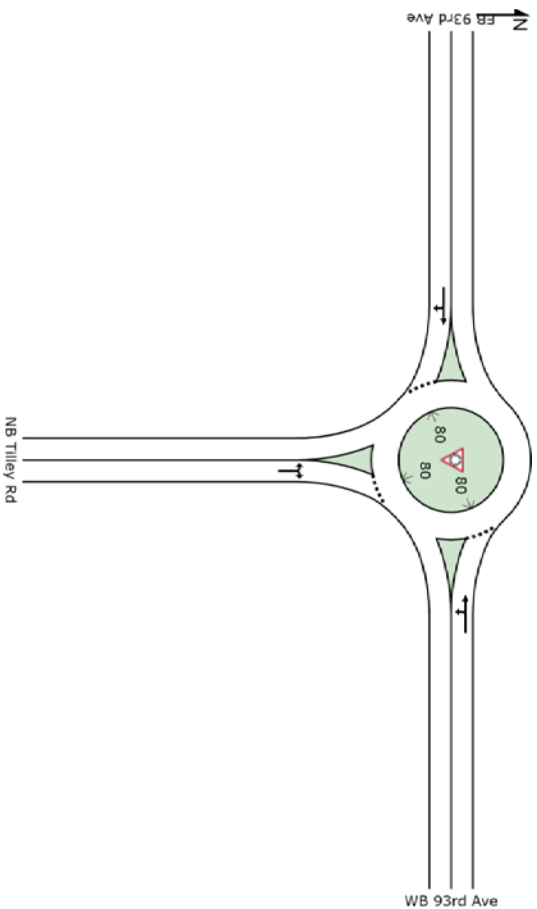
Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
Roundabout LOS Method: Same as Signalised Intersections.  
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).  
Intersection and Approach LOS values are based on average delay for all movements v/c not used as specified in HCM 2010).  
Roundabout Capacity Model: SIDRA Standard.  
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.  
Gap-Acceptance Capacity: SIDRA Standard (Akçelik, MSD).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arcelik and Associates Pty Ltd | sidrasolutions.com  
Organisation: SCJ ALLIANCE | Processed: Wednesday, February 17, 2016 3:18:52 PM  
Project: N:\projects\0625\_City of Tumwater\0625\_17\_Tumwater\_Transportation\_Master\_Plan\TrafficOperations\sidra\2040 With Imp66) 93rd Ave at Case Rd.sips

## SITE LAYOUT

### Site: 67) 93rd Ave at Tilley Rd (South)

Projected 2040 with Improvements  
Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arcelik and Associates Pty Ltd | sidrasolutions.com  
Organisation: SCJ ALLIANCE | Created: Wednesday, February 17, 2016 3:20:02 PM  
Project: N:\projects\0625\_City of Tumwater\0625\_17\_Tumwater\_Transportation\_Master\_Plan\TrafficOperations\sidra\2040 With Imp67) 93rd Ave at Tilley Rd (South).sips

## MOVEMENT SUMMARY

Site: 67) 93rd Ave at Tilley Rd (South)

Projected 2040 with Improvements Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total Veh/h	Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	99% Back of Queue Vehicles	Distance ft	Pop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Tilley Rd											
3	L2	179	2.0	0.345	8.8	LOS A	2.3	58.9	0.71	0.60	31.2
18	R2	89	2.0	0.345	8.8	LOS A	2.3	58.9	0.71	0.60	30.5
Approach											
		268	2.0	0.345	8.8	LOS A	2.3	58.9	0.71	0.60	31.0
East: WB 93rd Ave											
1	L2	279	2.0	0.788	19.4	LOS B	12.0	305.6	0.89	0.70	27.8
6	T1	511	2.0	0.788	19.4	LOS B	12.0	305.6	0.89	0.70	27.8
Approach											
		789	2.0	0.788	19.4	LOS B	12.0	305.6	0.89	0.70	27.8
West: EB 93rd Ave											
2	T1	405	2.0	0.732	17.9	LOS B	9.5	241.7	0.90	0.82	28.9
12	R2	247	2.0	0.732	17.9	LOS B	9.5	241.7	0.90	0.82	28.3
Approach											
		653	2.0	0.732	17.9	LOS B	9.5	241.7	0.90	0.82	28.7
All Vehicles											
		1711	2.0	0.788	17.2	LOS B	12.0	305.6	0.86	0.73	28.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010)

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement. LOS F will result if v/c > 1 (respectively of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: SIDRA Standard (Akcelik, M.D.).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

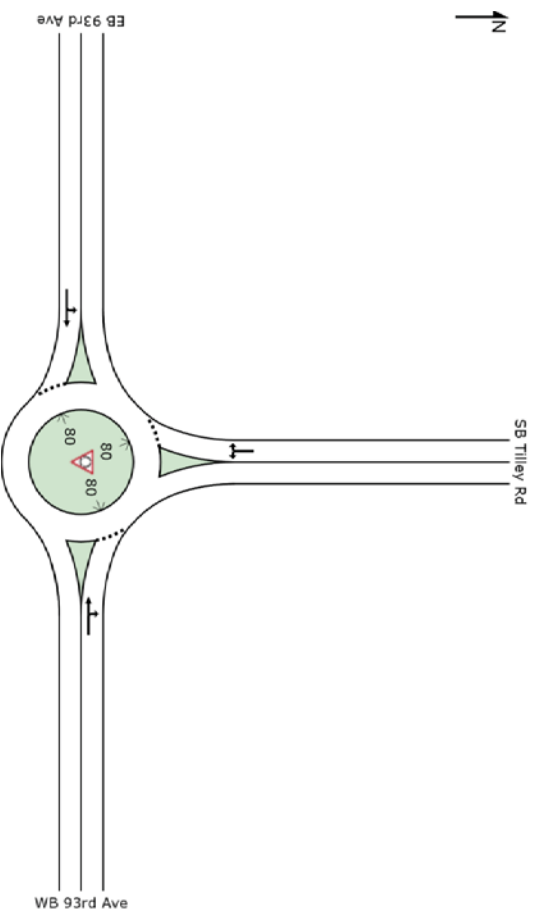
SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: SCJ ALLIANCE | Processed: Wednesday, February 17, 2016 3:20:01 PM  
 Project: N:\Projects\0625\0625\_17\_Turnwater\_Transportation Master Plan\TrafficOperations\sldra2040 With Imp\67\_93rd Ave at Tilley Rd (South).sfp6

## SITE LAYOUT

Site: 68) 93rd Ave at Tilley Rd (North)

Projected 2040 with Improvements Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: SCJ ALLIANCE | Created: Tuesday, February 23, 2016 12:42:54 PM  
 Project: N:\Projects\0625\0625\_17\_Turnwater\_Transportation Master Plan\TrafficOperations\sldra2040 With Imp\68\_93rd Ave at Tilley Rd (North).sfp6

## MOVEMENT SUMMARY

### Site: 68) 93rd Ave at Tilley Rd (North)

Projected 2040 with Improvements  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD	Demand Flows Total Veh/h	HV %	Deg Satn v/c	Average Delay sec	Level of Service	99% Back of Queue Vehicles	Distance ft	Pop. Queued	Effective Stop Rate per veh	Average Speed mph
East WB 93rd Ave											
6	T1	358	2.0	0.398	7.6	LOSA	2.9	74.5	0.44	0.26	33.4
16	R2	68	2.0	0.398	7.6	LOSA	2.9	74.5	0.44	0.26	32.5
Approach											
		426	2.0	0.398	7.6	LOSA	2.9	74.5	0.44	0.26	33.2
North: SB Tilley Rd											
7	L2	179	2.0	0.712	17.4	LOS B	8.5	215.1	0.87	0.87	28.4
14	R2	432	2.0	0.712	17.4	LOS B	8.5	215.1	0.87	0.87	27.9
Approach											
		611	2.0	0.712	17.4	LOS B	8.5	215.1	0.87	0.87	28.0
West: EB 93rd Ave											
5	L2	121	2.0	0.503	9.7	LOSA	4.2	106.7	0.61	0.42	31.7
2	T1	379	2.0	0.503	9.7	LOSA	4.2	106.7	0.61	0.42	31.8
Approach											
		500	2.0	0.503	9.7	LOSA	4.2	106.7	0.61	0.42	31.8
All Vehicles											
		1537	2.0	0.712	12.2	LOS B	8.5	215.1	0.67	0.55	30.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010)

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement. LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gain-Acceptance Capacity: SIDRA Standard (Arceik, M&D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arceik and Associates Pty Ltd | sidrasolutions.com

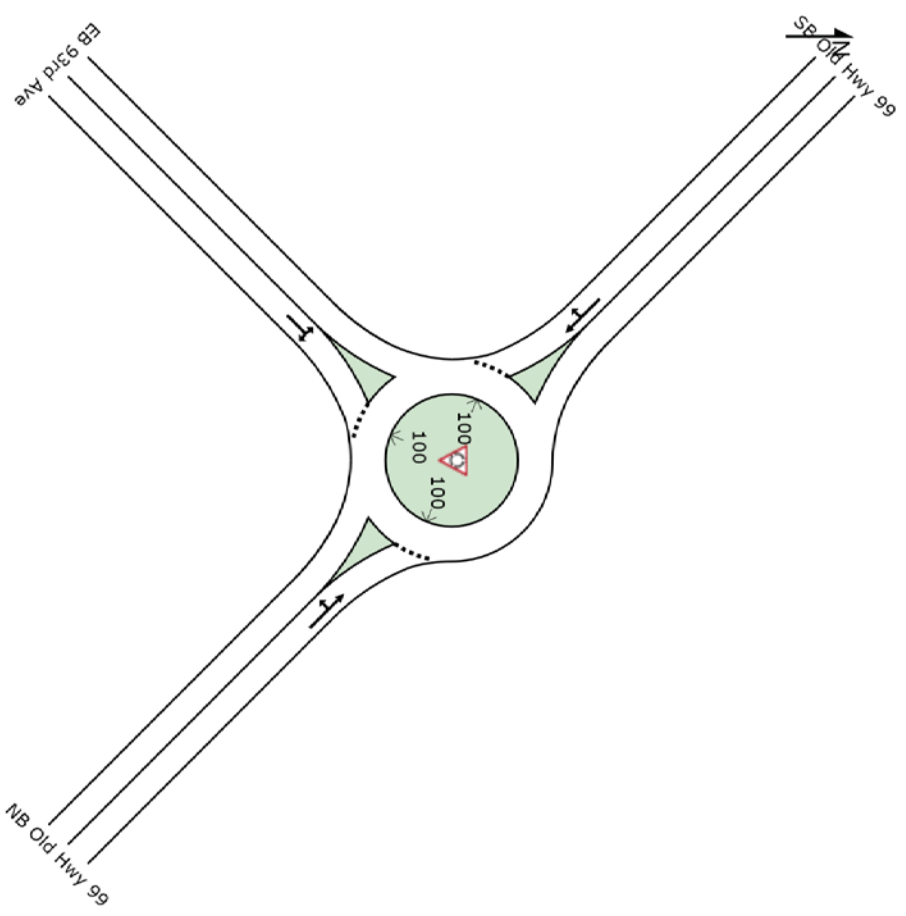
Organisation: SCU ALLIANCE | Processed: Thursday, February 25, 2016 12:42:02 PM

Project: N:\Projects\0625\_City of Tumwater\0625\_17 Tumwater Transportation Master Plan\TrafficOperations\sldra2040 With Imp\68) 93rd Ave at Tilley Rd (North).sfp6

## SITE LAYOUT

### Site: 69) 93rd Ave at Old Hwy 99

Projected 2040 With Improvements  
PM Peak Hour  
Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arceik and Associates Pty Ltd | sidrasolutions.com

Organisation: SCU ALLIANCE | Created: Thursday, February 25, 2016 11:31:20 AM

Project: N:\Projects\0625\_City of Tumwater\0625\_17 Tumwater Transportation Master Plan\TrafficOperations\sldra2040 With Imp\69) 93rd Ave at Old Hwy 99.sfp6



# MOVEMENT SUMMARY

Site: 69) 93rd Ave at Old Hwy 99

Projected 2040 With Improvements  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total Veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Veh	Queue Distance ft	Pop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: NB Old Hwy 99											
3x	L2	200	2.0	0.447	7.4	LOS A	4.3	109.6	0.18	0.05	33.1
8x	T1	358	2.0	0.447	7.4	LOS A	4.3	109.6	0.18	0.05	33.0
Approach											
		558	2.0	0.447	7.4	LOS A	4.3	109.6	0.18	0.05	33.0
NorthWest: SB Old Hwy 99											
4x	T1	937	2.0	0.922	32.1	LOS C	24.0	608.9	1.00	0.96	24.8
14x	R2	32	2.0	0.922	32.1	LOS C	24.0	608.9	1.00	0.96	24.3
Approach											
		968	2.0	0.922	32.1	LOS C	24.0	608.9	1.00	0.96	24.8
SouthWest: EB 93rd Ave											
5x	L2	16	2.0	0.623	27.5	LOS C	5.9	150.0	1.00	1.13	25.8
12x	R2	216	2.0	0.623	27.5	LOS C	5.9	150.0	1.00	1.13	25.2
Approach											
		232	2.0	0.623	27.5	LOS C	5.9	150.0	1.00	1.13	25.3
All Vehicles											
		1758	2.0	0.922	23.7	LOS C	24.0	608.9	0.74	0.69	27.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
Roundabout LOS Method: Same as Signalized Intersections.  
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
LOS F will result if v/c > 1 (respective of movement delay value (does not apply for approaches and intersection).  
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).  
Roundabout Capacity Model: SIDRA Standard.  
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.  
Gap-Acceptance Capacity: SIDRA Standard (Akçelik, M&D).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arcelik and Associates Pty Ltd | sidrasolutions.com  
Organisation: SCJ ALLIANCE | Processed: Thursday, February 25, 2016 8:13:12 AM  
Project: N:\Projects\0625.17 Turnwater Transportation Master Plan\TrafficOperations\sdr2040 With Impl69) 93rd Ave at Old Hwy 99.sps

## HCM 2010 AWSC 1: RW Johnson Rd & Mottman Rd

Projected 2022 without improvements  
PM Peak Hour

Intersection												
Intersection Delay: s/vch												
Intersection LOS												
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, Veh/h	0	45	85	5	0	120	45	85	0	5	175	135
Future Vol, Veh/h	0	45	85	5	0	120	45	85	0	5	175	135
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles: %	2	6	6	6	2	9	9	9	2	4	4	4
Mntrl Flow	0	49	92	5	0	130	49	92	0	5	190	147
Number of Lanes	0	1	1	1	0	0	1	1	0	1	1	1
Approach												
Opposing Approach	WB		EB		WB		EB		WB		EB	
Opposing Lanes	2		2		2		2		2		2	
Conflicting Approach Left	SB		SB		NB		NB		EB		EB	
Conflicting Lanes Left	2		2		2		2		2		2	
Conflicting Approach Right	NB		NB		SB		SB		WB		WB	
Conflicting Lanes Right	2		2		2		2		2		2	
HCM Control Delay	10.8		10.8		11.4		11.4		15.4		15.4	
HCM LOS	B		B		B		B		C		C	

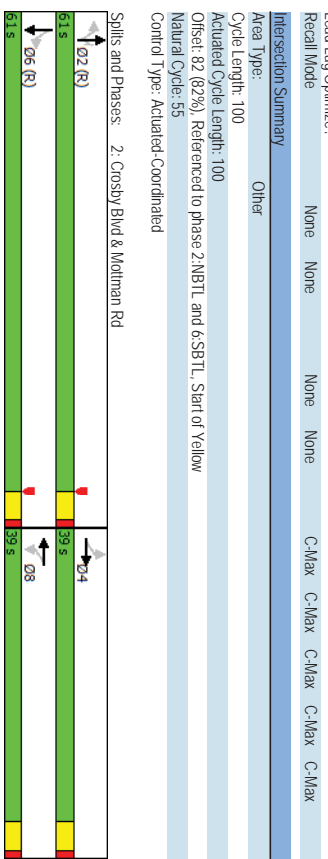
lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	56%	0%	94%	0%	35%	0%	85%
Vol Right, %	0%	44%	0%	6%	0%	65%	0%	15%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	310	45	90	120	130	45	130
LT Vol	5	0	45	0	120	0	45	0
RT Vol	0	175	0	85	0	45	0	110
Lane Flow Rate	5	337	49	98	130	141	49	141
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.01	0.548	0.098	0.18	0.254	0.237	0.094	0.246
Departure Headway (hd)	6.676	5.86	7.177	6.629	7.009	6.036	6.884	6.267
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	535	613	498	539	511	593	519	571
Service Time	4.43	3.614	4.943	4.394	4.766	3.794	4.647	4.029
HCM Lane v/c Ratio	0.009	0.55	0.098	0.182	0.254	0.238	0.094	0.247
HCM Control Delay	9.5	15.5	10.7	10.9	12.2	10.7	10.4	11.1
HCM Lane LOS	A	C	B	B	B	B	B	B
HCM 95th-ile Q	0	3.3	0.3	0.7	1	0.9	0.3	1

HCM 2010 AWSC  
1: RW Johnson Rd & Motman Rd  
Projected 2022 without improvements  
PM Peak Hour

Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Intersection Delay, s/vch												
Intersection LOS												
Movement	SBU	SBL	SBT	SBR								
Traffic Vol, veh/h	0	45	110	20								
Future Vol, veh/h	0	45	110	20								
Peak Hour Factor	0.92	0.92	0.92	0.92								
Heavy Vehicles, %	2	3	3	3								
Multi Flow	0	49	120	22								
Number of Lanes	0	1	1	0								
Approach	SB											
Opposing Approach	NB											
Opposing Lanes	2											
Conflicting Approach Left	WB											
Conflicting Lanes Left	2											
Conflicting Approach Right	EB											
Conflicting Lanes Right	2											
HCM Control Delay	10.9											
HCM LOS	B											
Lane												

Lanes, Volumes, Timings  
2: Crosby Blvd & Motman Rd  
Projected 2022 without improvements  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	180	250	25	5	30	85	45	425	155	135	690	455
Future Volume (vph)	180	250	25	5	30	85	45	425	155	135	690	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	0	0	0	0	0	200	0	100	0	0	
Storage Lanes	1	1	0	0	0	0	1	1	1	1	1	
Taper Length (ft)	25			25			25			25		
Right Turn on Red					Yes		Yes		Yes		Yes	
Link Speed (mph)		30			30		30		30		30	
Link Distance (ft)		940			1116		645		417		417	
Travel Time (s)		21.4			25.4		14.7		9.5		9.5	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	1%	1%	3%	3%	3%	
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8		2		2		6	
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Spill (s)	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	
Total Spill (s)	39.0	39.0	39.0	39.0	39.0	39.0	61.0	61.0	61.0	61.0	61.0	
Total Split (%)	39.0%	39.0%	39.0%	39.0%	39.0%	39.0%	61.0%	61.0%	61.0%	61.0%	61.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
LeadLag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	
Intersection Summary	Other											
Area Type:	Other											
Cycle Length:	100											
Actuated Cycle Length:	100											
Offset:	82 (82%), Referenced to phase 2: NBTL and 6:SBTL, Start of Yellow											
Natural Cycle:	55											
Control Type:	Actuated-Coordinated											



Projected 2022 without improvements  
 P/M Peak Hour

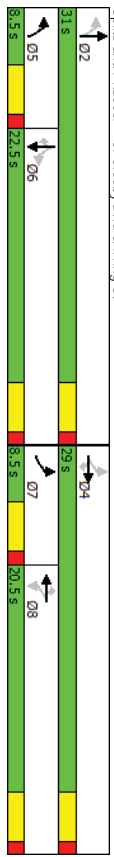
Projected 2022 without improvements  
 P/M Peak Hour

### 2: Crosby Blvd & Mottman Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	RB	RB	RB	RB	RB	RB	RB	RB	RB	RB	RB	RB
Traffic Volume (veh/h)	180	250	25	5	30	85	45	425	155	135	690	455
Future Volume (veh/h)	180	250	25	5	30	85	45	425	155	135	690	455
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Q0), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1845	1845	1900	1900	1900	1881	1881	1881	1845	1845	1900	1900
Adj Flow Rate, veh/h	202	281	28	6	34	96	51	478	174	152	775	0
Adj No. of Lanes	1	1	0	0	1	0	1	1	1	1	2	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh. %	3	3	3	0	0	0	1	1	1	1	3	3
Cap. veh/h	262	389	39	42	106	267	488	1269	1078	516	2364	0
Arrive-On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.67	0.67	0.67	0.67	0.00
Sat Flow, veh/h	1243	1651	165	21	452	1135	700	1881	1599	769	3597	0
Grp Volume(V), veh/hln	202	0	309	136	0	0	51	478	174	152	775	0
Grp Sat Flow(s), veh/hln	1243	0	1816	1608	0	0	700	1881	1599	769	3597	0
Q Serve(q.s), s	9.6	0.0	15.7	0.1	0.0	0.0	3.2	11.1	4.0	10.4	9.2	0.0
Cycle Q Clear(q.c), s	23.6	0.0	15.7	16.9	0.0	0.0	11.2	11.1	4.0	20.2	9.2	0.0
Prop In Lane	1.00	1.00	0.09	0.04	0.00	0.00	0.71	1.00	1.00	1.00	0.00	0.00
Lane Grp Cap(c), veh/h	262	0.0	428	416	0	0	488	1269	1078	516	2364	0.00
Avali Cap(c), veh/h	398	0	626	596	0	0	488	1269	1078	516	2364	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	0.00	1.00	1.00	0.00	0.00	0.93	0.93	0.93	1.00	1.00	0.00
Uniform Delay (d), s/veh	41.3	0.0	35.2	31.8	0.0	0.0	8.9	7.1	5.9	11.2	6.8	0.0
Incr Delay (d2), s/veh	5.0	0.0	2.3	0.5	0.0	0.0	0.4	0.8	0.3	1.5	0.4	0.0
Initial Q Delay(d1), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%alle BackQ(50%), veh/hln	5.9	0.0	8.1	3.2	0.0	0.0	0.7	6.0	1.8	2.4	4.5	0.0
Lngrp Delay(d), s/veh	46.3	0.0	37.5	32.2	0.0	0.0	9.3	7.9	6.2	12.6	7.2	0.0
Lngrp LOS	D	D	D	C	D	D	A	A	A	B	A	D
Approach Vol, veh/h	511	136	703	927	8.1	A						
Approach Delay, s/veh	41.0	32.2	7.6	8.1	A							
Approach LOS	D	C	A	A	A							
Timer	1	2	3	4	5	6	7	8	8	8	8	8
Assigned Pks	2	2	2	2	2	2	2	2	2	2	2	2
Pks Duration (G+Y+R), s	69.8	30.2	69.8	30.2	69.8	30.2	69.8	30.2	69.8	30.2	69.8	30.2
Change Period (Y+R), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	56.5	34.5	56.5	34.5	56.5	34.5	56.5	34.5	56.5	34.5	56.5	34.5
Max O Clear Time (G+CH1), s	13.2	25.6	13.2	22.2	13.2	22.2	18.9	18.9	18.9	18.9	18.9	18.9
Green Ext Time (G+C), s	15.4	2.4	14.2	14.2	15.4	2.4	3.1	3.1	3.1	3.1	3.1	3.1

### 3: Crosby Blvd & Irving St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	RB	RB	RB	RB	RB	RB	RB	RB	RB	RB	RB	RB
Traffic Volume (vph)	75	25	25	30	40	185	25	340	25	160	485	100
Future Volume (vph)	75	25	25	30	40	185	25	340	25	160	485	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	200	0	0	150	200	0	0	0	250	0
Storage Lanes	0	1	1	0	0	1	1	0	0	1	1	1
Taper Length (ft)	25	25	25	25	25	25	25	25	25	25	25	25
Right Turn on Red	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Link Speed (mph)	30	30	30	30	30	30	30	30	30	30	30	30
Link Distance (ft)	468	468	468	468	468	468	468	468	468	468	468	468
Travel Time (s)	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	8%	8%	8%	1%	1%	1%	1%	1%	1%	1%	2%	2%
Shaded Lane Traffic (%)	pm+pl	NA	Perm	Perm	NA	Perm	pm+pl	NA	Perm	NA	Perm	NA
Turn Type	7	4	4	8	8	8	5	2	8	2	6	6
Protected Phases	4	4	4	8	8	8	8	8	8	8	8	8
Permitted Phases	4	4	4	8	8	8	8	8	8	8	8	8
Detector Phase	4	4	4	8	8	8	8	8	8	8	8	8
Switch Phase	4	4	4	8	8	8	8	8	8	8	8	8
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Spill (s)	8.5	20.5	20.5	20.5	20.5	20.5	8.5	20.5	20.5	20.5	20.5	20.5
Total Spill (s)	8.5	29.0	29.0	20.5	20.5	20.5	8.5	31.0	22.5	22.5	22.5	22.5
Total Split (%)	14.2%	48.3%	48.3%	34.2%	34.2%	34.2%	14.2%	51.7%	37.5%	37.5%	37.5%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	None	None	None	None	None	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None



HCM 2010 Signalized Intersection Summary  
3: Crosby Blvd & Irving St

Projected 2022 without improvements  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	75	25	25	30	40	185	25	340	25	160	485	100
Traffic Volume (veh/h)	75	25	25	30	40	185	25	340	25	160	485	100
Future Volume (veh/h)	75	25	25	30	40	185	25	340	25	160	485	100
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Q <sub>0</sub> ), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1900	1759	1759	1900	1881	1881	1881	1900	1863	1863	1863	1863
Adj Flow Rate, veh/h	84	28	28	34	45	208	28	382	28	180	545	0
Adj No. of Lanes	0	1	1	0	1	1	1	1	0	1	1	1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh. %	8	8	8	8	1	1	1	1	1	2	2	2
Cap. veh/h	146	28	291	193	204	311	431	1041	76	623	880	748
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.03	0.60	0.60	0.47	0.47	0.00	0.00
Sat Flow, veh/h	15	142	1495	392	1047	1599	1792	1732	127	972	1863	1583
Gip Volume(V), veh/hln	112	0	28	79	0	208	28	0	410	180	545	0
Gip Sat Flow(s), veh/hln	156	0	1495	1439	0	1599	1792	0	1859	972	1863	1583
Q Serve(s), s	3.7	0.0	0.7	0.1	0.0	5.3	0.3	0.0	5.0	5.3	9.6	0.0
Cycle Q Clean(q,c), s	3.7	0.0	0.7	0.3	0.0	5.3	0.3	0.0	5.0	5.3	9.6	0.0
Prop In Lane	0.75	1.00	0.48	1.00	0.43	1.00	1.00	0.07	1.00	0.07	1.00	1.00
Lane Gp Cap(c), veh/h	0	0	291	397	0	311	431	0	1117	623	880	748
W/C Ratio(X)	0.00	0.00	0.10	0.20	0.00	0.67	0.06	0.00	0.37	0.29	0.62	0.00
Avail Cap(c), veh/h	0	0	831	668	0	580	546	0	1117	623	880	748
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	14.6	14.9	0.0	16.4	6.2	0.0	4.5	7.5	8.7	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.2	0.0	2.5	0.1	0.0	0.9	1.2	3.3	0.0
Initial Q Delay(d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/hln	0.0	0.0	0.3	0.8	0.0	2.5	0.2	0.0	2.8	1.6	5.6	0.0
LnGp Delay(d), s/veh	0.0	0.0	14.7	15.2	0.0	18.9	6.3	0.0	5.4	8.7	11.9	0.0
LnGp LOS			B	B		B	A		A	A	B	
Approach Vol, veh/h	140			287			438			725		
Approach Delay, s/veh	2.9			17.9			11.1			11.1		
Approach LOS	A			B			A			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Pks	2			4	5	6		8				
Pks Duration (G+Y+R), s	31.0			13.1	5.7	25.3		13.1				
Change Period (Y+R), s	4.5			4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	26.5			24.5	4.0	18.0		16.0				
Max Q Clear Time (Q_cH1), s	7.0			5.7	2.3	11.6		7.3				
Green Ext Time (Q_c), s	7.3			1.9	0.0	3.6		1.3				
<b>Intersection Summary</b>												
HCM 2010 C/H Delay				10.1								
HCM 2010 LOS				B								

HCM 2010 AWSC  
4: Irving St & 7th Ave

Projected 2022 without improvements  
PM Peak Hour

Intersection	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Intersection Delay, s/veh	8.6											
Intersection LOS	A											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	5	15	175	0	1	20	1	0	185	5	1
Future Vol, veh/h	0	5	15	175	0	1	20	1	0	185	5	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	1	1	1	2	0	0	0	2	1	1	1
Mvmt Flow	0	5	16	190	0	1	22	1	0	201	5	1
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0
<b>Approach</b>												
Opposing Approach	WB	EB			WB	EB			WB	EB		
Opposing Lanes	1	1			1	1			1	1		
Conflicting Approach Left	SB	1			NB	1			EB	1		
Conflicting Lanes Left	1	1			1	1			1	1		
Conflicting Approach Right	NB				SB				WB			
Conflicting Lanes Right	1				1				1			
HCM Control Delay	8.1				7.8				9.3			
HCM LOS	A				A				A			
<b>Lane</b>												
Vol Left, %		97%	3%	5%	0%							
Vol Thru, %		3%	8%	91%	50%							
Vol Right, %		1%	90%	5%	50%							
Sign Control		Stop	Stop	Stop	Stop							
Traffic Vol by Lane		191	195	22	10							
LT Vol		185	5	1	0							
Through Vol		5	15	20	5							
RT Vol		1	175	1	5							
Lane Flow Rate		208	212	24	11							
Geometry Gp		1	1	1	1							
Degree of Util.(X)		0.261	0.232	0.031	0.013							
Departure Headway (Hd)		4.631	3.943	4.629	4.335							
Convergence, Y/N		Yes	Yes	Yes	Yes							
Cap		781	916	776	826							
Service Time		2.631	1.945	2.638	2.357							
HCM Lane V/C Ratio		0.266	0.231	0.031	0.013							
HCM Control Delay		9.3	8.1	7.8	7.4							
HCM Lane LOS		A	A	A	A							
HCM 95th-ile-Q		1	0.9	0.1	0							

HCM 2010 AWSC  
4: Irving St & 7th Ave  
Projected 2022 without improvements  
PM Peak Hour

Intersection				
Intersection Delay, s/veh				
Intersection LOS				
Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	0	5	5
Future Vol, veh/h	0	0	5	5
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	0	0	0
Mvmt Flow	0	0	5	5
Number of Lanes	0	0	1	0
Approach				
SB				
Opposing Approach	NB			
Opposing Lanes	1			
Conflicting Approach Left	WB			
Conflicting Lanes Left	1			
Conflicting Approach Right	EB			
Conflicting Lanes Right	1			
HCM Control Delay	7.4			
HCM LOS	A			
Lane				

HCM 2010 TWSC  
5: Crosby Blvd & Barnes Rd  
Projected 2022 without improvements  
PM Peak Hour

Intersection												
Int Delay, s/veh												
6.3												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	10	1	0	10	5	215	10	5	215	1	110	5
Future Vol, veh/h	10	1	0	10	5	215	10	5	215	1	110	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	0	-	-	175
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	0
Grade, %	-	-	-	-	-	0	-	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	10	10	10	2	2	2	4	4	4	2	2	2
Mvmt Flow	11	1	0	11	5	236	1	121	5	291	170	22
Major/Minor												
Conflicting Flow All	Minor2			Minor1			Major1			Major2		
Stage 1	893	893	181	890	901	124	192	0	0	126	0	0
Stage 2	764	764	-	126	126	-	-	-	-	-	-	-
Critical Hdwy	129	129	-	764	715	-	-	-	-	-	-	-
Critical Hdwy Sig 1	7.2	6.6	6.3	7.12	6.52	6.22	4.14	-	-	4.12	-	-
Critical Hdwy Sig 2	6.2	5.6	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.518	4.018	3.318	2.236	-	-	2.218	-	-
Platoon blocked %	254	273	841	264	278	927	1370	-	-	1460	-	-
Stage 1	384	401	-	878	792	-	-	-	-	-	-	-
Stage 2	866	774	-	396	408	-	-	-	-	-	-	-
Mov Cap-1/Maneuver	157	218	841	223	222	927	1370	-	-	1460	-	-
Mov Cap-2/Maneuver	157	218	-	223	222	-	-	-	-	-	-	-
Stage 1	384	321	-	877	791	-	-	-	-	-	-	-
Stage 2	633	773	-	316	327	-	-	-	-	-	-	-
Approach												
EB												
HCM Control Delay, s	29.2			WB			NB			SB		
HCM LOS	D			B			0.1			4.9		
Minor Lane/Major Mvmt												
Capacity (veh/h)	NBL	NBT	NBR	EBL	TWB	TWBL	SBL	SBT	SBR	-	-	-
HCM Lane V/C Ratio	1370	-	-	161	223	927	1460	-	-	-	-	-
HCM Control Delay (s)	0.001	-	-	0.075	0.074	0.255	0.199	-	-	-	-	-
HCM Lane LOS	A	A	A	D	C	B	A	-	-	-	-	-
HCM 95th %ile Q(veh)	0	-	-	0.2	0.2	1	0.7	-	-	-	-	-

HCM 2010 TWSC  
6: Black Lake Belmore Rd & Black Lake Blvd  
Projected 2022 without improvements  
PM Peak Hour

Intersection									
Int Delay: s/veh 23									
Movement	EBT	EBR	WBL	WBT	NBL	NBR			
Traffic Vol, veh/h	175	75	165	330	190	135			
Future Vol, veh/h	175	75	165	330	190	135			
Conflicting Peds. #/hr	0	0	0	0	0	0			
Sign Control	Free	Free	Free	Free	Stop	Stop			
RT Channelized	-	None	-	None	-	None			
Storage Length	-	-	250	-	0	-			
Veh in Median Storage, #	0	-	-	0	0	-			
Grade, %	0	-	-	0	0	-			
Peak Hour Factor	94	94	94	94	94	94			
Heavy Vehicles, %	3	3	0	0	1	1			
Mvmt Flow	186	80	176	351	202	144			

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	0	266	0	928
Stage 1	-	-	-	226
Stage 2	-	-	-	702
Critical Hdwy	-	-	-	6.41
Critical Hdwy Sfg 1	-	4.1	-	6.21
Critical Hdwy Sfg 2	-	-	-	5.41
Follow-up Hdwy	-	-	-	5.41
Pol Cap-1 Maneuver	-	2.2	-	3.509
Stage 1	-	-	-	2.99
Stage 2	-	-	-	814
Platoon blocked, %	-	-	-	493
Mov Cap-1 Maneuver	-	-	-	259
Mov Cap-2 Maneuver	-	1310	-	816
Stage 1	-	-	-	259
Stage 2	-	-	-	814
Approach	EB	WB	NB	
HCM Control Delay, s	0	2.7	71.7	
HCM LOS			F	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	361	-	-	1310	-
HCM Lane V/C Ratio	0.958	-	-	0.134	-
HCM Control Delay (s)	71.7	-	-	8.2	-
HCM Lane LOS	F	-	-	A	-
HCM 95th %ile (Q)veh	10.5	-	-	0.5	-

HCM 2010 TWSC  
7: RW Johnson Rd & Sapp Rd  
Projected 2022 without improvements  
PM Peak Hour

Intersection									
Int Delay: s/veh 5.7									
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Traffic Vol, veh/h	15	30	2	10	45	80	1	10	10
Future Vol, veh/h	15	30	2	10	45	80	1	10	10
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0
Grade, %	-	-	0	-	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	3	3	3	1	1	1	0	0	0
Mvmt Flow	18	35	2	12	53	94	1	12	12

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	147	0	0	225
Stage 1	-	-	-	72
Stage 2	-	-	-	124
Critical Hdwy	4.13	-	-	153
Critical Hdwy Sfg 1	-	4.11	-	7.1
Critical Hdwy Sfg 2	-	-	-	6.1
Follow-up Hdwy	2.227	2.209	-	6.1
Pol Cap-1 Maneuver	1.429	1.579	-	3.5
Stage 1	-	-	-	4
Stage 2	-	-	-	3.3
Platoon blocked, %	-	-	-	735
Mov Cap-1 Maneuver	1.429	1.579	-	662
Mov Cap-2 Maneuver	-	1579	-	1042
Stage 1	-	-	-	747
Stage 2	-	-	-	697
Approach	EB	WB	NB	SB
HCM Control Delay, s	2.4	0.5	9.7	11.1
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	792	1429	-	-	1579	-	-	758
HCM Lane V/C Ratio	0.031	0.012	-	-	0.007	-	-	0.225
HCM Control Delay (s)	9.7	7.6	0	0	7.3	0	0	11.1
HCM Lane LOS	A	A	A	A	A	A	A	B
HCM 95th %ile (Q)veh	0.1	0	-	-	0	-	-	0.9

