Woodburn OR 214/OR 99E
Pedestrian Safety Study

DKS

ACKNOWLEDGEMENTS

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1.0 Executive Summary

INTRODUCTION

The Woodburn Pedestrian Safety Study is focused on the pedestrian safety performance of OR 214 and OR 99E in Woodburn, Oregon. The goal of this study is to evaluate pedestrian safety along both state highways and recommend enhancements that will improve safety performance.

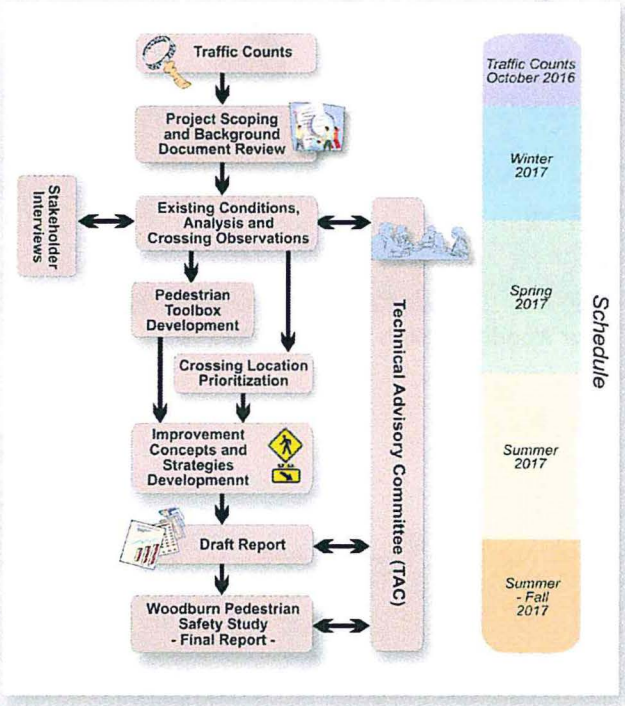
PUBLIC INVOLVEMENT

ODOT managed the Woodburn Pedestrian Safety Study in partnership with the City of Woodburn and DKS Associates. Project stakeholders, including the Woodburn Police Department, Woodburn School District, business owners, and members of the community, provided feedback during the early stages of this project.

Primary direction and input were provided by the Technical Advisory Committee (TAC). This committee directed the study, reviewed methods and findings, and assisted in reaching consensus on project recommendations.

Members of the TAC included agency staff from ODOT, the City of Woodburn, and other key members of the community. Additional public involvement included one-on-one stakeholder interviews, allowing citizens to comment on the overall plan, voice any concerns, and provide suggestions and feedback.

A schematic of the study process is shown to the right.



DATA COLLECTION AND TECHNICAL ANALYSIS

The project team collected data related to vehicle, bicycle, and pedestrian volumes in the study area and conducted field observations during typical day time conditions, peak hours, and nighttime conditions. These field observations focused on driver, cyclist, and pedestrian behaviors as related to crossings. Photos taken during field observations are shown on the following page.

The technical analysis relied on the guidance in NCHRP Report 562 and pedestrian crash history to determine the recommended pedestrian crossing locations and enhancements as well as corridor-wide improvements such as lighting.

Near Bi-Mart Access/Bus Stop on OR 214

Near Safeway Shopping Center on OR 99E

Near Woodburn High School on OR 214

Near Williams Avenue on OR 99E

Near Auto Part Store on OR 99E

At Lincoln Street near Goodwill on OR 99E

PEDESTRIAN TOOLBOX

To assist in the selection of recommended crossing treatments, DKS developed a toolbox of available pedestrian crossing treatments that were considered feasible for the OR 214 and OR 99E corridors. One example strategy, a staggered mid-block crossing, is shown below. See Chapter 3 (Crossing Treatment Toolbox) for the complete list of treatments.

Pedestrian Toolbox Example Treatments (staggered mid-block crossing)

RECOMMENDED PROJECTS

The final recommended projects include enhanced pedestrian crossings, traffic signal improvements, sidewalk infill, and lighting improvements. Planning level cost estimates and conceptual designs were prepared for several of the recommended projects.

Improvements to Existing Crossings

The existing mid-block crossing near the Woodburn High School is currently a marked crosswalk with a raised median. Due to the high pedestrian crossing volumes and concerns with impacts to traffic flow, DKS recommends installing a pedestrian hybrid beacon (PHB). A PHB is used to warn and control traffic to assist pedestrians in crossing a street at a marked crosswalk.

It is designed to require traffic to stop for the pedestrian walk interval (steady red) and to allow traffic movement during the flashing 'don't walk' stage of the pedestrian crossing (flashing red).

New Crossing Locations

Based on pedestrian crossing volumes, pedestrian crash history, adjacent land use, and locations of existing crossings, DKS recommends the installation of new pedestrian crossing locations at five locations along OR 99E. The above criteria were also used to prioritize the crossing improvements, as shown in the table below. More information on the scoring criteria can be found in Chapter 4.

RANK	CROSSING LOCATIONS (ALL ON OR 99E)
1	Near Williams Avenue
2	Between Laurel Avenue and Tomlin Avenue
3	Between Blaine Street and Aztec Drive
4	Near Mt. Jefferson Avenue
5	Near James Street

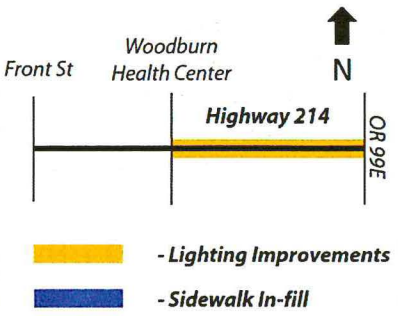
At each of the identified locations, recommended treatments include mid-block crossings with raised median refuge islands, sidewalk infill, and supplemental street lighting.

Chapter 4 (Pedestrian Improvement Design Concepts) discusses the crossing improvements in greater detail and includes conceptual drawings of each crossing. All concepts are subject to project development and the concepts may change based on additional analysis and stakeholder feedback.

A State Traffic-Roadway Engineer approval will be necessary for the implementation of any marked crosswalks or enhancements to existing marked crosswalks such as a PHB or Rapid Rectangular Flashing Beacon (RRFB).

CORRIDOR-WIDE PROJECTS

Corridor-wide safety treatments were also considered along the entire length of the study area corridors. These projects include improved street lighting and sidewalk infill. A schematic of these projects is shown to the right.



COST ESTIMATES

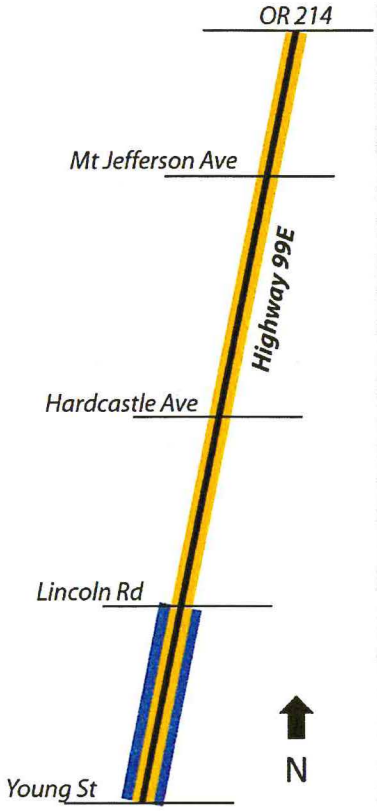
Cost estimates were prepared for each of the recommended improvements. A 20% engineering and construction fee and a 20% contingency were applied individually to the cost estimate for each location.

The total estimated cost is $975,000 for all improvements; $375,000 for the mid-block crosswalks, $150,000 for the PHB near Woodburn High School, and $450,000 for corridor-wide implementation of sidewalk infill and lighting improvements.

Cost Estimates of Proposed Safety Projects

SAFETY IMPROVEMENT	ESTIMATED COST[1]
CROSSING IMPROVEMENT LOCATIONS[2]	
OR 99E near Williams Avenue	$75,000
OR 99E between Laurel Avenue/Tomlin Avenue	$75,000
OR 99E between Blaine Street/Aztec Drive	$75,000
OR 99E near Mt Jefferson Avenue	$75,000
OR 99E near James Street	$75,000
Pedestrian Hybrid Signal (OR 214 at High School)	$150,000
Total Cost for Crossing Improvement Locations	**$525,000**
CORRIDOR-WIDE TREATMENTS	
OR 99E (Lincoln Street to Young Street) Sidewalk Infill	$150,000
Lighting Improvements	$300,000
Total Cost for Corridor-Wide Treatments	**$450,000**
Total Cost for All Improvement	**$975,000**

[1]A 20% engineering and construction fee and a 20% contingency were applied to the cost estimate for each location.
[2]The estimated cost for installing a RRFB at any of the above locations is an additional $40,000.

