

Traffic Impact Study for Smith Creek Development

Woodburn, Oregon

Prepared for
Stafford Development Company, LLC.



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Date:
March 2018

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INTRODUCTION

This study evaluates the transportation impacts for the proposed multi-phase Smith Creek Development in the City of Woodburn, Oregon. This study will review the existing street system in the study area and determine how effectively the proposed project will be served. Specifically, this transportation study will review and evaluate the following elements of the local system:

- Walking and biking networks
- General traffic safety
- Traffic performance at key study area intersection operations before and after the project is built
- Project phasing and connectivity recommendations
- Recommended transportation system improvements to adequately serve the site at build out consistent with the City's performance standards

PROJECT DESCRIPTION

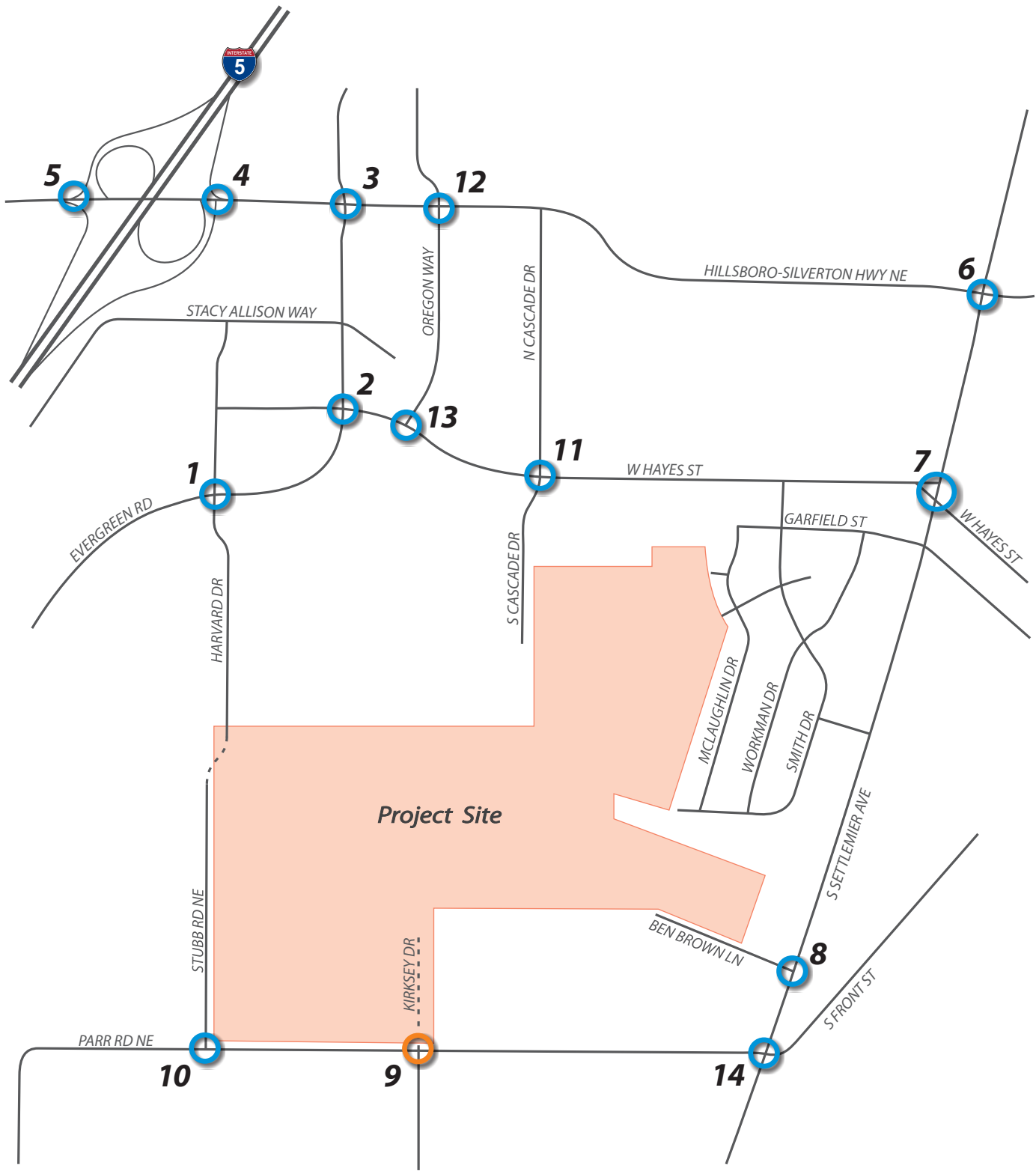
The proposed development is located on over 145 acres north of Parr Road NE between Settlemier Avenue and Stubb Road in the City of Woodburn, Oregon. The proposed development is planned over several phases. The Smith Creek Development project consists of a mix of single family detached housing, townhouses, and multi-family. The proposed residential development also includes a network of internal streets within the site.

For the purpose of this traffic study, the proposed development is expected to be fully built out within 8 years. Therefore, the operations analysis includes the existing conditions in 2017 and the future conditions in 2025.



STUDY AREA

The project site is shown in Figure 1. There is a total of fourteen study intersections identified through coordination with the City of Woodburn and ODOT as requiring intersection operations analysis to evaluate potential transportation impacts from the proposed project. These intersections are listed below.

1. Evergreen Road/Harvard Drive
2. Evergreen Road/Hayes Street
3. Highway 214/Evergreen Road
4. I-5 Northbound Ramps/Highway 214
5. I-5 Southbound Ramps/Highway 214
6. Highway 214/Settlemier Avenue
7. Settlemier Avenue/Hayes Street
8. Settlemier Avenue/Ben Brown Lane
9. Parr Road/Kirksey Drive (Future Intersection)
10. Parr Road/Stubb Road-Harvard Drive (extension)
11. Hayes Street/Cascade Drive
12. Highway 214/Oregon Way
13. Hayes Street/Oregon Way
14. Settlemier Avenue/Parr Road



LEGEND

- #  - Existing Study Intersection
- #  - Future Study Intersection
- - - - - Future Roadway

DKS



No Scale

Figure 1

Study Area

EXISTING CONDITIONS

This chapter includes a description of the study area roadway network, existing motor vehicle volumes, existing traffic operations, and safety analysis results.

STUDY AREA ROADWAY NETWORK

Key roadways within the study area are Highway 214, Settlemier Avenue, Evergreen Road, Hayes Street, Harvard Drive, Oregon Way and Parr Road. Their functional classifications and other important roadway characteristics are listed in Table 1, based on the adopted Transportation System Plan designation and field reviews.

TABLE 1: STUDY AREA ROADWAY CHARACTERISTICS

Roadway	Functional Classification ¹	Travel Lanes	Posted Speed	On-Street Parking	Sidewalks	Bike Lanes
Highway 214	Major Arterial	2 to 4 Lanes	30 mph	No	Yes	Yes
Settlemier Avenue	Minor Arterial	2 Lanes	30 mph	No	Partial	Yes
Evergreen Road	Minor Arterial	2 Lanes	25 mph	Yes	Partial	Partial
Hayes Street	Service Collector	2 Lanes	25 mph	Yes	Partial	Partial
Harvard Drive	Access Street	2 Lanes	25 mph	Yes	Yes	No
Oregon Way	Access Street	2 Lanes	25 mph	Yes	Partial	No
Ben Brown Lane	Access Street	2 Lanes	25 mph	Yes	Partial	No
Parr Road	Service Collector	2 Lanes	25/55 mph	No	Partial	No

Several of the above streets have specific issues that were noted in our review. Those issues include the following:

Highway 214 is also known as the Hillsboro-Silverton Highway and it is owned and operated by ODOT. A major upgrade project was recently completed for the area around the interchange with Interstate 5 to expand the highway to two travel lanes in each direction with a center turn lane, upgraded sidewalks, and dedicated bike lanes. The five-lane section ends east of North Cascade Drive, which is about 3,000 feet west of Settlemier Avenue. The remainder of Highway 214 is a 3-lane cross-section. Highway 214 offers the only continuous route with dedicated bike facilities in the area.

Evergreen Road is fully improved to city minor arterial standards except for the segment between Hayes Avenue and Stacy Allison Way, a distance of about 500 feet. This segment has sidewalks only on the west side and no dedicated bike lanes.

¹ City of Woodburn Transportation System Plan (TSP), Figure 7-1, October 2006.

Settlemier Avenue is a historic city street that is designated as a minor arterial. Generally, it provides one travel lane in each direction, however, because it has a limited right-of-way, it typically does not have sufficient width available for a center turn lane which is consistent with its minor arterial designation. There are no dedicated bike facilities on Settlemier Avenue beginning at Harrison Avenue. The travel lanes are shared with bikes from Harrison Avenue south to Parr Road, a distance of about a mile. North of Highway 214, this street changes names to North Boones Ferry Road, which parallels Interstate 5 and Highway 99 serving communities to the Willamette River.

Hayes Street is a service collector with one travel lane in each direction and no center turn lane. Sidewalks are provided intermittently and there are no bike lanes. The city has programmed an upgrade for the segment between Settlemier Avenue and Cascade Drive to incorporate continuous walking and biking facilities and a center turn lane along with intersection improvements at Settlemier Avenue.

Harvard Drive is designated as Access Street however it has been built to local street standards. The roadway is 34 feet between the curbs with parking allowed on both sides of the roadway. The city standard for an access street is 40 feet between the curbs. Typically, only the west side of Harvard Drive has driveways for access to fronting properties.

Oregon Way is an Access Street that was recently improved on its approach to Highway 214 to include sidewalks and bike facilities. However, the segment south to Hayes Street does not have dedicated walking or bike improvements.

Parr Road is a service collector that is owned and operated by Marion County. The roadway generally provides one travel lane in each direction with a center turn lane between Settlemier Avenue and Centennial Park. The south side of Parr Road between South Settlemier Avenue and 900 Parr Road contains two concrete paths, one for pedestrians and one for bikes. West of Centennial Park, Parr Road is a typical rural two-lane facility with unpaved shoulders and one lane in each direction.

PEDESTRIAN AND BICYCLE VOLUMES

Pedestrian and bicycle counts were collected during the AM and PM peak periods at each of the study area intersections.² Highway 214/Settlemier Avenue and Evergreen Road/Hayes Street were observed to have the highest pedestrian activity within the study area which was confirmed with the pedestrian count data collected. Low bicycle activity was observed at all study intersections which was confirmed with the bicycle count data collected (less than 5 cyclists were observed at a single study intersection). The bikeway improvements within the study area are very limited. Only OR 214 has a continuous route available.

TRANSIT

Woodburn Transit Service (WTS) provides fixed route bus and Dial-A-Ride service within the study area. Highway 214, Hayes Street, Oregon Way and Settlemier Avenue are the study area roadways which are the transit routes for the WTS. In addition to the WTS, the Cascades POINT bus service is operated by ODOT in the City of Woodburn.

² Traffic counts were collected on March 21, 2016 and April 18, 2016.

The new Woodburn Memorial Transit Facility is located at Highway 214/Evergreen Road. This is a park and ride facility which serves WTS and Cascade POINT bus service.

Dial-A-Ride service is a door to door service available Monday through Friday, 7:00 AM to 7:00 PM, within the Woodburn City limits. WTS also provides a Dial-A-Ride trip to Portland and Salem.

MOTOR VEHICLE FACILITIES

The City and State have established acceptable traffic operating conditions for their respective facilities. To determine intersection traffic operations, vehicle turn movement counts² were conducted at study area intersections during the AM period (7 to 9 AM) and PM period (4 to 6 PM). Traffic count data collected for this study was adjusted to account for seasonal variations in travel. For this study, the methodology from the ODOT Analysis Procedures Manual³ was applied to determine the 30th highest annual hour volume (30 HV) for the study intersections. The 30 HV is commonly used for design purposes and represents the level of congestion that is typically encountered during the peak travel month.

To determine when the 30th highest annual hour volumes occur, data is examined from Automatic Traffic Recorder (ATR) stations that record highway traffic volumes year-round. If no on-site ATR is present, one with similar characteristics can be identified using ODOT's ATR Characteristics Table. If these do not produce a similar ATR with average annual daily traffic volumes (AADT) within 10% of study area volumes, the seasonal trend method should be used. The seasonal trend method averages seasonal trend groupings from the ATR Characteristics Table. For the study area, no ATR's are located on-site, and the ATR Characteristics Table did not produce matches within 10% of the study area AADT volumes. Therefore, the seasonal trend method was utilized to develop the seasonal factor. The seasonal factor calculated was 1.06. This factor has been applied to the existing counts. The traffic data is included in Appendix A. The existing lane configuration at all study intersections is shown in Figure 2a and 2b. The existing peak hour volumes were used in the traffic operations analysis and are shown in Figure 3a and 3b.

EXISTING TRAFFIC OPERATIONS

Existing intersection operations analysis was performed for the fourteen study area intersections to calibrate baseline conditions. Intersections are the focus of the analysis because they are the controlling bottlenecks of traffic flow and the ability of a roadway system to carry traffic efficiently is nearly always diminished in their vicinity. Included are descriptions of the intersection performance measures, jurisdictional operational standards, existing traffic operational analysis and a summary of field observations.

INTERSECTION PERFORMANCE MEASURES

Level of service (LOS) ratings and volume-to-capacity (v/c) ratios are two commonly used performance measures that provide a good picture of intersection operations. In addition, they are often incorporated into agency mobility standards.

³ Analysis Procedures Manual Version 2, Oregon Department of Transportation, July 2016.

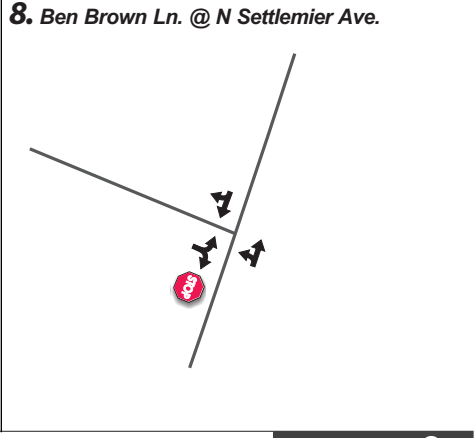
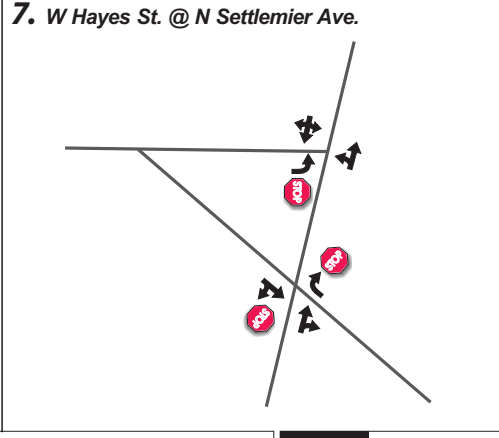
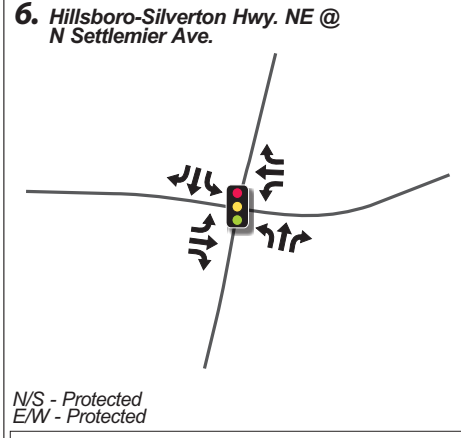
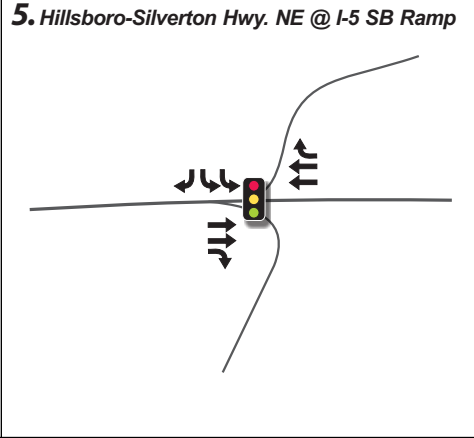
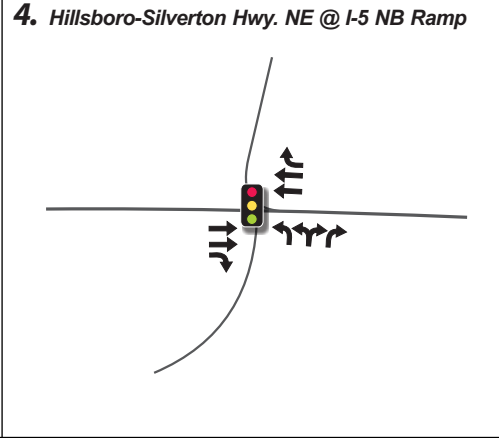
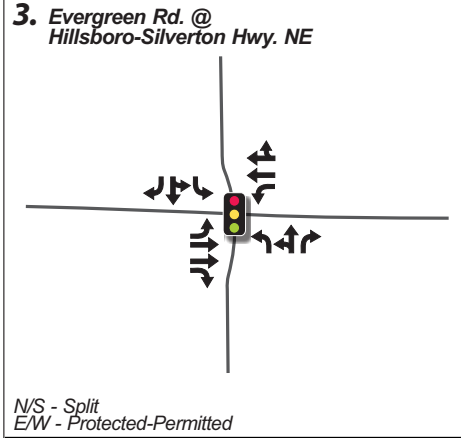
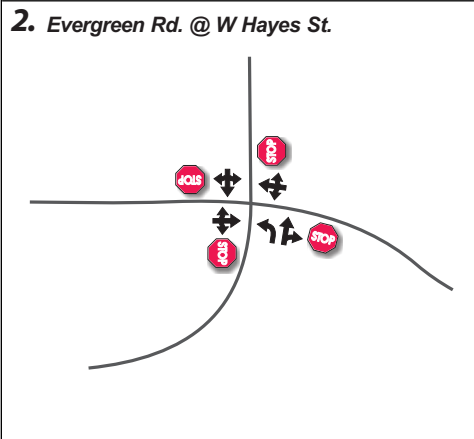
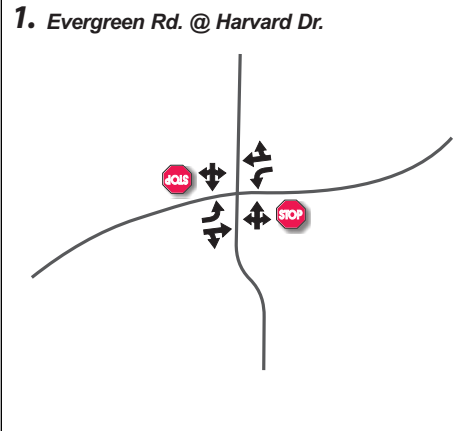
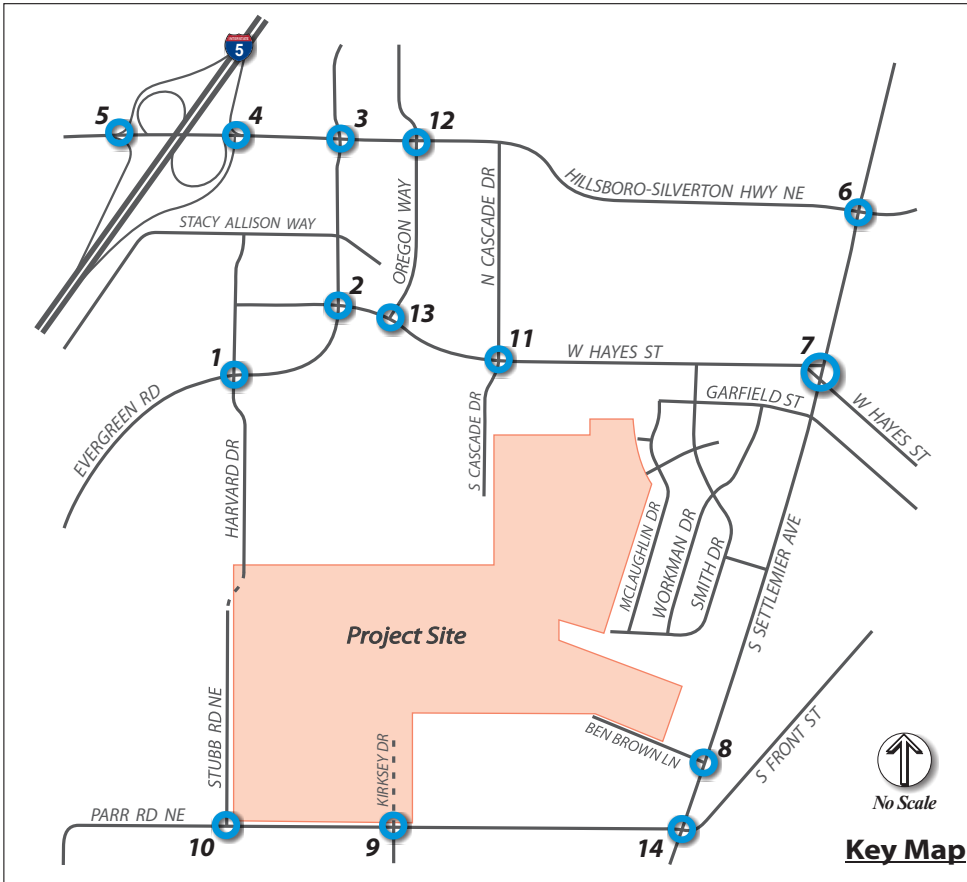
- **Level of service (LOS):** A “report card” rating (A through F) based on the average delay experienced by vehicles at the intersection. LOS A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. LOS D and E are progressively worse operating conditions. LOS F represents conditions where average vehicle delay has become excessive and demand has exceeded capacity. This condition is typically evident in long queues and delays.
- **Volume-to-capacity (v/c) ratio:** A decimal representation (typically between 0.00 and 1.00) of the proportion of capacity that is being used at a turn movement, approach leg, or intersection. It is determined by dividing the peak hour traffic volume by the hourly capacity of a given intersection or movement. A lower ratio indicates smooth operations and minimal delays. As the ratio approaches 0.95, congestion increases and performance is reduced. If the ratio is greater than 1.00, the turn movement, approach leg, or intersection is oversaturated and usually results in excessive queues and long delays.

JURISDICTIONAL OPERATING STANDARDS

All study intersections must comply with adopted operating standards or modifications may be necessary to serve future growth. Intersection performance measures used for operating standards vary by roadway jurisdiction. The study intersections under ODOT jurisdiction must comply with the v/c ratio targets in the Oregon Highway Plan (OHP), which specifies a v/c ratio target of 0.95 or less for the study area.⁴ The OHP requires ramp terminals to meet the v/c ratio for the crossroad in order to prevent traffic queuing at the off-ramps. The OHP specifies a v/c target of 0.85 for ramp terminals.⁵ The study intersections under City of Woodburn jurisdiction must comply with the LOS targets in the City’s CIP which requires a LOS E or better for city-owned streets. The v/c ratio requires being less than 1.00 regardless of the LOS on City streets. Additionally, the v/c ratio requires being less than 0.90 on critical movements for city streets. The LOS for unsignalized intersections is based on delay and not v/c.

⁴ City of Woodburn, Transportation System Plan, October 2005.

⁵ Oregon Highway Plan, Oregon Department of Transportation, December 2011, page 76.

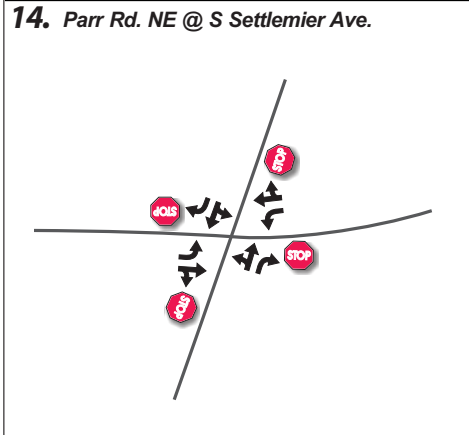
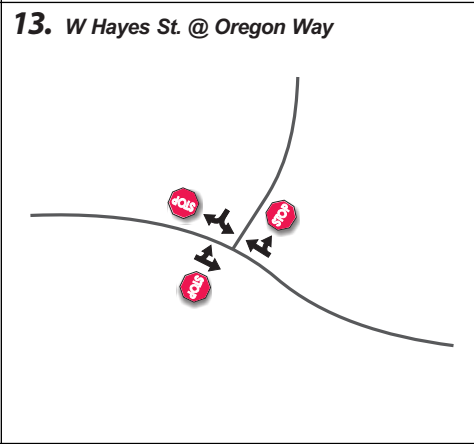
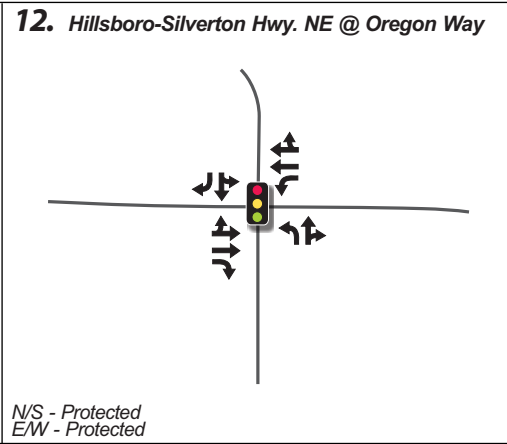
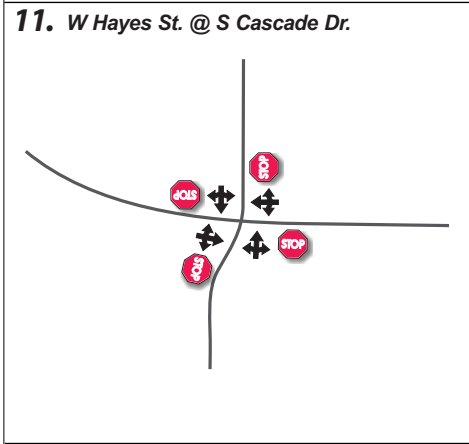
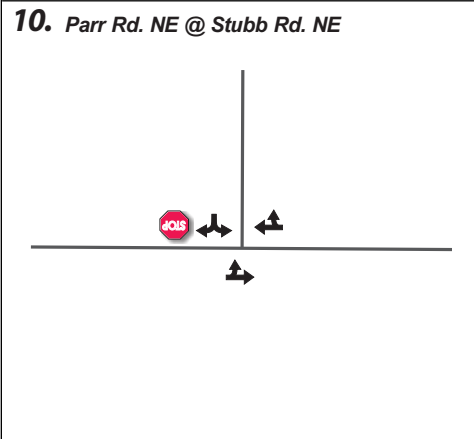
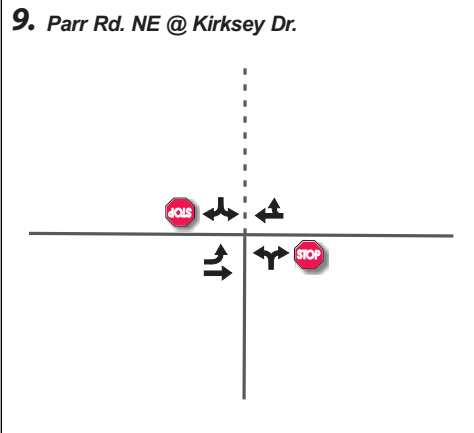
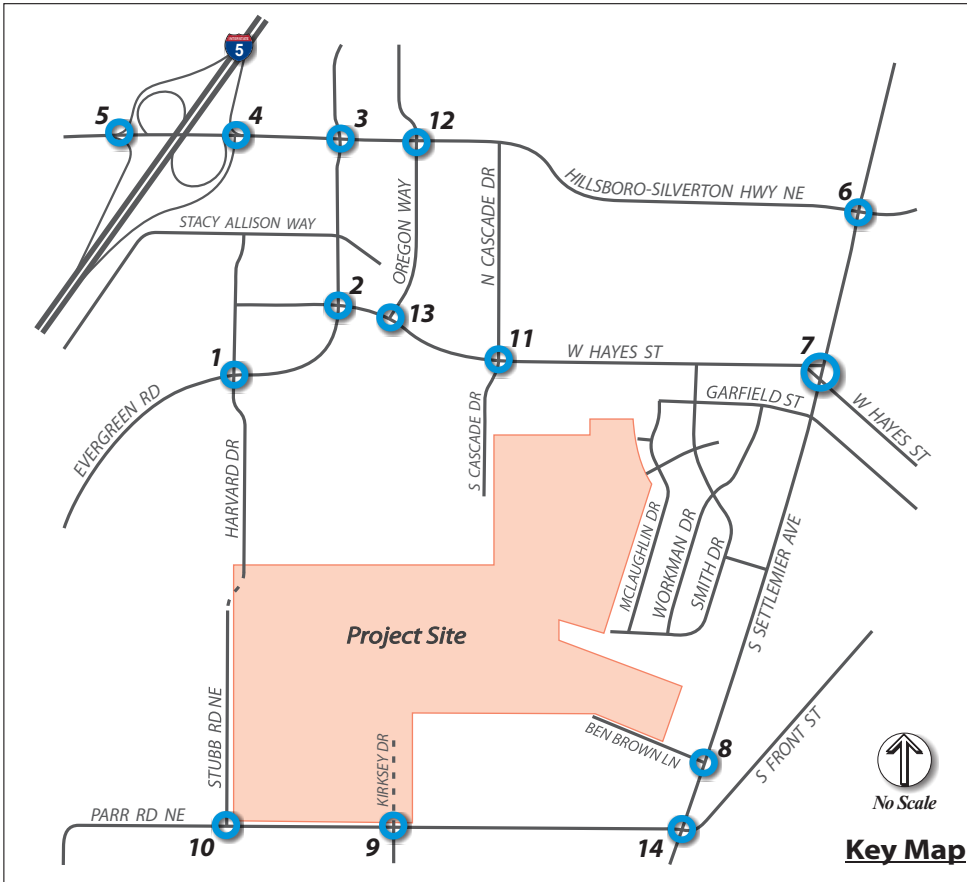


- LEGEND**
- # - Study Intersection
 - Traffic Signal
 - Stop Sign
 - Lane Configuration

DKS

Figure 2a

Existing Intersection Lane Configurations

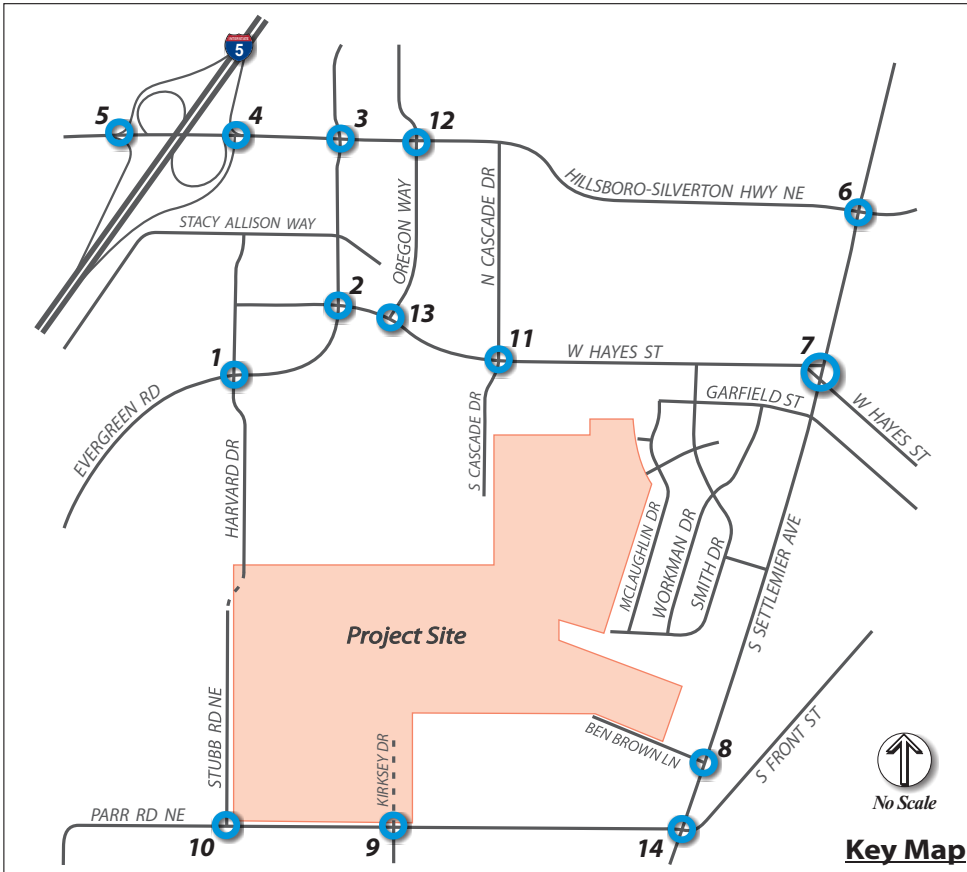


- LEGEND**
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 - Stop Sign
 - Lane Configuration

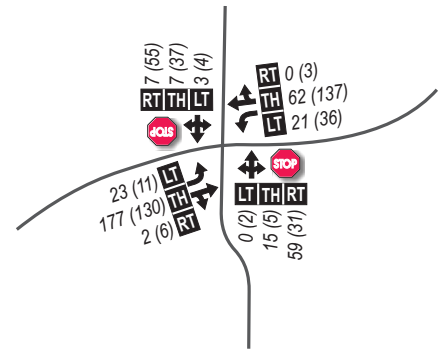
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Figure 2b

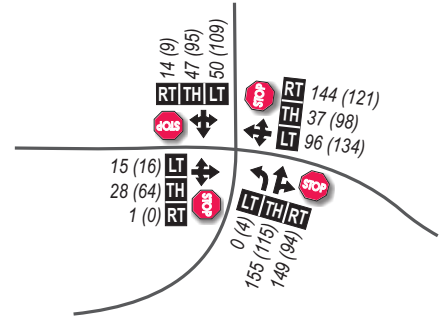
Existing Intersection Lane Configurations



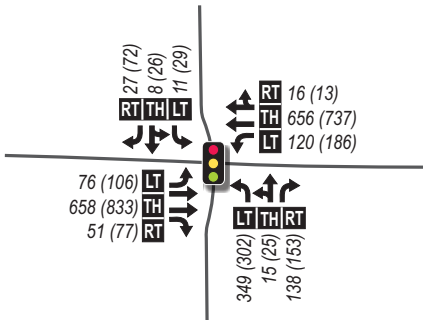
1. Evergreen Rd. @ Harvard Dr.



2. Evergreen Rd. @ W Hayes St.

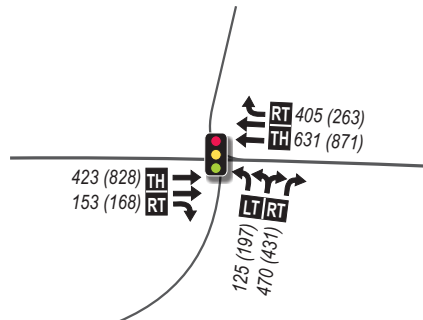


3. Evergreen Rd. @ Hillsboro-Silverton Hwy. NE

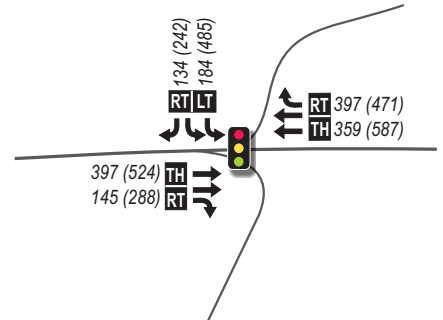


N/S - Split
E/W - Protected-Permitted

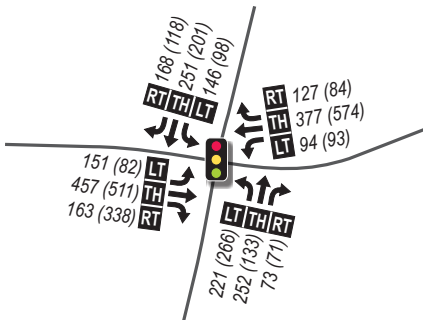
4. Hillsboro-Silverton Hwy. NE @ I-5 NB Ramp



5. Hillsboro-Silverton Hwy. NE @ I-5 SB Ramp

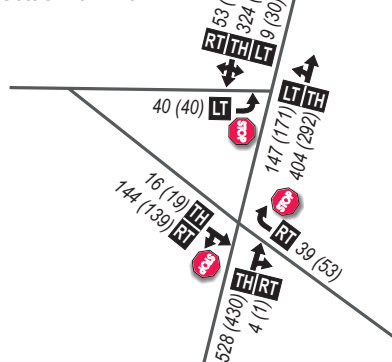


6. Hillsboro-Silverton Hwy. NE @ N Settlemier Ave.

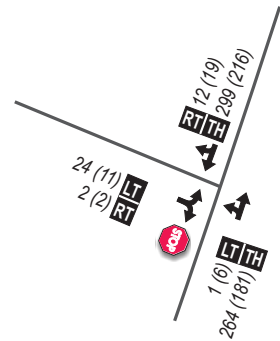


N/S - Protected
E/W - Protected

7. W Hayes St. @ N Settlemier Ave.



8. Ben Brown Ln. @ N Settlemier Ave.



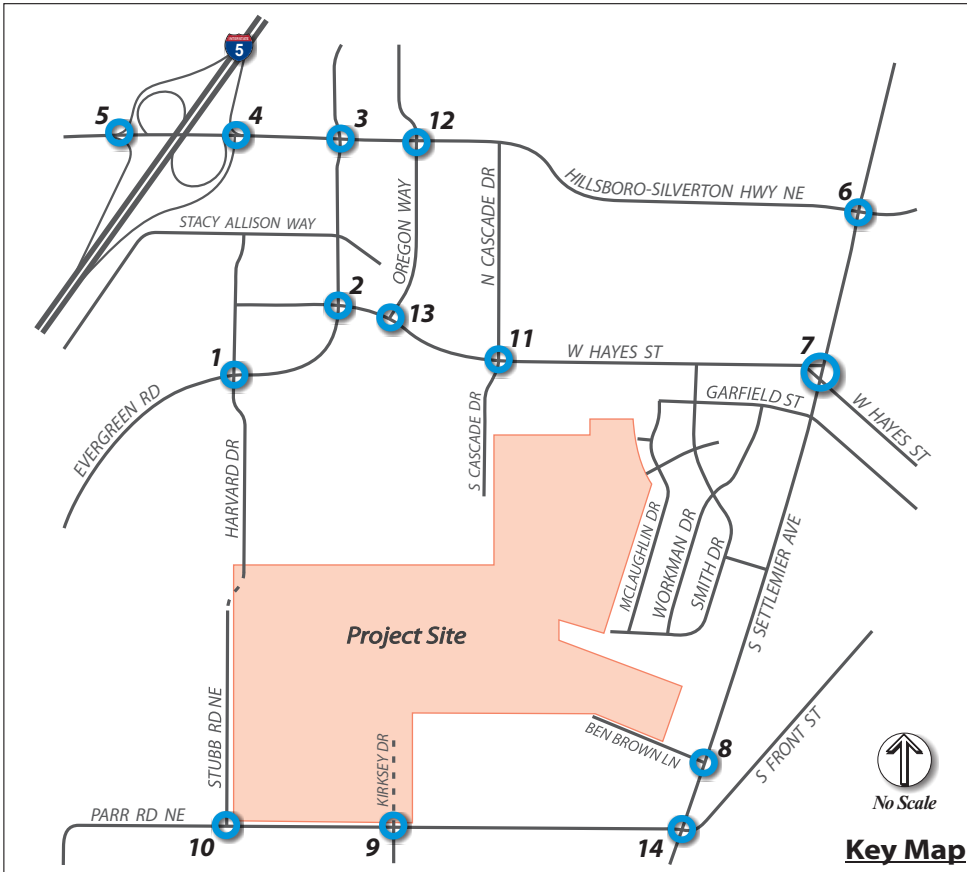
LEGEND

- # [Blue Circle with Arrow] - Study Intersection
- [Traffic Signal Icon] - Traffic Signal
- [Stop Sign Icon] - Stop Sign
- ← - Lane Configuration
- AM (PM) - Peak Hour Traffic Volumes
- [LT TH RT] - Volume Turn Movement (Left-Thru-Right)

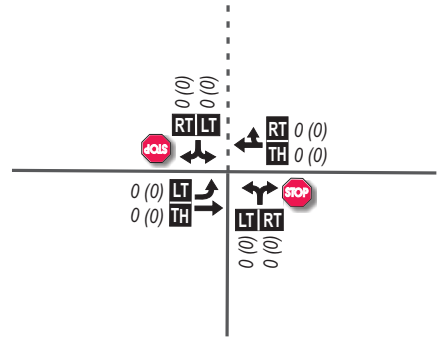
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Figure 3a

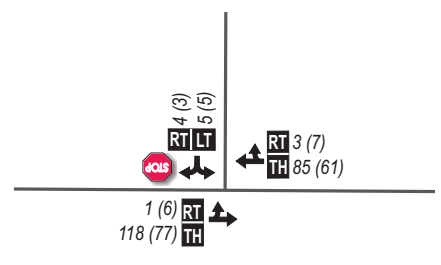
Existing (2017) AM/PM Peak Hour Traffic Volumes



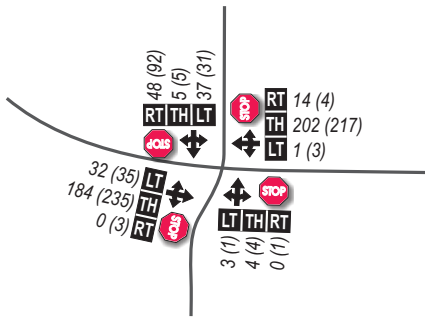
9. Parr Rd. NE @ Kirksey Dr.



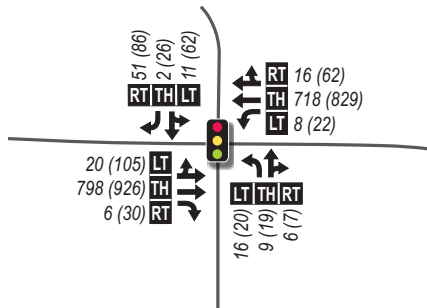
10. Parr Rd. NE @ Stubb Rd. NE



11. W Hayes St. @ S Cascade Dr.

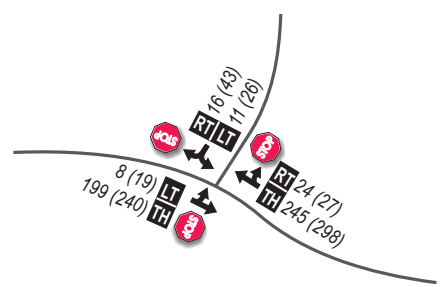


12. Hillboro-Silverton Hwy. NE @ Oregon Way

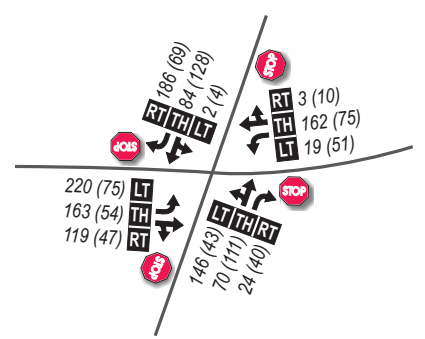


N/S - Protected
E/W - Protected

13. W Hayes St. @ Oregon Way



14. Parr Rd. NE @ S Settlemier Ave.



- LEGEND**
- # - Study Intersection
 - 🚦 - Traffic Signal
 - 🛑 - Stop Sign
 - ← - Lane Configuration
 - AM (PM) - Peak Hour Traffic Volumes
 - LT TH RT - Volume Turn Movement (Left-Thru-Right)

DKS

Figure 3b

Existing (2017) AM/PM Peak Hour Traffic Volumes

EXISTING OPERATING CONDITIONS

The existing traffic operations at the study intersections were determined for the AM and PM peak hours based on the Synchro software analysis using *2000 Highway Capacity Manual* methodology⁶ for signalized and *2010 Highway Capacity Manual* methodology⁷ for unsignalized intersections. The level of service (LOS) and volume to capacity (v/c) ratio of each study intersection are listed in Table 2. Detailed intersection calculation worksheets are included in Appendix B.

TABLE 2: EXISTING (2017) WEEKDAY AM AND PM PEAK HOUR STUDY INTERSECTION OPERATIONS

No.	Intersection	Operating Standard	AM Peak Hour			PM Peak Hour		
			LOS	Delay (sec)	V/C	LOS	Delay (sec)	V/C
Traffic Signal Controls								
3	Highway 214/Evergreen Road	0.95 V/C	B	18.7	0.46	C	27.7	0.55
4	I-5 NB Ramps/Highway 214	0.85 V/C	A	9.3	0.40	C	21.1	0.47
5	I-5 SB Ramps/Highway 214	0.85 V/C	B	10.8	0.40	B	16.0	0.69
6	Highway 214/Settlemier Avenue	0.95 V/C	E	63.2	0.84	F	84.6	0.88
12	Highway 214/Oregon Way	0.95 V/C	C	28.6	0.38	C	28.7	0.53
Stop Sign Controls								
1	Evergreen Road/Harvard Drive	LOS E	A/B	10.9	-	A/B	11.2	-
2	Evergreen Road/ Hayes Street*	LOS E	B	13.6	-	B	14.1	-
7	Settlemier Avenue/Hayes Street	LOS E	A/F	68.1	-	A/F	54.0	-
8	Settlemier Avenue/Ben Brown Lane	LOS E	A/B	14.2	-	A/B	11.6	-
9	Parr Road/Kirksey Drive	LOS E	-	-	-	-	-	-
10	Parr Road/Stubb Road	LOS E	A/A	9.6	-	A/A	9.3	-
11	Hayes Street/Cascade Drive*	LOS E	B	10.3	-	A	10.0	-
13	Hayes Street/Oregon Way*	LOS E	A	9.7	-	B	10.3	-
14	Settlemier Avenue/Parr Road*	LOS E	D	31.3	-	A	10.0	-

Bolded Red values do not meet operating standards.

Two-Way Stop Controlled intersections:

LOS = Level of Service of Major Street/Minor Street (i.e., A/F)

Delay = Seconds of Delay of Worst Movement

* All-Way Stop Controlled intersections:

LOS = Level of Service of intersection

Delay = Average Delay

⁶ *2000 Highway Capacity Manual*, Transportation Research Board, Washington DC, 2000.