HCM 2010 TWSC  
8: Sapp Rd & Crosby Blvd

Projected 2022 without improvements  
PM Peak Hour

Intersection	8: Sapp Rd & Crosby Blvd							
Int Delay, s/veh	6.3							
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Traffic Vol, veh/h	100	15	155	100	15	130		
Future Vol, veh/h	100	15	155	100	15	130		
Conflicting Peds. #/hr	0	0	0	0	0	0		
Sign Control	Stop	Stop	Free	Free	Stop	Stop		
RT Channelized	-	None	-	None	-	None		
Storage Length	250	0	0	-	0	-		
Veh in Median Storage, #	0	-	0	-	-	0		
Grade, %	0	-	0	-	-	0		
Peak Hour Factor	91	91	91	91	91	91		
Heavy Vehicles, %	1	1	1	1	1	0		
Mvmt Flow	110	16	170	110	16	143		

Major/Minor	Minor1	Minor2	Major1	Minor2
Conflicting Flow All	296	225	0	225
Stage 1	225	-	-	0
Stage 2	71	-	-	225
Critical Hdwy Sfg 1	7.11	6.21	-	7.1
Critical Hdwy Sfg 2	6.11	-	-	6.5
Follow-up Hdwy	3.509	3.309	-	6.1
Pol Cap-1/Maneuver	658	817	-	3.5
Stage 1	780	-	-	4
Stage 2	-	-	-	735
Platoon blocked, %	-	-	-	683
Mov Cap-1/Maneuver	543	817	-	720
Mov Cap-2/Maneuver	543	-	-	632
Stage 1	780	-	-	720
Stage 2	-	-	-	632
Approach	WB	NB	SB	
HCM Control Delay, s	12.8	0	12.2	
HCM LOS	B		B	
Minor Lane/Minor Mvmt	NBT	NBR/WBL1/WBL2/SBL1/SBL2		
Capacity (veh/h)	-	543	817	720
HCM Lane V/C Ratio	-	0.202	0.023	0.226
HCM Control Delay (s)	-	13.3	9.5	10.1
HCM Lane LOS	-	B	A	B
HCM 95th %ile Q(veh)	-	0.8	0.1	0.9

SimTraffic Performance Report  
9: Black Lake Belmore Rd & 49th Ave Performance by movement

Projected 2022 without improvements  
PM Peak Hour

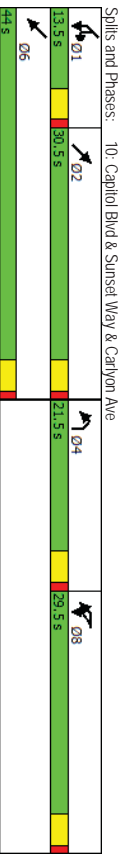
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2
Total Del/Veh (s)	5.7	7.1	3.3	7.6	8.3	4.7	7.8	8.5	5.6	0.8	1.1	0.7

9: Black Lake Belmore Rd & 49th Ave Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	4.6

Lanes, Volumes, Timings  
 10: Capitol Blvd & Sunset Way & Carlyon Ave  
 Projected 2022 without improvements  
 PM Peak Hour

Lane Group	WBL2	WBL	WBR	NBL	NBR	NBR2	NET	NER	NER2	SWL2	SWL	SWT
Lane Configurations												
Traffic Volume (vph)	5	55	40	35	15	2	565	90	15	50	10	995
Future Volume (vph)	5	55	40	35	15	2	565	90	15	50	10	995
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	0	0	0	0	0	0	0	150
Storage Lanes	1	0	1	0	1	0	0	0	0	0	0	1
Taper Length (ft)	25			25								25
Right Turn on Red		Yes		Yes		Yes		Yes		Yes		
Link Speed (mph)	30	30	30	30	30	30	30	30	30	30	30	30
Link Distance (ft)	840	629	629	731	731	731	731	731	731	731	731	791
Travel Time (s)	19.1	14.3	14.3	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	18.0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	NA	NA	Prot	Prot	Prot	NA
Protected Phases	8	8	8	4	4	2	2	2	1	1	1	6
Detector Phase	8	8	8	4	4	2	2	2	1	1	1	6
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	10.0	10.0	10.0	6.0	6.0	6.0	6.0	6.0	10.0
Minimum Spill (s)	29.5	29.5	21.5	29.5	29.5	29.5	10.5	10.5	10.5	10.5	10.5	20.0
Total Spill (s)	29.5	29.5	21.5	30.5	30.5	30.5	13.5	13.5	13.5	13.5	13.5	44.0
Total Spill (%)	31.1%	31.1%	22.6%	32.1%	32.1%	32.1%	14.2%	14.2%	14.2%	14.2%	14.2%	46.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Allard Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag				Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	
Lead-Lag Optimize?				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	Max	Max	Max	None	None	None	None	None	Max
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	95											
Actuated Cycle Length:	62.4											
Natural Cycle:	95											
Control Type:	Actuated-Uncoordinated											



HCM Signalized Intersection Capacity Analysis  
 10: Capitol Blvd & Sunset Way & Carlyon Ave  
 Projected 2022 without improvements  
 PM Peak Hour

Movement	WBL2	WBL	WBR	NBL	NBR	NBR2	NET	NER	NER2	SWL2	SWL	SWT
Lane Configurations												
Traffic Volume (vph)	5	55	40	35	15	2	565	90	15	50	10	995
Future Volume (vph)	5	55	40	35	15	2	565	90	15	50	10	995
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total lost time (s)	4.5	4.5	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	1.00	0.95	0.95	0.95	1.00	0.95	0.95
Fit	0.95	0.95	0.96	0.96	0.96	0.96	0.98	0.98	0.98	1.00	1.00	1.00
Fit Protected	0.97	0.97	0.97	0.97	0.97	0.97	1.00	1.00	1.00	1.00	1.00	1.00
Satd Flow (vph)	1745	1745	1757	1757	1787	1787	3456	3456	3456	1787	3574	3574
Fit Permitted	0.97	0.97	0.97	0.97	0.97	0.97	1.00	1.00	1.00	0.95	1.00	1.00
Satd Flow (vph)	1745	1745	1757	1757	1787	1787	3456	3456	3456	1787	3574	3574
Peak-hour factor: PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	6	65	47	41	18	2	665	106	18	59	12	1171
RTOR Reduction (vph)	0	108	0	58	0	0	1	0	0	0	0	0
Lane Group Flow (vph)	0	10	0	3	0	0	788	0	0	0	71	1171
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	1%	1%	1%
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	NA	NA	Prot	Prot	Prot	NA
Protected Phases	8	8	8	4	4	2	2	2	1	1	1	6
Actuated Green, G (s)	5.4	5.4	3.4	3.4	3.4	3.4	32.9	32.9	32.9	6.5	43.9	43.9
Effective Green, g (s)	5.4	5.4	3.4	3.4	3.4	3.4	32.9	32.9	32.9	6.5	43.9	43.9
Actuated g/C Ratio	0.08	0.08	0.05	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.66	0.66
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	142	90	90	1717	1717	1717	1717	1717	1717	1717	2370	2370
v/s Ratio Prot	60.01	60.01	60.00	0.23	0.23	0.23	0.04	0.04	0.04	0.33	0.33	0.33
v/s Ratio Perm												
v/c Ratio	0.07	0.07	0.03	0.03	0.03	0.03	0.46	0.46	0.46	0.41	0.49	0.49
Uniform Delay, d1	28.1	28.1	29.8	28.0	28.0	28.0	10.8	10.8	10.8	28.0	5.6	5.6
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	0.2	0.2	0.2	0.2	0.2	0.2	0.9	0.9	0.9	1.5	0.7	0.7
Delay (s)	28.3	28.3	30.0	30.0	30.0	30.0	11.7	11.7	11.7	29.6	6.3	6.3
Level of Service	C	C	C	C	C	C	B	B	B	C	A	A
Approach Delay (s)	28.3	28.3	30.0	30.0	30.0	30.0	11.7	11.7	11.7	29.6	6.3	6.3
Approach LOS	C	C	C	C	C	C	B	B	B	C	A	A
<b>Intersection Summary</b>												
HCM 2000 Control Delay	10.8											
HCM 2000 Volume to Capacity ratio	0.46											
Actuated Cycle Length (s)	66.2											
Analysis Capacity Utilization	49.7%											
Analysis Period (min)	15											
C Critical Lane Group	A											
Sum of lost time (s)												
ICU Level of Service												



HCM 2010 TWSC  
11: Deschutes Way & I-5 NB On-Ramp

Projected 2022 without improvements  
PM Peak Hour

Intersection						
Int Delay, s/veh	1.7					
Movement	SEL	SET	NWT	NWR	SWL	SWR
Traffic Vol, veh/h	160	325	245	140	0	0
Future Vol, veh/h	160	325	245	140	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-	0	-	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	203	411	310	177	0	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	487	0	1215
Stage 1	-	-	399
Stage 2	-	-	816
Critical Hdwy	4.1	-	6.4
Critical Hdwy Sig 1	-	-	5.4
Critical Hdwy Sig 2	-	-	5.4
Follow-up Hdwy	2.2	-	3.5
Pol Cap-1 Maneuver	1086	-	202
Stage 1	-	-	662
Stage 2	-	-	438
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1086	-	153
Mov Cap-2 Maneuver	-	-	153
Stage 1	-	-	682
Stage 2	-	-	332
Approach	SE	NW	SW
HCM Control Delay, s	3	0	0
HCM LOS	A	A	A

HCM 2010 TWSC  
12: Deschutes Way & US 101 WB On-Ramp

Projected 2022 without improvements  
PM Peak Hour

Intersection						
Int Delay, s/veh	3.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	0	0	450	400	285	20
Future Vol, veh/h	0	0	450	400	285	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	0	-
Grade, %	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	0	0	489	435	310	22

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1734	332	0
Stage 1	321	-	-
Stage 2	1413	-	-
Critical Hdwy	6.4	-	4.11
Critical Hdwy Sig 1	5.4	-	-
Critical Hdwy Sig 2	5.4	-	-
Follow-up Hdwy	3.5	-	2.209
Pol Cap-1 Maneuver	98	0	1233
Stage 1	740	0	-
Stage 2	227	0	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	59	-	1233
Mov Cap-2 Maneuver	59	-	-
Stage 1	740	-	-
Stage 2	137	-	-
Approach	EB	NB	SB
HCM Control Delay, s	0	5.2	0
HCM LOS	A	A	A

13: 2nd Ave/US 101/1-5 Off-Ramps Performance by movement

Movement	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.4	0.4	0.3
Total Del/Veh (s)	0.7	1.0	1.0	24.0	10.0	16.7

Lanes, Volumes, Timings  
14: 2nd Ave & Custer Way

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	175	180	20	210	840	255
Traffic Volume (vph)	175	180	20	210	840	255
Future Volume (vph)	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	0	225	0	0	0	0
Storage Length (ft)	1	1	1	0	1	1
Storage Lanes	25	Yes	Yes	Yes	30	505
Taper Length (ft)	30	2035	46.3	11.5	11.5	0.88
Right Turn on Red	15.0	0.88	0.88	0.88	0.88	0.88
Link Speed (mph)	1%	1%	1%	1%	0%	0%
Link Distance (ft)	Prot	Perm	NA	Spill	NA	NA
Travel Time (s)	8	8	2	6	6	6
Peak Hour Factor	8	8	2	6	6	6
Heavy Vehicles (%)	8	8	2	6	6	6
Shared Lane Traffic (%)	Switch Phase	Minimum Initial (s)	Minimum Spill (s)	Total Spill (s)	Total Spill (%)	Yellow Time (s)
Turn Type	4.0	4.0	4.0	4.0	4.0	4.0
Permitted Phases	100	100	24.5	20.0	20.0	20.0
Detector Phase	11.0	11.0	25.0	44.0	44.0	44.0
Switch Phase	13.8%	13.8%	31.3%	55.0%	55.0%	55.0%
Protected Phases	3.5	3.5	3.5	3.5	3.5	3.5
Detector Phase	All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Switch Phase	Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Protected Phases	Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Detector Phase	Lead-Lag Optimize?	None	None	None	Max	Max
Switch Phase	Recall Mode	None	None	None	Max	Max

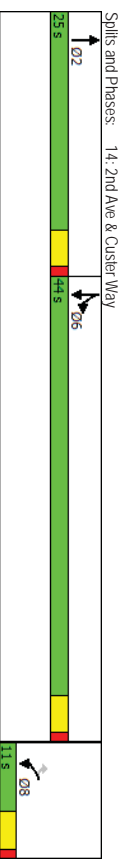
Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 66.9

Natural Cycle: 90

Control Type: Actuated-Uncoordinated



HCM 2010 Signalized Intersection Summary  
 14: 2nd Ave & Custer Way  
 Projected 2022 without improvements  
 PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	→	→	↔	↔
Traffic Volume (veh/h)	175	180	20	210	840	255
Future Volume (veh/h)	175	180	20	210	840	255
Number	3	18	2	12	1	6
Initial Q (Ob), veh	0	0	0	0	0	0
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1881	1881	1900	1900	1900
Adj Flow Rate, veh/h	199	40	23	74	955	290
Peak Hour Factor	1	1	1	0	1	1
Percent Heavy Veh. %	0.88	0.88	0.88	0.88	0.88	0.88
Cap. veh/h	181	161	30	96	1110	1165
Arrive On Green	0.10	0.10	0.08	0.08	0.61	0.61
Sat Flow, veh/h	1792	1599	393	1265	1810	1900
Grp Volume(V), veh/hln	199	40	0	97	955	290
Grp Sat Flow(s), veh/hln	1792	1599	0	1658	1810	1900
Q Serve(s), s	6.5	1.5	0.0	3.7	27.8	4.5
Cycle Q Clear(q_c), s	6.5	1.5	0.0	3.7	27.8	4.5
Prop In Lane	1.00	1.00	0.0	0.76	1.00	1.00
Lane Grp Cap(c), veh/h	181	161	0	126	1110	1165
V/C Ratio(X)	1.10	0.25	0.00	0.177	0.86	0.25
Avail Cap(c_a), veh/h	181	161	0	528	1110	1165
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.9	26.7	0.0	29.2	10.2	5.7
Incr Delay (d2), s/veh	96.4	0.3	0.0	3.7	8.8	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/hln	8.0	0.7	0.0	1.8	16.2	2.5
LnGrp Delay(d), s/veh	125.3	27.0	0.0	32.9	19.0	6.2
LnGrp LOS	F	C	C	C	B	A
Approach Vol, veh/h	239	97	1245			
Approach Delay, s/veh	108.9	32.9	16.0			
Approach LOS	F	C	B			
Timer	1	2	3	4	5	6
Assigned Phs	2	2	3	4	5	6
Phs Duration (G+Y+R), s	9.4	9.4	11.0			
Change Period (Y+R), s	4.5	4.5	4.5			
Max Green Setting (Gmax), s	20.5	29.5	6.5			
Max Q Clear Time (Q_cH1), s	5.7	29.8	8.5			
Green Ext Time (Q_c), s	0.3	4.2	0.0			
<b>Intersection Summary</b>						
HCM 2010 Ctrl Delay	31.1					
HCM 2010 LOS	C					

HCM 2010 TWSC  
 15: Boston St & Custer Way  
 Projected 2022 without improvements  
 PM Peak Hour

Intersection	5.2											
Int Delay, s/veh	5.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	785	175	380	335	5	0	1	165	0	1	5
Future Vol, veh/h	0	785	175	380	335	5	0	1	165	0	1	5
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	425	-	-	-	-	-	-	-	-
Veh In Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	0
Grade, %	-	0	-	-	-	-	-	-	-	-	-	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mmnt Flow	0	826	184	400	353	5	0	1	174	0	1	5
<b>Major/Minor</b>												
Major1	358			1011			Minor1			Minor2		
Conflicting Flow All	-			-			-			-		
Stage 1	-			-			-			-		
Stage 2	-			-			-			-		
Critical Hdwy	4.115			4.115			6.5			6.9		
Critical Hdwy Sig 1	-			-			5.5			5.5		
Critical Hdwy Sig 2	-			-			5.5			5.5		
Follow-up Hdwy	2.2095			2.2095			4			3.3		
Pln Cap-1 Maneuver	1205			689			0			54		
Stage 1	-			-			0			273		
Platoon blocked, %	-			-			-			-		
Mov Cap-1 Maneuver	1205			689			-			23		
Mov Cap-2 Maneuver	-			-			-			23		
Stage 1	-			-			-			353		
Stage 2	-			-			-			115		
Approach	EB						WB			NB		
HCM Control Delay, s	0						9.1			17.6		
HCM LOS	C						C			E		
<b>Minor Lane/Major Mmnt</b>												
NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1					
Capacity (veh/h)	459	1205	-	689	-	-	105					
HCM Lane V/C Ratio	0.381	-	-	0.581	-	-	0.06					
HCM Control Delay (s)	17.6	0	-	17.2	-	-	41.5					
HCM Lane LOS	C	A	-	C	-	-	E					
HCM 95th %ile (Q)veh	1.8	0	-	3.8	-	-	0.2					

HCM 2010 AWSC  
16: Deschutes Way & Boston St

Projected 2022 without improvements  
PM Peak Hour

Intersection										
Intersection Delay, s/veh	41.2									
Intersection LOS	E									
Movement	WBU	WBL	WBR	NBU	NBL	NBR	SBU	SBL	SBU	SBL
Traffic Vol, veh/h	0	115	410	0	400	75	0	110	200	410
Future Vol, veh/h	0	115	410	0	400	75	0	110	200	410
Peak Hour Factor	0.92	0.93	0.93	0.92	0.93	0.92	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	1	1	2	0	0	2	0	0	0
Mvmt Flow	0	124	441	0	430	81	0	118	215	441
Number of Lanes	0	1	0	0	1	0	0	0	1	1
Approach	WB					NB				
Opposing Approach						SB				
Opposing Lanes	0					SB				
Conflicting Approach Left	NB					1				
Conflicting Lanes Left	1					0				
Conflicting Approach Right	SB					WB				
Conflicting Lanes Right	1					1				
HCM Control Delay	50					44.2				
HCM LOS	E					E				
Lane	NBLn1	WBLn1	SBLn1	NBLn1	WBLn1	SBLn1	NBLn1	WBLn1	SBLn1	SBLn1
Vol Left, %	0%	22%	35%	0%	0%	65%	0%	0%	65%	0%
Vol Thru, %	84%	0%	0%	84%	0%	0%	84%	0%	0%	84%
Vol Right, %	16%	78%	0%	16%	78%	0%	16%	78%	0%	16%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	475	525	310	475	525	310	475	525	310	475
LT Vol	0	115	110	0	115	110	0	115	110	110
Through Vol	400	0	200	400	0	200	400	0	200	400
RT Vol	75	410	0	75	410	0	75	410	0	410
Lane Flow Rate	511	565	333	511	565	333	511	565	333	511
Geometry Crp	1	1	1	1	1	1	1	1	1	1
Degree of Lvl (X)	0.908	0.949	0.639	0.908	0.949	0.639	0.908	0.949	0.639	0.908
Departure Headway (Hd)	6.401	6.054	6.896	6.401	6.054	6.896	6.401	6.054	6.896	6.401
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	567	598	520	567	598	520	567	598	520	567
Service Time	4.465	4.107	4.969	4.465	4.107	4.969	4.465	4.107	4.969	4.465
HCM Lane V/C Ratio	0.901	0.945	0.64	0.901	0.945	0.64	0.901	0.945	0.64	0.901
HCM Control Delay	44.2	50	21.5	44.2	50	21.5	44.2	50	21.5	44.2
HCM Lane LOS	E	E	C	E	E	C	E	E	C	E
HCM 95th-ile Q	10.9	12.7	4.5	10.9	12.7	4.5	10.9	12.7	4.5	10.9

HCM 2010 TWSC  
17: Capitol Blvd & Cleveland Ave

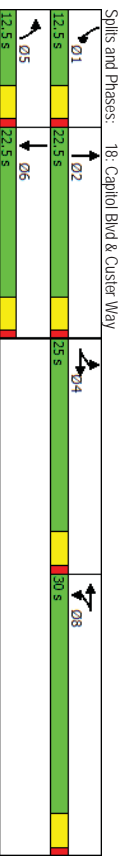
Projected 2022 without improvements  
PM Peak Hour

Intersection										
Int Delay, s/veh	4.1									
Movement	NBL	NBR	NET	NER	SWL	SWT	NBL	NBR	NET	NER
Traffic Vol, veh/h	0	245	460	20	395	720	0	245	460	20
Future Vol, veh/h	0	245	460	20	395	720	0	245	460	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Stop	Stop	Free	Free
RT Channelized	-	None	-	Yield	-	None	-	None	-	Yield
Storage Length	0	0	0	0	150	0	0	0	0	150
Veh in Median Storage, #	0	0	0	0	0	0	0	0	0	0
Grade, %	0	0	0	0	0	0	0	0	0	0
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	4	4	1	1	1	1	4	4	1	1
Mvmt Flow	0	278	523	23	449	818	0	278	523	23
Major/Minor	Minor1	Major1	Major2	Minor2	Major2	Minor2	Minor1	Major1	Major2	Minor2
Conflicting Flow All	-	261	0	0	523	0	-	261	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-
Stage 2	-	6.98	-	-	4.12	-	-	6.98	-	-
Critical Hdwy Sig 1	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Sig 2	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	0	3.34	-	-	2.21	-	0	3.34	-	-
Platoon blocked, %	0	732	-	-	1047	-	0	732	-	-
Mov Cap-1/Maneuver	-	-	-	-	-	-	-	-	-	-
Mov Cap-2/Maneuver	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-
Approach	NB			NE			SW			
HCM Control Delay, s	129			0			3.9			
HCM LOS	B						B			
Minor Lane/Major Mvmt	NET	NER	NBLn1	SWL	SWT	NET	NER	NBLn1	SWL	SWT
Capacity (veh/h)	-	732	1047	-	-	-	732	1047	-	-
HCM Lane V/C Ratio	-	0.38	0.429	-	-	-	0.38	0.429	-	-
HCM Control Delay (s)	-	12.9	11	-	-	-	12.9	11	-	-
HCM Lane LOS	-	B	B	-	-	-	B	B	-	-
HCM 95th kille Q(veh)	-	1.8	2.2	-	-	-	1.8	2.2	-	-

Lanes, Volumes, Timings  
18: Capitol Blvd & Custer Way

Projected 2022 without improvements  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	705	75	395	495	10	20	415	485	25	530	165
Future Volume (vph)	180	705	75	395	495	10	20	415	485	25	530	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150	0	0	0	100	0	100	0	100	0	100	0
Storage Lanes	1	0	0	1	1	0	1	0	1	0	1	0
Taper Length (ft)	25	0	0	25	0	0	25	0	25	0	25	0
Right Turn on Red				Yes			Yes		Yes		Yes	
Link Speed (mph)	30	684	15.5	631	14.3	631	2019	1179	26.8	30	1179	30
Link Distance (ft)	684	15.5	631	14.3	631	2019	1179	26.8	30	1179	30	
Travel Time (s)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Peak Hour Factor	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	0%	0%	0%
Shield Lane Traffic (%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	0%	0%	0%
Turn Type	Split	NA	Split	NA	Split	NA	Prot	NA	Prot	NA	Prot	NA
Projected Phases	4	4	8	8	8	8	5	2	1	6	6	6
Permitted Phases	4	4	8	8	8	8	5	2	1	6	6	6
Detector Phase	4	4	8	8	8	8	5	2	1	6	6	6
Switch Phase	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Initial (s)	22.0	22.0	22.0	22.0	22.0	12.5	22.0	12.5	22.0	12.5	22.0	22.0
Minimum Spill (s)	28.0	23.0	30.0	30.0	30.0	12.5	22.5	12.5	22.5	12.5	22.5	22.5
Total Spill (s)	27.8%	27.8%	33.3%	33.3%	33.3%	13.9%	25.0%	13.9%	25.0%	13.9%	25.0%	25.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
AllRed Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag				Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	None	None	None	None	None	None	None	None	None	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	None	Max	Max	Max
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	82.5											
Natural Cycle:	140											
Control Type:	Actuated-Uncoordinated											



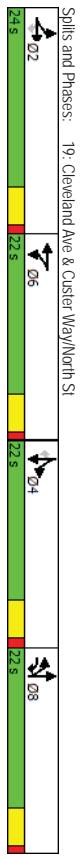
HCM 2010 Signalized Intersection Summary  
18: Capitol Blvd & Custer Way

Projected 2022 without improvements  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	705	75	395	495	10	20	415	485	25	530	165
Future Volume (veh/h)	180	705	75	395	495	10	20	415	485	25	530	165
Number	7	4	14	3	8	18	5	12	1	6	16	6
Initial Q (Ob.) veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped/Bike Adj./Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1881	1900	1881	1881	1881	1881	1881	1900	1900	1900	1900
Adj Flow Rate, veh/h	200	783	0	439	550	11	22	461	256	28	589	183
Adj No of Lanes	1	2	1	2	1	1	0	1	0	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Arrive On Green	0.23	0.23	0.00	0.30	0.30	0.30	0.04	0.21	0.21	0.05	0.22	0.22
Sat Flow, veh/h	1792	3762	0	1792	1838	37	1792	2224	1227	1810	2715	842
Gp Volume(v), veh/h	200	783	0	439	550	11	22	370	347	28	391	381
Gp Sat Flow(s), veh/hln	1792	1881	0	1792	1875	1792	1787	1665	1810	1805	1751	185
Q Serve(s), s	8.2	17.2	0.0	19.4	0.0	25.5	1.0	17.6	17.7	1.3	18.5	18.5
Cycle Q Clear(g-c), s	8.2	17.2	0.0	19.4	0.0	25.5	1.0	17.6	17.7	1.3	18.5	18.5
Prop In Lane	1.00	1.00	0.00	1.00	0.02	1.00	0.74	1.00	0.74	1.00	0.48	0.48
Lane Grp Cap(c), veh/h	419	880	0	535	0	560	68	377	351	82	394	382
AVC Ratio(X)	0.48	0.89	0.00	0.82	0.00	1.00	0.32	0.98	0.99	0.34	0.99	1.00
WAL Cap(C-a), veh/h	430	904	0	535	0	560	168	377	351	170	394	382
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(i)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.2	31.6	0.0	27.8	0.0	29.9	40.0	33.5	33.6	39.5	33.3	33.3
Incr Delay (d2), s/veh	0.8	10.7	0.0	9.8	0.0	38.4	2.7	41.9	45.4	2.4	43.6	45.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back(Q/50%), veh/h	4.2	10.2	0.0	11.1	0.0	19.0	0.6	13.0	12.5	0.7	13.9	13.7
LnGrp Delay(d), s/veh	29.0	42.3	0.0	37.6	0.0	68.3	42.7	75.4	78.9	41.9	76.9	78.4
LnGrp LOS	C	D	D	D	D	F	D	E	E	D	E	E
Approach Vol, veh/h	983											
Approach Delay, s/veh	39.6											
Approach LOS	D											
Timer	1	2	3	4	5	6	7	8				
Assigned Pns	1	2	3	4	5	6	7	8				
Pns Duration (G+Y+R), s	8.4	22.5		24.5	7.8	23.1		30.0				
Change Period (Y+R), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	8.0	18.0		20.5	8.0	18.0		27.5				
Max O Clear Time (G+CH1), s	3.3	19.7		3.0	20.5	2.5		2.5				
Green Ext Time (p.c.), s	0.0	0.0		0.8	0.0	0.0		0.0				
Intersection Summary												
HCM 2010 Cnt Delay	59.9											
HCM 2010 LOS	E											

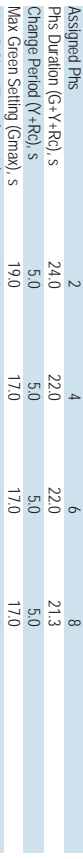
Lanes, Volumes, Timings  
 19: Cleveland Ave & Custer Way/North St  
 Projected 2022 without improvements  
 PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	55	385	700	15	300	70	530	155	15	110	310	115
Traffic Volume (vph)	55	385	700	15	300	70	530	155	15	110	310	115
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	100	100	0	200	0	300	0	150	0	150	150	150
Storage Length (ft)	1	25	1	1	1	0	1	1	0	1	1	1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	
Link Speed (mph)		30			30		30		30		30	
Link Distance (ft)		631			2207		2922		664		341	
Travel Time (s)		14.3			50.2		66.4		7.8		7.8	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%	2%
Shared Lane Traffic (%)	Spill	NA	pm+ov	Spill	NA	Spill	NA	Spill	NA	Spill	NA	Perm
Turn Type	2	2	8	6	6	6	8	8	4	4	4	4
Protected Phases	2	2	2	2	2	2	2	2	2	2	2	2
Permitted Phases	2	2	8	6	6	6	8	8	4	4	4	4
Detector Phase	2	2	8	6	6	6	8	8	4	4	4	4
Switch Phase												
Minimum Initial (s)	6.0	6.0	8.0	6.0	6.0	6.0	8.0	8.0	6.0	6.0	6.0	6.0
Minimum Spill (s)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Spill (s)	24.0	24.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Spill (%)	26.7%	26.7%	24.4%	24.4%	24.4%	24.4%	24.4%	24.4%	24.4%	24.4%	24.4%	24.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
AllRed Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead-Lag Optimizer?	None	None	None	None	None	None	None	None	None	None	None	None
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	90											
Activated Cycle Length:	90											
Natural Cycle:	90											
Control Type:	Actuated-Uncoordinated											



HCM 2010 Signalized Intersection Summary  
 19: Cleveland Ave & Custer Way/North St  
 Projected 2022 without improvements  
 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	55	385	700	15	300	70	530	155	15	110	310	115
Traffic Volume (veh/h)	55	385	700	15	300	70	530	155	15	110	310	115
Future Volume (veh/h)	55	385	700	15	300	70	530	155	15	110	310	115
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Ob.) veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped/Bike Adj (Adj)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	59	414	645	16	323	75	570	167	16	118	333	33
Adj No of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Cap. veh/h	381	400	632	341	281	65	653	308	30	338	355	302
Arrive On Green	0.21	0.21	0.21	0.19	0.19	0.19	0.18	0.18	0.18	0.19	0.19	0.19
Sat Flow, veh/h	1792	1881	1599	1792	1478	343	3583	1691	162	1774	1863	1583
Gpr Volume (v) veh/h	59	414	645	16	323	75	570	167	16	118	333	33
Gpr Sat Flow (s) veh/hln	1792	1881	1599	1792	0	1853	1792	0	1853	1774	1863	1583
Q Serve (s) s	2.4	19.0	19.0	0.7	0.0	17.0	13.8	0.0	8.0	5.1	15.7	1.5
Cycle Q Clear (g-c) s	2.4	19.0	0.7	0.0	17.0	13.8	0.0	8.0	5.1	15.7	1.5	
Prop In Lane	1.00	1.00	1.00	1.00	1.00	0.19	1.00	0.09	1.00	1.00	1.00	1.00
Lane Gpr Cap (c) veh/h	381	400	632	341	0	347	653	0	338	338	355	302
V/C Ratio (X)	0.15	1.03	1.02	0.05	0.00	1.15	0.87	0.00	0.54	0.35	0.94	0.11
Avail Cap (c-a) veh/h	381	400	632	341	0	347	682	0	353	338	355	302
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter (f)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d) s/veh	28.6	35.1	22.1	29.5	0.0	36.1	35.5	0.0	33.1	31.3	35.6	29.9
Incr Delay (d2) s/veh	0.2	54.0	41.2	0.1	0.0	94.9	11.6	0.0	1.5	0.5	32.2	0.1
Initial Q Delay (d3) s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back (Q50%) s/veh/h	1.2	15.8	22.7	0.3	0.0	17.6	7.9	0.0	4.2	2.6	11.2	0.7
LnGrp Delay (d) s/veh	28.8	89.2	63.3	29.6	0.0	131.0	47.1	0.0	34.7	31.8	67.8	30.0
LnGrp LOS	C	F	F	C	F	D	D	C	C	C	E	C
Approach Vol, veh/h	1118											
Approach Delay, s/veh	71.0											
Approach LOS	E											
Timer	1	2	3	4	5	6	7	8				
Assigned Pns	2	2	2	2	2	2	2	2				
Pns Duration (G+Y+R) s	24.0	24.0	22.0	22.0	22.0	22.0	21.3	21.3				
Change Period (Y+R) s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax) s	19.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0				
Max O Clear Time (G+CH1) s	21.0	17.7	17.7	17.7	19.0	15.8	15.8	15.8				
Green Ext Time (P.C.) s	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5				
<b>Intersection Summary</b>												
HCM 2010 Cnt Delay	69.5											
HCM 2010 LOS	E											



HCM 2010 TWSC  
20: Hoady St & North St

Projected 2022 without improvements  
PM Peak Hour

Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	45	330	0	10	455	50	0	2	10	25	1	15
Future Vol, veh/h	45	330	0	10	455	50	0	2	10	25	1	15
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	0
Grade, %	-	-	0	-	-	0	-	-	0	-	-	0
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	1	1	1	1	1	1	0	0	0	0	0	0
Wmnt Flow	52	379	0	11	523	57	0	2	11	29	1	17

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	580	0	0	0
Stage 1	-	-	483	483
Stage 2	-	-	584	603
Critical Hdwy	4.11	-	7.1	6.5
Critical Hdwy Sg 1	-	4.11	6.1	5.5
Critical Hdwy Sg 2	-	-	6.1	5.5
Follow-up Hdwy	2.209	-	3.5	4
Pol Cap-1/Maneuver	999	-	202	218
Stage 1	-	-	569	556
Stage 2	-	-	501	492
Platoon blocked, %	-	-	-	-
Mov Cap-1/Maneuver	999	-	183	201
Mov Cap-2/Maneuver	-	-	183	201
Stage 1	-	-	531	519
Stage 2	-	-	477	485

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0.2	12.7	23.3
HCM LOS			B	C

Minor Lane/Major Wmnt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	483	999	-	-	1185	-	-	244
HCM Lane V/C Ratio	0.029	0.052	-	-	0.01	-	-	0.193
HCM Control Delay (s)	12.7	88	0	0	8.1	0	0	23.3
HCM Lane LOS	B	A	A	A	A	A	A	C
HCM 95th %ile Q(veh)	0.1	0.2	-	-	0	-	-	0.7

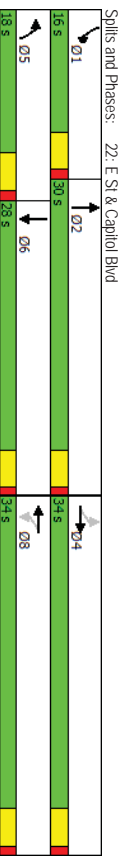
SimTraffic Performance Report  
21: I-5 NB Off-Ramp/Deschutes Way & E St Performance by movement

Projected 2022 without improvements  
PM Peak Hour

Movement	WBT	WBR	NBT	NBR	SBL	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.2	0.3	0.1
Total Del/Veh (s)	1.4	2.3	25.6	6.2	1.6	4.6

Lanes, Volumes, Timings  
 22: E St & Capitol Blvd  
 Projected 2022 without improvements  
 PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	95	280	135	100	140	235	550	145	205	760	85
Future Volume (vph)	120	95	280	135	100	140	235	550	145	205	760	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	0	0	175	0	150	0	0	0
Storage Lanes	0	0	0	0	0	0	1	0	0	1	0	0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)	30			30			30			30		30
Link Distance (ft)	282			479			1902			2019		2019
Travel Time (s)	6.4			10.9			43.2			45.9		45.9
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	8.0		5.0	8.0	
Minimum Spill (s)	29.5	29.5		29.5	29.5		9.5	26.5		9.5	26.5	
Total Spill (s)	34.0	34.0		34.0	34.0		18.0	30.0		16.0	28.0	
Total Spill (%)	42.5%	42.5%		42.5%	42.5%		22.5%	37.5%		20.0%	35.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	80											
Actuated Cycle Length:	80											
Natural Cycle:	80											
Control Type:	Actuated-Uncoordinated											