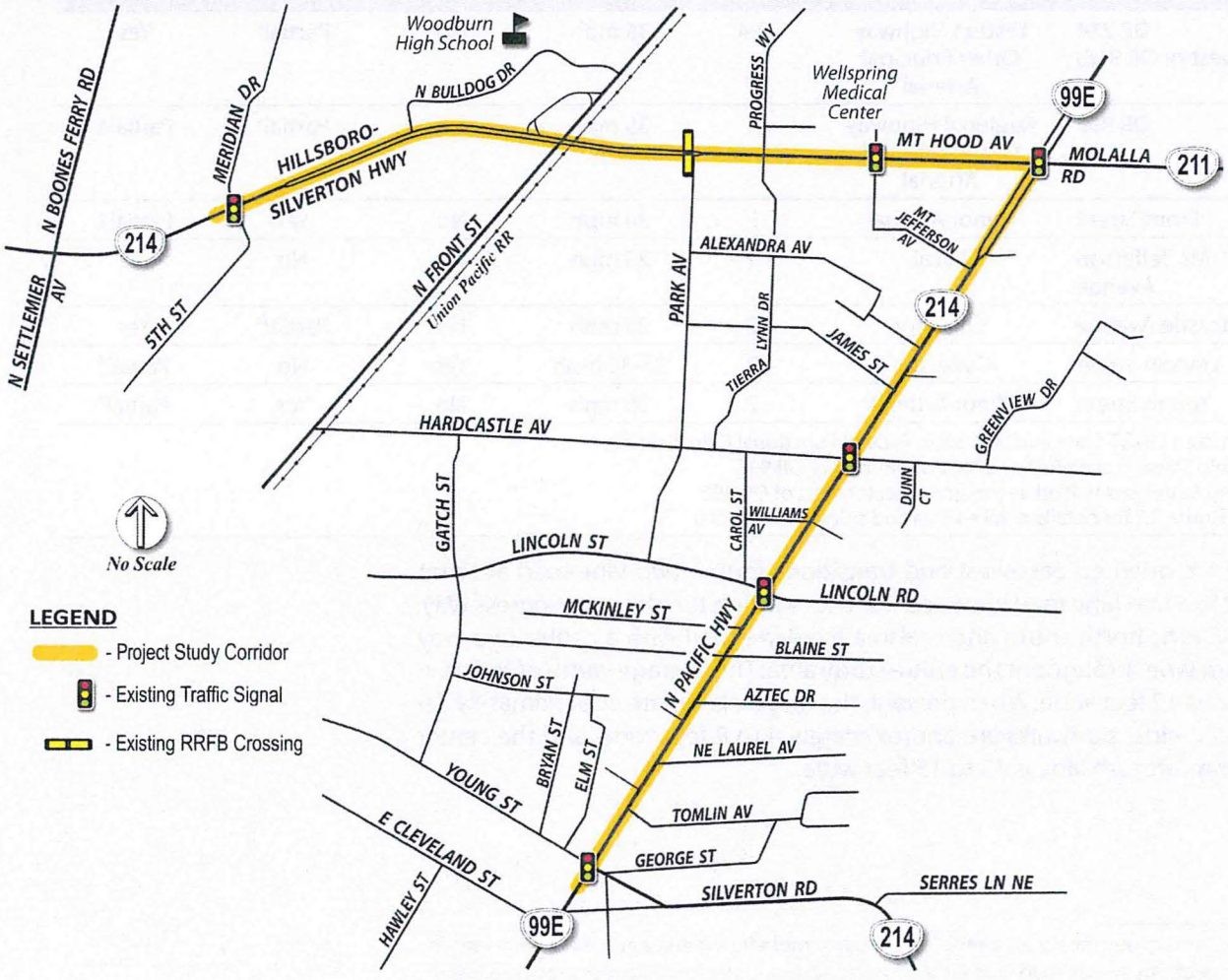


Chapter 5 provides additional information on cost estimates and project prioritization. These resources may be used by ODOT and the City of Woodburn to secure funding for project implementation.

CHAPTER
2.0 Existing Conditions

This section summarizes the existing and expected future conditions for motor vehicles, bicycles, and pedestrian along OR 214 and OR 99E in Woodburn, Oregon. The following section includes an inventory of the transportation system, an evaluation of existing safety performance, existing and future motor vehicles conditions, and a list of high-priority locations identified for further investigation and possible improvements. The study area extents are shown on Figure 2.1.

Figure 2.1: Study Area



TRANSPORTATION SYSTEM INVENTORY

This section summarizes the roadway characteristics for bicycles, pedestrians, and motor vehicles including lane geometry, existing land uses and activity centers, number of travel lanes, pavement and shoulder widths, on street parking, bicycle and pedestrian facility types (locations and widths), posted speeds, traffic control at each study intersection, roadway functional classification, existing deficiencies, and bicycle and pedestrian crossing volumes at each study intersection.

Roadway Inventory

The transportation characteristics of the key study area roadways and cross streets are shown in Table 2.1. The functional classification is a key roadway characteristic because it specifies the purpose of the facility and is a determining factor of applicable cross-section, access spacing, and intersection mobility targets.[13] Key roadways that intersect OR 214 and OR 99E include Front Street, Mt. Jefferson Avenue, Hardcastle Avenue, Lincoln Street, and Young Street.

Table 2.1: Existing Study Area Roadway Characteristics

ROADWAY	ODOT FUNCTIONAL CLASSIFICATION[1]	TRAVEL LANES	POSTED SPEED	ON-STREET PARKING	BIKE LANES	SIDEWALKS
OR 214 (west of OR 99E)	District Highway Other Principal Arterial	2-4	35 mph	No	Partial[4]	Yes
OR 99E	Regional Highway Other Principal Arterial	4	35 mph	No	Partial[4]	Partial4
Front Street	Minor Arterial	2	30 mph	No	Yes	Partial4
Mt. Jefferson Avenue	Local	2	25 mph	Yes	No	Yes
Hardcastle Avenue	Collector	2	25 mph	No	Partial[4]	Yes
Lincoln Street	Collector[2]	2	25-35 mph	Yes	No	Partial[4]
Young Street	Minor Arterial[3]	2	35 mph	No	Yes	Partial[4]

1 Data from ODOT State and Non-state Federal Functional Classification
2 Lincoln Street is classified as a local street east of OR 99E
3 Young Street is classified as a major collector west of OR 99E
4 See Figure 2.2 for details of bike lanes and sidewalk locations

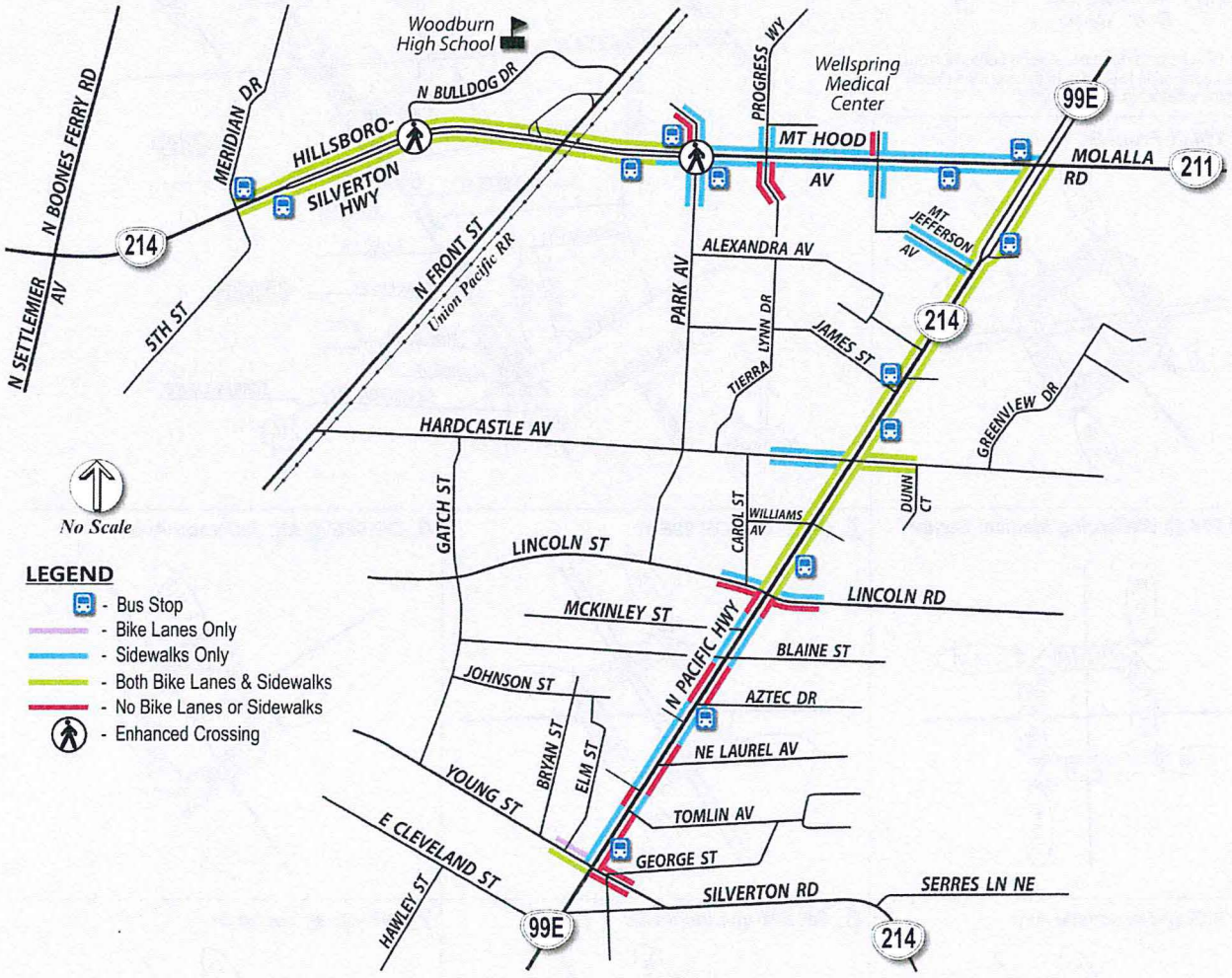
OR 214 is oriented east-west and transitions from a two-lane road at Front Street to a five-lane road with a center two-way left turn lane at Progress Way. OR 99E runs north-south and is also a five-lane road with a center two-way left turn lane throughout the entire study area. The average width of the travel lanes is 12 feet wide. When present, the bicycle lanes are approximately 5.5 to 6 feet wide, sidewalks are approximately 4 to 8 feet wide, and the center two-way left turn lane is 13 to 15 feet wide.