⁷ *2010 Highway Capacity Manual*, Transportation Research Board, Washington DC, 2010.

As shown, one location does not meet operating standards today. The unsignalized intersection of Settlemier Avenue/Hayes Street fails during both peak hours for left-turn movement of the minor street. The side street traffic at Hayes Street experiences long delays due to the heavy traffic volume in the north-south direction on Settlemier Avenue during peak hours. The delay analysis suggests that there is a high north-south volume along Settlemier which is free flowing. This results in inadequate gaps for the left turning traffic in the eastbound direction. The eastbound through movements experience the highest delays as they must cross two opposing lanes of high volume traffic.

SAFETY ANALYSIS

Five years of collision records (2011-2015) for the study area were obtained from ODOT's online database. The data identified 144 collisions at the study intersections during the five-year period. Observed crash rates at the study intersections were calculated to identify problem areas in need of safety mitigation. The total number of crashes experienced at an intersection is typically proportional to the number of vehicles entering it. Therefore, a crash rate describing the frequency of crashes per million entering vehicles (MEV) based on the critical crash rate procedure in the Highway Safety Manual (HSM) Network Screening chapter is used to evaluate each intersection.

This observed crash rate at each site was then compared to either a calculated critical crash rate that is unique to each site and based on the critical crash rate procedure in the Highway Safety Manual (HSM) Network Screening chapter, or a critical crash rate based on the 90th percentile crash rate for similar intersections in Oregon. Intersections that exceed their respective critical crash rate are flagged for further review.

Table 3 shows the total reported collisions at each study intersection as well as the calculated observed crash rate and the 90th percentile critical crash rates for similar intersections in Oregon. The observed crash rates exceeded the critical crash rates at the intersections of Evergreen Road/Harvard Drive and Evergreen Road/Highway 214. Therefore, further review of the intersection crashes has been provided.

- **Evergreen Road / Harvard Drive** - A total of seven (7) crashes were reported over the five-year period at this location and approximately 83 percent of crashes were angled collisions and 17 percent of crashes were considered 'other' type collisions. The leading cause of the angled collisions was due to a vehicle making an improper turn. There was one (1) pedestrian related crash that resulted in an injury to the pedestrian. The report indicates that the driver failed to yield to the pedestrian due to the pedestrian's dark clothing. The crash occurred at 9 p.m. during dry conditions
- **Highway 214 / Evergreen Road** – A total of 47 crashes were reported over the five-year period at this location and approximately 47 percent of crashes were rear-ending collisions, 41 percent of crashes were turning collisions, and 12 percent were considered 'other' or angled collisions. The leading causes of the rear-end collisions were due to driver's inattentiveness and vehicles following too closely. The leading cause of the turning and angled collisions were due to a vehicle making an improper turn. There was one (1) pedestrian related crash that resulted in an injury to the pedestrian. The report indicates that the driver failed to yield to the pedestrian. The crash occurred at 3 p.m. during dry conditions. No reported crashes at this intersection resulted in fatalities or severe injuries, and the majority of collisions at this location were classified as property damage only.

Based on the review of the causes of the crashes, it can be concluded that the crashes are mostly due to the error of the driver. None of the crashes were due to weather conditions, high traffic volume, bad lighting or faulty design at the intersection. Therefore, it can be concluded that the addition of traffic at this intersection may not result in more crashes in the future.

TABLE 3: SUMMARY OF INTERSECTION COLLISION HISTORY (2011-2015)

No.	Study Intersection	Collision Type				Observed Crash Rate	Critical Crash Rate	Over Critical Rate?
		Fatal	Injury	Property Damage Only	Total			
1	Evergreen Road/Harvard Street	0	5	1	6	0.72	0.41	Yes
2	Evergreen Road/Hayes Street	0	3	1	4	0.26	0.41	No
3	Highway 214/Evergreen Road	0	22	25	47	1.01	0.86	Yes
4	I-5 NB Ramps/Highway 214	0	17	20	37	0.74	0.86	No
5	I-5 SB Ramps/Highway 214	0	13	15	28	0.59	0.86	No
6	Highway 214/Settlemier Avenue	0	0	1	1	0.02	0.86	No
7	Settlemier Avenue/Hayes Street	0	1	6	7	0.33	0.41	No
8	Settlemier Avenue/Ben Brown Road	0	0	0	0	0.00	0.48	No
11	Hayes Street/Cascade Drive	0	0	1	1	0.09	0.41	No
12	Highway 214/Oregon Way	0	6	4	10	0.25	0.86	No
13	Hayes Street/Oregon Way	0	0	0	0	0.00	0.41	No
14	Settlemier Avenue/Parr Road	0	3	0	3	0.08	0.19	No

KEY ASSUMPTIONS AND METHODOLOGIES

The following section outlines key assumptions and methodologies associated with the proposed project that were used to analyze future conditions and identify any potential impacts at study intersections. Areas of interest covered in this section are trip generation, trip distribution, and background traffic growth.

PROJECT DESCRIPTION

The proposed project is the multi-phase Smith Creek Development. The project is primarily a residential project which consists of a mix of single family detached housing, townhouses, and multi-family. The proposed Project Site Plan is shown in Figure 4. The plan shows 607 single family residential units and 201 multi-family housing units along Kirksey Street. To be conservative, we assumed that all of this property would be developed at site build out.

TRIP GENERATION

Trip generation is the method used to estimate the number of vehicles that are added to the surrounding roadway network as a result of the proposed project. The trip generation for the proposed project was estimated using similar land uses as reported by the Institute of Transportation Engineers (ITE)⁸. Since the proposed site would be adding residential units, the potential trip generation was calculated for the AM and PM peak hour using the Single-Family Detached Housing (ITE Code 210) and Residential Condominiums/Townhouse (ITE Code 230) land use. The proposed project will be built in three scenarios as follows:

- **Scenario 1:** Phase 1A, 1B, 2A, 2B and 2C will be built. Internal street connections to Harvard Drive, Ben Brown Lane and Kirksey Drive will be built. Completion Year 2021.
- **Scenario 2:** Phase 3A and 4A will be built. Internal street connections to Stubb Road will be built. Completion Year 2023.
- **Scenario 3:** All the remaining project phases (Phases 3B and 4B) will be built-out. Completion Year 2025.

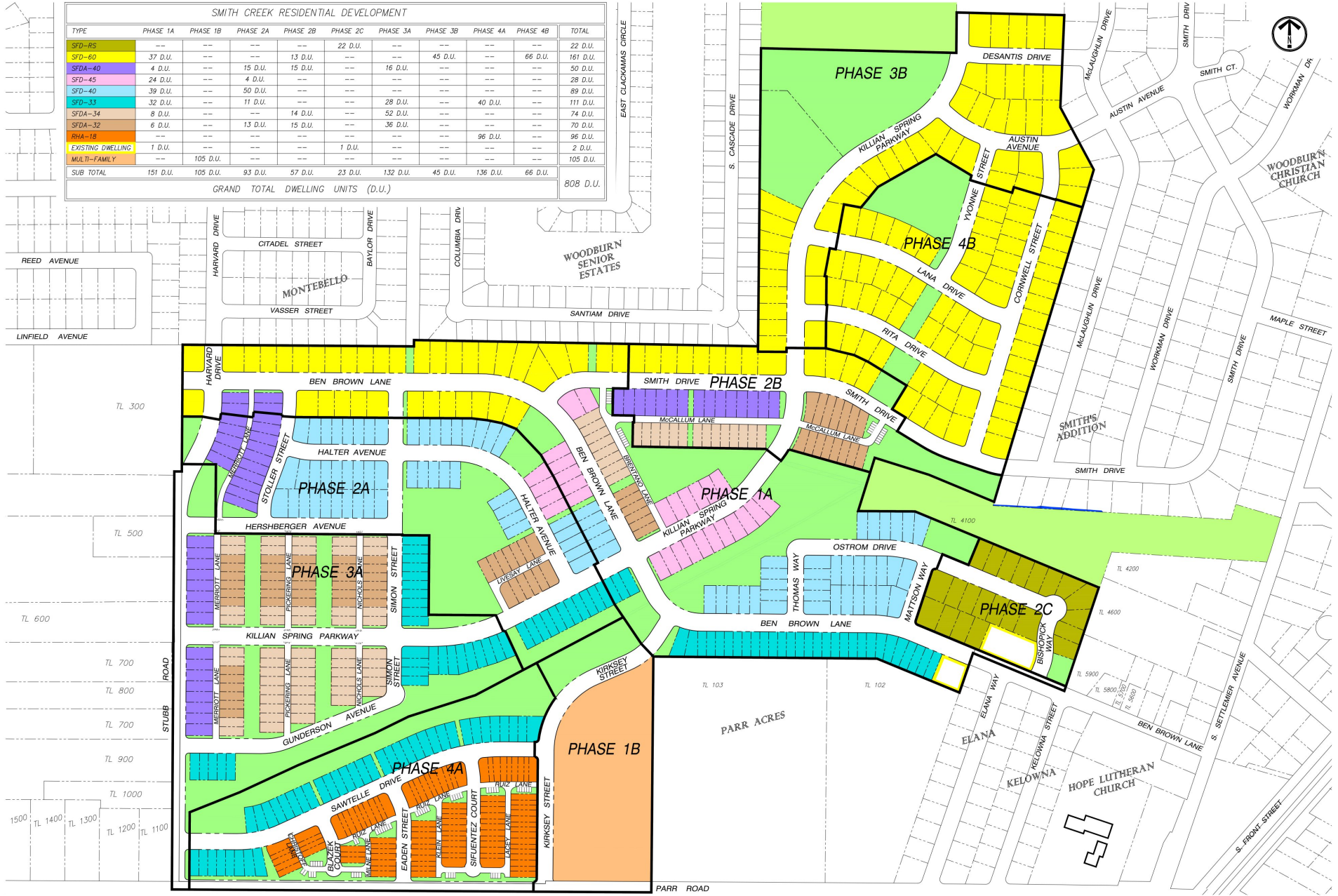
As shown in Table 4, project site has the potential to generate 543 trips in the AM peak hour, 712 trips in the PM peak hour and 6,946 daily trips.

TRIP DISTRIBUTION AND ASSIGNMENT

Trip distribution reflects how site traffic will leave and arrive at the site and what roads those trips will take. The distribution of site-generated trips through the study intersections was estimated using the US Census data and observed local traffic patterns. It is estimated that of the total project trips, 45% would travel north and 30% would travel south using the I-5 freeway, 20% would travel to the east and 5% would travel to the west of the project site. The trip distribution percentage to/from the project site for each scenario is shown in Appendix C. The Trip assignment showing the project trips at each study intersection is shown in Figure 5a and 5b.

⁸ Institute of Transportation Engineers (ITE) manual, Trip Generation, 9th Edition.

SMITH CREEK RESIDENTIAL DEVELOPMENT										
TYPE	PHASE 1A	PHASE 1B	PHASE 2A	PHASE 2B	PHASE 2C	PHASE 3A	PHASE 3B	PHASE 4A	PHASE 4B	TOTAL
SFD-RS	---	---	---	---	22 D.U.	---	---	---	---	22 D.U.
SFD-60	37 D.U.	---	13 D.U.	---	---	45 D.U.	---	---	---	161 D.U.
SFDA-40	4 D.U.	---	15 D.U.	15 D.U.	---	16 D.U.	---	---	---	50 D.U.
SFD-45	24 D.U.	---	4 D.U.	---	---	---	---	---	---	28 D.U.
SFD-40	39 D.U.	---	50 D.U.	---	---	---	---	---	---	89 D.U.
SFD-33	32 D.U.	---	11 D.U.	---	28 D.U.	---	40 D.U.	---	---	111 D.U.
SFDA-34	8 D.U.	---	14 D.U.	---	52 D.U.	---	---	---	---	74 D.U.
SFDA-32	6 D.U.	---	13 D.U.	15 D.U.	36 D.U.	---	---	---	---	70 D.U.
RHA-18	---	---	---	---	---	96 D.U.	---	---	---	96 D.U.
EXISTING DWELLING	1 D.U.	---	---	---	1 D.U.	---	---	---	---	2 D.U.
MULTI-FAMILY	---	105 D.U.	---	---	---	---	---	---	---	105 D.U.
SUB TOTAL	151 D.U.	105 D.U.	93 D.U.	57 D.U.	23 D.U.	132 D.U.	45 D.U.	136 D.U.	66 D.U.	808 D.U.
GRAND TOTAL DWELLING UNITS (D.U.)										



DKS

Figure 4

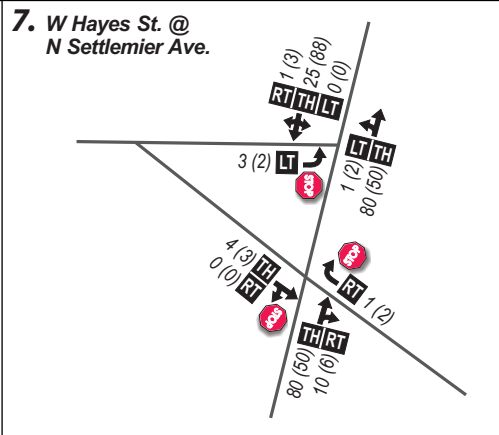
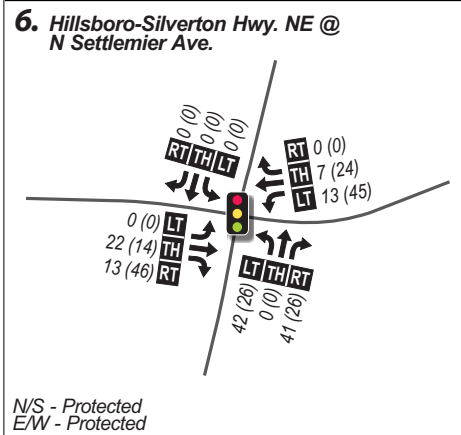
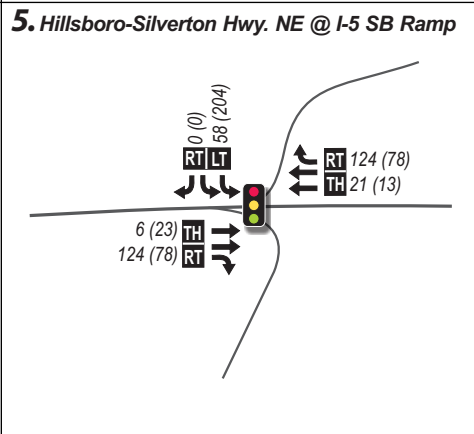
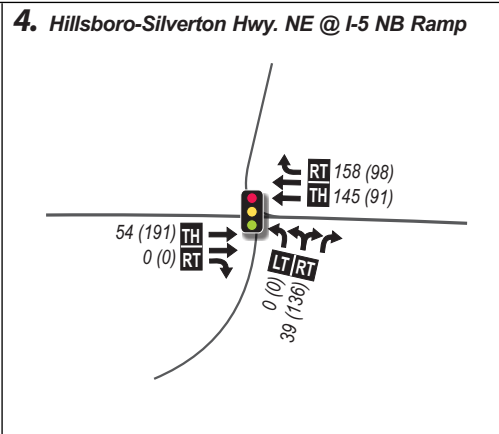
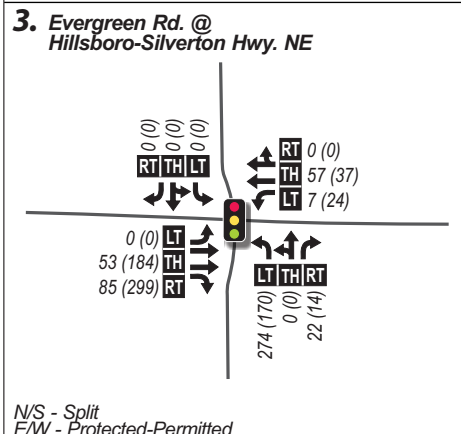
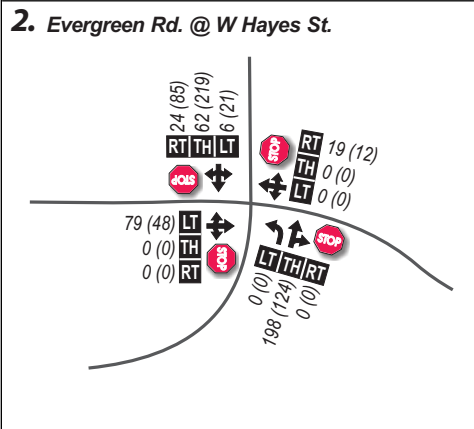
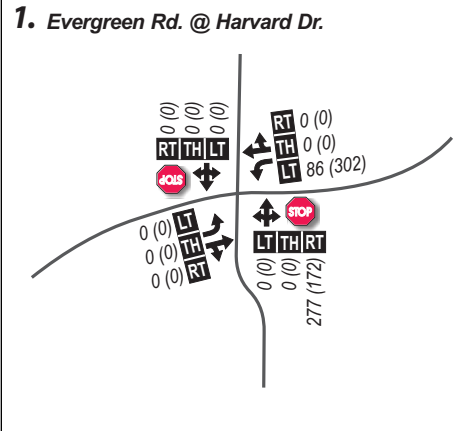
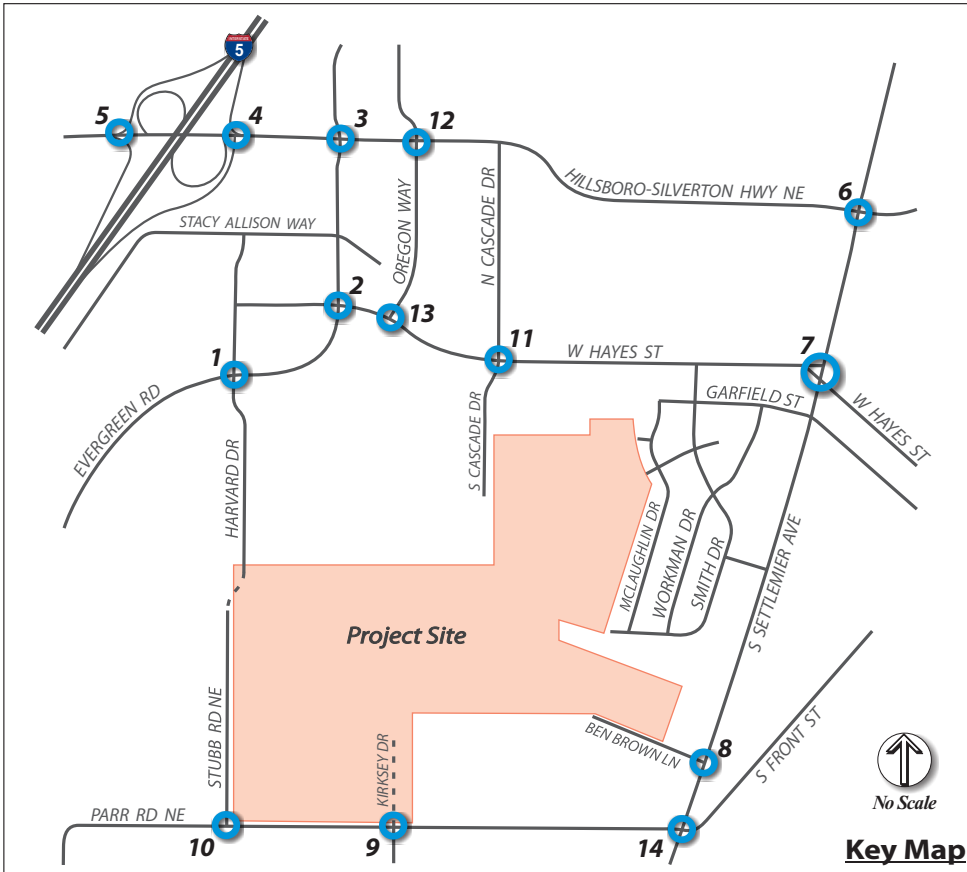


No Scale

Project Site Plan
Source: Planning & Land Design

TABLE 4: SMITH CREEK DEVELOPMENT VEHICLE TRIP GENERATION BY PROJECT DEVELOPMENT PHASE

ITE Land Use	Quantity	Daily Trips	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Scenario 1								
Single-Family Detached	324	3,084	62	181	243	204	120	324
Residential Condominium/Townhouse	105	610	7	39	46	37	18	55
Scenario 2								
Single-Family Detached	172	1,637	33	96	129	108	64	172
Residential Condominium/Townhouse	96	558	7	36	42	34	16	50
Scenario 3								
Single-Family Detached	111	1,057	21	62	83	70	41	111
TOTAL VEHICLE TRIPS	808	6,946	129	414	543	453	259	712



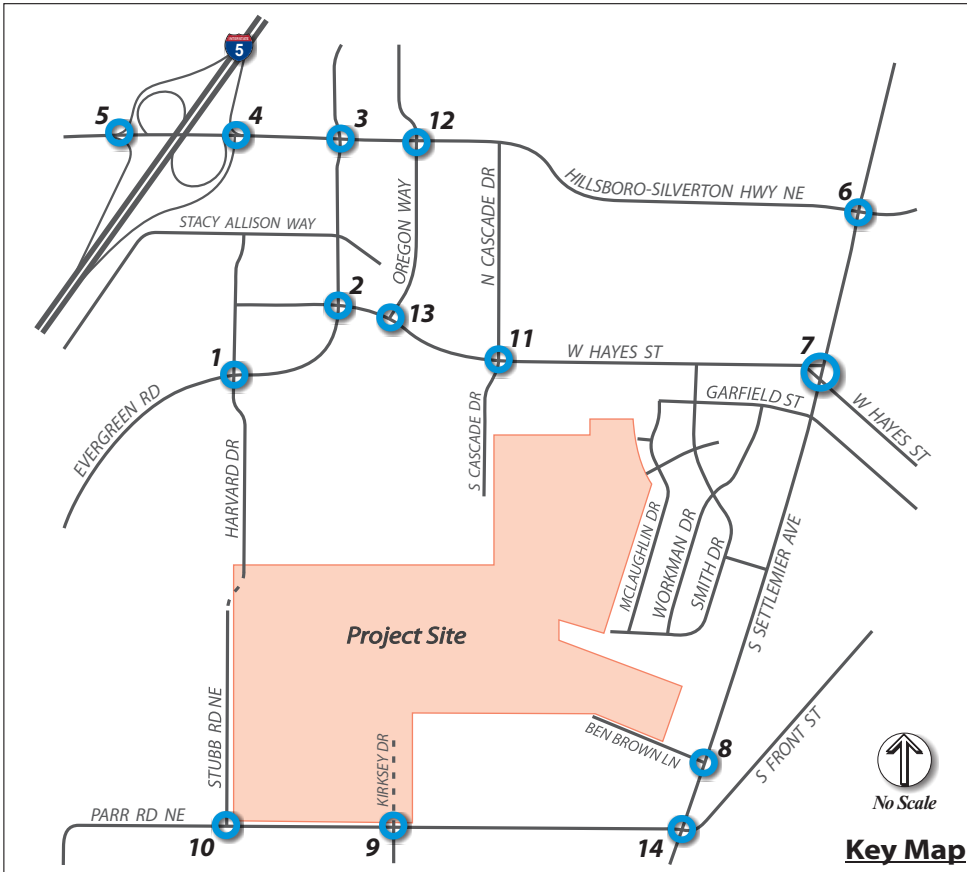
LEGEND

- # - Study Intersection
- Traffic Signal
- Stop Sign
- ← - Lane Configuration
- AM (PM) - Peak Hour Traffic Volumes
- Volume Turn Movement (Left-Thru-Right)

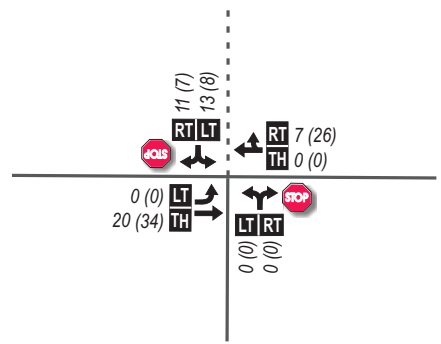
DKS

Figure 5a

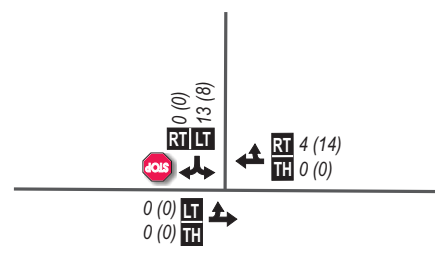
Project Trip Assignment at Full Buildout



9. Parr Rd. NE @ Kirksey Dr.

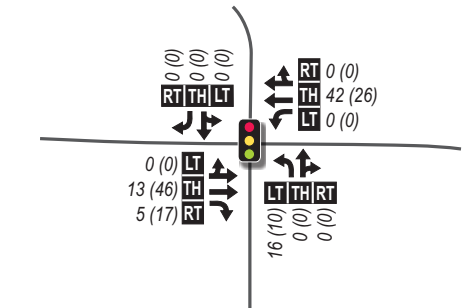


10. Parr Rd. NE @ Stubb Rd. NE



11. W Hayes St. @ S Cascade Dr.

12. Hillsboro-Silverton Hwy. NE @ Oregon Way



N/S - Protected
E/W - Protected

13. W Hayes St. @ Oregon Way



14. Parr Rd. NE @ S Settlemier Ave.

- LEGEND**
- # - Study Intersection
 - Traffic Signal
 - Stop Sign
 - ← - Lane Configuration
 - AM (PM) - Peak Hour Traffic Volumes
 - Volume Turn Movement
Left•Thru•Right

DKS

Figure 5b

Project Trip Assignment at Full Buildout

BACKGROUND TRAFFIC

Background traffic, or the traffic expected to be present in 2025 without the proposed project, was estimated using the ODOT's 2035 Future Traffic Volume Table. Using this table and discussions with the City staff, it was determined that an annual growth rate of 1% would be added to the existing vehicular volumes to determine the future traffic volumes in the year 2025.

The forecast of future traffic volumes was checked against any developments in the study area that have been approved by the City, but have not yet been occupied, in order to account for their impact. DKS coordinated with the City to obtain the list of such cumulative projects and details that described how many trips would be generated and how they would impact study intersections. It was determined that all the trips from all development projects will be accounted for in the annual growth rate. Therefore, no further adjustments to the traffic forecast would be necessary.

Figure 6a and 6b shows the traffic volumes in the year 2025 that would be present with the proposed project completely built and operational (Figure 5a and 5b volumes plus 2025 baseline peak hour volumes).

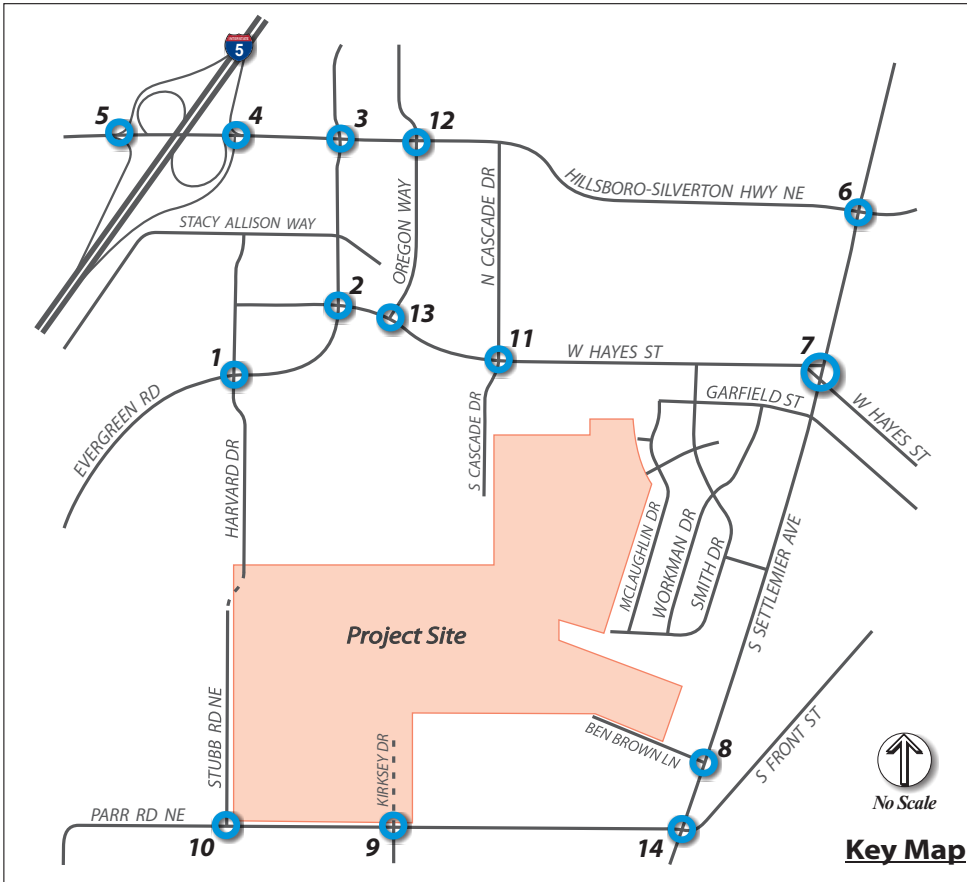
FUTURE TRANSPORTATION NETWORK

Based on discussions with the City, DKS obtained the list of proposed future capital improvement projects which would add capacity and/or change traffic operations within the study area.

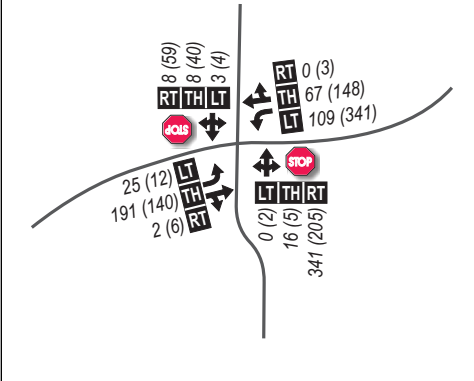
Improvement projects assumed to be constructed by 2025:

- **Hayes Street between Settlemier Avenue and Cascade Drive.** The improvement is in the City's Capital Improvement Program as project CIST1486, and is allocated \$3.2 million. The intent of the improvement project is to upgrade this portion of Hayes Street to provide a modified service collector cross-section, which includes sidewalks on both sides of the street, and space for bike lanes. Additional right-of-way is required. This improvement will also modify the existing intersection approaches at Hayes Street and Settlemier Avenue, although the final design has not been identified.

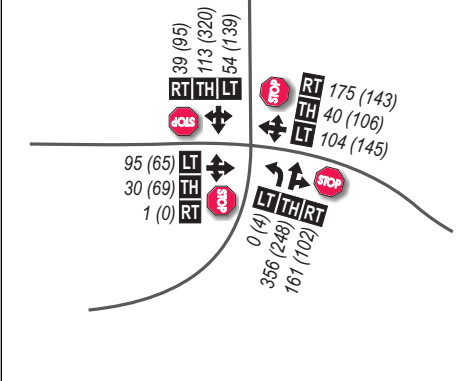
No other planned improvements have been assumed for the off-site roadways within the study area.



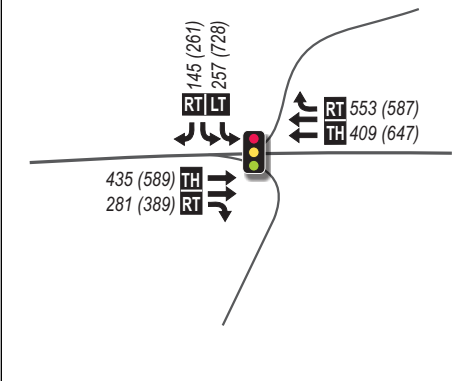
1. Evergreen Rd. @ Harvard Dr.



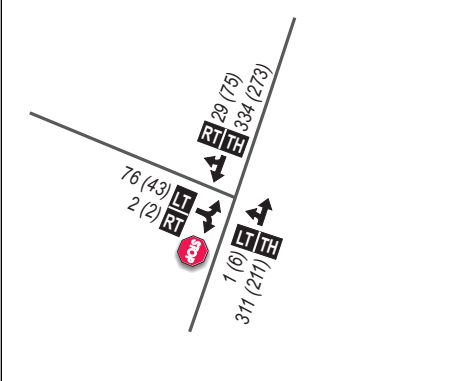
2. Evergreen Rd. @ W Hayes St.



3. Evergreen Rd. @ Hillsboro-Silverton Hwy. NE



4. Hillsboro-Silverton Hwy. NE @ I-5 NB Ramp



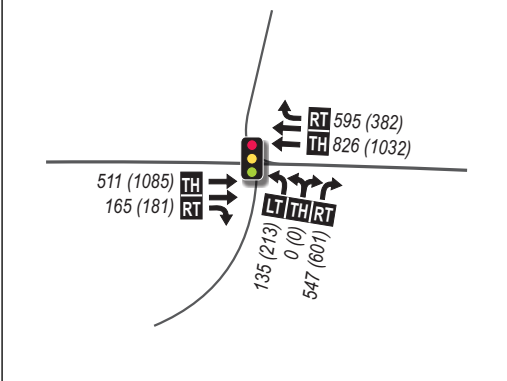
5. Hillsboro-Silverton Hwy. NE @ I-5 SB Ramp



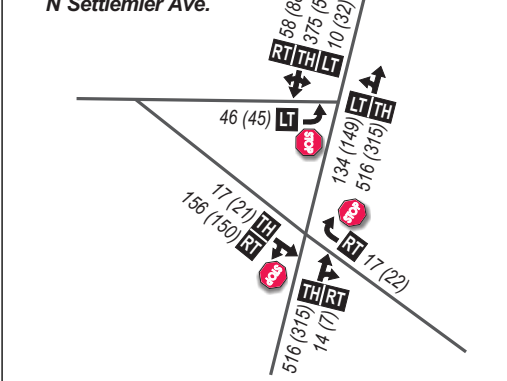
6. Hillsboro-Silverton Hwy. NE @ N Settlemier Ave.



7. W Hayes St. @ N Settlemier Ave.



8. Ben Brown Ln. @ N Settlemier Ave.



N/S - Split
E/W - Protected-Permitted

N/S - Protected
E/W - Protected

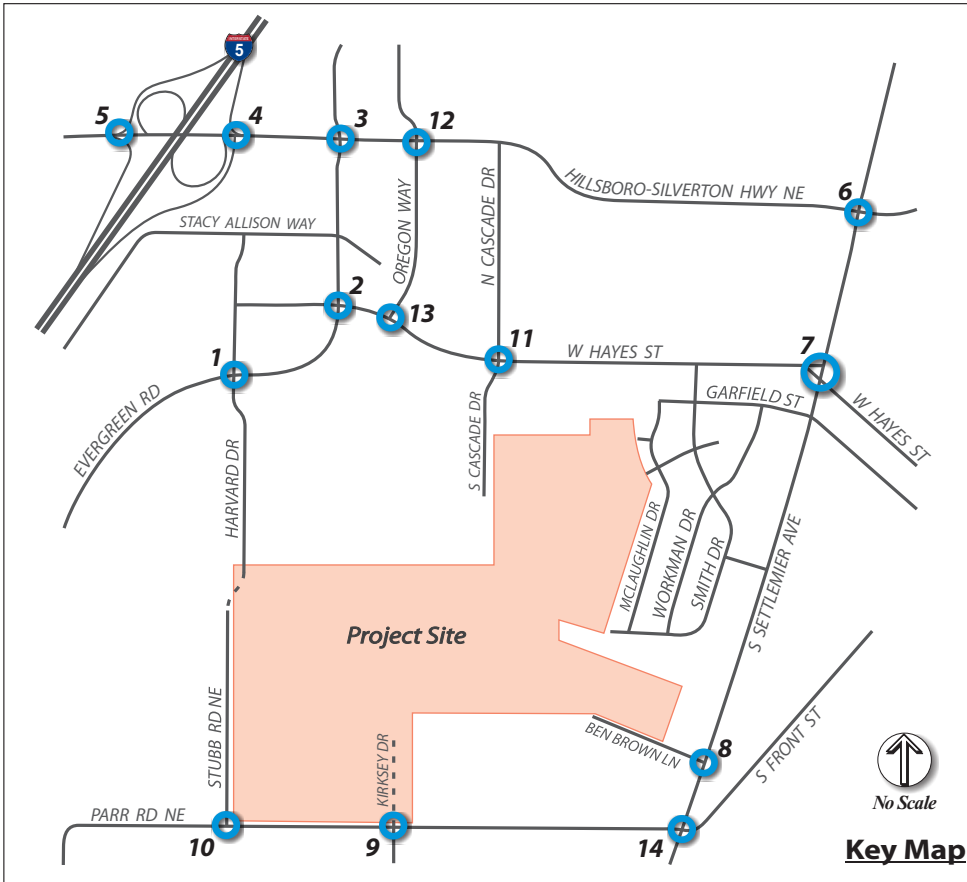
LEGEND

- # - Study Intersection
- Traffic Signal
- Stop Sign
- Lane Configuration
- AM (PM) - Peak Hour Traffic Volumes
- Volume Turn Movement
Left•Thru•Right

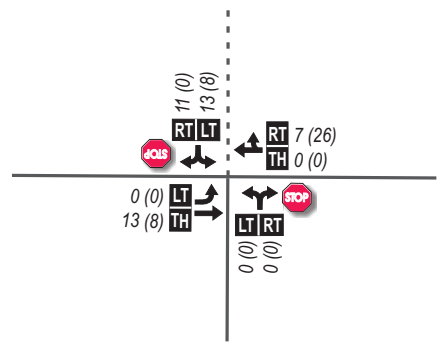
DKS

Figure 6a

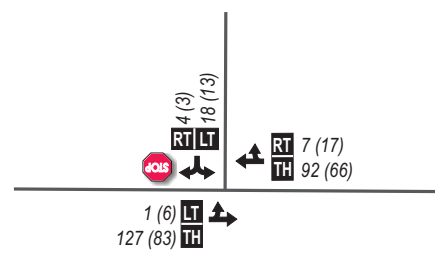
Project Site Buildout (2025)
AM/PM Peak Hour Traffic Volumes



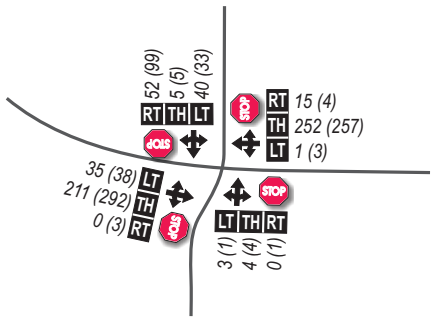
9. Parr Rd. NE @ Kirksey Dr.



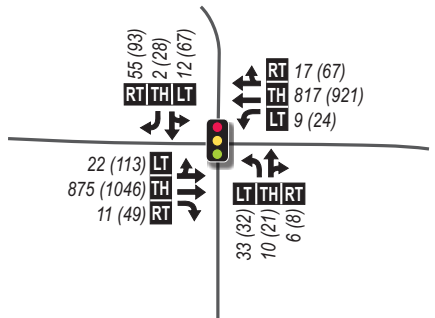
10. Parr Rd. NE @ Stubb Rd. NE



11. W Hayes St. @ S Cascade Dr.

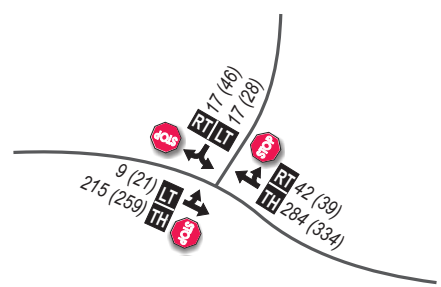


12. Hillboro-Silverton Hwy. NE @ Oregon Way

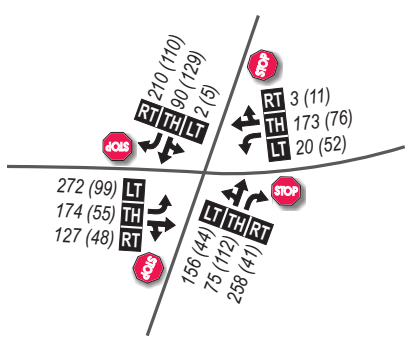


N/S - Protected
E/W - Protected

13. W Hayes St. @ Oregon Way



14. Parr Rd. NE @ S Settlemier Ave.



LEGEND

- # (circle with cross) - Study Intersection
- (Traffic Signal Icon) - Traffic Signal
- (Stop Sign Icon) - Stop Sign
- ← - Lane Configuration
- AM (PM) - Peak Hour Traffic Volumes
- LT TH RT - Volume Turn Movement (Left-Thru-Right)

DKS

Figure 6b

**Project Site Buildout (2025)
AM/PM Peak Hour Traffic Volumes**

FUTURE CONDITIONS

This chapter reviews the impacts that the proposed project would have on the study area transportation system. The analysis was performed for 2025 to capture impacts during this period, which are when study area traffic volumes are expected to be the highest due to daily commuter trends. Following the analysis, recommended mitigations are described and evaluated.

FUTURE TRAFFIC OPERATIONS

Future traffic operating conditions were analyzed at the study intersections to determine if the transportation network can support the proposed project.

2025 OPERATING CONDITIONS

To determine project impacts at the study area intersections, traffic operating conditions were analyzed during the AM and PM peak hour for the 2025 Project Site Buildout scenario. The same operations analysis methodology that was used to evaluate existing conditions was applied, including the Synchro software package using 2000 *Highway Capacity Manual* methodology⁹ for signalized intersections and 2010 *Highway Capacity Manual* methodology¹⁰ for unsignalized intersections.

Intersection operating conditions for the 2025 Project Site Buildout scenario is listed in Table 5 and detailed intersection calculation worksheets are included in Appendix D. As shown, three intersections **do not meet mobility targets**:

- Evergreen Road/Hayes Street
- Highway 214/Settlemier Avenue
- Settlemier Avenue/Hayes Street – which does not meet standards today

The intersection of Parr Road/Stubb Road in its current configuration is suitable for expected project volumes at the buildout of the site. Therefore, no new left turn lanes on the Stubb Road approach are required as part of this project. It is anticipated that the City (or Marion County) will require frontage improvements to Parr Road that match the roadway's ultimate cross-section, similar to Parr Road to the east of the site. Once the south side of Parr Road is fully improved, by subsequent development, this will provide space in the center for left-turns on and off of Parr Road.

⁹ 2000 *Highway Capacity Manual*, Transportation Research Board, Washington DC, 2000.

¹⁰ 2010 *Highway Capacity Manual*, Transportation Research Board, Washington DC, 2010.



TABLE 5: 2025 PROJECT SITE BUILDOUT AM AND PM PEAK HOUR MOTOR VEHICLE OPERATIONS

No.	Intersection	Operating Standard	AM Peak Hour			PM Peak Hour		
			LOS	Delay (sec)	V/C	LOS	Delay (sec)	V/C
Traffic Signal Controls								
3	Highway 214/Evergreen Road	0.95 V/C	C	31.0	0.65	D	43.8	0.78
4	I-5 NB Ramps/Highway 214	0.85 V/C	B	10.1	0.59	C	20.9	0.65
5	I-5 SB Ramps/Highway 214	0.85 V/C	B	10.6	0.56	C	20.3	0.83
6	Highway 214/Settlemier Avenue	0.95 V/C	F	81.2	0.97	F	120.8	1.01
12	Highway 214/Oregon Way	0.95 V/C	C	32.8	0.41	C	28.7	0.60
Stop Sign Controls								
1	Evergreen Road/Harvard Drive	LOS E	A/B	14.6	-	A/D	25.8	-
2	Evergreen Road/ Hayes Street*	LOS E	E	42.2	-	F	88.6	-
7	Settlemier Avenue/Hayes Street	LOS E	A/E	>100	-	A/F	>180	-
8	Settlemier Avenue/Ben Brown Lane	LOS E	A/C	16.4	-	A/B	13.9	-
9	Parr Road/Kirksey Drive	LOS E	A/A	8.8	-	A/A	9.3	-
10	Parr Road/Stubb Road	LOS E	A/A	9.8	-	A/A	9.5	-
11	Hayes Street/Cascade Drive*	LOS E	A	9.8	-	B	10.9	-
13	Hayes Street/Oregon Way*	LOS E	A	9.7	-	B	11.0	-
14	Settlemier Avenue/Parr Road*	LOS E	C	21.9	-	B	10.3	-

Bolded Red values do not meet operating standards.
 Two-Way Stop Controlled intersections:
 LOS = Level of Service of Major Street/Minor Street (i.e., A/F)
 Delay = Seconds of Delay of Worst Movement
 *All-Way Stop Controlled intersections:
 LOS = Level of Service of intersection
 Delay = Average Delay

PROJECT PHASING

This development is programmed over a total of 9 phases. To investigate how growth and new street connections impact the local street system, a project phasing traffic analysis was conducted for three scenarios. Under each scenario, assumptions were made about which development phases and the on-site roadways that would be built as detailed below.

Scenario 1

Based on discussions with the applicant, below are the assumptions for this scenario:

- The completion year is 2021.
- Phase 1A, 1B, 2A, 2B and 2C of the proposed project are assumed to be completed and operational. Therefore, a total of 324 single family housing units and 105 multi-family residential housing units are assumed to be built.
- Connection from the project site is via Harvard Drive, and Ben Brown Lane. All street connections to Ben Brown Lane should be stop-controlled.

The daily traffic volume on Harvard Drive today is about 1,300 just south of Evergreen Road. With the added traffic from Scenario 1, it will increase to about 3,330 a day. Harvard Drive and Ben Brown Lane are designated as an 'Access Street' as per the City of Woodburn Transportation System Plan. Therefore, the existing roadway classification for both streets would be able to support the new trips added due to the proposed project. Also, Harvard Drive lacks fronting driveways on the eastside of the road; therefore the growth in traffic would have less impact. Harvard Drive south of Evergreen Road allows on-street parking along the eastside which could be restricted to address impacts of higher traffic volumes.

Scenario 2

The second phasing scenario makes the following assumptions:

- The completion year is 2023.
- Phase 3A and 4A of the proposed project are assumed to be completed and operational. Therefore, a total of 172 single family housing units and 96 townhouse units are assumed to be built.
- Additional connection from the project site is via Stubb Road.

Stubb Road is designated as an 'Access Street' in the City of Woodburn Transportation System Plan. Killian Spring Parkway is being proposed as an 'Access Street.' Based on trip distributions all internal streets will be able to support the buildout condition of the project trips within the existing roadway classification.