HCM 2010 Signalized Intersection Summary  
 22: E St & Capitol Blvd  
 Projected 2022 without improvements  
 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	95	280	135	100	140	235	550	145	205	760	85
Future Volume (veh/h)	120	95	280	135	100	140	235	550	145	205	760	85
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Q <sub>0</sub> ) veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped/Bike Adj (A <sub>b</sub> )	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1900	1881	1900	1900	1900	1881	1881	1900	1881	1881	1900	1900
Adj Flow Rate, veh/h	140	110	0	157	116	163	273	640	169	238	884	99
Adj No of Lanes	0	1	1	0	1	1	0	2	0	1	2	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Cap. veh/h	265	189	0	233	153	191	314	934	246	278	1016	114
Arrive On Green	0.33	0.33	0.00	0.33	0.33	0.33	0.33	0.33	0.33	0.16	0.31	0.31
Sat Flow, veh/h	577	576	0	507	468	582	1792	2900	738	792	3241	363
Gp Volume (V <sub>l</sub> ) veh/h	250	0	0	436	0	0	273	408	401	238	487	496
Gp Sat Flow (S <sub>l</sub> ) veh/hln	1154	0	0	1557	0	0	1792	1787	1751	1792	1787	1817
Q Serve (g <sub>s</sub> ) s	0.0	0.0	0.0	5.1	0.0	0.0	10.9	14.5	14.6	9.5	19.0	19.0
Cycle Q Clear (g <sub>c</sub> ) s	14.1	0.0	0.0	19.2	0.0	0.0	10.9	14.5	14.6	9.5	19.0	19.0
Prop In Lane	0.56	0.00	0.36	0.37	1.00		0.42	1.00		0.42	1.00	0.20
Lane Gp Cap (c <sub>l</sub> ) veh/h	454	0	0	577	0	0	314	596	584	278	560	570
V/C Ratio (X)	0.55	0.00	0.00	0.76	0.00	0.00	0.87	0.68	0.69	0.86	0.87	0.87
Aval Cap (C <sub>a</sub> ) veh/h	553	0	0	689	0	0	328	619	606	280	570	580
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter (f <sub>l</sub> )	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d) s/veh	20.9	0.0	0.0	23.0	0.0	0.0	29.5	21.2	21.2	30.3	23.9	23.9
Incr Delay (d <sub>2</sub> ) s/veh	1.0	0.0	0.0	4.0	0.0	0.0	20.6	3.0	3.1	21.9	13.5	13.3
Initial Q Delay (d <sub>3</sub> ) s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back (Q <sub>0</sub> /50%) s/veh	4.5	0.0	0.0	8.9	0.0	0.0	7.2	7.6	7.5	6.4	11.4	11.6
LnGrp Delay (d <sub>l</sub> ) s/veh	22.0	0.0	0.0	26.9	0.0	0.0	50.1	24.2	24.3	52.2	37.3	37.2
LnGrp LOS	C			C			D	C	C	D	D	D
Approach Vol, veh/h	250			436			1082			1221		
Approach Delay, s/veh	22.0			26.9			30.8			40.2		
Approach LOS	C			C			C			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Pns	1	2		4	5	6	8					
Pns Duration (G+Y+R <sub>0</sub> ) s	15.9	29.1		28.6	17.4	27.6	28.6					
Change Period (Y+R <sub>0</sub> ) s	4.5	4.5		4.5	4.5	4.5	4.5					
Max Green Setting (G <sub>max</sub> ) s	11.5	25.5		29.5	13.5	23.5	29.5					
Max O Clear Time (G <sub>chl</sub> ) s	11.5	16.6		16.1	12.9	21.0	21.2					
Green Ext Time (P <sub>0</sub> ) s	0.0	6.6		3.9	0.1	2.1	2.9					
<b>Intersection Summary</b>												
HCM 2010 Cnt Delay	33.3											
HCM 2010 LOS	C											



HCM 2010 TWSC  
 23: Cleveland Ave & South St  
 Projected 2022 without improvements  
 PM Peak Hour

Intersection									
Int Delay, s/veh		0.5							
Movement	WBL	WBR	NBT	NBR	SBL	SBT			
Traffic Vol, veh/h	5	15	630	10	20	930			
Future Vol, veh/h	5	15	630	10	20	930			
Conflicting Peds, #/hr	0	0	0	0	0	0			
Sign Control	Stop	Stop	Free	Free	Free	Free			
RT Channelized	-	None	-	None	-	None			
Storage Length	0	-	0	-	-	0			
Veh in Median Storage, #	0	-	0	-	-	0			
Grade, %	0	-	0	-	-	0			
Peak Hour Factor	88	88	88	88	88	88			
Heavy Vehicles, %	0	0	1	1	1	1			
Mvmt Flow	6	17	716	11	23	1057			

Major/Minor	Minor1	Major1	Major2	Minor2
Conflicting Flow All	1296	364	0	727
Stage 1	722	-	-	-
Stage 2	574	-	-	-
Critical Hdwy	6.8	6.9	-	4.12
Critical Hdwy Sig 1	5.8	-	-	-
Critical Hdwy Sig 2	5.8	-	-	-
Follow-up Hdwy	3.5	3.3	-	2.21
Platoon blocked %	532	-	-	-
Mov Cap-1/Maneuver	146	639	-	879
Mov Cap-2/Maneuver	146	-	-	-
Stage 1	447	-	-	-
Stage 2	498	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.1	0	0.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR/WBL	SBL	SBT
Capacity (veh/h)	-	346	879	-
HCM Lane V/C Ratio	-	0.066	0.026	-
HCM Control Delay (s)	-	16.1	9.2	0.3
HCM Lane LOS	-	C	A	A
HCM 95th %ile (Q)(veh)	-	0.2	0.1	-

HCM 2010 TWSC  
 24: Linwood Ave & 7th Ave  
 Projected 2022 without improvements  
 PM Peak Hour

Intersection									
Int Delay, s/veh		4.2							
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Traffic Vol, veh/h	20	140	0	1	285	210	0	0	1
Future Vol, veh/h	20	140	0	1	285	210	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0
Grade, %	-	-	-	-	-	-	-	-	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	3	3	3	1	1	1	0	0	0
Mvmt Flow	22	151	0	1	306	226	0	0	1

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	532	151	626	728
Stage 1	-	-	194	194
Stage 2	-	-	432	534
Critical Hdwy	4.13	4.11	7.1	6.5
Critical Hdwy Sig 1	-	-	6.1	5.5
Critical Hdwy Sig 2	-	-	6.1	5.5
Follow-up Hdwy	2.227	2.209	3.5	4
Platoon blocked %	1030	1436	400	353
Mov Cap-1/Maneuver	1030	1436	812	744
Mov Cap-2/Maneuver	1030	1436	606	528
Stage 1	-	-	379	345
Stage 2	-	-	396	397

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0	9	20
HCM LOS			A	C

Minor Lane/Major Mvmt	NBL	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBT
Capacity (veh/h)	901	1030	-	-	1436	-	-	415	-
HCM Lane V/C Ratio	0.001	0.021	-	-	0.001	-	-	0.428	-
HCM Control Delay (s)	9	8.6	0	0	7.5	0	0	20	-
HCM Lane LOS	A	A	A	A	A	A	A	C	-
HCM 95th %ile (Q)(veh)	0	0.1	-	-	0	-	-	2.1	-

HCM 2010 AWSC  
 25: Linwood Ave & 2nd Ave  
 Projected 2022 without improvements  
 PM Peak Hour

Intersection	38.2														
Intersection Delay, s/veh	E														
Intersection LOS	E														
Movement	E	B	E	B	E	B	W	B	W	B	W	B	W	B	N
Traffic Vol, veh/h	0	50	135	110	0	135	265	60	0	120	155	90	0	50	135
Future Vol, veh/h	0	50	135	110	0	135	265	60	0	120	155	90	0	50	135
Peak Hour Factor	0.92	0.89	0.89	0.89	0.92	0.89	0.89	0.89	0.92	0.89	0.89	0.89	0.92	0.89	0.89
Heavy Vehicles, %	2	1	1	1	2	1	1	1	2	0	0	0	0	2	1
Mvmt Flow	0	56	174	124	0	152	298	67	0	135	174	101	0	56	174
Number of Lanes	0	1	1	1	0	0	1	1	1	0	1	1	0	1	1

Approach	EB	WB	WB	NB
Opposing Approach	WB	EB	EB	SB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	NB	EB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	SB	WB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	31.3	43.2	43.2	25.8
HCM LOS	D	E	E	D

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	63%	0%	58%	0%	82%	0%	57%
Vol Right, %	0%	37%	0%	42%	0%	18%	0%	43%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	120	245	50	265	135	325	95	340
LT Vol	120	0	50	0	135	0	95	0
Through Vol	0	155	0	155	0	265	0	195
RT Vol	0	90	0	110	0	60	0	145
Lane Flow Rate	135	275	56	298	152	365	107	382
Geometry Crp	7	7	7	7	7	7	7	7
Degree of Lilt(X)	0.367	0.688	0.154	0.749	0.402	0.9	0.283	0.925
Departure Headway (Hd)	9.791	8.999	9.886	9.058	9.531	8.874	9.55	8.717
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	367	402	362	399	378	409	376	416
Service Time	7.568	6.775	7.662	6.833	7.305	6.648	7.321	6.487
HCM Lane V/C Ratio	0.368	0.684	0.155	0.747	0.402	0.892	0.285	0.918
HCM Control Delay	18.2	29.5	14.5	34.5	18.6	53.4	16.1	57.4
HCM Lane LOS	C	D	B	D	C	F	C	F
HCM 95th-ile Q	1.6	5	0.5	6	1.9	9.4	1.1	10.2

HCM 2010 AWSC  
 25: Linwood Ave & 2nd Ave  
 Projected 2022 without improvements  
 PM Peak Hour

Intersection	38.2													
Intersection Delay, s/veh	E													
Intersection LOS	E													
Movement	S	B	S	B	S	B	S	B	S	B	S	B	S	B
Traffic Vol, veh/h	0	95	195	145	0	95	195	145	0	95	195	145	0	95
Future Vol, veh/h	0	95	195	145	0	95	195	145	0	95	195	145	0	95
Peak Hour Factor	0.92	0.89	0.89	0.89	0.92	0.89	0.89	0.89	0.92	0.89	0.89	0.89	0.92	0.89
Heavy Vehicles, %	2	1	1	1	2	1	1	1	2	0	0	0	0	2
Mvmt Flow	0	107	219	163	0	107	219	163	0	107	219	163	0	107
Number of Lanes	0	1	1	1	0	1	1	1	0	1	1	1	0	1

Approach	SB	SB	SB	SB
Opposing Approach	NB	NB	NB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	WB	WB	WB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	EB	EB	EB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	48.4	48.4	48.4	48.4
HCM LOS	E	E	E	E

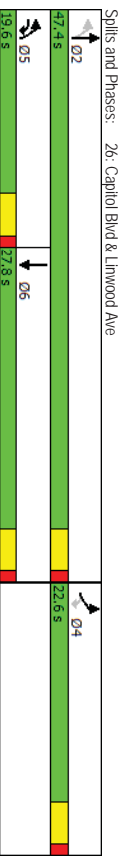
Lane	SBLn1	SBLn2	SBLn1	SBLn2	SBLn1	SBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	63%	0%	58%	0%	82%	0%	57%
Vol Right, %	0%	37%	0%	42%	0%	18%	0%	43%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	120	245	50	265	135	325	95	340
LT Vol	120	0	50	0	135	0	95	0
Through Vol	0	155	0	155	0	265	0	195
RT Vol	0	90	0	110	0	60	0	145
Lane Flow Rate	135	275	56	298	152	365	107	382
Geometry Crp	7	7	7	7	7	7	7	7
Degree of Lilt(X)	0.367	0.688	0.154	0.749	0.402	0.9	0.283	0.925
Departure Headway (Hd)	9.791	8.999	9.886	9.058	9.531	8.874	9.55	8.717
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	367	402	362	399	378	409	376	416
Service Time	7.568	6.775	7.662	6.833	7.305	6.648	7.321	6.487
HCM Lane V/C Ratio	0.368	0.684	0.155	0.747	0.402	0.892	0.285	0.918
HCM Control Delay	18.2	29.5	14.5	34.5	18.6	53.4	16.1	57.4
HCM Lane LOS	C	D	B	D	C	F	C	F
HCM 95th-ile Q	1.6	5	0.5	6	1.9	9.4	1.1	10.2

Lanes, Volumes, Timings  
26: Capitol Blvd & Linwood Ave

Projected 2022 without improvements  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	155	175	165	770	880	280
Future Volume (vph)	155	175	165	770	880	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150	0	150	0	0	0
Storage Lanes	1	1	1	1	1	1
Taper Length (ft)	25		25			
Right Turn on Red		Yes		Yes		Yes
Link Speed (mph)	30		30		30	
Link Distance (ft)	489		2664		1902	
Travel Time (s)	11.1		60.5		43.2	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)						
Turn Type	Prot	pm+ov	pm+pl	NA	NA	NA
Protected Phases	4	5	5	2	6	6
Permitted Phases	4	4	2			
Detector Phase	4	5	5	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	15.0	15.0	15.0	15.0	15.0
Minimum Spill (s)	22.5	19.5	19.5	20.0	21.5	21.5
Total Spill (s)	22.6	19.6	19.6	47.4	21.8	21.8
Total Split (%)	32.3%	28.0%	28.0%	67.7%	39.7%	39.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Max	Max	Max

Area Type: Other  
 Cycle Length: 70  
 Actuated Cycle Length: 62.8  
 Natural Cycle: 80  
 Control Type: Actuated-Uncoordinated



HCM 2010 Signalized Intersection Summary  
26: Capitol Blvd & Linwood Ave

Projected 2022 without improvements  
PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	155	175	165	770	880	280
Future Volume (veh/h)	155	175	165	770	880	280
Number	7	14	5	2	6	16
Initial Q (Ob.) veh	0	0	0	0	0	0
Ped Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1881	1881	1881	1881	1900
Adj Flow Rate, veh/h	185	208	196	917	1048	333
Adj No of Lanes	1	1	1	2	2	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh. %	1	1	1	1	1	1
Cap. veh/h	251	607	549	2540	1063	334
Arrive On Green	0.14	0.14	0.24	0.71	0.40	0.40
Sat Flow, veh/h	1792	1599	1792	3668	2771	843
Gp Volume(v), veh/h	185	208	196	917	696	685
Gp Sat Flow(s), veh/hln	1792	1599	1792	1787	1787	1732
Q Serve(g.s), s	6.0	5.6	2.5	6.0	23.2	23.8
Cycle Q Clear(g.c), s	6.0	5.6	2.5	6.0	23.2	23.8
Prop In Lane	1.00	1.00	1.00		0.49	
Lane Gp Cap(c), veh/h	251	607	549	2540	709	688
V/C Ratio(X)	0.74	0.34	0.36	0.36	0.98	1.00
Avail Cap(c_a), veh/h	537	862	569	2540	709	688
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.9	13.4	9.3	3.4	18.0	18.1
Incr Delay (d2), s/veh	1.6	0.1	0.1	0.4	29.6	33.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(O50%), s/veh	3.0	5.7	1.4	3.1	17.2	17.6
LnGrp Delay(d), s/veh	26.5	13.5	9.4	3.8	47.6	51.4
LnGrp LOS	C	B	A	A	D	D
Approach Vol, veh/h	393		1113		1381	
Approach Delay, s/veh	19.6		4.8		49.5	
Approach LOS	B		A		D	
Timer	1	2	3	4	5	6
Assigned Pns		2		4	5	6
Pns Duration (G+Y+Rc), s		47.4		13.0	18.9	28.5
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		42.9		18.1	15.1	23.3
Max O Clear Time (G_c+H), s		8.0		8.0	4.5	25.8
Green Ext Time (p.c.), s		20.1		0.5	0.2	0.0



HCM 2010 TWSC  
28: Trospen Rd & Rural Rd

Projected 2022 without improvements  
PM Peak Hour

Intersection	Int Delay, s/veh	3.9				
Movement	EBL EBT	WBT WBR	SBL	SBR		
Traffic Vol, veh/h	55 205	330 110	95	100		
Future Vol, veh/h	55 205	330 110	95	100		
Conflicting Peds, #/hr	0 0	0 0	0	0		
Sign Control	Free Free	Free Free	Stop	Stop		
RT Channelized	- None	- None	- None	- None		
Storage Length	- 0	- 0	150	0		
Veh in Median Storage, #	- 0	- 0	- 0	- 0		
Grade, %	- 0	- 0	- 0	- 0		
Peak Hour Factor	0.92	0.92	0.92	0.92		
Heavy Vehicles, %	0 0	1 1	2	2		
Wmnt Flow	60 223	359 120	103	109		

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	478	0	760 418
Stage 1	-	-	342
Stage 2	-	-	642 622
Critical Hdwy, Sig 1	4.1	-	5.42
Critical Hdwy, Sig 2	-	-	5.42
Follow-up Hdwy	2.2	-	3.518 3.318
Pol Cap-1 Maneuver	1095	-	374 635
Stage 1	-	-	664
Platoon blocked, %	-	-	719
Mov Cap-1 Maneuver	1095	-	350 635
Mov Cap-2 Maneuver	-	-	350
Stage 1	-	-	664
Stage 2	-	-	674

Approach	EB	WB	SB
HCM Control Delay, s	1.8	0	15.6
HCM LOS			C

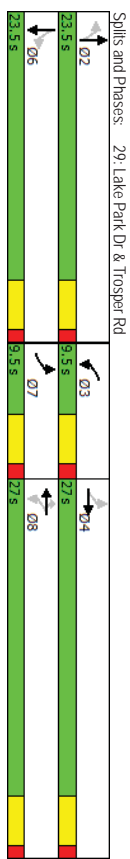
Minor Lane/Major Wmnt	EBL	EBT	WBT	WBR	SBL	SBR
Capacity (veh/h)	1095	-	-	350	635	
HCM Lane V/C Ratio	0.055	-	-	0.295	0.171	
HCM Control Delay (s)	8.5	0	-	19.5	11.8	
HCM Lane LOS	A	A	-	C	B	
HCM 95th %ile Q(veh)	0.2	-	-	1.2	0.6	

Lanes, Volumes, Timings  
29: Lake Park Dr & Trospen Rd

Projected 2022 without improvements  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	10	290	45	55	415	75	65	25	60	70
Future Volume (vph)	10	290	45	55	415	75	65	25	60	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125	150	225	1	1	1	1	1	1	1
Storage Lanes	1	1	1	1	1	1	1	1	1	1
Taper Length (ft)	25			25				25		
Right Turn on Red			Yes			Yes		Yes		Yes
Link Speed (mph)		30			30			30		30
Link Distance (ft)		2012			652			269		583
Travel Time (s)		45.7			14.8			6.1		13.3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	0%	0%	0%	0%
Shaded Lane Traffic (%)										
Turn Type	pm+pl	NA	pm+pl	NA	Perm	Perm	NA	Perm	NA	NA
Protected Phases	7	4	3	8	8	2	2	6	6	6
Permitted Phases	4	4	3	8	8	2	2	6	6	6
Detector Phase	7	4	3	8	8	2	2	6	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Spill (s)	9.5	26.5	9.5	26.5	21.5	21.5	21.5	21.5	21.5	21.5
Total Spill (s)	9.5	27.0	9.5	27.0	23.5	23.5	23.5	23.5	23.5	23.5
Total Split (%)	15.8%	45.0%	15.8%	45.0%	39.2%	39.2%	39.2%	39.2%	39.2%	39.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max

Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	46
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated



HCM 2010 Signalized Intersection Summary  
 29: Lake Park Dr & Trospers Rd  
 Projected 2022 without improvements  
 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (veh/h)	10	290	45	55	415	75	65	25	60	70	20	15
Future Volume (vph)	10	290	45	55	415	75	65	25	60	70	20	15
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1881	1900	1881	1881	1881	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	11	305	47	58	437	79	68	26	63	74	21	16
Adj No. of Lanes	1	2	0	1	1	1	1	1	0	1	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Cap. veh/h	277	875	133	456	607	516	668	191	463	617	388	296
Arrive On Green	0.01	0.28	0.28	0.06	0.32	0.32	0.39	0.39	0.39	0.39	0.39	0.39
Sat Flow, veh/h	1792	3110	474	1792	1881	1599	1393	493	1196	1329	1002	763
Gpr Volume(V), veh/hln	11	174	178	58	437	79	68	0	89	74	0	37
Gpr Sat Flow(s), veh/hln	1792	1787	1792	1792	1881	1599	1393	0	1689	1329	0	1765
Q Serve(g), s	0.2	3.8	3.9	1.1	100	1.7	1.6	0.0	1.7	1.9	0.0	0.6
Cycle Q Clear(g,c), s	0.2	3.8	3.9	1.1	100	1.7	2.2	0.0	1.7	3.5	0.0	0.6
Prop In Lane	1.00	0.26	1.00	1.00	1.00	1.00	1.00	0.71	1.00	1.00	0.43	0.43
Lane Gpr Cap(c), veh/h	277	503	506	456	607	516	668	0	655	617	0	684
W/C Ratio(X)	0.04	0.35	0.35	0.13	0.72	0.15	0.10	0.00	0.14	0.12	0.00	0.05
Avail Cap(c), veh/h	435	820	825	539	863	734	668	0	655	617	0	684
HC Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	12.9	14.0	14.1	11.3	14.6	11.8	10.1	0.0	9.7	10.9	0.0	9.4
Incr Delay (d2), s/veh	0.1	0.4	0.4	0.1	1.7	0.1	0.3	0.0	0.4	0.4	0.0	0.2
Initial Q Delay(d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%alle BackQ(50%), veh/hln	0.1	1.9	2.0	0.5	5.4	0.8	0.7	0.0	0.8	0.7	0.0	0.3
LnGpr Delay(d), s/veh	13.0	14.4	14.5	11.4	16.3	12.0	10.4	0.0	10.1	11.2	0.0	9.5
LnGpr LOS	B	B	B	B	B	B	B	B	B	B	B	A
Approach Vol, veh/h	363			574			157			111		
Approach Delay, s/veh	14.4			15.2			10.2			10.7		
Approach LOS	B			B			B			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2	3	4	5	6	7	8					
Phs Duration (G+Y+R), s	23.5	7.2	18.3	23.5	5.2	20.3						
Change Period (Y+R), s	4.5	4.5	4.5	4.5	4.5	4.5						
Max Green Setting (Gmax), s	19.0	5.0	22.5	19.0	5.0	22.5						
Max Q Clear Time (Q_cH1), s	4.2	3.1	5.9	5.5	2.2	12.0						
Green Ext Time (Q_c), s	0.9	0.0	4.8	0.9	0.0	3.8						
Intersection Summary	HCM 2010 Crt Delay 139											
HCM 2010 LOS	B											

Lanes, Volumes, Timings  
 30: Littlerock Rd/2nd Ave & Trospers Rd  
 Projected 2022 without improvements  
 PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	50	315	120	395	325	35	215	265	440	115	300	60
Future Volume (vph)	50	315	120	395	325	35	215	265	440	115	300	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100	0	150	0	150	0	250	0	150	250	0	250
Storage Lanes	1	0	1	0	1	0	1	0	1	1	2	0
Taper Length (ft)	25	0	25	0	25	0	25	0	25	25	0	25
Right Turn on Red	Yes											
Link Speed (mph)	30											
Link Distance (ft)	652											
Travel Time (s)	14.8											
Peak Hour Factor	0.98											
Heavy Vehicles (%)	1%											
Shared Lane Traffic (%)	37%											
Turn Type	Split											
Protected Phases	4				8				8			
Permitted Phases	4				8				8			
Detector Phase	4				8				8			
Switch Phase	4				8				8			
Minimum Initial (s)	4.0				4.0				4.0			
Minimum Spill (s)	35.6				33.6				24.5			
Total Spill (s)	36.0				37.0				29.0			
Total Split (%)	26.7%				27.4%				21.5%			
Yellow Time (s)	3.6				3.6				3.6			
All-Red Time (s)	1.0				1.0				1.0			
Lost Time Adjust (s)	0.0				0.0				0.0			
Total Lost Time (s)	4.6				4.6				4.6			
Lead/Lag	Lead				Lag				Lead			
Lead/Lag Optimize?	Yes				Yes				Yes			
Recall Mode	Max				C-Max				C-Max			
Intersection Summary	Area Type: Other											
Cycle Length: 135	Activated Cycle Length: 135											
Offset: 46 (34%)	Referenced to phase 8/WBTL, Start of Red											
Natural Cycle: 130	Control Type: Actuated-Coordinated											





HCM 2010 Signalized Intersection Summary  
 31: Tye Dr/I-5 SB Ramps & Trospier Rd  
 Projected 2022 without improvements  
 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (veh/h)	170	640	20	265	340	240	25	190	345	430	330	415
Future Volume (veh/h)	170	640	20	265	340	240	25	190	345	430	330	415
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Q <sub>0</sub> ), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj/(A <sub>pb</sub> )	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	179	674	21	279	358	0	26	200	310	453	347	121
Adj No. of Lanes	1	2	1	1	2	0	1	1	1	2	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh. %	1	1	1	1	1	1	2	2	2	1	1	1
Cap. veh/h	202	1006	450	303	1206	0	255	268	495	628	507	431
Arrive On Green	0.23	0.56	0.28	0.56	0.00	0.14	0.14	0.14	0.14	0.27	0.27	0.27
Sat Flow, veh/h	1792	3574	1599	1792	3668	0	1774	1863	1583	2329	1881	1599
Grp Volume (V), veh/hln	179	674	21	279	358	0	26	200	310	453	347	121
Grp Sat Flow(s), veh/hln	1792	1787	1599	1787	1787	0	1774	1863	1583	1165	1881	1599
Q Serve(s), s	13.0	17.9	0.8	20.4	7.1	0.0	1.7	13.9	19.4	23.8	22.3	8.1
Cycle Q Clear(q.c.), s	13.0	17.9	0.8	20.4	7.1	0.0	1.7	13.9	19.4	23.8	22.3	8.1
Prop In Lane	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	202	1006	450	303	1206	0	255	268	495	628	507	431
V/C Ratio(X)	0.88	0.67	0.05	0.92	0.30	0.00	0.10	0.75	0.63	0.72	0.68	0.28
Avail Cap(c), veh/h	277	1006	450	364	1206	0	255	268	495	628	507	431
HCM Platoon Ratio	2.00	2.00	2.00	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	0.84	0.84	0.84	0.82	0.82	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.4	25.1	21.4	47.6	21.1	0.0	50.2	55.4	39.7	44.7	44.2	39.0
Incr Delay (d <sub>2</sub> ), s/veh	18.6	3.0	0.2	22.5	0.5	0.0	0.8	17.3	5.9	7.0	7.3	1.6
Initial Q Delay(d <sub>1</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/h	7.5	9.1	0.4	12.0	3.6	0.0	0.9	8.4	10.7	8.3	12.6	3.7
LnGrp Delay(d), s/veh	70.0	28.1	21.5	70.1	21.6	0.0	51.0	72.7	45.5	51.7	51.5	40.6
LnGrp LOS	E	C	C	E	C	D	D	E	D	D	D	D
Approach Vol, veh/h	874	637	536	921	502	539	539	539	539	539	539	539
Approach Delay, s/veh	36.5	42.9	53.9	53.9	53.9	53.9	53.9	53.9	53.9	53.9	53.9	53.9
Approach LOS	D	D	D	D	D	D	D	D	D	D	D	D
Timer	1	2	3	4	5	6	7	8				
Assigned PIs	2	3	4	5	6	7	8					
Phs Duration (G+Y+R), s	24.0	27.4	42.6	41.0	19.9	50.1						
Change Period (Y+R), s	4.6	4.6	4.6	4.6	4.6	4.6						
Max Green Setting (G <sub>max</sub> ), s	19.4	27.4	33.4	36.4	20.9	39.9						
Max Q Clear Time (Q <sub>clear</sub> ), s	21.4	22.4	19.9	25.8	15.0	9.1						
Green Ext Time (G <sub>ext</sub> ), s	0.0	0.4	5.6	3.9	0.2	7.8						
Intersection Summary	HCM 2010 Cfl Delay: 45.6 HCM 2010 LOS: D											

Lanes, Volumes, Timings  
 32: I-5 NB Ramps & Trospier Rd  
 Projected 2022 without improvements  
 PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL2	NBL	NBR	SEL	SER	
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL2	NBL	NBR	SEL	SER	
Traffic Volume (vph)	0	905	545	0	660	615	190	0	85	0	0	
Future Volume (vph)	0	905	545	0	660	615	190	0	85	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	300	0	0	0	0	0	200	0	0	0	
Storage Lanes	1	1	0	0	0	0	1	1	1	0	0	
Taper Length (ft)	25	0	0	0	0	25	0	25	0	0	0	
Right Turn on Red												
Link Speed (mph)		30			30			30		30		
Link Distance (ft)		883			397			785		593		
Travel Time (s)		20.1			9.0			17.8		13.5		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	
Shared Lane Traffic (%)												
Turn Type	NA	4	4	NA	8	8	5	5	5	5	5	
Protected Phases	4	4	4	8	8	8	5	5	5	5	5	
Permitted Phases	4	4	4	8	8	8	5	5	5	5	5	
Detector Phase	4	4	4	8	8	8	5	5	5	5	5	
Switch Phase												
Minimum Initial (s)	10.0	21.5	21.5	10.0	21.5	21.5	10.6	10.6	10.6	10.6	10.6	
Minimum Spill (s)	96.0	96.0	96.0	96.0	96.0	96.0	39.0	39.0	39.0	39.0	39.0	
Total Spill (s)	71.1%	71.1%	71.1%	71.1%	71.1%	71.1%	28.9%	28.9%	28.9%	28.9%	28.9%	
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	
Intersection Summary	Area Type: Other Cycle Length: 135 Actuated Cycle Length: 135 Offset: 103 (76%), Referenced to phase 4:EBT and 8:WBT Start of Red Natural Cycle: 40 Control Type: Actuated-Coordinated											



HCM 2010 Signalized Intersection Summary  
 32: -5 NB Ramps & Trospers Rd  
 Projected 2022 without improvements  
 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL/2	NBL	NBR	SEL	SER
Lane Configurations	0	4+4	5/45	0	4+4	6/15	1/1	1/1	1/1	1/1	0
Traffic Volume (veh/h)	0	905	545	0	660	615	190	0	85	0	0
Future Volume (veh/h)	0	905	545	0	660	615	190	0	85	0	0
Number	7	4	14	3	8	18	5	5	12	0	0
Initial Q (Q0), veh	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	0	1881	1900	0	1881	1900	1881	1881	1881	0	0
Adj Flow Rate, veh/h	0	973	0	0	710	0	204	204	0	0	0
Adj No of Lanes	0	3	0	0	2	0	1	1	1	0	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh %	0	1	1	0	1	1	1	1	1	1	1
Cap. veh/h	0	4125	0	0	2871	0	230	230	206	0	0
Arrive On Green	0.00	1.00	0.00	0.00	1.00	0.00	0.13	0.13	0.00	0.00	0.00
Sat Flow, veh/h	0	5474	0	0	3762	0	1792	1792	1599	0	0
Gpr Volume(V), veh/hln	0	973	0	0	1787	0	204	204	0	0	0
Gpr Sat Flow(s), veh/hln	0	1712	0	0	1787	0	1792	1792	1599	0	0
Q Serve(s), s	0.0	0.0	0.0	0.0	0.0	0.0	15.1	15.1	0.0	0.0	0.0
Cycle Q Clear(q,c), s	0.0	0.0	0.0	0.0	0.0	0.0	15.1	15.1	0.0	0.0	0.0
Prop In Lane	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00
Lane Grp Cap(c), veh/h	0	4125	0	0	2871	0	230	230	206	0	0
AVC Relat(X)	0.00	0.24	0.00	0.00	0.25	0.00	0.89	0.89	0.00	0.00	0.00
Avail Cap(c), veh/h	0	4125	0	0	2871	0	457	457	407	0	0
HCM Platoon Ratio	1.00	2.00	2.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	0.00	0.66	0.00	0.00	0.49	0.00	1.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	57.8	57.8	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.1	0.0	4.5	4.5	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/hln	0.0	0.0	0.0	0.0	0.0	0.0	7.8	7.8	0.0	0.0	0.0
LnGrp Delay(d), s/veh	0.0	0.1	0.0	0.0	0.1	0.0	62.3	62.3	0.0	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	E	E	E	E	E
Approach Vol, veh/h	973	710	204	204	204	204	204	204	204	204	204
Approach Delay, s/veh	0.1	0.1	62.3	62.3	62.3	62.3	62.3	62.3	62.3	62.3	62.3
Approach LOS	A	A	E	E	E	E	E	E	E	E	E
Timer	1	2	3	4	5	6	7	7	8	8	8
Assigned Pns	2	2	4	4	4	4	8	8	8	8	8
Pns Duration (G+Y+R), s	22.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0
Change Period (Y+R), s	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Max Green Setting (Gmax), s	34.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4
Max O Clear Time (G+CH1), s	17.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Green Ext Time (G_C), s	0.3	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
<b>Intersection Summary</b>											
HCM 2010 CH Delay	6.8										
HCM 2010 LOS	A										

Lanes, Volumes, Timings  
 33: Capitol Blvd & Trospers Rd  
 Projected 2022 without improvements  
 PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	325	50	600	30	75	35	795	675	10	15	615	395
Traffic Volume (vph)	325	50	600	30	75	35	795	675	10	15	615	395
Future Volume (vph)	325	50	600	30	75	35	795	675	10	15	615	395
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	50	0	250	0	100	200	0	0	0
Storage Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Taper Length (ft)	25	25	25	25	25	25	25	25	25	25	25	25
Right Turn on Red	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Link Speed (mph)	30	30	30	30	30	30	30	30	30	30	30	30
Link Distance (ft)	397	397	397	397	397	397	397	397	397	397	397	397
Travel Time (s)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)	43%	NA	pm+ov	Split	NA	Split	NA	Split	NA	Split	NA	Perm
Turn Type	Split	4	2	8	8	8	2	2	2	6	6	6
Protected Phases	4	4	2	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	2	8	8	8	2	2	2	6	6	6
Detector Phase	4	4	2	8	8	8	2	2	2	6	6	6
Switch Phase	100	100	60	60	60	60	60	60	60	60	60	60
Minimum Initial (s)	20.6	20.6	29.6	28.6	28.6	29.6	29.6	29.6	34.6	34.6	34.6	34.6
Minimum Spill (s)	20.6	20.6	51.2	28.6	28.6	51.2	51.2	51.2	34.6	34.6	34.6	34.6
Total Split (s)	15.3%	15.3%	37.9%	21.2%	21.2%	37.9%	37.9%	37.9%	25.6%	25.6%	25.6%	25.6%
Total Split (%)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Yellow Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Lead-Lag Optimize?	None	None	C-Min	None	None	C-Min	C-Min	C-Min	None	None	None	None
Recall Mode	None	None	C-Min	None	None	C-Min	C-Min	C-Min	None	None	None	None
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	135											
Actuated Cycle Length:	135											
Offset:	6 (4%), Referenced to phase 2:NBT_L, Start of Red											
Natural Cycle:	145											
Control Type:	Actuated-Coordinated											
Splits and Phases: 33: Capitol Blvd & Trospers Rd												

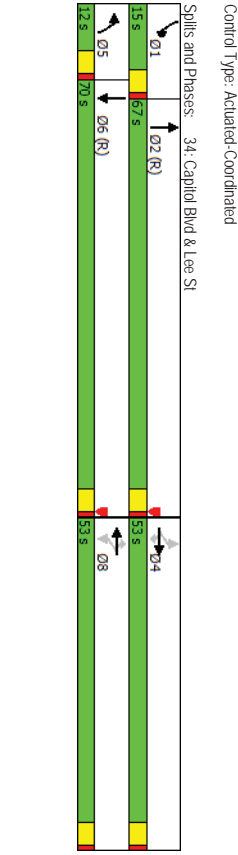
HCM 2010 Signalized Intersection Summary  
 33: Capitol Blvd & Trospier Rd  
 Projected 2022 without improvements  
 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	325	50	600	30	75	35	795	675	10	15	615	395
Future Volume (veh/h)	325	50	600	30	75	35	795	675	10	15	615	395
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Q0), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1881	1881	1900	1900	1900	1881	1881	1900	1881	1881	1881
Adj Flow Rate, veh/h	364	0	379	30	76	35	498	1109	10	15	621	0
Adj No. of Lanes	2	0	1	1	1	0	1	0	2	0	1	2
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh. %	1	1	1	0	0	0	1	1	1	1	1	1
Cap. veh/h	425	0	947	139	95	44	849	1764	16	349	696	311
Arrive On Green	0.04	0.00	0.04	0.08	0.08	0.08	0.079	0.79	0.79	0.19	0.19	0.00
Sat Flow, veh/h	3583	0	1599	1810	1232	568	1792	3723	34	1792	3574	1599
Gpr Volume(V), veh/h	364	0	379	30	0	111	498	560	15	621	0	0
Gpr Sat Flow(s), veh/hln	1792	0	1599	1810	0	1800	1792	1881	1875	1792	1881	1599
Q Served(Q_s), s	13.6	0.0	15.4	2.1	0.0	8.2	14.6	16.7	16.7	0.9	22.9	0.0
Cycle Q Clear(Q_c), s	13.6	0.0	15.4	2.1	0.0	8.2	14.6	16.7	16.7	0.9	22.9	0.0
Prop In Lane	1.00	1.00	1.00	1.00	0.32	1.00	0.02	1.00	1.00	1.00	1.00	0.00
Lane Grp Cap(c), veh/h	425	0	947	139	0	138	849	891	888	349	696	311
V/C Ratio(X)	0.86	0.00	0.40	0.22	0.00	0.80	0.59	0.63	0.63	0.04	0.89	0.00
Avail Cap(c_a), veh/h	425	0	947	322	0	320	849	891	888	398	794	355
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.00	0.92	1.00	0.00	1.00	0.80	0.80	0.80	0.23	0.23	0.00
Uniform Delay(d), s/veh	63.7	0.0	15.7	58.5	0.0	61.3	9.0	9.2	9.2	44.2	53.0	0.0
Incrr Delay(d2), s/veh	14.2	0.0	0.1	0.3	0.0	4.0	2.4	2.7	2.7	0.0	2.8	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%alle BackQ(50%), veh/h	7.6	0.0	14.2	1.1	0.0	4.2	7.4	8.9	8.9	0.5	11.6	0.0
Lngrp Delay(d), s/veh	77.9	0.0	15.8	58.8	0.0	65.3	11.3	11.9	11.9	44.2	55.8	0.0
Lngrp LOS	E	E	B	E	E	E	B	B	B	D	E	E
Approach Vol, veh/h	743				141				1617			
Approach Delay, s/veh	46.2				63.9				11.7			
Approach LOS	D				E				B			
Timer	1	2	3	4	5	6	7	8				
Assigned Pns	2	2	3	4	6	6	8					
Pns Duration (G+Y+R), s	68.5	20.6	30.9	15.0								
Change Period (Y+R), s	4.6	4.6	4.6	4.6								
Max Green Sdling (Gmax), s	46.6	16.0	30.0	24.0								
Max Q Clear Time (Q_c-H1), s	18.7	17.4	10.2	10.2								
Green Ext Time (G_c), s	6.4	0.0	1.4	0.2								
<b>Intersection Summary</b>												
HCM 2010 Crt Delay	31.1											
HCM 2010 LOS	C											