13 The primary purpose of an arterial is to provide mobility, whereas at the opposite end of the spectrum, a local road is designed for site access. Collector roadways provide a transition between arterials and local roads.

Pedestrian and Bicycle Facility Inventory

The existing pedestrian and bicycle facilities are shown on Figure 2.2. Bicycle facilities include designated bicycle lanes along segments of OR 214 and OR 99E. Within the study area, sidewalks are present along OR 214 and most of OR 99E with the exception of the segment between Lincoln Road and Young Street. In this segment, there are no bicycle lanes and the pedestrian facilities include discontinuous sidewalks, widened shoulders, and gravel or dirt paths that are interrupted by obstacles (utility poles, signs, etc.) and driveways.

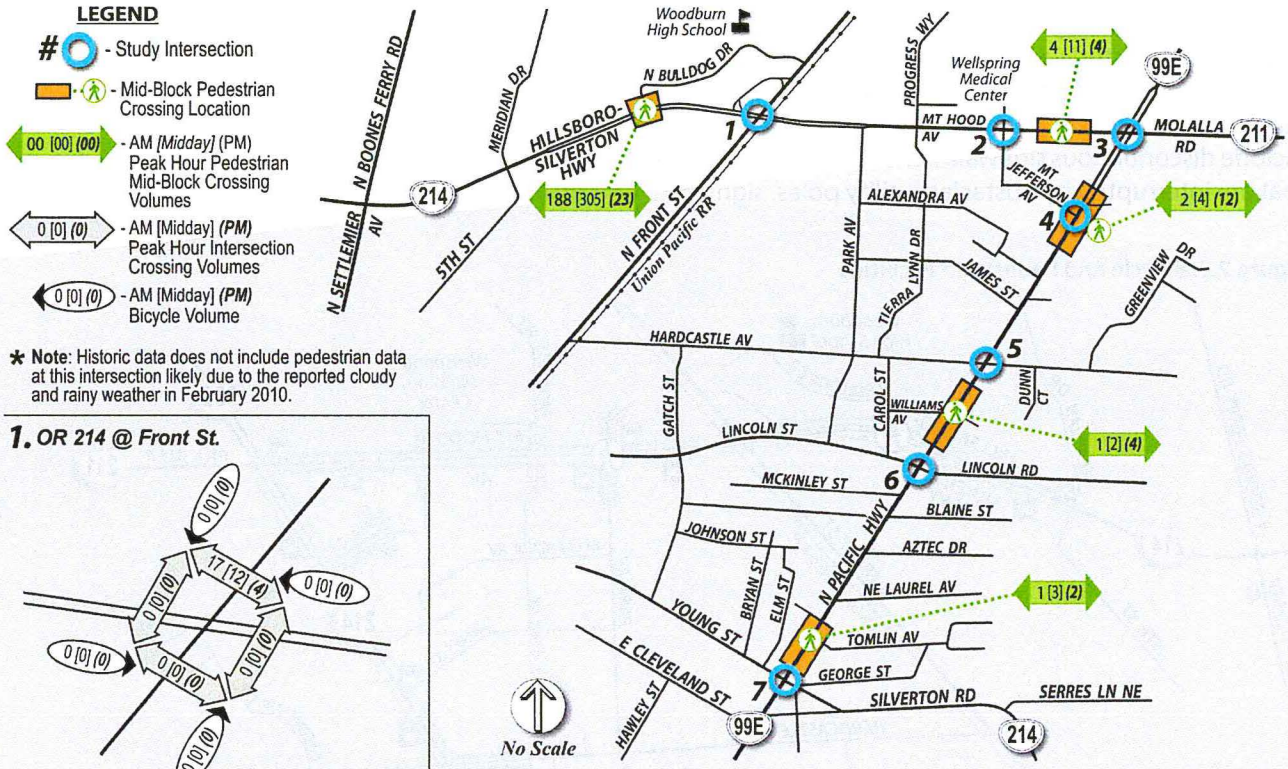
Figure 2.2: Bicycle and Pedestrian Facilities



There are marked crosswalks at all of the signalized intersections in the study area as well as a midblock crossing at the High School at OR 214/Bulldog Drive. At the OR 214/Park Avenue (Wellspring Medical Center) intersection there is a marked crosswalk with a Rectangular Rapid Flashing Beacon (RRFB) and a median refuge island on the west leg of the intersection as well as a marked crosswalk on the north leg. At the OR 214/Front Street intersection there is a marked crosswalk on the north leg of the intersection that also has a median refuge island.

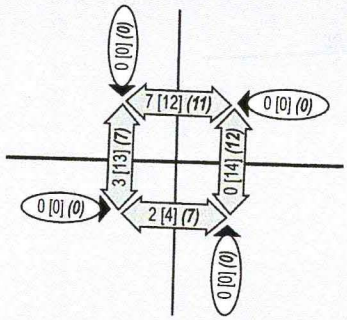
Bicycle and pedestrian counts were collected at each of the study intersections and additional pedestrian midblock crossing counts were collected along key portions of OR 214 and OR 99E. Figure 2.3 on the following page presents bicycle and pedestrian volumes in the study area.

Figure 2.3: Existing Bicycle and Pedestrian Traffic Volumes

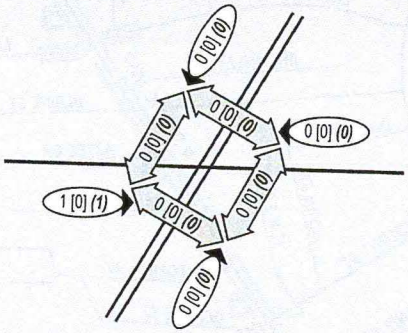


1. OR 214 @ Front St.

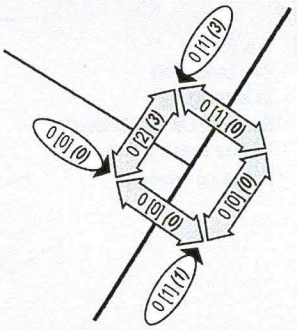
2. OR 214 @ Wellspring Medical Center



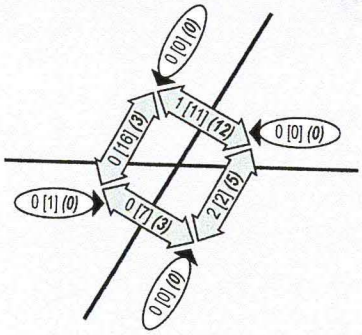
3. OR 214 @ OR 99E *



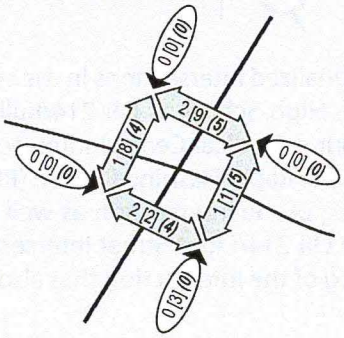
4. OR 99E @ Mt. Jefferson Ave.



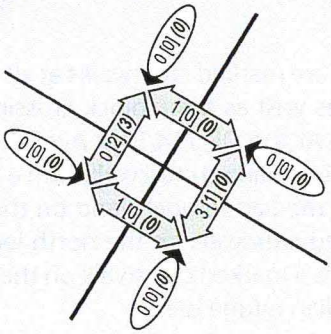
5. OR 99E @ Hardcastle Ave.