Harvard Drive is proposed to be extended south via Stubb Road right-of-way and connect to Parr Road as part of this project. This extension would provide an alternative access to Parr Road from the project site along with Kirksey Drive and Eaden Drive. The proposed extension of Harvard Drive via Stubb Road would result in five new intersections along the extension, the first at Ben Brown Lane, the second at Hershberger Avenue (three legged), third at Killian Spring Parkway (three legged), fourth at Gunderson Lane (three legged) and the fifth at Sawtelle Drive. Due to lower traffic volumes, it is recommended that these intersections will be controlled by stop signs

on the minor street approaches. A two-way stop controlled operation at all three intersections (having north-south Harvard Drive as free) is recommended.

Scenario 3

The third phasing scenario makes the following assumptions:

- The completion year is 2025.
- All phases of the project are assumed to be completed and operational in this scenario.
- The entire proposed internal street network is assumed to be completed for this scenario.

This scenario is presented in detail in the previous section of this report. Some of the planned internal streets within the project site are Ben Brown Lane, Harvard Drive Extension to Parr Road, and Killian Spring Parkway. These streets are proposed to be built as 'Access Street' in the City of Woodburn Transportation System Plan. Based on trip distributions all internal streets will be able to support the buildout condition of the project trips within the existing roadway classification.



RECOMMENDED OFF-SITE IMPROVEMENTS AND PROJECT MITIGATIONS

The foregoing traffic study identified three intersections that will be operating below the agency’s preferred minimum targets. The intersection of Settlemier Avenue/Hayes Street fails today and will continue to under serve side street traffic without improvements at that intersection. As noted previously, the City is planning to upgrade Hayes Street, including its intersection with Settlemier Avenue in the next few years. The latest concept for this intersection is illustrated on Figure 7 on the following page.

Two other study intersections were shown to not meet agency performance targets by the time the project is fully developed in 2025. These two locations include the Highway 214/Settlemier Avenue (ODOT) intersection and the Evergreen Road/Hayes Street (City) intersection.

The ODOT mobility target on Highway 214 is 0.95 Volume-to-Capacity Ratio, which means that they prefer no more than 95 percent of the intersection capacity to be used at the busiest times of day. Today it operates at 0.88 Volume-to-Capacity Ratio during the PM peak hour, which shows that there is a small portion of peak hour capacity (0.07) available. Our phasing analysis determined that Scenario 1, with 429 units built within the proposed Smith Creek PUD, would add 0.06 to the Volume-to-Capacity Ratio to the intersection in the PM peak hour, and still operate under ODOT’s preferred 0.95 Volume-to-Capacity Ratio target. This essential fully utilizes the peak hour capacity, and improvements will be required to serve additional growth, both locally and regionally. The recommended mitigation for this intersection is identified below.

The City intersection of Evergreen Road/Hayes Street also falls below the City’s mobility target with the full development of the project site. We recommend a mitigation to address the project impacts at this location. Once the recommended mitigations are applied, the 2025 PM peak hour conditions will be as summarized in Table 6 below. Detailed intersection calculation worksheets are included in Appendix E. Previous analysis has shown that the PM peak hour has more congestion than the AM peak hour period, so we conclude that the recommended improvements would perform adequately for both periods.

TABLE 6: 2025 MITIGATED PM PEAK HOUR MOTOR VEHICLE OPERATIONS

No.	Intersection	Operating Standard	PM Peak Hour		
			LOS	Delay (sec)	V/C
Traffic Signal Controls					
6	Highway 214/Settlemier Avenue	0.95 V/C	E	66.3	0.78
Stop Controls					
2	Evergreen Road/Hayes Street*	LOS E	E	48.9	-
7	Settlemier Avenue/Hayes Street**	LOS E	A	6.0	0.72

V/C = Volume-to-Capacity Ratio of Worst Movement

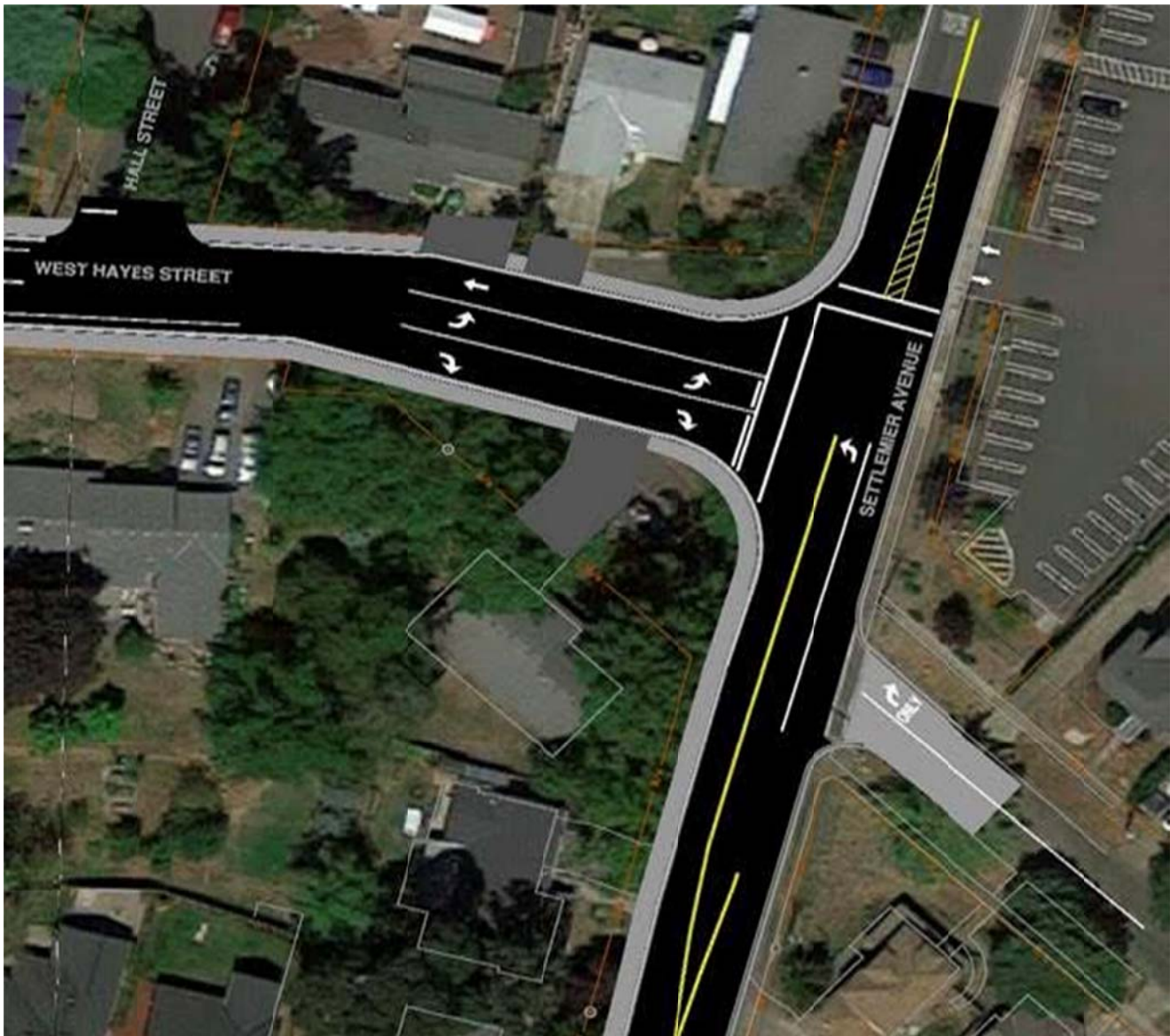
** It is a Mini-Roundabout

*All-Way Stop Controlled intersections:

LOS = Level of Service of intersection

Delay = Average Delay

FIGURE 7: CURRENT IMPROVEMENTS PROPOSED BY THE CITY AT SETTLEMIER AVENUE/HAYES STREET



Settlemier Avenue/Hayes Street: This location is the intersection of a designated minor arterial and a service collector street. These are two higher class streets in the city's transportation network. The existing stop controls are not adequate to serve side street traffic during peak hours. The delay analysis suggests that there is a high north-south volume along Settlemier Avenue which is free flowing. This results in inadequate gaps for the left turning traffic in the eastbound direction on Hayes Street. Therefore, the delay on the west leg is very high. The city's latest improvement concept, as shown above in Figure 7, is a significant enhancement to this location, however, it does not address the major delays for the Hayes Street left-turning traffic. This approach would continue to fail during peak hours.

Therefore, the following improvements should be considered:

- Install traffic signal

- Install mini-roundabout or
- Limit access for the west leg to right-in and right-out only.

Since this intersection is being upgraded as part of the City's improvement to the Hayes Street corridor, it is recommended that the City incorporate better quality traffic controls at this location as a part of that investment. For analysis purposes, we assumed a mini-roundabout design, which a Volume-to-Capacity Ratio of 0.72, which is within the range allowed by the city standards.

It should be noted that the proposed project has no impacts on the off-site pedestrian movement. Therefore, no mitigation measures to address potential impacts to pedestrians are recommended as part of this project.

Highway 214/Settlemier Avenue: This location does not meet the minimum performance standards in the project buildout year. A review of the traffic operations analysis suggests that the intersection has a high volume of traffic eastbound and westbound on Highway 214, and in the PM peak hour the northbound left-turn from Settlemier Avenue onto the highway westbound exceeds capacity. Together, there is significant queuing on all approaches. The challenge at this location is that adding capacity to serve these high volumes requires roadway expansion. Therefore, the following geometric improvements are recommended:

- Upgrade OR 214 to 5-lane section from North Cascade Drive to east of Settlemier Avenue.
- Expand the intersection of OR 214/Settlemier Avenue to provide two through lanes in the westbound and the eastbound direction on the highway. The five-lane improvement should continue east of Settlemier Avenue, a sufficient distance to promote balanced usage of the new eastbound lane.

This is a major roadway improvement project that covers about a mile of the highway corridor. This improvement will likely be considered by the City and ODOT during its update to the Woodburn Transportation System Plan, which began last year. It is highly unlikely that the planned improvement at this location would be completed before the approval of the proposed project. Therefore, the applicant could support the City and ODOT to help the proposed project move forward despite the delays in the implementation of the proposed improvements by the agencies. With this recommended improvement in place, the intersection would operate at a Volume-to-Capacity Ratio of 0.78 by 2025, as noted in Table 6, which is within ODOT's performance standards.

Evergreen Road/Hayes Street: The southbound approach will experience heavy queuing with insufficient turn pocket storage without improvements. Left-turning vehicle queues are likely to block right turning vehicles during the PM peak hour. Therefore, the following geometric improvements are recommended:

- Re-stripe the southbound shared left-through-right turn lane to provide a shared through-right turn lane.
- Add striping to accommodate a new left turn lane in the southbound direction.
- Adjust the east curb line, if necessary, to accommodate a northbound receiving lane.

This additional left turn lane will increase intersection capacity and provide additional left turn storage. The existing curb to curb width is 40'; this would accommodate a southbound through-right turn lane, one southbound left turn lane, and one receiving lane for the northbound traffic. The left turn pocket needs to be



150' based on the left turning volumes in the PM peak hour (149). The taper transition area to develop the left-turn pocket will be 60'.

With the provision of a separate southbound left-turn lane, the peak hour conditions will improve to LOS E during the PM peak hour, as shown in Table 6.

SUMMARY/RECOMMENDATIONS

The traffic study report outlined the existing conditions of the study intersections in the vicinity of the project, details of the proposed project, number of new trips generated, its impacts on the intersections and the recommended mitigation measures.

EXISTING CONDITIONS

Based on field investigation and the initial operational analysis of the intersections, below is the brief summary of findings:

- One study area intersection operates below standards, and that is Settlemier Avenue/Hayes Street
- The bikeway improvements within the study area are very limited. Only OR 214 has a continuous route available. Once Hayes Street is improved between Cascade Avenue and Settlemier Avenue, this will represent a second alternative route.
- High crash rates were observed at two locations, however, the crashes are not due to high traffic volumes or facility design.

FUTURE CONDITIONS

- The Smith Creek Development will be developed over approximately 9 phases and was assumed to be completed within about 8 years.
- The Smith Creek Development will generate approximately 6,946 daily vehicle trips and 1,256 (543 in AM and 712 in PM) peak hour trips when fully built.
- A possible restriction on on-street parking along Harvard Drive would address traffic impacts along the roadway.
- The addition of Smith Creek Development plus background growth will cause two additional intersections to fall below peak hour performance standards.

PROJECT PHASING AND CONNECTIONS

- When it is fully built, the Smith Creek Development site will have twelve (12) connections to the local street system, which will offer many routes for travelers in and out and through this new development area.
- The large number of travel options will help to reduce added traffic on existing neighborhood streets.
- The analysis was conducted in three scenarios. Each scenario was based on the assumption that some phases of the project and proposed roadway connections are built.
- For Scenario 1, it was assumed that the Phase 1A, 1B, 2A, 2B and 2C of the project will be completed by the year 2021 and the connections from the project site was via Harvard Drive, Kirksey Drive and Ben Brown Lane. The intersection of Highway 214/Settlemier Avenue can handle all the project trips for this scenario without getting impacted.

- For Scenario 2, it was assumed that Phase 3A and 4A of the project will be completed by the year 2023 and the connections from the project site was via Stubb Road and Eaden Way
- For Scenario 3, it was assumed that all phases of the project will be completed by the year 2025 and all the remaining connections from the project site are completed.

RECOMMENDED OFF-SITE IMPROVEMENTS AND PROJECT MITIGATION

Based upon the analysis presented in this report, it was determined that the proposed project would generate significant off-site traffic impacts at three intersections. One of these intersections does not meet performance standards today. The cost to correct these existing deficiencies should be funded by the local agencies. We have developed initial recommendations for improvements at these locations. These improvement concepts should be considered during the City's Transportation System Plan update process.

The recommended mitigation at Evergreen Road/Hayes Street will be the responsibility of the applicant due to the added traffic at this location. The applicant will provide the fairshare for the improvements at Settlemier Avenue/Highway 214. The mitigation measures recommended below will provide acceptable performance at the intersections and they would operate within the mobility targets adopted by the City.

RESPONSIBILITY OF LOCAL AGENCIES

Settlemier Avenue/Hayes Street: The existing offset legs of Hayes Street compounds the operational issues at this location. Given the City's plan to upgrade the quality of Hayes Street and its intersection with Settlemier Avenue, which is designated as a service collector street, between Settlemier Avenue and Cascade Avenue, this location should continue to provide full access and provide safe crossings for bikes and pedestrians. Our preliminary review of this location suggests that a mini-roundabout design is feasible, and will provide acceptable traffic performance. Alternatively, a traffic signal control could be installed to achieve the same objective without the need for striping changes.

RESPONSIBILITY OF LOCAL AGENCIES AND ODOT (APPLICANT WILL PROVIDE FAIRSHARE)

Highway 214/Settlemier Avenue: This junction of major arterial (highway 214) and a minor arterial (Settlemier Avenue) operates at Level of Service E during peak hours today during peak hours. The intersection fails during the project buildout. However, the intersection could handle all project trips for Scenario 1 without exceeding the threshold from the ODOT's Mobility target of 0.95 v/c. Therefore, a total of 324 single family units and 105 multi-family units could be built before this intersection could be impacted. Additional traffic capacity is recommended to serve the expected growth within the community. It is recommended to upgrade the OR 214 to a 5-lane roadway by adding a through lane in eastbound and westbound direction. As shown in Table 6 on page 24, this improvement would provide LOS E conditions during the PM peak hour.

RESPONSIBILITY OF APPLICANT

Evergreen Road/Hayes Street: It is recommended that the north leg of this intersection be improved. This would provide a left turn lane in southbound direction and a shared through and right-turn lane, similar to the south leg of the intersection. The left turn storage length needs to at least 150' with a 60' taper. These improvements would provide LOS D or better conditions during the peak hours.



APPENDIX

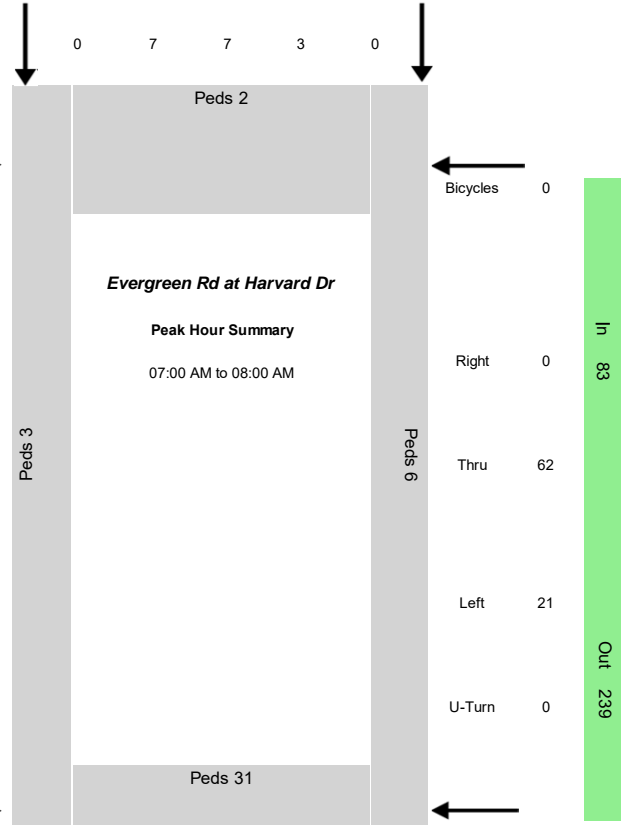
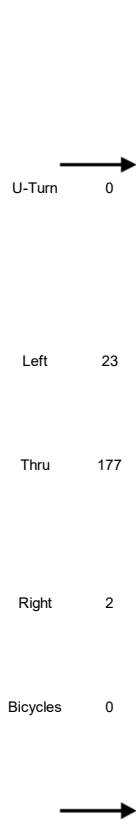
Appendix A – Raw Traffic Count Data



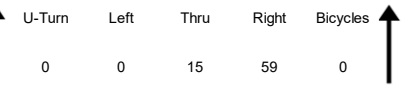
Data Provided by K-D-N.com 503-594-4224	
N/S street	Harvard Dr
E/W street	Evergreen Rd
City, State	Woodburn OR
Site Notes	
Location	45.147347 - -122.878546
Start Date	Tuesday, March 21, 2017
Start Time	07:00:00 AM
Weather	
Study ID #	107803
Peak Hour Start	07:00:00 AM
Peak 15 Min Start	07:35:00 AM
PHF (15-Min Int)	0.84

Eastbound
Evergreen Rd
Heavy Vehicle 5.4%

In 202
Out 69



Westbound
Evergreen Rd
Heavy Vehicle 8.4%



Heavy Vehicle 2.7%
Harvard Dr
Northbound

In 17 Out 38
Bicycles Right Thru Left U-Turn

0 7 7 3 0

Peds 2

Evergreen Rd at Harvard Dr

Peak Hour Summary

07:00 AM to 08:00 AM

U-Turn Left Thru Right Bicycles

0 0 15 59 0

In 74 Out 30



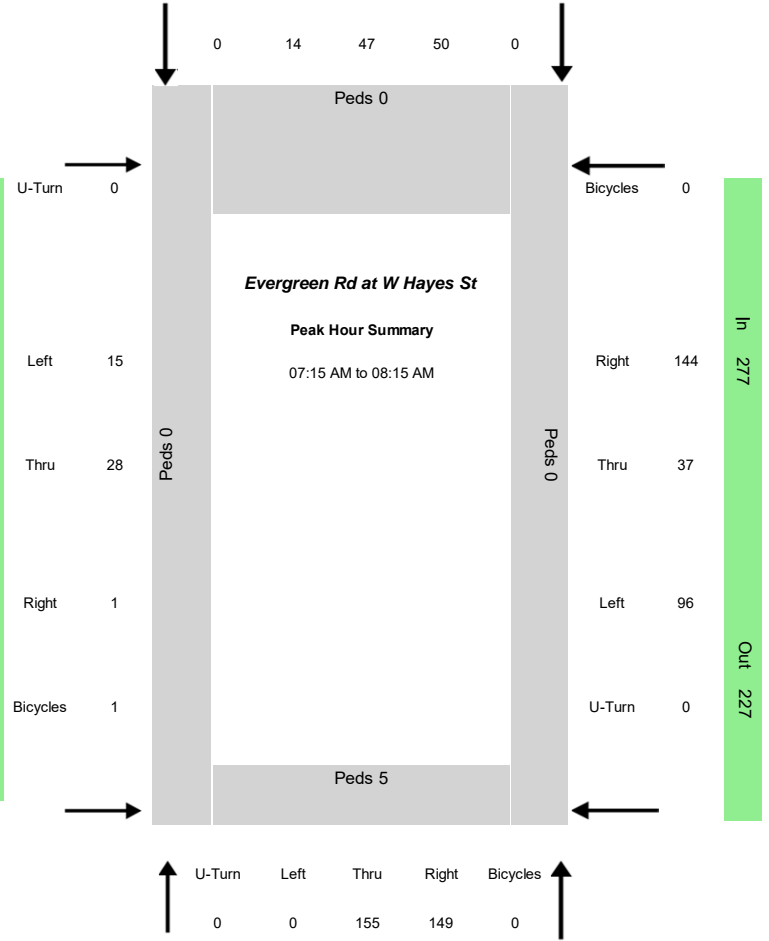
Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
0	15	59	0	3	7	7	0	23	177	2	0	21	62	0	0	74	17	202	83	30	38	69	239
Percent Heavy Vehicles																							
0.0%	0.0%	3.4%	0.0%	66.7%	0.0%	14.3%	0.0%	0.0%	5.6%	50.0%	0.0%	4.8%	9.7%	0.0%	0.0%	2.7%	17.6%	5.4%	8.4%	6.7%	0.0%	10.1%	5.9%
PHV - Bicycles															PHV - Pedestrians								
Northbound				Southbound				Eastbound				Westbound				Sum	in Crosswalk				Sum		
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn		NB	SB	EB	WB			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	2	3	6	42		
All Vehicle Volumes																							
Time	Northbound Harvard Dr				Southbound Harvard Dr				Eastbound Evergreen Rd				Westbound Evergreen Rd				15 Min Sum	1 HR Sum					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn							
07:00:00 AM	0	2	5	0	0	0	0	0	2	10	0	0	0	1	0	0							
07:05:00 AM	0	0	4	0	0	0	0	0	1	17	0	0	2	1	0	0							
07:10:00 AM	0	1	4	0	0	1	2	0	4	12	0	0	1	3	0	0	73						
07:15:00 AM	0	1	4	0	1	0	0	0	2	15	1	0	2	2	0	0	81						
07:20:00 AM	0	2	5	0	0	0	1	0	2	15	0	0	0	3	0	0	84						
07:25:00 AM	0	1	7	0	0	2	3	0	0	16	0	0	1	3	0	0	89						
07:30:00 AM	0	2	5	0	1	1	1	0	10	14	0	0	1	4	0	0	100						
07:35:00 AM	0	1	6	0	0	1	0	0	1	21	0	0	2	5	0	0	109						
07:40:00 AM	0	2	6	0	1	0	0	0	0	13	0	0	1	7	0	0	106						
07:45:00 AM	0	0	5	0	0	2	0	0	1	23	1	0	2	11	0	0	112						
07:50:00 AM	0	2	7	0	0	0	0	0	0	13	0	0	2	7	0	0	106						
07:55:00 AM	0	1	1	0	0	0	0	0	0	8	0	0	7	15	0	0	108	376					
08:00:00 AM	0	0	3	0	0	1	0	0	0	8	0	0	2	6	0	0	83	376					
08:05:00 AM	0	0	1	0	1	0	1	0	0	9	0	0	1	10	0	0	75	374					
08:10:00 AM	0	0	2	0	0	1	1	0	1	11	0	0	2	4	0	0	65	368					
08:15:00 AM	0	0	1	0	0	0	0	0	0	7	0	0	1	5	1	0	60	355					
08:20:00 AM	0	1	4	0	0	1	1	0	0	7	0	0	0	3	0	0	54	344					
08:25:00 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	4	0	0	38	317					
08:30:00 AM	0	0	3	0	0	0	0	0	1	10	1	0	0	3	1	0	42	297					
08:35:00 AM	0	1	0	0	0	0	1	0	1	3	0	0	1	3	0	0	35	270					
08:40:00 AM	0	0	0	0	0	1	0	0	0	6	0	0	0	2	0	0	38	249					
08:45:00 AM	0	1	0	0	0	4	1	0	0	4	0	0	0	2	0	0	31	216					
08:50:00 AM	0	2	3	0	0	1	1	0	1	5	0	0	0	3	0	0	37	201					
08:55:00 AM	0	0	5	0	0	2	0	0	1	5	0	0	2	5	1	0	49	190					



Data Provided by K-D-N.com 503-594-4224	
N/S street	Evergreen Rd
E/W street	W Hayes St
City, State	Woodburn OR
Site Notes	
Location	45.147403 - -122.875759
Start Date	Tuesday, March 21, 2017
Start Time	07:00:00 AM
Weather	
Study ID #	107805
Peak Hour Start	07:15:00 AM
Peak 15 Min Start	07:25:00 AM
PHF (15-Min Int)	0.81

Eastbound
W Hayes St
Heavy Vehicle 2.2%

In 44
Out 51



Southbound	
Evergreen Rd	
Heavy Vehicle 6.3%	
In	111
Out	314
Bicycles	0
Right	14
Thru	47
Left	50
U-Turn	0

Northbound	
Evergreen Rd	
Heavy Vehicle 5.3%	
In	304
Out	144
Bicycles	0
Right	149
Thru	155
Left	0
U-Turn	0

Westbound
W Hayes St
Heavy Vehicle 3.6%

In 277
Out 227

Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
0	155	149	0	50	47	14	0	15	28	1	0	96	37	144	0	304	111	44	277	144	314	51	227
Percent Heavy Vehicles																							
0.0%	7.1%	3.4%	0.0%	0.0%	10.6%	14.3%	0.0%	0.0%	3.6%	0.0%	0.0%	2.1%	5.4%	4.2%	0.0%	5.3%	6.3%	2.3%	3.6%	4.9%	5.4%	7.8%	2.6%
PHV - Bicycles															PHV - Pedestrians								
Northbound				Southbound				Eastbound				Westbound				in Crosswalk							
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum		
0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	5	0	0	0	5		
All Vehicle Volumes																							
Time	Northbound Evergreen Rd				Southbound Evergreen Rd				Eastbound W Hayes St				Westbound W Hayes St				15 Min Sum	1 HR Sum					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn							
07:00:00 AM	0	20	4	0	1	0	0	0	1	1	0	0	0	3	6	0							
07:05:00 AM	0	24	5	0	3	0	1	0	0	2	0	0	2	0	10	0							
07:10:00 AM	0	14	6	0	4	1	0	0	3	1	0	0	2	0	5	0	119						
07:15:00 AM	0	19	7	0	3	1	1	0	0	4	0	0	2	4	9	0	133						
07:20:00 AM	0	12	15	0	6	1	1	0	1	1	1	0	1	3	7	0	135						
07:25:00 AM	0	17	18	0	5	1	4	0	3	5	0	0	5	1	13	0	171						
07:30:00 AM	0	11	15	0	5	2	1	0	4	5	0	0	8	6	19	0	197						
07:35:00 AM	0	20	20	0	5	1	0	0	1	4	0	0	9	3	17	0	228						
07:40:00 AM	0	11	16	0	4	5	1	0	2	3	0	0	5	0	8	0	211						
07:45:00 AM	0	12	19	0	4	2	1	0	0	1	0	0	11	4	13	0	202						
07:50:00 AM	0	12	17	0	5	1	1	0	2	1	0	0	14	1	16	0	192						
07:55:00 AM	0	10	8	0	4	18	0	0	0	0	0	0	16	2	16	0	211	712					
08:00:00 AM	0	5	5	0	3	6	0	0	0	2	0	0	6	3	10	0	184	716					
08:05:00 AM	0	11	8	0	4	6	2	0	2	1	0	0	9	4	9	0	170	725					
08:10:00 AM	0	15	1	0	2	3	2	0	0	1	0	0	10	6	7	0	143	736					
08:15:00 AM	0	9	3	0	3	2	1	0	1	1	0	0	6	5	5	0	139	722					
08:20:00 AM	0	7	6	0	2	1	0	0	0	0	0	0	2	6	5	0	112	702					
08:25:00 AM	0	6	0	0	1	2	0	0	1	1	0	0	4	3	7	0	90	655					
08:30:00 AM	0	8	7	0	1	1	0	0	0	3	0	0	6	4	9	0	93	618					
08:35:00 AM	0	2	2	0	3	0	0	0	0	1	0	0	4	2	10	0	88	562					
08:40:00 AM	0	5	1	0	0	2	2	0	1	1	0	0	2	4	6	0	87	531					
08:45:00 AM	0	5	4	0	2	3	0	0	1	2	0	0	2	6	4	0	77	493					
08:50:00 AM	0	4	3	0	2	1	4	0	0	5	0	0	4	6	10	0	92	462					
08:55:00 AM	0	9	4	0	2	3	0	0	1	1	0	0	7	5	9	0	109	429					



Data Provided by K-D-N.com 503-594-4224

N/S street	Evergreen Rd
E/W street	OR 214
City, State	Woodburn OR
Site Notes	
Location	45.150952 - -122.875772
Start Date	Tuesday, March 21, 2017
Start Time	07:00:00 AM
Weather	
Study ID #	107801
Peak Hour Start	07:00:00 AM
Peak 15 Min Start	07:20:00 AM
PHF (15-Min Int)	0.93

Eastbound
OR 214
Heavy Vehicle 4.8%

In 785

Out 1056

Bicycles 0

U-Turn 23

Right 51

Thru 658

Left 52

Peds 0

U-Turn	0	Left	349	Thru	15	Right	138	Bicycles	0
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In 502 Out 173

Heavy Vehicle 6.0%
Evergreen Rd
Northbound

In 46 Out 83

Bicycles Right Thru Left U-Turn

U-Turn	0	Right	27	Thru	8	Left	11	Bicycles	0
--------	---	-------	----	------	---	------	----	----------	---

Peds 0

Evergreen at OR214

Peak Hour Summary

07:00 AM to 08:00 AM

Peds 0

Peds 2

Peds 0

Peds 2

Westbound
OR 214
Heavy Vehicle 8.2%

In 792

Out 813

Bicycles 0

U-Turn 6

Left 114

Thru 656

Right 16

Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
349	15	138	0	11	8	27	0	52	658	51	24	114	656	16	6	502	46	785	792	173	83	1056	813
Percent Heavy Vehicles																							
5.4%	6.7%	7.2%	0.0%	9.1%	0.0%	3.7%	0.0%	5.8%	4.9%	3.9%	4.2%	6.1%	8.7%	6.3%	0.0%	6.0%	4.3%	4.8%	8.2%	5.2%	6.0%	7.4%	5.3%
PHV - Bicycles															PHV - Pedestrians								
Northbound				Southbound				Eastbound				Westbound				in Crosswalk							
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	4		
All Vehicle Volumes																							
Time	Northbound Evergreen Rd				Southbound Evergreen Rd				Eastbound OR 214				Westbound OR 214				15 Min	1 HR					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum					
07:00:00 AM	26	0	8	0	3	1	2	0	5	39	3	1	9	52	0	0							
07:05:00 AM	28	1	15	0	1	2	0	0	1	52	2	2	7	43	1	0							
07:10:00 AM	29	2	11	0	1	0	4	0	1	55	1	0	8	58	1	0	475						
07:15:00 AM	26	1	14	0	0	0	3	0	3	49	10	4	9	53	1	1	500						
07:20:00 AM	33	1	12	0	2	0	4	0	6	61	4	1	13	61	1	0	544						
07:25:00 AM	29	1	11	0	0	0	2	0	5	55	4	1	9	55	1	0	546						
07:30:00 AM	29	1	17	0	1	0	2	0	2	65	8	7	6	61	2	0	573						
07:35:00 AM	46	2	15	0	0	2	1	0	4	49	3	2	6	54	1	0	559						
07:40:00 AM	30	2	14	0	1	2	2	0	5	49	2	2	3	65	2	0	565						
07:45:00 AM	18	1	7	0	0	1	4	0	3	63	5	0	8	63	3	2	542						
07:50:00 AM	26	2	8	0	1	0	2	0	12	71	2	2	13	44	3	1	544						
07:55:00 AM	29	1	6	0	1	0	1	0	5	50	7	2	23	47	0	2	539	2125					
08:00:00 AM	24	2	4	0	1	2	0	0	4	42	6	3	12	34	0	0	495	2110					
08:05:00 AM	24	1	6	0	1	3	9	0	3	46	5	2	9	56	1	0	474	2121					
08:10:00 AM	14	0	3	0	2	2	4	0	4	39	3	1	8	63	4	0	447	2097					
08:15:00 AM	26	3	11	0	1	2	3	0	2	29	4	4	6	41	4	0	449	2059					
08:20:00 AM	25	1	4	0	1	2	1	0	4	39	3	0	8	37	1	1	410	1987					
08:25:00 AM	20	3	7	0	0	0	3	0	8	39	2	1	7	43	1	2	399	1950					
08:30:00 AM	17	2	8	0	0	0	0	0	4	52	2	0	4	23	0	2	377	1863					
08:35:00 AM	23	0	5	0	0	0	1	0	1	35	1	3	7	60	0	0	386	1814					
08:40:00 AM	18	0	10	0	3	0	0	0	3	36	8	1	9	32	2	0	372	1757					
08:45:00 AM	22	0	7	0	2	2	3	0	2	29	2	1	10	34	2	0	374	1695					
08:50:00 AM	15	2	9	0	2	0	4	0	5	36	5	2	11	35	2	2	368	1638					
08:55:00 AM	16	2	16	0	0	0	4	0	6	33	5	2	6	38	1	2	377	1595					



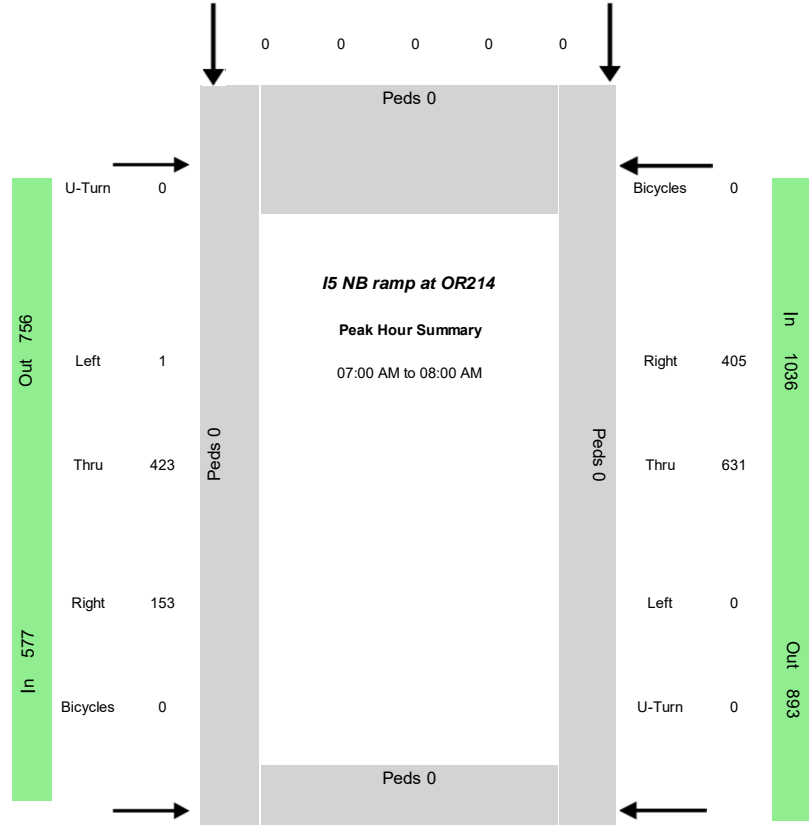
Data Provided by K-D-N.com 503-594-4224

N/S street	15 NB ramps	
E/W street	OR214	
City, State	Woodburn OR	
Site Notes		
Location	45.150722 - -122.878041	
Start Date	Tuesday, March 21, 2017	
Start Time	07:00:00 AM	
Weather		
Study ID #	107807	
Peak Hour Start	07:00:00 AM	
Peak 15 Min Start	07:15:00 AM	
PHF (15-Min Int)	0.94	

Eastbound
OR214
Heavy Vehicle 8.1%

Southbound
15 NB ramps
Heavy Vehicle 0.0%

In	0	Out	406
Bicycles		Right	
		Thru	
		Left	
		U-Turn	



Northbound
15 NB ramps
Heavy Vehicle 4.5%

In	595	Out	153
U-Turn		Right	
Left		Thru	
		Left	
		Bicycles	

Westbound
OR214
Heavy Vehicle 7.2%

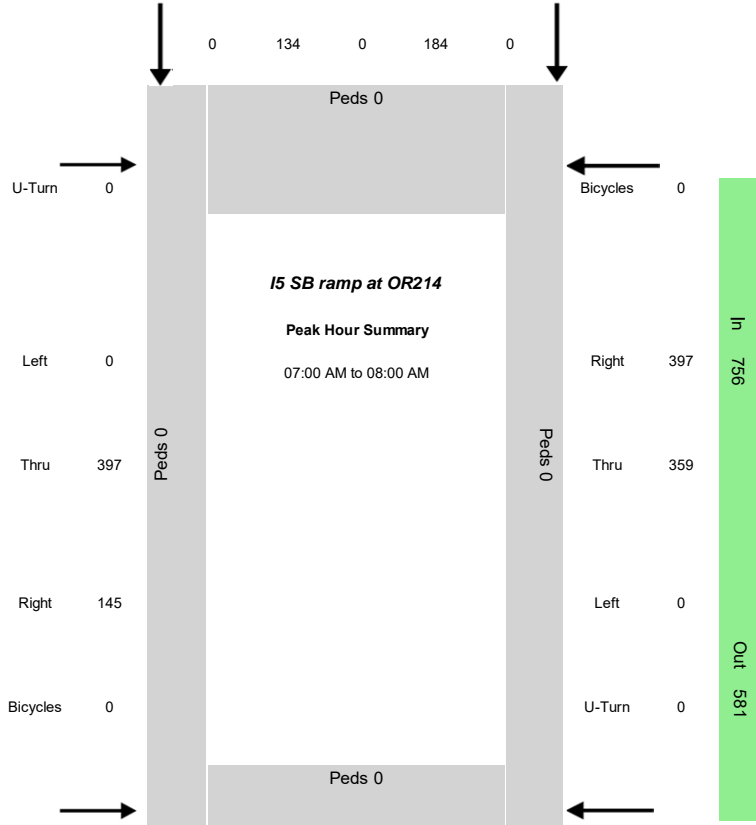
Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
125	0	470	0	0	0	0	0	1	423	153	0	0	631	405	0	595	0	577	1036	153	406	756	893
Percent Heavy Vehicles																							
9.6%	0.0%	3.2%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	7.6%	9.2%	0.0%	0.0%	9.8%	3.2%	0.0%	4.5%	0.0%	8.1%	7.2%	9.2%	3.4%	9.8%	5.3%
PHV- Bicycles														PHV - Pedestrians									
Northbound				Southbound				Eastbound				Westbound				in Crosswalk							
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
All Vehicle Volumes																							
Time	Northbound 15 NB ramps				Southbound 15 NB ramps				Eastbound OR214				Westbound OR214				15 Min	1 HR					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn			Sum	Sum			
07:00:00 AM	7	0	35	0	0	0	0	0	0	27	21	0	0	43	30	0							
07:05:00 AM	11	0	39	0	0	0	0	0	0	35	16	0	0	50	28	0							
07:10:00 AM	13	0	36	0	0	0	0	0	0	34	6	0	0	47	36	0	514						
07:15:00 AM	7	0	33	0	0	0	0	0	0	34	14	0	0	55	43	0	537						
07:20:00 AM	15	0	59	0	0	0	0	0	1	29	15	0	0	56	28	0	561						
07:25:00 AM	15	0	38	0	0	0	0	0	0	40	10	0	0	58	35	0	585						
07:30:00 AM	3	0	32	0	0	0	0	0	0	48	9	0	0	64	29	0	584						
07:35:00 AM	5	0	34	0	0	0	0	0	0	32	15	0	0	60	49	0	576						
07:40:00 AM	14	0	38	0	0	0	0	0	0	24	12	0	0	68	25	0	561						
07:45:00 AM	14	0	45	0	0	0	0	0	0	36	14	0	0	42	33	0	560						
07:50:00 AM	13	0	41	0	0	0	0	0	0	52	11	0	0	43	24	0	549						
07:55:00 AM	8	0	40	0	0	0	0	0	0	32	10	0	0	45	45	0	548	2208					
08:00:00 AM	10	0	27	0	0	0	0	0	0	31	8	0	0	36	23	0	499	2180					
08:05:00 AM	6	0	33	0	0	0	0	0	0	33	2	0	0	51	34	0	474	2160					
08:10:00 AM	7	0	20	0	0	0	0	0	0	31	8	0	0	52	31	0	443	2137					
08:15:00 AM	8	0	19	0	0	0	0	0	0	18	16	0	0	39	38	0	446	2089					
08:20:00 AM	5	0	25	0	0	0	0	0	0	31	10	0	0	43	23	0	424	2023					
08:25:00 AM	8	0	29	0	0	0	0	0	0	25	9	0	0	40	17	0	403	1955					
08:30:00 AM	5	0	34	0	0	0	0	0	0	46	10	0	0	24	19	0	403	1908					
08:35:00 AM	11	0	27	0	0	0	0	0	0	29	6	0	0	48	32	0	419	1866					
08:40:00 AM	7	0	27	0	0	0	0	0	0	31	10	0	0	22	28	0	416	1810					
08:45:00 AM	12	0	25	0	0	0	0	0	0	23	6	0	0	29	31	0	404	1752					
08:50:00 AM	12	0	22	0	0	0	0	0	0	37	7	0	0	35	23	0	387	1704					
08:55:00 AM	11	0	27	0	0	0	0	0	0	29	6	0	0	32	24	0	391	1653					



Data Provided by K-D-N.com 503-594-4224	
N/S street	I5 SB ramps
E/W street	OR214
City, State	Woodburn OR
Site Notes	
Location	45.15108 - -122.882928
Start Date	Tuesday, March 21, 2017
Start Time	07:00:00 AM
Weather	
Study ID #	107809
Peak Hour Start	07:00:00 AM
Peak 15 Min Start	07:20:00 AM
PHF (15-Min Int)	0.92

Eastbound
OR214
Heavy Vehicle 7.9%

In 542
Out 493



Westbound
OR214
Heavy Vehicle 0.8%

In 756
Out 581

U-Turn	0	Left	0	Thru	0	Right	0	Bicycles	0
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In 0
Out 145

Heavy Vehicle NaN
I5 SB ramps
Northbound

In 318
Out 397

Bicycles Right Thru Left U-Turn

Southbound
I5 SB ramps
Heavy Vehicle 10.7%

0	134	0	184	0
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Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
0	0	0	0	184	0	134	0	0	397	145	0	0	359	397	0	0	318	542	756	145	397	493	581
Percent Heavy Vehicles																							
0.0%	0.0%	0.0%	0.0%	9.2%	0.0%	12.7%	0.0%	0.0%	7.8%	8.3%	0.0%	0.0%	7.2%	12.1%	0.0%	#DIV/0!	10.7%	7.9%	9.8%	8.3%	12.1%	8.7%	8.3%
PHV - Bicycles															PHV - Pedestrians								
Northbound				Southbound				Eastbound				Westbound				in Crosswalk							
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum		
0				0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0		
All Vehicle Volumes																							
Time	Northbound				Southbound I5 SB ramps				Eastbound OR214				Westbound OR214				15 Min	1 HR					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum					
07:00:00 AM					15		7		40	12	0		21	29	0								
07:05:00 AM					19		14		21	12	0		35	26	0								
07:10:00 AM					16		7		31	12	0		26	34	0		377						
07:15:00 AM					16		10		31	7	0		29	33	0		379						
07:20:00 AM					13		16		34	19	0		33	38	0		405						
07:25:00 AM					19		11		32	9	0		33	40	0		423						
07:30:00 AM					23		10		34	8	0		20	47	0		439						
07:35:00 AM					14		19		32	8	0		25	40	0		424						
07:40:00 AM					9		14		33	11	0		43	39	0		429						
07:45:00 AM					18		10		38	20	0		29	27	0		429						
07:50:00 AM					9		8		42	16	0		34	22	0		422						
07:55:00 AM					13		8		29	11	0		31	22	0		387	1616					
08:00:00 AM					15		5		24	8	0		21	25	0		343	1590					
08:05:00 AM					17		6		21	10	0		23	34	0		323	1574					
08:10:00 AM					14		9		25	9	0		23	36	0		325	1564					
08:15:00 AM					9		8		27	7	0		28	19	0		325	1536					
08:20:00 AM					13		12		24	14	0		18	30	0		325	1494					
08:25:00 AM					16		9		32	7	0		19	29	0		321	1462					
08:30:00 AM					12		19		31	10	0		13	16	0		324	1421					
08:35:00 AM					13		11		24	11	0		28	31	0		331	1401					
08:40:00 AM					14		9		27	14	0		16	13	0		312	1345					
08:45:00 AM					16		8		15	10	0		22	19	0		301	1293					
08:50:00 AM					15		4		30	7	0		26	21	0		286	1265					
08:55:00 AM					22		10		14	8	0		23	20	0		290	1248					