Turnwater Transportation Master Plan  
 SCL Alliance  
 Synchro 9 Report  
 6/10/2016

Lanes, Volumes, Timings  
 34: Capitol Blvd & Lee St  
 Projected 2022 without improvements  
 PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	300	5	45	15	10	80	25	110	25	55	940	185
Future Volume (vph)	300	5	45	15	10	80	25	110	25	55	940	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	125	0	100	250	0	200	0	200	0	0
Storage Lanes	0	0	1	0	1	1	1	1	0	1	0	0
Storage Length (ft)	0	0	125	0	100	250	0	200	0	200	0	0
Right Turn on Red	Yes											
Link Speed (mph)	30											
Link Distance (ft)	718											
Travel Time (s)	16.3											
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Shaded Lane Traffic (%)	Perm											
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Permitted Phases	4	4	4	8	8	8	5	2	6	6	2	6
Detector Phase	4											
Switch Phase	4											
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	12.0	6.0	12.0	6.0	12.0
Minimum Split (s)	29.0	29.0	29.0	30.0	30.0	30.0	11.0	25.0	11.0	25.0	11.0	25.0
Total Split (s)	53.0	53.0	53.0	53.0	53.0	53.0	12.0	67.0	15.0	70.0	15.0	70.0
Total Split (%)	39.3%	39.3%	39.3%	39.3%	39.3%	39.3%	8.9%	49.6%	11.1%	51.9%	11.1%	51.9%
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust(s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead
Lead/Lag Optimizer?	None	None	None	None	None	None	None	None	None	None	None	None
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max	None	C-Max
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length: 135	Other											
Activated Cycle Length: 135	Other											
Offser: 130 (96%), Referenced to phase 2NBT and 6SBT, Start of Red	Other											
Natural Cycle: 70	Other											
Control Type: Actuated-Coordinated	Other											



Turnwater Transportation Master Plan  
 SCL Alliance  
 Synchro 9 Report  
 6/10/2016

HCM Signalized Intersection Capacity Analysis  
 34: Capitol Blvd & Lee St  
 Projected 2022 without improvements  
 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		4	4		4	4		4	4	4	4	4	
Traffic Volume (vph)	300	5	45	15	10	80	25	110	25	55	940	185	
Future Volume (vph)	300	5	45	15	10	80	25	110	25	55	940	185	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Fit	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.98	1.00	0.98	1.00	0.98	
Fit Protected	0.95	1.00	0.97	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	
Satd. Flow (vpo)	1793	1599	1845	1615	1787	3562	1787	3486	1787	3486	1787	3486	
Flt. Permitted	0.71	1.00	0.77	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (vpo)	1335	1599	1458	1615	1787	3562	1787	3486	1787	3486	1787	3486	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
Adj. Flow (vph)	323	5	48	16	11	86	27	1194	27	59	1011	199	
RTOR Reduction (vph)	0	0	35	0	0	62	0	1	0	0	10	0	
Lane Group Flow (vph)	0	328	13	0	27	24	27	1220	0	59	1200	0	
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%	1%	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA	Prot	NA	
Protected Phases	4	4	8	8	8	8	5	2					
Permitted Phases													
Actuated Green, G(s)	37.8	37.8	37.8	37.8	37.8	4.1	76.2	7.2	79.3	7.2	79.3	7.2	
Effective Green, g(s)	37.8	37.8	37.8	37.8	37.8	4.1	76.2	7.2	79.3	7.2	79.3	7.2	
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28	0.03	0.56	0.05	0.59	0.05	0.59	0.05	
Clearance Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	1.5	3.0	1.6	3.0	1.6	3.0	1.6	
Lane Cap Cap (vph)	373	447	408	452	54	2010	95	2047	95	2047	95	2047	
Vis Ratio Prot						0.02	0.34						
Vis Ratio Perm	0.25	0.01	0.02	0.01	0.02	0.01	0.61	0.62	0.59	0.62	0.59	0.62	
V/C Ratio	0.88	0.03	0.07	0.05	0.50	0.61	0.62	0.62	0.59	0.62	0.59	0.62	
Uniform Delay, d1	46.4	35.3	35.7	35.5	64.4	19.5	62.6	17.5	62.6	17.5	62.6	17.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.79	0.96	0.79	0.96	0.79	0.96	
Incremental Delay, d2	19.8	0.0	0.0	0.0	2.6	1.4	6.7	0.9	6.7	0.9	6.7	0.9	
Delay (s)	66.2	35.3	35.7	35.5	67.1	20.9	56.4	17.7	56.4	17.7	56.4	17.7	
Level of Service	E	D	D	D	E	C	E	B	E	B	E	B	
Approach Delay (s)	62.2				35.6		21.9		19.5		19.5		
Approach LOS	E				D		C		B		B		
<b>Intersection Summary</b>													
HCM 2000 Control Delay	26.4	HCM 2000 Level of Service					C						
HCM 2000 Volume to Capacity ratio	0.69	135.0	Sum of lost time (s)					13.8					
Actuated Cycle Length (s)	71.9%	ICU Level of Service					C						
Intersection Capacity Utilization	15												
Analysis Period (min)	15												
Critical Lane Group	c												

Lanes, Volumes, Timings  
 35: Littlerock Rd & Fred Meyer/Costco Drwy  
 Projected 2022 without improvements  
 PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4	4		4	4		4	4	4	4	4
Traffic Volume (vph)	0	0	0	130	5	115	0	770	100	105	680	0
Future Volume (vph)	0	0	0	130	5	115	0	770	100	105	680	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	0	0	100	0	175	0	175	0
Storage Lanes	0	0	1	0	1	1	1	1	1	1	1	1
Taper Length (ft)				25		25		25		25		25
Right Turn on Red				Yes		Yes		Yes		Yes		Yes
Link Speed (mph)				30		30		30		30		30
Link Distance (ft)				390		426		713		896		896
Travel Time (s)				8.9		9.7		16.2		20.4		20.4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	Perm	Perm	NA	pm+ov	Prot	NA	pm+pl	NA	pm+pl	NA	NA
Protected Phases	4	4	4	8	8	8	1	5	2			
Detector Phase	4	4	4	8	8	8	1	5	2			
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Spill (s)	200	200	200	200	200	90	90	200	90	200	90	200
Total Spill (s)	200	200	200	200	200	100	90	200	100	210	100	210
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%	20.0%	18.0%	40.0%	20.0%	42.0%	20.0%	42.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						Lead	Lead	Lag	Lag	Lead	Lag	Lag
Lead/Lag Optimizer?						Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	Max	None	Max
<b>Area Type: Other</b>												
Cycle Length: 50												
Actuated Cycle Length: 42.1												
Natural Cycle: 50												
Control Type: Actuated-Uncoordinated												
<b>Spills and Phases: 35: Littlerock Rd &amp; Fred Meyer/Costco Drwy</b>												

HCM 2010 Signalized Intersection Summary  
35: Littlerock Rd & Fred Meyer/Costco Drwy

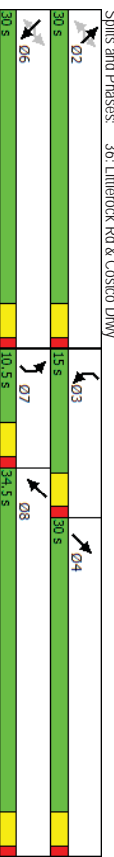
Projected 2022 without improvements  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	0	0	0	130	5	115	0	770	100	105	680	0
Traffic Volume (veh/h)	0	0	0	130	5	115	0	770	100	105	680	0
Future Volume (vph)	0	0	0	130	5	115	0	770	100	105	680	0
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Q0), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1900	1900	1900	1881	1881	1881	1881	1900	1881	1881	1900	1900
Adj Flow Rate, veh/h	0	0	0	137	5	121	0	811	105	111	716	0
Adj No. of Lanes	0	1	1	0	1	1	1	1	2	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh. %	0	0	0	1	1	1	1	1	1	1	1	1
Arrive On Green	0	285	243	400	8	387	5	1378	178	506	2263	0
Cap. veh/h	0	0.00	0.00	0.15	0.15	0.15	0.00	0.43	0.43	0.09	0.63	0.00
Sat Flow, veh/h	0	1900	1615	1387	51	1599	1792	3183	412	1792	3668	0
Grp Volume(V), veh/hln	0	0	142	0	121	0	455	461	111	716	0	0
Grp Sat Flow(S), veh/hln	0	1900	1615	1438	0	1599	1792	1878	1808	1792	1787	0
Q Serve(Q), s	0.0	0.0	0.0	3.4	0.0	2.3	0.0	7.2	7.2	1.0	3.4	0.0
Cycle Q Clear(Q_c), s	0.0	0.0	0.0	3.4	0.0	2.3	0.0	7.2	7.2	1.0	3.4	0.0
Prop In Lane	0.00	1.00	0.96	1.00	1.00	1.00	0.23	1.00	0.23	1.00	0.00	0.00
Lane Grp Cap(c), veh/h	0	285	243	407	0	387	5	774	783	506	2263	0
W/C Ratio(X)	0.00	0.00	0.00	0.35	0.00	0.31	0.00	0.59	0.59	0.22	0.32	0.00
Avail Cap(c), veh/h	0	823	699	814	0	840	242	774	783	632	2263	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	0.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	14.8	0.0	11.5	0.0	8.0	8.0	4.9	3.1	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.2	0.0	0.2	0.0	3.3	3.2	0.2	0.4	0.0
Initial Q Delay(d0), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/hln	0.0	0.0	0.0	1.4	0.0	1.0	0.0	4.1	4.2	0.5	1.7	0.0
LnGrp Delay(d), s/veh	0.0	0.0	0.0	15.0	0.0	11.6	0.0	11.2	11.2	5.0	3.5	0.0
LnGrp LOS				B		B		B	B	A	A	
Approach Vol, veh/h	0			263			916			827		
Approach Delay, s/veh	0.0			13.5			11.2			3.7		
Approach LOS				B			B			A		
Timer	1	2	3	4	5	6	7	8				
Assigned Pks	1	2		4	5	6		8				
Pks Duration (G+Y+R0), s	7.4	20.0		9.6	0.0	27.4		9.6				
Change Period (Y+R0), s	4.0	4.0		4.0	4.0	4.0		4.0				
Max Green Setting (Gmax), s	6.0	16.0		5.0	17.0	16.0		16.0				
Max Q Clear Time (Q_cH1), s	3.0	9.2		0.0	0.0	5.4		5.4				
Green Ext Time (Q_c), s	0.0	4.6		0.0	0.0	6.8		0.5				
<b>Intersection Summary</b>												
HCM 2010 CH Delay	8.4											
HCM 2010 LOS	A											

Lanes, Volumes, Timings  
36: Littlerock Rd & Costco Drwy

Projected 2022 without improvements  
PM Peak Hour

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	MER	SWL	SWT	SWR
Lane Configurations	80	25	15	130	5	220	50	590	110	220	495	80
Traffic Volume (vph)	80	25	15	130	5	220	50	590	110	220	495	80
Future Volume (vph)	80	25	15	130	5	220	50	590	110	220	495	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100	0	100	150	0	150	0	150	0	0
Storage Lanes	0	0	1	0	0	1	1	1	0	1	0	0
Taper Length (ft)	25			25			25			25		
Right Turn on Red Link Speed (mph)		30			30			30			30	
Link Distance (ft)		325			608			995			713	
Travel Time (s)		7.4			13.8			22.6			16.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%	1%	1%
Shaded Lane Traffic (%)	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Turn Type	Protected Phases	6	6	6	2	2	2	7	4	3	8	
Detector Phase	6	6	6	2	2	2	2	7	4	3	8	
Switch Phase	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Initial (s)	300	300	300	300	300	300	9.5	300	9.5	300	300	
Minimum Split (s)	300	300	300	300	300	300	10.5	300	15.0	34.5	300	
Total Split (s)	400%	400%	400%	400%	400%	400%	14.0%	400%	20.0%	46.0%	400%	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust(s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead/Lag Optimizer?							Yes	Yes		Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max	None	None	None	None	None	
<b>Area Type: Other</b>												
Cycle Length: 75												
Actuated Cycle Length: 69.7												
Natural Cycle: 75												
Control Type: Actuated-Uncoordinated												

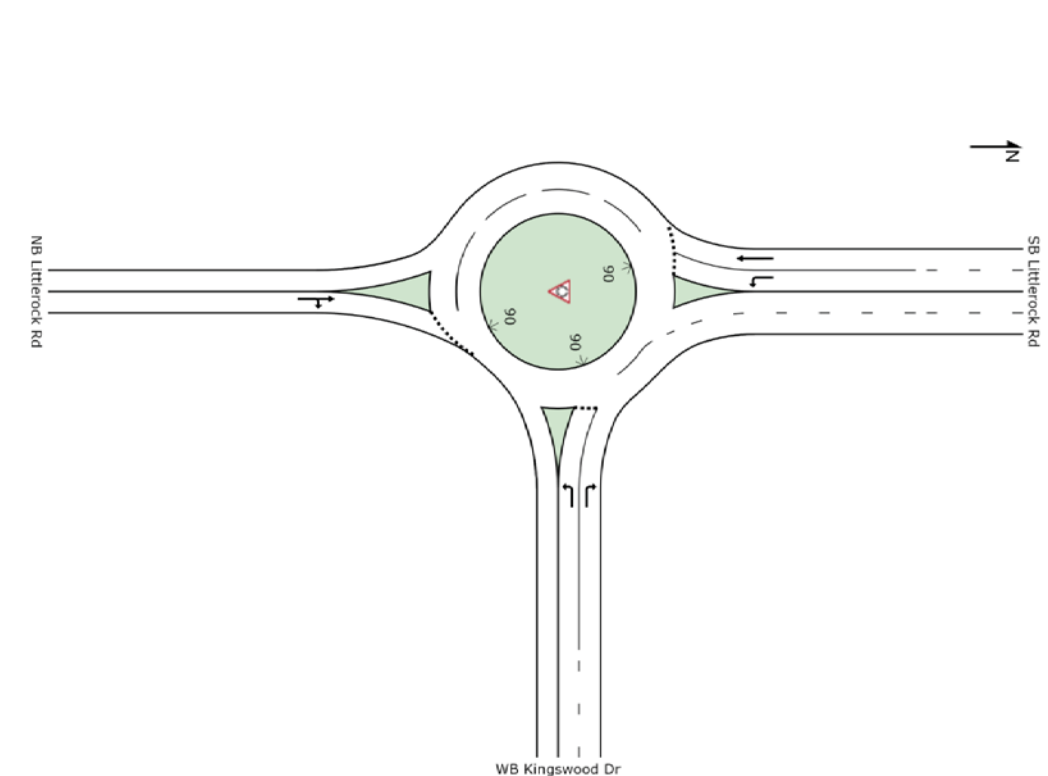


HCM Signalized Intersection Capacity Analysis Projected 2022 without improvements  
 36: Litterock Rd & Costco Drw PM Peak Hour

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	80	25	15	130	5	220	50	590	110	220	495	80
Traffic Volume (vph)	80	25	15	130	5	220	50	590	110	220	495	80
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vph)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Lane Util. Factor	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.98	1.00	0.98	1.00	0.98
Fit	0.96	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Fit Protected	1830	1615	1813	1615	1787	3490	1787	3500	1787	3500	1787	3500
Satd. Flow (vpo)	0.73	1.00	0.67	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Fill Permitted	1395	1615	1275	1615	1787	3490	1787	3500	1787	3500	1787	3500
Satd. Flow (perm)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	84	26	16	137	5	232	53	621	116	232	521	84
Adj. Flow (vph)	0	0	10	0	142	85	53	716	0	232	588	0
RTOR Reduction (vph)	0	110	6	0	147	0	21	0	0	17	0	0
Lane Group Flow (vph)	0%	0%	0%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Heavy Vehicles (%)	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA	Prot	NA
Turn Type	6	6	2	2	2	7	4	8	8	8	8	8
Protected Phases	6	6	2	2	2	7	4	8	8	8	8	8
Permitted Phases	26.1	26.1	26.1	26.1	26.1	3.7	22.2	11.0	29.5	11.0	29.5	29.5
Actuated Green, G (s)	26.1	26.1	26.1	26.1	26.1	3.7	22.2	11.0	29.5	11.0	29.5	29.5
Effective Green, g (s)	0.37	0.37	0.37	0.37	0.37	0.05	0.31	0.15	0.41	0.15	0.41	0.41
Actuated g/C Ratio	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	510	591	466	591	92	1086	275	1448	275	1448	275	1448
Lane Grp Cap (vph)	0.08	0.00	0.11	0.05	0.14	0.58	0.66	0.84	0.41	0.66	0.84	0.41
v/s Ratio Prot	0.22	0.01	0.30	0.14	0.58	0.66	0.84	0.41	0.66	0.84	0.41	0.41
v/s Ratio Perm	15.6	14.4	16.1	15.1	33.0	21.3	29.3	14.7	29.3	14.7	29.3	14.7
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.0	0.0	1.7	0.5	8.5	1.5	20.4	0.2	20.4	0.2	20.4	0.2
Incremental Delay, d2	16.5	14.4	17.8	15.6	41.5	22.7	49.7	14.9	49.7	14.9	49.7	14.9
Delay (s)	B	B	B	B	B	D	C	D	D	D	D	B
Level of Service	16.3	B	16.5	B	16.5	D	C	D	D	D	D	B
Approach Delay (s)	B	B	B	B	B	D	C	D	D	D	D	B
Approach LOS	B	B	B	B	B	D	C	D	D	D	D	B
<b>Intersection Summary</b>												
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service										
HCM 2000 Volume to Capacity ratio	0.54	C										
Actuated Cycle Length (s)	71.3	Sum of lost time (s)										
Intersection Capacity Utilization	56.1%	12.0										
Analysis Period (min)	15	B										
Critical Lane Group	c											

**SITE LAYOUT**

Site: 37) Litterock Rd at Kingswood Dr  
 Projected 2022 without improvements  
 PM Peak Hour  
 Roundabout



# MOVEMENT SUMMARY

## Site: 37) Litterock Rd at Kingswood Dr

Projected 2022 without improvements  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Pop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Litterock Rd											
8	T1	666	1.0	0.747	5.2	LOS A	9.0	226.0	0.54	0.47	36.0
18	R2	151	1.0	0.747	5.1	LOS A	9.0	226.0	0.54	0.47	35.0
Approach											
		806	1.0	0.747	5.2	LOS A	9.0	226.0	0.54	0.47	35.8
East: WB Kingswood Dr											
1	L2	215	1.0	0.254	13.3	LOS B	1.7	43.9	0.76	0.81	33.0
16	R2	91	1.0	0.055	4.2	LOS A	0.0	0.0	0.00	0.49	36.5
Approach											
		306	1.0	0.254	10.6	LOS B	1.7	43.9	0.53	0.71	33.9
North: SB Litterock Rd											
7	L2	70	1.0	0.092	11.5	LOS B	0.5	12.2	0.47	0.66	33.8
4	T1	667	1.0	0.547	5.5	LOS A	4.9	123.5	0.63	0.55	35.7
Approach											
		737	1.0	0.547	6.1	LOS A	4.9	123.5	0.61	0.56	35.5
All Vehicles											
		1849	1.0	0.747	6.4	LOS A	9.0	226.0	0.57	0.55	35.3

Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
Roundabout LOS Method: Same as Signalized Intersections.  
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).  
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).  
Roundabout Capacity Model: SIDRA Standard.  
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.  
Gap-Acceptance Capacity: SIDRA Standard (Akçelik, M.D.).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arcaitek and Associates Pty Ltd | sidrasolutions.com  
Organisation: SCJ ALLIANCE | Processed: Wednesday, June 8, 2016 9:37:03 AM  
Project: N:\Projects\0625\_City of Tumwater\0625\_17\_Tumwater Transportation Master Plan\TrafficOperations\sidra\_2022 Baseline\Existing 2022 PM.sp6

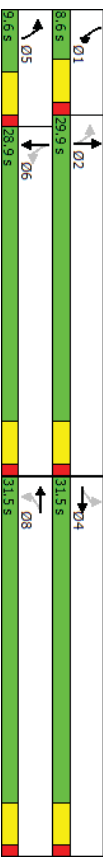
## Lanes, Volumes, Timings

## Projected 2022 without improvements

PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	25	1	15	15	1	20	20	975	15	35	840	40
Future Volume (vph)	25	1	15	15	1	20	20	975	15	35	840	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100	0	100	0	100	0	150	0	250	0	0	0
Storage Lanes	1	0	1	0	1	0	1	0	1	0	0	0
Taper Length (ft)	25	0	25	0	25	0	25	0	25	0	0	0
Right Turn on Red												
Link Speed (mph)	30	30	30	30	30	30	30	30	30	30	30	30
Link Distance (ft)	642	642	642	1326	1326	1326	1300	1300	1366	1366	1366	1366
Travel Time (s)	14.6	14.6	14.6	30.1	30.1	30.1	29.5	29.5	31.1	31.1	31.1	31.1
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA
Protected Phases	4	4	8	8	8	8	5	2	6	6	6	6
Permitted Phases	4	4	4	4	4	4	2	2	2	2	2	2
Detector Phase	4	4	8	8	8	8	5	2	6	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	4.0	7.0	4.0	7.0	4.0	7.0
Minimum Spill (s)	31.5	31.5	31.5	31.5	31.5	31.5	9.5	25.5	8.5	26.5	8.5	26.5
Total Spill (s)	31.5	31.5	31.5	31.5	31.5	31.5	9.6	29.9	8.6	28.9	8.6	28.9
Total Split (%)	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	13.7%	42.7%	12.3%	41.3%	12.3%	41.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag							Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimizer?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
Intersection Summary												
Area Type:	Other											
Cycle Length:	70											
Actuated Cycle Length:	46.3											
Natural Cycle:	70											
Control Type:	Actuated-Uncoordinated											

### Spills and Phases: 38: Capitol Blvd & X St

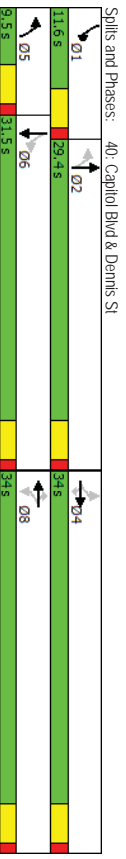




Lanes, Volumes, Timings  
40: Capitol Blvd & Dennis St

Projected 2022 without improvements  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	170	40	35	30	20	75	15	740	25	50	695	90
Traffic Volume (vph)	170	40	35	30	20	75	15	740	25	50	695	90
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	0	0	125	0	100	175	0	225	0	225	0	0
Storage Length (ft)	0	0	1	0	1	1	1	1	1	1	1	0
Storage Lanes	0	0	1	0	1	1	1	1	1	1	1	0
Taper Length (ft)	25			25			25			25		25
Right Turn on Red		Yes			Yes			Yes			Yes	
Link Speed (mph)	30			30			30			30		30
Link Distance (ft)	834			700			1337			1300		1300
Travel Time (s)	19.0			15.9			30.4			29.5		29.5
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pl	NA	pm+pl	NA	pm+pl	NA
Protected Phases	4	4	8	8	8	8	5	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	8	2	2	1	1	6
Detector Phase	4	4	4	8	8	8	8	5	2	1	1	6
Switch Phase	7.0	7.0	7.0	7.0	7.0	7.0	5.0	8.0	8.0	7.0	8.0	8.0
Minimum Initial (s)	33.5	33.5	33.5	33.5	33.5	33.5	9.5	27.5	27.5	11.5	27.5	27.5
Minimum Spill (s)	34.0	34.0	34.0	34.0	34.0	34.0	9.5	29.4	29.4	11.6	31.5	31.5
Total Spill (s)	45.3%	45.3%	45.3%	45.3%	45.3%	45.3%	12.7%	39.2%	39.2%	15.5%	42.0%	42.0%
Total Spill (%)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Yellow Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
All-red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Total Lost Time (s)												
Lead/Lag							Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	Max	None	Max	Max
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	75											
Actuated Cycle Length:	59.3											
Natural Cycle:	75											
Control Type:	Actuated-Uncoordinated											



HCM Signalized Intersection Capacity Analysis  
40: Capitol Blvd & Dennis St

Projected 2022 without improvements  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	170	40	35	30	20	75	15	740	25	50	695	90
Traffic Volume (vph)	170	40	35	30	20	75	15	740	25	50	695	90
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	0	0	125	0	100	175	0	225	0	225	0	0
Total lost time (s)	4.5	4.5	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	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Fit	1.00	0.85	1.00	1.00	0.85	1.00	1.00	1.00	0.98	1.00	0.98	1.00
Fit Protected	0.96	1.00	0.97	1.00	0.97	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd Flow (vphpl)	1808	1599	1845	1615	1787	3557	1787	3513	1787	3513	1787	3513
Fit Permitted	0.73	1.00	0.76	1.00	0.76	1.00	0.30	1.00	0.24	1.00	0.24	1.00
Satd Flow (vphpl)	1312	1599	1453	1615	1453	568	357	461	3513	461	3513	3513
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	187	44	38	33	22	82	16	813	27	55	764	99
RTOR Reduction (%)	0	0	29	0	0	62	0	3	0	0	10	0
Lane Group Flow (vph)	0	231	9	0	55	20	16	837	0	55	853	0
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	1%	1%	1%	1%	1%	1%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pl	NA	pm+pl	NA	pm+pl	NA
Protected Phases	4	4	8	8	8	8	5	2	2	6	6	6
Actuated Green, G (s)	15.0	15.0	15.0	15.0	15.0	15.0	31.3	30.4	37.3	33.4	37.3	33.4
Effective Green, g (s)	13.0	15.0	13.0	15.0	13.0	31.3	30.4	37.3	33.4	37.3	33.4	33.4
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24	0.50	0.48	0.59	0.53	0.59	0.53	0.53
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Crp Cap (vph)	327	381	347	385	300	1721	356	1868	356	1868	356	1868
W/s Ratio Prot						0.00	0.24			0.24		
W/s Ratio Perm	0.17	0.02	0.04	0.04	0.01	0.03	0.08			0.08		
v/c Ratio	0.71	0.02	0.16	0.05	0.05	0.49	0.15			0.15		
Uniform Delay, d1	21.9	18.3	18.9	18.4	8.0	10.9	6.1	9.1		9.1		
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	6.8	0.0	0.2	0.1	0.1	1.0	0.2	0.8		0.8		
Delay (s)	28.7	18.3	19.1	18.5	8.1	11.9	6.3	9.9		9.9		
Level of Service	C	B	B	B	B	A	B	A		A		
Approach Delay (s)	27.2			18.7		11.8		9.7				
Approach LOS	C			B		B		A				
<b>Intersection Summary</b>												
HCM 2000 Control Delay	13.3											
HCM 2000 Volume to Capacity ratio	0.53											
Actuated Cycle Length (s)	62.8											
Intersection Capacity Utilization	56.5%											
Analysis Period (min)	15											
C Critical Lane Group	B											



Splits and Phases: 41: Israel Rd & Capitol Blvd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	95	160	150	105	215	150	120	335	25	120	575	105
Traffic Volume (vph)	95	160	150	105	215	150	120	335	25	120	575	105
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vph)	0	0	0	150	0	150	0	150	0	100	0	0
Storage Length (ft)	1	1	0	1	1	0	1	1	0	1	1	0
Taper Length (ft)	25	25	0	25	25	0	25	25	0	25	25	0
Right Turn on Red				Yes			Yes			Yes		
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	2751			725			934			1337		
Travel Time (s)	62.5			16.5			21.2			30.4		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	NA	NA
Turn Type	3	8	8	7	4	4	6	5	2	2	2	2
Permitted Phases	8	8	8	7	7	7	4	6	2	2	2	2
Detector Phase	3	8	8	7	7	7	4	6	2	2	2	2
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Spill (s)	10.5	26.5	10.5	26.5	10.5	26.5	10.5	26.5	10.5	26.5	10.5	26.5
Total Spill (s)	10.5	26.5	10.5	26.5	10.6	27.5	10.6	27.5	10.5	27.4	10.5	27.4
Total Spill (%)	14.0%	35.3%	14.0%	35.3%	14.1%	36.7%	14.0%	36.5%	14.0%	36.5%	14.0%	36.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
AllRed Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Area Type:	Other											
Cycle Length:	75											
Actuated Cycle Length:	67.5											
Natural Cycle:	75											
Control Type:	Actuated-Uncoordinated											

Area Type: Other

Cycle Length: 75

Actuated Cycle Length: 67.5

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Turnwater Transportation Master Plan  
SCJ Alliance

Synchro 9 Report  
6/10/2016

Assigned Phs

Change Period (V+R): s

Max Green Setting (Gmax): s

Max O Clear Time (G+CH): s

Green Ext Time (P.C.): s

Intersection Summary

HCM 2010 Chl Delay

HCM 2010 LOS

Turnwater Transportation Master Plan  
SCJ Alliance

Synchro 9 Report  
6/10/2016

HCM 2010 TWSC  
42: 66th Ave & Black Lake Belmore Rd

Projected 2022 without improvements  
PM Peak Hour

Intersection		EBL		EBT		WBT		WBR		SBL		SBR	
Int Delay, s/veh	4.5												
Movement		EBL	EBT	WBT	WBR	SBL	SBR						
Traffic Vol, veh/h		55	85	100	135	85	85						
Future Vol, veh/h		55	85	100	135	85	85						
Conflicting Peds, #/hr		0	0	0	0	0	0						
Sign Control		Free	Free	Free	Free	Stop	Stop						
RT Channelized		-	None	-	None	-	None						
Storage Length		-	-	-	-	0	-						
Veh in Median Storage, #		-	0	0	-	0	-						
Grade, %		-	0	0	-	0	-						
Peak Hour Factor		95	95	95	95	95	95						
Heavy Vehicles, %		1	1	1	1	0	0						
Mvmt Flow		58	89	105	142	89	89						

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	247	0	381
Stage 1	-	-	176
Stage 2	-	-	205
Critical Hdwy	4.11	-	6.4
Critical Hdwy Sig 1	-	-	5.4
Critical Hdwy Sig 2	-	-	5.4
Follow-up Hdwy	2,209	-	3.5
Pol Cap-1 Maneuver	1325	-	625
Stage 1	-	-	859
Stage 2	-	-	834
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1325	-	596
Mov Cap-2 Maneuver	-	-	596
Stage 1	-	-	859
Stage 2	-	-	796

Approach	EB	WB	SB
HCM Control Delay, s	3.1	0	11.8
HCM LOS	B	B	B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBL	SBR
Capacity (veh/h)	1325	-	-	-	708	-
HCM Lane V/C Ratio	0.044	-	-	-	0.253	-
HCM Control Delay (s)	7.8	0	-	-	11.8	-
HCM Lane LOS	A	A	-	-	B	-
HCM 95th %ile (Q)veh	0.1	-	-	-	1	-

HCM 2010 TWSC  
43: Kinsop Rd & 66th Ave

Projected 2022 without improvements  
PM Peak Hour

Intersection		EBL		EBR		WBL		WBR		NBL		NBR	
Int Delay, s/veh	8.2												
Movement		EBL	EBR	WBL	WBR	NBL	NBR						
Traffic Vol, veh/h		25	5	145	5	1	5			240	15	5	10
Future Vol, veh/h		25	5	145	5	1	5			240	15	5	10
Conflicting Peds, #/hr		0	0	0	0	0	0			0	0	0	0
Sign Control		Stop	Stop	Stop	Stop	Stop	Stop			Free	Free	Free	Free
RT Channelized		-	None	-	None	-	None			-	None	-	None
Storage Length		-	-	-	-	-	-			-	-	-	-
Veh in Median Storage, #		-	0	-	0	-	0			-	0	-	0
Grade, %		-	0	-	-	-	-			-	0	-	0
Peak Hour Factor		84	84	84	84	84	84			84	84	84	84
Heavy Vehicles, %		1	1	1	1	0	0			1	1	1	1
Mvmt Flow		30	6	173	6	1	6			286	18	6	12

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	644	643	36	729
Stage 1	48	48	-	592
Stage 2	596	595	-	137
Critical Hdwy	7.11	6.51	6.21	7.1
Critical Hdwy Sig 1	6.11	5.51	-	6.1
Critical Hdwy Sig 2	6.11	5.51	-	6.1
Follow-up Hdwy	3,509	4,009	3,309	3.5
Pol Cap-1 Maneuver	387	393	1039	341
Stage 1	968	857	-	496
Stage 2	492	494	-	871
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	328	318	1039	239
Mov Cap-2 Maneuver	328	318	-	239
Stage 1	787	854	-	403
Stage 2	397	402	-	718

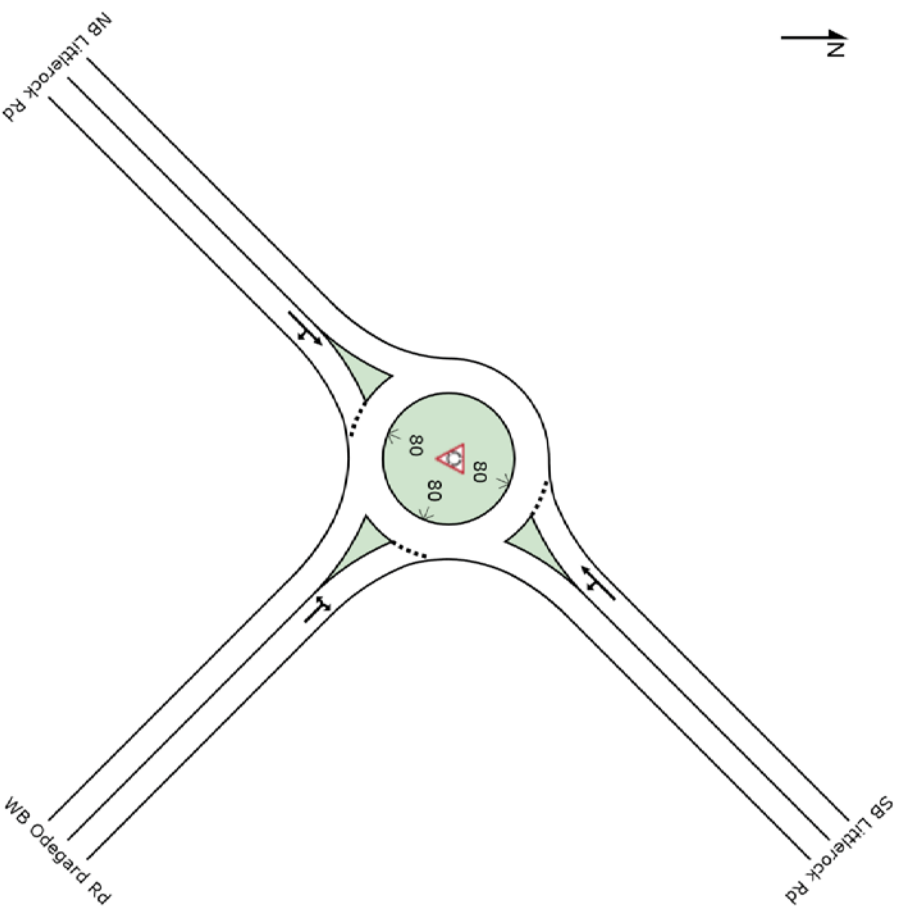
Approach	EB	WB	NB	SB
HCM Control Delay, s	11.6	14.8	7.2	0.7
HCM LOS	B	B	B	B