6. OR 99E @ Lincoln St.

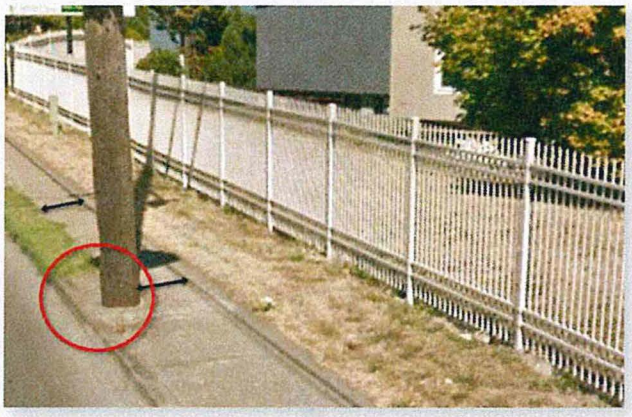


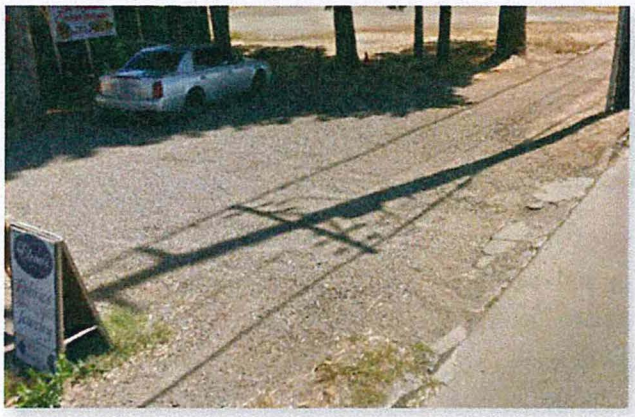
7. OR 99E @ Young St.



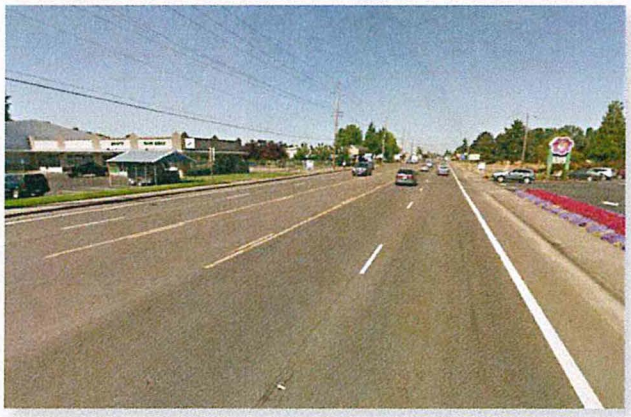
The following photos show some of the existing bicycle and pedestrian conditions along OR 214 and OR 99E.

Along OR 99E near Young Street there are missing sidewalks and during rain events large puddles can form in the travel lanes (left). A pedestrian crossing OR 214 at a midblock location near Wellsprings Medical Center (right).





Obstacles such as utility poles limit the effective width of sidewalks (left) and along OR 99E sidewalk condition is so poor it is essentially a gravel surface (right)



OR 99E Cross section with bike lanes (left) and without bike lanes (right)

SAFETY PERFORMANCE

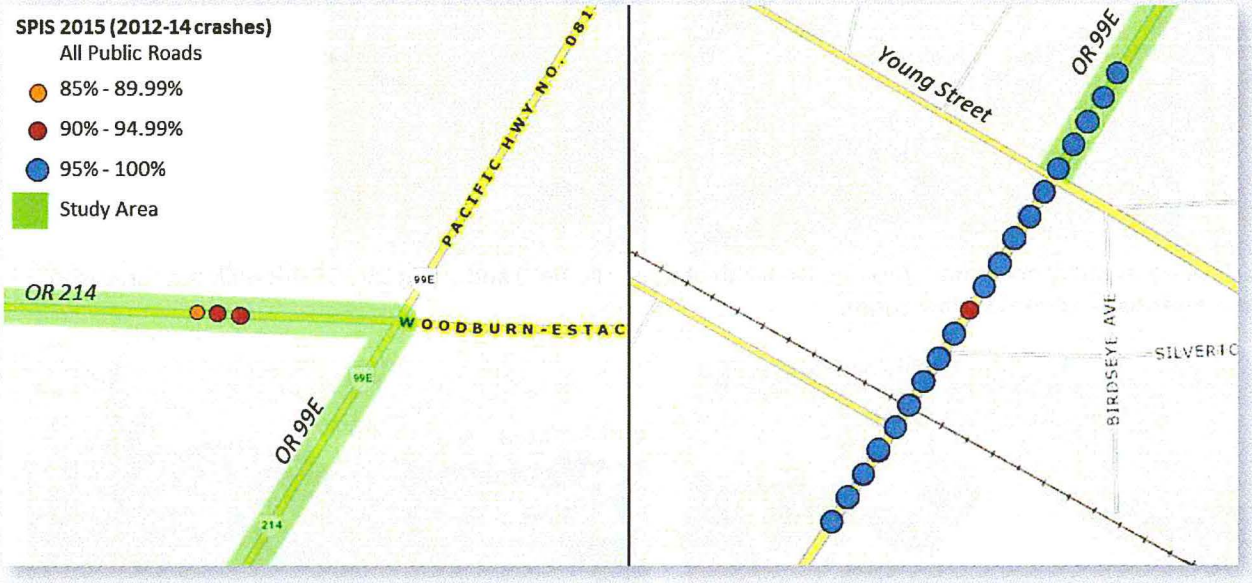
The following sections summarize the collision history along the study corridors including statewide safety locations, the most recent five years of collision data, and the trends specific to pedestrian collisions.

SPIS

The Safety Priority Index System (SPIS) is a ranking system developed by ODOT to identify potential safety problems on state highways. SPIS scores are developed based upon crash frequency, severity, and rate for a 0.10 mile or variable length segment along the state highway over a rolling three-year window (i.e., every year it is updated with the most recent three years). A prioritized list of the top 15% of statewide SPIS sites is created for each region, and the top 5% are investigated further.

Based on crash data from 2012-2014, there were three SPIS locations along OR 214 within the study area, two of which were in the top 10% and one in the top 15%. The southern portion of the OR 99E study segment was also a top 5% SPIS site. Figure 2.4 shows the SPIS locations along OR 214 and OR 99E.

Figure 2.4: 2015 SPIS Locations within the Study Area



ODOT Collision Analysis (2011-2015)

Within the study area, there were a total of 273 collisions between 2011 and 2015. Of those, one resulted in a fatality and 4 resulted in severe injuries. The two most common collision types were rear end (44%) and turning (30%). Table 2.2 shows the breakdown of collision type and severity along each segment and a summary of the collisions along OR 214 and OR 99E.