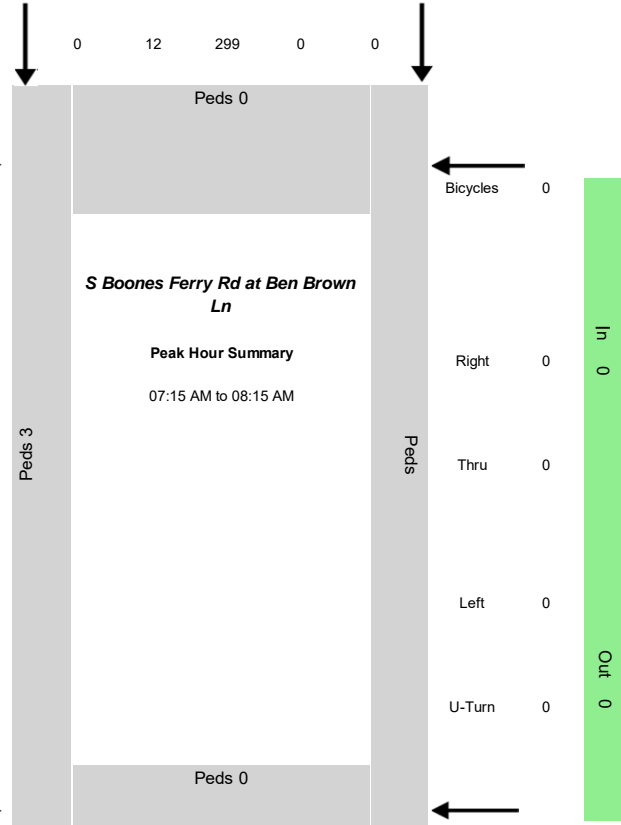
Data Provided by K-D-N.com 503-594-4224	
N/S street	S Boones Ferry Rd
E/W street	Ben Brown Ln
City, State	Woodburn OR
Site Notes	
Location	45.137496 - -122.864178
Start Date	Tuesday, March 21, 2017
Start Time	07:00:00 AM
Weather	
Study ID #	107815
Peak Hour Start	07:15:00 AM
Peak 15 Min Start	07:40:00 AM
PHF (15-Min Int)	0.82

Eastbound
Ben Brown Ln
Heavy Vehicle 3.8%



Southbound
S Boones Ferry Rd
Heavy Vehicle 5.5%

In	311	Out	288
Bicycles		Right	
		Thru	
		Left	
		U-Turn	



Westbound
Heavy Vehicle 0.0%

U-Turn	Left	Thru	Right	Bicycles
0	1	264	0	0

In	265	Out	301
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Heavy Vehicle 11.3%
S Boones Ferry Rd
Northbound

Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
1	264	0	0	0	299	12	0	24	0	2	0	0	0	0	0	265	311	26	0	301	288	13	0
Percent Heavy Vehicles																							
0.0%	11.4%	0.0%	0.0%	0.0%	5.7%	0.0%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	11.3%	5.5%	3.8%	0.0%	6.0%	10.4%	0.0%	0.0%
PHV- Bicycles																PHV - Pedestrians							
Northbound				Southbound				Eastbound				Westbound				in Crosswalk							
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3		
All Vehicle Volumes																							
Time	Northbound S Boones Ferry Rd				Southbound S Boones Ferry Rd				Eastbound Ben Brown Ln				Westbound				15 Min Sum	1 HR Sum					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn							
07:00:00 AM	0	19	0	0	8	0	0	0	1	0	0	0											
07:05:00 AM	0	10	0	0	15	1	0	0	2	0	0	0											
07:10:00 AM	0	14	0	0	13	0	0	0	1	0	0	0					84						
07:15:00 AM	0	13	0	0	19	1	0	0	2	0	0	0					91						
07:20:00 AM	0	17	0	0	23	0	0	0	2	0	0	0					105						
07:25:00 AM	0	18	0	0	20	1	0	0	2	0	0	0					118						
07:30:00 AM	0	23	0	0	28	0	0	0	4	0	0	0					138						
07:35:00 AM	0	21	0	0	25	0	0	0	4	0	0	0					146						
07:40:00 AM	0	25	0	0	39	3	0	0	4	0	0	0					176						
07:45:00 AM	0	23	0	0	35	1	0	0	1	0	0	0					181						
07:50:00 AM	0	23	0	0	27	2	0	0	1	0	0	0					184						
07:55:00 AM	0	24	0	0	32	1	0	0	1	0	0	0					171	549					
08:00:00 AM	1	21	0	0	19	2	0	0	1	0	0	0					155	565					
08:05:00 AM	0	25	0	0	22	0	0	0	1	1	0	0					151	586					
08:10:00 AM	0	31	0	0	10	1	0	0	1	1	0	0					137	602					
08:15:00 AM	0	9	0	0	5	0	0	0	1	0	0	0					108	582					
08:20:00 AM	0	16	0	0	7	0	0	0	2	0	0	0					84	565					
08:25:00 AM	0	9	0	0	5	0	0	0	0	0	0	0					54	538					
08:30:00 AM	1	9	0	0	14	1	0	0	1	0	0	0					65	509					
08:35:00 AM	0	5	0	0	3	0	0	0	1	0	0	0					49	468					
08:40:00 AM	0	10	0	0	6	0	0	0	0	0	0	0					51	413					
08:45:00 AM	0	6	0	0	4	1	0	0	2	0	0	0					38	366					
08:50:00 AM	0	8	0	0	3	0	0	0	0	1	0	0					41	325					
08:55:00 AM	0	7	0	0	7	0	0	0	1	0	0	0					40	282					

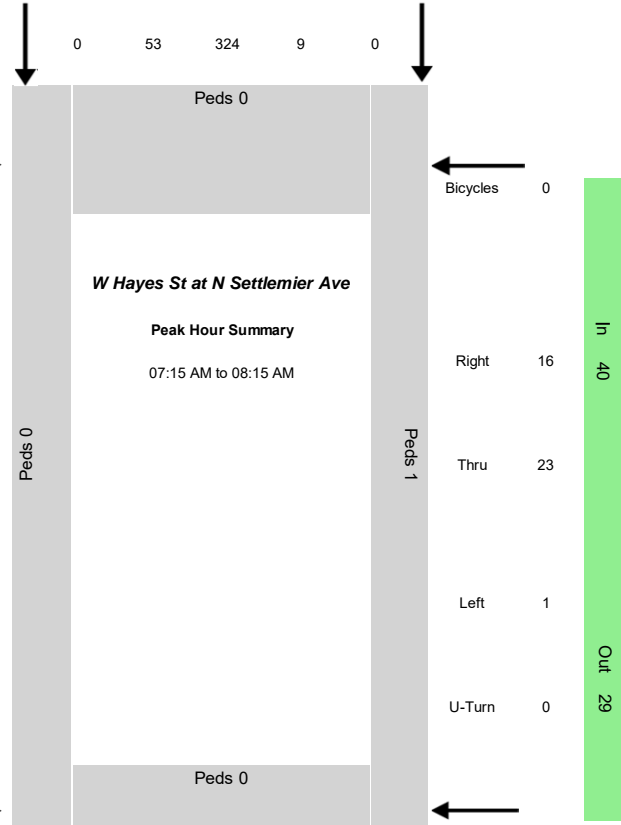


Data Provided by K-D-N.com 503-594-4224

N/S street	N Settlemeir Ave	
E/W street	W Hayes St	
City, State	Woodburn OR	
Site Notes		
Location	45.145751 - -122.860855	
Start Date	Tuesday, March 21, 2017	
Start Time	07:00:00 AM	
Weather		
Study ID #	107817	
Peak Hour Start	07:15:00 AM	
Peak 15 Min Start	07:30:00 AM	
PHF (15-Min Int)	0.83	

Southbound
N Settlemeir Ave
Heavy Vehicle 5.7%

In	386	Out	460
Bicycles		Right	
		Thru	
		Left	
		U-Turn	



In	532	Out	469
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Heavy Vehicle 7.0%
N Settlemeir Ave
Northbound

Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
124	404	4	0	9	324	53	0	40	16	144	0	1	23	16	0	532	386	200	40	469	460	200	29
Percent Heavy Vehicles																							
4.8%	7.7%	0.0%	0.0%	0.0%	5.6%	7.5%	0.0%	2.5%	0.0%	4.9%	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%	5.7%	4.0%	0.0%	5.3%	7.0%	5.0%	0.0%
PHV- Bicycles															PHV - Pedestrians								
Northbound				Southbound				Eastbound				Westbound				Sum	in Crosswalk				Sum		
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn		NB	SB	EB	WB			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1		
All Vehicle Volumes																							
Time	Northbound N Settlemeir Ave				Southbound N Settlemeir Ave				Eastbound W Hayes St				Westbound W Hayes St				15 Min Sum	1 HR Sum					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn							
07:00:00 AM	6	28	0	0	1	15	2	0	1	1	3	0	0	0	2	0							
07:05:00 AM	6	37	0	0	0	26	3	0	4	0	8	0	0	0	1	0							
07:10:00 AM	6	28	0	0	0	21	1	0	0	2	3	0	0	1	1	0	207						
07:15:00 AM	7	31	0	0	0	16	6	0	4	0	12	0	0	0	0	0	224						
07:20:00 AM	10	35	0	0	0	27	5	0	3	1	10	0	0	3	2	0	235						
07:25:00 AM	10	33	0	0	3	13	3	0	2	0	18	0	1	2	1	0	258						
07:30:00 AM	13	40	1	0	2	31	9	0	3	2	13	0	0	1	2	0	299						
07:35:00 AM	10	36	0	0	0	30	6	0	3	1	16	0	0	2	3	0	310						
07:40:00 AM	13	36	1	0	1	36	7	0	3	0	23	0	0	4	2	0	350						
07:45:00 AM	12	36	1	0	1	32	3	0	5	3	15	0	0	6	1	0	348						
07:50:00 AM	7	36	0	0	1	34	2	0	4	2	12	0	0	3	0	0	342						
07:55:00 AM	11	29	0	0	0	28	4	0	4	4	7	0	0	2	4	0	309	1124					
08:00:00 AM	10	32	0	0	0	27	2	0	2	2	4	0	0	0	1	0	274	1145					
08:05:00 AM	9	28	1	0	0	33	4	0	5	0	12	0	0	0	0	0	265	1152					
08:10:00 AM	12	32	0	0	1	17	2	0	2	1	2	0	0	0	0	0	241	1158					
08:15:00 AM	7	25	1	0	1	15	1	0	2	1	4	0	0	0	1	0	219	1140					
08:20:00 AM	6	21	0	0	0	10	3	0	1	0	6	0	0	0	1	0	175	1092					
08:25:00 AM	5	26	0	0	0	12	0	0	0	1	5	0	0	1	0	0	156	1056					
08:30:00 AM	8	17	1	0	1	22	4	0	1	0	0	0	0	0	1	0	153	994					
08:35:00 AM	2	11	0	0	0	12	0	0	3	3	2	0	0	1	0	0	139	921					
08:40:00 AM	3	10	1	0	0	10	3	0	2	0	2	0	1	0	0	0	121	827					
08:45:00 AM	7	17	0	0	0	14	3	0	0	0	3	0	0	2	0	0	112	758					
08:50:00 AM	7	20	0	0	1	10	2	0	1	1	4	0	0	0	1	0	125	704					
08:55:00 AM	2	17	0	0	1	13	3	0	2	3	2	0	1	2	0	0	139	657					

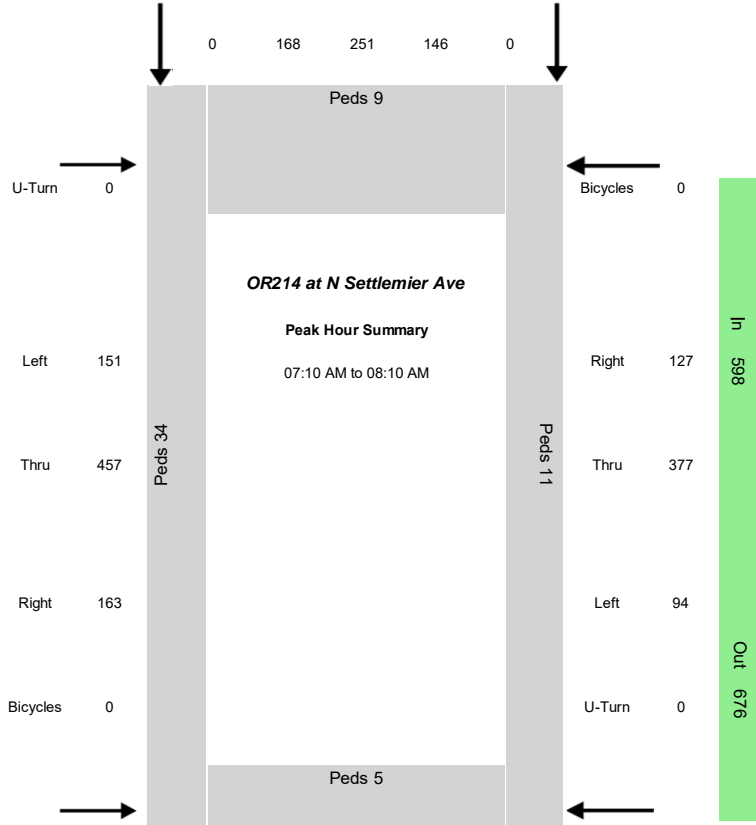


Data Provided by K-D-N.com 503-594-4224

N/S street	Boones Ferry Rd	
E/W street	OR 214	
City, State	Woodburn OR	
Site Notes		
Location	45.149127 - -122.860072	
Start Date	Tuesday, March 21, 2017	
Start Time	07:00:00 AM	
Weather		
Study ID #	107811	
Peak Hour Start	07:10:00 AM	
Peak 15 Min Start	07:40:00 AM	
PHF (15-Min Int)	0.88	

Eastbound
OR 214
Heavy Vehicle 5.8%

In 771
Out 766



Westbound
OR 214
Heavy Vehicle 11.4%

In 598
Out 676

U-Turn	0	Left	221	Thru	252	Right	73	Bicycles	0
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In 546 Out 508

Heavy Vehicle 5.1%
Boones Ferry Rd
Northbound

In 565 Out 530
Bicycles Right Thru Left U-Turn

Bicycles	0	Right	168	Thru	251	Left	146	U-Turn	0
----------	---	-------	-----	------	-----	------	-----	--------	---

Southbound
N Settlemier Rd
Heavy Vehicle 6.5%

Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
221	252	73	0	146	251	168	0	151	457	163	0	94	377	127	0	546	565	771	598	508	530	766	676
Percent Heavy Vehicles																							
6.8%	1.2%	13.7%	0.0%	11.6%	6.4%	2.4%	0.0%	3.3%	6.8%	5.5%	0.0%	3.2%	16.2%	3.1%	0.0%	5.1%	6.5%	5.8%	11.4%	5.5%	2.3%	10.4%	8.6%
PHV- Bicycles														PHV - Pedestrians									
Northbound				Southbound				Eastbound				Westbound				in Crosswalk							
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	9	34	11	59		
All Vehicle Volumes																							
Time	Northbound Boones Ferry Rd				Southbound N Settlemier Rd				Eastbound OR 214				Westbound OR 214				15 Min	1 HR					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn			Sum	Sum			
07:00:00 AM	20	13	3	0	6	3	4	0	8	31	16	0	2	31	2	0							
07:05:00 AM	21	16	7	0	4	12	6	0	10	26	17	0	6	21	8	0							
07:10:00 AM	21	16	3	0	2	5	10	0	12	42	14	0	3	32	2	0	455						
07:15:00 AM	19	24	10	0	1	17	11	0	6	33	10	0	2	31	11	0	491						
07:20:00 AM	13	25	0	0	11	22	12	0	11	30	12	0	8	32	11	0	524						
07:25:00 AM	20	22	5	0	10	18	12	0	12	43	17	0	6	27	13	0	567						
07:30:00 AM	16	25	10	0	13	22	17	0	6	40	18	0	4	31	13	0	607						
07:35:00 AM	23	15	4	0	11	15	17	0	19	48	14	0	8	33	13	0	640						
07:40:00 AM	21	25	11	0	10	24	12	0	18	35	11	0	18	35	17	0	672						
07:45:00 AM	15	25	8	0	12	26	22	0	19	41	11	0	12	33	13	0	694						
07:50:00 AM	20	28	5	0	19	29	18	0	19	30	10	0	20	26	9	0	707						
07:55:00 AM	17	19	5	0	17	26	13	0	19	44	16	0	5	33	12	0	696	2390					
08:00:00 AM	15	15	5	0	19	19	9	0	4	36	18	0	5	31	9	0	644	2436					
08:05:00 AM	21	13	7	0	21	28	15	0	6	35	12	0	3	33	4	0	609	2480					
08:10:00 AM	22	15	6	0	9	21	14	0	6	23	5	0	2	26	2	0	534	2469					
08:15:00 AM	19	12	5	0	8	9	6	0	8	36	10	0	5	22	1	0	490	2435					
08:20:00 AM	13	5	4	0	6	10	5	0	5	32	8	0	2	26	4	0	412	2368					
08:25:00 AM	10	13	8	0	4	3	7	0	4	20	10	0	3	23	2	0	368	2270					
08:30:00 AM	13	9	4	0	3	10	5	0	6	28	14	0	6	28	1	0	354	2182					
08:35:00 AM	17	2	5	0	6	10	3	0	3	29	14	0	5	27	3	0	358	2086					
08:40:00 AM	9	1	3	0	4	8	2	0	7	35	12	0	6	24	2	0	364	1962					
08:45:00 AM	15	7	1	0	2	8	3	0	2	18	10	0	2	34	1	0	340	1828					
08:50:00 AM	17	12	5	0	9	13	9	0	3	31	7	0	2	19	8	0	351	1730					
08:55:00 AM	9	4	1	0	2	8	3	0	5	40	20	0	5	30	1	0	366	1632					

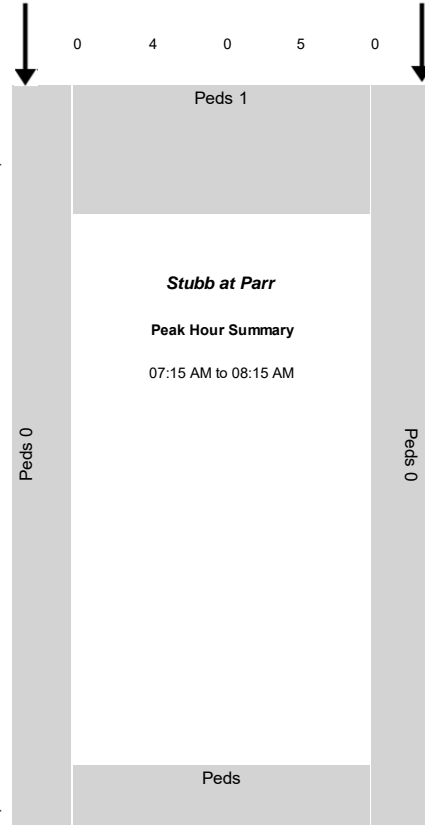


Data Provided by K-D-N.com 503-594-4224	
N/S street	Stubb Rd NE
E/W street	Parr Rd
City, State	Woodburn OR
Site Notes	
Location	45.136454 - -122.879529
Start Date	Tuesday, March 21, 2017
Start Time	07:00:00 AM
Weather	
Study ID #	107813
Peak Hour Start	07:15:00 AM
Peak 15 Min Start	07:25:00 AM
PHF (15-Min Int)	0.71

Eastbound
Parr Rd
Heavy Vehicle 3.4%

In 119
Out 89

Bicycles 0
U-Turn 0
Left 1
Thru 118
Right 0



In 9 Out 4
Bicycles Right Thru Left U-Turn

0 4 0 5 0

U-Turn Left Thru Right Bicycles
0 0 0 0 0

In 0 Out 0

Heavy Vehicle NaN

Northbound

Westbound
Parr Rd
Heavy Vehicle 2.3%

In 88
Out 123

Bicycles 0
U-Turn 0
Left 0
Thru 85
Right 3

Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
0	0	0	0	5	0	4	0	1	118	0	0	0	85	3	0	0	9	119	88	0	4	89	123
Percent Heavy Vehicles																							
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.4%	0.0%	0.0%	0.0%	2.4%	0.0%	0.0%	#DIV/0!	0.0%	3.4%	2.3%	#DIV/0!	0.0%	2.2%	3.3%
PHV- Bicycles															PHV - Pedestrians								
Northbound				Southbound				Eastbound				Westbound			Sum	in Crosswalk				Sum			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right		NB	SB	EB	WB				
0				0				0				0			1				1				
All Vehicle Volumes																							
Time	Northbound				Southbound Stubb Rd NE				Eastbound Parr Rd				Westbound Parr Rd				15 Min Sum	1 HR Sum					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn							
07:00:00 AM					0				0	3			1	0									
07:05:00 AM					0				0	4			4	0									
07:10:00 AM					0				0	6			8	0			26						
07:15:00 AM					1				0	10			6	0			39						
07:20:00 AM					0				0	10			6	0			48						
07:25:00 AM					2				0	16			9	0			62						
07:30:00 AM					0				1	16			10	0			72						
07:35:00 AM					0				2	12			7	0			76						
07:40:00 AM					0				0	12			8	0			68						
07:45:00 AM					0				0	13			5	0			59						
07:50:00 AM					0				0	10			7	0			55						
07:55:00 AM					0				0	11			5	0			51	207					
08:00:00 AM					0				0	1			5	0			39	209					
08:05:00 AM					1				0	4			8	1			36	215					
08:10:00 AM					1				0	3			9	2			35	216					
08:15:00 AM					2				1	7			0	0			40	210					
08:20:00 AM					0				0	4			2	0			32	199					
08:25:00 AM					0				0	2			1	0			20	174					
08:30:00 AM					0				0	1			0	1			11	149					
08:35:00 AM					0				0	2			3	0			10	133					
08:40:00 AM					0				0	2			0	0			9	115					
08:45:00 AM					1				0	1			0	0			9	99					
08:50:00 AM					0				0	2			0	0			6	84					
08:55:00 AM					0				0	3			1	0			8	72					

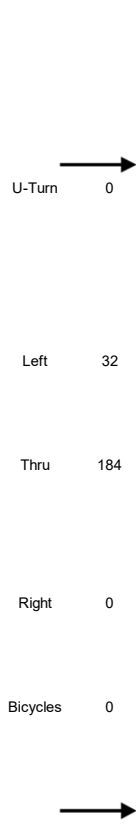


Data Provided by K-D-N.com 503-594-4224

N/S street	N Cascade Dr
E/W street	W Hayes St
City, State	Woodburn OR
Site Notes	
Location	45.146214 - -122.870792
Start Date	Tuesday, April 18, 2017
Start Time	07:00:00 AM
Weather	
Study ID #	
Peak Hour Start	07:15:00 AM
Peak 15 Min Start	07:40:00 AM
PHF (15-Min Int)	0.72

Eastbound
W Hayes St
Heavy Vehicle 1.9%

In 216
Out 253

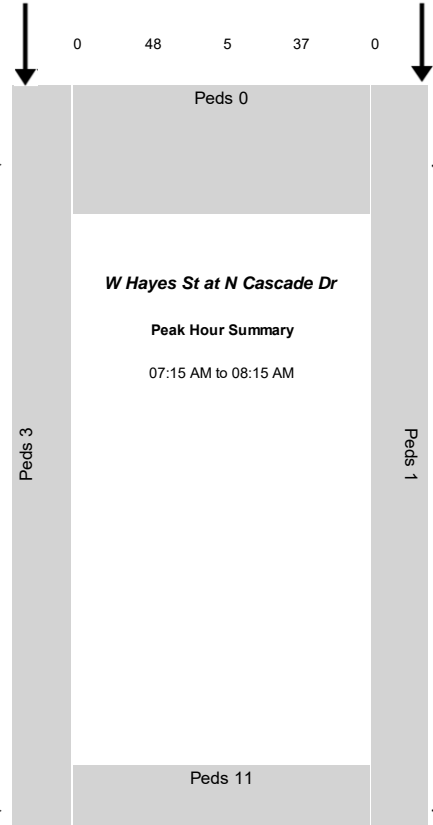


U-Turn	Left	Thru	Right	Bicycles
0	3	4	0	0

In 7 Out 6

Heavy Vehicle 0.0%
N Cascade Dr
Northbound

In 90 Out 50
Bicycles Right Thru Left U-Turn



W Hayes St at N Cascade Dr

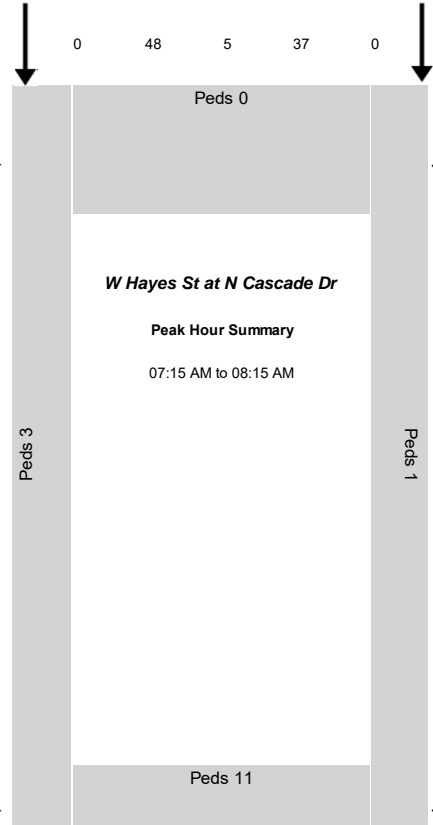
Peak Hour Summary

07:15 AM to 08:15 AM

Westbound
W Hayes St
Heavy Vehicle 3.2%

In 217
Out 221

0 48 5 37 0
Bicycles Right Thru Left U-Turn



U-Turn	Left	Thru	Right	Bicycles
0	3	4	0	0

In 7 Out 6

Heavy Vehicle 0.0%
N Cascade Dr
Northbound

Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
3	4	0	0	37	5	48	0	32	184	0	0	1	202	14	0	7	90	216	217	6	50	253	221
Percent Heavy Vehicles																							
0.0%	0.0%	0.0%	0.0%	10.8%	20.0%	4.2%	0.0%	0.0%	2.2%	0.0%	0.0%	0.0%	2.0%	21.4%	0.0%	0.0%	7.8%	1.9%	3.2%	16.7%	6.0%	2.4%	3.6%
PHV- Bicycles															PHV - Pedestrians								
Northbound				Southbound				Eastbound				Westbound			Sum	in Crosswalk				Sum			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right		NB	SB	EB	WB				
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	3	1	15		
All Vehicle Volumes																							
Time	Northbound N Cascade Dr				Southbound N Cascade Dr				Eastbound W Hayes St				Westbound W Hayes St				15 Min Sum	1 HR Sum					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn							
07:00:00 AM	0	0	0	0	0	0	1	0	0	9	0	0	0	11	0	0							
07:05:00 AM	0	0	0	0	3	0	3	0	0	7	0	0	0	4	1	0							
07:10:00 AM	0	1	1	0	4	0	3	0	0	10	0	0	0	8	0	0	66						
07:15:00 AM	1	1	0	0	4	0	2	0	1	16	0	0	0	10	0	0	80						
07:20:00 AM	0	0	0	0	4	0	4	0	1	28	0	0	0	12	1	0	112						
07:25:00 AM	0	0	0	0	1	1	2	0	3	17	0	0	0	11	0	0	120						
07:30:00 AM	1	0	0	0	4	1	3	0	2	16	0	0	0	21	1	0	134						
07:35:00 AM	0	0	0	0	3	0	1	0	7	16	0	0	0	13	1	0	125						
07:40:00 AM	0	0	0	0	7	0	3	0	5	19	0	0	0	22	2	0	148						
07:45:00 AM	1	0	0	0	3	0	5	0	4	26	0	0	0	21	3	0	162						
07:50:00 AM	0	0	0	0	3	0	7	0	3	23	0	0	0	21	6	0	184						
07:55:00 AM	0	0	0	0	5	1	7	0	1	8	0	0	0	26	0	0	174	508					
08:00:00 AM	0	0	0	0	2	1	4	0	1	6	0	0	0	20	0	0	145	521					
08:05:00 AM	0	0	0	0	1	1	4	0	1	6	0	0	1	11	0	0	107	528					
08:10:00 AM	0	3	0	0	0	0	6	0	3	3	0	0	0	14	0	0	88	530					
08:15:00 AM	0	1	0	0	0	1	3	0	1	9	0	0	0	15	0	0	84	525					
08:20:00 AM	0	1	0	0	0	0	4	0	0	3	0	0	1	9	0	0	77	493					
08:25:00 AM	0	0	0	0	0	0	5	0	2	5	0	0	0	5	1	0	66	476					
08:30:00 AM	1	2	0	0	3	1	5	0	1	9	0	0	0	5	0	0	63	454					
08:35:00 AM	0	0	0	0	0	1	2	0	3	3	0	0	0	4	0	0	58	426					
08:40:00 AM	0	0	0	0	0	2	2	0	2	4	0	0	0	10	0	0	60	388					
08:45:00 AM	0	0	0	0	1	1	3	0	1	6	0	0	0	9	0	0	54	346					
08:50:00 AM	1	2	0	0	0	0	4	0	0	13	0	0	0	18	0	0	79	321					
08:55:00 AM	1	1	0	0	0	0	6	0	3	5	0	0	0	6	0	0	81	295					



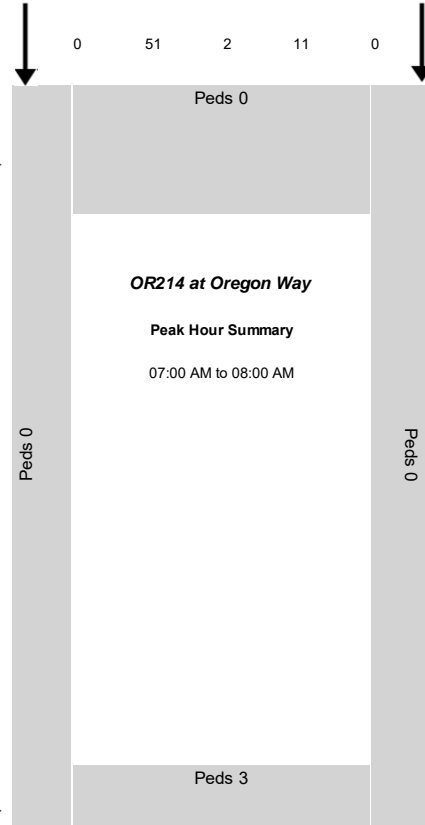
Data Provided by K-D-N.com 503-594-4224

N/S street	W Oregon Way	
E/W street	OR214	
City, State	Woodburn OR	
Site Notes		
Location	45.150927	-122.873334
Start Date	Tuesday, April 18, 2017	
Start Time	07:00:00 AM	
Weather		
Study ID #		
Peak Hour Start	07:00:00 AM	
Peak 15 Min Start	07:30:00 AM	
PHF (15-Min Int)	0.88	

Eastbound
OR214
Heavy Vehicle 7.5%

In 835
Out 796

U-Turn 11
Left 20
Thru 798
Right 6
Bicycles 0



In 64 Out 45
Bicycles Right Thru Left U-Turn

0 51 2 11 0

U-Turn Left Thru Right Bicycles
0 16 9 6 0

In 31 Out 16

Westbound
OR214
Heavy Vehicle 8.9%

In 742
Out 815

Bicycles 0
Right 16
Thru 718
Left 8
U-Turn 0

Peds 0
Peds 0
Peds 3

Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
16	9	6	0	11	2	51	0	20	798	6	11	8	718	16	0	31	64	835	742	16	45	796	815
Percent Heavy Vehicles																							
6.3%	0.0%	33.3%	0.0%	9.1%	0.0%	2.0%	0.0%	5.0%	7.8%	0.0%	0.0%	12.5%	8.9%	6.3%	0.0%	9.7%	3.1%	7.5%	8.9%	6.3%	4.4%	8.3%	8.0%
PHV- Bicycles															PHV - Pedestrians								
Northbound				Southbound				Eastbound				Westbound			Sum	in Crosswalk				Sum			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right		NB	SB	EB	WB				
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3		
All Vehicle Volumes																							
Time	Northbound W Oregon Way				Southbound W Oregon Way				Eastbound OR214				Westbound OR214				15 Min	1 HR					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn			Sum	Sum			
07:00:00 AM	0	0	0	0	0	0	3	0	3	58	0	1	0	56	1	0							
07:05:00 AM	0	1	0	0	3	0	3	0	2	55	0	1	0	60	0	0							
07:10:00 AM	0	0	0	0	0	0	4	0	2	59	1	1	2	61	0	0	377						
07:15:00 AM	3	0	0	0	0	0	4	0	0	63	0	1	0	54	1	0	381						
07:20:00 AM	0	0	2	0	0	0	4	0	1	89	0	3	0	68	0	0	423						
07:25:00 AM	1	1	0	0	1	0	9	0	2	57	0	1	0	57	2	0	424						
07:30:00 AM	2	1	1	0	0	0	3	0	1	71	1	1	2	73	3	0	457						
07:35:00 AM	3	0	0	0	1	0	3	0	2	88	1	2	1	61	2	0	454						
07:40:00 AM	2	0	2	0	3	0	3	0	0	84	1	0	1	53	3	0	475						
07:45:00 AM	1	0	1	0	3	0	1	0	1	69	1	0	0	64	0	0	457						
07:50:00 AM	2	3	0	0	0	2	9	0	5	59	0	0	1	54	1	0	429						
07:55:00 AM	2	3	0	0	0	0	5	0	1	46	1	0	1	57	3	0	396	1672					
08:00:00 AM	3	0	0	0	3	1	3	0	3	36	1	1	5	57	0	0	368	1663					
08:05:00 AM	3	0	0	0	2	1	4	0	2	58	1	0	2	45	2	0	352	1658					
08:10:00 AM	3	0	2	0	1	1	9	0	1	39	1	2	0	59	2	0	353	1648					
08:15:00 AM	0	0	0	0	2	0	3	0	3	58	1	1	0	55	2	0	365	1647					
08:20:00 AM	2	2	0	0	1	0	4	0	3	47	2	3	0	45	4	0	358	1593					
08:25:00 AM	1	2	1	0	3	4	6	0	2	43	1	0	0	63	0	0	364	1588					
08:30:00 AM	0	1	1	0	2	0	8	0	4	48	0	1	0	55	1	0	360	1550					
08:35:00 AM	0	1	1	0	2	0	7	0	4	37	2	1	0	48	2	0	352	1491					
08:40:00 AM	1	1	2	0	2	0	2	0	5	33	0	0	0	37	1	0	310	1423					
08:45:00 AM	1	1	0	0	2	0	10	0	3	42	0	0	1	37	1	0	287	1380					
08:50:00 AM	4	4	0	0	1	0	4	0	2	50	2	1	1	41	1	0	293	1355					
08:55:00 AM	0	1	0	0	0	0	5	0	6	49	4	0	0	51	1	0	326	1353					

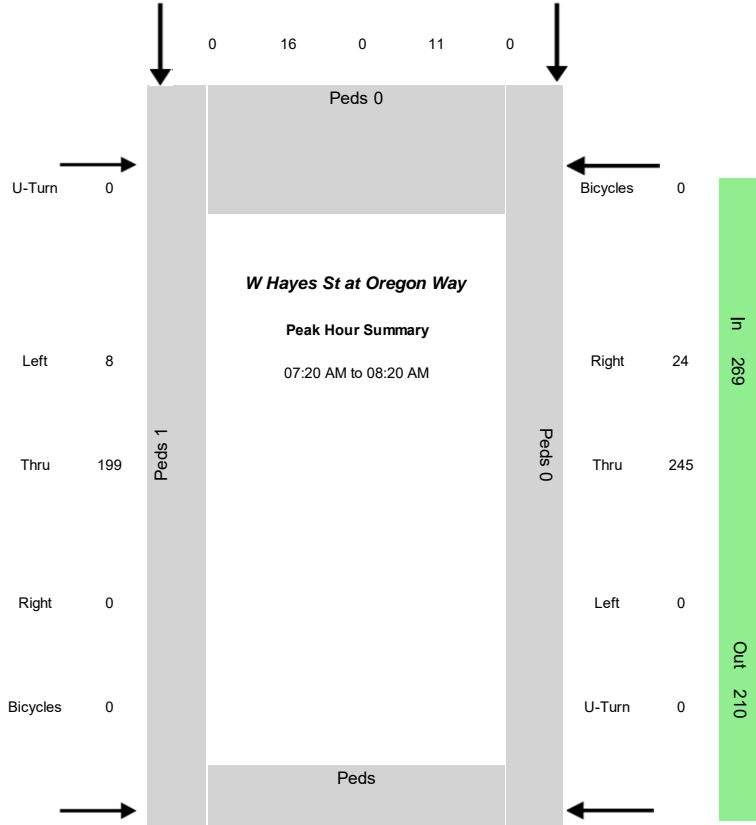


Data Provided by K-D-N.com 503-594-4224

N/S street	W Oregon Way	
E/W street	W Hayes St	
City, State	Woodburn OR	
Site Notes		
Location	45.147108 - -122.874207	
Start Date	Tuesday, April 18, 2017	
Start Time	07:00:00 AM	
Weather		
Study ID #		
Peak Hour Start	07:20:00 AM	
Peak 15 Min Start	07:45:00 AM	
PHF (15-Min Int)	0.79	

Eastbound
W Hayes St
Heavy Vehicle 2.9%

In 207
Out 261



Southbound
W Oregon Way
Heavy Vehicle 0.0%

In	27	Out	32
Bicycles		U-Turn	

Northbound

In	0	Out	0
Heavy Vehicle NaN			

Westbound
W Hayes St
Heavy Vehicle 2.2%

In 269
Out 210

Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
0	0	0	0	11	0	16	0	8	199	0	0	0	245	24	0	0	27	207	269	0	32	261	210
Percent Heavy Vehicles																							
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	25.0%	2.0%	0.0%	0.0%	0.0%	2.0%	4.2%	0.0%	#DIV/0!	0.0%	2.9%	2.2%	#DIV/0!	9.4%	1.9%	1.9%
PHV - Bicycles															PHV - Pedestrians								
Northbound				Southbound				Eastbound				Westbound				in Crosswalk							
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1		
All Vehicle Volumes																							
Time	Northbound				Southbound				Eastbound				Westbound				15 Min	1 HR					
	Left	Thru	Right	Uturn	W Oregon Way				W Hayes St				W Hayes St										
07:00:00 AM					3	0	0	0	0	6	0	0	14	0	0	0							
07:05:00 AM					0	0	0	0	0	7	0	0	8	1	0	0							
07:10:00 AM					1	0	0	0	0	11	0	0	8	1	0	0	60						
07:15:00 AM					0	1	0	0	0	16	0	0	13	1	0	0	68						
07:20:00 AM					0	0	0	1	31	0	14	1	0	0	99								
07:25:00 AM					0	0	0	1	18	0	12	5	0	0	114								
07:30:00 AM					1	2	0	0	16	0	22	1	0	0	125								
07:35:00 AM					1	1	0	0	20	0	14	2	0	0	116								
07:40:00 AM					1	0	0	1	29	0	21	1	0	0	133								
07:45:00 AM					1	0	0	0	23	0	24	3	0	0	142								
07:50:00 AM					2	1	0	2	24	0	25	0	0	0	158								
07:55:00 AM					2	1	0	1	12	0	35	3	0	0	159	466							
08:00:00 AM					2	2	0	1	4	0	26	3	0	0	146	481							
08:05:00 AM					0	6	0	0	7	0	17	1	0	0	123	496							
08:10:00 AM					1	2	0	1	5	0	15	3	0	0	96	502							
08:15:00 AM					0	1	0	0	10	0	20	1	0	0	90	503							
08:20:00 AM					0	2	0	0	3	0	10	2	0	0	76	473							
08:25:00 AM					0	1	0	3	8	0	11	2	0	0	74	462							
08:30:00 AM					0	3	0	0	13	0	12	1	0	0	71	449							
08:35:00 AM					1	0	0	2	5	0	4	2	0	0	68	425							
08:40:00 AM					1	1	0	1	3	0	9	2	0	0	60	389							
08:45:00 AM					0	1	0	1	8	0	16	0	0	0	57	364							
08:50:00 AM					0	2	0	1	12	0	20	4	0	0	82	349							
08:55:00 AM					3	5	0	0	6	0	12	1	0	0	92	322							



Data Provided by K-D-N.com 503-594-4224

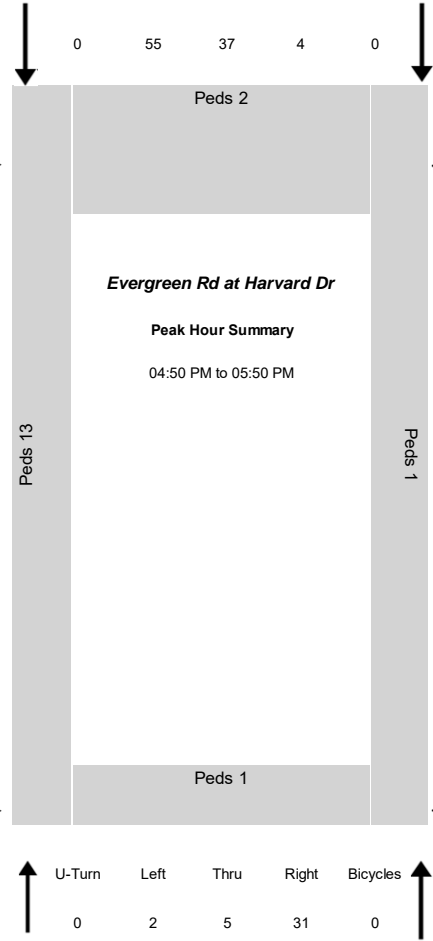
N/S street	Harvard Dr	
E/W street	Evergreen Rd	
City, State	Woodburn OR	
Site Notes		
Location	45.147347 - -122.878546	
Start Date	Tuesday, March 21, 2017	
Start Time	04:00:00 PM	
Weather		
Study ID #	107804	
Peak Hour Start	04:50:00 PM	
Peak 15 Min Start	05:30:00 PM	
PHF (15-Min Int)	0.92	

Eastbound
Evergreen Rd
Heavy Vehicle 0.7%



Southbound
Harvard Dr
Heavy Vehicle 0.0%

In	96	Out	19
Bicycles		Right	
		Thru	
		Left	
		U-Turn	



Northbound
Harvard Dr
Heavy Vehicle 0.0%

In	38	Out	79
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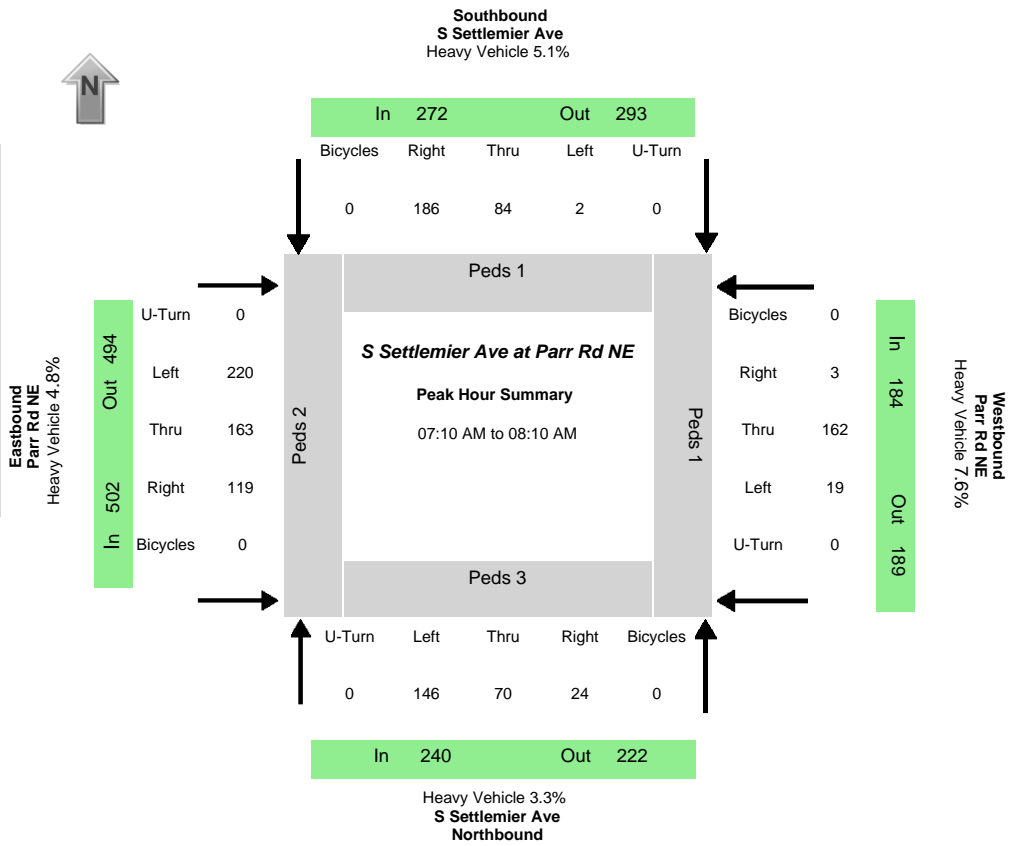
Westbound
Evergreen Rd
Heavy Vehicle 1.1%



Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
2	5	31	0	4	37	55	0	11	130	6	0	36	137	3	0	38	96	147	176	79	19	194	165
Percent Heavy Vehicles																							
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	1.5%	0.0%	0.0%	0.0%	0.0%	0.7%	1.1%	0.0%	0.0%	1.0%	0.6%
PHV- Bicycles															PHV - Pedestrians								
Northbound				Southbound				Eastbound				Westbound				in Crosswalk							
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	13	1	17		
All Vehicle Volumes																							
Time	Northbound Harvard Dr				Southbound Harvard Dr				Eastbound Evergreen Rd				Westbound Evergreen Rd				15 Min Sum	1 HR Sum					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn							
04:00:00 PM	0	1	2	0	0	4	5	0	1	11	0	0	2	13	1	0							
04:05:00 PM	0	1	3	0	1	2	4	0	1	11	0	0	3	10	0	0							
04:10:00 PM	0	0	1	0	1	2	1	0	1	9	2	0	5	11	0	0	109						
04:15:00 PM	1	2	3	0	0	2	7	0	0	7	1	0	1	6	0	0	99						
04:20:00 PM	0	0	3	0	2	5	2	0	0	12	1	0	4	10	0	0	102						
04:25:00 PM	0	0	4	0	0	1	1	0	0	15	1	0	1	7	0	0	99						
04:30:00 PM	0	0	0	0	1	2	2	0	0	13	0	0	8	8	0	0	103						
04:35:00 PM	0	0	2	0	1	4	3	0	2	10	0	0	5	9	1	0	101						
04:40:00 PM	0	0	2	0	2	4	3	0	1	12	1	0	3	4	0	0	103						
04:45:00 PM	1	0	2	0	0	0	5	0	0	9	0	0	2	11	0	0	99						
04:50:00 PM	0	1	3	0	0	3	5	0	1	12	2	0	5	13	0	0	107						
04:55:00 PM	1	0	2	0	0	3	3	0	4	12	1	0	3	12	0	0	116	427					
05:00:00 PM	0	1	5	0	0	2	9	0	1	10	0	0	3	6	0	0	123	424					
05:05:00 PM	0	0	1	0	0	3	5	0	1	14	0	0	2	7	1	0	112	422					
05:10:00 PM	0	0	3	0	2	1	4	0	0	9	1	0	3	10	0	0	104	422					
05:15:00 PM	0	0	3	0	0	3	5	0	1	5	0	0	2	17	0	0	103	428					
05:20:00 PM	0	1	1	0	1	3	6	0	1	13	0	0	2	9	0	0	106	426					
05:25:00 PM	0	0	0	0	0	6	5	0	1	5	0	0	6	10	0	0	106	429					
05:30:00 PM	1	1	4	0	1	4	5	0	0	11	0	0	3	9	0	0	109	434					
05:35:00 PM	0	0	5	0	0	2	3	0	0	13	0	0	3	17	0	0	115	440					
05:40:00 PM	0	1	2	0	0	5	3	0	0	15	2	0	0	14	0	0	124	450					
05:45:00 PM	0	0	2	0	0	2	2	0	1	11	0	0	4	13	2	0	122	457					
05:50:00 PM	0	1	2	0	0	3	1	0	0	9	1	0	2	8	2	0	108	441					
05:55:00 PM	0	0	0	0	0	3	3	0	1	11	2	0	3	14	0	0	103	437					