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBL	EBR	WBL	WBR	SBL	SBR
Capacity (veh/h)	1550	-	-	756	381	1604	-	-	-
HCM Lane V/C Ratio	0.184	-	-	0.276	0.034	0.004	-	-	-
HCM Control Delay (s)	7.8	0	-	11.6	14.8	7.3	0	-	-
HCM Lane LOS	A	A	-	B	B	A	A	-	-
HCM 95th %ile (Q)veh	0.7	-	-	1.1	0.1	0	-	-	-

## SITE LAYOUT

### Site: 44) Litterlock Rd at Odegard Rd

Projected 2022 without improvements  
PM Peak Hour  
Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arcelik and Associates Pty Ltd | sidrasolutions.com  
Organisation: SCU ALLIANCE | Created: Monday, February 29, 2016 1:17:54 PM  
Project: N:\Projects\0625-17-Tumwater\_Transportation Master Plan\Traffic\Operations\sidra\2022 Baseline\Existing 2022 PM.sp6

## MOVEMENT SUMMARY

### Site: 44) Litterlock Rd at Odegard Rd

Projected 2022 without improvements  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Sat w/c	Deg. Delay sec	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: WB Odegard Rd												
3x	L2	16	0.0	0.034	14.9	LOS B	0.2	4.6	0.70	0.73	32.6	
18x	R2	5	0.0	0.034	9.5	LOS A	0.2	4.6	0.70	0.73	31.8	
Approach		22	0.0	0.034	13.5	LOS B	0.2	4.6	0.70	0.73	32.4	
NorthEast: SB Litterlock Rd												
1x	L2	11	1.0	0.677	9.7	LOS A	9.6	242.9	0.26	0.38	36.6	
6x	T1	823	1.0	0.677	4.4	LOS A	9.6	242.9	0.26	0.38	36.6	
Approach		833	1.0	0.677	4.5	LOS A	9.6	242.9	0.26	0.38	36.6	
SouthWest: NB Litterlock Rd												
2x	T1	790	1.0	0.641	4.3	LOS A	7.5	189.4	0.17	0.38	37.0	
12x	R2	5	1.0	0.641	4.2	LOS A	7.5	189.4	0.17	0.38	36.0	
Approach		796	1.0	0.641	4.3	LOS A	7.5	189.4	0.17	0.38	37.0	
All Vehicles		1851	1.0	0.677	4.5	LOS A	9.6	242.9	0.22	0.39	36.7	

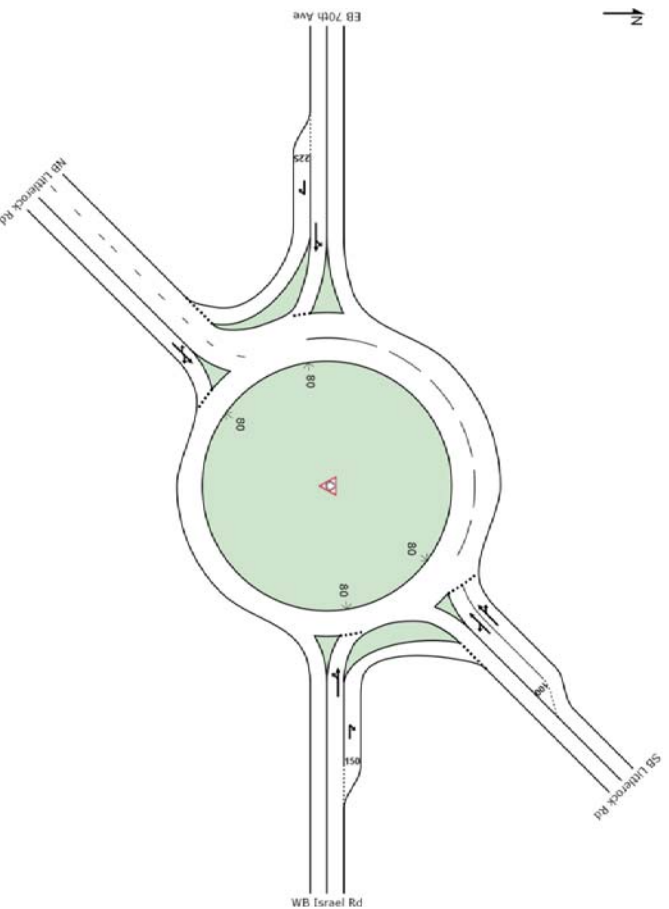
Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
Roundabout LOS Method: Same as Signalised Intersections.  
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
LOS F will result if  $v/c > 1$  (respective of movement delay value (does not apply for approaches and intersection).  
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).  
Roundabout Capacity Model: SIDRA Standard.  
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.  
Gap-Acceptance Capacity: SIDRA Standard (Akegik M3D).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arcelik and Associates Pty Ltd | sidrasolutions.com  
Organisation: SCU ALLIANCE | Processed: Wednesday, June 8, 2016 9:37:04 AM  
Project: N:\Projects\0625-17-Tumwater\_Transportation Master Plan\Traffic\Operations\sidra\2022 Baseline\Existing 2022 PM.sp6

## SITE LAYOUT

Site: 45) Litterock Rd at Israel Rd

Projected 2022 without improvements  
PM Peak Hour  
Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com  
Organisation: SCJ ALLIANCE | Created: Monday, February 29, 2016 1:18:58 PM  
Project: N:\Projects\0625\_City of Tumwater\0625\_17 Tumwater Transportation Master Plan\Traffic\Operations\sidra\2022 Baseline\Existing\_2022 PM.sp6

## MOVEMENT SUMMARY

Site: 45) Litterock Rd at Israel Rd

Projected 2022 without improvements  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Satm v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
<b>East: WB Israel Rd</b>											
1a	L1	137	1.0	0.426	13.0	LOS B	3.3	84.3	0.88	0.87	33.5
6	T1	184	1.0	0.426	8.8	LOS A	3.3	84.3	0.88	0.87	33.8
16b	R3	337	1.0	0.336	6.6	LOS A	2.3	58.8	0.67	0.71	34.8
Approach											
		658	1.0	0.426	8.5	LOS A	3.3	84.3	0.77	0.79	34.2
<b>NorthEast: SB Litterock Rd</b>											
11x	L3	184	1.0	0.493	16.1	LOS B	3.9	96.7	0.82	0.90	33.3
6x	T1	505	1.0	0.493	9.3	LOS A	4.0	101.8	0.82	0.86	34.1
16ax	R1	132	1.0	0.493	8.4	LOS A	4.0	101.8	0.82	0.83	34.5
Approach											
		821	1.0	0.493	10.7	LOS B	4.0	101.8	0.82	0.87	34.0
<b>West: EB 70th Ave</b>											
5a	L1	116	1.0	0.283	11.2	LOS B	1.4	35.1	0.68	0.80	34.0
2	T1	95	1.0	0.283	7.2	LOS A	1.4	35.1	0.68	0.80	34.4
12b	R3	79	1.0	0.094	6.0	LOS A	0.4	9.9	0.55	0.70	35.1
Approach											
		289	1.0	0.283	8.5	LOS A	1.4	35.1	0.64	0.77	34.4
<b>SouthWest: NB Litterock Rd</b>											
5bx	L3	263	1.0	0.757	19.4	LOS B	10.0	253.2	0.92	1.02	31.9
2x	T1	305	1.0	0.757	13.0	LOS B	10.0	253.2	0.92	1.02	31.7
12ax	R1	79	1.0	0.757	12.6	LOS B	10.0	253.2	0.92	1.02	31.5
Approach											
		647	1.0	0.757	15.5	LOS B	10.0	253.2	0.92	1.02	31.8
<b>All Vehicles</b>											
		2416	1.0	0.757	11.1	LOS B	10.0	253.2	0.81	0.87	33.5

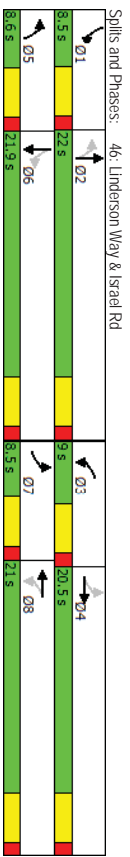
Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
Roundabout LOS Method: Same as Signalised Intersections.  
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).  
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).  
Roundabout Capacity Model: SIDRA Standard.  
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.  
Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com  
Organisation: SCJ ALLIANCE | Processed: Wednesday, June 8, 2016 9:37:05 AM  
Project: N:\Projects\0625\_City of Tumwater\0625\_17 Tumwater Transportation Master Plan\Traffic\Operations\sidra\2022 Baseline\Existing\_2022 PM.sp6

Lanes, Volumes, Timings  
46: Linderon Way & Israel Rd

Projected 2022 without improvements  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	210	50	135	305	25	130	105	115	40	90	80
Future Volume (vph)	65	210	50	135	305	25	130	105	115	40	90	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	0	200	0	150	0	150	0	100	0	0	0
Storage Lanes	1	0	1	0	1	0	1	0	1	0	0	0
Taper Length (ft)	25	0	25	0	25	0	25	0	25	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)	30	30	30	30	30	30	30	30	30	30	30	30
Link Distance (ft)	3505	2751	625	2073	47.1	19.3	47.1	19.3	47.1	19.3	47.1	19.3
Travel Time (s)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Heavy Vehicles (%)												
Shaded Lane Traffic (%)												
Turn Type	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA	pm+pl	NA
Protected Phases	7	4	8	8	8	5	2	6	6	6	6	6
Permitted Phases	4	7	4	8	3	8	8	5	2	1	6	6
Detector Phase	7	4	8	8	3	8	8	5	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Minimum Spill (s)	8.5	20.5	8.5	20.5	8.5	20.5	8.5	21.5	8.5	21.5	8.5	21.5
Total Spill (s)	8.5	20.5	9.0	21.0	8.6	22.0	8.6	22.0	8.5	21.9	8.5	21.9
Yellow Time (s)	3.5	3.5	14.2%	34.2%	15.0%	35.0%	14.3%	36.7%	14.2%	36.5%	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	60											
Actuated Cycle Length:	53.8											
Natural Cycle:	60											
Control Type:	Actuated-Uncoordinated											



HCM 2010 Signalized Intersection Summary  
46: Linderon Way & Israel Rd

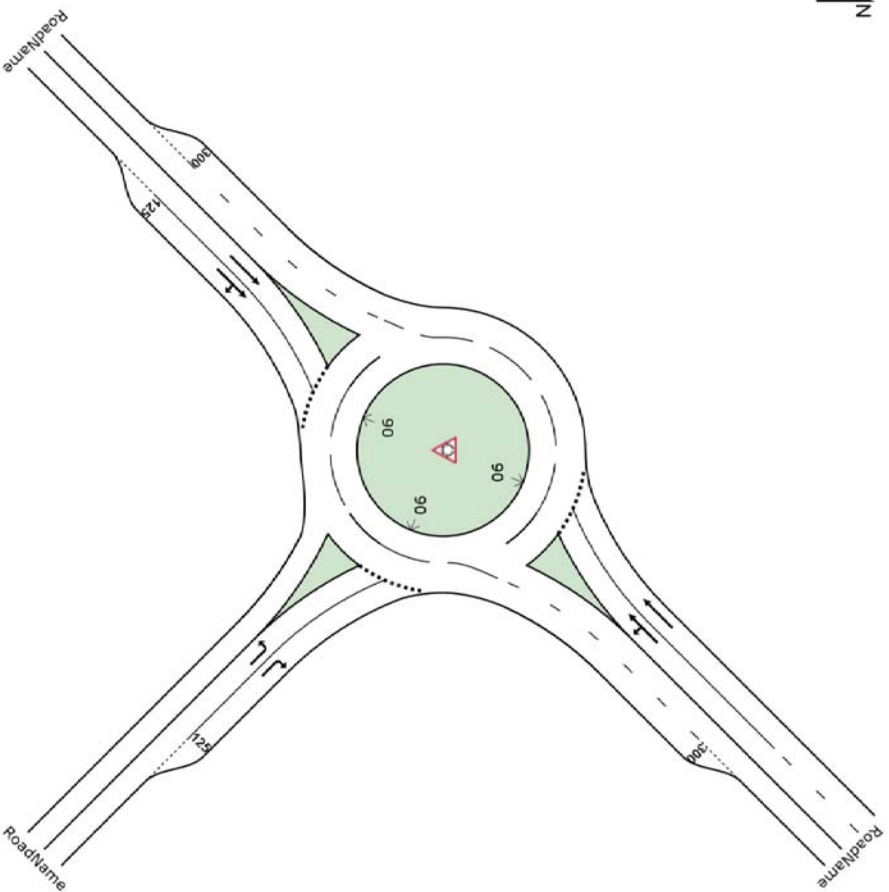
Projected 2022 without improvements  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	210	50	135	305	25	130	105	115	40	90	80
Future Volume (veh/h)	65	210	50	135	305	25	130	105	115	40	90	80
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Obs.) veh	0	0	0	0	0	0	0	0	0	0	0	0
Peak BkUp Adj (Adj)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1881	1900	1881	1881	1881	1881	1881	1881	1881	1881	1900
Adj Flow Rate, veh/h	68	221	53	142	321	26	137	111	47	42	95	84
Adj No of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Arrive On Green	0.05	0.21	0.21	0.08	0.25	0.25	0.07	0.35	0.35	0.03	0.31	0.31
Sat Flow, veh/h	1792	1467	352	1792	1718	139	1792	1256	532	1792	922	815
Gp Volume (V), veh/h	68	0	274	142	0	347	137	0	158	42	0	179
Gp Sat Flow (S), veh/hln	1792	0	1819	1792	0	1857	1792	0	1787	1792	0	1737
Q Serve (S), s	1.6	0.0	7.8	3.4	0.0	9.7	2.8	0.0	3.5	0.9	0.0	4.4
Cycle Q Clear (C), s	1.6	0.0	7.8	3.4	0.0	9.7	2.8	0.0	3.5	0.9	0.0	4.4
Prop In Lane	1.00	0.19	1.00	0.07	1.00	0.30	1.00	0.30	1.00	0.30	1.00	0.47
Lane Grp Cap (C), veh/h	287	0	385	353	0	456	543	0	627	546	0	542
V/C Ratio (X)	0.24	0.00	0.71	0.40	0.00	0.76	0.25	0.00	0.25	0.08	0.00	0.33
Aval Cap (C-a), veh/h	332	0	522	353	0	549	543	0	627	613	0	542
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter (f)	1.00	0.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.5	0.0	20.4	15.8	0.0	19.5	11.6	0.0	12.9	12.2	0.0	14.7
Incr Delay (d2), s/veh	0.2	0.0	2.9	0.3	0.0	5.1	0.1	0.0	1.0	0.0	0.0	1.6
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BndQ (50%), s/veh	0.8	0.0	4.2	1.7	0.0	5.6	1.4	0.0	1.9	0.4	0.0	2.3
LnGrp Delay (d) s/veh	16.7	0.0	23.3	16.1	0.0	24.6	11.7	0.0	13.9	12.3	0.0	16.4
<b>Intersection Summary</b>												
Approach Vol, veh/h	342											
Approach Delay, s/veh	22.0											
Approach LOS	C											
Timer	1	2	3	4	5	6	7	8				
Assigned Pns	1	2	3	4	5	6	7	8				
Pns Duration (G+Y+R), s	6.4	24.1	9.0	16.3	8.6	21.9	7.1	18.2				
Change Period (Y+R), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	4.0	17.5	4.5	16.0	4.1	17.4	4.0	16.5				
Max Q Clear Time (Qc+H), s	2.9	5.5	5.4	9.8	4.8	6.4	3.6	11.7				
Green Ext Time (P.C.), s	0.0	1.5	0.0	2.0	0.0	1.5	0.0	1.6				
<b>Intersection Summary</b>												
HCM 2010 C/D Delay	19.0											
HCM 2010 LOS	B											

## SITE LAYOUT

Site: 47) Litterrock Rd at Turnwater Blvd

Projected 2022 without improvements  
PM Peak Hour  
Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arceik and Associates Pty Ltd | sidrasolutions.com  
Organisation: SCU ALLIANCE | Created: Monday, February 29, 2016 1:19:40 PM  
Project: N:\Projects\0625\_City of Turnwater\0625\_17\_Turnwater\_Transportation Master Plan\Traffic\Operations\sidra\_2022\_Baseline\Existing\_2022\_PM.sp6

## MOVEMENT SUMMARY

Site: 47) Litterrock Rd at Turnwater Blvd

Projected 2022 without improvements  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	W/C	Deg. Satm	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
SouthEast: RoadName												
3x	L2	314	1.0	0.282		10.7	LOS B	1.5	38.9	0.40	0.56	34.0
18x	R2	340	1.0	0.299		5.1	LOS A	1.7	42.1	0.40	0.55	35.6
Approach		654	1.0	0.299		7.8	LOS A	1.7	42.1	0.40	0.50	34.8
NorthEast: RoadName												
1x	L2	383	1.0	0.491		11.7	LOS B	3.2	80.8	0.58	0.71	34.3
6x	T1	410	1.0	0.491		6.2	LOS A	3.2	80.8	0.54	0.63	35.4
Approach		793	1.0	0.491		8.9	LOS A	3.2	80.8	0.56	0.67	34.8
SouthWest: RoadName												
2x	T1	197	0.0	0.198		5.9	LOS A	1.1	26.5	0.52	0.55	36.0
12x	R2	181	0.0	0.190		6.0	LOS A	1.0	24.9	0.52	0.63	35.3
Approach		378	0.0	0.198		5.9	LOS A	1.1	26.5	0.52	0.59	35.7
All Vehicles		1824	0.8	0.491		7.9	LOS A	3.2	80.8	0.50	0.63	35.0

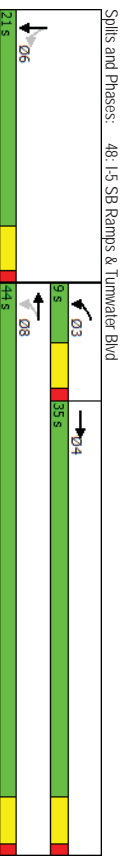
Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
Roundabout LOS Method: Same as Signalised Intersections.  
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).  
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).  
Roundabout Capacity Model: SIDRA Standard.  
Roundabout Delay Model is used: Control Delay includes Geometric Delay.  
Gap-Acceptance Capacity: SIDRA Standard (Arceik M3D).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Arceik and Associates Pty Ltd | sidrasolutions.com  
Organisation: SCU ALLIANCE | Processed: Wednesday, June 8, 2016 9:37:08 AM  
Project: N:\Projects\0625\_City of Turnwater\0625\_17\_Turnwater\_Transportation Master Plan\Traffic\Operations\sidra\_2022\_Baseline\Existing\_2022\_PM.sp6

Lanes, Volumes, Timings  
48: I-5 SB Ramps & Turnwater Blvd

Projected 2022 without improvements  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	0	425	105	365	310	0	0	0	0	400	30	310
Traffic Volume (vph)	0	425	105	365	310	0	0	0	0	400	30	310
Future Volume (vph)	0	425	105	365	310	0	0	0	0	400	30	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	0	0	0	0	0	350	0	0
Storage Lanes	0	0	0	0	0	0	0	0	0	1	1	0
Taper Length (ft)	25			25			25			25		25
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	Yes
Link Speed (mph)	30			30			30		30		30	30
Link Distance (ft)	1843			807			1457		1571		1571	1571
Travel Time (s)	41.9			18.3			33.1		35.7		35.7	35.7
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	0%	0%	0%	4%	4%	4%
Shared Lane Traffic (%)	NA			pm+pl	NA		NA		Perm	NA		NA
Turn Type	Protected Phases	4		8			8		6		6	6
Detector Phase	Switch Phase	4		3			8		6		6	6
Minimum Initial (s)	4.0			4.0			4.0		4.0		4.0	4.0
Minimum Spill (s)	20.5			8.5			20.5		20.5		20.5	20.5
Total Spill (s)	33.0			9.0			44.0		21.0		21.0	21.0
Total Split (%)	53.8%			13.8%			67.7%		32.3%		32.3%	32.3%
Yellow Time (s)	3.5			3.5			3.5		3.5		3.5	3.5
All-Red Time (s)	1.0			1.0			1.0		1.0		1.0	1.0
Lost Time Adjust (s)	0.0			0.0			0.0		0.0		0.0	0.0
Total Lost Time (s)	4.5			4.5			4.5		4.5		4.5	4.5
Lead/Lag	Lag			Lead			Lead		Lead		Lead	Lead
Lead-Lag Optimize?	Yes			Yes			Yes		Yes		Yes	Yes
Recall Mode	None			None			Max		None		None	None
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	65											
Actuated Cycle Length:	64.9											
Natural Cycle:	75											
Control Type:	Actuated-Uncoordinated											



HCM 2010 Signalized Intersection Summary  
48: I-5 SB Ramps & Turnwater Blvd

Projected 2022 without improvements  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	0	425	105	365	310	0	0	0	0	400	30	310
Traffic Volume (veh/h)	0	425	105	365	310	0	0	0	0	400	30	310
Future Volume (veh/h)	0	425	105	365	310	0	0	0	0	400	30	310
Number	7	4	14	3	8	18	1	6	16	0	0	0
Initial Q (Ob.) veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped/Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	0	1881	1900	1900	1881	0	1881	1827	1827	1900	1900	1900
Adj Flow Rate, veh/h	0	452	112	388	330	0	306	200	154	0	0	0
Adj No. of Lanes	0	2	0	0	1	0	1	0	1	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh. %	0	1	1	1	1	0	1	0	1	0	0	0
Cap. veh/h	0	1759	433	88	7	0	419	231	178	0	0	0
Arrive On Green	0.00	0.62	0.62	0.62	0.62	0.00	0.24	0.24	0.24	0.00	0.24	0.24
Sat Flow, veh/h	0	2939	700	3	11	0	1740	959	738	0	0	0
Gp Volume(v), veh/h	0	283	281	718	0	0	306	0	354	0	0	0
Gp Sat Flow(s), veh/hln	0	1787	1758	13	0	0	1740	0	1697	0	0	0
Q Serve(s), s	0.0	4.6	4.6	28.2	0.0	0.0	10.3	0.0	12.8	0.0	0.0	0.0
Cycle Q Clear(g-c), s	0.0	4.6	4.6	28.2	0.0	0.0	10.3	0.0	12.8	0.0	0.0	0.0
Prop. In Lane	0.00	0.40	0.54	0.00	0.00	0.00	1.00	0.00	0.44	0.00	0.00	0.00
Lane Gp Cap(c), veh/h	0	1105	1086	0	0	0	419	0	409	0	0	0
V/C Ratio(X)	0.00	0.26	0.26	0.00	0.00	0.00	0.73	0.00	0.87	0.00	0.00	0.00
Aval Cap(C_a), veh/h	0	1105	1086	0	0	0	449	0	438	0	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	0.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	5.5	5.5	0.0	0.0	0.0	22.3	0.0	23.3	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.1	0.0	0.0	0.0	5.5	0.0	15.7	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%),veh/hln	0.0	2.2	2.2	0.0	0.0	0.0	5.6	0.0	7.8	0.0	0.0	0.0
LnGrp Delay(d), s/veh	0.0	5.7	5.7	0.0	0.0	0.0	27.9	0.0	39.0	0.0	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	D	A	A	D
Approach Vol, veh/h	564			718			660		660		660	660
Approach Delay, s/veh	5.7			0.0			33.8		33.8		33.8	33.8
Approach LOS	A			A			C		C		C	C
Timer	1	2	3	4	5	6	7	8				
Assigned Pns				4		6		8				
Pns Duration (G+Y+R), s				44.0		19.9		44.0				
Change Period (Y+R), s				4.5		4.5		4.5				
Max Green Setting (Gmax), s				30.5		16.5		39.5				
Max O Clear Time (G+CH1), s				6.6		14.8		30.2				
Green Ext Time (P.C.), s				11.5		0.6		6.1				
<b>Intersection Summary</b>												
HCM 2010 Cnt Delay	13.1											
HCM 2010 LOS	B											
<b>Notes</b>												

Intersection	Int Delay, s/veh	19.8												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Traffic Vol, veh/h	195	630	0	0	610	1205	65	5	150	0	0	0		
Future Vol, veh/h	195	630	0	0	610	1205	65	5	150	0	0	0		
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0		
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop		
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	None		
Storage Length	150	0	0	0	0	0	0	0	150	0	0	0		
Veh in Median Storage, #	0	0	0	0	0	0	0	0	0	0	0	0		
Grade, %	-	-	-	-	-	-	-	-	-	-	-	-		
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88		
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3		
Mvmt Flow	222	716	0	0	693	1369	74	6	170	0	0	0		

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	693	0	0	1852	1852
Stage 1	-	-	-	1159	1159
Stage 2	-	-	-	693	693
Critical Hdwy, Sig 1	4145	-	-	6445	6545
Critical Hdwy, Sig 2	-	-	-	5845	5545
Follow-up Hdwy	22285	-	-	5445	5545
Poi Cap-1/Maneuver	895	0	0	35285	40285
Stage 1	-	0	0	72	73
Stage 2	-	0	0	260	268
Platoon blocked, %	-	0	0	493	442
Man Cap-1/Maneuver	895	-	-	-	54
Man Cap-2/Maneuver	-	-	-	-	54
Stage 1	-	-	-	-	196
Stage 2	-	-	-	-	493

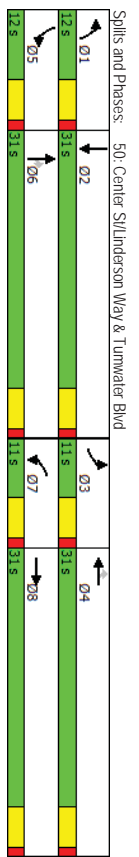
Approach	EB	WB	NB
HCM Control Delay, s	2.4	0	140.3
HCM LOS	F	F	F

Minor Lane/Major Mvmt	NBL/N1	NBL/N2	EBL	EBT	WBT
Capacity (veh/h)	54	637	895	-	-
HCM Lane V/C Ratio	1.473	0.268	0.248	-	-
HCM Control Delay (s)	\$ 413.7	12.7	10.3	-	-
HCM Lane LOS	F	B	B	-	-
HCM 95th %ile Q(veh)	7.3	1.1	1	-	-

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

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	130	595	150	105	755	30	170	105	55	185	185	875
Future Volume (vph)	130	595	150	105	755	30	170	105	55	185	185	875
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300	0	350	250	250	150	300	700				
Storage Lanes	2	0	1	1	1	1	1	1				
Taper Length (ft)	25	0	25	25	25	25	25	25				
Right Turn on Red												
Link Speed (mph)	30	Yes	30	Yes	30	Yes	30	Yes				
Link Distance (ft)	895		1275		1023		2073					
Travel Time (s)	20.3		29.0		23.3		47.1					
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)	Prot	NA	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Free	Free
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Free	Free
Protected Phases	3	8	7	4	4	4	1	6	6	5	2	Free
Detector Phase	3	8	7	4	4	4	1	6	6	5	2	Free
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Spill (s)	11.0	31.0	11.0	31.0	31.0	11.0	31.0	31.0	11.0	31.0	31.0	31.0
Total Spill (s)	11.0	31.0	11.0	31.0	31.0	12.0	31.0	31.0	12.0	31.0	31.0	31.0
Total Split (%)	12.9%	36.5%	12.9%	36.5%	14.1%	36.5%	14.1%	36.5%	14.1%	36.5%	14.1%	36.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimizer?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	Max	None	Max	None	Max	None	Max	None	Max

Area Type:	Other
Cycle Length: 85	
Actuated Cycle Length: 71.8	
Natural Cycle: 85	
Control Type: Actuated-Uncoordinated	



Spills and Phases: 50: Center St/Linderson Way & Turnwater Blvd  
 Turnwater Transportation Master Plan  
SCJ Alliance  
Synchro 9 Report  
6/10/2016

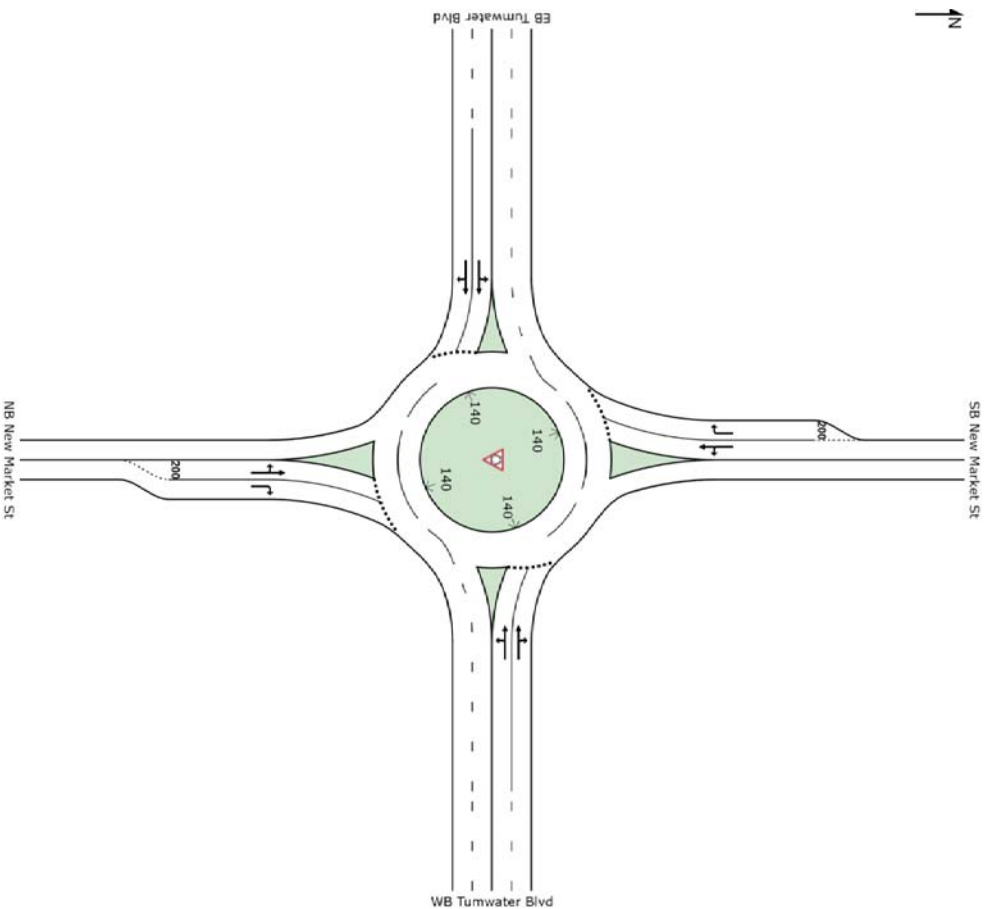


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	RT	LT	RT	LT	LT	RT	LT	LT	RT	LT	RT	LT
Traffic Volume (veh/h)	130	595	150	105	755	30	170	105	55	185	185	875
Future Volume (veh/h)	130	595	150	105	755	30	170	105	55	185	185	875
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1863	1863	1900	1881	1881	1881	1881	1881	1881	1881	1881	1881
Adj Flow Rate, veh/h	138	633	160	112	803	32	181	112	59	197	197	0
Adj No of Lanes	2	2	0	1	2	1	1	1	1	1	1	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh. %	2	2	2	1	1	1	1	1	1	1	1	1
Arrive On Green	0.08	0.38	0.38	0.08	0.38	0.38	0.10	0.15	0.15	0.10	0.15	0.00
Cap. veh/h	277	1055	266	143	1343	601	181	289	245	181	289	245
Sat Flow, veh/h	3442	2801	707	1792	3574	1599	1792	1881	1599	1792	1881	1599
Grp Volume(V), veh/h	138	400	393	112	803	32	181	112	59	197	197	0
Grp Sat Flow(s), veh/hln	1721	1770	1236	1792	1787	1599	1792	1881	1599	1792	1881	1599
Q Serve(s), s	2.7	12.6	12.6	4.2	12.5	0.9	7.0	3.7	2.2	7.0	6.9	0.0
Cycle Q Clear(c), s	2.7	12.6	12.6	4.2	12.5	0.9	7.0	3.7	2.2	7.0	6.9	0.0
Prop In Lane	1.00	0.41	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	277	666	654	143	1343	601	181	289	245	181	289	245
V/C Ratio(X)	0.50	0.60	0.60	0.78	0.60	0.05	1.00	0.39	0.24	1.09	0.68	0.00
Avail Cap(c), veh/h	298	666	654	155	1343	601	181	707	601	181	707	601
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.5	17.4	17.4	31.3	17.4	13.8	31.1	26.4	25.7	31.1	27.7	0.0
Incr Delay (d2), s/veh	1.4	4.0	4.1	21.1	2.0	0.2	66.5	0.9	0.5	92.0	2.8	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/h	1.3	6.8	6.7	2.9	6.5	0.4	6.8	2.0	1.0	8.1	3.8	0.0
LnGrp Delay(d), s/veh	31.8	21.3	21.4	52.3	19.4	13.9	97.6	27.2	26.2	123.1	30.5	0.0
LnGrp LOS	C	C	C	D	B	B	F	C	C	F	C	C
Approach Vol, veh/h	931	229	947	231	632	76.8	394	76.8	394	76.8	394	0
Approach Delay, s/veh	22.9	23.1	23.1	23.1	23.1	23.1	23.1	23.1	23.1	23.1	23.1	23.1
Approach LOS	C	C	C	C	C	C	E	E	E	E	E	E
Timer	1	2	3	4	5	6	7	8	8	8	8	8
Assigned Phs	1	2	3	4	5	6	7	8	8	8	8	8
Phs Duration (G+Y+R), s	120	15.6	10.6	31.0	12.0	15.6	10.5	31.1	10.5	31.1	10.5	31.1
Change Period (Y+R), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	7.0	26.0	6.0	26.0	7.0	26.0	6.0	26.0	6.0	26.0	6.0	26.0
Max Q Clear Time (Q_cH1), s	9.0	8.9	4.7	14.5	9.0	5.7	6.2	14.6	5.7	6.2	14.6	5.7
Green Ext Time (Q_c), s	0.0	1.8	0.0	7.6	0.0	1.9	0.0	7.5	1.9	0.0	7.5	1.9
<b>Intersection Summary</b>												
HCM 2010 C/H Delay	36.5											
HCM 2010 LOS	D											

**SITE LAYOUT**

Site: 51) New Market Rd at Turnwater Blvd

Projected 2022 without improvements  
 PM Peak Hour  
 Roundabout



# MOVEMENT SUMMARY

## Site: 51) New Market Rd at Turnwater Blvd

Projected 2022 without improvements  
PM Peak Hour  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total Veh/h	HV %	Deg. Satn W/C	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Distance Queued ft	Pop. per veh	Effective Stop Rate per veh	Average Speed mph
South: NB New Market St											
3	L2	22	0.0	0.043	13.5	LOS B	0.2	4.1	0.60	0.78	34.8
8	T1	5	0.0	0.043	6.4	LOS A	0.2	4.1	0.60	0.78	34.3
18	R2	65	0.0	0.073	5.8	LOS A	0.3	7.6	0.58	0.67	35.9
Approach											
		92	0.0	0.073	7.6	LOS A	0.3	7.6	0.59	0.71	35.5
East: WB Turnwater Blvd											
1	L2	65	2.0	0.316	10.7	LOS B	2.1	52.3	0.28	0.41	38.1
6	T1	815	2.0	0.316	3.5	LOS A	2.1	52.9	0.27	0.37	38.0
16	R2	27	2.0	0.316	3.9	LOS A	2.1	52.9	0.26	0.35	36.7
Approach											
		908	2.0	0.316	4.1	LOS A	2.1	52.9	0.27	0.38	38.0
North: SB New Market St											
7	L2	60	4.0	0.118	13.4	LOS B	0.4	11.4	0.58	0.80	34.9
4	T1	22	4.0	0.118	6.3	LOS A	0.4	11.4	0.58	0.80	34.6
14	R2	147	4.0	0.163	5.9	LOS A	0.7	17.0	0.57	0.69	35.8
Approach											
		228	4.0	0.163	7.9	LOS A	0.7	17.0	0.57	0.73	35.5
West: EB Turnwater Blvd											
5	L2	49	4.0	0.360	11.2	LOS B	2.4	62.6	0.41	0.44	37.7
2	T1	875	4.0	0.360	4.0	LOS A	2.5	63.9	0.40	0.41	37.5
12	R2	27	4.0	0.360	4.4	LOS A	2.5	63.9	0.39	0.39	36.1
Approach											
		951	4.0	0.360	4.4	LOS A	2.5	63.9	0.40	0.41	37.5
All Vehicles											
		2179	3.0	0.360	4.7	LOS A	2.5	63.9	0.37	0.44	37.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).  
Roundabout LOS Method: Same as Signalised Intersections.  
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).  
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).  
Roundabout Capacity Model: SIDRA Standard.  
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.  
Gap-Acceptance Capacity: SIDRA Standard (Akceik, MSD).  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akceik and Associates Pty Ltd | sidrasolutions.com  
Organisation: SCJ ALLIANCE | Processed: Wednesday, June 8, 2016 9:37:07 AM  
Project: N:\projects\0625\_City of Turnwater\0625\_17 Turnwater Transportation Master Plan\Traffic\Operations\sidra\_2022 Baseline Existing 2022 PM.spe