Table 2.2:
2011 to 2015 Collision Type and Severity on each Highway Segment

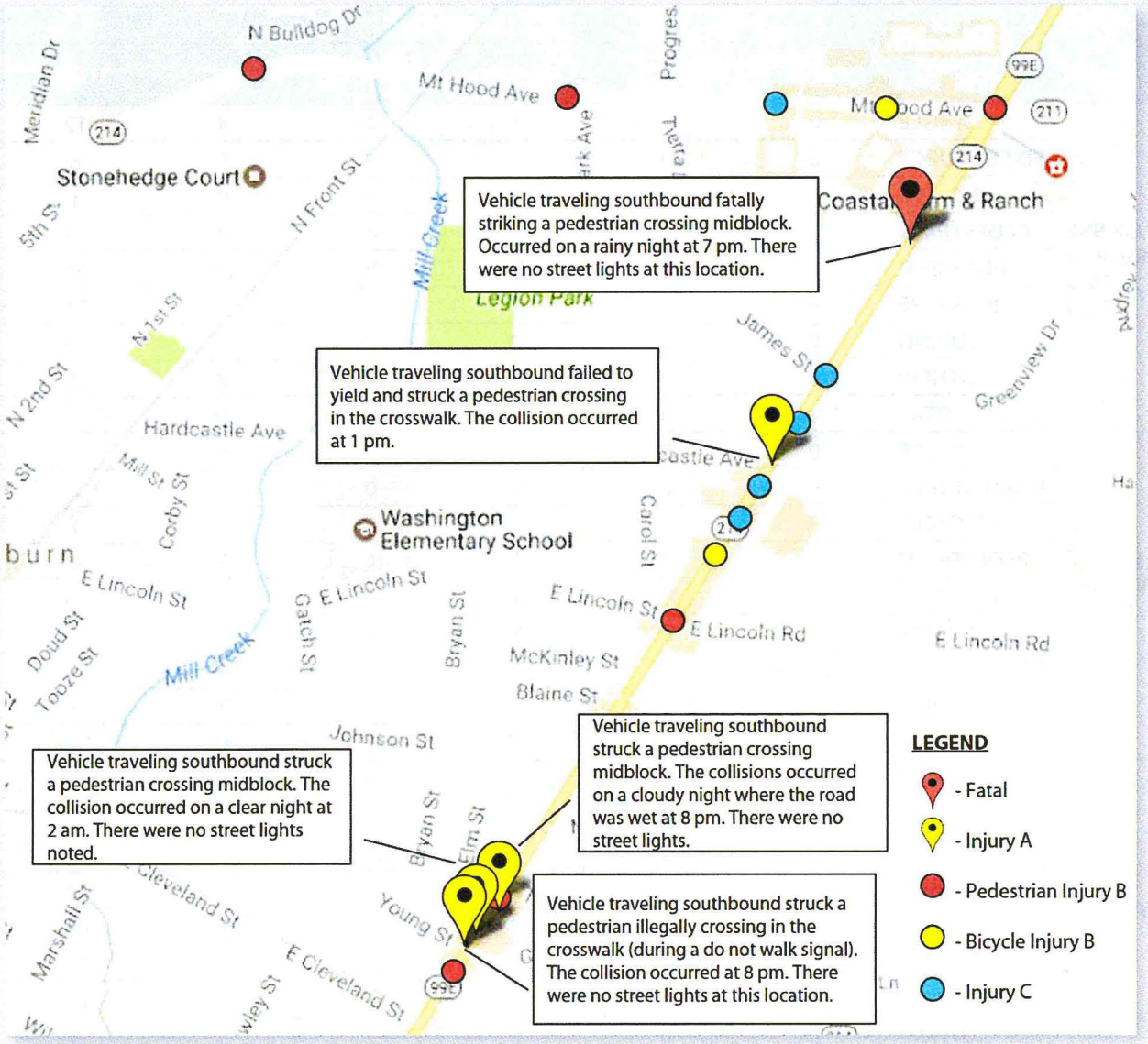
SEGMENT	COLLISION TYPE	COLLISION SEVERITY					
		FATAL	SERIOUS INJURY	INJURY	POSSIBLE INJURY	PDO[1]	TOTAL
OR 99E (Mile point 31.70 to 32.87)	ANGLE	0	0	4	4	4	12
	FIXED OBJECT	0	0	0	3	5	8
	BICYCLE	0	0	1	0	0	1
	PEDESTRIAN	1	4	3	4	0	12
	REAR-END	0	0	6	26	29	61
	SIDESWIPE	0	0	0	4	7	11
	TURING	0	0	11	18	26	55
	OTHER[2]	0	0	1	0	2	3
	TOTAL	1	4	25	59	73	162
OR 214 (Mile point 38.13 to 39.29)	ANGLE	0	0	1	4	6	11
	FIXED OBJECT	0	0	1	0	1	2
	BICYCLE	0	0	1	0	0	1
	PEDESTRIAN	0	0	3	1	0	4
	REAR-END	0	0	5	26	27	58
	SIDESWIPE	0	0	0	1	3	4
	TURING	0	0	7	11	9	27
	OTHER[2]	0	0	0	2	1	3
	TOTAL	0	0	17	45	47	109
Total Study Area	ANGLE	0	0	5	8	10	23
	FIXED OBJECT	0	0	1	3	6	10
	BICYCLE	0	0	2	0	0	2
	PEDESTRIAN	1	4	6	5	0	16
	REAR-END	0	0	11	52	56	119
	SIDESWIPE	0	0	0	5	10	15
	TURING	0	0	18	29	35	82
	OTHER[2]	0	0	1	2	3	6
	TOTAL	1	4	42	104	120	271

[1] Property Damage Only (PDO)
[2] Other collision types include backing, head on, and parked collisions, which accounted for less than 2% of the total collisions.

Bicycle and Pedestrian Collision Trends

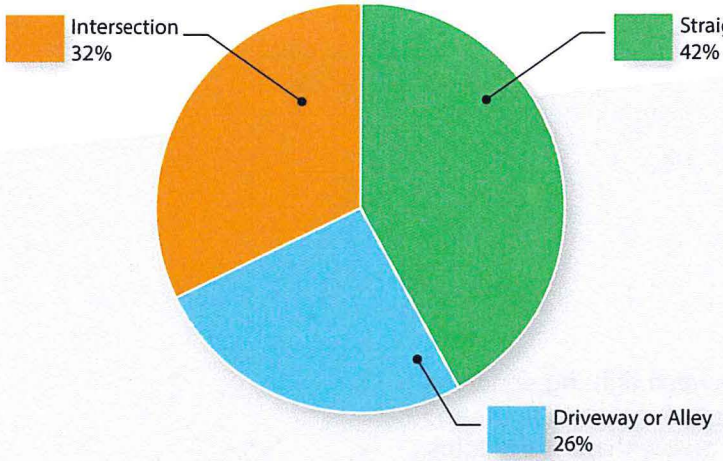
There were two collisions that involved a bicyclist and 16 that involved pedestrians, one of which was a fatal collision as shown in Figure 2.5. A preliminary investigation of the bicycle and pedestrian collision data identified trends in location, roadway and environmental characteristics, and driver/pedestrian behavior that are associated with collisions in the study area. The following graphs and tables summarize the notable trends.

Figure 2.5: Bicycle and Pedestrian Collisions and Descriptions



As shown in Figure 2.6, 42% of bicycle and pedestrian collisions occurred along a straight, mid-block segment and 32% of collisions occurred at an intersection. The remaining collisions occurred at a driveway or alleyway.

Figure 2.6: Percentage of Collisions by Roadway Character



Time of Day and Lighting

Figure 2.7 shows the distribution of collisions by time of day. As shown, reported bicycle and pedestrian crashes occurred in clusters during Midday (10:00 a.m.-3:00 p.m.) and evening (5:00 p.m.-9:00 p.m.) hours.

While time of day is an important consideration, the reported lighting condition can provide further insight as daylight hours shift throughout the year. As shown in Figure 2.8, 53% of bicycle and pedestrian collisions occurred during daylight hours, while 47% occurred during dark conditions, all of which were reported to not have street lighting. In comparison, only 19% of all motor vehicle crashes occurred during dark conditions (with or without street lighting).

Figure 2.7: Number of Collisions by Time of Day

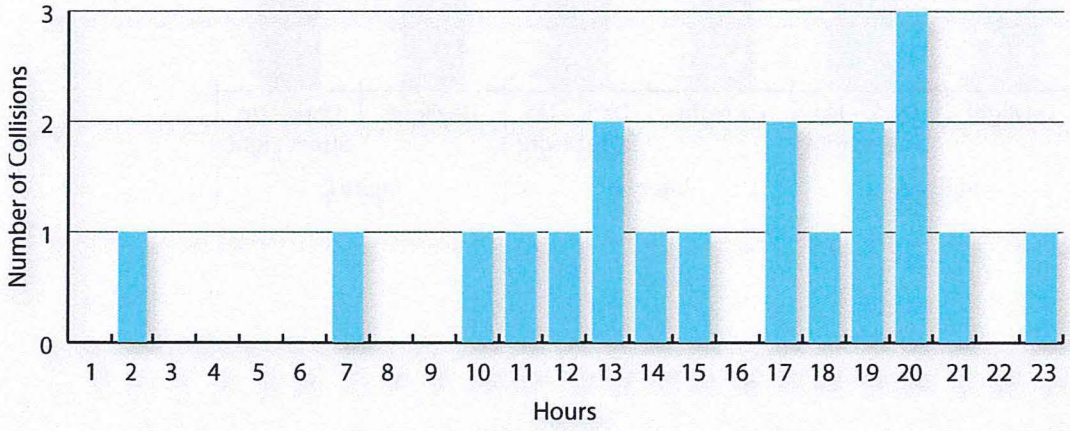


Figure 2.8: Collisions by Lighting Condition

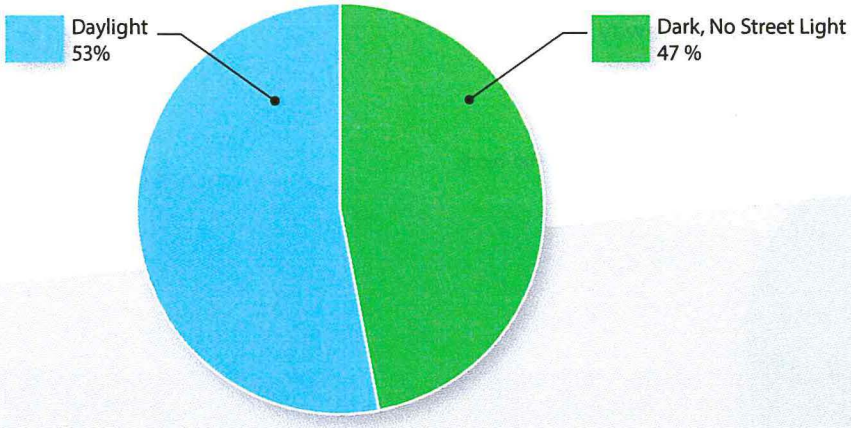
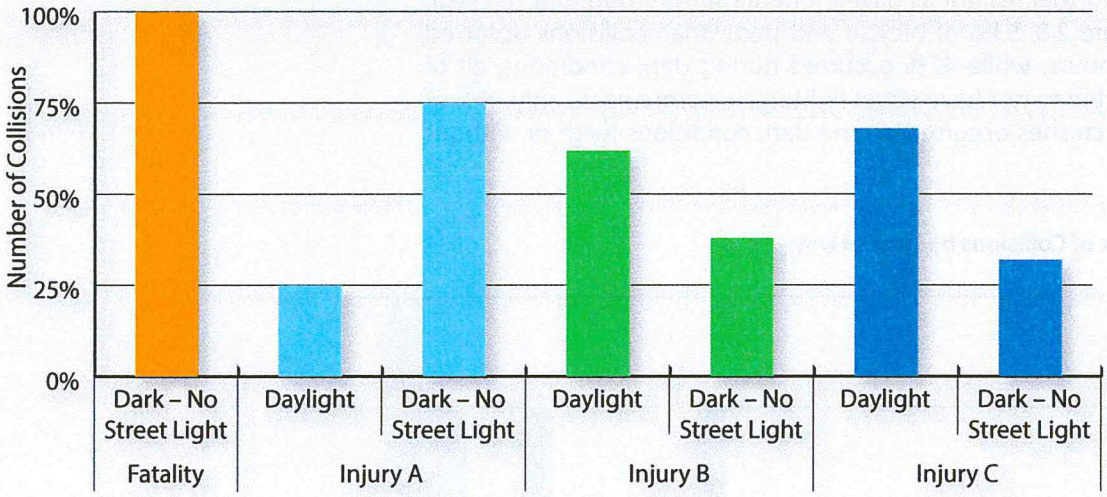