Data Provided by K-D-N.com 503-594-4224

N/S street	S Settlemier Ave
E/W street	Parr Rd NE
City, State	Woodburn OR
Site Notes	
Location	45.135906 - -122.865101
Start Date	Thursday, March 01, 2018
Start Time	07:00:00 AM
Weather	
Study ID #	
Peak Hour Start	07:10:00 AM
Peak 15 Min Start	07:40:00 AM
PHF (15-Min Int)	0.75



Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
146	70	24	0	2	84	186	0	220	163	119	0	19	162	3	0	240	272	502	184	222	293	494	189
Percent Heavy Vehicles																							
2.7%	5.7%	0.0%	0.0%	0.0%	1.2%	7.0%	0.0%	9.5%	0.6%	1.7%	0.0%	0.0%	8.0%	33.3%	0.0%	3.3%	5.1%	4.8%	7.6%	1.4%	8.9%	6.1%	0.5%

PHV - Bicycles														PHV - Pedestrians							
Northbound				Southbound				Eastbound				Westbound				in Crosswalk					
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	2	1	7

All Vehicle Volumes																		
Time	Northbound S Settlemier Ave				Southbound S Settlemier Ave				Eastbound Parr Rd NE				Westbound Parr Rd NE				15 Min Sum	1 HR Sum
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn		
07:00:00 AM	7	9	0	0	0	2	4	0	6	1	3	0	2	4	0	0		
07:05:00 AM	9	8	2	0	1	3	6	0	9	2	2	0	4	5	1	0		
07:10:00 AM	12	6	3	0	0	7	7	0	14	4	3	0	3	6	0	0	155	
07:15:00 AM	5	2	1	0	0	7	9	0	10	8	5	0	0	5	0	0	169	
07:20:00 AM	17	15	3	0	1	9	25	0	15	12	5	0	2	12	0	0	233	
07:25:00 AM	10	5	3	0	0	5	9	0	12	8	5	0	1	8	0	0	234	
07:30:00 AM	12	7	1	0	0	5	14	0	19	7	12	0	2	18	0	0	279	
07:35:00 AM	10	6	1	0	0	7	23	0	11	19	8	0	4	18	0	0	270	
07:40:00 AM	20	5	3	0	0	7	24	0	20	22	10	0	2	15	0	0	332	
07:45:00 AM	17	5	3	0	0	7	21	0	19	16	12	0	0	19	0	0	354	
07:50:00 AM	20	4	2	0	0	10	34	0	23	19	15	0	2	24	0	0	400	
07:55:00 AM	4	1	0	0	0	5	16	0	20	9	6	0	2	18	1	0	354	1075
08:00:00 AM	17	9	2	0	0	11	1	0	25	17	16	0	1	10	0	0	344	1146
08:05:00 AM	2	5	2	0	1	4	3	0	32	22	22	0	0	9	2	0	295	1198
08:10:00 AM	6	3	1	0	0	2	9	0	11	8	7	0	2	1	0	0	263	1183
08:15:00 AM	1	3	1	0	1	2	4	0	10	9	6	0	2	4	1	0	198	1175
08:20:00 AM	3	3	2	0	0	4	2	0	3	3	0	0	0	1	0	0	115	1080
08:25:00 AM	2	8	2	0	0	3	3	0	8	1	1	0	2	0	0	0	95	1044
08:30:00 AM	3	4	0	0	0	3	1	0	4	1	2	0	1	2	0	0	72	968
08:35:00 AM	1	5	4	0	0	2	2	0	1	3	1	0	1	2	0	0	73	883
08:40:00 AM	0	5	1	0	0	4	4	0	1	4	4	0	4	0	0	0	70	782
08:45:00 AM	2	5	3	0	0	4	6	0	2	4	2	0	0	1	1	0	79	693
08:50:00 AM	1	7	1	0	0	5	3	0	3	1	2	0	1	1	0	0	82	565
08:55:00 AM	2	7	1	0	1	2	2	0	1	3	4	0	3	2	0	0	83	511



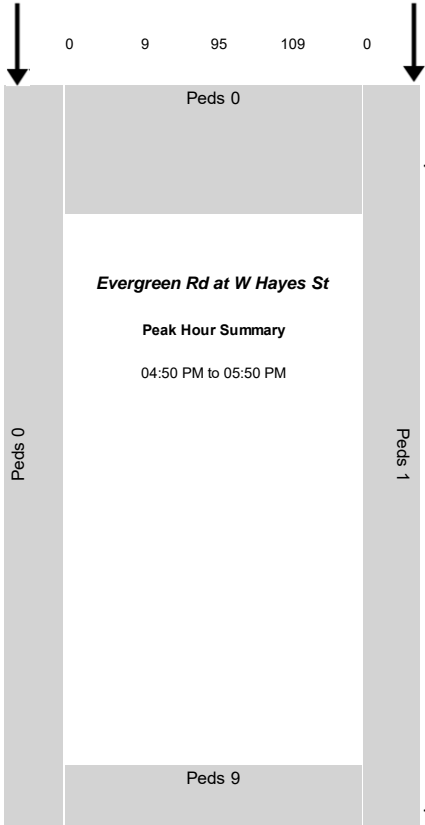
Data Provided by K-D-N.com 503-594-4224

N/S street	Evergreen Rd
E/W street	W Hayes St
City, State	Woodburn OR
Site Notes	
Location	45.147403 - -122.875759
Start Date	Tuesday, March 21, 2017
Start Time	04:00:00 PM
Weather	
Study ID #	107806
Peak Hour Start	04:50:00 PM
Peak 15 Min Start	05:30:00 PM
PHF (15-Min Int)	0.88

Eastbound
W Hayes St
Heavy Vehicle 1.3%

In 80
Out 111

U-Turn 0
Left 16
Thru 64
Right 0
Bicycles 0



U-Turn 0
Left 4
Thru 115
Right 94
Bicycles 0

In 213 Out 229

Heavy Vehicle 0.9%
Evergreen Rd Northbound

In 213 Out 252
Bicycles Right Thru Left U-Turn

0 9 95 109 0

Peds 0
U-Turn 0
Bicycles 0

U-Turn 0
Right 121
Thru 98
Left 134
U-Turn 0

In 353
Out 267

Westbound
W Hayes St
Heavy Vehicle 0.6%

U-Turn 0
Left 4
Thru 115
Right 94
Bicycles 0

In 213 Out 229

Heavy Vehicle 0.9%
Evergreen Rd Northbound

In 213 Out 252
Bicycles Right Thru Left U-Turn

0 9 95 109 0

Peds 0
U-Turn 0
Bicycles 0

U-Turn 0
Right 121
Thru 98
Left 134
U-Turn 0

In 353
Out 267

Westbound
W Hayes St
Heavy Vehicle 0.6%

Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
4	115	94	0	109	95	9	0	16	64	0	0	134	98	121	0	213	213	80	353	229	252	111	267
Percent Heavy Vehicles																							
0.0%	0.0%	2.1%	0.0%	0.0%	2.1%	0.0%	0.0%	0.0%	1.6%	0.0%	0.0%	0.0%	1.0%	0.8%	0.0%	0.9%	0.9%	1.3%	0.6%	0.9%	0.4%	0.9%	1.1%
PHV - Bicycles															PHV - Pedestrians								
Northbound				Southbound				Eastbound				Westbound				in Crosswalk							
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	1	10		
All Vehicle Volumes																							
Time	Northbound Evergreen Rd				Southbound Evergreen Rd				Eastbound W Hayes St				Westbound W Hayes St				15 Min Sum	1 HR Sum					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn							
04:00:00 PM	0	7	8	0	11	12	0	0	3	6	0	0	6	12	15	0							
04:05:00 PM	0	9	7	0	10	8	0	0	1	5	0	0	11	8	15	0							
04:10:00 PM	0	9	7	0	1	8	0	0	0	5	0	0	10	9	6	0	209						
04:15:00 PM	0	4	11	0	4	4	1	0	0	3	0	0	5	8	8	0	177						
04:20:00 PM	0	9	7	0	8	10	3	0	0	1	0	0	9	11	8	0	169						
04:25:00 PM	0	17	3	0	6	8	2	0	0	2	0	0	6	8	13	0	179						
04:30:00 PM	0	10	11	0	6	8	0	0	2	8	0	0	8	6	3	0	193						
04:35:00 PM	1	16	8	0	3	6	3	0	1	3	0	0	14	12	3	0	197						
04:40:00 PM	0	10	7	0	14	3	3	0	3	6	0	0	9	12	11	0	210						
04:45:00 PM	0	5	7	0	9	5	1	0	1	4	0	0	9	8	6	0	203						
04:50:00 PM	0	12	5	0	6	6	0	0	1	10	0	0	12	5	16	0	206						
04:55:00 PM	0	5	8	0	3	6	3	0	2	4	0	0	14	7	10	0	190	788					
05:00:00 PM	0	9	9	0	6	5	2	0	3	4	0	0	11	5	9	0	198	771					
05:05:00 PM	1	6	14	0	13	2	0	0	1	2	0	0	10	8	14	0	196	768					
05:10:00 PM	0	9	9	0	5	4	0	0	0	10	0	0	14	4	9	0	198	777					
05:15:00 PM	0	5	4	0	10	13	1	0	3	3	0	0	13	11	11	0	209	803					
05:20:00 PM	1	11	9	0	15	6	0	0	0	5	0	0	7	12	10	0	214	813					
05:25:00 PM	0	10	2	0	8	11	0	0	1	2	0	0	12	10	7	0	213	811					
05:30:00 PM	0	11	8	0	9	2	0	0	1	7	0	0	13	14	6	0	210	820					
05:35:00 PM	0	13	11	0	10	13	1	0	1	1	0	0	10	9	12	0	215	831					
05:40:00 PM	2	12	11	0	16	14	0	0	2	10	0	0	7	9	10	0	245	846					
05:45:00 PM	0	12	4	0	8	13	2	0	1	6	0	0	11	4	7	0	242	859					
05:50:00 PM	0	6	6	0	9	6	1	0	2	5	0	0	11	7	7	0	221	846					
05:55:00 PM	0	7	8	0	7	10	3	0	1	4	0	0	11	7	5	0	191	847					



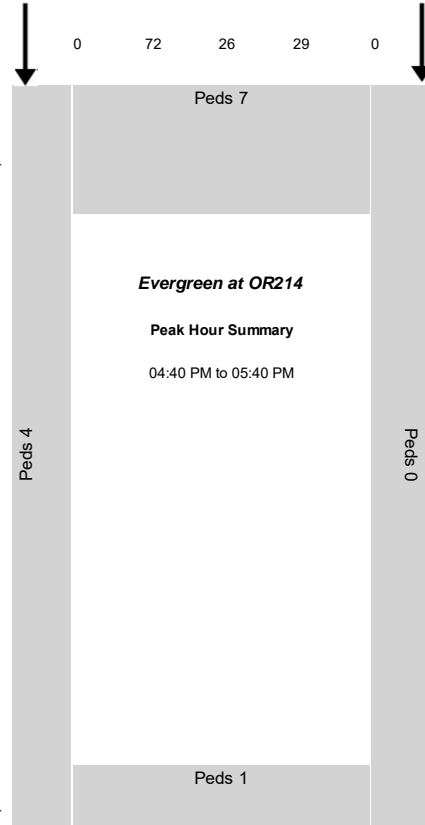
Data Provided by K-D-N.com 503-594-4224

N/S street	Evergreen Rd
E/W street	OR 214
City, State	Woodburn OR
Site Notes	
Location	45.150952 - -122.875772
Start Date	Tuesday, March 21, 2017
Start Time	04:00:00 PM
Weather	
Study ID #	107802
Peak Hour Start	04:40:00 PM
Peak 15 Min Start	05:25:00 PM
PHF (15-Min Int)	0.95

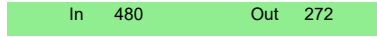
Eastbound
OR 214
Heavy Vehicle 2.5%



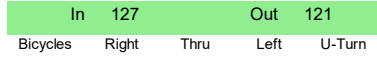
U-Turn	23
Left	83
Thru	833
Right	77
Bicycles	0



U-Turn	Left	Thru	Right	Bicycles
0	302	25	153	0



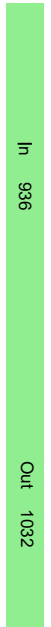
Heavy Vehicle 2.3%
Evergreen Rd
Northbound



Bicycles Right Thru Left U-Turn

0	72	26	29	0
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Peds 7				
Bicycles	0			
Peds 4				
Peds 0				
Peds 1				
Bicycles	0			
U-Turn	17			
Left	169			
Right	13			
Thru	737			
U-Turn	23			
Bicycles	0			



Westbound
OR 214
Heavy Vehicle 2.5%

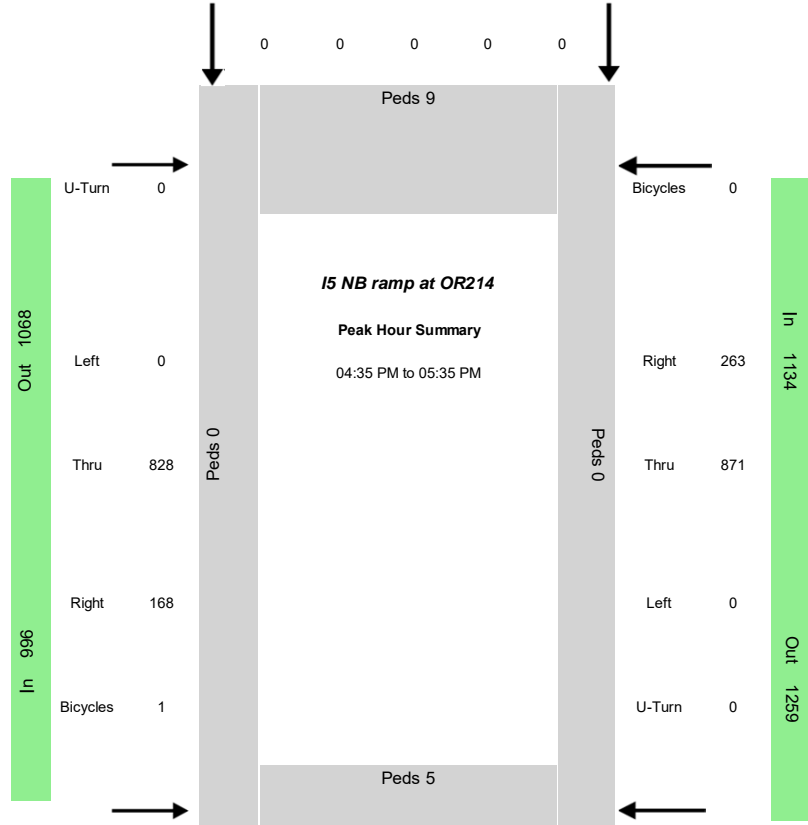
Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
302	25	153	0	29	26	72	0	83	833	77	23	169	737	13	17	480	127	1016	936	272	121	1134	1032
Percent Heavy Vehicles																							
3.0%	0.0%	1.3%	0.0%	0.0%	0.0%	1.4%	0.0%	0.0%	2.8%	2.6%	0.0%	0.0%	3.1%	0.0%	0.0%	2.3%	0.8%	2.5%	2.5%	0.7%	0.0%	2.9%	2.4%
PHV - Bicycles																PHV - Pedestrians							
Northbound				Southbound				Eastbound				Westbound				in Crosswalk							
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	7	4	0	12		
All Vehicle Volumes																							
Time	Northbound Evergreen Rd				Southbound Evergreen Rd				Eastbound OR 214				Westbound OR 214				15 Min	1 HR					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn							
04:00:00 PM	18	1	19	0	4	0	3	0	6	65	8	4	17	44	1	1							
04:05:00 PM	45	2	15	0	0	0	1	0	9	74	10	5	11	55	1	0							
04:10:00 PM	31	1	14	0	4	3	9	0	6	68	3	2	15	57	0	2	634						
04:15:00 PM	26	2	12	0	2	4	1	0	7	65	3	3	11	57	3	2	641						
04:20:00 PM	22	1	9	0	0	3	9	0	10	69	10	3	18	47	1	0	615						
04:25:00 PM	29	1	25	0	1	4	6	0	8	80	10	1	10	39	2	3	619						
04:30:00 PM	29	0	11	0	3	4	7	0	3	70	7	3	14	61	2	0	635						
04:35:00 PM	18	2	18	0	2	2	4	0	6	67	8	2	13	58	1	2	636						
04:40:00 PM	25	1	8	0	2	0	4	0	5	75	10	2	16	66	1	2	634						
04:45:00 PM	22	2	13	0	4	2	4	0	7	70	5	3	9	53	2	3	619						
04:50:00 PM	28	1	14	0	2	3	8	0	10	57	4	0	9	51	3	1	607						
04:55:00 PM	20	0	18	0	2	3	7	0	7	56	6	2	13	58	1	0	583	2470					
05:00:00 PM	30	3	8	0	3	3	6	0	5	51	4	1	19	71	1	1	590	2485					
05:05:00 PM	23	2	19	0	3	2	5	0	3	72	3	2	6	70	1	0	610	2468					
05:10:00 PM	36	0	10	0	2	1	1	0	5	80	5	1	16	71	0	1	646	2482					
05:15:00 PM	17	5	12	0	2	4	9	0	16	76	7	1	15	65	1	1	671	2515					
05:20:00 PM	27	3	12	0	4	4	9	0	4	71	8	5	12	48	0	0	667	2520					
05:25:00 PM	26	3	12	0	2	3	5	0	6	73	8	2	17	58	1	3	657	2520					
05:30:00 PM	27	2	11	0	2	0	7	0	7	87	8	2	20	65	0	2	666	2546					
05:35:00 PM	21	3	16	0	1	1	7	0	8	65	9	2	17	61	2	3	675	2559					
05:40:00 PM	23	5	16	0	3	3	6	0	5	60	8	3	15	46	0	0	649	2535					
05:45:00 PM	24	1	16	0	2	4	5	0	8	65	13	6	20	41	0	0	614	2541					
05:50:00 PM	21	0	17	0	5	0	4	0	11	67	9	0	12	55	2	0	601	2553					
05:55:00 PM	20	1	9	0	1	4	9	0	4	78	6	1	10	40	2	1	594	2546					



Data Provided by K-D-N.com 503-594-4224	
N/S street	15 NB ramps
E/W street	OR214
City, State	Woodburn OR
Site Notes	
Location	45.150722 - -122.878041
Start Date	Tuesday, March 21, 2017
Start Time	04:00:00 PM
Weather	
Study ID #	107808
Peak Hour Start	04:35:00 PM
Peak 15 Min Start	05:05:00 PM
PHF (15-Min Int)	0.93

Eastbound
OR214
Heavy Vehicle 1.7%

Southbound 15 NB ramps Heavy Vehicle 0.0%				
In	0	Out	263	
Bicycles	Right	Thru	Left	U-Turn
0	0	0	0	0



Westbound
OR214
Heavy Vehicle 2.6%

U-Turn	Left	Thru	Right	Bicycles
0	197	0	431	0

In	628	Out	168
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Heavy Vehicle 4.5%
15 NB ramps
Northbound

Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
197	0	431	0	0	0	0	0	0	828	168	0	0	871	263	0	628	0	996	1134	168	263	1068	1259
Percent Heavy Vehicles																							
3.0%	0.0%	5.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.4%	3.0%	0.0%	0.0%	1.8%	4.9%	0.0%	4.5%	0.0%	1.7%	2.6%	3.0%	4.9%	2.1%	2.7%
PHV - Bicycles																PHV - Pedestrians							
Northbound				Southbound				Eastbound				Westbound				in Crosswalk							
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum		
0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	5	9	0	0	14		
All Vehicle Volumes																							
Time	Northbound 15 NB ramps				Southbound 15 NB ramps				Eastbound OR214				Westbound OR214				15 Min	1 HR					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum					
04:00:00 PM	19	0	24	0	0	0	0	0	0	75	6	0	0	42	19	0							
04:05:00 PM	18	0	31	0	0	0	0	0	0	87	16	0	0	83	34	0							
04:10:00 PM	14	0	27	0	0	0	0	0	0	73	15	0	0	67	27	0	677						
04:15:00 PM	10	0	29	0	0	0	0	0	0	64	18	0	0	68	18	0	699						
04:20:00 PM	17	0	43	0	0	0	0	0	0	72	15	0	0	59	28	0	664						
04:25:00 PM	20	0	38	0	0	0	0	0	0	73	14	1	0	52	22	0	661						
04:30:00 PM	13	0	30	0	0	0	0	0	0	65	16	0	0	69	25	0	672						
04:35:00 PM	19	0	36	0	0	0	0	0	0	71	12	0	0	56	23	0	655						
04:40:00 PM	15	0	46	0	0	0	0	0	0	70	9	0	0	82	15	0	672						
04:45:00 PM	21	0	34	0	0	0	0	0	0	67	13	0	0	56	13	0	658						
04:50:00 PM	12	0	23	0	0	0	0	0	0	56	15	0	0	84	24	0	655						
04:55:00 PM	15	0	32	0	0	0	0	0	0	52	20	0	0	59	26	0	622	2632					
05:00:00 PM	18	0	27	0	0	0	0	0	0	58	10	0	0	77	19	0	627	2656					
05:05:00 PM	12	0	27	0	0	0	0	0	0	80	14	0	0	80	30	0	656	2630					
05:10:00 PM	15	0	38	0	0	0	0	0	0	66	22	0	0	96	23	0	712	2667					
05:15:00 PM	20	0	39	0	0	0	0	0	0	79	13	0	0	72	14	0	740	2697					
05:20:00 PM	18	0	44	0	0	0	0	0	0	62	11	0	0	61	27	0	720	2686					
05:25:00 PM	14	0	53	0	0	0	0	0	0	85	18	0	0	74	24	0	728	2734					
05:30:00 PM	18	0	32	0	0	0	0	0	0	82	11	0	0	74	25	0	733	2758					
05:35:00 PM	19	0	47	0	0	0	0	0	0	56	9	0	0	60	25	0	726	2757					
05:40:00 PM	14	0	34	0	0	0	0	0	0	68	16	0	0	56	21	0	667	2729					
05:45:00 PM	14	0	32	0	0	0	0	0	0	76	13	0	0	59	18	0	637	2737					
05:50:00 PM	18	0	35	0	0	0	0	0	0	70	10	0	0	61	16	0	631	2733					
05:55:00 PM	10	0	34	0	0	0	0	0	0	72	16	0	0	44	25	0	623	2730					

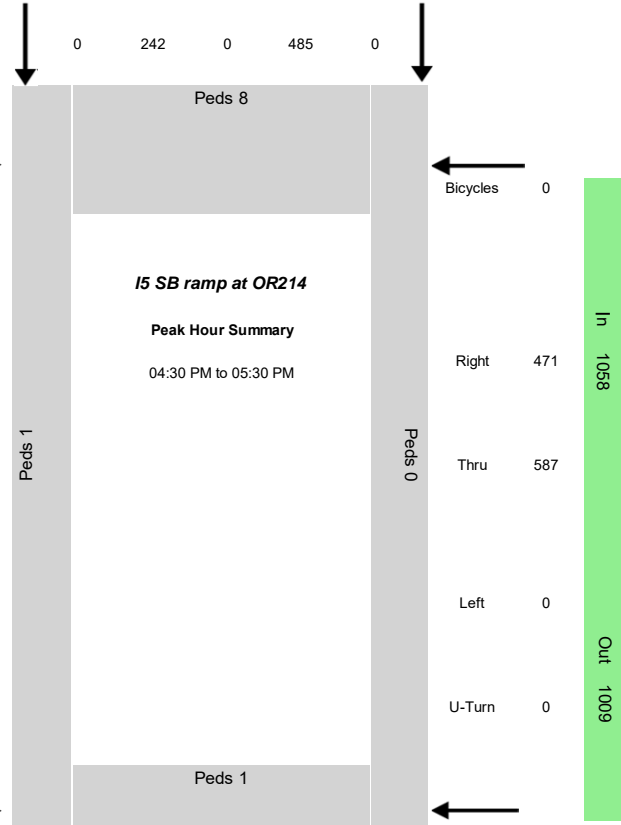


Data Provided by K-D-N.com 503-594-4224	
N/S street	I5 SB ramps
E/W street	OR214
City, State	Woodburn OR
Site Notes	
Location	45.15108 - -122.882928
Start Date	Tuesday, March 21, 2017
Start Time	04:00:00 PM
Weather	
Study ID #	107810
Peak Hour Start	04:30:00 PM
Peak 15 Min Start	05:05:00 PM
PHF (15-Min Int)	0.92

Eastbound
OR214
Heavy Vehicle 2.2%



Southbound I5 SB ramps Heavy Vehicle 2.1%				
In 727		Out 471		
Bicycles	Right	Thru	Left	U-Turn
0	242	0	485	0



Westbound
OR214
Heavy Vehicle 2.2%



Northbound I5 SB ramps Heavy Vehicle NaN				
In 0		Out 288		
U-Turn	Left	Thru	Right	Bicycles
0	0	0	0	0

Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
0	0	0	0	485	0	242	0	0	524	288	0	0	587	471	0	0	727	812	1058	288	471	829	1009
Percent Heavy Vehicles																							
0.0%	0.0%	0.0%	0.0%	1.4%	0.0%	3.3%	0.0%	0.0%	2.5%	1.7%	0.0%	0.0%	1.4%	3.2%	0.0%	#DIV/0!	2.1%	2.2%	2.2%	1.7%	3.2%	1.9%	2.0%
PHV- Bicycles														PHV - Pedestrians									
Northbound				Southbound				Eastbound				Westbound				Sum		in Crosswalk				Sum	
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum		
0				0		0		1	0	0		0	0	0		1	1	8	1	0	10		
All Vehicle Volumes																							
Time	Northbound				Southbound I5 SB ramps				Eastbound OR214				Westbound OR214				15 Min	1 HR					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum					
04:00:00 PM					60		24		37	18	0		42	19	0								
04:05:00 PM					55		33		46	33	0		58	43	0								
04:10:00 PM					28		15		54	36	0		50	31	0		682						
04:15:00 PM					36		35		50	28	0		45	33	0		709						
04:20:00 PM					34		19		52	19	0		44	31	0		640						
04:25:00 PM					41		26		55	18	0		43	30	0		639						
04:30:00 PM					51		25		37	20	0		44	38	0		627						
04:35:00 PM					30		14		50	20	0		47	28	0		617						
04:40:00 PM					40		25		41	39	0		52	45	0		646						
04:45:00 PM					38		19		46	24	0		49	28	0		635						
04:50:00 PM					28		17		32	17	0		50	46	0		636						
04:55:00 PM					35		26		46	12	0		45	29	0		587	2554					
05:00:00 PM					56		19		29	23	0		60	35	0		605	2576					
05:05:00 PM					40		19		49	34	0		41	51	0		649	2542					
05:10:00 PM					35		16		52	34	0		48	63	0		704	2576					
05:15:00 PM					37		18		51	26	0		55	37	0		706	2573					
05:20:00 PM					45		16		35	21	0		45	34	0		668	2570					
05:25:00 PM					50		28		56	18	0		51	37	0		660	2597					
05:30:00 PM					33		21		42	16	0		58	34	0		640	2586					
05:35:00 PM					36		18		37	13	0		51	28	0		627	2580					
05:40:00 PM					46		23		48	19	0		51	19	0		593	2544					
05:45:00 PM					32		22		52	10	0		42	31	0		578	2529					
05:50:00 PM					29		16		48	13	0		53	26	0		580	2524					
05:55:00 PM					38		21		48	17	0		36	18	0		552	2509					



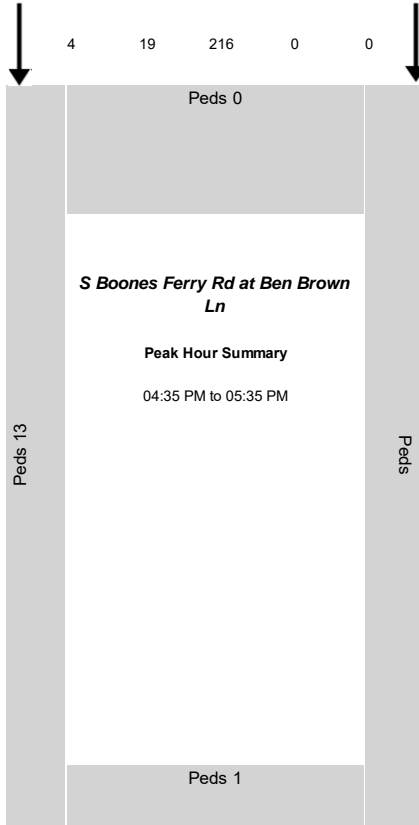
Data Provided by K-D-N.com 503-594-4224	
N/S street	S Boones Ferry Rd
E/W street	Ben Brown Ln
City, State	Woodburn OR
Site Notes	
Location	45.137496 - -122.864178
Start Date	Tuesday, March 21, 2017
Start Time	04:00:00 PM
Weather	
Study ID #	107816
Peak Hour Start	04:35:00 PM
Peak 15 Min Start	05:10:00 PM
PHF (15-Min Int)	0.86

Eastbound
Ben Brown Ln
Heavy Vehicle 0.0%



U-Turn 0
Left 11
Thru 0
Right 2
Bicycles 0

Southbound S Boones Ferry Rd Heavy Vehicle 2.5%				
In	239	Out	192	
Bicycles	Right	Thru	Left	U-Turn
4	19	216	0	0



U-Turn	Left	Thru	Right	Bicycles
0	6	181	0	0

In	187	Out	218
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Heavy Vehicle 2.7%
S Boones Ferry Rd
Northbound

Westbound
Heavy Vehicle 0.0%



Bicycles 0
Right 0
Thru 0
Left 0
U-Turn 0

Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
6	181	0	0	0	216	19	0	11	0	2	0	0	0	0	0	187	235	13	0	218	192	25	0
Percent Heavy Vehicles																							
0.0%	2.8%	0.0%	0.0%	0.0%	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.7%	2.6%	0.0%	0.0%	2.8%	2.6%	0.0%	0.0%
PHV- Bicycles																PHV - Pedestrians							
Northbound				Southbound				Eastbound				Westbound				in Crosswalk							
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum		
0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	4	1	0	13	14			
All Vehicle Volumes																							
Time	Northbound S Boones Ferry Rd				Southbound S Boones Ferry Rd				Eastbound Ben Brown Ln				Westbound				15 Min Sum	1 HR Sum					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn							
04:00:00 PM	0	10	0	0	10	0	0	0	1	0	0	0	0	0	0	0	95						
04:05:00 PM	0	14	0	0	20	1	0	0	1	1	0	0					105						
04:10:00 PM	0	16	0	0	18	1	0	0	2	0	0	0					98						
04:15:00 PM	0	12	0	0	14	3	0	0	0	2	0	0					89						
04:20:00 PM	0	11	0	0	17	1	0	0	1	0	0	0					87						
04:25:00 PM	0	11	0	0	15	2	0	0	0	0	0	0					99						
04:30:00 PM	0	11	0	0	14	4	0	0	0	0	0	0					97						
04:35:00 PM	0	21	0	0	17	2	0	0	2	0	0	0					107						
04:40:00 PM	2	12	0	0	11	0	0	0	1	0	0	0					103						
04:45:00 PM	0	15	0	0	23	1	0	0	0	0	0	0					104	385					
04:50:00 PM	1	17	0	0	16	4	0	0	0	0	0	0					95	394					
04:55:00 PM	0	15	0	0	10	1	0	0	1	0	0	0					95	395					
05:00:00 PM	0	11	0	0	19	0	0	0	0	0	0	0					106	396					
05:05:00 PM	0	9	0	0	26	1	0	0	2	0	0	0					122	411					
05:10:00 PM	0	16	0	0	18	4	0	0	0	0	0	0					126	423					
05:15:00 PM	1	23	0	0	20	1	0	0	1	0	0	0					122	429					
05:20:00 PM	1	18	0	0	19	3	0	0	0	1	0	0					111	435					
05:25:00 PM	1	10	0	0	19	1	0	0	2	1	0	0					93	417					
05:30:00 PM	0	14	0	0	18	1	0	0	2	0	0	0					94	426					
05:35:00 PM	0	7	0	0	14	1	0	0	2	0	0	0					97	425					
05:40:00 PM	0	17	0	0	14	2	0	0	1	1	0	0					105	419					
05:45:00 PM	0	12	0	0	23	2	0	0	1	0	0	0					103	425					
05:50:00 PM	0	9	0	0	15	4	0	0	3	1	0	0											
05:55:00 PM	0	16	0	0	16	1	0	0	0	0	0	0											

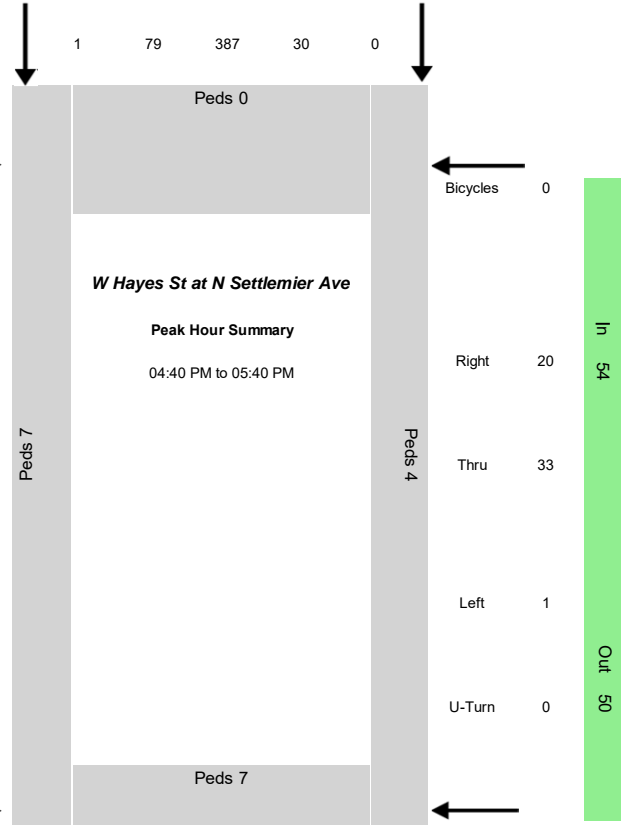


Data Provided by K-D-N.com 503-594-4224

N/S street	N Settlemeir Ave	
E/W street	W Hayes St	
City, State	Woodburn OR	
Site Notes		
Location	45.145751 - -122.860855	
Start Date	Tuesday, March 21, 2017	
Start Time	04:00:00 PM	
Weather		
Study ID #	107818	
Peak Hour Start	04:40:00 PM	
Peak 15 Min Start	05:05:00 PM	
PHF (15-Min Int)	0.91	

Southbound
N Settlemeir Ave
Heavy Vehicle 1.4%

In	497	Out	352
Bicycles		Right	
		Thru	
		Left	
		U-Turn	



U-Turn	Left	Thru	Right	Bicycles
0	138	292	1	0

In	431	Out	527
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Heavy Vehicle 1.6%
N Settlemeir Ave
Northbound

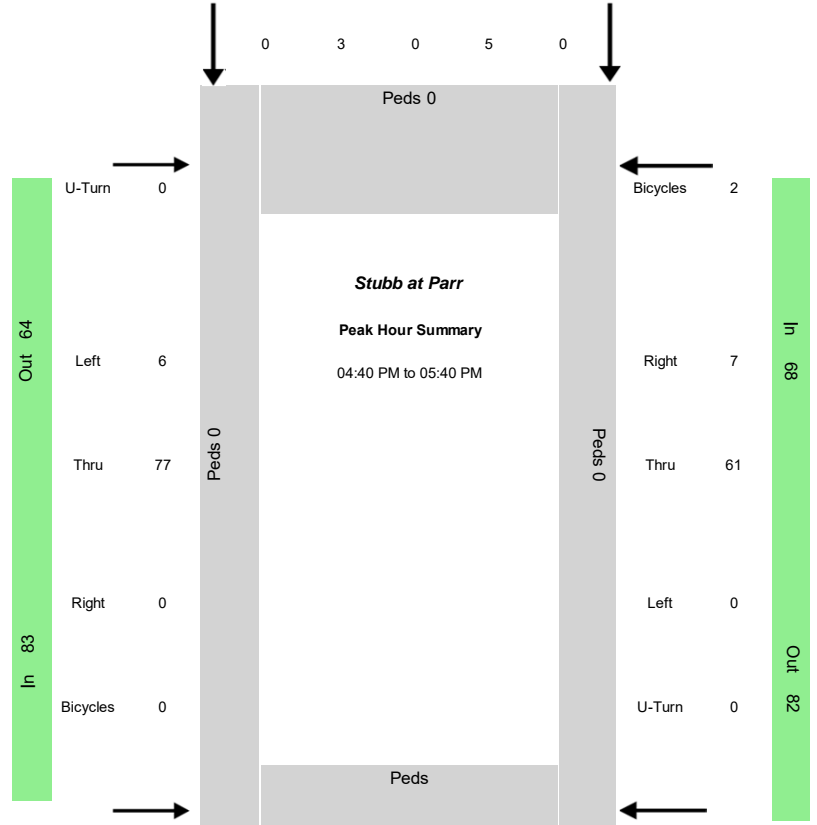
Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
138	292	1	0	30	387	79	0	40	19	139	0	1	33	20	0	431	496	198	54	527	352	250	50
Percent Heavy Vehicles																							
0.7%	2.1%	0.0%	0.0%	0.0%	1.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.6%	1.4%	0.0%	0.0%	1.3%	1.7%	0.4%	0.0%
PHV- Bicycles															PHV - Pedestrians								
Northbound				Southbound				Eastbound				Westbound			Sum	in Crosswalk				Sum			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right		NB	SB	EB	WB				
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	7	0	7	4	18		
All Vehicle Volumes																							
Time	Northbound N Settlemeir Ave				Southbound N Settlemeir Ave				Eastbound W Hayes St				Westbound W Hayes St				15 Min Sum	1 HR Sum					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn							
04:00:00 PM	8	24	1	0	3	31	9	0	1	4	9	0	0	3	1	0							
04:05:00 PM	7	28	1	0	0	28	4	0	10	2	17	0	0	3	2	0							
04:10:00 PM	10	26	0	0	2	34	6	0	4	0	8	0	0	1	3	0	290						
04:15:00 PM	9	25	0	0	1	36	7	0	4	3	15	0	0	2	1	0	299						
04:20:00 PM	11	23	0	0	2	37	3	0	6	1	5	0	1	1	0	0	287						
04:25:00 PM	7	32	0	0	1	31	5	0	4	0	9	0	0	0	2	0	284						
04:30:00 PM	10	22	0	0	3	30	5	0	0	4	8	0	1	2	0	0	266						
04:35:00 PM	12	30	0	0	2	27	3	0	0	3	17	0	1	0	0	0	271						
04:40:00 PM	9	29	0	0	2	31	6	0	4	1	9	0	0	3	1	0	275						
04:45:00 PM	11	26	0	0	2	25	8	0	4	1	11	0	0	1	4	0	283						
04:50:00 PM	15	16	0	0	2	32	10	0	2	2	14	0	0	1	0	0	282						
04:55:00 PM	7	26	0	0	4	26	6	0	2	4	9	0	0	7	1	0	279	1128					
05:00:00 PM	11	28	0	0	3	36	4	0	5	2	10	0	0	6	2	0	293	1141					
05:05:00 PM	11	28	0	0	0	36	6	0	7	2	13	0	0	3	2	0	307	1147					
05:10:00 PM	7	21	0	0	3	35	9	0	7	2	10	0	0	1	5	0	315	1153					
05:15:00 PM	19	31	0	0	4	36	8	0	2	0	11	0	1	2	1	0	323	1165					
05:20:00 PM	9	19	0	0	5	27	5	0	2	4	13	0	0	1	1	0	301	1161					
05:25:00 PM	10	17	0	0	1	38	6	0	1	0	12	0	0	5	0	0	291	1160					
05:30:00 PM	17	29	0	0	1	31	5	0	1	0	11	0	0	1	2	0	274	1173					
05:35:00 PM	12	22	1	0	3	34	6	0	3	1	16	0	0	2	1	0	289	1179					
05:40:00 PM	11	23	0	0	1	29	3	0	4	2	8	0	0	0	0	0	280	1165					
05:45:00 PM	12	28	1	0	0	22	2	0	8	4	19	0	0	0	1	0	279	1169					
05:50:00 PM	11	22	2	0	1	17	3	0	3	2	5	0	0	2	0	0	246	1143					
05:55:00 PM	13	24	0	0	0	30	5	0	5	4	11	0	0	3	1	0	261	1147					

Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
266	133	71	0	98	201	118	0	82	511	338	0	93	574	84	0	470	417	931	751	632	299	958	680
Percent Heavy Vehicles																							
0.4%	2.3%	1.4%	0.0%	0.0%	1.5%	1.7%	0.0%	1.2%	4.5%	0.6%	0.0%	2.2%	2.8%	2.4%	0.0%	1.1%	1.2%	2.8%	2.7%	1.1%	2.0%	2.0%	3.5%
PHV- Bicycles															PHV - Pedestrians								
Northbound				Southbound				Eastbound				Westbound				in Crosswalk							
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum		
0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2	3	10	10	3	26		
All Vehicle Volumes																							
Time	Northbound Boones Ferry Rd				Southbound N Settlemier Rd				Eastbound OR 214				Westbound OR 214				15 Min	1 HR					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn							
04:00:00 PM	16	8	5	0	10	6	5	0	8	46	24	0	3	44	5	0							
04:05:00 PM	15	13	7	0	10	6	7	0	5	55	25	0	8	54	5	0							
04:10:00 PM	19	15	8	0	8	17	9	0	9	55	28	0	0	46	6	0	610						
04:15:00 PM	20	12	9	0	11	19	10	0	1	31	30	0	10	49	9	0	641						
04:20:00 PM	16	13	6	0	3	14	8	0	9	44	29	0	11	38	5	0	627						
04:25:00 PM	26	10	4	0	5	11	10	0	8	48	18	0	7	45	5	0	604						
04:30:00 PM	13	11	3	0	5	14	4	0	13	45	24	0	6	38	4	0	573						
04:35:00 PM	19	11	9	0	6	12	10	0	7	49	25	0	3	56	3	0	587						
04:40:00 PM	22	14	6	0	8	13	9	0	5	48	30	0	6	45	11	0	607						
04:45:00 PM	27	20	2	0	10	18	6	0	10	38	30	0	8	47	6	0	649						
04:50:00 PM	15	4	4	0	12	16	5	0	8	46	32	0	10	48	9	0	648						
04:55:00 PM	19	9	9	0	7	19	6	0	8	29	19	0	7	36	5	0	604	2425					
05:00:00 PM	24	6	12	0	5	12	13	0	1	46	24	0	8	62	8	0	603	2466					
05:05:00 PM	30	18	6	0	12	14	17	0	5	37	32	0	8	40	11	0	624	2486					
05:10:00 PM	24	14	2	0	15	22	15	0	5	42	26	0	7	54	5	0	682	2497					
05:15:00 PM	18	6	5	0	7	26	9	0	12	41	28	0	9	56	6	0	684	2509					
05:20:00 PM	28	13	5	0	5	15	10	0	8	44	32	0	6	52	5	0	677	2536					
05:25:00 PM	15	7	2	0	2	16	14	0	8	47	29	0	12	49	6	0	653	2546					
05:30:00 PM	25	11	9	0	9	18	4	0	5	44	31	0	9	29	9	0	633	2569					
05:35:00 PM	16	11	6	0	8	17	5	0	12	44	25	0	8	46	5	0	613	2562					
05:40:00 PM	12	12	4	0	5	14	8	0	6	49	24	0	8	52	11	0	611	2550					
05:45:00 PM	25	16	10	0	11	11	8	0	4	44	21	0	2	36	10	0	606	2526					
05:50:00 PM	14	8	3	0	7	14	3	0	9	47	18	0	4	38	4	0	572	2486					
05:55:00 PM	9	15	2	0	6	12	6	0	15	41	31	0	5	47	12	0	568	2514					



Data Provided by K-D-N.com 503-594-4224	
N/S street	Stubb Rd NE
E/W street	Parr Rd
City, State	Woodburn OR
Site Notes	
Location	45.136454 - -122.879529
Start Date	Tuesday, March 21, 2017
Start Time	04:00:00 PM
Weather	
Study ID #	107814
Peak Hour Start	04:40:00 PM
Peak 15 Min Start	04:40:00 PM
PHF (15-Min Int)	0.86