## Lanes, Volumes, Timings

Projected 2022 without improvements  
PM Peak Hour

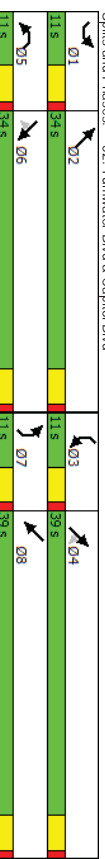
### 52: Turnwater Blvd & Capitol Blvd

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	MER	SWL	SWT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	120	475	175	200	305	20	90	325	245	85	340
Future Volume (vph)	120	475	175	200	305	20	90	325	245	85	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	0	275	1900	1900	1900	1900
Storage Length (ft)	250	0	200	0	200	0	275	0	200	0	200
Storage Lanes	1	1	1	2	2	0	1	1	1	1	1
Taper Length (ft)	25			25			25			25	
Right Turn on Red			Yes			Yes			Yes		Yes
Link Speed (mph)		50			50			30			30
Link Distance (ft)		934			3620			2404			1729
Travel Time (s)		12.7			49.4			54.6			39.3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)	Prot	NA	Perm	Prot	NA	Prot	NA	Perm	Prot	NA	Prot
Turn Type	1	6	6	5	2	7	7	4	4	3	8
Permitted Phases											
Detector Phase	1	6	6	5	2	7	7	4	4	3	8
Switch Phase											
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	11.0	34.0	34.0	11.0	34.0	11.0	39.0	39.0	11.0	39.0	39.0
Total Split (s)	11.0	34.0	34.0	11.0	34.0	11.0	39.0	39.0	11.0	39.0	39.0
Total Split (%)	11.6%	35.8%	35.8%	11.6%	35.8%	11.6%	41.1%	41.1%	11.6%	41.1%	41.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimizer?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	Max	None	Max	None	None	None	None	None	None

#### Intersection Summary

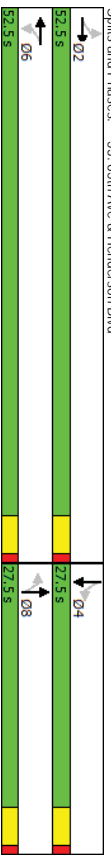
Area Type:	Other
Cycle Length: 95	
Actuated Cycle Length: 83.7	
Natural Cycle: 95	
Control Type: Actuated-Uncoordinated	

#### Spills and Phases: 52: Turnwater Blvd & Capitol Blvd



Movement	SEL	SET	SER	NWL	NWT	NWR	NEI	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	120	475	175	200	305	20	90	325	245	85	340	15
Future Volume (veh/h)	120	475	175	200	305	20	90	325	245	85	340	15
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Q0), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped. Bike Adj./A-ph7	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Sat. Flow, veh/hln	1845	1845	1845	1881	1881	1900	1881	1881	1881	1881	1900	1900
Adj. Flow Rate, veh/h	133	528	116	222	339	22	100	361	33	94	378	17
Adj. No. of Lanes	1	1	1	2	2	0	1	1	1	1	2	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh. %	3	3	3	1	1	1	1	1	1	1	1	1
Cap. veh/h	130	658	559	257	1216	79	128	482	410	120	879	39
Arrive On Green	0.07	0.36	0.36	0.07	0.36	0.36	0.07	0.26	0.26	0.07	0.25	0.25
Sat. Flow, veh/h	1757	1845	1568	3476	3409	220	1792	1881	1599	1792	3484	156
Grp Volume (V), veh/hln	133	528	116	222	177	184	100	361	33	94	193	202
Grp Sat. Flow(s), veh/hln	1757	1845	1568	1738	1787	1842	1792	1881	1599	1792	1877	1854
Q Serve (s), s	6.0	21.0	4.2	5.1	5.7	5.8	4.5	14.4	1.3	4.2	7.4	7.4
Cycle Q Clear (q,c), s	1.00	1.00	1.00	1.00	1.12	1.00	1.00	1.00	1.00	1.00	1.00	0.08
Prop In Lane	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Grp Cap(c), veh/h	130	658	559	257	638	657	128	482	410	120	451	467
W/C Ratio(X)	1.03	0.80	0.21	0.87	0.28	0.28	0.78	0.75	0.08	0.78	0.43	0.43
Avail Cap(c), veh/h	130	658	559	257	638	657	128	482	410	120	451	467
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.6	23.6	18.2	37.2	18.7	18.7	37.1	27.8	23.0	37.3	25.5	25.5
Incr Delay (d2), s/veh	86.0	10.0	0.8	25.1	1.1	1.1	22.9	2.4	0.1	20.7	0.6	0.6
Initial Q Delay (d1), s/veh	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(.50%), veh/hln	6.0	12.4	1.9	3.4	3.0	3.1	3.0	7.7	0.6	2.8	3.7	3.9
LnGrp Delay(d), s/veh	124.0	33.5	19.0	62.4	19.7	19.7	60.0	30.2	23.0	58.0	26.1	26.1
LnGrp LOS	F	C	B	E	B	B	E	C	C	E	C	C
Approach Vol, veh/h	777	777		583		494		489		489		
Approach Delay, s/veh	46.8	46.8		36.0		35.7		32.3		32.3		
Approach LOS	D	D		D		D		C		C		
Timer	1	2	3	4	5	6	7	8				
Assigned PIs	1	2	3	4	5	6	7	8				
PIs Duration (G+Y+R), s	11.0	34.0	10.5	25.8	11.0	34.0	10.8	25.5				
Change Period (Y+R), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Sdling (Gmax), s	6.0	29.0	6.0	34.0	6.0	29.0	6.0	34.0				
Max Q Clear Time (QcH1), s	8.0	7.8	6.2	16.4	7.1	23.0	6.5	9.4				
Green Ext Time (QcC), s	0.0	6.5	0.0	4.5	0.0	3.1	0.0	5.0				
Intersection Summary	<p>HCM 2010 C/H Delay 388</p> <p>HCM 2010 LOS D</p>											

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	870	70	80	565	5	35	0	55	5	0	2
Future Volume (vph)	5	870	70	80	565	5	35	0	55	5	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100	0	0	150	0	0	0	0	0	0	0	0
Storage Lanes	1	0	0	1	0	0	0	0	0	0	0	0
Storage Length (ft)	25	0	0	25	0	0	0	0	0	0	0	0
Taper Length (ft)												
Right Turn on Red	Yes											
Link Speed (mph)	30	30		30		30		30		30		30
Link Distance (ft)	2111	480		1760		704		160		80		354
Travel Time (s)	48.0	48.0		40.0		8.0		8.0		8.0		8.0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Turn Type	Perm											
Protected Phases	2											
Permitted Phases	2											
Detector Phase	2											
Switch Phase	6											
Minimum Initial (s)	8.0											
Minimum Spill (s)	27.5											
Total Spill (s)	52.5											
Total Split (%)	65.6%											
Yellow Time (s)	3.5											
All-Red Time (s)	1.0											
Lost Time Adjust (s)	0.0											
Total Lost Time (s)	4.5											
Lead-Lag Optimizer?	No											
Recall Mode	Max											
Intersection Summary	<p>Area Type: Other</p> <p>Cycle Length: 80</p> <p>Activated Cycle Length: 71.9</p> <p>Natural Cycle: 90</p> <p>Control Type: Actuated-Uncoordinated</p>											



HCM 2010 Signalized Intersection Summary  
53: 65th Ave & Henderson Blvd

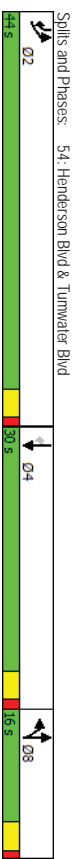
Projected 2022 without improvements  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (veh/h)	5	870	70	80	565	5	35	0	55	5	0	2
Future Volume (veh/h)	5	870	70	80	565	5	35	0	55	5	0	2
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1881	1900	1881	1881	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	5	956	77	88	621	5	38	0	60	5	0	2
Adj No of Lanes	1	1	0	1	1	0	0	1	0	0	1	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh. %	1	1	1	1	1	1	1	1	1	1	1	1
Arrive On Green	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Sat Flow, veh/h	804	1718	138	549	1864	15	469	143	966	1026	151	471
Grp Volume(V), veh/hln	5	0	1033	88	0	626	98	0	7	0	0	0
Grp Sat Flow(s), veh/hln	804	0	1857	549	0	1879	1519	0	0	1647	0	0
Q Serve(g.s), s	0.1	0.0	19.8	6.8	0.0	7.9	2.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g.c), s	8.0	0.0	19.8	26.5	0.0	7.9	3.7	0.0	0.0	0.2	0.0	0.0
Prop In Lane	1.00	0.07	1.00	0.07	1.00	0.01	0.39	0.01	0.61	0.71	0.0	0.29
Lane Grp Cap(c), veh/h	619	0	1398	356	0	1414	246	0	271	0	0	0.00
W/C Ratio(X)	0.01	0.00	0.74	0.25	0.00	0.44	0.40	0.00	0.03	0.00	0.00	0.00
Avail Cap(c), veh/h	619	0	1398	356	0	1414	638	0	635	0	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.4	0.0	4.4	11.8	0.0	2.9	27.1	0.0	0.0	25.6	0.0	0.0
Incrt Delay (d2), s/veh	0.0	0.0	3.5	1.6	0.0	1.0	1.3	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/hln	0.0	0.0	11.1	1.2	0.0	4.4	1.7	0.0	0.1	0.1	0.0	0.0
Lngrp Delay(d), s/veh	4.4	0.0	7.9	13.4	0.0	3.9	28.4	0.0	0.0	25.6	0.0	0.0
Lngrp LOS	A	A	A	B	A	A	C	C	C	C	C	C
Approach Vol, veh/h		1038			714			98		7		
Approach Delay, s/veh		7.9			5.1			28.4		25.6		
Approach LOS		A			A			C		C		
Timer	1	2	3	4	5	6	7	8				
Assigned Pns		2		4		6		8				
Pns Duration (G+Y+R), s		52.5		11.3		52.5		11.3				
Change Period (Y+R), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		48.0		23.0		48.0		23.0				
Max Q Clear Time (G+CH1), s		21.8		2.2		28.5		5.7				
Green Ext Time (G_C), s		18.7		0.6		14.8		0.5				
<b>Intersection Summary</b>												
HCM 2010 CH Delay	8.0											
HCM 2010 LOS	A											

Lanes, Volumes, Timings  
54: Henderson Blvd & Turnwater Blvd

Projected 2022 without improvements  
PM Peak Hour

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	1	1	1	1	1	1
Traffic Volume (vph)	685	30	25	170	215	355
Future Volume (vph)	685	30	25	170	215	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	0	0	100
Storage Lanes	1	0	0	0	0	1
Taper Length (ft)	25			25		
Right Turn on Red			Yes			Yes
Link Speed (mph)	35			35		35
Link Distance (ft)	3122			2394		2111
Travel Time (s)	60.8			46.6		41.1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)						
Signal Lane Type	Prot		Split	NA	NA	pm+ov
Protected Phases	2		8	8	4	2
Permitted Phases						
Detector Phase	2		8	8	4	2
Switch Phase						
Minimum Initial (s)	6.0		6.0	6.0	6.0	6.0
Minimum Spill (s)	20.5		10.5	10.5	30.0	20.5
Total Spill (s)	44.0		16.0	16.0	30.0	44.0
Total Spill (%)	48.9%		17.8%	17.8%	33.3%	48.9%
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0		4.0	4.0	4.0	4.0
LeadLag						
Lead-Lag Optimize?						
Recall Mode	Max		None	None	Max	Max
<b>Intersection Summary</b>						
Area Type:	Other					
Cycle Length:	90					
Actuated Cycle Length:	90					
Natural Cycle:	90					
Control Type:	Actuated-Uncoordinated					



HCM 2010 Signalized Intersection Summary  
 54: Henderson Blvd & Turnwater Blvd

Projected 2022 without improvements  
 PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations	RT	LT	LT	LT	LT	LT		
Traffic Volume (veh/h)	685	30	25	170	215	355		
Future Volume (veh/h)	685	30	25	170	215	355		
Number	5	12	3	8	4	14		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped Bike Adj(A_pb7)	1.00	1.00	1.00	1.00	1.00	1.00		
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/hln	1881	1900	1900	1881	1881	1881		
Adj Flow Rate, veh/h	753	33	27	187	236	269		
Adj No of Lanes	0	0	0	1	1	1		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91		
Percent Heavy Veh. %	0	0	1	1	1	1		
Cap. veh/h	758	33	31	218	543	1173		
Arrive On Green	0.44	0.44	0.13	0.13	0.29	0.29		
Sat Flow, veh/h	1706	75	236	1634	1881	1599		
Gpr Volume(V), veh/h	787	0	214	0	236	269		
Gpr Sat Flow(s), veh/hln	1783	0	1869	0	1881	1599		
Q Serve(g,s), s	39.5	0.0	10.1	0.0	9.2	4.9		
Cycle Q Clear(g,c), s	39.5	0.0	10.1	0.0	9.2	4.9		
Prop In Lane	0.96	0.04	0.13	0.0	1.00	1.00		
Lane Gpr Cap(c), veh/h	792	0	249	0	543	1173		
V/C Ratio(X)	0.99	0.00	0.86	0.00	0.43	0.23		
Avail Cap(c), veh/h	792	0	249	0	543	1173		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(f)	1.00	0.00	1.00	0.00	1.00	1.00		
Uniform Delay (d), s/veh	24.9	0.0	38.2	0.0	26.0	3.8		
Incr Delay (d2), s/veh	30.4	0.0	24.9	0.0	2.5	0.5		
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackQ(50%), veh/h	25.9	0.0	6.9	0.0	5.2	5.8		
LnGpr Delay(d), s/veh	55.3	0.0	63.1	0.0	28.5	4.3		
LnGpr LOS	E		E		C	A		
Approach Vol, veh/h	787		214		505			
Approach Delay, s/veh	55.3		63.1		15.6			
Approach LOS	E		E		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs								
Phs Duration (G+Y+R), s		44.0		30.0			16.0	
Change Period (Y+R), s		4.0		4.0			4.0	
Max Green Setting (Gmax), s		40.0		26.0			12.0	
Max Q Clear Time (Q_c+I), s		41.5		11.2			12.1	
Green Ext Time (Q_c), s		0.0		2.4			0.0	
<b>Intersection Summary</b>								
HCM 2010 Ctrl Delay			43.1					
HCM 2010 LOS			D					
<b>Notes</b>								

HCM 2010 TWSC  
 55: Henderson Blvd & Trails End Dr

Projected 2022 without improvements  
 PM Peak Hour

Intersection	Int Delay, s/veh	4.3				
<b>Movement</b>						
Traffic Vol, veh/h	NWL	NWR	NET	NER	SWL	SWT
Future Vol, veh/h	60	55	160	95	125	145
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	0	-
Grade, %	0	-	-	-	-	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	0	1	1	1	1
Mmnt Flow	69	63	184	109	144	167
<b>Major/Minor</b>						
Conflicting Flow All	Minor1	Major1	Major2	Minor2	Minor1	Major2
Stage 1	693	239	0	0	293	0
Stage 2	454	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.11	-
Critical Hdwy Sig 1	5.4	-	-	-	-	-
Critical Hdwy Sig 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.209	-
Pln Cap-1 Maneuver	412	805	-	-	1274	-
Stage 1	805	-	-	-	-	-
Platoon blocked, %	64.4	-	-	-	-	-
Mov Cap-1 Maneuver	361	805	-	-	1274	-
Mov Cap-2 Maneuver	361	-	-	-	-	-
Stage 1	805	-	-	-	-	-
Stage 2	564	-	-	-	-	-
<b>Approach</b>						
HCM Control Delay, s	NW	NE	SW			
HCM LOS	15	0	3.8			
<b>Minor Lane/Major Mmnt</b>						
Capacity (veh/h)	NET	NER	NWL	SWL	SWT	
HCM Lane V/C Ratio	-	0.27	0.113	-	-	-
HCM Control Delay (s)	-	15	8.2	0	-	-
HCM Lane LOS	-	C	A	A	-	-
HCM 95th %ile Q(veh)	-	1.1	0.4	-	-	-
<b>Notes</b>						

Lanes, Volumes, Timings  
56: Litterock Rd & Black Hills School Drwy

Projected 2022 without improvements  
PM Peak Hour

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	5	10	10	205	450	55
Future Volume (vph)	5	10	10	205	450	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200	0	175			350
Storage Lanes	1		1			1
Taper Length (ft)	25		25			
Right Turn on Red			Yes			Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	1065			1067	3970	
Travel Time (s)	24.2			24.3	90.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	1%	1%	1%	1%
Shared Lane Traffic (%)						
Turn Type	Prot	Perm	pm+pl	NA	NA	Perm
Protected Phases	8		1	6	2	
Permitted Phases	8	8	6		2	2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	4.0	7.0	7.0	7.0
Minimum Spill (s)	21.5	21.5	8.5	24.5	27.5	27.5
Total Spill (s)	21.5	21.5	8.5	38.5	30.0	30.0
Total Spill (%)	35.8%	35.8%	14.2%	64.2%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Max	None	None
Area Type:	Other					
Cycle Length:	60					
Actuated Cycle Length:	53.7					
Natural Cycle:	60					
Control Type:	Actuated-Uncoordinated					

Spills and Phases: 56: Litterock Rd & Black Hills School Drwy



HCM 2010 Signalized Intersection Summary  
56: Litterock Rd & Black Hills School Drwy

Projected 2022 without improvements  
PM Peak Hour

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	5	10	10	205	450	55
Future Volume (veh/h)	5	10	10	205	450	55
Number	3	18	1	6	2	12
Initial Q (Ob.) veh	0	0	0	0	0	0
Ped Bike Adj(A_pb7)	1.00	1.00	1.00			1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1900	1900	1881	1881	1881	1881
Adj Flow Rate, veh/h	5	11	11	216	474	58
Adj No of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh. %	0	0	1	1	1	1
Cap. veh/h	51	46	656	1445	1233	1048
Arrive On Green	0.03	0.03	0.01	0.77	0.66	0.66
Sat Flow, veh/h	1810	1615	1792	1881	1881	1599
Gp Volume(v), veh/h	5	11	11	216	474	58
Gp Sat Flow(s), veh/hln	1810	1615	1792	1881	1881	1599
Q Serve(g.-s), s	0.1	0.3	0.1	1.3	5.1	0.6
Cycle Q Clear(g.-c), s	0.1	0.3	0.1	1.3	5.1	0.6
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	51	46	656	1445	1233	1048
V/C Ratio(X)	0.10	0.24	0.02	0.15	0.38	0.06
Avail Cap(C_a), veh/h	695	620	797	1445	1233	1048
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	210	210	2.4	1.3	3.5	2.7
Incr Delay (d2), s/veh	0.8	2.7	0.0	0.2	0.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%),veh/hln	0.1	0.2	0.0	0.7	2.7	0.2
LnGrp Delay(d),s/veh	218	23.7	2.4	1.6	3.8	2.8
LnGrp LOS	C	C	A	A	A	A
Approach Vol, veh/h	16		227	532		
Approach Delay, s/veh	23.1		1.6	3.6		
Approach LOS	C		A	A		
Timer	1	2	3	4	5	6
Assigned Pns	1	2				8
Pns Duration (G+Y+R), s	5.0	33.5				5.7
Change Period (Y+R), s	4.5	4.5				4.5
Max Green Setting (Gmax), s	4.0	25.5				17.0
Max O Clear Time (Q_c+I), s	2.1	7.1				2.3
Green Ext Time (p.c.), s	0.0	5.2				6.1
Green Ext Time (p.c.), s	0.0	5.2				6.1
Green Ext Time (p.c.), s	0.0	5.2				6.1
Green Ext Time (p.c.), s	0.0	5.2				6.1
Intersection Summary	HCM 2010 Cnt Delay 3.4					
HCM 2010 Cnt Delay	A					
HCM 2010 LOS	A					

HCM 2010 TWSC  
57: Center St & 76th Ave

Projected 2022 without improvements  
PM Peak Hour

Intersection											
Int Delay, s/veh	2.6										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Traffic Vol, veh/h	60	10	1	10	10	20	1	265	0	10	335
Future Vol, veh/h	60	10	1	10	10	20	1	265	0	10	335
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-
Storage Length	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0
Grade, %	-	0	-	-	0	-	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	11	11	11	1	1	1	3	3
Wmnt Flow	65	11	1	11	11	22	1	288	0	11	364

Major/Minor	Minor2	Minor1	Major1	Major2
Conflicting Flow All	739	722	410	728
Stage 1	432	432	-	290
Stage 2	307	290	-	438
Critical Hdwy Spt 1	7.13	6.53	6.23	7.21
Critical Hdwy Spt 2	6.13	5.53	-	6.21
Follow-up Hdwy	3.527	4.027	3.327	3.599
Platoon blocked, %	332	352	639	328
Stage 1	600	581	-	699
Stage 2	701	670	-	580
Mov Cap-1 Maneuver	311	347	639	316
Mov Cap-2 Maneuver	311	347	-	316
Stage 1	599	574	-	698
Stage 2	668	669	-	561

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.9	14	0	0.2
HCM LOS	C	B		

Minor Lane/Major Wmnt	NBL	NBT	NBR	EBL	WBL	SBL	SBT	SBR
Capacity (veh/h)	1109	-	-	318	442	1268	-	-
HCM Lane V/C Ratio	0.001	-	-	0.243	0.098	0.009	-	-
HCM Control Delay (s)	8.2	A	A	19.9	14	7.9	A	A
HCM Lane LOS	A	A	A	C	B	A	A	A
HCM 95th %ile Q(veh)	0	-	-	0.9	0.3	0	-	-

Lanes, Volumes, Timings  
58: Old Hwy 99 & Henderson Blvd

Projected 2022 without improvements  
PM Peak Hour

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	MER	SWL	SWT	SWR
Lane Configurations	Traffic Volume (vph)	110	865	10	2	540	115	15	5	150	5	60
Future Volume (vph)	110	865	10	2	540	115	15	5	150	5	60	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150	50	50	50	50	0	0	0	150	0	0	
Storage Lanes	1	1	1	1	1	0	0	0	1	0	0	
Taper Length (ft)	25	25	25	25	25	25	25	25	25	25	25	
Right Turn on Red	Link Speed (mph)	50	3620	Yes	50	1652	Yes	30	Yes	30	2274	
Link Distance (ft)	Travel Time (s)	49.4	49.4	22.5	22.5	22.5	9.4	9.4	0.87	0.87	0.87	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	3%	3%	1%	1%	1%	
Shared Lane Traffic (%)	Turn Type	pm+pl	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	
Protected Phases	1	6	6	2	2	2	4	4	4	8	8	
Permitted Phases	6	6	6	6	2	2	2	2	2	8	8	
Detector Phase	1	6	6	6	2	2	2	2	2	8	8	
Switch Phase	Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0	5.0	
Minimum Spill (s)	10.5	25.5	25.5	26.5	26.5	26.5	33.5	33.5	33.5	33.5	33.5	
Total Spill (s)	11.0	56.5	56.5	45.5	45.5	45.5	33.5	33.5	33.5	33.5	33.5	
Total Split (%)	12.2%	62.8%	62.8%	50.6%	50.6%	50.6%	37.2%	37.2%	37.2%	37.2%	37.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	None	None	None	None	None	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	Max	Max	Max	Max	Max	None	None	None	None	None	

Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 76.4	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	



### HCM 2010 Signalized Intersection Summary

Projected 2022 without improvements

PM Peak Hour

### HCM 2010 TWSC

Projected 2022 without improvements

PM Peak Hour

Movement	SEL	SET	SER	NWL	NWT	NWR	NET	NER	SWL	SWT	SWR
Lane Configurations											
Traffic Volume (veh/h)	110	865	10	2	540	115	15	5	150	5	60
Future Volume (veh/h)	110	865	10	2	540	115	15	5	150	5	60
Number	1	6	16	5	2	12	7	4	14	3	8
Initial Q (Q <sub>0</sub> ) veh	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj(A <sub>pbt</sub> )	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1881	1881	1881	1863	1900	1900	1845	1900	1881	1881	1900
Adj Flow Rate, veh/h	126	994	11	2	621	132	17	6	172	6	69
Adj No. of Lanes	1	1	1	1	1	0	1	0	1	1	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh. %	1	1	1	2	2	3	3	3	1	1	1
Cap. veh/h	399	1332	1132	313	846	180	162	56	36	312	18
Arrive On Green	0.06	0.71	0.71	0.57	0.57	0.57	0.14	0.14	0.14	0.14	0.14
Sat Flow, veh/h	1792	1881	1599	558	1490	317	922	405	260	1410	129
Grp Volume(V), veh/h	126	994	11	2	0	753	29	0	172	0	75
Grp Sat Flow(s), veh/hln	1792	1881	1599	558	0	1807	1267	0	1410	0	1618
Q Serve(Q <sub>s</sub> ), s	1.9	23.6	0.1	0.2	0.0	22.2	0.0	0.0	4.6	0.0	3.0
Cycle Q Clean(Q <sub>c</sub> ), s	1.9	23.6	0.1	0.2	0.0	22.2	3.0	0.0	7.7	0.0	3.0
Prop In Lane	1.00	1.00	1.00	1.00	0.18	0.59	0.21	1.00	1.00	0.92	0.92
Lane Grp Cap(c), veh/h	399	1332	1132	313	0	1026	254	0	312	0	225
Avg Relat(X)	0.32	0.75	0.01	0.01	0.00	0.73	0.11	0.00	0.55	0.00	0.33
Avail Cap(c), veh/h	422	1332	1132	313	0	1026	614	0	664	0	629
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.4	6.5	3.1	13.8	0.0	11.5	27.1	0.0	29.8	0.0	28.0
Incr Delay (d <sub>2</sub> ), s/veh	0.2	3.8	0.0	0.0	0.0	4.7	0.1	0.0	0.6	0.0	0.3
Initial Q Delay(d <sub>0</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), veh/h	1.0	13.3	0.1	0.0	0.0	12.2	0.5	0.0	3.3	0.0	1.4
LnGrp Delay(d <sub>g</sub> ), s/veh	9.6	10.3	3.1	13.9	0.0	16.2	27.2	0.0	30.3	0.0	28.3
LnGrp LOS	A	B	A	B	B	C	C	C	C	C	C
Approach Vol, veh/h	1131	755	29	29.7	247	29.7	29.7	29.7	29.7	29.7	29.7
Approach Delay, s/veh	10.2	16.2	C	C	C	C	C	C	C	C	C
Approach LOS	B	B	C	C	C	C	C	C	C	C	C
Timer	1	2	3	4	5	6	7	8			
Assigned Phs	1	2	4	5	6	7	8				
Phs Duration (G+Y+R <sub>0</sub> ), s	10.1	46.4	15.5	56.5	15.5	15.5					
Change Period (Y+R <sub>0</sub> ), s	5.5	5.5	5.5	5.5	5.5	5.5					
Max Green Setting (G <sub>max</sub> ), s	5.5	40.0	28.0	51.0	28.0	28.0					
Max Q Clear Time (Q <sub>chl</sub> ), s	3.9	24.2	5.0	25.6	9.7	9.7					
Green Ext Time (Q <sub>e</sub> ), s	0.0	10.2	0.4	13.9	0.4	0.4					
<b>Intersection Summary</b>											
HCM 2010 Crt Delay	14.7										
HCM 2010 LOS	B										

Int Delay, s/veh	2.4												
<b>Intersection</b>													
EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR	SWL	
1	1	10	15	0	115	115	915	0	1	460	15	15	
1	1	10	15	0	115	115	915	0	1	460	15	15	
0	0	0	0	0	0	0	0	0	0	0	0	0	
Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	
RT	RT	RT	RT	RT	RT	None	None	None	None	None	None	None	
Storage Length						300	250						
Vehicle in Median Storage, #													
Grade, %													
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mmnt. Flow	1	1	11	16	0	121	121	963	1	484	16	16	
<b>Major/Minor</b>													
Major1	Minor1					Minor2					Major1		Major2
1699	1707	963	1705	1699	492	500	0	0	963	0	0	0	
<b>Conflicting Flow All</b>													
Stage 1	1205	1205	494	494									
494	502		1211	1205									
<b>Stage 2</b>													
712	652	622	711	651	621	411							
612	552		611	551									
612	552		611	551									
3518	4018	3318	3509	4009	3309	2209							
<b>Poi Cap-1 Manuever</b>													
73	91	310	73	93	579	1069							
<b>Stage 1</b>													
225	257		559	548									
<b>Stage 2</b>													
557	542		224	258									
<b>Platoon blocked, %</b>													
53	81	310	64	82	579	1069							
<b>Mov Cap-1 Manuever</b>													
53	81		64	82									
200	228		496	547									
<b>Stage 1</b>													
440	541		191	229									
<b>Stage 2</b>													
<b>Approach</b>													
EB	WB						SE		NW				
25.4	20.5						1		0				
<b>HCM Control Delay, s</b>													
D													
<b>HCM LOS</b>													
D													
<b>Minor Lane/Minor Mmnt</b>													
NWL	NWT	NWR	EBL	EBT	EBR	SEL	SET	SER					
719	-	-	189	64	579	1069	-	-					
<b>Capacity (veh/h)</b>													
0.001	-	-	0.067	0.247	0.209	0.113	-	-					
<b>HCM Lane V/C Ratio</b>													
10	0	-	25.4	78.8	12.9	8.8	-	-					
<b>HCM Lane Delay (s)</b>													
B	A	-	D	F	B	A	-	-					
<b>HCM Lane LOS</b>													
0	-	-	0.2	0.9	0.8	0.4	-	-					
<b>HCM 95th Xile (Q<sub>veh</sub>)</b>													
0	-	-	0.2	0.9	0.8	0.4	-	-					



HCM 2010 TWSC  
60: Kimmie St & 83rd Ave  
Projected 2022 without improvements  
PM Peak Hour

Intersection						
Int Delay, s/veh	2.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	45	15	40	15	5	115
Future Vol, veh/h	45	15	40	15	5	115
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	3	3	9	9	3	3
Mvmt Flow	55	18	49	18	6	140

Major/Minor	Minor1	Major1	Major2	Minor2
Conflicting Flow All	210	58	0	67
Stage 1	58	-	-	-
Stage 2	152	-	-	-
Critical Hdwy	6.43	6.23	-	4.13
Critical Hdwy Sig 1	5.43	-	-	-
Critical Hdwy Sig 2	5.43	-	-	-
Follow-up Hdwy	3.527	3.327	-	2.227
Plat Cap-1 Maneuver	776	1005	-	1528
Stage 1	962	-	-	-
Stage 2	874	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	773	1005	-	1528
Mov Cap-2 Maneuver	773	-	-	-
Stage 1	962	-	-	-
Stage 2	871	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.8	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR/WBL	SBL	SBT
Capacity (veh/h)	-	820	1528	-
HCM Lane V/C Ratio	-	0.089	0.004	-
HCM Control Delay (s)	-	9.8	7.4	0
HCM Lane LOS	-	A	A	A
HCM 95th %ile Q(veh)	-	0.3	0	-

HCM 2010 TWSC  
61: 83rd Ave & Center St  
Projected 2022 without improvements  
PM Peak Hour

Intersection						
Int Delay, s/veh	8.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol, veh/h	70	20	10	110	200	75
Future Vol, veh/h	70	20	10	110	200	75
Conflicting Peds. #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	1	1	3	3	1	1
Mvmt Flow	80	23	11	125	227	85

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	136	0	256
Stage 1	-	-	74
Stage 2	-	-	182
Critical Hdwy	4.11	-	6.41
Critical Hdwy Sig 1	-	-	5.41
Critical Hdwy Sig 2	-	-	5.41
Follow-up Hdwy	2.209	-	3.509
Plat Cap-1 Maneuver	1454	-	735
Stage 1	-	-	951
Stage 2	-	-	852
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1454	-	694
Mov Cap-2 Maneuver	-	-	694
Stage 1	-	-	951
Stage 2	-	-	804

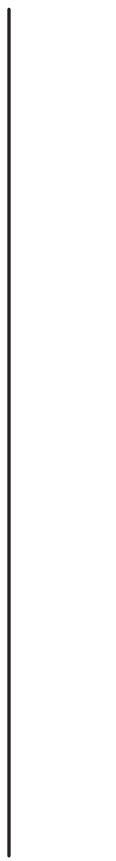
Approach	EB	WB	SB
HCM Control Delay, s	5.9	0	13.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBL	SBR
Capacity (veh/h)	1454	-	-	-	756	-
HCM Lane V/C Ratio	0.055	-	-	0.413	-	-
HCM Control Delay (s)	7.6	0	-	13.1	-	-
HCM Lane LOS	A	A	-	-	B	-
HCM 95th %ile Q(veh)	0.2	-	-	-	2	-

Lanes, Volumes, Timings  
 62: 88th Ave & Old Hwy 99

Projected 2022 without improvements  
 PM Peak Hour

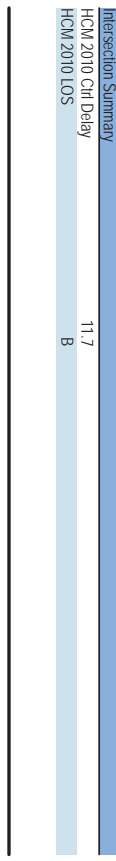
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	785	220	10	310	0	205	10	25	2	5	1
Future Volume (vph)	0	785	220	10	310	0	205	10	25	2	5	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100	150	150	150	150	0	150	0	0	0	0	0
Storage Lanes	1	1	1	1	1	0	1	0	0	0	0	0
Taper Length (ft)	25			25			25			25		
Right Turn on Red					Yes			Yes		Yes		
Link Speed (mph)	50				50			30		30		
Link Distance (ft)	3849				1410			1160		265		
Travel Time (s)	52.5				19.2			26.4		6.0		
Peak Hour Factor	0.92	0.90	0.90	0.90	0.90	0.92	0.90	0.92	0.90	0.92	0.92	0.92
Heavy Vehicles (%)	2%	1%	1%	1%	1%	2%	3%	2%	3%	2%	2%	2%
Shield Lane Traffic (%)												
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	6	6	6	2	2	2	4	4	4	8	8	8
Permitted Phases	6	6	6	2	2	2	4	4	4	8	8	8
Detector Phase	6	6	6	2	2	2	4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Spill (s)	26.0	26.0	26.0	26.0	26.0	26.0	24.0	24.0	26.0	26.0	26.0	26.0
Total Spill (s)	34.0	34.0	34.0	34.0	34.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
Total Spill (%)	56.7%	56.7%	56.7%	56.7%	56.7%	43.3%	43.3%	43.3%	43.3%	43.3%	43.3%	43.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead-Lag Optimize?												
Recall Mode	Max	Max	Max	Max	Max	Max	None	None	None	None	None	None
Area Type:	Other											
Cycle Length:	60											
Actuated Cycle Length:	56.1											
Natural Cycle:	65											
Control Type:	Actuated-Uncoordinated											



HCM 2010 Signalized Intersection Summary  
 62: 88th Ave & Old Hwy 99

Projected 2022 without improvements  
 PM Peak Hour

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	0	785	220	10	310	0	205	10	25	2	5	1
Future Volume (veh/h)	0	785	220	10	310	0	205	10	25	2	5	1
Number	1	6	16	5	2	12	7	4	14	3	8	18
Initial Q (Ob.) veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped Bike Adj./Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1883	1881	1881	1881	1881	1881	1845	1850	1900	1863	1900	1900
Adj Flow Rate, veh/h	0	872	244	11	344	0	228	11	28	2	5	1
Adj No of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor %	0.92	0.90	0.90	0.90	0.90	0.92	0.90	0.92	0.90	0.92	0.92	0.92
Percent Heavy Veh %	2	1	1	1	1	3	2	2	2	2	2	2
Arrive On Green	150	1100	935	265	1100	0	438	95	243	140	268	45
Cap. veh/h	0.00	0.58	0.58	0.58	0.58	0.00	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	1032	1881	1599	508	1881	0	1391	463	1179	225	1299	218
Gpr Volume(v), veh/h	0	872	244	11	344	0	228	0	39	8	0	0
Gpr Sat Flow(s), veh/hln	1032	1881	1599	508	1881	0	1391	0	1642	1742	0	0
Q Serve(s), s	0.0	17.2	3.6	0.8	4.4	0.0	7.2	0.0	0.9	0.0	0.0	0.0
Cycle Q Clear(g-c), s	0.0	17.2	3.6	18.0	4.4	0.0	7.4	0.0	0.9	0.2	0.0	0.0
Prop In Lane	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.72	0.25	0.12		
Lane Gpr Cap(c), veh/h	150	1100	935	265	1100	0	438	0	39	453	0	0
V/C Ratio(X)	0.00	0.79	0.26	0.04	0.31	0.00	0.52	0.00	0.12	0.02	0.00	0.00
Aval Cap(C-a), veh/h	150	1100	935	265	1100	0	791	0	754	877	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	7.7	4.9	14.7	5.0	0.0	18.0	0.0	15.4	15.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	5.9	0.7	0.3	0.7	0.0	1.0	0.0	0.1	0.0	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%),veh/hln	0.0	10.5	1.7	0.1	2.5	0.0	3.0	0.0	0.4	0.1	0.0	0.0
LnGrp Delay(d),s/veh	0.0	13.6	5.5	14.9	5.8	0.0	19.0	0.0	15.6	15.2	0.0	0.0
LnGrp LOS		B	A	B	A		B		B	B		
Approach Vol, veh/h		1116			355			267			8	
Approach Delay, s/veh		11.8			6.1			18.5			15.2	
Approach LOS		B			A			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Pns		2						8				
Pns Duration (G+Y+R), s		34.0			13.9			34.0			13.9	
Change Period (V+R), s		6.0			4.0			6.0			4.0	
Max Green Setting (Gmax), s		28.0			22.0			28.0			22.0	
Max O Clear Time (G+CH1), s		200			9.4			200			2.2	
Green Ext Time (P.C.), s		4.9			0.7			5.3			0.9	
Intersection Summary												
HCM 2010 Cnt Delay		11.7										
HCM 2010 LOS		B						B				