Figure 2.9 further investigates the correlation between lighting condition and crash severity. The fatality occurred in the dark with no street lights and 75% of the serious injury collisions occurred in the dark with no street lights. In other words, fatal and serious injury bicycle and pedestrian collisions are more likely to occur in the dark than during daylight hours, despite lower exposure volumes. It should also be noted that 100% of the nighttime fatal and severe injury motor vehicle collisions during the study period involved a pedestrian.

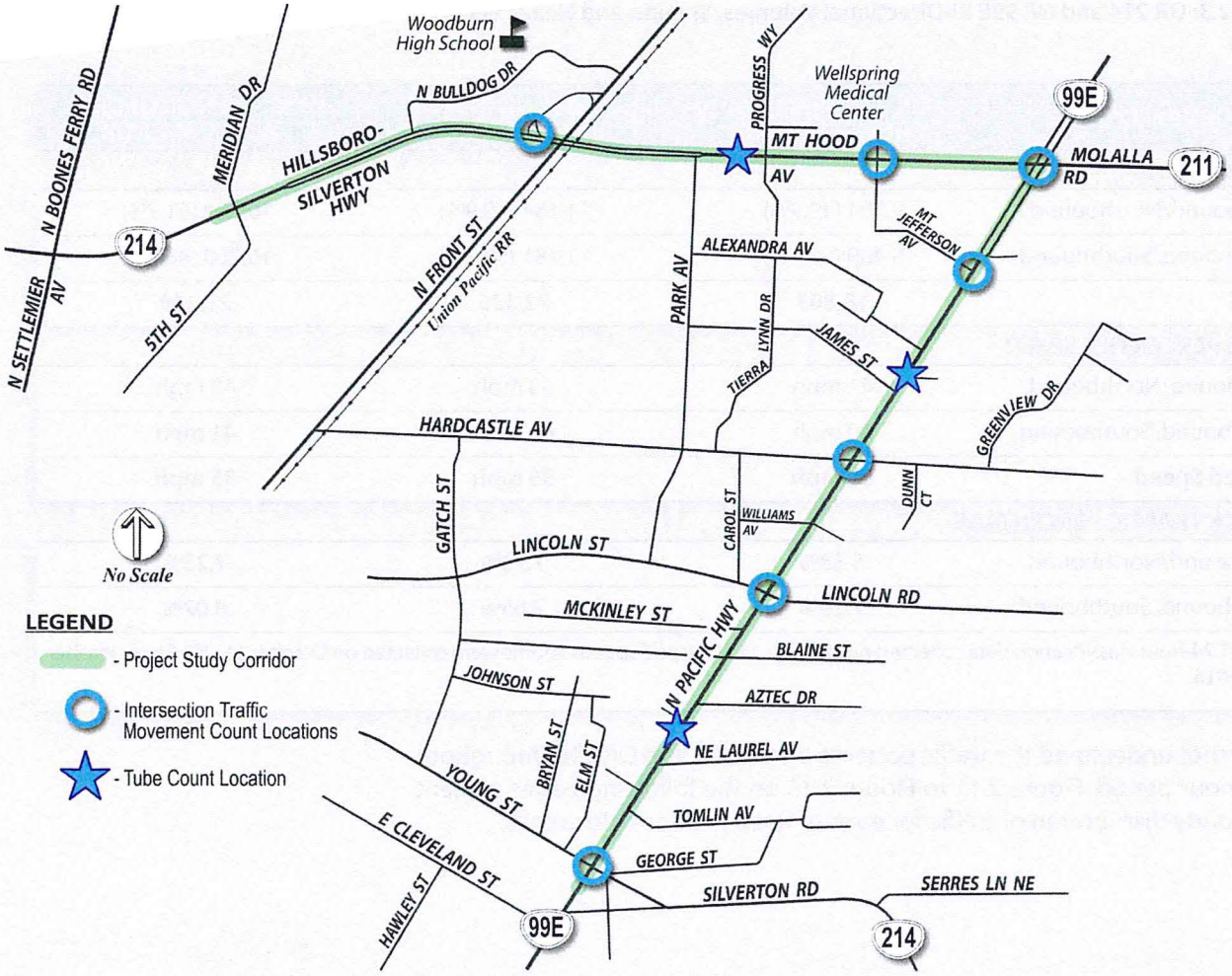
Figure 2.9: Collisions by Severity and Lighting Condition



MOTOR VEHICLE OPERATIONS

Existing traffic conditions were evaluated for the study area which included vehicular volume, speed, heavy vehicle summary, intersection turn movement volumes, existing intersection operations, and future intersection operations. Figure 2.10 shows the locations where data was collected.

Figure 2.10: Data Collection Locations



Vehicle Volume, Speed, and Heavy Vehicle Summary

Table 2.3, below presents the data collected from 24-hour bi-directional tube counts at the three selected location along OR 214 and OR 99E. This data includes vehicular volumes, 85th percentile speed, and the percentage of heavy vehicle traffic. As shown, the travel speeds range from 5 mph to 8 mph above the current posted speed limit. The percentage of truck traffic ranges from 5 percent to 8 percent.

Table 2.3: OR 214 and OR 99E Bi-Directional Volumes, Speeds, and Heavy Vehicle Usage

SURVEYED DATA[1]	OR 214 WEST OF PROGRESS WAY	OR 99E NORTH OF JAMES STREET	OR 99E NORTH OF LAUREL AVENUE
AVERAGE DAILY TRAFFIC			
Eastbound/Northbound	9,394 (49.9%)	11,154 (49.9%)	10,989 (51.7%)
Westbound/Southbound	9,409 (50.1%)	11,181 (50.1%)	10,260 (48.3%)
Total	**18,803**	**22,335**	**21,249**
85TH PERCENTILE SPEED			
Eastbound/Northbound	41 mph	43 mph	40 mph
Westbound/Southbound	40 mph	42 mph	41 mph
Posted Speed	**35 mph**	**35 mph**	**35 mph**
TRUCK TRAFFIC PERCENTAGE			
Eastbound/Northbound	5.35%	7.70%	7.23%
Westbound/Southbound	7.26%	7.65%	8.02%

[1]ODOT 24-hour classification data collected on October 11, 2016 and speeds counts were collected on October 11, 2016 and October 12, 2016.

To further understand the traffic patterns on OR 214 and OR 99E throughout a 24-hour period, Figure 2.11 to Figure 2.13 on the following pages present the hourly distribution of traffic for each of the three count locations.