Eastbound
Parr Rd
Heavy Vehicle 0.0%

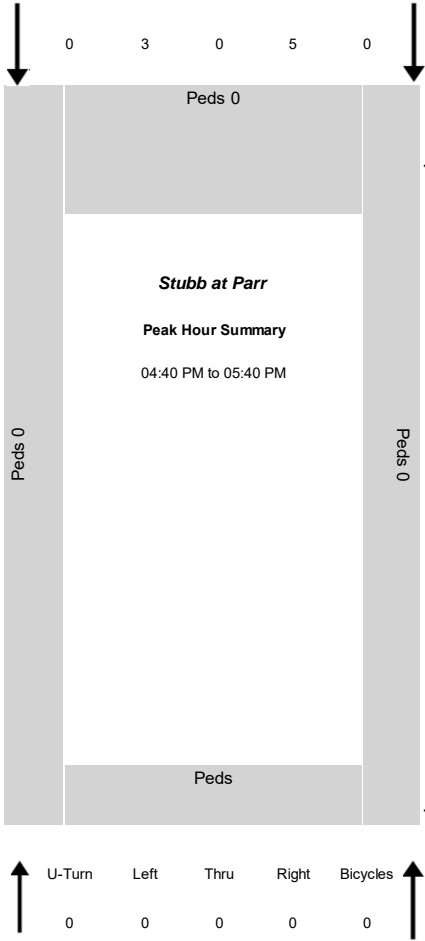


Westbound
Parr Rd
Heavy Vehicle 0.0%

Southbound
Stubb Rd NE
Heavy Vehicle 0.0%

In	Out
8	13

Bicycles Right Thru Left U-Turn



Northbound

In	Out
0	0

Heavy Vehicle NaN

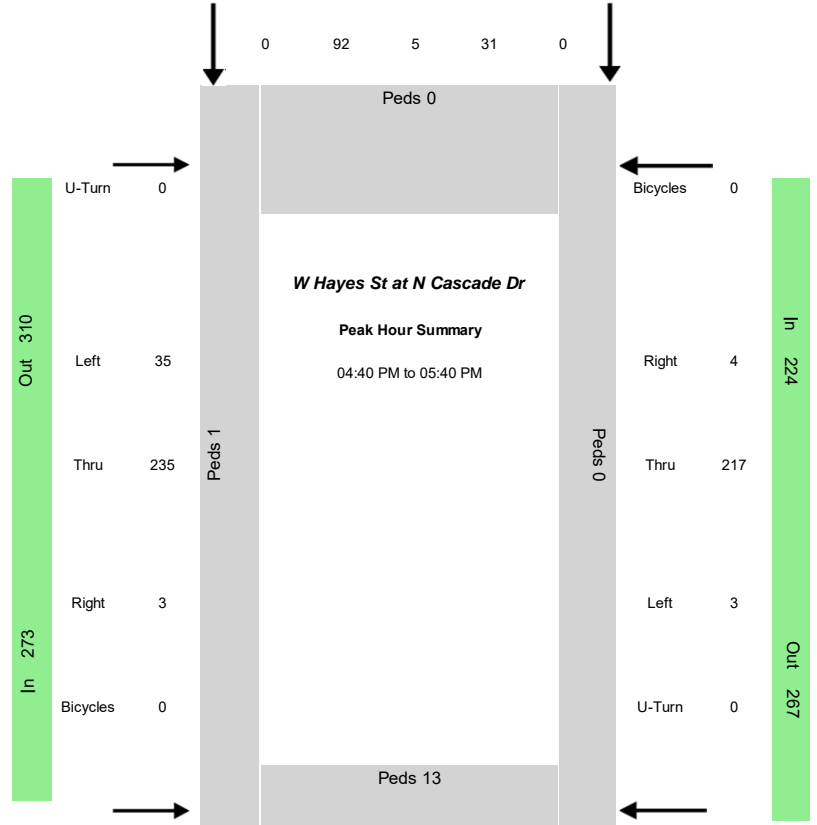
Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
0	0	0	0	5	0	3	0	6	77	0	0	0	61	7	0	0	8	83	68	0	13	64	82
Percent Heavy Vehicles																							
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	#DIV/0!	0.0%	0.0%	0.0%	#DIV/0!	0.0%	0.0%	0.0%
PHV- Bicycles														PHV - Pedestrians									
Northbound				Southbound				Eastbound				Westbound				in Crosswalk							
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum		
0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0		
All Vehicle Volumes																							
Time	Northbound				Southbound				Eastbound				Westbound				15 Min	1 HR					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn							
04:00:00 PM					0	0	0	0	0	5	0	0	2	0	0	0							
04:05:00 PM					0	0	0	0	0	7	0	0	8	0	0	0							
04:10:00 PM					0	0	0	0	0	7	0	0	3	0	0	0	32						
04:15:00 PM					0	0	0	0	0	8	0	0	4	0	0	0	37						
04:20:00 PM					0	0	0	0	1	6	0	0	6	1	0	0	36						
04:25:00 PM					0	0	0	0	0	7	0	0	5	0	0	0	38						
04:30:00 PM					0	1	0	0	0	1	0	0	2	0	0	0	30						
04:35:00 PM					0	0	0	0	1	3	0	0	5	0	0	0	25						
04:40:00 PM					0	0	0	0	0	10	0	0	10	0	0	0	33						
04:45:00 PM					0	0	0	0	0	6	0	0	3	1	0	0	39						
04:50:00 PM					0	0	0	0	1	9	0	0	6	0	0	0	46						
04:55:00 PM					1	0	0	0	1	2	0	0	2	2	0	0	34	137					
05:00:00 PM					0	0	0	0	0	5	0	0	5	0	0	0	34	140					
05:05:00 PM					0	2	0	0	1	4	0	0	5	1	0	0	31	138					
05:10:00 PM					0	0	0	0	0	8	0	0	4	0	0	0	35	140					
05:15:00 PM					0	0	0	0	2	8	0	0	6	2	0	0	43	146					
05:20:00 PM					2	0	0	0	1	5	0	0	6	0	0	0	44	146					
05:25:00 PM					0	1	0	0	0	8	0	0	3	1	0	0	45	147					
05:30:00 PM					1	0	0	0	0	4	0	0	7	0	0	0	39	155					
05:35:00 PM					1	0	0	0	0	8	0	0	4	0	0	0	38	159					
05:40:00 PM					0	0	0	0	0	6	0	0	4	1	0	0	36	150					
05:45:00 PM					0	0	0	0	1	4	0	0	6	0	0	0	35	151					
05:50:00 PM					1	0	0	0	1	3	0	0	4	1	0	0	32	145					
05:55:00 PM					1	0	0	0	0	0	0	0	3	0	0	0	25	141					



Data Provided by K-D-N.com 503-594-4224

N/S street	N Cascade Dr
E/W street	W Hayes St
City, State	Woodburn OR
Site Notes	
Location	45.146214 - -122.870792
Start Date	Tuesday, April 18, 2017
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:40:00 PM
Peak 15 Min Start	04:50:00 PM
PHF (15-Min Int)	0.90

Eastbound
W Hayes St
Heavy Vehicle 1.5%



Southbound
N Cascade Dr
Heavy Vehicle 1.6%

In	128	Out	43
Bicycles		Left	
Right		U-Turn	

Northbound
N Cascade Dr
Heavy Vehicle 16.7%

In	6	Out	11
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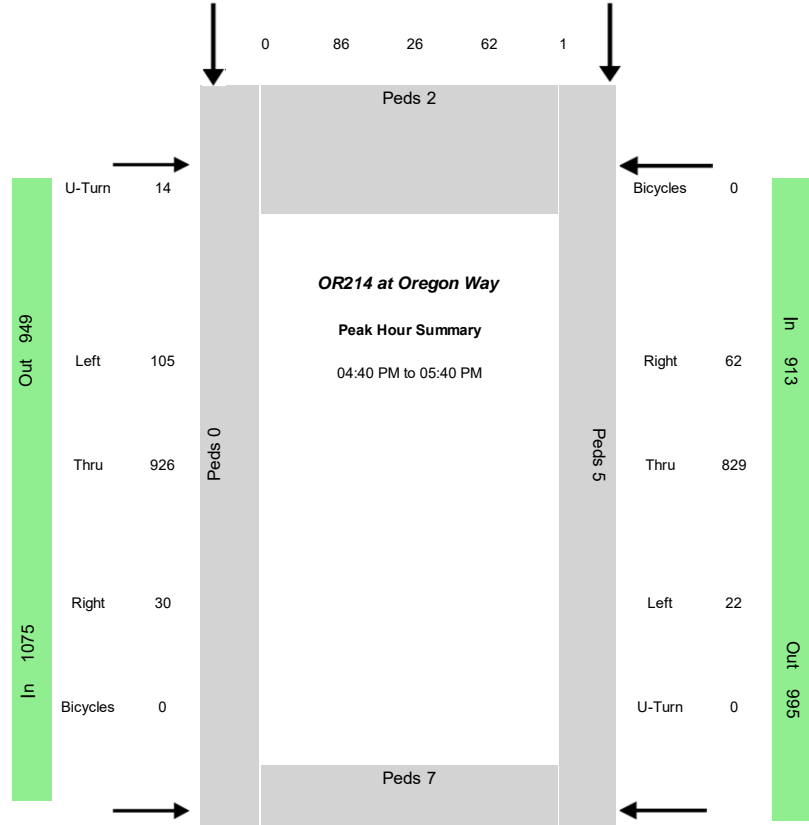
Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
1	4	1	0	31	5	92	0	35	235	3	0	3	217	4	0	6	128	273	224	11	43	310	267
Percent Heavy Vehicles																							
0.0%	25.0%	0.0%	0.0%	0.0%	0.0%	2.2%	0.0%	5.7%	0.9%	0.0%	0.0%	0.0%	0.9%	0.0%	0.0%	16.7%	1.6%	1.5%	0.9%	0.0%	7.0%	1.3%	0.7%
PHV - Bicycles															PHV - Pedestrians								
Northbound				Southbound				Eastbound				Westbound				Sum	in Crosswalk				Sum		
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn		NB	SB	EB	WB			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	1	0	14		
All Vehicle Volumes																							
Time	Northbound N Cascade Dr				Southbound N Cascade Dr				Eastbound W Hayes St				Westbound W Hayes St				15 Min Sum	1 HR Sum					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn							
04:00:00 PM	0	0	0	0	3	2	7	0	4	24	3	0	0	17	1	0							
04:05:00 PM	0	0	1	0	4	1	6	0	1	16	0	0	0	15	4	0							
04:10:00 PM	0	0	0	0	3	0	8	0	4	20	1	0	0	20	1	0	166						
04:15:00 PM	0	0	0	0	1	1	5	0	1	18	0	0	0	24	0	0	155						
04:20:00 PM	0	0	0	0	0	0	2	0	3	10	1	0	1	23	1	0	148						
04:25:00 PM	0	0	0	0	0	1	6	0	3	10	0	0	0	15	0	0	126						
04:30:00 PM	0	1	0	0	1	0	12	0	3	18	0	0	0	15	1	0	127						
04:35:00 PM	0	0	0	0	2	0	9	0	0	16	1	0	0	20	0	0	134						
04:40:00 PM	0	1	0	0	0	0	7	0	4	19	0	0	0	17	2	0	149						
04:45:00 PM	0	0	0	0	2	0	4	0	2	13	1	0	0	19	0	0	139						
04:50:00 PM	0	0	0	0	3	1	11	0	2	20	0	0	0	19	1	0	148						
04:55:00 PM	1	2	0	0	2	1	9	0	5	22	0	0	0	17	0	0	157	598					
05:00:00 PM	0	0	0	0	2	0	7	0	3	21	0	0	1	25	1	0	176	597					
05:05:00 PM	0	0	0	0	5	1	10	0	1	11	0	0	0	15	0	0	162	592					
05:10:00 PM	0	1	0	0	2	1	7	0	6	18	0	0	0	19	0	0	157	589					
05:15:00 PM	0	0	0	0	0	0	14	0	5	18	0	0	0	15	0	0	149	591					
05:20:00 PM	0	0	0	0	6	0	6	0	2	22	0	0	0	18	0	0	160	604					
05:25:00 PM	0	0	0	0	1	0	2	0	2	17	0	0	2	24	0	0	154	617					
05:30:00 PM	0	0	0	0	4	1	8	0	2	27	2	0	0	20	0	0	166	630					
05:35:00 PM	0	0	1	0	4	0	7	0	1	27	0	0	0	9	0	0	161	631					
05:40:00 PM	0	0	0	0	1	2	4	0	0	25	0	0	0	11	0	0	156	624					
05:45:00 PM	1	1	0	0	1	0	3	0	5	12	1	0	1	19	0	0	136	627					
05:50:00 PM	0	0	1	0	3	0	5	0	2	19	0	0	0	15	0	0	132	615					
05:55:00 PM	1	0	0	0	1	1	6	0	1	16	0	0	0	20	1	0	136	603					



Data Provided by K-D-N.com 503-594-4224

N/S street	W Oregon Way	
E/W street	OR214	
City, State	Woodburn OR	
Site Notes		
Location	45.150927 - -122.873334	
Start Date	Tuesday, April 18, 2017	
Start Time	04:00:00 PM	
Weather		
Study ID #		
Peak Hour Start	04:40:00 PM	
Peak 15 Min Start	05:10:00 PM	
PHF (15-Min Int)	0.95	

Eastbound
OR214
Heavy Vehicle 2.2%



Heavy Vehicle 4.3%
W Oregon Way
Northbound

Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
20	19	7	0	62	26	86	1	105	926	30	14	22	829	62	0	46	175	1075	913	78	187	949	995
Percent Heavy Vehicles																							
0.0%	0.0%	28.6%	0.0%	1.6%	0.0%	3.5%	0.0%	1.0%	2.5%	0.0%	0.0%	0.0%	2.4%	1.6%	0.0%	4.3%	2.3%	2.2%	2.3%	0.0%	1.1%	2.4%	2.6%
PHV - Bicycles															PHV - Pedestrians								
Northbound				Southbound				Eastbound				Westbound				in Crosswalk							
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum		
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	2	0	5	14		
All Vehicle Volumes																							
Time	Northbound W Oregon Way				Southbound W Oregon Way				Eastbound OR214				Westbound OR214				15 Min	1 HR					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn							
04:00:00 PM	0	2	0	0	8	3	9	0	2	79	3	0	0	64	3	0							
04:05:00 PM	1	3	0	0	7	3	6	0	11	67	0	0	0	74	4	0							
04:10:00 PM	2	0	0	0	1	3	5	0	10	101	2	1	4	59	5	0	542						
04:15:00 PM	2	1	1	0	9	5	6	0	10	67	2	3	2	65	6	0	548						
04:20:00 PM	1	1	0	0	3	2	8	0	1	73	3	2	2	67	5	0	540						
04:25:00 PM	0	0	0	0	4	2	9	0	7	72	1	2	2	58	6	0	510						
04:30:00 PM	1	2	1	0	5	0	5	0	8	79	0	4	3	64	7	0	510						
04:35:00 PM	2	0	1	0	7	2	2	0	4	61	0	1	1	67	5	0	495						
04:40:00 PM	3	3	3	0	8	2	10	0	4	65	1	2	0	70	9	0	512						
04:45:00 PM	1	0	0	0	6	1	8	0	13	74	5	0	3	72	6	0	522						
04:50:00 PM	3	2	0	0	5	2	6	0	0	70	4	1	2	69	4	0	537						
04:55:00 PM	2	4	0	0	4	1	12	0	13	87	2	0	1	66	6	0	555	2119					
05:00:00 PM	0	3	0	0	5	1	5	0	9	72	2	1	4	70	8	0	546	2126					
05:05:00 PM	1	1	0	0	10	4	8	0	9	65	1	3	1	71	7	0	559	2131					
05:10:00 PM	4	0	0	0	4	5	7	0	6	78	3	2	1	80	3	0	554	2131					
05:15:00 PM	3	1	0	0	4	3	5	0	8	86	6	1	2	71	2	0	566	2144					
05:20:00 PM	0	2	1	0	6	4	6	0	12	84	1	0	5	68	5	0	579	2170					
05:25:00 PM	0	1	1	0	5	0	5	0	7	80	3	1	1	58	0	0	548	2169					
05:30:00 PM	3	1	0	0	1	1	3	1	13	97	1	2	2	60	7	0	548	2182					
05:35:00 PM	0	1	2	0	4	2	11	0	11	68	1	1	0	74	5	0	534	2209					
05:40:00 PM	1	2	0	0	3	2	5	0	6	79	0	1	1	57	5	0	534	2191					
05:45:00 PM	0	1	1	0	6	0	3	0	6	77	3	2	0	61	6	0	508	2168					
05:50:00 PM	1	1	0	0	2	0	5	0	9	63	1	1	0	53	4	0	468	2140					
05:55:00 PM	3	0	0	0	3	2	9	0	6	72	3	0	1	68	4	0	477	2113					



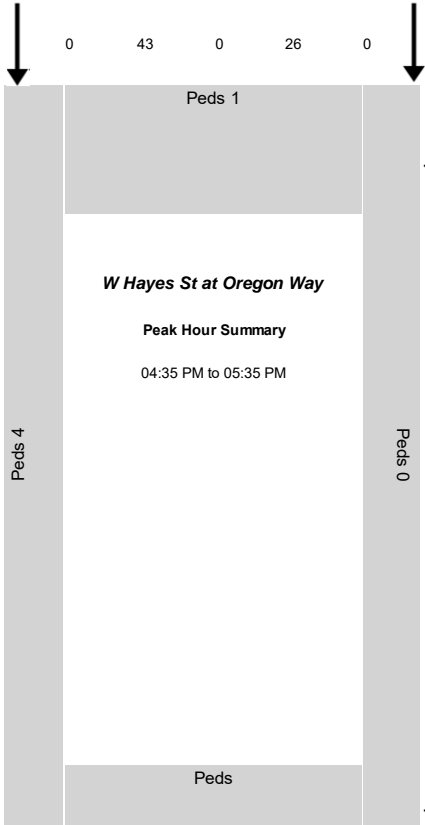
Data Provided by K-D-N.com 503-594-4224

N/S street	W Oregon Way	
E/W street	W Hayes St	
City, State	Woodburn OR	
Site Notes		
Location	45.147108 - -122.874207	
Start Date	Tuesday, April 18, 2017	
Start Time	04:00:00 PM	
Weather		
Study ID #		
Peak Hour Start	04:35:00 PM	
Peak 15 Min Start	04:50:00 PM	
PHF (15-Min Int)	0.91	

Eastbound
W Hayes St
Heavy Vehicle 2.3%



U-Turn	0
Left	19
Thru	240
Right	0
Bicycles	1

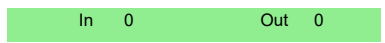


Bicycles	0
Right	27
Thru	298
Left	0
U-Turn	0



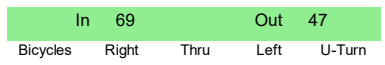
Westbound
W Hayes St
Heavy Vehicle 0.9%

U-Turn	0	Left	0	Thru	0	Right	0	Bicycles	0
--------	---	------	---	------	---	-------	---	----------	---



Heavy Vehicle NaN

Northbound



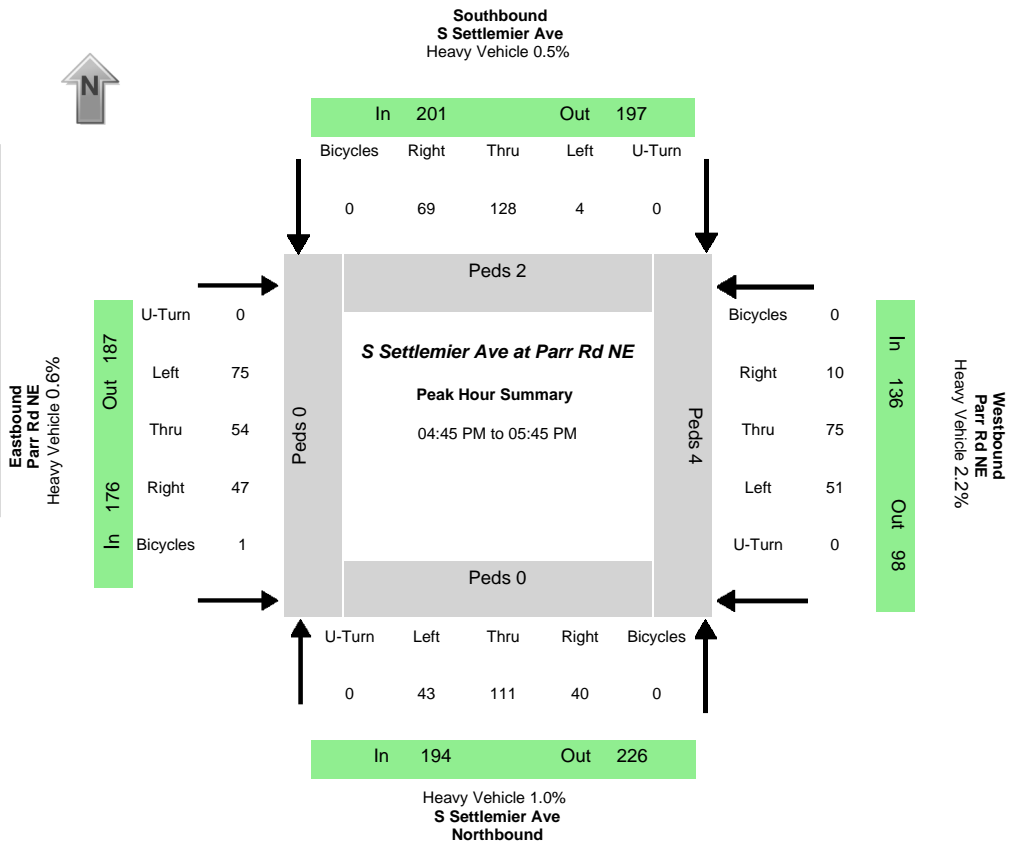
Southbound
W Oregon Way
Heavy Vehicle 0.0%

Bicycles	0	Right	43	Thru	0	Left	26	U-Turn	0
----------	---	-------	----	------	---	------	----	--------	---

Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
0	0	0	0	26	0	43	0	19	240	0	0	0	298	27	0	0	69	259	325	0	46	341	266
Percent Heavy Vehicles																							
0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.3%	2.1%	0.0%	0.0%	0.0%	1.0%	0.0%	0.0%	#DIV/0!	0.0%	2.3%	0.9%	#DIV/0!	2.2%	0.9%	1.9%
PHV- Bicycles															PHV - Pedestrians								
Northbound				Southbound				Eastbound				Westbound			Sum	in Crosswalk				Sum			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right		NB	SB	EB	WB				
0				0				1	0			0	0	0	1	1	4	0	5				
All Vehicle Volumes																							
Time	Northbound				Southbound W Oregon Way				Eastbound W Hayes St				Westbound W Hayes St				15 Min	1 HR					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	Sum					
04:00:00 PM					5		1	0	3	24		0	22	2	0								
04:05:00 PM					3		0	0	2	17		0	21	0	0								
04:10:00 PM					2		6	0	0	20		0	21	3	0		152						
04:15:00 PM					1		4	0	2	18		0	27	3	0		150						
04:20:00 PM					4		4	0	0	11		0	27	0	0		153						
04:25:00 PM					3		3	0	0	14		0	16	2	0		139						
04:30:00 PM					1		3	0	2	20		0	27	0	0		137						
04:35:00 PM					1		1	0	5	19		0	27	4	0		148						
04:40:00 PM					2		4	0	1	21		0	20	2	0		160						
04:45:00 PM					2		2	0	0	14		0	23	1	0		149						
04:50:00 PM					2		5	0	3	19		0	29	3	0		153						
04:55:00 PM					3		2	0	3	25		0	28	1	0		165	616					
05:00:00 PM					0		2	0	1	22		0	28	4	0		180	616					
05:05:00 PM					3		5	0	1	12		0	21	2	0		163	617					
05:10:00 PM					4		4	0	2	20		0	27	1	0		159	623					
05:15:00 PM					5		4	0	1	17		0	25	4	0		158	624					
05:20:00 PM					0		9	0	1	24		0	22	1	0		171	635					
05:25:00 PM					1		4	0	0	22		0	22	1	0		163	647					
05:30:00 PM					3		1	0	1	25		0	26	3	0		166	653					
05:35:00 PM					2		1	0	4	32		0	17	0	0		165	652					
05:40:00 PM					1		1	0	0	20		0	13	3	0		153	640					
05:45:00 PM					0		2	0	1	19		0	20	0	0		136	640					
05:50:00 PM					0		2	0	0	19		0	19	1	0		121	620					
05:55:00 PM					3		4	0	0	16		0	27	1	0		134	609					

Data Provided by K-D-N.com 503-594-4224

N/S street	S Settlemier Ave
E/W street	Parr Rd NE
City, State	Woodburn OR
Site Notes	
Location	45.135906 - -122.865101
Start Date	Thursday, March 01, 2018
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:45:00 PM
Peak 15 Min Start	05:10:00 PM
PHF (15-Min Int)	0.89



Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
43	111	40	0	4	128	69	0	75	54	47	0	51	75	10	0	194	201	176	136	226	196	187	98
Percent Heavy Vehicles																							
0.0%	1.8%	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%	1.3%	0.0%	0.0%	0.0%	0.0%	2.7%	10.0%	0.0%	1.0%	0.5%	0.6%	2.2%	0.4%	2.0%	1.1%	0.0%

PHV- Bicycles														PHV- Pedestrians							
Northbound				Southbound				Eastbound				Westbound				in Crosswalk					
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Sum	NB	SB	EB	WB	Sum
0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	2	0	4	6

Time	Northbound S Settlemier Ave				Southbound S Settlemier Ave				Eastbound Parr Rd NE				Westbound Parr Rd NE				15 Min Sum	1 HR Sum
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn		
04:00:00 PM	2	5	3	0	0	5	5	0	5	4	3	0	2	5	0	0		
04:05:00 PM	1	9	2	0	2	11	4	0	5	5	3	0	6	6	0	0		
04:10:00 PM	3	8	6	0	0	12	3	0	2	5	6	0	2	4	1	0	145	
04:15:00 PM	2	9	1	0	2	12	8	0	11	9	4	0	5	3	1	0	173	
04:20:00 PM	3	5	6	0	0	18	2	0	9	5	2	0	1	9	2	0	181	
04:25:00 PM	2	9	2	0	0	11	6	0	12	7	1	0	4	6	2	0	191	
04:30:00 PM	4	7	1	0	0	8	5	0	2	10	6	0	1	7	0	0	175	
04:35:00 PM	1	6	6	0	0	4	8	0	4	7	1	0	8	3	1	0	162	
04:40:00 PM	9	10	4	0	0	9	4	0	3	4	1	0	5	8	1	0	158	
04:45:00 PM	4	10	2	0	2	6	4	0	5	3	6	0	5	3	3	0	160	
04:50:00 PM	1	6	5	0	1	12	10	0	3	5	4	0	4	5	1	0	168	
04:55:00 PM	4	13	3	0	0	7	4	0	7	4	4	0	2	3	0	0	161	655
05:00:00 PM	6	7	1	0	0	6	0	0	5	4	8	0	3	8	0	0	156	664
05:05:00 PM	2	8	4	0	0	9	10	0	8	5	3	0	6	4	1	0	159	670
05:10:00 PM	2	9	4	0	0	13	6	0	3	2	4	0	9	11	1	0	172	682
05:15:00 PM	4	12	0	0	0	16	8	0	12	6	3	0	3	4	2	0	194	685
05:20:00 PM	3	9	2	0	0	17	4	0	3	6	6	0	4	11	0	0	199	688
05:25:00 PM	4	15	7	0	0	4	4	0	8	4	3	0	3	5	0	0	192	683
05:30:00 PM	4	4	5	0	1	10	6	0	7	4	2	0	4	6	1	0	176	686
05:35:00 PM	6	7	4	0	0	12	7	0	6	6	2	0	3	9	0	0	173	699
05:40:00 PM	3	11	3	0	0	16	6	0	8	5	2	0	5	6	1	0	182	707
05:45:00 PM	1	6	2	0	1	9	3	0	3	9	5	0	4	0	0	0	171	697
05:50:00 PM	3	6	4	0	0	16	6	0	4	0	2	0	3	5	0	0	158	689
05:55:00 PM	2	5	2	0	0	3	7	0	4	6	3	0	7	9	3	0	143	689



Appendix B – Existing 2017 HCM Reports

HCM 2010 TWSC
1: Harvard Dr & Evergreen Rd

03/21/2018

Intersection

Int Delay, s/veh 3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↻		↻	↻			↻			↻	
Traffic Vol, veh/h	23	177	2	21	62	0	0	15	59	3	7	7
Future Vol, veh/h	23	177	2	21	62	0	0	15	59	3	7	7
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	-	-	-	75	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	27	211	2	25	74	0	0	18	70	4	8	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	74	0	0	213	0	0	399	391	212	435	392	74
Stage 1	-	-	-	-	-	-	267	267	-	124	124	-
Stage 2	-	-	-	-	-	-	132	124	-	311	268	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1526	-	-	1357	-	-	561	545	828	531	544	988
Stage 1	-	-	-	-	-	-	738	688	-	880	793	-
Stage 2	-	-	-	-	-	-	871	793	-	699	687	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1526	-	-	1357	-	-	534	524	828	460	523	988
Mov Cap-2 Maneuver	-	-	-	-	-	-	534	524	-	460	523	-
Stage 1	-	-	-	-	-	-	723	674	-	862	778	-
Stage 2	-	-	-	-	-	-	839	778	-	610	673	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	1.9	10.5	10.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	741	1526	-	-	1357	-	-	630
HCM Lane V/C Ratio	0.119	0.018	-	-	0.018	-	-	0.032
HCM Control Delay (s)	10.5	7.4	-	-	7.7	-	-	10.9
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0.1	-	-	0.1

Intersection	
Intersection Delay, s/veh	42.2
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕			↕	
Traffic Vol, veh/h	95	30	1	104	40	175	0	365	161	54	113	39
Future Vol, veh/h	95	30	1	104	40	175	0	365	161	54	113	39
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	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	103	33	1	113	43	190	0	397	175	59	123	42
Number of Lanes	0	1	0	0	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	1
HCM Control Delay	13.9	20.5	72.8	15.2
HCM LOS	B	C	F	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	0%	75%	33%	26%
Vol Thru, %	100%	69%	24%	13%	55%
Vol Right, %	0%	31%	1%	55%	19%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	526	126	319	206
LT Vol	0	0	95	104	54
Through Vol	0	365	30	40	113
RT Vol	0	161	1	175	39
Lane Flow Rate	0	572	137	347	224
Geometry Grp	7	7	2	2	5
Degree of Util (X)	0	1.035	0.286	0.628	0.425
Departure Headway (Hd)	6.739	6.52	7.832	6.762	7.095
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	0	560	462	537	511
Service Time	4.439	4.22	5.832	4.762	5.095
HCM Lane V/C Ratio	0	1.021	0.297	0.646	0.438
HCM Control Delay	9.4	72.8	13.9	20.5	15.2
HCM Lane LOS	N	F	B	C	C
HCM 95th-tile Q	0	15.9	1.2	4.3	2.1

HCM Signalized Intersection Capacity Analysis
3: Evergreen Rd & Highway 214



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗↗	↘	↘	↗↗		↘	↗	↘	↘	↗	↘
Traffic Volume (vph)	82	764	140	137	765	17	651	16	171	12	9	29
Future Volume (vph)	82	764	140	137	765	17	651	16	171	12	9	29
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00	0.95	0.99	1.00
Satd. Flow (prot)	1630	3260	1458	1630	3249		1548	1556	1458	1548	1616	1458
Flt Permitted	0.26	1.00	1.00	0.22	1.00		0.95	0.95	1.00	0.95	0.99	1.00
Satd. Flow (perm)	438	3260	1458	370	3249		1548	1556	1458	1548	1616	1458
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)	88	822	151	147	823	18	700	17	184	13	10	31
RTOR Reduction (vph)	0	0	141	0	2	0	0	0	139	0	0	29
Lane Group Flow (vph)	88	822	10	147	839	0	357	360	45	11	12	2
Turn Type	pm+pt	NA	custom	pm+pt	NA		Split	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4		4
Permitted Phases	2		4	6					8			4
Actuated Green, G (s)	48.4	42.4	6.8	54.6	45.5		24.2	24.2	24.2	6.8	6.8	6.8
Effective Green, g (s)	48.4	42.4	6.8	54.6	45.5		24.2	24.2	24.2	6.8	6.8	6.8
Actuated g/C Ratio	0.48	0.42	0.07	0.55	0.46		0.24	0.24	0.24	0.07	0.07	0.07
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.5	6.2	2.5	2.5	6.2		2.5	2.5	2.5	2.5	2.5	2.5
Lane Grp Cap (vph)	283	1382	99	316	1478		374	376	352	105	109	99
v/s Ratio Prot	0.02	0.25		c0.04	c0.26		0.23	c0.23		0.01	c0.01	
v/s Ratio Perm	0.13		0.01	0.21					0.03			0.00
v/c Ratio	0.31	0.59	0.10	0.47	0.57		0.95	0.96	0.13	0.10	0.11	0.02
Uniform Delay, d1	14.7	22.2	43.7	13.2	20.0		37.4	37.4	29.6	43.7	43.8	43.5
Progression Factor	1.00	1.00	1.00	1.13	0.14		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	1.9	0.3	0.6	1.2		34.6	35.0	0.1	0.3	0.3	0.1
Delay (s)	15.1	24.1	44.1	15.5	4.0		71.9	72.4	29.8	44.1	44.1	43.6
Level of Service	B	C	D	B	A		E	E	C	D	D	D
Approach Delay (s)		26.2			5.7			63.5			43.8	
Approach LOS		C			A			E			D	

Intersection Summary		
HCM 2000 Control Delay	31.0	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.65	
Actuated Cycle Length (s)	100.0	Sum of lost time (s) 17.5
Intersection Capacity Utilization	68.7%	ICU Level of Service C
Analysis Period (min)	15	













c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

4: I-5 NB Ramps & Highway 214

Smith Creek Development TIA

03/08/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑	↗	↗	↕	↗			
Traffic Volume (vph)	0	511	165	0	826	595	135	0	547	0	0	0
Future Volume (vph)	0	511	165	0	826	595	135	0	547	0	0	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.0		4.5	4.0	4.5	4.5	4.5			
Lane Util. Factor		0.95	1.00		0.95	1.00	0.95	0.91	0.95			
Frt		1.00	0.85		1.00	0.85	1.00	0.86	0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95	1.00	1.00			
Satd. Flow (prot)		3260	1458		3260	1458	1548	1335	1385			
Flt Permitted		1.00	1.00		1.00	1.00	0.95	1.00	1.00			
Satd. Flow (perm)		3260	1458		3260	1458	1548	1335	1385			
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	544	176	0	879	633	144	0	582	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	114	114	0	0	0
Lane Group Flow (vph)	0	544	176	0	879	633	130	185	183	0	0	0
Turn Type		NA	Free		NA	Free	Perm	NA	Perm			
Protected Phases		2			6			8				
Permitted Phases			Free			Free	8		8			
Actuated Green, G (s)		23.2	57.8		23.2	57.8	25.6	25.6	25.6			
Effective Green, g (s)		23.2	57.8		23.2	57.8	25.6	25.6	25.6			
Actuated g/C Ratio		0.40	1.00		0.40	1.00	0.44	0.44	0.44			
Clearance Time (s)		4.5			4.5		4.5	4.5	4.5			
Vehicle Extension (s)		4.0			5.0		2.5	2.5	2.5			
Lane Grp Cap (vph)		1308	1458		1308	1458	685	591	613			
v/s Ratio Prot		0.17			c0.27							
v/s Ratio Perm			0.12			c0.43	0.08	0.14	0.13			
v/c Ratio		0.42	0.12		0.67	0.43	0.19	0.31	0.30			
Uniform Delay, d1		12.4	0.0		14.2	0.0	9.8	10.4	10.3			
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2		0.3	0.2		1.8	0.9	0.6	1.4	1.2			
Delay (s)		12.7	0.2		16.0	0.9	10.4	11.8	11.6			
Level of Service		B	A		B	A	B	B	B			
Approach Delay (s)		9.7			9.7			11.5			0.0	
Approach LOS		A			A			B			A	
Intersection Summary												
HCM 2000 Control Delay			10.1				HCM 2000 Level of Service		B			
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			57.8				Sum of lost time (s)		9.0			
Intersection Capacity Utilization			47.4%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: I-5 SB Ramps & Highway 214

Smith Creek Development TIA

03/08/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑	↑				↑↑		↑
Traffic Volume (vph)	0	435	281	0	409	553	0	0	0	257	0	145
Future Volume (vph)	0	435	281	0	409	553	0	0	0	257	0	145
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.0		4.5	4.0				4.5		4.5
Lane Util. Factor		0.95	1.00		0.95	1.00				0.97		1.00
Frt		1.00	0.85		1.00	0.85				1.00		0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (prot)		3260	1458		3260	1458				3162		1458
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (perm)		3260	1458		3260	1458				3162		1458
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	473	305	0	445	601	0	0	0	279	0	158
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	129
Lane Group Flow (vph)	0	473	305	0	445	601	0	0	0	279	0	29
Turn Type		NA	Free		NA	Free				Prot		Perm
Protected Phases		2			6					4		
Permitted Phases			Free			Free						4
Actuated Green, G (s)		14.6	51.3		13.7	51.3				9.5		9.5
Effective Green, g (s)		14.6	51.3		13.7	51.3				9.5		9.5
Actuated g/C Ratio		0.28	1.00		0.27	1.00				0.19		0.19
Clearance Time (s)		4.5			4.5					4.5		4.5
Vehicle Extension (s)		6.0			4.0					2.5		2.5
Lane Grp Cap (vph)		927	1458		870	1458				585		270
v/s Ratio Prot		0.15			0.14					0.09		
v/s Ratio Perm			0.21			c0.41						0.02
v/c Ratio		0.51	0.21		0.51	0.41				0.48		0.11
Uniform Delay, d1		15.4	0.0		16.0	0.0				18.7		17.4
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00
Incremental Delay, d2		1.3	0.3		0.7	0.9				0.4		0.1
Delay (s)		16.6	0.3		16.6	0.9				19.1		17.5
Level of Service		B	A		B	A				B		B
Approach Delay (s)		10.2			7.6			0.0			18.5	
Approach LOS		B			A			A			B	

Intersection Summary

HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	51.3	Sum of lost time (s)	13.5
Intersection Capacity Utilization	29.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Settlemier Ave & Highway 214



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	163	516	189	115	414	137	281	272	120	158	271	181
Future Volume (vph)	163	516	189	115	414	137	281	272	120	158	271	181
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	5.0	4.5	4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Lane Util. 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
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1630	1716	1458	1630	1716	1458	1630	1716	1458	1630	1716	1458
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1630	1716	1458	1630	1716	1458	1630	1716	1458	1630	1716	1458
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	177	561	205	125	450	149	305	296	130	172	295	197
RTOR Reduction (vph)	0	0	115	0	0	83	0	0	85	0	0	143
Lane Group Flow (vph)	177	561	90	125	450	66	305	296	45	172	295	54
Turn Type	Prot	NA	pm+ov	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases			2			8			2			6
Actuated Green, G (s)	9.7	30.1	44.0	7.0	27.4	31.3	13.9	31.3	30.1	12.6	30.0	27.4
Effective Green, g (s)	9.7	30.1	44.0	7.0	27.4	31.3	13.9	31.3	30.1	12.6	30.0	27.4
Actuated g/C Ratio	0.10	0.30	0.44	0.07	0.27	0.31	0.14	0.31	0.30	0.13	0.30	0.27
Clearance Time (s)	4.5	5.0	4.5	4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Vehicle Extension (s)	2.5	4.8	2.5	2.5	4.8	2.5	2.5	2.5	4.8	2.5	2.5	4.8
Lane Grp Cap (vph)	158	516	641	114	470	456	226	537	438	205	514	399
v/s Ratio Prot	c0.11	c0.33	0.02	0.08	0.26		c0.19	c0.17		0.11	0.17	
v/s Ratio Perm			0.04			0.05			0.03			0.04
v/c Ratio	1.12	1.09	0.14	1.10	0.96	0.14	1.35	0.55	0.10	0.84	0.57	0.14
Uniform Delay, d1	45.1	35.0	16.7	46.5	35.7	24.7	43.0	28.5	25.2	42.7	29.6	27.4
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	107.5	65.4	0.1	112.6	31.1	0.1	183.6	1.0	0.2	24.4	4.6	0.3
Delay (s)	152.7	100.3	16.8	159.1	66.8	24.8	226.7	29.5	25.4	67.1	34.2	27.7
Level of Service	F	F	B	F	E	C	F	C	C	E	C	C
Approach Delay (s)		92.0			74.1			111.0			40.8	
Approach LOS		F			E			F			D	

Intersection Summary

HCM 2000 Control Delay	81.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection												
Int Delay, s/veh	18.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	46	17	156	4	25	17	134	516	14	10	375	58
Future Vol, veh/h	46	17	156	4	25	17	134	516	14	10	375	58
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	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	50	18	170	4	27	18	146	561	15	11	408	63

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1344	1328	439	1415	1352	568	471	0	0	576	0	0
Stage 1	461	461	-	860	860	-	-	-	-	-	-	-
Stage 2	883	867	-	555	492	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	129	155	618	115	150	522	1091	-	-	997	-	-
Stage 1	581	565	-	351	373	-	-	-	-	-	-	-
Stage 2	340	370	-	516	548	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	87	123	618	62	119	522	1091	-	-	997	-	-
Mov Cap-2 Maneuver	87	123	-	62	119	-	-	-	-	-	-	-
Stage 1	467	557	-	282	300	-	-	-	-	-	-	-
Stage 2	240	297	-	357	540	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	102.7		40.6		1.8		0.2	
HCM LOS	F		E					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1091	-	-	238	150	997	-
HCM Lane V/C Ratio	0.134	-	-	1	0.333	0.011	-
HCM Control Delay (s)	8.8	0	-	102.7	40.6	8.7	0
HCM Lane LOS	A	A	-	F	E	A	A
HCM 95th %tile Q(veh)	0.5	-	-	9.5	1.4	0	-

Intersection						
Int Delay, s/veh	1.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	76	2	1	311	334	29
Future Vol, veh/h	76	2	1	311	334	29
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	83	2	1	338	363	32

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	719	379	395	0	-	0
Stage 1	379	-	-	-	-	-
Stage 2	340	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	395	668	1164	-	-	-
Stage 1	692	-	-	-	-	-
Stage 2	721	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	395	668	1164	-	-	-
Mov Cap-2 Maneuver	395	-	-	-	-	-
Stage 1	692	-	-	-	-	-
Stage 2	720	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.4	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1164	-	399	-	-
HCM Lane V/C Ratio	0.001	-	0.212	-	-
HCM Control Delay (s)	8.1	0	16.4	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.8	-	-

Intersection

Int Delay, s/veh 4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↗			↕			↕	
Traffic Vol, veh/h	0	13	0	0	0	7	0	0	0	13	0	11
Future Vol, veh/h	0	13	0	0	0	7	0	0	0	13	0	11
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	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	14	0	0	0	8	0	0	0	14	0	12

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	8	0	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.12	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.218	-	-	-
Pot Cap-1 Maneuver	1612	-	0	0
Stage 1	-	-	0	0
Stage 2	-	-	0	0
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1612	-	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	8.8
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	1612	-	-	-	984
HCM Lane V/C Ratio	-	-	-	-	-	0.027
HCM Control Delay (s)	0	0	-	-	-	8.8
HCM Lane LOS	A	A	-	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	-	0.1

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Vol, veh/h	1	127	92	7	18	4
Future Vol, veh/h	1	127	92	7	18	4
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	138	100	8	20	4

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	108	0	-	0	244
Stage 1	-	-	-	-	104
Stage 2	-	-	-	-	140
Critical Hdwy	4.12	-	-	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	2.218	-	-	-	3.518
Pot Cap-1 Maneuver	1483	-	-	-	744
Stage 1	-	-	-	-	920
Stage 2	-	-	-	-	887
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1483	-	-	-	743
Mov Cap-2 Maneuver	-	-	-	-	750
Stage 1	-	-	-	-	920
Stage 2	-	-	-	-	886

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1483	-	-	-	780
HCM Lane V/C Ratio	0.001	-	-	-	0.031
HCM Control Delay (s)	7.4	0	-	-	9.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	35	211	0	1	252	15	3	4	0	40	5	52
Future Vol, veh/h	35	211	0	1	252	15	3	4	0	40	5	52
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	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	38	229	0	1	274	16	3	4	0	43	5	57
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.9	10.1	8.6	8.8
HCM LOS	A	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	43%	14%	0%	41%
Vol Thru, %	57%	86%	94%	5%
Vol Right, %	0%	0%	6%	54%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	7	246	268	97
LT Vol	3	35	1	40
Through Vol	4	211	252	5
RT Vol	0	0	15	52
Lane Flow Rate	8	267	291	105
Geometry Grp	1	1	1	1
Degree of Util (X)	0.011	0.339	0.363	0.145
Departure Headway (Hd)	5.434	4.563	4.481	4.95
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	655	789	801	722
Service Time	3.495	2.595	2.512	2.997
HCM Lane V/C Ratio	0.012	0.338	0.363	0.145
HCM Control Delay	8.6	9.9	10.1	8.8
HCM Lane LOS	A	A	B	A
HCM 95th-tile Q	0	1.5	1.7	0.5

HCM Signalized Intersection Capacity Analysis
12: Oregon Way & Highway 214



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	22	875	11	9	817	17	33	10	6	12	2	55
Future Volume (vph)	22	875	11	9	817	17	33	10	6	12	2	55
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.94		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1630	3254		1630	3250		1630	1616		1630	1467	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1630	3254		1630	3250		1630	1616		1630	1467	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	951	12	10	888	18	36	11	7	13	2	60
RTOR Reduction (vph)	0	1	0	0	1	0	0	6	0	0	50	0
Lane Group Flow (vph)	24	962	0	10	905	0	36	12	0	13	12	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	11.0	38.5		11.0	38.5		18.0	16.0		18.0	16.0	
Effective Green, g (s)	11.0	38.5		11.0	38.5		18.0	16.0		18.0	16.0	
Actuated g/C Ratio	0.11	0.38		0.11	0.38		0.18	0.16		0.18	0.16	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	6.2		2.5	6.2		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	179	1252		179	1251		293	258		293	234	
v/s Ratio Prot	c0.01	c0.30		0.01	0.28		c0.02	0.01		0.01	c0.01	
v/s Ratio Perm												
v/c Ratio	0.13	0.77		0.06	0.72		0.12	0.05		0.04	0.05	
Uniform Delay, d1	40.2	26.9		39.8	26.2		34.4	35.5		33.9	35.6	
Progression Factor	1.01	1.16		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	3.9		0.6	3.7		0.9	0.3		0.3	0.4	
Delay (s)	41.9	35.0		40.4	29.9		35.2	35.9		34.2	36.0	
Level of Service	D	C		D	C		D	D		C	D	
Approach Delay (s)		35.1			30.0			35.5			35.7	
Approach LOS		D			C			D			D	