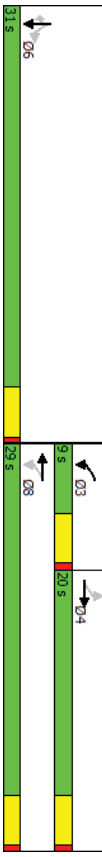


Lanes, Volumes, Timings  
63 : I-5 SB Ramps & 93rd Ave

Projected 2022 without improvements  
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	0	325	45	130	180	0	0	0	0	520	0	315
Traffic Volume (vph)	0	325	45	130	180	0	0	0	0	520	0	315
Future Volume (vph)	0	325	45	130	180	0	0	0	0	520	0	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	0	150	0	0	0	0	0	0	0	300
Storage Lanes	0	0	0	1	0	0	0	0	0	0	0	1
Taper Length (ft)	25	0	0	25	0	0	25	0	0	25	0	0
Right Turn on Red		Yes		Yes		Yes		Yes		Yes		Yes
Link Speed (mph)	30	30	30	40	40	30	30	30	30	30	30	30
Link Distance (ft)	1124	1124	1124	936	936	1099	1099	1099	1099	1644	1644	1644
Travel Time (s)	25.5	25.5	25.5	16.0	16.0	25.0	25.0	25.0	25.0	37.4	37.4	37.4
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	1%	1%	1%	9%	9%	0%	0%	0%	0%	4%	4%	4%
Shared Lane Traffic (%)												
Turn Type	Protected	Protected	Protected	pm+pt	Protected	Protected	Protected	Protected	Protected	Perm	Perm	Perm
Permitted Phases	4	4	4	8	8	8	8	8	8	6	6	6
Detector Phase	4	4	4	3	3	3	3	3	3	6	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Spill (s)	2.00	2.00	2.00	8.0	8.0	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Total Split (s)	20.0	20.0	20.0	9.0	29.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0
Total Spill (%)	33.3%	33.3%	33.3%	15.0%	48.3%	51.7%	51.7%	51.7%	51.7%	51.7%	51.7%	51.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	None	Max	Max	Max

Area Type: Other



HCM 2010 Signalized Intersection Summary  
63 : I-5 SB Ramps & 93rd Ave

Projected 2022 without improvements  
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	0	325	45	130	180	0	0	0	0	520	0	315
Traffic Volume (veh/h)	0	325	45	130	180	0	0	0	0	520	0	315
Future Volume (veh/h)	0	325	45	130	180	0	0	0	0	520	0	315
Number	7	4	14	3	8	18	1	6	16	0	0	0
Initial Q (Ob.) Veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped/Bike Adj(A_pbh)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1900	1881	1900	1743	1743	0	0	0	0	1827	1827	1827
Adj Flow Rate, veh/h	0	369	51	148	205	0	0	0	0	165	165	165
Adj No. of Lanes	0	1	1	1	1	0	0	0	0	1	1	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh. %	1	1	1	1	1	9	9	0	0	4	4	4
Cap. veh/h	0	420	58	297	716	0	0	0	0	791	0	706
Arrive On Green	0.00	0.26	0.26	0.08	0.41	0.00	0.00	0.00	0.00	0.45	0.00	0.45
Sat Flow, veh/h	0	1618	224	1660	1743	0	0	0	0	1740	0	1553
Gp Volume(v), veh/h	0	420	148	205	0	0	0	0	0	591	0	165
Gp Sat Flow(s), veh/hln	0	0	1882	1660	1743	0	0	0	0	1740	0	1553
Q Serve(g.-s), s	0.0	0.0	13.0	3.6	4.7	0.0	0.0	0.0	0.0	16.7	0.0	3.9
Cycle Q Clear(g.-c), s	0.0	0.0	13.0	3.6	4.7	0.0	0.0	0.0	0.0	16.7	0.0	3.9
Prop In Lane	0.00	0.00	0.12	1.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
Lane Gp Cap(c), veh/h	0	0	478	297	716	0	0	0	0	791	0	706
V/C Ratio(X)	0.00	0.00	0.88	0.50	0.29	0.00	0.00	0.00	0.00	0.75	0.00	0.23
Avail Cap(C-a), veh/h	0	0	496	297	734	0	0	0	0	791	0	706
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	0.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	21.1	14.9	11.7	0.0	0.0	0.0	0.0	13.4	0.0	9.9
Incr Delay (d2), s/veh	0.0	0.0	16.1	1.3	0.2	0.0	0.0	0.0	0.0	6.4	0.0	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackQ(50%), s/veh	0.0	0.0	8.7	1.8	2.3	0.0	0.0	0.0	0.0	9.3	0.0	1.8
LnGrp Delay(d), s/veh	0.0	0.0	37.2	16.2	11.9	0.0	0.0	0.0	0.0	19.8	0.0	10.7
LnGrp LOS			D	B	B					B		B
Approach Vol, veh/h		420			353					756		
Approach Delay, s/veh		37.2			13.7					17.8		
Approach LOS		D			B					B		
Timer	1	2	3	4	5	6	7	8				
Assigned Pks		3				8						
Pks Duration (G+Y+R), s		9.0				31.0				28.4		
Change Period (Y+R), s		4.0				4.0				4.0		
Max Green Setting (Gmax), s		5.0				27.0				25.0		
Max Q Clear Time (q-clear), s		5.6				18.7				6.7		
Green Ext Time (p-c), s		0.0				0.4				3.0		

HCM 2010 TWSC  
64: I-5 NB Ramps & 93rd Ave

Projected 2022 without improvements  
PM Peak Hour

Intersection												
Int Delay: s/veh 3.1												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	260	540	0	0	270	370	70	0	125	0	0	0
Future Vol, veh/h	260	540	0	0	270	370	70	0	125	0	0	0
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Yield	-	-	Yield	-	-	None
Storage Length	125	-	-	-	-	300	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	0
Grade, %	-	0	-	-	0	-	-	0	-	-	-	0
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	3	3	3	8	8	8	14	14	14	14	0	0
Mvmt Flow	277	574	0	0	287	394	74	0	133	0	0	0

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	287	0	1415	1415
Stage 1	-	-	1128	1128
Stage 2	-	-	287	287
Critical Hdwy	4.13	-	6.54	6.64
Critical Hdwy Sig 1	-	-	5.54	5.64
Critical Hdwy Sig 2	-	-	5.54	5.64
Follow-up Hdwy	2.227	-	3.626	4.126
Platoon blocked %	-	-	735	653
Mov Cap-1/Maneuver	1269	-	111	0
Mov Cap-2/Maneuver	-	-	111	0
Stage 1	-	-	229	0
Stage 2	-	-	735	0

Approach	EB	WB	NB
HCM Control Delay, s	2.8	0	14.4
HCM LOS	B	B	B

Minor Lane/Major Mvmt	NBL	EBL	EBT	WBL	WBR
Capacity (veh/h)	590	1269	-	-	-
HCM Lane V/C Ratio	0.352	0.218	-	-	-
HCM Control Delay (s)	14.4	8.6	-	-	-
HCM Lane LOS	B	A	-	-	-
HCM 95th %ile (Q)veh	1.6	0.8	-	-	-

HCM 2010 TWSC  
65: Kimmie St & 93rd Ave

Projected 2022 without improvements  
PM Peak Hour

Intersection												
Int Delay: s/veh 2.4												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	35	500	15	5	435	10	15	2	10	20	5	70
Future Vol, veh/h	35	500	15	5	435	10	15	2	10	20	5	70
Conflicting Peds. #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	0
Grade, %	-	0	-	-	0	-	-	0	-	-	-	0
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	4	4	4	1	1	1	0	0	0	0	0	0
Mvmt Flow	37	532	16	5	463	11	16	2	11	21	5	74

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	473	0	1133	1098
Stage 1	-	-	614	614
Stage 2	-	-	519	484
Critical Hdwy	4.14	-	7.1	6.5
Critical Hdwy Sig 1	-	-	6.1	5.5
Critical Hdwy Sig 2	-	-	6.1	5.5
Follow-up Hdwy	2.236	-	3.5	4
Platoon blocked %	-	-	483	486
Mov Cap-1/Maneuver	1079	-	182	215
Mov Cap-2/Maneuver	-	-	483	486
Stage 1	-	-	544	555
Stage 2	-	-	470	474

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.1	24.8	18.5
HCM LOS	C	C	C	C

Minor Lane/Major Mvmt	NBL	EBL	EBT	WBL	WBR	SBL	SBR
Capacity (veh/h)	210	1079	-	1027	-	367	-
HCM Lane V/C Ratio	0.137	0.035	-	0.005	-	0.275	-
HCM Control Delay (s)	24.8	8.5	0	8.5	0	18.5	-
HCM Lane LOS	C	A	A	A	A	C	-
HCM 95th %ile (Q)veh	0.5	0.1	-	0	-	1.1	-

HCM 2010 AWSC  
66: Case Rd & 93rd Ave

Projected 2022 without improvements  
PM Peak Hour

Intersection												
Intersection Delay, s/veh	42.9											
Intersection LOS	E											
Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NEU	NEL	NET	NER
Traffic Vol, veh/h	0	2	370	165	0	105	320	45	0	85	20	35
Future Vol, veh/h	0	2	370	165	0	105	320	45	0	85	20	35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	3	3	3	2	2	2	2	2	0	0	0
Mvmt Flow	0	2	402	179	0	114	348	49	0	92	22	38
Number of Lanes	0	0	1	0	0	0	1	1	0	0	1	0

Approach	EB	WB	NE
Opposing Approach	WB	EB	WB
Opposing Lanes	2	1	1
Conflicting Approach Left	SW	NE	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NE	SW	WB
Conflicting Lanes Right	1	1	2
HCM Control Delay	61	39.1	14.7
HCM LOS	F	E	B

Lane	NE/L1	EB/L1	WB/L1	WB/L2	SW/L1
Vol Left, %	61%	0%	25%	0%	65%
Vol Thru, %	14%	69%	75%	0%	34%
Vol Right, %	25%	31%	0%	100%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	140	537	425	45	146
LT Vol	85	2	105	0	95
Through Vol	20	370	320	0	50
RT Vol	35	165	0	45	1
Lane Flow Rate	152	584	462	49	159
Geometry Crp	2	5	7	7	2
Degree of Util(X)	0.331	0.995	0.883	0.082	0.351
Departure Headway (Hd)	7.824	6.139	6.98	6.137	7.952
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	461	584	522	587	454
Service Time	5.837	4.237	4.68	3.837	5.964
HCM Lane V/C Ratio	0.33	1	0.885	0.083	0.35
HCM Control Delay	14.7	61	42.2	9.4	15.2
HCM Lane LOS	B	F	E	A	C
HCM 95th-ile Q	1.4	14.5	9.8	0.3	1.6

HCM 2010 AWSC  
66: Case Rd & 93rd Ave

Projected 2022 without improvements  
PM Peak Hour

Intersection						
Intersection Delay, s/veh						
Intersection LOS						
Movement	SWU	SWL	SWT	SWR		
Traffic Vol, veh/h	0	95	50	1		
Future Vol, veh/h	0	95	50	1		
Peak Hour Factor	0.92	0.92	0.92	0.92		
Heavy Vehicles, %	2	1	1	1		
Mvmt Flow	0	103	54	1		
Number of Lanes	0	0	1	0		

Approach	SW
Opposing Approach	NE
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	2
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	15.2
HCM LOS	C

Lane	SW
Vol Left, %	
Vol Thru, %	
Vol Right, %	
Sign Control	
Traffic Vol by Lane	
LT Vol	
Through Vol	
RT Vol	
Lane Flow Rate	
Geometry Crp	
Degree of Util(X)	
Departure Headway (Hd)	
Convergence, Y/N	
Cap	
Service Time	
HCM Lane V/C Ratio	
HCM Control Delay	
HCM Lane LOS	
HCM 95th-ile Q	

HCM 2010 AWSC  
67: Tilley Rd (South) & 93rd Ave  
Projected 2022 without improvements  
PM Peak Hour

Intersection										
Intersection Delay, s/veh	24.6									
Intersection LOS	C									
Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR	
Traffic Vol, veh/h	0	305	190	0	100	315	0	145	70	
Future Vol, veh/h	0	305	190	0	100	315	0	145	70	
Peak Hour Factor	0.92	0.87	0.87	0.92	0.87	0.87	0.92	0.87	0.87	
Heavy Vehicles, %	2	3	3	2	2	2	2	1	1	
Mvmt Flow	0	351	218	0	115	362	0	167	80	
Number of Lanes	0	1	0	0	0	1	0	1	0	
Approach	EB			WB			NB			
Opposing Approach	WB			EB			NB			
Opposing Lanes	1			1			0			
Conflicting Approach Left	NB			NB			EB			
Conflicting Lanes Left	0			1			1			
Conflicting Approach Right	NB			1			WB			
Conflicting Lanes Right	1			0			1			
HCM Control Delay	29.6			23.7			14.6			
HCM LOS	D			C			B			
Lane	NBLn1	EBLn1	WBLn1	NBLn2	EBLn2	WBLn2	NBLn3	EBLn3	WBLn3	
Vol Left, %	67%	0%	24%							
Vol Thru, %	0%	62%	76%							
Vol Right, %	33%	38%	0%							
Sign Control	Stop	Stop	Stop							
Traffic Vol by Lane	215	495	415							
LT Vol	145	0	100							
Through Vol	0	305	315							
RT Vol	70	190	0							
Lane Flow Rate	247	569	417							
Geometry Crp	1	1	1							
Degree of Liltl (X)	0.442	0.836	0.748							
Departure Headway (Hd)	6.442	5.289	5.642							
Convergence, Y/N	Yes	Yes	Yes							
Cap	556	683	639							
Service Time	4.522	3.353	3.709							
HCM Lane V/C Ratio	0.444	0.833	0.746							
HCM Control Delay	14.6	29.6	23.7							
HCM Lane LOS	B	D	C							
HCM 95th-ile Q	2.2	9.2	6.7							

HCM 2010 TWSC  
68: 93rd Ave & Tilley Rd (North)  
Projected 2022 without improvements  
PM Peak Hour

Intersection										
Int Delay, s/veh	5.1									
Movement	EBL	EBT	WBT	WBR	SBL	SBR				
Traffic Vol, veh/h	110	260	175	20	35	240				
Future Vol, veh/h	110	260	175	20	35	240				
Conflicting Peds, #/hr	0	0	0	0	0	0				
Sign Control	Free	Free	Free	Free	Stop	Stop				
RT Channelized	-	None	-	None	-	None				
Storage Length	-	-	-	-	250	0				
Veh in Median Storage, #	-	0	0	0	0	0				
Grade, %	-	-	-	-	-	-				
Peak Hour Factor	86	86	86	86	86	86				
Heavy Vehicles, %	2	2	3	3	1	1				
Mvmt Flow	128	302	203	23	41	279				
Major/Minor	Major1	Major2	Minor2							
Conflicting Flow All	227	0	773	215						
Stage 1	-	-	215	558						
Stage 2	-	-	-	-						
Critical Hdwy	4.12	-	6.41	6.21						
Critical Hdwy Sig 1	-	-	5.41	-						
Critical Hdwy Sig 2	-	-	5.41	-						
Follow-up Hdwy	2.218	-	3.509	3.309						
Pl Cap-1 Maneuver	1341	-	369	827						
Stage 1	-	-	823	-						
Stage 2	-	-	575	-						
Platoon blocked, %	-	-	-	-						
Mov Cap-1 Maneuver	1341	-	327	827						
Mov Cap-2 Maneuver	-	-	327	-						
Stage 1	-	-	823	-						
Stage 2	-	-	509	-						
Approach	EB		WB		SB					
HCM Control Delay, s	2.4		0		12.4					
HCM LOS	B		B		B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2				
Capacity (veh/h)	1341	-	-	-	327	827				
HCM Lane V/C Ratio	0.095	-	-	-	0.124	0.337				
HCM Control Delay (s)	8	0	-	-	17.6	11.6				
HCM Lane LOS	A	A	-	-	C	B				
HCM 95th %ile Q(veh)	0.3	-	-	-	0.4	1.5				

Intersection  
Int Delay, s/veh 4

Movement	EBT	EBR	WBL	WBT	NEL	NER
Traffic Vol, veh/h	675	30	115	230	15	175
Future Vol, veh/h	675	30	115	230	15	175
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	None	None
Storage Length	-	450	-	300	-	300
Veh in Median Storage, #	0	-	-	0	2	-
Grade, %	0	-	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	1	2	2	1	1
Wmnt Flow	734	33	125	250	16	190

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	0	0	734	0
Stage 1	-	-	734	-
Stage 2	-	-	-	-
Critical Hdwy	-	-	500	-
Critical Hdwy, Sig 1	-	-	412	-
Critical Hdwy, Sig 2	-	-	641	-
Follow-up Hdwy	-	-	541	-
Pol Cap-1/Maneuver	-	-	2218	-
Stage 1	-	-	3509	-
Stage 2	-	-	871	-
Platoon blocked, %	-	-	196	-
Mov Cap-1/Maneuver	-	-	477	-
Mov Cap-2/Maneuver	-	-	611	-
Stage 1	-	-	871	-
Stage 2	-	-	168	-
Approach	EB	WB	NE	SE
HCM Control Delay, s	0	3.3	19.9	-
HCM LOS	C	C	C	-

Minor Lane/Major Wmnt	NEL1	NEL2	EBT	EBR	WBL	WBT
Capacity (veh/h)	368	422	-	-	871	-
HCM Lane V/C Ratio	0.044	0.451	-	-	0.144	-
HCM Control Delay (s)	15.2	20.3	-	-	9.8	-
HCM Lane LOS	C	C	-	-	A	-
HCM 95th %ile Q(veh)	0.1	2.3	-	-	0.5	-

## B. ANALYSIS OF NON-MOTORIZED NETWORK

This was prepared as background for the non-motorized network



# Tumwater Non-Motorized LOS Framework

The purpose of this white paper is to describe the draft Non-Motorized LOS Framework for the City of Tumwater as part of the Transportation Master Plan. This framework is intended to provide the structure, policies, and goals that would be associated with the Non-Motorized LOS standards. Specific details regarding non-motorized facility design standards are not the focus of this framework as those details should be identified in the City's street design standards or as part of a separate Non-Motorized Plan. However, examples of specific facility designs may be discussed to explain concepts. It is anticipated that text and concepts described in this white paper may be used in some manner in the Transportation Master Plan.

First the framework concepts and structure will be discussed, which define the terms being used in the Non-Motorized LOS Framework and highlight how different pieces of the policy fit together. Next the resulting framework for Non-Motorized LOS Standards is presented. Finally, a needs based assessment was conducted using the framework.

## 1. Concept and Structure for LOS Framework

The first important concepts are "Quality of Service" and "Level of Service" as defined below:

- **Quality of Service (QOS)** describes how well a facility operates from the traveler's perspective.
- **Level of Service (LOS)** is a quantitative stratification of one or more performance measures that represent quality of service.

For example, let us consider the traditional auto-based LOS framework. Drivers expect that a good transportation network means that they can *conveniently* get where they want to go. The QOS goal relates "convenience" to "congestion". A more technical performance metric for "congestion" is "vehicle delay". The traditional auto-based LOS system is stratified into six categories of "vehicle delay" ranging from A to F. Communities set LOS standards (A to F) according to what they consider an acceptable level of "congestion" (in other works, the LOS standard is meant to meet a QOS goal). If portions of the transportation network fall below acceptable LOS standards, then local agencies (and developers) build improvement projects to return the system to an acceptable level of "congestion" goal.

For non-motorized transportation systems, the QOS goals are broadened to capture different traveler expectations. Walkers and bicyclists expect that a good transportation network means that they can *comfortably* and *conveniently* get where they want to go. For vehicles the QOS goal relates to congestion, but for non-motorized transportation systems the QOS goal relates to the following:

- **Comfort.** Sense of safety, street conditions, or wayfinding
- **Completeness.** Continuity, extent, or duration
- **Connectivity.** Land use, route choice, or linkages
- **Convenience.** Distance, destinations, or choices

## Transportation Master Plan Network

The City of Tumwater Transportation Master Plan (or similar document) identifies the ultimate network of pedestrian and bicycle facilities throughout the City. A hierarchy of pedestrian routes and bicycle routes are developed based on route continuity, connectivity to community destinations, and convenient locations. Table 1 defines the hierarchy of the Master Plan, which includes Primary Routes and Secondary Routes. This hierarchy and Master Plan network addresses the QOS goals related to completeness, connectivity, and convenience.

**Table 1: Framework for the Transportation Master Plan Hierarchy of Pedestrian and Bicycle Routes**

Hierarchy Level	Description	Relationship to Street Functional Classification
<b>Primary Route</b>	Primary routes provide the backbone of the non-motorized system. They provide network continuity throughout the city and link to major community destinations. On these routes, the pedestrian and bicycle modes are considered <u>equal or higher priority</u> than vehicle travel modes. Multi-use pathways are typically primary routes.	Primary routes are typically along city arterials and collector streets because the street corridors provide the continuity and connectivity. However, primary routes may be on parallel streets or pathways if the available, especially if the arterial street is prioritized for auto travel.
<b>Secondary Route</b>	Secondary routes support the primary route network, but are not considered as critical. On these routes, the pedestrian and bicycle modes are considered <u>equal or lower priority</u> than vehicle travel modes.	Secondary routes are typically along city arterials and collector streets because the street corridors provide the continuity and connectivity. These are routes where non-motorized activity is expected but the street is prioritized for auto traffic modes or where primary route facilities are not needed and/or feasible.
<b>Other Streets or Paths</b>	These are anything not classified primary or secondary routes. These are other routes not considered critical for citywide plans and projects. Non-motorized facilities would be provided based on the City's design standards.	These are typically on local streets but may also be on arterials and collectors where non-motorized travel is not expected or desired.

The Transportation Master Plan identifies the low-stress pedestrian and bicycle facilities for the streets and pathways in the non-motorized system. For transportation professionals, “low-stress” or “traveler stress” is the more technical performance metric for “comfortable”. Traveler stress takes into account the facility design, vehicle volumes and speeds on adjacent streets, and topography. In addition, special

areas or districts may be identified for geographic areas to indicate where different levels of stress are acceptable.

The Non-Motorized LOS framework relies on a Transportation Master Plan that identifies the network, the facilities, and the areas to address the QOS goals.

### Project-Focused Outcomes

In practice, LOS standards are used by local governments to understand where transportation projects are needed. LOS standards reflect community QOS goals, and when the standards are not met, the community expects that improvement be made over time to bring the facility within standards. Table 2 illustrates how QOS, traveler expectations, and project identification relate.

As shown in Table 2, projects are expected in areas where the QOS is considered “POOR” because people cannot get to desirable destinations in a safe or convenient manner. “POOR” facilities would be the highest priority for project improvements and “ACCEPTABLE” facilities would be lower priority. “GOOD” facilities match the Master Plan expectations for the area.

**Table 2: Framework for Non-Motorized Quality of Service**

Quality of Service	Traveler Expectations	Project Identification
“GOOD”	People can safely, comfortably, and conveniently get where they want to go	“GOOD” a realistic goal for every primary non-motorized facility. No project is needed if traveler stress is low.
“ACCEPTABLE”	People can safely get where they want to go, but may not be comfortable or convenient.	“ACCEPTABLE” are facilities that are transitioning from “POOR” to “GOOD” and are lower priority areas for new project, in general.
“POOR”	People cannot safely or conveniently get where they want to go.	“POOR” represent major gaps in the primary routes and highlight the highest priorities for non-motorized projects, in general.

## 2. Framework for LOS Standard

The framework for the LOS standards needs both a table of LOS definitions, and the LOS standards that would be applied. Table 3 shows the LOS definitions, the quantitative stratification of the non-motorized performance metric “traveler stress”. The stratification of LOS can take a form of a letter grade (from A to F) but for Non-Motorized LOS it is can be simplified to Green, Yellow, or Red scale.

**Table 3: Level of Service Definitions**

Level of Service	Traveler Stress	Description
“GREEN”	Low	LOS GREEN reflects where traveler stress is low and meets community expectations for that area (complies with the Transportation Master Plan). Areas with higher traffic volumes and speeds typically require greater protection for the non-motorized modes.
“YELLOW”	Moderate	LOS YELLOW reflects where traveler stress is moderate and may or may not meet community expectations for that area. There are non-motorized facilities provided, but not enough to reach low-stress levels.
“RED”	High	LOS RED reflects where traveler stress is high and does not meet community expectations for that area. These are areas where non-motorized modes are not separated from higher volume and speed traffic.

The defined LOS Standards for the City of Tumwater would be segmented by geographic areas. The “Urban Corridor District” would have more rigid design standards, whereas the “Practical Design District” would have more flexible design standards.

The LOS Standards are set at:

- LOS GREEN for primary and secondary routes in the Urban Corridor District.
- LOS GREEN for primary routes in the Practical Design District
- LOS YELLOW for secondary routes in the Practical Design District

For facilities not classified as primary or secondary routes, there would be no set LOS Standard.

### Implementation and Development Review

Implementation of this framework would require further specific details surrounding stress levels: What are the traffic volume thresholds? What are the traffic speed thresholds? How much does the city want to account for topology? What type and design of facilities does the City want? We have provided a draft set of recommendations in Section 3 that could be incorporated into the Transportation Master Plan.

For Development Reviews the Non-Motorized LOS standard would apply to site frontages. For SEPA analysis, the most direct route between the development site to the nearest transit stop, school, and community center (within a certain distance) would be disclosed. These points would be identified by the City on an official map. If the route includes sections that fail the City’s LOS standard, the developer may be required to mitigate at the City’s discretion according to SEPA guidelines.

### City-Wide Monitoring and Concurrency

Concurrency may be monitored in a similar manner. Most communities use two types of concurrency programs. One is a planning-based program to understand if communities are progressing toward their goals and being concurrent with the associated growth. The other is a regulatory-based program that can limit future development if LOS standards along specific corridors are not being achieved. This framework follows a planning-based program approach that monitors completion of the non-motorized system citywide.

Regular monitoring of the Non-Motorized System on a City-wide basis would track metrics associated with percent complete as shown in Table 4. This could be tracked separately for pedestrian and bicycle systems, or combined. The “Existing Year” documents the current state of the network. The “Future Goal” is the Transportation Master Plan conditions that are constrained by the projects that are possible in the next 20 years. The “Study Year” would be the future year that would be evaluated to see if the Percent Complete results are on target to reach the “Future Goal.”

**Table 4: Monitoring the Non-Motorized System**

Mode	Hierarchy Level	Percent Complete (Centerline Miles at LOS GREEN and YELLOW)		
		Existing Year	Study Year <sup>1</sup>	Future Goal <sup>2</sup>
Pedestrian	Primary Route	33%	TBD	TBD
	Secondary Route	36%	TBD	TBD
Bicycle	Primary Route	45%	TBD	TBD
	Secondary Route	27%	TBD	TBD

<sup>1</sup> Study Year percentages to completed with final Transportation Element project list.

<sup>2</sup> Future Goal to be set evaluated and set at a later date.

### 3. Needs Analysis

This section highlights how the Non-Motorized LOS Framework was applied to existing conditions. Because the framework would benefit from information contained in a Non-Motorized Master Plan, some specific details about the City non-motorized system have been developed that are for discussion purposes only or may be refined into formalized definitions at a later date. The pedestrian and bicycle facilities that are present in Tumwater are first described, followed by an analysis of existing and future non-motorized needs.

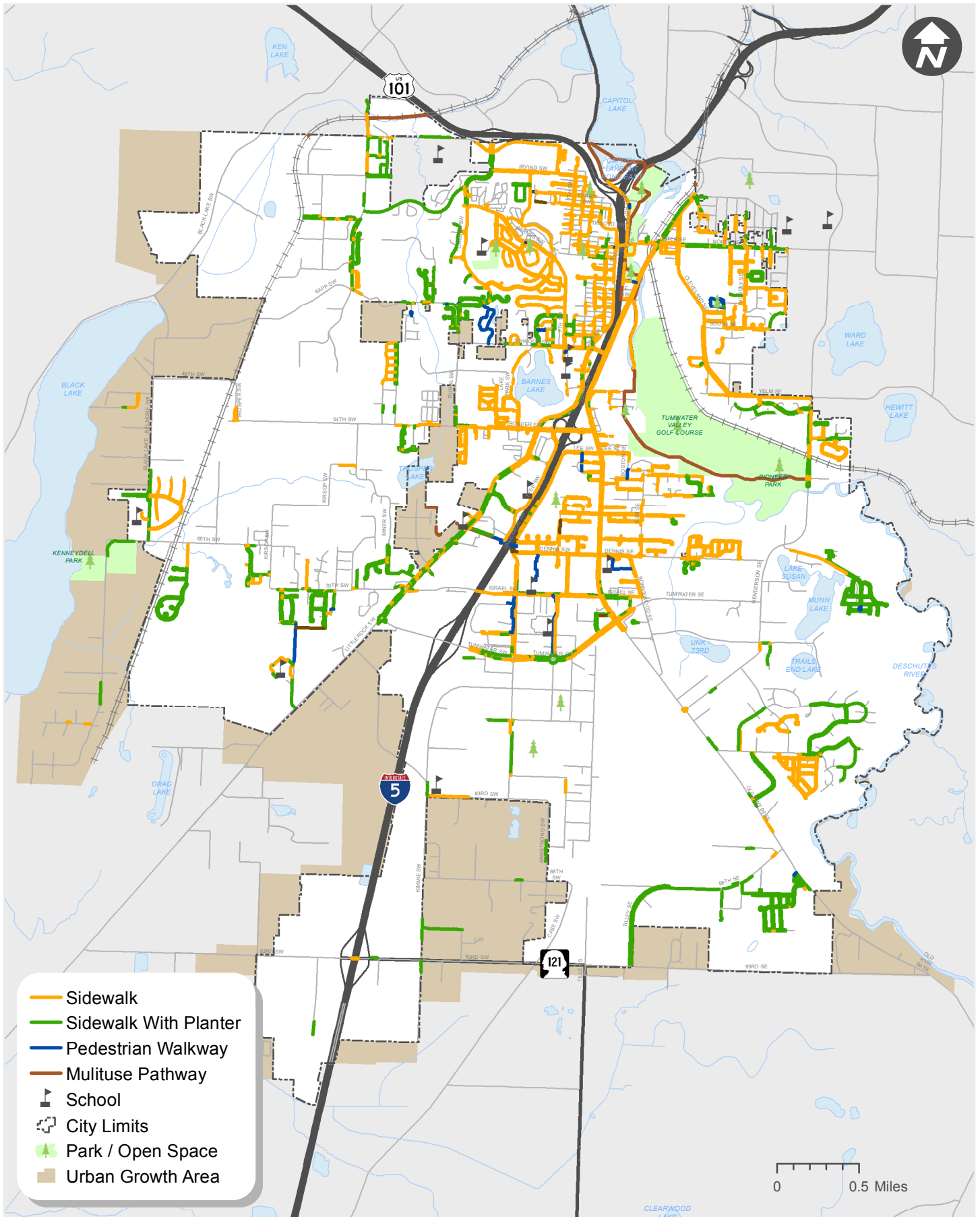
#### Pedestrian Facilities

Every trip begins or ends with walking. Walking promotes physical activity among residents and provides connections among destinations that include shopping areas, parking lots, and recreational trips within parks and open space. A combination of walkways, sidewalks, and off-street pathways provides the core network for pedestrians.

The following types of pedestrian facilities are present in the City of Tumwater:

- **Attached Sidewalks** are the primary pedestrian facility within downtowns and developed areas. Sidewalks are directly adjacent to the curb or roadway edge and vary in width and quality. They are generally 5 feet wide. There are currently over 65 miles of attached sidewalks in the City of Tumwater.
- **Buffered Sidewalks** (Sidewalks with Planters) include a landscaped area or buffer between the roadway and sidewalk. This buffer area may also include hardscape elements where landscape planters may not be feasible or desirable. These facilities provide additional separation from traveling or parked vehicles and are generally more comfortable for pedestrians. The sidewalks are generally 5 feet wide, with a buffer distance of 4 feet. There are approximately 37 miles of sidewalks with planters in the City limits.
- **Pedestrian Pathways** traverse open areas and are typically paved. Pedestrian walkways are short segments that are used to provide more direct connections between land uses and other types of pedestrian facilities. They are generally an 8-foot wide public space with 5-foot wide paved area. They are typically not designed for bicycle use. There are approximately 2.6 miles of pedestrian walkways in the City of Tumwater.
- **Multiuse Pathways** are longer connections that include paved and unpaved trails that are designed for both pedestrians and bicyclists. These facilities are generally used for recreational purposes, but may also serve commuter and utility travel between neighborhoods and to surrounding areas.

The existing pedestrian facilities in Tumwater are shown in Figure 1. Some cities consider wide shoulders to be pedestrian facilities as well.



# Existing Pedestrian Facilities Map

City of Tumwater Transportation Element

**DRAFT**

FIGURE



**1**

## Bicycle Facilities

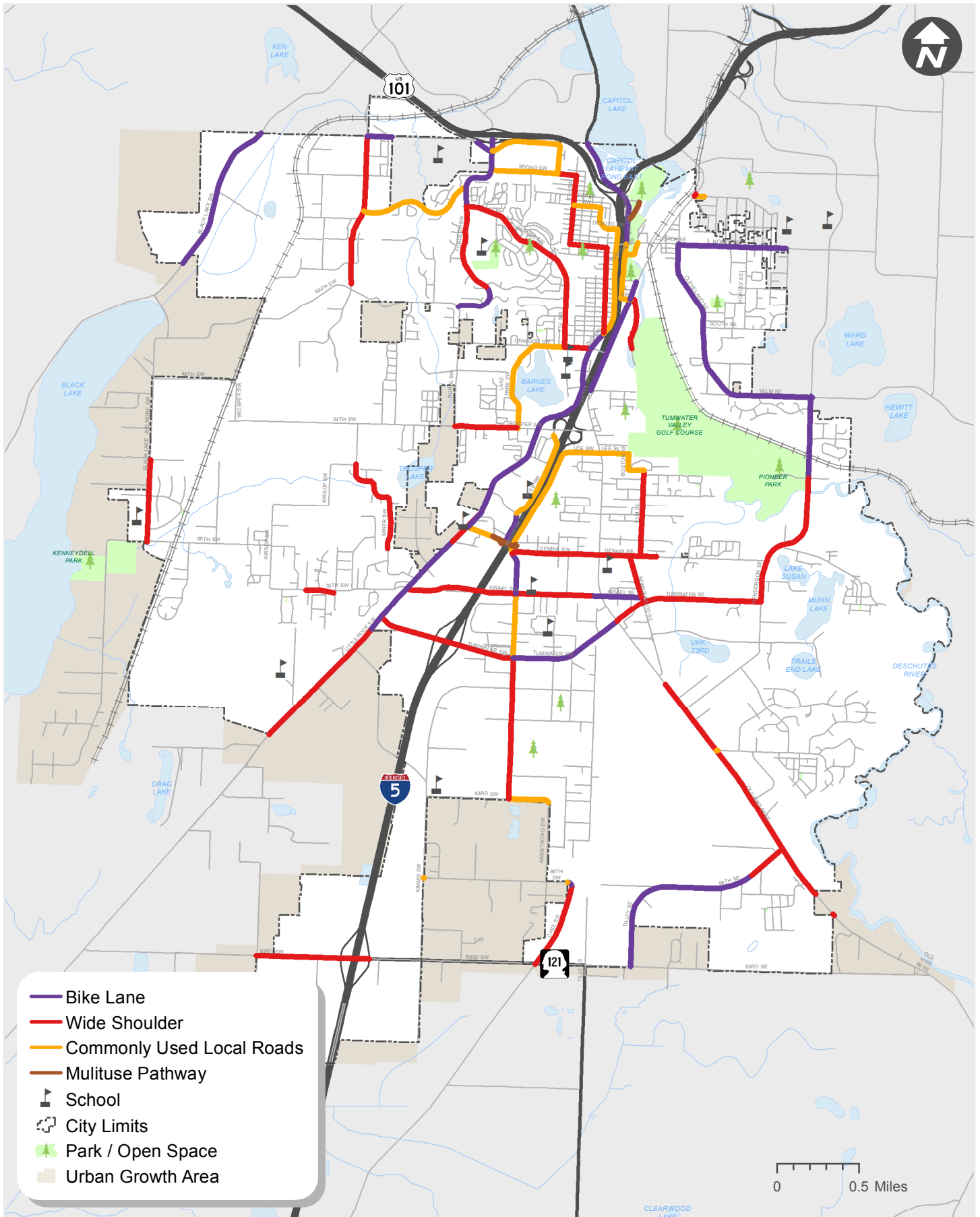
Bicycling is an important and growing mode of travel for people in cities across the country. When appropriately planned, bicycle facilities have a role in reducing congestion, improving air quality, providing travel choices, encouraging exercise and recreation, and providing greater mobility for those without access to a vehicle.