Figure 2.11: 24-Hour Directional Volumes West of Progress Way on OR 214

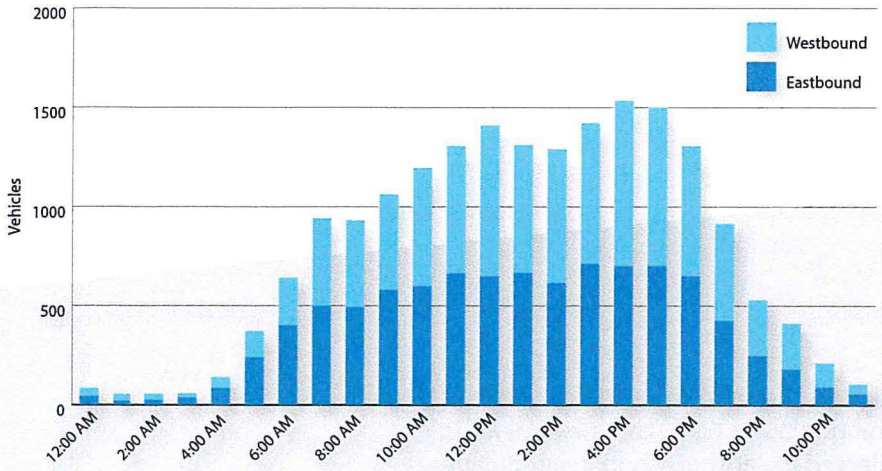


Figure 2.12: 24-Hour Directional Volumes North of James Street on OR 99E

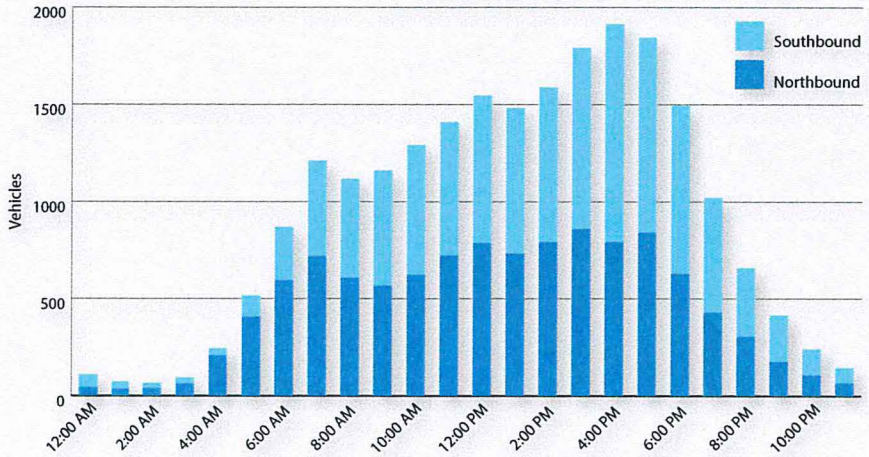
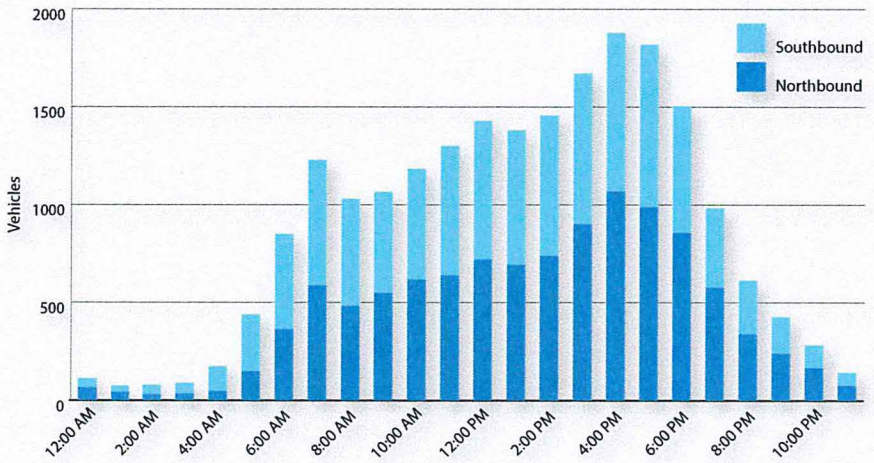


Figure 2.13: 24-Hour Directional Volumes North of Laurel Avenue on OR 99E



As shown in the 24-hour volume figures above, the highest traffic volumes occur consistently between 4:00 p.m. and 6:00 p.m. throughout the study area, which correlates to peak commute times and commercial usage. Although the peak hours occur at the same time of day across all count locations, the peaking characteristics are much more prominent along OR 99E than on OR 214, where volumes are more consistent throughout the day.

Intersection Turn Movement Volumes

Intersection vehicle turn movement volumes were collected at the following seven intersections along the study corridors.

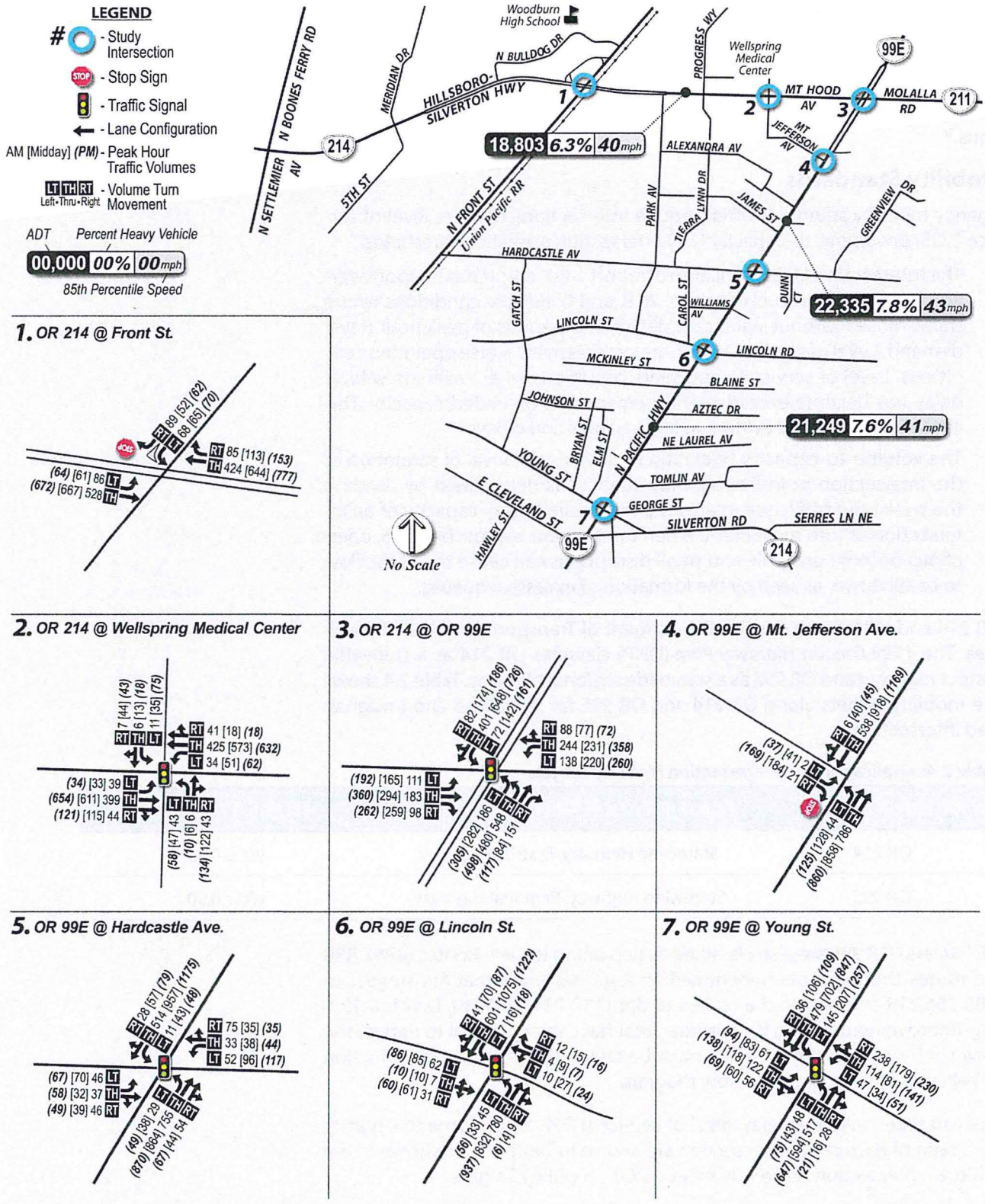
- OR 214/Front Street
- OR 214/Wellspring Medical Center
- OR 214/OR 99E[14]
- OR 99E/Mt. Jefferson Avenue
- OR 99E/Hardcastle Avenue
- OR 99E/Lincoln Street
- OR 99E/Young Street

The traffic volumes were collected during the morning (7:00 to 9:00 a.m.), mid-day (2:00 to 4:00 p.m.) and evening (4:00 to 6:00 p.m.) peak periods.[15] The mid-day traffic volumes were collected to capture school related pedestrian and bicycle volumes. The morning, mid-day, and evening peak hour traffic volumes, lane configurations, and traffic control for the seven study intersections are shown in Figure 2.14.

14 Historical traffic counts from 2010, provided by ODOT, were utilized for this intersection. Turning movement volumes were increased to existing levels based on the adjacent intersection (OR 214/Wellspring Medical Center and OR 99E/Mt Jefferson Avenue) approach volumes collected in October 2016.

15 Turn movement counts taken by Key Data Network on Tuesday, October 11, 2016.

Figure 2.14: Existing Condition Traffic Volumes



Existing Intersection Performance

Existing traffic conditions at the study intersections were analyzed to understand study area traffic operations. The existing AM, Midday, and PM peak hour traffic operations at the study intersections were determined based on the *2000 Highway Capacity Manual* methodology for signalized intersections and *2010 Highway Capacity Manual* methodology for unsignalized intersections.[16]

Mobility Standards

Agency mobility standards often require intersections to meet level of service (LOS) or volume-to-capacity (v/c) intersection operation thresholds.

- The **intersection LOS** is similar to a "report card" rating based upon average vehicle delay. Level of service A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. Level of service D and E are progressively worse operating conditions. Level of service 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.
- The **volume-to-capacity (v/c)** ratio represents the level of saturation of the intersection or individual movement. It is determined by dividing the peak hour traffic volume by the maximum hourly capacity of an intersection or turn movement. When the v/c ratio approaches 0.95, operations become unstable and small disruptions can cause the traffic flow to break down, as seen by the formation of excessive queues.