Intersection Summary

HCM 2000 Control Delay	32.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	42.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	9.7
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↔		↕	
Traffic Vol, veh/h	9	215	284	42	17	17
Future Vol, veh/h	9	215	284	42	17	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	234	309	46	18	18
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	9.2	10.2	8.3
HCM LOS	A	B	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	0%	50%
Vol Thru, %	96%	87%	0%
Vol Right, %	0%	13%	50%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	224	326	34
LT Vol	9	0	17
Through Vol	215	284	0
RT Vol	0	42	17
Lane Flow Rate	243	354	37
Geometry Grp	1	1	1
Degree of Util (X)	0.296	0.414	0.051
Departure Headway (Hd)	4.381	4.21	5.006
Convergence, Y/N	Yes	Yes	Yes
Cap	823	861	715
Service Time	2.396	2.21	3.035
HCM Lane V/C Ratio	0.295	0.411	0.052
HCM Control Delay	9.2	10.2	8.3
HCM Lane LOS	A	B	A
HCM 95th-tile Q	1.2	2.1	0.2

Intersection	
Intersection Delay, s/veh	21.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷			↶	↷		↶	↷
Traffic Vol, veh/h	272	174	127	20	173	3	156	75	258	2	90	210
Future Vol, veh/h	272	174	127	20	173	3	156	75	258	2	90	210
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	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	296	189	138	22	188	3	170	82	280	2	98	228
Number of Lanes	1	1	0	1	1	0	0	1	1	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	26.8	18.2	21	16.7
HCM LOS	D	C	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	68%	0%	100%	0%	100%	0%	2%	0%
Vol Thru, %	32%	0%	0%	58%	0%	98%	98%	0%
Vol Right, %	0%	100%	0%	42%	0%	2%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	231	258	272	301	20	176	92	210
LT Vol	156	0	272	0	20	0	2	0
Through Vol	75	0	0	174	0	173	90	0
RT Vol	0	258	0	127	0	3	0	210
Lane Flow Rate	251	280	296	327	22	191	100	228
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.588	0.573	0.691	0.69	0.056	0.462	0.236	0.493
Departure Headway (Hd)	8.432	7.361	8.411	7.592	9.233	8.701	8.506	7.77
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	427	488	429	474	387	413	421	461
Service Time	6.207	5.135	6.187	5.366	7.023	6.49	6.288	5.55
HCM Lane V/C Ratio	0.588	0.574	0.69	0.69	0.057	0.462	0.238	0.495
HCM Control Delay	22.6	19.6	28.1	25.7	12.6	18.8	13.9	17.9
HCM Lane LOS	C	C	D	D	B	C	B	C
HCM 95th-tile Q	3.7	3.5	5.1	5.2	0.2	2.4	0.9	2.7

Intersection												
Int Delay, s/veh	8.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↻		↻	↻			↻			↻	↻
Traffic Vol, veh/h	12	140	6	341	148	3	2	5	205	4	40	59
Future Vol, veh/h	12	140	6	341	148	3	2	5	205	4	40	59
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	-	-	-	75	-	-	-	-	-	-	-	-
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	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	152	7	371	161	3	2	5	223	4	43	64

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	164	0	0	159	0	0	1140	1087	155	1200	1089	163
Stage 1	-	-	-	-	-	-	182	182	-	904	904	-
Stage 2	-	-	-	-	-	-	958	905	-	296	185	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1414	-	-	1420	-	-	178	216	891	162	215	882
Stage 1	-	-	-	-	-	-	820	749	-	331	356	-
Stage 2	-	-	-	-	-	-	309	355	-	712	747	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1414	-	-	1420	-	-	104	158	891	94	157	882
Mov Cap-2 Maneuver	-	-	-	-	-	-	104	158	-	94	157	-
Stage 1	-	-	-	-	-	-	812	742	-	328	263	-
Stage 2	-	-	-	-	-	-	177	262	-	525	740	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			5.8			11.8			25.8		
HCM LOS							B			D		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	755	1414	-	-	1420	-	-	283
HCM Lane V/C Ratio	0.305	0.009	-	-	0.261	-	-	0.396
HCM Control Delay (s)	11.8	7.6	-	-	8.4	-	-	25.8
HCM Lane LOS	B	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	1.3	0	-	-	1.1	-	-	1.8

Intersection	
Intersection Delay, s/veh	88.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕			↕	
Traffic Vol, veh/h	65	69	0	145	106	143	4	248	102	139	320	95
Future Vol, veh/h	65	69	0	145	106	143	4	248	102	139	320	95
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	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	71	75	0	158	115	155	4	270	111	151	348	103
Number of Lanes	0	1	0	0	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	1
HCM Control Delay	18.4	48.8	40.9	164.3
HCM LOS	C	E	E	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1
Vol Left, %	100%	0%	49%	37%	25%
Vol Thru, %	0%	71%	51%	27%	58%
Vol Right, %	0%	29%	0%	36%	17%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	4	350	134	394	554
LT Vol	4	0	65	145	139
Through Vol	0	248	69	106	320
RT Vol	0	102	0	143	95
Lane Flow Rate	4	380	146	428	602
Geometry Grp	7	7	2	2	5
Degree of Util (X)	0.01	0.831	0.362	0.89	1.278
Departure Headway (Hd)	9.234	8.502	9.918	8.194	7.64
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	390	430	366	445	482
Service Time	6.934	6.202	7.918	6.194	5.64
HCM Lane V/C Ratio	0.01	0.884	0.399	0.962	1.249
HCM Control Delay	12	41.2	18.4	48.8	164.3
HCM Lane LOS	B	E	C	E	F
HCM 95th-tile Q	0	7.9	1.6	9.5	25.3

HCM Signalized Intersection Capacity Analysis
3: Evergreen Rd & Highway 214



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	900	382	225	796	14	496	27	179	31	28	78
Future Volume (vph)	114	900	382	225	796	14	496	27	179	31	28	78
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1630	3260	1458	1630	3251		1548	1560	1458	1548	1622	1458
Flt Permitted	0.24	1.00	1.00	0.15	1.00		0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (perm)	414	3260	1458	249	3251		1548	1560	1458	1548	1622	1458
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)	120	947	402	237	838	15	522	28	188	33	29	82
RTOR Reduction (vph)	0	0	342	0	1	0	0	0	148	0	0	74
Lane Group Flow (vph)	120	947	60	237	852	0	277	273	40	30	32	8
Turn Type	pm+pt	NA	custom	pm+pt	NA		Split	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	2		4	6					8			4
Actuated Green, G (s)	47.9	39.4	9.6	55.3	43.1		21.3	21.3	21.3	9.6	9.6	9.6
Effective Green, g (s)	47.9	39.4	9.6	55.3	43.1		21.3	21.3	21.3	9.6	9.6	9.6
Actuated g/C Ratio	0.48	0.39	0.10	0.55	0.43		0.21	0.21	0.21	0.10	0.10	0.10
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.5	6.2	2.5	2.5	6.2		2.5	2.5	2.5	2.5	2.5	2.5
Lane Grp Cap (vph)	301	1284	139	306	1401		329	332	310	148	155	139
v/s Ratio Prot	0.03	0.29		c0.09	0.26		c0.18	0.18		0.02	0.02	
v/s Ratio Perm	0.16		c0.04	c0.33					0.03			0.01
v/c Ratio	0.40	0.74	0.43	0.77	0.61		0.84	0.82	0.13	0.20	0.21	0.06
Uniform Delay, d1	15.4	25.9	42.6	16.3	21.9		37.7	37.5	31.8	41.7	41.7	41.1
Progression Factor	0.75	0.83	2.44	2.38	1.62		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	3.0	1.2	7.6	1.3		17.2	14.7	0.1	0.5	0.5	0.1
Delay (s)	12.1	24.5	105.2	46.5	36.8		54.9	52.3	32.0	42.2	42.2	41.2
Level of Service	B	C	F	D	D		D	D	C	D	D	D
Approach Delay (s)		45.5			38.9			48.1			41.6	
Approach LOS		D			D			D			D	

Intersection Summary

HCM 2000 Control Delay	43.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

4: I-5 NB Ramps & Highway 214

Smith Creek Development TIA

03/08/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑	↑	↑	↑↓	↑			
Traffic Volume (vph)	0	1085	181	0	1032	382	213	0	601	0	0	0
Future Volume (vph)	0	1085	181	0	1032	382	213	0	601	0	0	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.0		4.5	4.0	4.5	4.5	4.5			
Lane Util. Factor		0.95	1.00		0.95	1.00	0.95	0.91	0.95			
Frt		1.00	0.85		1.00	0.85	1.00	0.86	0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95	1.00	1.00			
Satd. Flow (prot)		3260	1458		3260	1458	1548	1339	1385			
Flt Permitted		1.00	1.00		1.00	1.00	0.95	1.00	1.00			
Satd. Flow (perm)		3260	1458		3260	1458	1548	1339	1385			
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)	0	1167	195	0	1110	411	229	0	646	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	26	26	0	0	0
Lane Group Flow (vph)	0	1167	195	0	1110	411	206	307	310	0	0	0
Turn Type		NA	Free		NA	Free	Perm	NA	Perm			
Protected Phases		2			6			8				
Permitted Phases			Free			Free	8		8			
Actuated Green, G (s)		43.9	100.0		43.9	100.0	47.1	47.1	47.1			
Effective Green, g (s)		43.9	100.0		43.9	100.0	47.1	47.1	47.1			
Actuated g/C Ratio		0.44	1.00		0.44	1.00	0.47	0.47	0.47			
Clearance Time (s)		4.5			4.5		4.5	4.5	4.5			
Vehicle Extension (s)		4.0			5.0		2.5	2.5	2.5			
Lane Grp Cap (vph)		1431	1458		1431	1458	729	630	652			
v/s Ratio Prot		c0.36			0.34							
v/s Ratio Perm			0.13			0.28	0.13	0.23	0.22			
v/c Ratio		0.82	0.13		0.78	0.28	0.28	0.49	0.48			
Uniform Delay, d1		24.5	0.0		23.9	0.0	16.1	18.2	18.0			
Progression Factor		1.00	1.00		0.89	1.00	1.00	1.00	1.00			
Incremental Delay, d2		5.2	0.2		2.5	0.4	1.0	2.7	2.5			
Delay (s)		29.7	0.2		23.6	0.4	17.1	20.8	20.5			
Level of Service		C	A		C	A	B	C	C			
Approach Delay (s)		25.5			17.3			19.8			0.0	
Approach LOS		C			B			B			A	

Intersection Summary

HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

5: I-5 SB Ramps & Highway 214

Smith Creek Development TIA

03/08/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑	↑				↑↑		↑
Traffic Volume (vph)	0	589	389	0	647	587	0	0	0	728	0	261
Future Volume (vph)	0	589	389	0	647	587	0	0	0	728	0	261
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.0		4.5	4.0				4.5		4.5
Lane Util. Factor		0.95	1.00		0.95	1.00				0.97		1.00
Frt		1.00	0.85		1.00	0.85				1.00		0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (prot)		3260	1458		3260	1458				3162		1458
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (perm)		3260	1458		3260	1458				3162		1458
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	640	423	0	703	638	0	0	0	791	0	284
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	199
Lane Group Flow (vph)	0	640	423	0	703	638	0	0	0	791	0	85
Turn Type		NA	Free		NA	Free				Prot		Perm
Protected Phases		2			6					4		
Permitted Phases			Free			Free						4
Actuated Green, G (s)		15.6	66.8		17.6	66.8				20.1		20.1
Effective Green, g (s)		15.6	66.8		17.6	66.8				20.1		20.1
Actuated g/C Ratio		0.23	1.00		0.26	1.00				0.30		0.30
Clearance Time (s)		4.5			4.5					4.5		4.5
Vehicle Extension (s)		6.0			4.0					2.5		2.5
Lane Grp Cap (vph)		761	1458		858	1458				951		438
v/s Ratio Prot		c0.20			c0.22					c0.25		
v/s Ratio Perm			0.29			0.44						0.06
v/c Ratio		0.84	0.29		0.82	0.44				0.83		0.20
Uniform Delay, d1		24.4	0.0		23.1	0.0				21.8		17.3
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00
Incremental Delay, d2		9.6	0.5		6.5	1.0				6.2		0.2
Delay (s)		34.0	0.5		29.6	1.0				28.0		17.5
Level of Service		C	A		C	A				C		B
Approach Delay (s)		20.7			16.0			0.0			25.2	
Approach LOS		C			B			A			C	

Intersection Summary

HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	66.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Settlemier Ave & Highway 214



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	89	566	411	145	644	91	313	144	103	106	217	127
Future Volume (vph)	89	566	411	145	644	91	313	144	103	106	217	127
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	5.0	4.5	4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Lane Util. 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
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1630	1716	1458	1630	1716	1458	1630	1716	1458	1630	1716	1458
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1630	1716	1458	1630	1716	1458	1630	1716	1458	1630	1716	1458
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	95	602	437	154	685	97	333	153	110	113	231	135
RTOR Reduction (vph)	0	0	188	0	0	65	0	0	76	0	0	94
Lane Group Flow (vph)	95	602	249	154	685	32	333	153	34	113	231	41
Turn Type	Prot	NA	pm+ov	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases			2			8			2			6
Actuated Green, G (s)	7.6	31.0	44.9	7.0	30.4	33.0	13.9	33.0	31.0	10.9	30.0	30.4
Effective Green, g (s)	7.6	31.0	44.9	7.0	30.4	33.0	13.9	33.0	31.0	10.9	30.0	30.4
Actuated g/C Ratio	0.08	0.31	0.44	0.07	0.30	0.33	0.14	0.33	0.31	0.11	0.30	0.30
Clearance Time (s)	4.5	5.0	4.5	4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Vehicle Extension (s)	2.5	4.8	2.5	2.5	4.8	2.5	2.5	2.5	4.8	2.5	2.5	4.8
Lane Grp Cap (vph)	122	527	648	113	517	476	224	561	447	176	510	439
v/s Ratio Prot	0.06	0.35	0.05	c0.09	c0.40		c0.20	c0.09		0.07	c0.13	
v/s Ratio Perm			0.12			0.02			0.02			0.03
v/c Ratio	0.78	1.14	0.38	1.36	1.32	0.07	1.49	0.27	0.08	0.64	0.45	0.09
Uniform Delay, d1	45.8	35.0	18.8	47.0	35.2	23.4	43.5	25.1	24.8	43.1	28.8	25.3
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	25.3	84.8	0.3	209.8	159.3	0.0	241.3	0.2	0.1	6.9	2.9	0.2
Delay (s)	71.2	119.7	19.0	256.8	194.5	23.4	284.8	25.3	24.9	50.0	31.7	25.5
Level of Service	E	F	B	F	F	C	F	C	C	D	C	C
Approach Delay (s)		76.8			187.0			170.2			34.3	
Approach LOS		E			F			F			C	

Intersection Summary

HCM 2000 Control Delay	120.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	100.9	Sum of lost time (s)	19.0
Intersection Capacity Utilization	89.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection												
Int Delay, s/veh	34.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	45	21	150	12	36	22	149	315	7	32	506	88
Future Vol, veh/h	45	21	150	12	36	22	149	315	7	32	506	88
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	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	23	163	13	39	24	162	342	8	35	550	96

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1369	1341	598	1430	1385	346	646	0	0	350	0	0
Stage 1	667	667	-	670	670	-	-	-	-	-	-	-
Stage 2	702	674	-	760	715	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	124	152	502	112	143	697	939	-	-	1209	-	-
Stage 1	448	457	-	446	455	-	-	-	-	-	-	-
Stage 2	429	454	-	398	434	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	70	114	502	52	107	697	939	-	-	1209	-	-
Mov Cap-2 Maneuver	70	114	-	52	107	-	-	-	-	-	-	-
Stage 1	352	436	-	351	358	-	-	-	-	-	-	-
Stage 2	290	357	-	243	414	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	187.2		80.4		3		0.4	
HCM LOS	F		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	939	-	-	192	117	1209	-
HCM Lane V/C Ratio	0.172	-	-	1.223	0.65	0.029	-
HCM Control Delay (s)	9.6	0	-	187.2	80.4	8.1	0
HCM Lane LOS	A	A	-	F	F	A	A
HCM 95th %tile Q(veh)	0.6	-	-	12.4	3.4	0.1	-

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T		T		T	
Traffic Vol, veh/h	43	2	6	211	273	75
Future Vol, veh/h	43	2	6	211	273	75
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	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	50	2	7	245	317	87

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	620	361	405	0	-	0
Stage 1	361	-	-	-	-	-
Stage 2	259	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	452	684	1154	-	-	-
Stage 1	705	-	-	-	-	-
Stage 2	784	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	449	684	1154	-	-	-
Mov Cap-2 Maneuver	449	-	-	-	-	-
Stage 1	705	-	-	-	-	-
Stage 2	779	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.9	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1154	-	456	-	-
HCM Lane V/C Ratio	0.006	-	0.115	-	-
HCM Control Delay (s)	8.1	0	13.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↗			↕			↕	
Traffic Vol, veh/h	0	8	0	0	0	26	0	0	0	8	7	0
Future Vol, veh/h	0	8	0	0	0	26	0	0	0	8	7	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	-	-	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	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	9	0	0	0	28	0	0	0	9	8	0

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	28	0	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.12	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.218	-	-	-
Pot Cap-1 Maneuver	1585	-	0	0
Stage 1	-	-	0	0
Stage 2	-	-	0	0
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1585	-	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	9.3
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	1585	-	-	-	857
HCM Lane V/C Ratio	-	-	-	-	-	0.019
HCM Control Delay (s)	0	0	-	-	-	9.3
HCM Lane LOS	A	A	-	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	-	0.1

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	6	83	66	17	13	3
Future Vol, veh/h	6	83	66	17	13	3
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	90	72	18	14	3

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	90	0	-	0	184
Stage 1	-	-	-	-	81
Stage 2	-	-	-	-	103
Critical Hdwy	4.12	-	-	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	2.218	-	-	-	3.518
Pot Cap-1 Maneuver	1505	-	-	-	805
Stage 1	-	-	-	-	942
Stage 2	-	-	-	-	921
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1505	-	-	-	801
Mov Cap-2 Maneuver	-	-	-	-	789
Stage 1	-	-	-	-	942
Stage 2	-	-	-	-	916

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1505	-	-	-	819
HCM Lane V/C Ratio	0.004	-	-	-	0.021
HCM Control Delay (s)	7.4	0	-	-	9.5
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Intersection Delay, s/veh	10.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	38	292	3	3	257	4	1	4	1	33	5	99
Future Vol, veh/h	38	292	3	3	257	4	1	4	1	33	5	99
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	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	41	317	3	3	279	4	1	4	1	36	5	108
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.8	10.7	8.7	9.4
HCM LOS	B	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	17%	11%	1%	24%
Vol Thru, %	67%	88%	97%	4%
Vol Right, %	17%	1%	2%	72%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	6	333	264	137
LT Vol	1	38	3	33
Through Vol	4	292	257	5
RT Vol	1	3	4	99
Lane Flow Rate	7	362	287	149
Geometry Grp	1	1	1	1
Degree of Util (X)	0.01	0.47	0.377	0.208
Departure Headway (Hd)	5.69	4.672	4.73	5.021
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	633	767	755	709
Service Time	3.69	2.728	2.79	3.095
HCM Lane V/C Ratio	0.011	0.472	0.38	0.21
HCM Control Delay	8.7	11.8	10.7	9.4
HCM Lane LOS	A	B	B	A
HCM 95th-tile Q	0	2.5	1.8	0.8

HCM Signalized Intersection Capacity Analysis
 12: Oregon Way & Highway 214



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↗↘		↗	↗↘		↗	↘		↗	↘	
Traffic Volume (vph)	113	1046	49	24	921	67	32	21	8	67	28	93
Future Volume (vph)	113	1046	49	24	921	67	32	21	8	67	28	93
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.96		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1630	3238		1630	3226		1630	1647		1630	1517	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1630	3238		1630	3226		1630	1647		1630	1517	
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)	119	1101	52	25	969	71	34	22	8	71	29	98
RTOR Reduction (vph)	0	4	0	0	5	0	0	7	0	0	82	0
Lane Group Flow (vph)	119	1149	0	25	1035	0	34	23	0	71	45	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	11.0	40.3		11.0	40.3		16.2	16.0		16.2	16.0	
Effective Green, g (s)	11.0	40.3		11.0	40.3		16.2	16.0		16.2	16.0	
Actuated g/C Ratio	0.11	0.40		0.11	0.40		0.16	0.16		0.16	0.16	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	6.2		2.5	6.2		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	179	1304		179	1300		264	263		264	242	
v/s Ratio Prot	c0.07	c0.36		0.02	0.32		0.02	0.01		c0.04	c0.03	
v/s Ratio Perm												
v/c Ratio	0.66	0.88		0.14	0.80		0.13	0.09		0.27	0.18	
Uniform Delay, d1	42.7	27.6		40.2	26.2		35.9	35.8		36.7	36.4	
Progression Factor	1.47	0.42		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.4	7.2		1.6	5.1		1.0	0.7		2.5	1.7	
Delay (s)	77.4	18.9		41.8	31.3		36.9	36.5		39.2	38.0	
Level of Service	E	B		D	C		D	D		D	D	
Approach Delay (s)		24.3			31.6			36.7			38.5	
Approach LOS		C			C			D			D	

Intersection Summary

HCM 2000 Control Delay	28.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	11
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↔		↕	
Traffic Vol, veh/h	21	259	334	39	28	46
Future Vol, veh/h	21	259	334	39	28	46
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	282	363	42	30	50
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	10.5	11.7	8.9
HCM LOS	B	B	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	7%	0%	38%
Vol Thru, %	93%	90%	0%
Vol Right, %	0%	10%	62%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	280	373	74
LT Vol	21	0	28
Through Vol	259	334	0
RT Vol	0	39	46
Lane Flow Rate	304	405	80
Geometry Grp	1	1	1
Degree of Util (X)	0.387	0.497	0.116
Departure Headway (Hd)	4.58	4.409	5.172
Convergence, Y/N	Yes	Yes	Yes
Cap	785	815	690
Service Time	2.616	2.441	3.228
HCM Lane V/C Ratio	0.387	0.497	0.116
HCM Control Delay	10.5	11.7	8.9
HCM Lane LOS	B	B	A
HCM 95th-tile Q	1.8	2.8	0.4

Intersection	
Intersection Delay, s/veh	10.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷			↶	↷		↶	↷
Traffic Vol, veh/h	99	55	48	52	76	11	44	112	41	5	129	110
Future Vol, veh/h	99	55	48	52	76	11	44	112	41	5	129	110
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	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	108	60	52	57	83	12	48	122	45	5	140	120
Number of Lanes	1	1	0	1	1	0	0	1	1	0	1	1

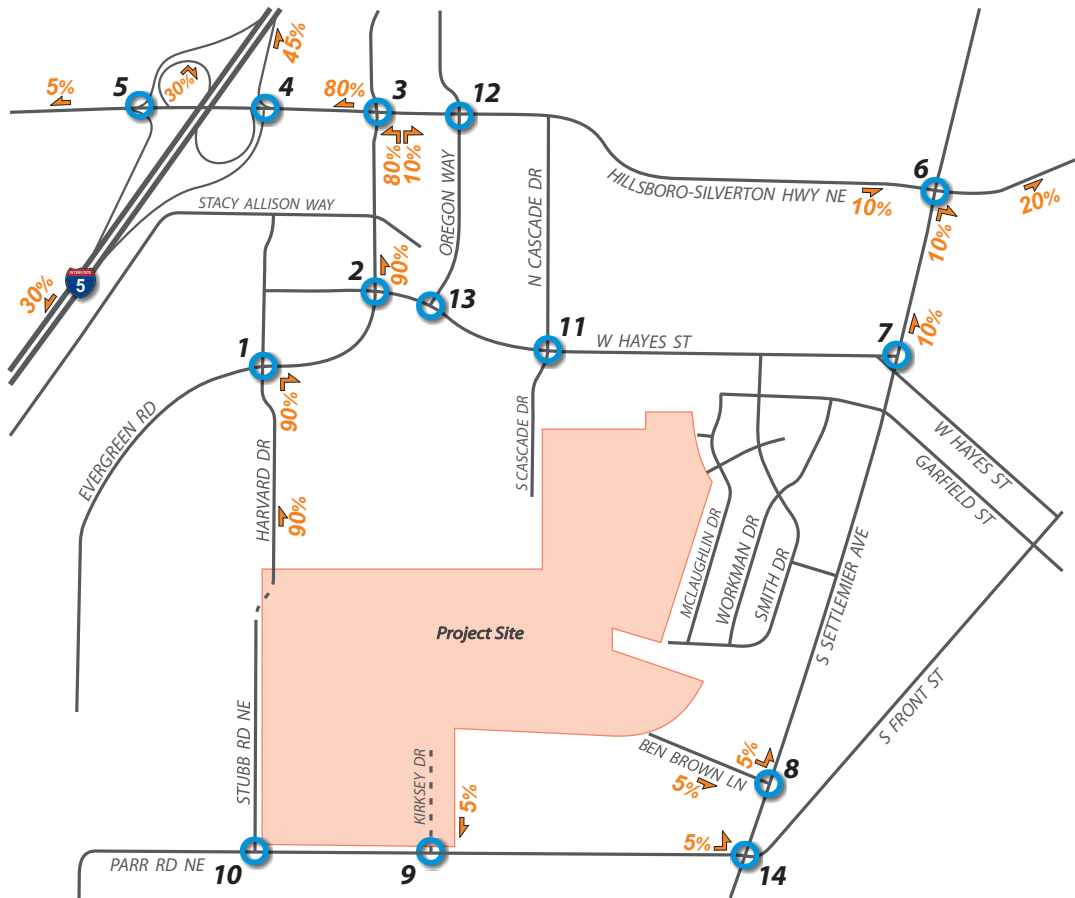
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	10.4	10.1	10.8	9.9
HCM LOS	B	B	B	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	28%	0%	100%	0%	100%	0%	4%	0%
Vol Thru, %	72%	0%	0%	53%	0%	87%	96%	0%
Vol Right, %	0%	100%	0%	47%	0%	13%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	156	41	99	103	52	87	134	110
LT Vol	44	0	99	0	52	0	5	0
Through Vol	112	0	0	55	0	76	129	0
RT Vol	0	41	0	48	0	11	0	110
Lane Flow Rate	170	45	108	112	57	95	146	120
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.29	0.066	0.197	0.179	0.105	0.161	0.242	0.174
Departure Headway (Hd)	6.151	5.3	6.606	5.769	6.713	6.116	5.976	5.249
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	585	676	543	621	534	586	602	684
Service Time	3.885	3.034	4.344	3.507	4.453	3.857	3.709	2.982
HCM Lane V/C Ratio	0.291	0.067	0.199	0.18	0.107	0.162	0.243	0.175
HCM Control Delay	11.4	8.4	11	9.8	10.2	10	10.6	9.1
HCM Lane LOS	B	A	B	A	B	A	B	A
HCM 95th-tile Q	1.2	0.2	0.7	0.6	0.3	0.6	0.9	0.6

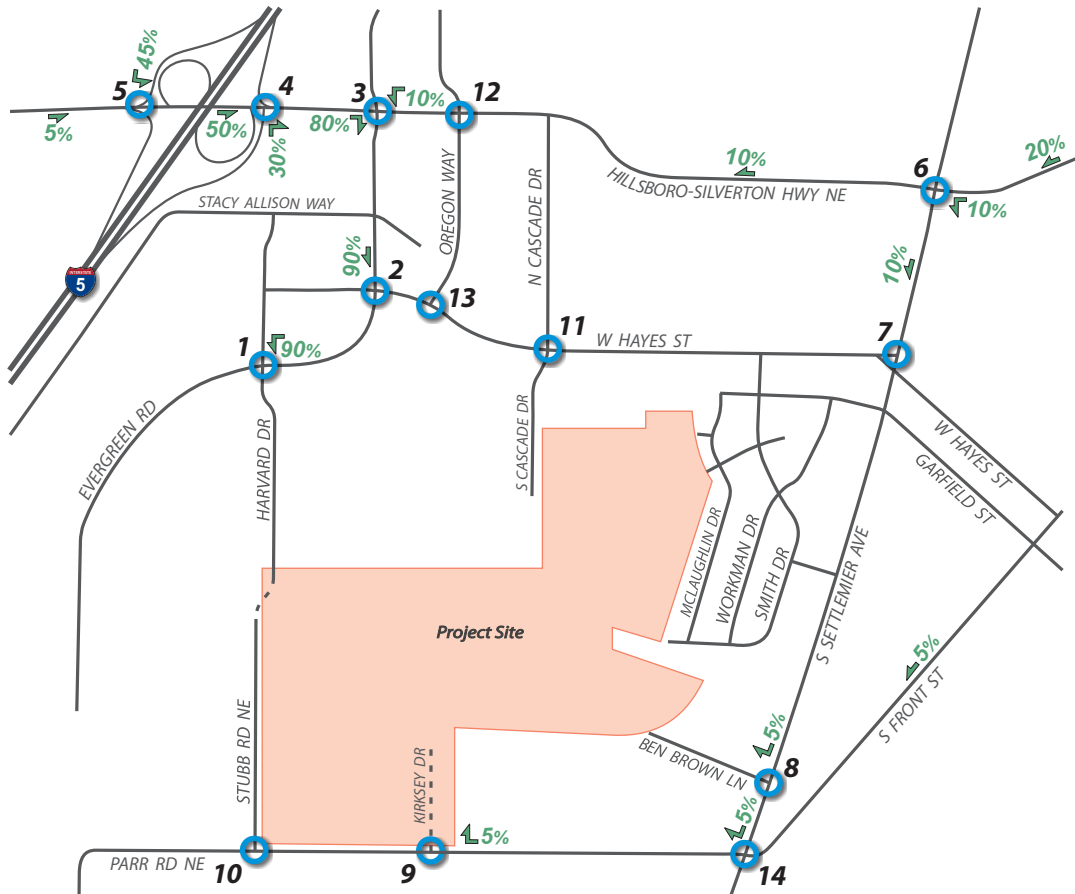


Appendix C – Trip Distribution

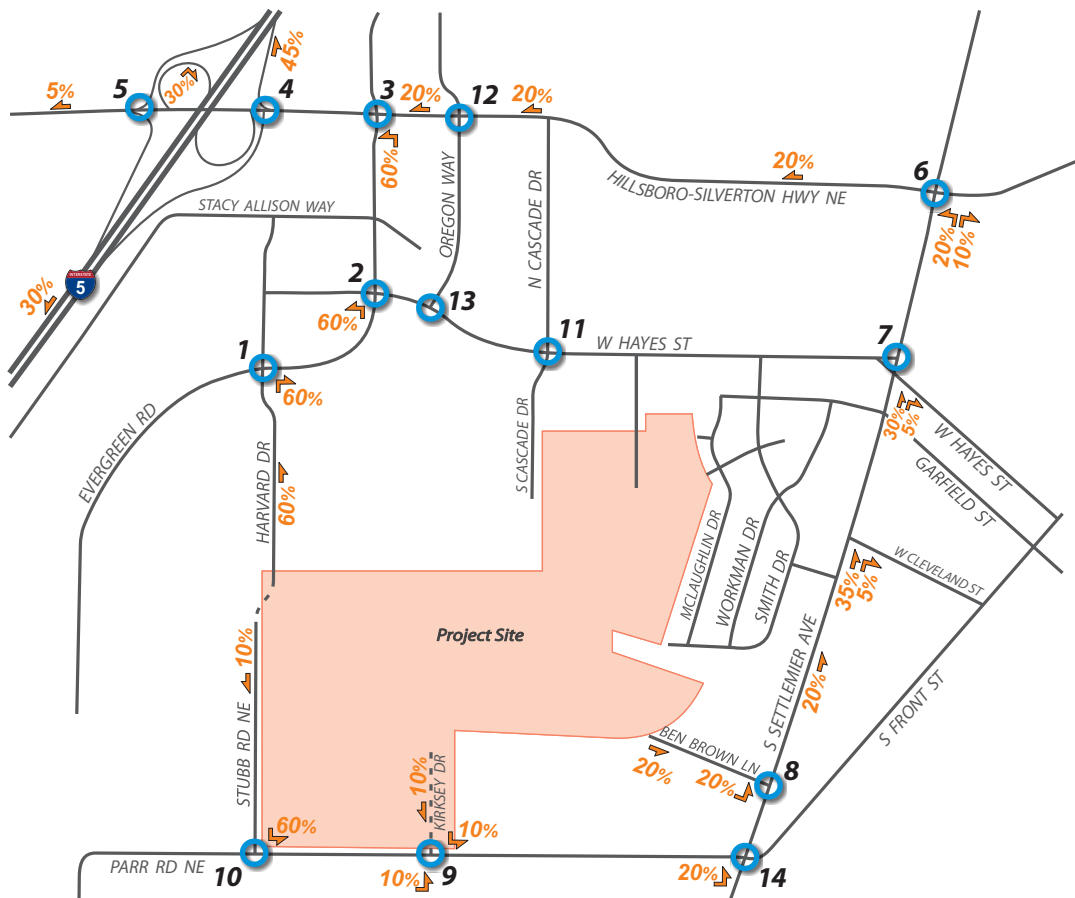
Outbound



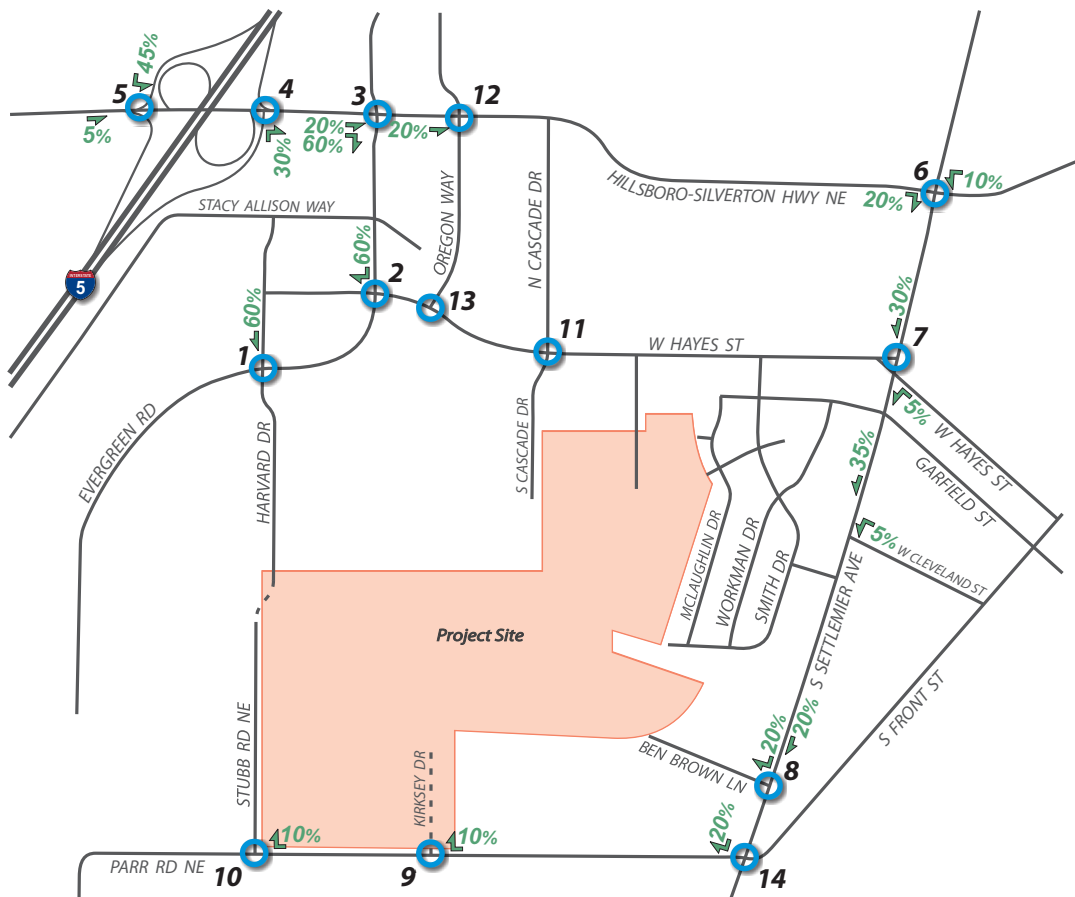
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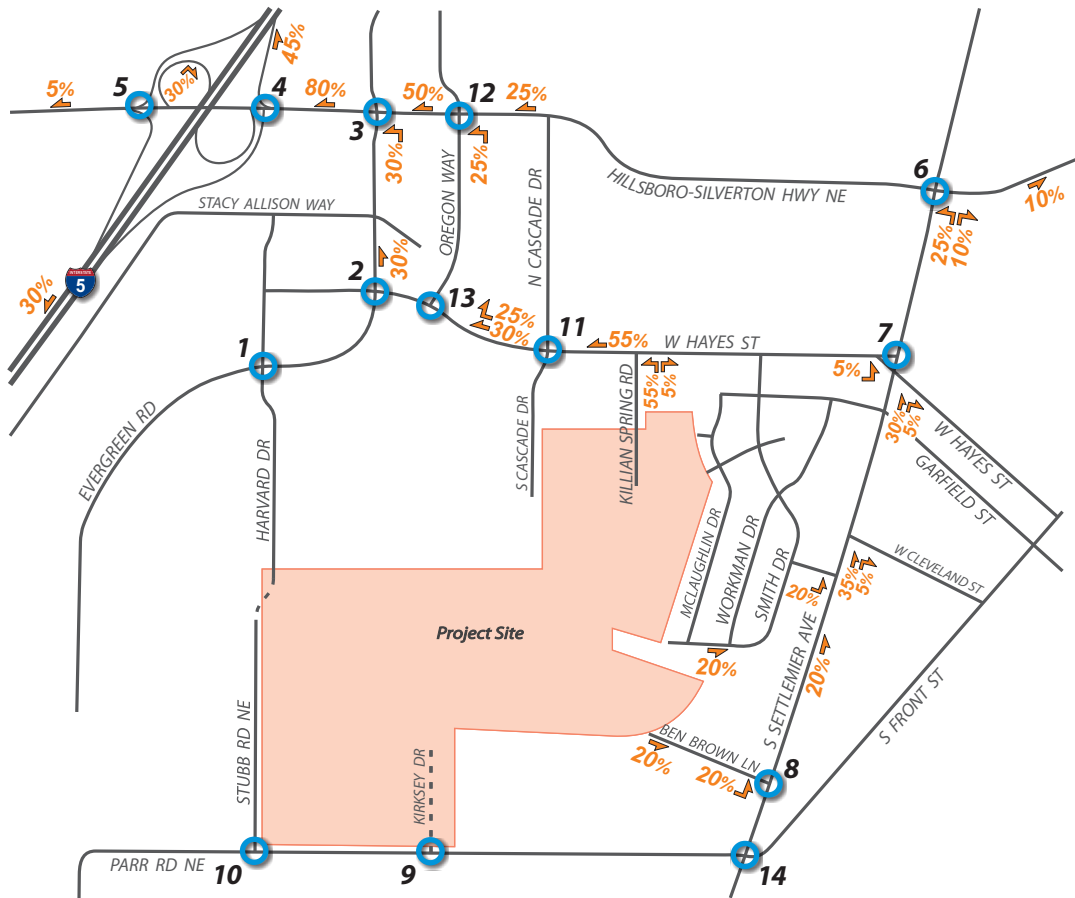
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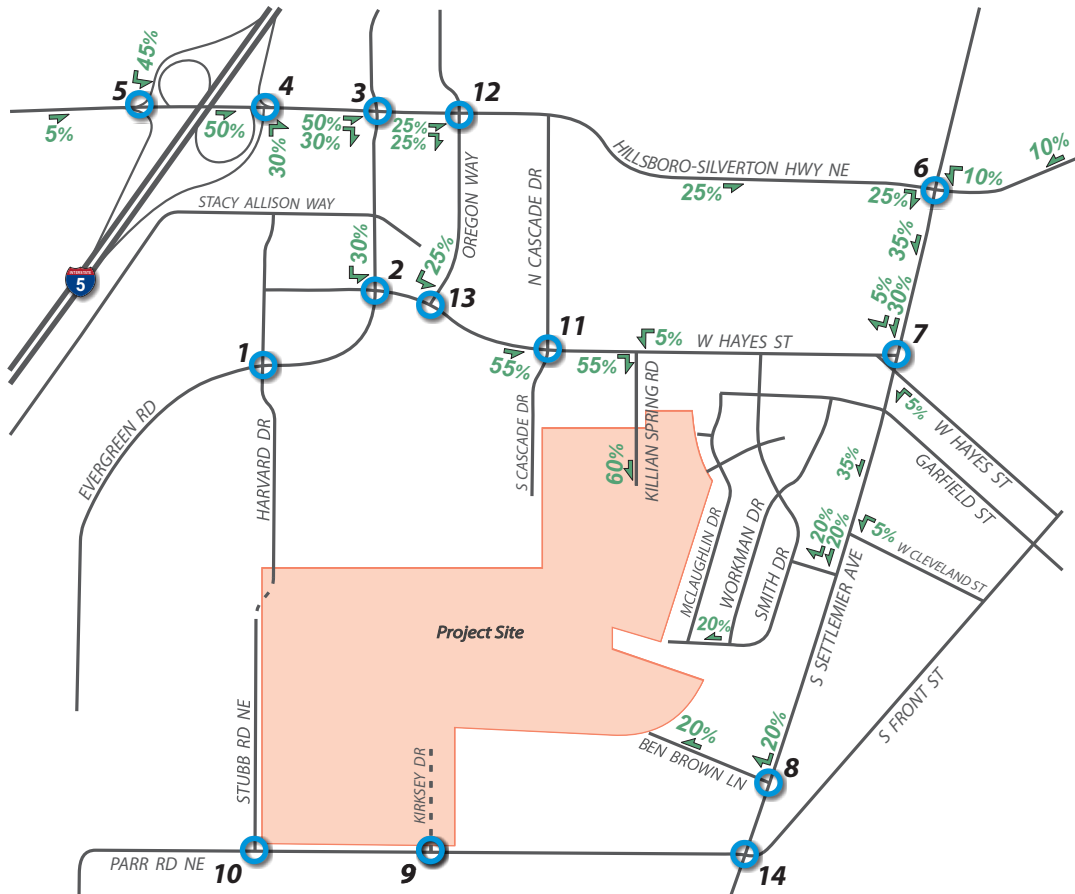
Inbound



Outbound



Inbound





Appendix D – Future 2025 HCM Reports

Intersection												
Int Delay, s/veh	8.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↻		↻	↻			↻			↻	↻
Traffic Vol, veh/h	25	191	2	109	67	0	0	16	341	3	8	8
Future Vol, veh/h	25	191	2	109	67	0	0	16	341	3	8	8
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	-	-	-	75	-	-	-	-	-	-	-	-
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	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	27	208	2	118	73	0	0	17	371	3	9	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	73	0	0	210	0	0	581	573	209	767	574	73
Stage 1	-	-	-	-	-	-	263	263	-	310	310	-
Stage 2	-	-	-	-	-	-	318	310	-	457	264	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1527	-	-	1361	-	-	425	430	831	319	429	989
Stage 1	-	-	-	-	-	-	742	691	-	700	659	-
Stage 2	-	-	-	-	-	-	693	659	-	583	690	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1527	-	-	1361	-	-	381	385	831	157	384	989
Mov Cap-2 Maneuver	-	-	-	-	-	-	381	385	-	157	384	-
Stage 1	-	-	-	-	-	-	727	677	-	686	602	-
Stage 2	-	-	-	-	-	-	618	602	-	308	676	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	4.9	13.9	14.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	790	1527	-	-	1361	-	-	396
HCM Lane V/C Ratio	0.491	0.018	-	-	0.087	-	-	0.052
HCM Control Delay (s)	13.9	7.4	-	-	7.9	-	-	14.6
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	2.7	0.1	-	-	0.3	-	-	0.2

Intersection	
Intersection Delay, s/veh	42.2
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕			↕	
Traffic Vol, veh/h	95	30	1	104	40	175	0	365	161	54	113	39
Future Vol, veh/h	95	30	1	104	40	175	0	365	161	54	113	39
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	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	103	33	1	113	43	190	0	397	175	59	123	42
Number of Lanes	0	1	0	0	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	1
HCM Control Delay	13.9	20.5	72.8	15.2
HCM LOS	B	C	F	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	0%	75%	33%	26%
Vol Thru, %	100%	69%	24%	13%	55%
Vol Right, %	0%	31%	1%	55%	19%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	526	126	319	206
LT Vol	0	0	95	104	54
Through Vol	0	365	30	40	113
RT Vol	0	161	1	175	39
Lane Flow Rate	0	572	137	347	224
Geometry Grp	7	7	2	2	5
Degree of Util (X)	0	1.035	0.286	0.628	0.425
Departure Headway (Hd)	6.739	6.52	7.832	6.762	7.095
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	0	560	462	537	511
Service Time	4.439	4.22	5.832	4.762	5.095
HCM Lane V/C Ratio	0	1.021	0.297	0.646	0.438
HCM Control Delay	9.4	72.8	13.9	20.5	15.2
HCM Lane LOS	N	F	B	C	C
HCM 95th-tile Q	0	15.9	1.2	4.3	2.1