A combination of bicycle lanes, wide shoulders, quiet streets, and off-street pathways provide the core network for bicyclists to travel. The following types of bicycle facilities are present in the City of Tumwater:

- **Bicycle Lanes** are dedicated striped roadway space for cyclists that are typically in both directions on the edge of the traveled way. They are marked with a wide white stripe and range from 4 to 6 feet in width (widths are typically measured from the lane stripe to face of curb). The City has approximately 11 miles of bicycle lanes.
- **Wide Shoulders** are on the edge of the traveled way where there is a reasonable distance available for pedestrians and cyclists to travel with minor impact to motor vehicles. Wide shoulders mean striped shoulders with more than 4 feet width. Narrower shoulders often result in non-motorized users being forced into the vehicle travel lanes. Widths are typically measured from the lane stripe to face of curb, or if no curb to edge of pavement. There are approximately 15 miles of roadways with wide shoulders in the City limits.
- **Multiuse Pathways** are longer connections that include paved and unpaved trails that are designed for both pedestrians and bicyclists. These facilities are generally used for recreational purposes, but may also serve commuter and utility travel between neighborhoods and to surrounding areas.
- **Bike Routes** are low volume, low speed routes that may include shared lane markings or wayfinding signs for bicyclists, but are typically unmarked. These quiet streets that are commonly used by bicyclists comprise approximately 7 miles of the existing bicycle network.

The existing bicycle facilities in Tumwater are shown in Figure 2. Some cities are considering or have built the following bicycle facilities: bike boulevards (like bike routes, but with traffic calming elements); protected bike lanes (like bike lanes but physically separated from vehicle traffic); and specialized bicycle facilities at major intersections.





# Existing Bicycle Facilities Map

City of Tumwater Transportation Element

**DRAFT**

FIGURE



**2**

## Non-Motorized Network Hierarchy

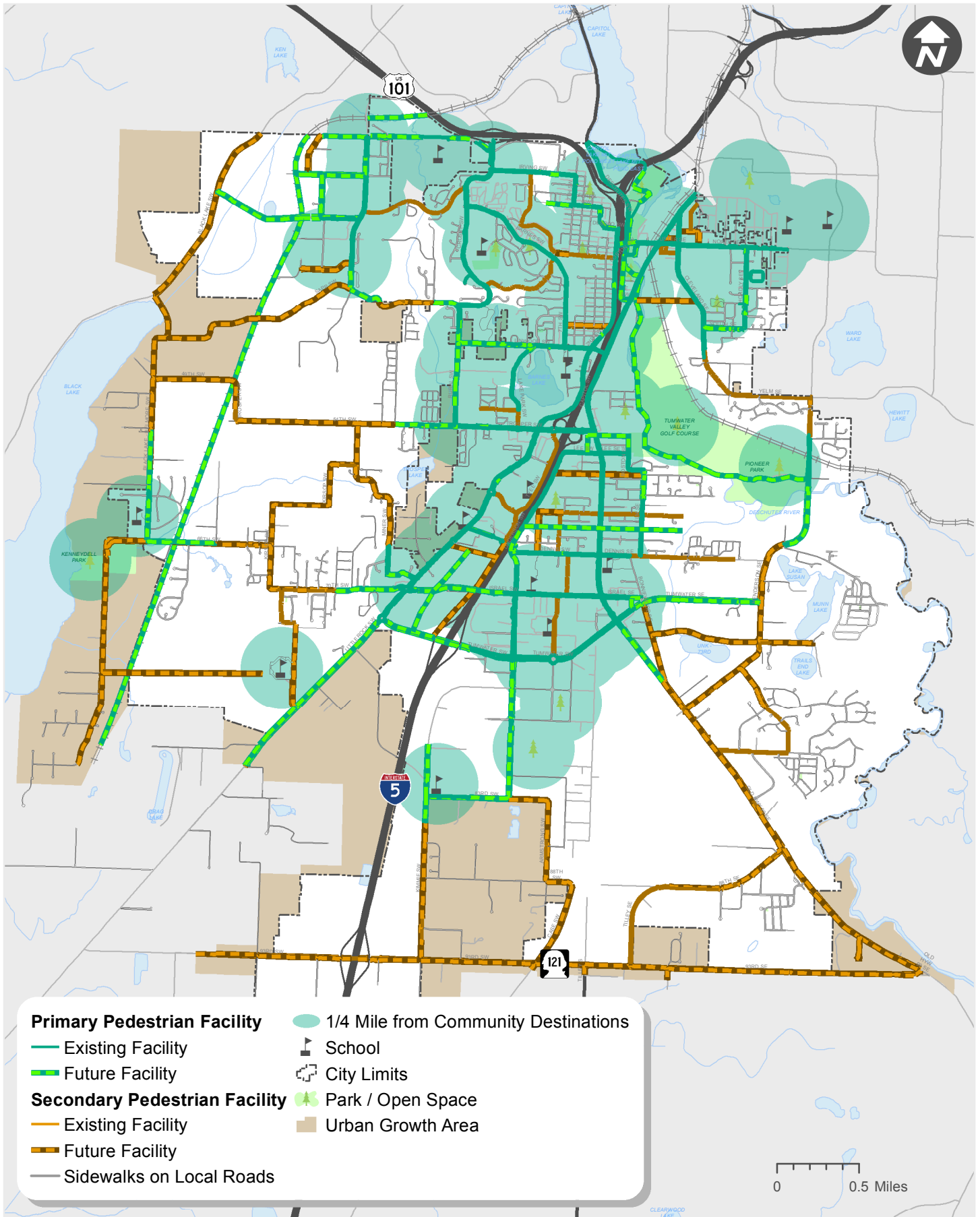
For the purposes of this sample existing analysis the primary and secondary routes were defined for the City of Tumwater network. They are defined separately for pedestrian and bicycle routes.

### Pedestrian System

Proximity to schools, transit stops, parks, and other destinations were used to identify priority areas for the pedestrian network. Primary and Secondary pedestrian routes were determined based on the following criteria:

- **Primary pedestrian routes** are sections of arterial and collector roadways that are within ¼ mile of community destinations (schools, parks, and transit stops) that are expected to serve a higher volume of pedestrians. Multiuse pathways are also primary pedestrian routes due to their importance for all non-motorized travelers. Other streets may be included to complete logical gaps in the system.
- **Secondary pedestrian routes** are sections of arterial and collector roadways that are within ¼ mile of community destinations (schools, parks, and transit stops) that are expected to serve a lower volume of pedestrians. Other streets may be included to complete logical gaps in the system.

Pedestrian facilities on Primary routes anticipate higher levels of pedestrian activity due to their proximity to community destinations that generate walking trips. Secondary routes do not have as much pedestrian activity but complete important gaps in the pedestrian network. The City of Tumwater pedestrian network map is shown in Figure 3.



# Pedestrian Network Map

City of Tumwater Transportation Element

**DRAFT**

FIGURE

**3**

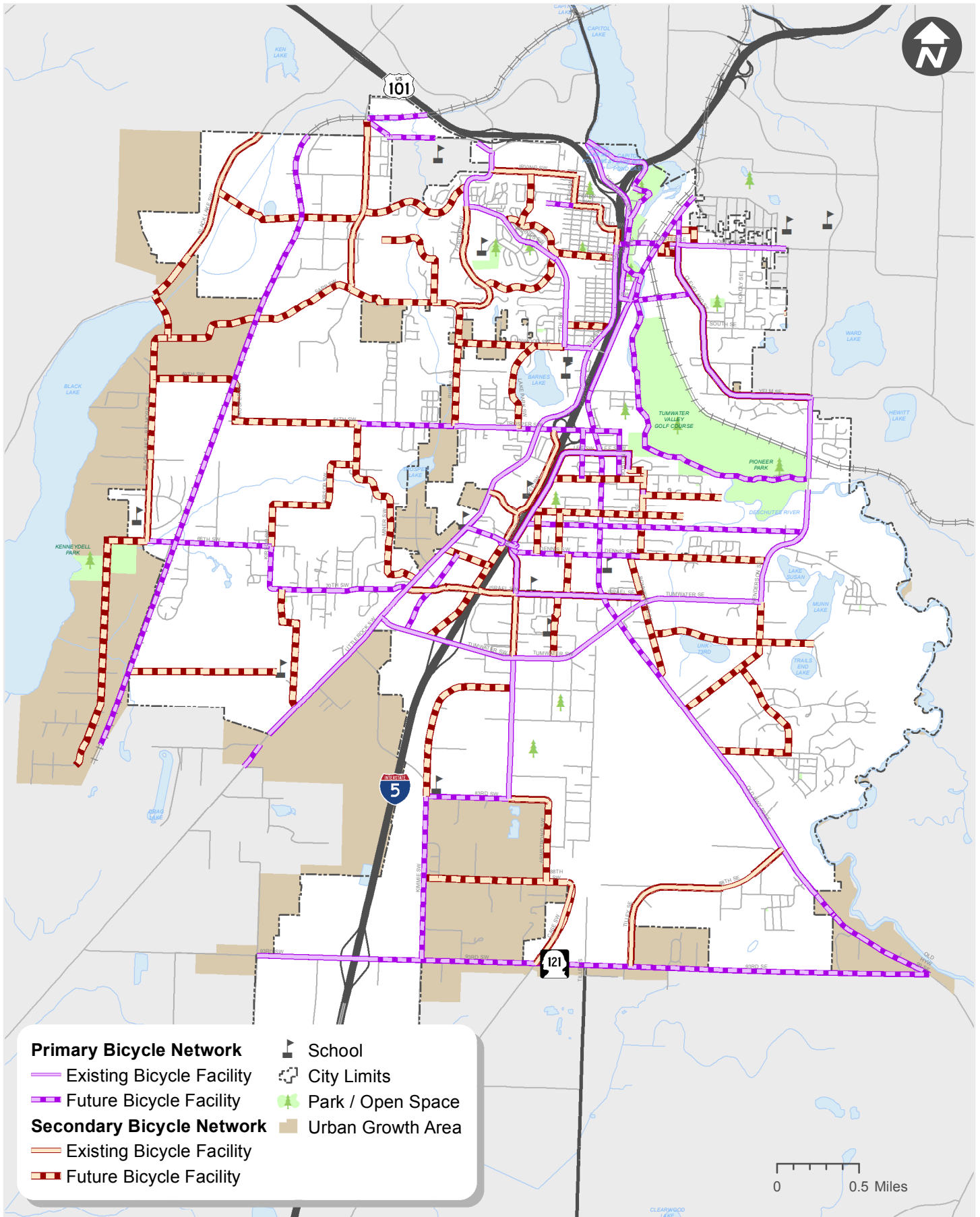


## Bicycle System

Bicycles are a network of primary and secondary bicycle streets that form a complete network, linking major bike destinations. The bicycle LOS includes look at the complete bike network considering both the bicycle corridors and the conflicts at major intersections and freeway interchanges.

- **Primary bicycle routes** connect community destinations through a backbone network of arterials, collector roadways, and local streets identified as bike routes. Multiuse pathways are also primary bicycle routes due to their importance for all non-motorized travelers.
- **Secondary bicycle routes** include other arterials, collector roadways, and local streets identified as bike routes that serve as connections between primary bicycle routes.

Primary and Secondary bicycle routes anticipate higher volumes and levels of bicycle activity. The City of Tumwater bicycle network map is shown in Figure 4.



# Bicycle Network Map

City of Tumwater Transportation Element

**DRAFT**

FIGURE



**4**

C. CAPITOL BOULEVARD CORRIDOR PLAN –  
TRANSPORTATION SUMMARY

Following are excerpts from the Capitol Boulevard Corridor Plan with particular relevance to this Transportation Master Plan. The complete plan and its implementing regulations can be found at

Transportation-related Goals and Objectives from the Capitol Boulevard Plan

Improve mobility for pedestrian, bicycle, bus, and automobile transportation.

- Incorporate a multi-modal strategy to make transportation safe and enjoyable for a range of users.
- Develop a multi-modal street network and supporting land uses that diffuse the dependency on Capitol Boulevard to meet the needs of all users at all times.
- Balance regional transportation needs, business access, and non-motorized circulation.
- Address safety of all users.
- Refine multi-modal street design standards to guide new street development that supports walkable communities.
- Consider a variety of measures to reduce excessive traffic speed on existing streets.

Improve pedestrian and bicycle environments.

- Create safe, universally accessible and comfortable walking and bicycling routes throughout the community, especially to schools.
- Improve the safety of existing crosswalks and intersections.
- Utilize urban design, landscaping, sidewalk art, and creative streetscape treatments to encourage walking.
- Connect residential areas to the Boulevard.

Enhance transit experience and efficiency.

- Enhance the transit experience by improving bus stops and the connections to them.
- Increase transit ridership in the central zone.

## Transportation Directives and Planning Principles

### Directives:

- Reduce congestion growth
- Provide for pedestrian and bicycle connectivity
- Improve neighborhoods
- Beautify corridor
- Mitigate new development impacts

### Principles:

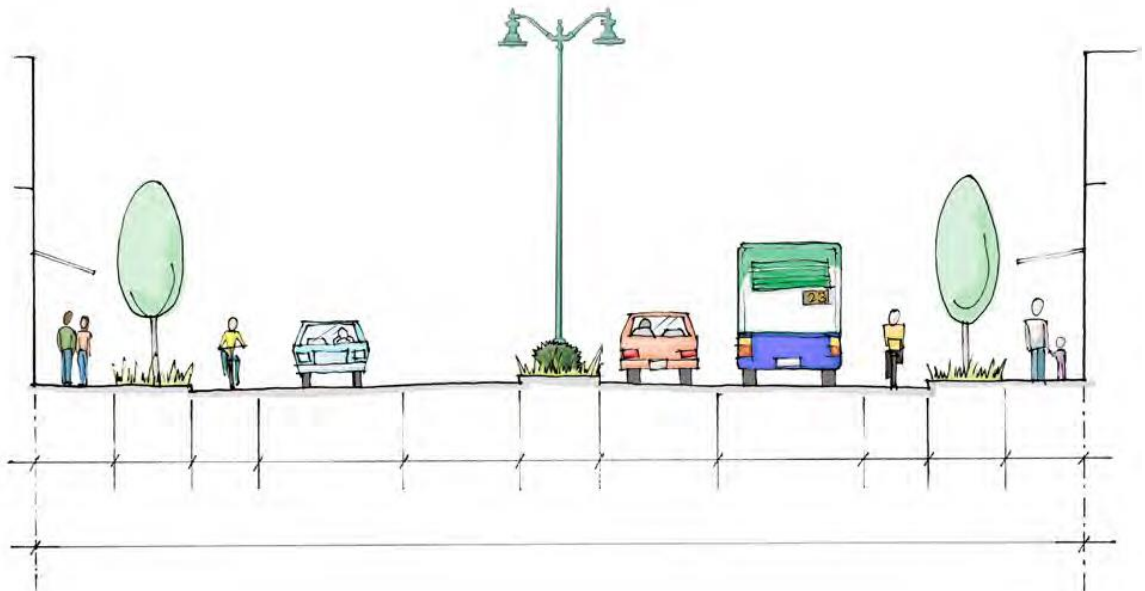
- Added travel lanes to quell congestion is neither feasible or desired
- A parallel street system should be pursued
- Ensure traffic operations help prioritize premium transit
- Enhance streetscape at major intersections and crossings
- Integrate and enhance bus stop facilities
- Establish parallel and intersecting bike network
- Establish parallel and intersecting walking routes

### Transportation System Recommendations:

*By repurposing existing right-of-way Tumwater will add bike lanes to Capitol Boulevard without having to reconstruct the entire street, which would be cost prohibitive.*

#### (T-7) Initiate Capitol Boulevard improvements, including:

- Rechannelize the street to remove the continuous center, left-turn lane and replace with a 4-6 foot raised median, re-designate travel lanes, and designate new bicycle lanes between T Street and Dennis Street.
- Remove U Street pedestrian crossing due to its proximity to the new T Street crossing; and
- Construct new roundabouts at T, X, and Dennis Streets.





(T-8) Examine the design needs for vision- and mobility-impaired pedestrians, including the need for accessible and audible pedestrian signals, and install new pedestrian crosswalks and hybrid pedestrian beacons at or near:

- New roundabouts
- Gerth Street
  - BPA transmission line corridor
- Existing pedestrian crossing between Dennis Street and Israel Road

(T-9) Use the VE study findings to help determine whether similar median treatment, bike lane and roundabout installations are also suitable on Capitol Boulevard north through Lee Street and south to Israel Road, or whether existing signalized intersections (Lee and Israel) may require minor widening to accommodate greater u-turn traffic demand.

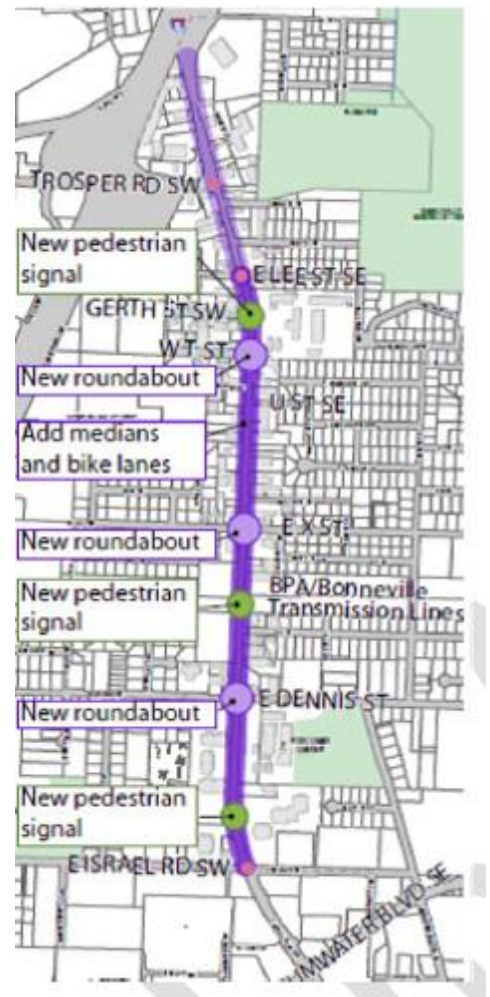
(T-10) Coordinate with property owners and purchase additional rights-of-way to construct a wider sidewalk corridor zone as feasible.

Connectivity Recommendations:

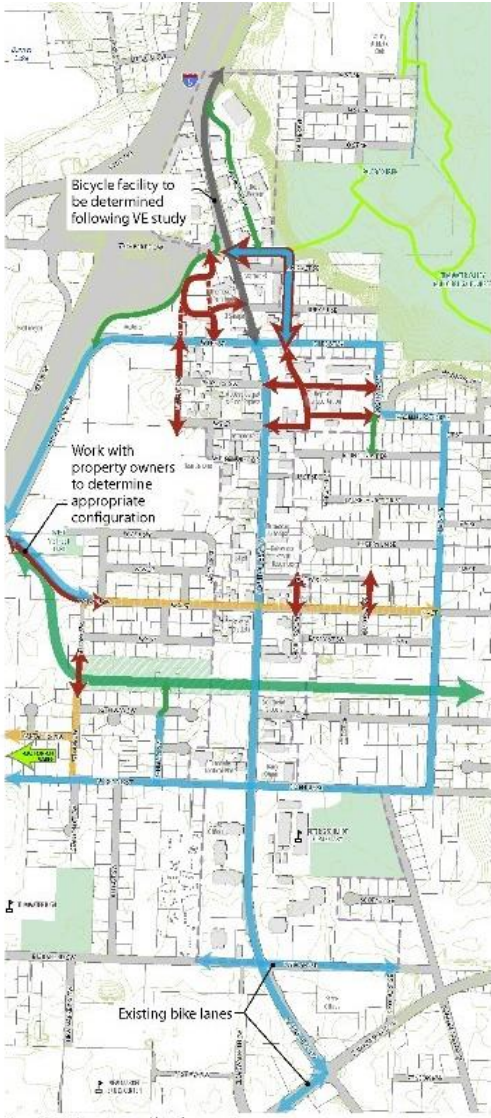
(T-3) Consider findings of Capitol Boulevard / Trospen Road Value-Engineering (VE) study and complete center median curbing along Capitol Boulevard from Trospen Road to Lee Street, in coordination with:

- New North-South Street – a low-speed local access street connection linking Ruby, Linda and Lee Streets with Trospen Road at the Capitol Boulevard intersection.  
*[Illustration to the right is a schematic of the proposed cross section for this new neighborhood connection.]*
- Westside Internal Connectors

(T-6) Construct local connectors facilitating circulation and access to businesses between Trospen Road and W Lee Street west of Capitol Boulevard



*The mobility strategy for Capitol Boulevard includes roundabouts and medians and the addition of bike lanes and improved pedestrian facilities to help transform the old highway character of this street into a more urban, people-oriented place.*



(T-13) Construct a narrow two-lane access street between W Lee Street and W T Street along the 6<sup>th</sup> Avenue SW right-of-way. *[This small roadway would allow residents on Gerth Street to access Capitol Boulevard at a signal or roundabout and would greatly facilitate local circulation.]*

(T-14) Extend X Street westward to Linderson Way SW. *[A connection here provides a much needed east-west route for emergency vehicles and local traffic. Implementation and alignment of this street connection depends on development of property near Linderson. Traffic calming will ensure that X Street provides local access but does not become a shortcut.]*

(T-16) Extend 7<sup>th</sup> Avenue SW to connect West Y Street with 65<sup>th</sup> Way SW.

(T-17) Extend Charles Street and Boston Street to connect East W Street and East X Street. *[Boston Street connection will be a narrow alley and Charles Street extension will require ROW so these improvements are lower priority than some others.]*

(T-18) Establish a loop of bicycle lanes along Linderson Way, West and East Lee Streets, Boston Street, Hazelhurst Drive, Elm Street, and West and East Dennis Streets.

(T-19) Designate X Street, Dennis Place, and 7<sup>th</sup> Avenue as shared-lane bicycle routes, with signs and pavement markings for “sharrows.”

(T-21) Secure rights-of-way and construct a new shared-use pathway (a) along the BPA/Bonneville transmission lines between Elm Street and 6<sup>th</sup> Avenue, (b) from the transmission lines to the X Street extension, (c) from Lee Street to Trosper Road, (d) from the new North-South Street to Capitol Boulevard along Market Street, (e) along the 7th Street extension, (f) on the Boston Street easement between Pinehurst and Hazelhurst, and (g) two connections to the Deschutes Valley Trail.

(NL-15) Construct the Deschutes Valley Trail and associated trail spurs according to the Parks plan

#### Development-driven Transportation Policies:

(T-2) Install driveway modifications at Starbucks drive to prevent left turns. *[This will resolve current operational issues and safety concerns.]*

(T-5) Coordinate with local property owners to plan local street connectors providing local access alternatives to and from Capitol Boulevard via Lee Street.

(T-11) As properties redevelop, require (a) additional rights-of-way and construct a wider sidewalk corridor zone, and (b) parallel to Capitol Boulevard, external site vehicular connectivity.

(T-15) Construct internal streets within any WSDOT site redevelopment. *[These streets are needed for access but will also reduce congestion in this vicinity and enhance site's role as a community focus.]*

(T-20) Coordinate with local property owners and/or developers to construct sidewalks and bicycle facilities as part of new street construction, especially those new street connections identified in recommendations T-13 to T-17.

(T-22) As redevelopment occurs, require internal pedestrian connectivity linking neighborhoods behind the commercial strip to Capitol Boulevard.

#### Transit Policy:

(T-23) As part of the Capitol Boulevard street improvements the City should coordinate with Intercity Transit to revise the current bus stop location and design, conforming with the following:

- Far-side (of intersection) bus stop location guidelines;
- Removal of bus pull-out bays; and
- Placement of stops and added arterial crossing to coincide with recommended corridor improvements.

#### Traffic Calming Policies:

(NL-2) Construct traffic calming devices – bulb-outs, traffic circles, or chicanes – along X Street (at 7th Avenue and at the commercial/residential zone boundary), Elm Street (at Dennis Street, BPA/Bonneville corridor, and X Street), and along the bike route loop (Lee Street, Boston Street, Hazelhurst Drive, Dennis Street, and Linderson Way) as appropriate to moderate traffic speed. Undertake measures necessary to prevent parking impacts on safety and residential quality.

(NL-3) Ensure that the new access streets near Trosper Road include traffic calming devices.

D. BREWERY DISTRICT PLAN – SUMMARY OF  
RECOMMENDATIONS

## Transportation-related Goals and Objectives from the Brewery District Plan

### Brewery District Vision:

*The Tumwater Brewery District is a vibrant, neighborly mixed-use urban community with abundant shopping and business services, safe and accessible transportation options and outstanding recreational amenities. At the heart of Washington State's "original city," the Brewery District continues to serve as an historic destination, even as it evolves to provide new homes and economic opportunity for a growing regional population. The District infuses the best of past and present urban development through the preservation of critical heritage sites, incorporation of modern urban design practices and emphasis on creating a unique sense of place.*

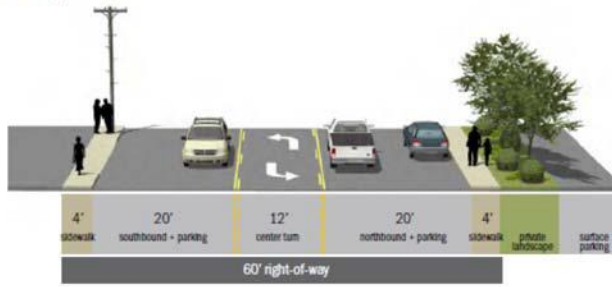
Create a strong sense of place by facilitating pedestrian access, establishing gathering places for residents and fostering a District identity.

- a. Evaluate opportunities for a pedestrian-oriented "Main Street"
- b. Consider opportunities for reducing/redistributing wide rights-of-way where appropriate
- c. Facilitate opportunities for pedestrian-oriented, mixed-use and commercial development.

Improve transportation options, safety, and access within and across the District.

- a. Reduce pressure on over-burdened intersections
- b. Improve transit, bicycle and pedestrian access into the District
- c. Prioritize and implement safety and comfort enhancements for non-motorized users
- d. Update current parking and access management framework

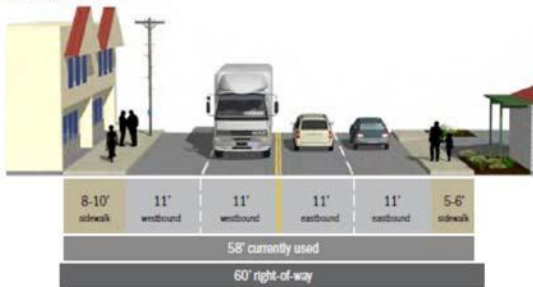
Cleveland Avenue - Custer Way to Capitol Boulevard  
Existing Condition



Cleveland Avenue - Custer Way to Capitol Boulevard: Proposed Cross Section



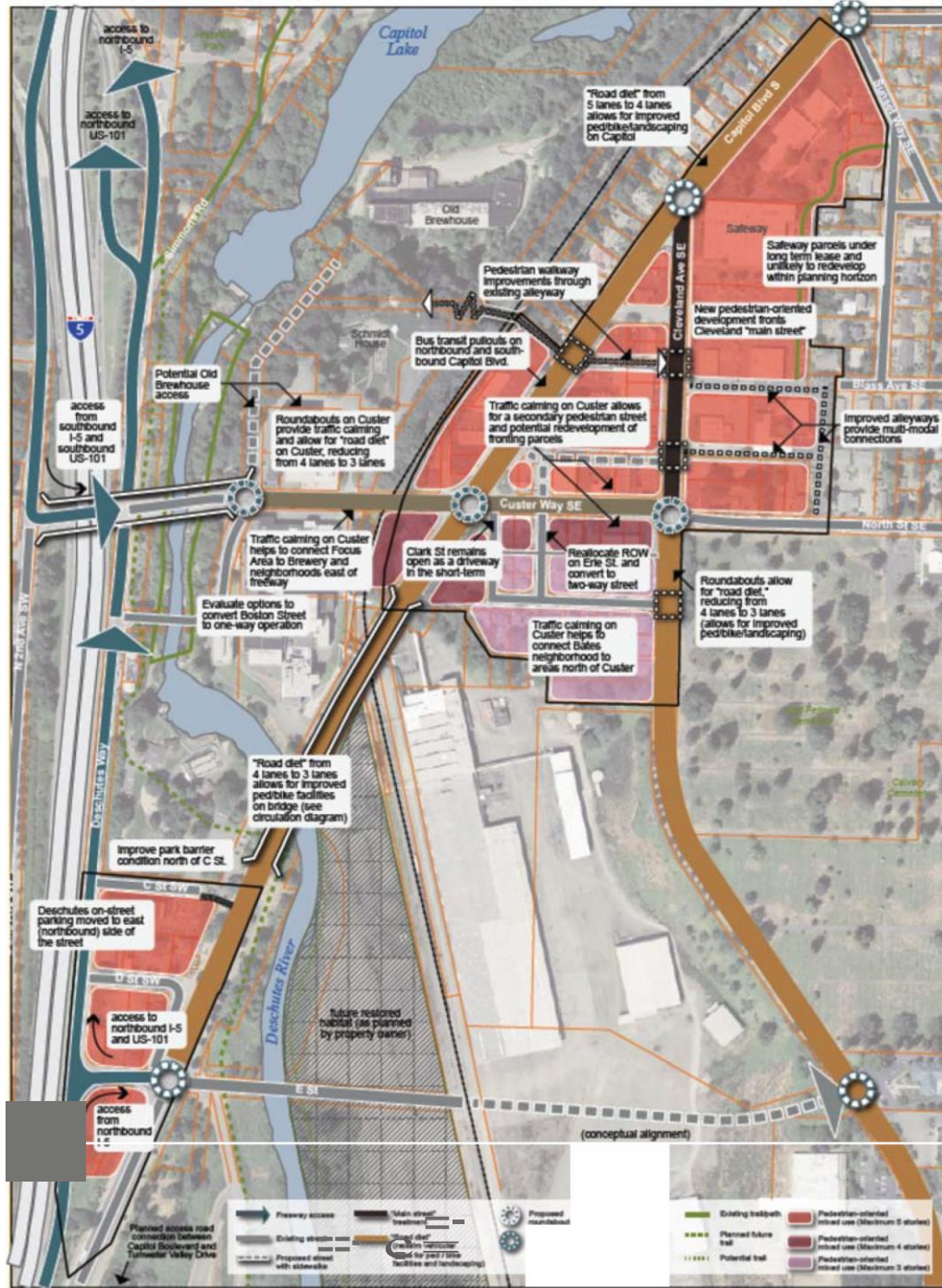
Custer Way - Custer Bridge to Cleveland Avenue  
Existing Condition:



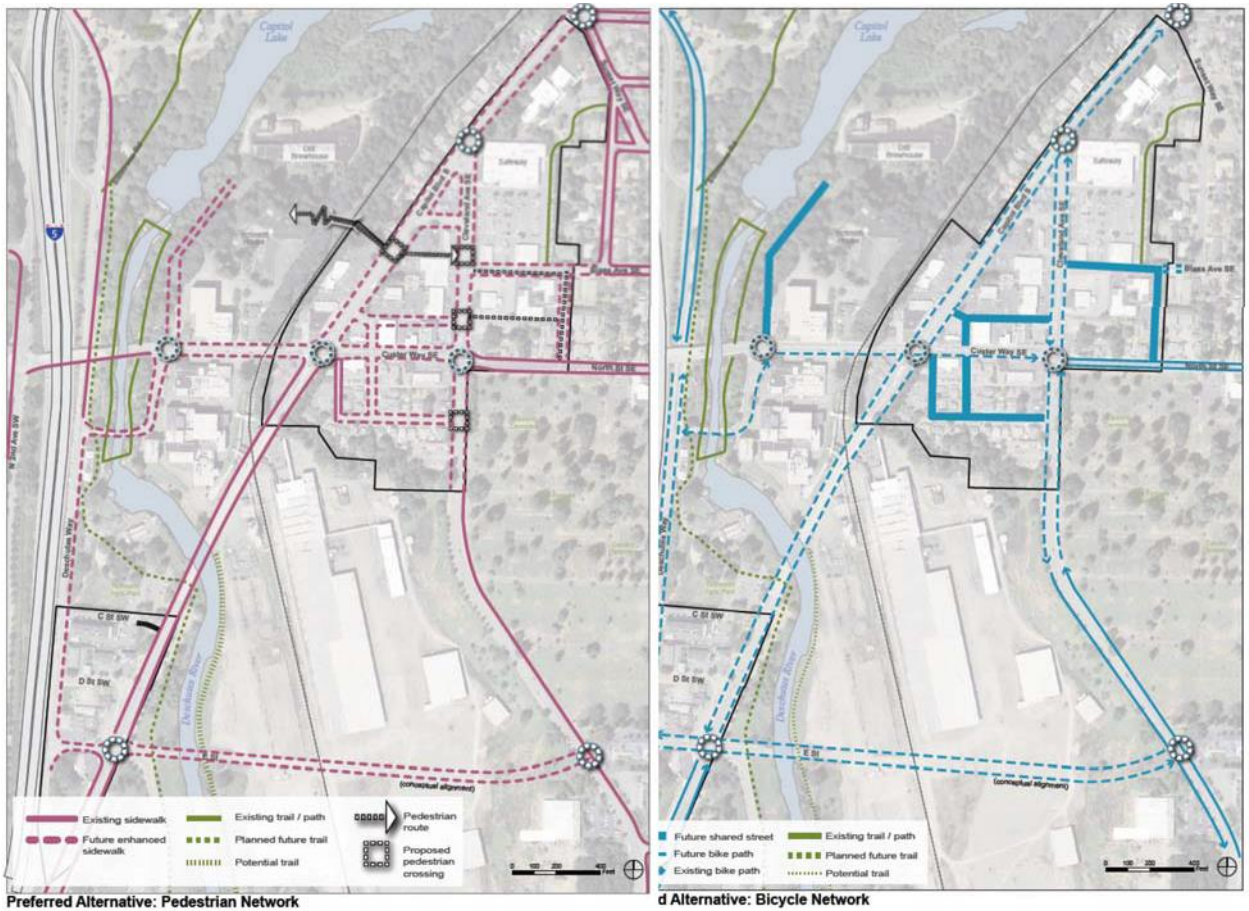
Custer Way - Custer Bridge to Cleveland Avenue  
Proposed Cross Section:



The illustrations demonstrate how repurposing existing right-of-way can be used to create or enhance non-motorized facilities and contribute to the overall livability of a place. Cleveland Avenue, top, and Custer Way, bottom, will be reconfigured so that there is better balance between motorized and non-motorized uses in this area



*The land use and transportation strategies for the Brewery District are completely integrated, each relying on the other to be most effective*



*Clearly defined strategies for addressing bike and pedestrian mobility will help ensure the successful transition of the Brewery District into a vibrant, people-oriented place.*



Figure 3.4: A road diet on Cleveland Avenue will include adding bicycle facilities, widening sidewalks, and installing street trees and stormwater facilities. The calmed streetscape allows easier pedestrian crossings and creates a more welcoming environment for mixed-use (re)development along the "main street".



Potential to rehab existing development to be more pedestrian-oriented

New development built up against the sidewalk (parking in rear)

Housing above ground floor commercial



Wide right-of-way redistributed to pedestrians, bicycles, and landscaping

Well-marked pedestrian crossing

Pedestrian-scale lighting and streetscape elements

Active ground floor building design

Another example of how repurposing valuable right-of-way can be used to transform the character of a place. This planned treatment of Cleveland Avenue will take advantage of a vast space that is greatly under-utilized today.