HCM Signalized Intersection Capacity Analysis
3: Evergreen Rd & Highway 214



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗↗	↘	↘	↗↗		↘	↗	↘	↘	↗	↘
Traffic Volume (vph)	82	764	140	137	765	17	651	16	171	12	9	29
Future Volume (vph)	82	764	140	137	765	17	651	16	171	12	9	29
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.95	1.00	0.95	0.99	1.00
Satd. Flow (prot)	1630	3260	1458	1630	3249		1548	1556	1458	1548	1616	1458
Flt Permitted	0.26	1.00	1.00	0.22	1.00		0.95	0.95	1.00	0.95	0.99	1.00
Satd. Flow (perm)	438	3260	1458	370	3249		1548	1556	1458	1548	1616	1458
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)	88	822	151	147	823	18	700	17	184	13	10	31
RTOR Reduction (vph)	0	0	141	0	2	0	0	0	139	0	0	29
Lane Group Flow (vph)	88	822	10	147	839	0	357	360	45	11	12	2
Turn Type	pm+pt	NA	custom	pm+pt	NA		Split	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4		4
Permitted Phases	2		4	6					8			4
Actuated Green, G (s)	48.4	42.4	6.8	54.6	45.5		24.2	24.2	24.2	6.8	6.8	6.8
Effective Green, g (s)	48.4	42.4	6.8	54.6	45.5		24.2	24.2	24.2	6.8	6.8	6.8
Actuated g/C Ratio	0.48	0.42	0.07	0.55	0.46		0.24	0.24	0.24	0.07	0.07	0.07
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.5	6.2	2.5	2.5	6.2		2.5	2.5	2.5	2.5	2.5	2.5
Lane Grp Cap (vph)	283	1382	99	316	1478		374	376	352	105	109	99
v/s Ratio Prot	0.02	0.25		c0.04	c0.26		0.23	c0.23		0.01	c0.01	
v/s Ratio Perm	0.13		0.01	0.21					0.03			0.00
v/c Ratio	0.31	0.59	0.10	0.47	0.57		0.95	0.96	0.13	0.10	0.11	0.02
Uniform Delay, d1	14.7	22.2	43.7	13.2	20.0		37.4	37.4	29.6	43.7	43.8	43.5
Progression Factor	1.00	1.00	1.00	1.13	0.14		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	1.9	0.3	0.6	1.2		34.6	35.0	0.1	0.3	0.3	0.1
Delay (s)	15.1	24.1	44.1	15.5	4.0		71.9	72.4	29.8	44.1	44.1	43.6
Level of Service	B	C	D	B	A		E	E	C	D	D	D
Approach Delay (s)		26.2			5.7			63.5			43.8	
Approach LOS		C			A			E			D	

Intersection Summary

HCM 2000 Control Delay	31.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

4: I-5 NB Ramps & Highway 214

Smith Creek Development TIA

03/08/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑	↑	↑	↑↓	↑			
Traffic Volume (vph)	0	511	165	0	826	595	135	0	547	0	0	0
Future Volume (vph)	0	511	165	0	826	595	135	0	547	0	0	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.0		4.5	4.0	4.5	4.5	4.5			
Lane Util. Factor		0.95	1.00		0.95	1.00	0.95	0.91	0.95			
Frt		1.00	0.85		1.00	0.85	1.00	0.86	0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95	1.00	1.00			
Satd. Flow (prot)		3260	1458		3260	1458	1548	1335	1385			
Flt Permitted		1.00	1.00		1.00	1.00	0.95	1.00	1.00			
Satd. Flow (perm)		3260	1458		3260	1458	1548	1335	1385			
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	544	176	0	879	633	144	0	582	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	114	114	0	0	0
Lane Group Flow (vph)	0	544	176	0	879	633	130	185	183	0	0	0
Turn Type		NA	Free		NA	Free	Perm	NA	Perm			
Protected Phases		2			6			8				
Permitted Phases			Free			Free	8		8			
Actuated Green, G (s)		23.2	57.8		23.2	57.8	25.6	25.6	25.6			
Effective Green, g (s)		23.2	57.8		23.2	57.8	25.6	25.6	25.6			
Actuated g/C Ratio		0.40	1.00		0.40	1.00	0.44	0.44	0.44			
Clearance Time (s)		4.5			4.5		4.5	4.5	4.5			
Vehicle Extension (s)		4.0			5.0		2.5	2.5	2.5			
Lane Grp Cap (vph)		1308	1458		1308	1458	685	591	613			
v/s Ratio Prot		0.17			c0.27							
v/s Ratio Perm			0.12			c0.43	0.08	0.14	0.13			
v/c Ratio		0.42	0.12		0.67	0.43	0.19	0.31	0.30			
Uniform Delay, d1		12.4	0.0		14.2	0.0	9.8	10.4	10.3			
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2		0.3	0.2		1.8	0.9	0.6	1.4	1.2			
Delay (s)		12.7	0.2		16.0	0.9	10.4	11.8	11.6			
Level of Service		B	A		B	A	B	B	B			
Approach Delay (s)		9.7			9.7			11.5			0.0	
Approach LOS		A			A			B			A	

Intersection Summary

HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	57.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

5: I-5 SB Ramps & Highway 214

Smith Creek Development TIA

03/08/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑	↑				↑↑		↑
Traffic Volume (vph)	0	435	281	0	409	553	0	0	0	257	0	145
Future Volume (vph)	0	435	281	0	409	553	0	0	0	257	0	145
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.0		4.5	4.0				4.5		4.5
Lane Util. Factor		0.95	1.00		0.95	1.00				0.97		1.00
Frt		1.00	0.85		1.00	0.85				1.00		0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (prot)		3260	1458		3260	1458				3162		1458
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (perm)		3260	1458		3260	1458				3162		1458
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	473	305	0	445	601	0	0	0	279	0	158
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	129
Lane Group Flow (vph)	0	473	305	0	445	601	0	0	0	279	0	29
Turn Type		NA	Free		NA	Free				Prot		Perm
Protected Phases		2			6					4		
Permitted Phases			Free			Free						4
Actuated Green, G (s)		14.6	51.3		13.7	51.3				9.5		9.5
Effective Green, g (s)		14.6	51.3		13.7	51.3				9.5		9.5
Actuated g/C Ratio		0.28	1.00		0.27	1.00				0.19		0.19
Clearance Time (s)		4.5			4.5					4.5		4.5
Vehicle Extension (s)		6.0			4.0					2.5		2.5
Lane Grp Cap (vph)		927	1458		870	1458				585		270
v/s Ratio Prot		0.15			0.14					0.09		
v/s Ratio Perm			0.21			c0.41						0.02
v/c Ratio		0.51	0.21		0.51	0.41				0.48		0.11
Uniform Delay, d1		15.4	0.0		16.0	0.0				18.7		17.4
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00
Incremental Delay, d2		1.3	0.3		0.7	0.9				0.4		0.1
Delay (s)		16.6	0.3		16.6	0.9				19.1		17.5
Level of Service		B	A		B	A				B		B
Approach Delay (s)		10.2			7.6			0.0			18.5	
Approach LOS		B			A			A			B	

Intersection Summary

HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	51.3	Sum of lost time (s)	13.5
Intersection Capacity Utilization	29.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Settlemier Ave & Highway 214



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	163	516	189	115	414	137	281	272	120	158	271	181
Future Volume (vph)	163	516	189	115	414	137	281	272	120	158	271	181
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	5.0	4.5	4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Lane Util. 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
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1630	1716	1458	1630	1716	1458	1630	1716	1458	1630	1716	1458
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1630	1716	1458	1630	1716	1458	1630	1716	1458	1630	1716	1458
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	177	561	205	125	450	149	305	296	130	172	295	197
RTOR Reduction (vph)	0	0	115	0	0	83	0	0	85	0	0	143
Lane Group Flow (vph)	177	561	90	125	450	66	305	296	45	172	295	54
Turn Type	Prot	NA	pm+ov	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases			2			8			2			6
Actuated Green, G (s)	9.7	30.1	44.0	7.0	27.4	31.3	13.9	31.3	30.1	12.6	30.0	27.4
Effective Green, g (s)	9.7	30.1	44.0	7.0	27.4	31.3	13.9	31.3	30.1	12.6	30.0	27.4
Actuated g/C Ratio	0.10	0.30	0.44	0.07	0.27	0.31	0.14	0.31	0.30	0.13	0.30	0.27
Clearance Time (s)	4.5	5.0	4.5	4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Vehicle Extension (s)	2.5	4.8	2.5	2.5	4.8	2.5	2.5	2.5	4.8	2.5	2.5	4.8
Lane Grp Cap (vph)	158	516	641	114	470	456	226	537	438	205	514	399
v/s Ratio Prot	c0.11	c0.33	0.02	0.08	0.26		c0.19	c0.17		0.11	0.17	
v/s Ratio Perm			0.04			0.05			0.03			0.04
v/c Ratio	1.12	1.09	0.14	1.10	0.96	0.14	1.35	0.55	0.10	0.84	0.57	0.14
Uniform Delay, d1	45.1	35.0	16.7	46.5	35.7	24.7	43.0	28.5	25.2	42.7	29.6	27.4
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	107.5	65.4	0.1	112.6	31.1	0.1	183.6	1.0	0.2	24.4	4.6	0.3
Delay (s)	152.7	100.3	16.8	159.1	66.8	24.8	226.7	29.5	25.4	67.1	34.2	27.7
Level of Service	F	F	B	F	E	C	F	C	C	E	C	C
Approach Delay (s)		92.0			74.1			111.0			40.8	
Approach LOS		F			E			F			D	

Intersection Summary

HCM 2000 Control Delay	81.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection												
Int Delay, s/veh	18.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	46	17	156	4	25	17	134	516	14	10	375	58
Future Vol, veh/h	46	17	156	4	25	17	134	516	14	10	375	58
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	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	50	18	170	4	27	18	146	561	15	11	408	63

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1344	1328	439	1415	1352	568	471	0	0	576	0	0
Stage 1	461	461	-	860	860	-	-	-	-	-	-	-
Stage 2	883	867	-	555	492	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	129	155	618	115	150	522	1091	-	-	997	-	-
Stage 1	581	565	-	351	373	-	-	-	-	-	-	-
Stage 2	340	370	-	516	548	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	87	123	618	62	119	522	1091	-	-	997	-	-
Mov Cap-2 Maneuver	87	123	-	62	119	-	-	-	-	-	-	-
Stage 1	467	557	-	282	300	-	-	-	-	-	-	-
Stage 2	240	297	-	357	540	-	-	-	-	-	-	-




Approach	EB		WB		NB		SB	
HCM Control Delay, s	102.7		40.6		1.8		0.2	
HCM LOS	F		E					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1091	-	-	238	150	997	-	-
HCM Lane V/C Ratio	0.134	-	-	1	0.333	0.011	-	-
HCM Control Delay (s)	8.8	0	-	102.7	40.6	8.7	0	-
HCM Lane LOS	A	A	-	F	E	A	A	-
HCM 95th %tile Q(veh)	0.5	-	-	9.5	1.4	0	-	-

Intersection

Int Delay, s/veh 1.7

Movement EBL EBR NBL NBT SBT SBR

Lane Configurations						
Traffic Vol, veh/h	76	2	1	311	334	29
Future Vol, veh/h	76	2	1	311	334	29
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	83	2	1	338	363	32

Major/Minor Minor2 Major1 Major2

Conflicting Flow All	719	379	395	0	-	0
Stage 1	379	-	-	-	-	-
Stage 2	340	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	395	668	1164	-	-	-
Stage 1	692	-	-	-	-	-
Stage 2	721	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	395	668	1164	-	-	-
Mov Cap-2 Maneuver	395	-	-	-	-	-
Stage 1	692	-	-	-	-	-
Stage 2	720	-	-	-	-	-

Approach EB NB SB

HCM Control Delay, s 16.4 0 0
 HCM LOS C

Minor Lane/Major Mvmt NBL NBT EBLn1 SBT SBR

Capacity (veh/h)	1164	-	399	-	-
HCM Lane V/C Ratio	0.001	-	0.212	-	-
HCM Control Delay (s)	8.1	0	16.4	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.8	-	-

Intersection												
Int Delay, s/veh	4.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↗			↕			↕	
Traffic Vol, veh/h	0	13	0	0	0	7	0	0	0	13	0	11
Future Vol, veh/h	0	13	0	0	0	7	0	0	0	13	0	11
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	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	14	0	0	0	8	0	0	0	14	0	12

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	8	0	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.12	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.218	-	-	-
Pot Cap-1 Maneuver	1612	-	0	0
Stage 1	-	-	0	0
Stage 2	-	-	0	0
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1612	-	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	8.8
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	1612	-	-	-	984
HCM Lane V/C Ratio	-	-	-	-	-	0.027
HCM Control Delay (s)	0	0	-	-	-	8.8
HCM Lane LOS	A	A	-	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	-	0.1

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Vol, veh/h	1	127	92	7	18	4
Future Vol, veh/h	1	127	92	7	18	4
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	138	100	8	20	4

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	108	0	-	0	244
Stage 1	-	-	-	-	104
Stage 2	-	-	-	-	140
Critical Hdwy	4.12	-	-	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	2.218	-	-	-	3.518
Pot Cap-1 Maneuver	1483	-	-	-	744
Stage 1	-	-	-	-	920
Stage 2	-	-	-	-	887
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1483	-	-	-	743
Mov Cap-2 Maneuver	-	-	-	-	750
Stage 1	-	-	-	-	920
Stage 2	-	-	-	-	886

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1483	-	-	-	780
HCM Lane V/C Ratio	0.001	-	-	-	0.031
HCM Control Delay (s)	7.4	0	-	-	9.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	35	211	0	1	252	15	3	4	0	40	5	52
Future Vol, veh/h	35	211	0	1	252	15	3	4	0	40	5	52
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	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	38	229	0	1	274	16	3	4	0	43	5	57
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.9	10.1	8.6	8.8
HCM LOS	A	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	43%	14%	0%	41%
Vol Thru, %	57%	86%	94%	5%
Vol Right, %	0%	0%	6%	54%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	7	246	268	97
LT Vol	3	35	1	40
Through Vol	4	211	252	5
RT Vol	0	0	15	52
Lane Flow Rate	8	267	291	105
Geometry Grp	1	1	1	1
Degree of Util (X)	0.011	0.339	0.363	0.145
Departure Headway (Hd)	5.434	4.563	4.481	4.95
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	655	789	801	722
Service Time	3.495	2.595	2.512	2.997
HCM Lane V/C Ratio	0.012	0.338	0.363	0.145
HCM Control Delay	8.6	9.9	10.1	8.8
HCM Lane LOS	A	A	B	A
HCM 95th-tile Q	0	1.5	1.7	0.5

HCM Signalized Intersection Capacity Analysis
 12: Oregon Way & Highway 214



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	875	11	9	817	17	33	10	6	12	2	55
Future Volume (vph)	22	875	11	9	817	17	33	10	6	12	2	55
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.94		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1630	3254		1630	3250		1630	1616		1630	1467	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1630	3254		1630	3250		1630	1616		1630	1467	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	951	12	10	888	18	36	11	7	13	2	60
RTOR Reduction (vph)	0	1	0	0	1	0	0	6	0	0	50	0
Lane Group Flow (vph)	24	962	0	10	905	0	36	12	0	13	12	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	11.0	38.5		11.0	38.5		18.0	16.0		18.0	16.0	
Effective Green, g (s)	11.0	38.5		11.0	38.5		18.0	16.0		18.0	16.0	
Actuated g/C Ratio	0.11	0.38		0.11	0.38		0.18	0.16		0.18	0.16	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	6.2		2.5	6.2		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	179	1252		179	1251		293	258		293	234	
v/s Ratio Prot	c0.01	c0.30		0.01	0.28		c0.02	0.01		0.01	c0.01	
v/s Ratio Perm												
v/c Ratio	0.13	0.77		0.06	0.72		0.12	0.05		0.04	0.05	
Uniform Delay, d1	40.2	26.9		39.8	26.2		34.4	35.5		33.9	35.6	
Progression Factor	1.01	1.16		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	3.9		0.6	3.7		0.9	0.3		0.3	0.4	
Delay (s)	41.9	35.0		40.4	29.9		35.2	35.9		34.2	36.0	
Level of Service	D	C		D	C		D	D		C	D	
Approach Delay (s)		35.1			30.0			35.5			35.7	
Approach LOS		D			C			D			D	

Intersection Summary

HCM 2000 Control Delay	32.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	42.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	9.7
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↔		↕	
Traffic Vol, veh/h	9	215	284	42	17	17
Future Vol, veh/h	9	215	284	42	17	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	234	309	46	18	18
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	9.2	10.2	8.3
HCM LOS	A	B	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	0%	50%
Vol Thru, %	96%	87%	0%
Vol Right, %	0%	13%	50%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	224	326	34
LT Vol	9	0	17
Through Vol	215	284	0
RT Vol	0	42	17
Lane Flow Rate	243	354	37
Geometry Grp	1	1	1
Degree of Util (X)	0.296	0.414	0.051
Departure Headway (Hd)	4.381	4.21	5.006
Convergence, Y/N	Yes	Yes	Yes
Cap	823	861	715
Service Time	2.396	2.21	3.035
HCM Lane V/C Ratio	0.295	0.411	0.052
HCM Control Delay	9.2	10.2	8.3
HCM Lane LOS	A	B	A
HCM 95th-tile Q	1.2	2.1	0.2

Intersection	
Intersection Delay, s/veh	21.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	272	174	127	20	173	3	156	75	258	2	90	210
Future Vol, veh/h	272	174	127	20	173	3	156	75	258	2	90	210
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	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	296	189	138	22	188	3	170	82	280	2	98	228
Number of Lanes	1	1	0	1	1	0	0	1	1	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	26.8	18.2	21	16.7
HCM LOS	D	C	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	68%	0%	100%	0%	100%	0%	2%	0%
Vol Thru, %	32%	0%	0%	58%	0%	98%	98%	0%
Vol Right, %	0%	100%	0%	42%	0%	2%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	231	258	272	301	20	176	92	210
LT Vol	156	0	272	0	20	0	2	0
Through Vol	75	0	0	174	0	173	90	0
RT Vol	0	258	0	127	0	3	0	210
Lane Flow Rate	251	280	296	327	22	191	100	228
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.588	0.573	0.691	0.69	0.056	0.462	0.236	0.493
Departure Headway (Hd)	8.432	7.361	8.411	7.592	9.233	8.701	8.506	7.77
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	427	488	429	474	387	413	421	461
Service Time	6.207	5.135	6.187	5.366	7.023	6.49	6.288	5.55
HCM Lane V/C Ratio	0.588	0.574	0.69	0.69	0.057	0.462	0.238	0.495
HCM Control Delay	22.6	19.6	28.1	25.7	12.6	18.8	13.9	17.9
HCM Lane LOS	C	C	D	D	B	C	B	C
HCM 95th-tile Q	3.7	3.5	5.1	5.2	0.2	2.4	0.9	2.7

Intersection												
Int Delay, s/veh	8.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↻		↻	↻			↻			↻	↻
Traffic Vol, veh/h	12	140	6	341	148	3	2	5	205	4	40	59
Future Vol, veh/h	12	140	6	341	148	3	2	5	205	4	40	59
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	-	-	-	75	-	-	-	-	-	-	-	-
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	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	152	7	371	161	3	2	5	223	4	43	64

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	164	0	0	159	0	0	1140	1087	155	1200	1089	163
Stage 1	-	-	-	-	-	-	182	182	-	904	904	-
Stage 2	-	-	-	-	-	-	958	905	-	296	185	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1414	-	-	1420	-	-	178	216	891	162	215	882
Stage 1	-	-	-	-	-	-	820	749	-	331	356	-
Stage 2	-	-	-	-	-	-	309	355	-	712	747	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1414	-	-	1420	-	-	104	158	891	94	157	882
Mov Cap-2 Maneuver	-	-	-	-	-	-	104	158	-	94	157	-
Stage 1	-	-	-	-	-	-	812	742	-	328	263	-
Stage 2	-	-	-	-	-	-	177	262	-	525	740	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			5.8			11.8			25.8		
HCM LOS							B			D		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	755	1414	-	-	1420	-	-	283
HCM Lane V/C Ratio	0.305	0.009	-	-	0.261	-	-	0.396
HCM Control Delay (s)	11.8	7.6	-	-	8.4	-	-	25.8
HCM Lane LOS	B	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	1.3	0	-	-	1.1	-	-	1.8

Intersection	
Intersection Delay, s/veh	88.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕			↕	
Traffic Vol, veh/h	65	69	0	145	106	143	4	248	102	139	320	95
Future Vol, veh/h	65	69	0	145	106	143	4	248	102	139	320	95
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	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	71	75	0	158	115	155	4	270	111	151	348	103
Number of Lanes	0	1	0	0	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	1	1
HCM Control Delay	18.4	48.8	40.9	164.3
HCM LOS	C	E	E	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1
Vol Left, %	100%	0%	49%	37%	25%
Vol Thru, %	0%	71%	51%	27%	58%
Vol Right, %	0%	29%	0%	36%	17%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	4	350	134	394	554
LT Vol	4	0	65	145	139
Through Vol	0	248	69	106	320
RT Vol	0	102	0	143	95
Lane Flow Rate	4	380	146	428	602
Geometry Grp	7	7	2	2	5
Degree of Util (X)	0.01	0.831	0.362	0.89	1.278
Departure Headway (Hd)	9.234	8.502	9.918	8.194	7.64
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	390	430	366	445	482
Service Time	6.934	6.202	7.918	6.194	5.64
HCM Lane V/C Ratio	0.01	0.884	0.399	0.962	1.249
HCM Control Delay	12	41.2	18.4	48.8	164.3
HCM Lane LOS	B	E	C	E	F
HCM 95th-tile Q	0	7.9	1.6	9.5	25.3

HCM Signalized Intersection Capacity Analysis
3: Evergreen Rd & Highway 214



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	900	382	225	796	14	496	27	179	31	28	78
Future Volume (vph)	114	900	382	225	796	14	496	27	179	31	28	78
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1630	3260	1458	1630	3251		1548	1560	1458	1548	1622	1458
Flt Permitted	0.24	1.00	1.00	0.15	1.00		0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (perm)	414	3260	1458	249	3251		1548	1560	1458	1548	1622	1458
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)	120	947	402	237	838	15	522	28	188	33	29	82
RTOR Reduction (vph)	0	0	342	0	1	0	0	0	148	0	0	74
Lane Group Flow (vph)	120	947	60	237	852	0	277	273	40	30	32	8
Turn Type	pm+pt	NA	custom	pm+pt	NA		Split	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases	2		4	6					8			4
Actuated Green, G (s)	47.9	39.4	9.6	55.3	43.1		21.3	21.3	21.3	9.6	9.6	9.6
Effective Green, g (s)	47.9	39.4	9.6	55.3	43.1		21.3	21.3	21.3	9.6	9.6	9.6
Actuated g/C Ratio	0.48	0.39	0.10	0.55	0.43		0.21	0.21	0.21	0.10	0.10	0.10
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.5	6.2	2.5	2.5	6.2		2.5	2.5	2.5	2.5	2.5	2.5
Lane Grp Cap (vph)	301	1284	139	306	1401		329	332	310	148	155	139
v/s Ratio Prot	0.03	0.29		c0.09	0.26		c0.18	0.18		0.02	0.02	
v/s Ratio Perm	0.16		c0.04	c0.33					0.03			0.01
v/c Ratio	0.40	0.74	0.43	0.77	0.61		0.84	0.82	0.13	0.20	0.21	0.06
Uniform Delay, d1	15.4	25.9	42.6	16.3	21.9		37.7	37.5	31.8	41.7	41.7	41.1
Progression Factor	0.75	0.83	2.44	2.38	1.62		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	3.0	1.2	7.6	1.3		17.2	14.7	0.1	0.5	0.5	0.1
Delay (s)	12.1	24.5	105.2	46.5	36.8		54.9	52.3	32.0	42.2	42.2	41.2
Level of Service	B	C	F	D	D		D	D	C	D	D	D
Approach Delay (s)		45.5			38.9			48.1			41.6	
Approach LOS		D			D			D			D	

Intersection Summary

HCM 2000 Control Delay	43.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

4: I-5 NB Ramps & Highway 214

Smith Creek Development TIA

03/08/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑	↑	↑	↑↓	↑			
Traffic Volume (vph)	0	1085	181	0	1032	382	213	0	601	0	0	0
Future Volume (vph)	0	1085	181	0	1032	382	213	0	601	0	0	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.0		4.5	4.0	4.5	4.5	4.5			
Lane Util. Factor		0.95	1.00		0.95	1.00	0.95	0.91	0.95			
Frt		1.00	0.85		1.00	0.85	1.00	0.86	0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95	1.00	1.00			
Satd. Flow (prot)		3260	1458		3260	1458	1548	1339	1385			
Flt Permitted		1.00	1.00		1.00	1.00	0.95	1.00	1.00			
Satd. Flow (perm)		3260	1458		3260	1458	1548	1339	1385			
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)	0	1167	195	0	1110	411	229	0	646	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	26	26	0	0	0
Lane Group Flow (vph)	0	1167	195	0	1110	411	206	307	310	0	0	0
Turn Type		NA	Free		NA	Free	Perm	NA	Perm			
Protected Phases		2			6			8				
Permitted Phases			Free			Free	8		8			
Actuated Green, G (s)		43.9	100.0		43.9	100.0	47.1	47.1	47.1			
Effective Green, g (s)		43.9	100.0		43.9	100.0	47.1	47.1	47.1			
Actuated g/C Ratio		0.44	1.00		0.44	1.00	0.47	0.47	0.47			
Clearance Time (s)		4.5			4.5		4.5	4.5	4.5			
Vehicle Extension (s)		4.0			5.0		2.5	2.5	2.5			
Lane Grp Cap (vph)		1431	1458		1431	1458	729	630	652			
v/s Ratio Prot		c0.36			0.34							
v/s Ratio Perm			0.13			0.28	0.13	0.23	0.22			
v/c Ratio		0.82	0.13		0.78	0.28	0.28	0.49	0.48			
Uniform Delay, d1		24.5	0.0		23.9	0.0	16.1	18.2	18.0			
Progression Factor		1.00	1.00		0.89	1.00	1.00	1.00	1.00			
Incremental Delay, d2		5.2	0.2		2.5	0.4	1.0	2.7	2.5			
Delay (s)		29.7	0.2		23.6	0.4	17.1	20.8	20.5			
Level of Service		C	A		C	A	B	C	C			
Approach Delay (s)		25.5			17.3			19.8			0.0	
Approach LOS		C			B			B			A	

Intersection Summary

HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

5: I-5 SB Ramps & Highway 214

Smith Creek Development TIA

03/08/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑		↑↑	↑				↑↑		↑
Traffic Volume (vph)	0	589	389	0	647	587	0	0	0	728	0	261
Future Volume (vph)	0	589	389	0	647	587	0	0	0	728	0	261
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.5	4.0		4.5	4.0				4.5		4.5
Lane Util. Factor		0.95	1.00		0.95	1.00				0.97		1.00
Frt		1.00	0.85		1.00	0.85				1.00		0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (prot)		3260	1458		3260	1458				3162		1458
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (perm)		3260	1458		3260	1458				3162		1458
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	640	423	0	703	638	0	0	0	791	0	284
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	199
Lane Group Flow (vph)	0	640	423	0	703	638	0	0	0	791	0	85
Turn Type		NA	Free		NA	Free				Prot		Perm
Protected Phases		2			6					4		
Permitted Phases			Free			Free						4
Actuated Green, G (s)		15.6	66.8		17.6	66.8				20.1		20.1
Effective Green, g (s)		15.6	66.8		17.6	66.8				20.1		20.1
Actuated g/C Ratio		0.23	1.00		0.26	1.00				0.30		0.30
Clearance Time (s)		4.5			4.5					4.5		4.5
Vehicle Extension (s)		6.0			4.0					2.5		2.5
Lane Grp Cap (vph)		761	1458		858	1458				951		438
v/s Ratio Prot		c0.20			c0.22					c0.25		
v/s Ratio Perm			0.29			0.44						0.06
v/c Ratio		0.84	0.29		0.82	0.44				0.83		0.20
Uniform Delay, d1		24.4	0.0		23.1	0.0				21.8		17.3
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00
Incremental Delay, d2		9.6	0.5		6.5	1.0				6.2		0.2
Delay (s)		34.0	0.5		29.6	1.0				28.0		17.5
Level of Service		C	A		C	A				C		B
Approach Delay (s)		20.7			16.0			0.0			25.2	
Approach LOS		C			B			A			C	

Intersection Summary

HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	66.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Settlemier Ave & Highway 214



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	89	566	411	145	644	91	313	144	103	106	217	127
Future Volume (vph)	89	566	411	145	644	91	313	144	103	106	217	127
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	5.0	4.5	4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Lane Util. 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
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1630	1716	1458	1630	1716	1458	1630	1716	1458	1630	1716	1458
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1630	1716	1458	1630	1716	1458	1630	1716	1458	1630	1716	1458
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	95	602	437	154	685	97	333	153	110	113	231	135
RTOR Reduction (vph)	0	0	188	0	0	65	0	0	76	0	0	94
Lane Group Flow (vph)	95	602	249	154	685	32	333	153	34	113	231	41
Turn Type	Prot	NA	pm+ov	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases			2			8			2			6
Actuated Green, G (s)	7.6	31.0	44.9	7.0	30.4	33.0	13.9	33.0	31.0	10.9	30.0	30.4
Effective Green, g (s)	7.6	31.0	44.9	7.0	30.4	33.0	13.9	33.0	31.0	10.9	30.0	30.4
Actuated g/C Ratio	0.08	0.31	0.44	0.07	0.30	0.33	0.14	0.33	0.31	0.11	0.30	0.30
Clearance Time (s)	4.5	5.0	4.5	4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Vehicle Extension (s)	2.5	4.8	2.5	2.5	4.8	2.5	2.5	2.5	4.8	2.5	2.5	4.8
Lane Grp Cap (vph)	122	527	648	113	517	476	224	561	447	176	510	439
v/s Ratio Prot	0.06	0.35	0.05	c0.09	c0.40		c0.20	c0.09		0.07	c0.13	
v/s Ratio Perm			0.12			0.02			0.02			0.03
v/c Ratio	0.78	1.14	0.38	1.36	1.32	0.07	1.49	0.27	0.08	0.64	0.45	0.09
Uniform Delay, d1	45.8	35.0	18.8	47.0	35.2	23.4	43.5	25.1	24.8	43.1	28.8	25.3
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	25.3	84.8	0.3	209.8	159.3	0.0	241.3	0.2	0.1	6.9	2.9	0.2
Delay (s)	71.2	119.7	19.0	256.8	194.5	23.4	284.8	25.3	24.9	50.0	31.7	25.5
Level of Service	E	F	B	F	F	C	F	C	C	D	C	C
Approach Delay (s)		76.8			187.0			170.2			34.3	
Approach LOS		E			F			F			C	

Intersection Summary

HCM 2000 Control Delay	120.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	100.9	Sum of lost time (s)	19.0
Intersection Capacity Utilization	89.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection												
Int Delay, s/veh	34.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	45	21	150	12	36	22	149	315	7	32	506	88
Future Vol, veh/h	45	21	150	12	36	22	149	315	7	32	506	88
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	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	23	163	13	39	24	162	342	8	35	550	96

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1369	1341	598	1430	1385	346	646	0	0	350	0	0
Stage 1	667	667	-	670	670	-	-	-	-	-	-	-
Stage 2	702	674	-	760	715	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	124	152	502	112	143	697	939	-	-	1209	-	-
Stage 1	448	457	-	446	455	-	-	-	-	-	-	-
Stage 2	429	454	-	398	434	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	70	114	502	52	107	697	939	-	-	1209	-	-
Mov Cap-2 Maneuver	70	114	-	52	107	-	-	-	-	-	-	-
Stage 1	352	436	-	351	358	-	-	-	-	-	-	-
Stage 2	290	357	-	243	414	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	187.2		80.4		3		0.4	
HCM LOS	F		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	939	-	-	192	117	1209	-
HCM Lane V/C Ratio	0.172	-	-	1.223	0.65	0.029	-
HCM Control Delay (s)	9.6	0	-	187.2	80.4	8.1	0
HCM Lane LOS	A	A	-	F	F	A	A
HCM 95th %tile Q(veh)	0.6	-	-	12.4	3.4	0.1	-

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T		T		T	
Traffic Vol, veh/h	43	2	6	211	273	75
Future Vol, veh/h	43	2	6	211	273	75
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	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	50	2	7	245	317	87

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	620	361	405	0	-	0
Stage 1	361	-	-	-	-	-
Stage 2	259	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	452	684	1154	-	-	-
Stage 1	705	-	-	-	-	-
Stage 2	784	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	449	684	1154	-	-	-
Mov Cap-2 Maneuver	449	-	-	-	-	-
Stage 1	705	-	-	-	-	-
Stage 2	779	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.9	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1154	-	456	-	-
HCM Lane V/C Ratio	0.006	-	0.115	-	-
HCM Control Delay (s)	8.1	0	13.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection

Int Delay, s/veh 2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↗			↕			↕	
Traffic Vol, veh/h	0	8	0	0	0	26	0	0	0	8	7	0
Future Vol, veh/h	0	8	0	0	0	26	0	0	0	8	7	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	-	-	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	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	9	0	0	0	28	0	0	0	9	8	0

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	28	0	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.12	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.218	-	-	-
Pot Cap-1 Maneuver	1585	-	0	0
Stage 1	-	-	0	0
Stage 2	-	-	0	0
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1585	-	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	9.3
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	1585	-	-	-	857
HCM Lane V/C Ratio	-	-	-	-	-	0.019
HCM Control Delay (s)	0	0	-	-	-	9.3
HCM Lane LOS	A	A	-	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	-	0.1

Intersection

Int Delay, s/veh 1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	6	83	66	17	13	3
Future Vol, veh/h	6	83	66	17	13	3
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	90	72	18	14	3

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	90	0	0 184 81
Stage 1	-	-	- - 81 -
Stage 2	-	-	- - 103 -
Critical Hdwy	4.12	-	- - 6.42 6.22
Critical Hdwy Stg 1	-	-	- - 5.42 -
Critical Hdwy Stg 2	-	-	- - 5.42 -
Follow-up Hdwy	2.218	-	- - 3.518 3.318
Pot Cap-1 Maneuver	1505	-	- - 805 979
Stage 1	-	-	- - 942 -
Stage 2	-	-	- - 921 -
Platoon blocked, %		-	- - -
Mov Cap-1 Maneuver	1505	-	- - 801 979
Mov Cap-2 Maneuver	-	-	- - 789 -
Stage 1	-	-	- - 942 -
Stage 2	-	-	- - 916 -

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1505	-	-	-	819
HCM Lane V/C Ratio	0.004	-	-	-	0.021
HCM Control Delay (s)	7.4	0	-	-	9.5
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Intersection Delay, s/veh	10.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	38	292	3	3	257	4	1	4	1	33	5	99
Future Vol, veh/h	38	292	3	3	257	4	1	4	1	33	5	99
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	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	41	317	3	3	279	4	1	4	1	36	5	108
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.8	10.7	8.7	9.4
HCM LOS	B	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	17%	11%	1%	24%
Vol Thru, %	67%	88%	97%	4%
Vol Right, %	17%	1%	2%	72%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	6	333	264	137
LT Vol	1	38	3	33
Through Vol	4	292	257	5
RT Vol	1	3	4	99
Lane Flow Rate	7	362	287	149
Geometry Grp	1	1	1	1
Degree of Util (X)	0.01	0.47	0.377	0.208
Departure Headway (Hd)	5.69	4.672	4.73	5.021
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	633	767	755	709
Service Time	3.69	2.728	2.79	3.095
HCM Lane V/C Ratio	0.011	0.472	0.38	0.21
HCM Control Delay	8.7	11.8	10.7	9.4
HCM Lane LOS	A	B	B	A
HCM 95th-tile Q	0	2.5	1.8	0.8

HCM Signalized Intersection Capacity Analysis
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↗↘		↗	↗↘		↗	↘		↗	↘	
Traffic Volume (vph)	113	1046	49	24	921	67	32	21	8	67	28	93
Future Volume (vph)	113	1046	49	24	921	67	32	21	8	67	28	93
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.96		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1630	3238		1630	3226		1630	1647		1630	1517	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1630	3238		1630	3226		1630	1647		1630	1517	
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)	119	1101	52	25	969	71	34	22	8	71	29	98
RTOR Reduction (vph)	0	4	0	0	5	0	0	7	0	0	82	0
Lane Group Flow (vph)	119	1149	0	25	1035	0	34	23	0	71	45	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	11.0	40.3		11.0	40.3		16.2	16.0		16.2	16.0	
Effective Green, g (s)	11.0	40.3		11.0	40.3		16.2	16.0		16.2	16.0	
Actuated g/C Ratio	0.11	0.40		0.11	0.40		0.16	0.16		0.16	0.16	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.5	6.2		2.5	6.2		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	179	1304		179	1300		264	263		264	242	
v/s Ratio Prot	c0.07	c0.36		0.02	0.32		0.02	0.01		c0.04	c0.03	
v/s Ratio Perm												
v/c Ratio	0.66	0.88		0.14	0.80		0.13	0.09		0.27	0.18	
Uniform Delay, d1	42.7	27.6		40.2	26.2		35.9	35.8		36.7	36.4	
Progression Factor	1.47	0.42		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.4	7.2		1.6	5.1		1.0	0.7		2.5	1.7	
Delay (s)	77.4	18.9		41.8	31.3		36.9	36.5		39.2	38.0	
Level of Service	E	B		D	C		D	D		D	D	
Approach Delay (s)		24.3			31.6			36.7			38.5	
Approach LOS		C			C			D			D	

Intersection Summary

HCM 2000 Control Delay	28.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	11
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↔		↕	
Traffic Vol, veh/h	21	259	334	39	28	46
Future Vol, veh/h	21	259	334	39	28	46
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	282	363	42	30	50
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	10.5	11.7	8.9
HCM LOS	B	B	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	7%	0%	38%
Vol Thru, %	93%	90%	0%
Vol Right, %	0%	10%	62%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	280	373	74
LT Vol	21	0	28
Through Vol	259	334	0
RT Vol	0	39	46
Lane Flow Rate	304	405	80
Geometry Grp	1	1	1
Degree of Util (X)	0.387	0.497	0.116
Departure Headway (Hd)	4.58	4.409	5.172
Convergence, Y/N	Yes	Yes	Yes
Cap	785	815	690
Service Time	2.616	2.441	3.228
HCM Lane V/C Ratio	0.387	0.497	0.116
HCM Control Delay	10.5	11.7	8.9
HCM Lane LOS	B	B	A
HCM 95th-tile Q	1.8	2.8	0.4

Intersection	
Intersection Delay, s/veh	10.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷			↶	↷		↶	↷
Traffic Vol, veh/h	99	55	48	52	76	11	44	112	41	5	129	110
Future Vol, veh/h	99	55	48	52	76	11	44	112	41	5	129	110
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	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	108	60	52	57	83	12	48	122	45	5	140	120
Number of Lanes	1	1	0	1	1	0	0	1	1	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	10.4	10.1	10.8	9.9
HCM LOS	B	B	B	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	28%	0%	100%	0%	100%	0%	4%	0%
Vol Thru, %	72%	0%	0%	53%	0%	87%	96%	0%
Vol Right, %	0%	100%	0%	47%	0%	13%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	156	41	99	103	52	87	134	110
LT Vol	44	0	99	0	52	0	5	0
Through Vol	112	0	0	55	0	76	129	0
RT Vol	0	41	0	48	0	11	0	110
Lane Flow Rate	170	45	108	112	57	95	146	120
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.29	0.066	0.197	0.179	0.105	0.161	0.242	0.174
Departure Headway (Hd)	6.151	5.3	6.606	5.769	6.713	6.116	5.976	5.249
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	585	676	543	621	534	586	602	684
Service Time	3.885	3.034	4.344	3.507	4.453	3.857	3.709	2.982
HCM Lane V/C Ratio	0.291	0.067	0.199	0.18	0.107	0.162	0.243	0.175
HCM Control Delay	11.4	8.4	11	9.8	10.2	10	10.6	9.1
HCM Lane LOS	B	A	B	A	B	A	B	A
HCM 95th-tile Q	1.2	0.2	0.7	0.6	0.3	0.6	0.9	0.6



Appendix E – Future 2025 Mitigation HCM Report

Intersection	
Intersection Delay, s/veh	49.1
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	65	69	0	145	106	143	4	248	102	139	320	95
Future Vol, veh/h	65	69	0	145	106	143	4	248	102	139	320	95
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	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	71	75	0	158	115	155	4	270	111	151	348	103
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	17.9	50.8	44.1	58.6
HCM LOS	C	F	E	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	49%	37%	100%	0%
Vol Thru, %	0%	71%	51%	27%	0%	77%
Vol Right, %	0%	29%	0%	36%	0%	23%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	4	350	134	394	139	415
LT Vol	4	0	65	145	139	0
Through Vol	0	248	69	106	0	320
RT Vol	0	102	0	143	0	95
Lane Flow Rate	4	380	146	428	151	451
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.011	0.862	0.378	0.912	0.366	1.007
Departure Headway (Hd)	8.991	8.273	9.345	7.776	8.719	8.033
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	400	441	386	471	415	456
Service Time	6.706	5.973	7.368	5.776	6.419	5.733
HCM Lane V/C Ratio	0.01	0.862	0.378	0.909	0.364	0.989
HCM Control Delay	11.8	44.5	17.9	50.8	16.4	72.7
HCM Lane LOS	B	E	C	F	C	F
HCM 95th-tile Q	0	8.7	1.7	10.3	1.6	13.2

HCM Signalized Intersection Capacity Analysis

6: Settlemier Ave & Highway 214

03/09/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	89	566	411	145	644	91	313	144	103	106	217	127
Future Volume (vph)	89	566	411	145	644	91	313	144	103	106	217	127
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.5	5.0	4.5	4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1630	3260	1458	1630	3260	1458	1630	1716	1458	1630	1716	1458
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1630	3260	1458	1630	3260	1458	1630	1716	1458	1630	1716	1458
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	95	602	437	154	685	97	333	153	110	113	231	135
RTOR Reduction (vph)	0	0	193	0	0	64	0	0	79	0	0	97
Lane Group Flow (vph)	95	602	244	154	685	33	333	153	31	113	231	38
Turn Type	Prot	NA	pm+ov	Prot	NA	custom	Prot	NA	custom	Prot	NA	custom
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases			2			8			2			6
Actuated Green, G (s)	7.4	28.0	41.9	7.0	27.6	33.3	13.9	33.3	28.0	10.7	30.1	27.6
Effective Green, g (s)	7.4	28.0	41.9	7.0	27.6	33.3	13.9	33.3	28.0	10.7	30.1	27.6
Actuated g/C Ratio	0.08	0.29	0.43	0.07	0.28	0.34	0.14	0.34	0.29	0.11	0.31	0.28
Clearance Time (s)	4.5	5.0	4.5	4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Vehicle Extension (s)	2.5	4.8	2.5	2.5	4.8	2.5	2.5	2.5	4.8	2.5	2.5	4.8
Lane Grp Cap (vph)	123	931	623	116	918	495	231	583	416	177	527	410
v/s Ratio Prot	0.06	0.18	0.06	c0.09	c0.21		c0.20	c0.09		0.07	c0.13	
v/s Ratio Perm			0.11			0.02			0.02			0.03
v/c Ratio	0.77	0.65	0.39	1.33	0.75	0.07	1.44	0.26	0.08	0.64	0.44	0.09
Uniform Delay, d1	44.5	30.7	19.3	45.5	32.0	21.9	42.0	23.4	25.6	41.8	27.2	26.0
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	24.5	2.0	0.3	195.0	3.9	0.0	221.5	0.2	0.2	6.5	2.6	0.2
Delay (s)	69.0	32.7	19.6	240.5	35.9	21.9	263.6	23.6	25.7	48.3	29.8	26.2
Level of Service	E	C	B	F	D	C	F	C	C	D	C	C
Approach Delay (s)		30.7			68.1			158.1			33.1	
Approach LOS		C			E			F			C	

Intersection Summary

HCM 2000 Control Delay	66.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	98.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

MOVEMENT SUMMARY

 **Site: Hayes Settlemier PM**

Hayes Settlemier Mini Roundabout - 2025 PM peak hour
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	95% Back of Queue Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: N Settlemier Ave											
3	L2	162	0.0	0.495	6.1	LOS A	4.6	114.3	0.36	0.44	24.1
8	T1	342	0.0	0.495	3.0	LOS A	4.6	114.3	0.36	0.44	24.1
Approach		504	0.0	0.495	4.0	LOS A	4.6	114.3	0.36	0.44	24.1
North: N Settlemier Ave											
4	T1	550	0.0	0.720	6.3	LOS A	8.5	212.6	0.76	0.66	23.7
14	R2	96	0.0	0.720	6.5	LOS A	8.5	212.6	0.76	0.66	23.3
Approach		646	0.0	0.720	6.3	LOS A	8.5	212.6	0.76	0.66	23.7
West: W Hayes St											
5	L2	49	0.0	0.416	11.4	LOS B	2.8	69.7	0.80	0.89	23.0
12	R2	186	0.0	0.416	8.6	LOS A	2.8	69.7	0.80	0.89	22.6
Approach		235	0.0	0.416	9.2	LOS A	2.8	69.7	0.80	0.89	22.7
All Vehicles		1385	0.0	0.720	6.0	LOS A	8.5	212.6	0.62	0.62	23.6

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

Roundabout LOS Method: SIDRA Roundabout LOS.

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 M3D).

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



Appendix F – Traffic Signal Warrant Worksheet

Oregon Department of Transportation
Transportation Development Branch
Transportation Planning Analysis Unit

Preliminary Traffic Signal Warrant Analysis¹

Major Street: Evergreen Road	Minor Street: Hayes Street
Project: Smith Creek TIA	City/County: Woodburn
Year: 2025	Alternative: Project Site Buildout

Preliminary Signal Warrant Volumes

Number of Approach lanes		ADT on major street approaching from both directions		ADT on minor street, highest approaching volume	
Major Street	Minor Street	Percent of standard warrants		Percent of standard warrants	
		100	70	100	70

Case A: Minimum Vehicular Traffic

1	1	8850	6200	2650	1850
2 or more	1	10600	7400	2650	1850
2 or more	2 or more	10600	7400	3550	2500
1	2 or more	8850	6200	3550	2500

Case B: Interruption of Continuous Traffic

1	1	13300	9300	1350	950
2 or more	1	15900	11100	1350	950
2 or more	2 or more	15900	11100	1750	1250
1	2 or more	13300	9300	1750	1250

100 percent of standard warrants

X 70 percent of standard warrants²

Preliminary Signal Warrant Calculation

	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	2	7400	9080	Y
	Minor	1	1850	3650	
Case B	Major	2	11100	9080	N
	Minor	1	950	3650	

Analyst and Date:	Reviewer and Date:
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¹ Meeting preliminary signal warrants does **not** guarantee that a signal will be installed. When preliminary signal warrants are met, project analysts need to coordinate with Region Traffic to initiate the traffic signal engineering investigation as outlined in the Traffic Manual. Before a signal can be installed, the engineering investigation must be conducted or reviewed by the Region Traffic Manager who will forward signal recommendations to headquarters. Traffic signal warrants must be met and the State Traffic Engineer's approval obtained before a traffic signal can be installed on a state highway.

² Used due to 85th percentile speed in excess of 40 mph or isolated community with population of less than 10,000.