OR 214 and OR 99E are Oregon Department of Transportation (ODOT) facilities. The *1999 Oregon Highway Plan* (OHP) classifies OR 214 as a statewide district highway and OR 99E as a statewide regional highway. Table 2.4 shows the mobility targets along OR 214 and OR 99E for signalized and unsignalized intersections.

Table 2.4: Applicable Study Intersection Mobility Targets

MAJOR ROADWAY	CLASSIFICATION AND DESIGNATION	MOBILITY TARGET
OR 214	Statewide Highway, District Highway	v/c ≤ 0.95
OR 99E	Statewide Highway, Regional Highway	v/c ≤ 0.90

OR 214 and OR 99E are also classified as Reduction Review Routes (RRR). RRR are routes that have been identified as state highways that are subject to ORS 366.215 and required a review under OAR 731-01-0030, Division 12.[17] Any improvements along these routes that have the potential to impact the travel of heavy vehicles on a RRR must be reviewed using the No Reduction of Vehicle-Carrying Capacity Flow Diagram.

The estimated average delay, level of service (LOS), and volume to capacity (v/c) ratio of each study intersection are shown in Table 2.5. As shown in the table, all intersections currently meet ODOT's Mobility Targets.

16 *Highway Capacity Manual*, Transportation Research Board, Washington DC, 2000 and 2010.

17 *Mobility Procedures Manual*. Oregon Department of Transportation. April 2015.

Table 2.5: 2016 Existing Peak Hour Study Intersection Operating Conditions

INTERSECTION	MOBILITY TARGETS	AM PEAK HOUR			MIDDAY PEAK HOUR			PM PEAK HOUR		
		DELAY	LOS	V/C	DELAY	LOS	V/C	DELAY	LOS	V/C
SIGNALIZED										
OR 214/Woodburn Health Center	0.95	4.7	A	0.27	5.8	A	0.35	6.5	A	0.40
OR 214/OR 99E	0.90	33.8	C	0.69	48.7	D	0.84	53.3	D	0.89
OR 99E/Hardcastle Ave	0.90	10.0	A	0.50	12.0	B	0.56	13.2	B	0.63
OR 99E/Lincoln St	0.90	8.1	A	0.45	10.0	A	0.57	11.3	B	0.65
OR 99E/Young St	0.90	13.2	B	0.47	12.9	B	0.53	15.3	B	0.63
UNSIGNALIZED										
OR 214/Front St	0.90	39.1	A/E	0.64	54.4	A/F	0.65	105.9	A/F	0.90
OR 99E/Mt. Jefferson Ave	0.90	26.5	A/D	0.05	>100	B/F	0.42	>100	B/F	0.83

Signalized Intersections:
Delay = Average Stopped Delay per Vehicle (sec)
v/c = Volume-to-Capacity Ratio of Intersection
LOS = Level of Service of Intersection

Unsignalized intersection:
Delay = Critical Movement Approach Delay (sec.)
v/c = Critical Movement Volume-to-Capacity Ratio
LOS = Major Street LOS/Minor Street LOS

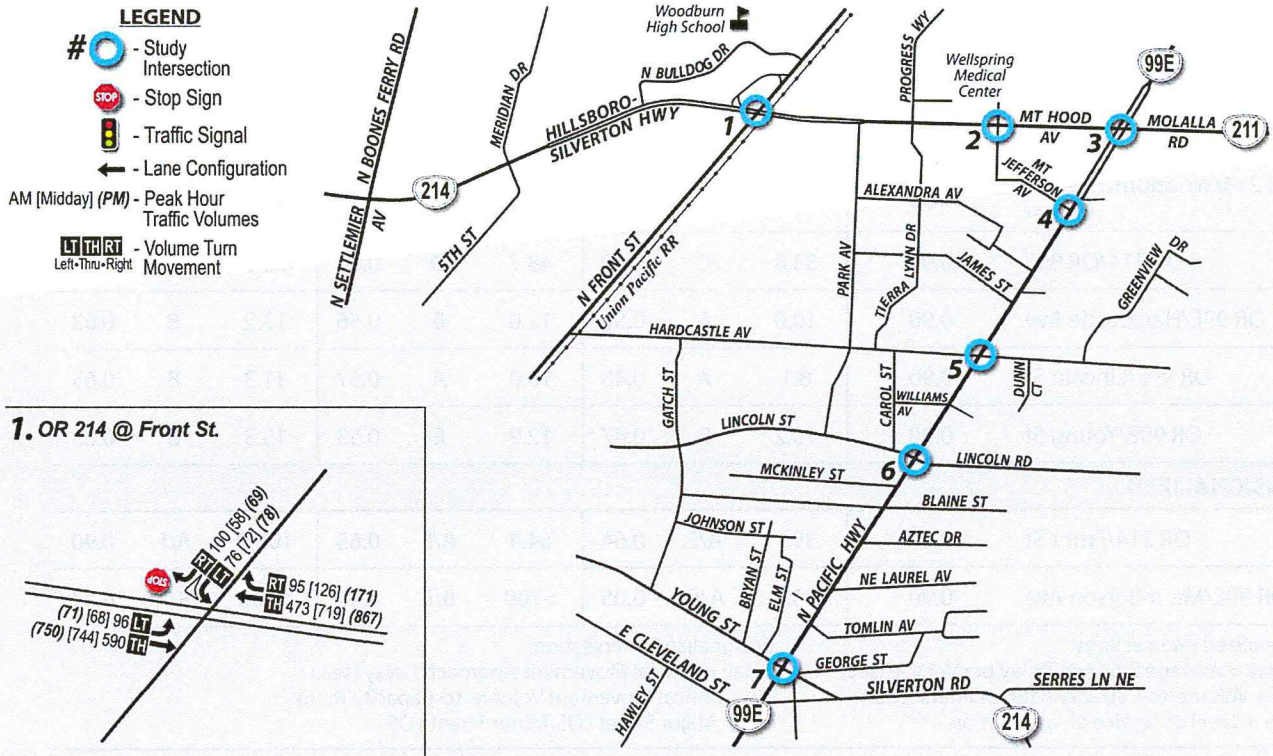
At the unsignalized intersection of OR 214/Front Street, the critical movement is the southbound left turn and at the intersection of OR 99E/Mt. Jefferson Avenue the critical movement is the northbound left turn in the AM peak hour and the eastbound left turn in the Midday and PM peak hour.

Future Intersection Performance

A 20-year growth rate was applied to the study intersections in order to project future transportation growth from 2016 to 2036. The annual growth factor was obtained with direction from the ODOT Analysis Procedures Manual which utilizes ODOT Future Volumes Table[18]. A growth rate of 0.58% per year was applied to traffic volumes along OR 214, while a growth rate of 1.22% per year was applied to volumes along OR 99E. The future AM, Midday, and PM peak hour traffic volumes, lane configurations, and traffic control for the seven study intersections are shown in Figure 2.15.

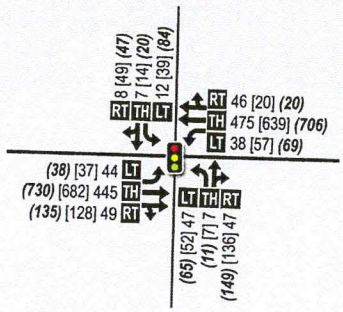
18 The 2035 Future Highway Volume Table is created using data from the Transportation Volume Tables. The future volumes are estimates only and local growth patterns and comprehensive plans may affect the actual outcome.

Figure 2.15: Future Condition Traffic Volumes

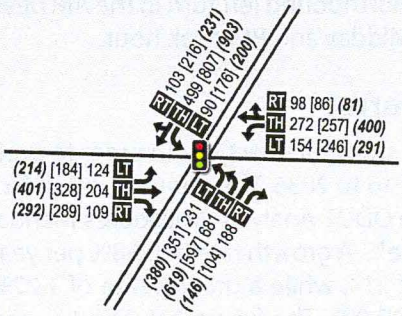


1. OR 214 @ Front St.

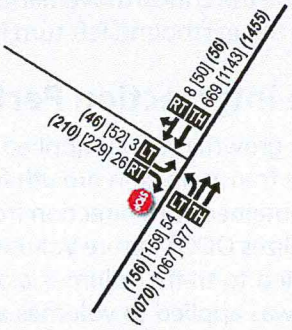
2. OR 214 @ Wellspring Medical Center



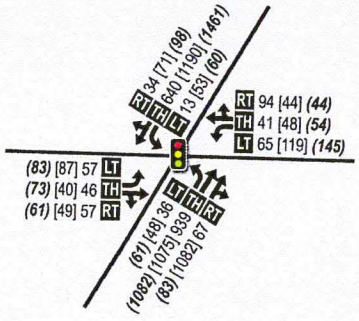
3. OR 214 @ OR 99E



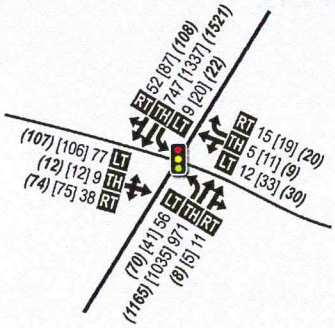
4. OR 99E @ Mt. Jefferson Ave.



5. OR 99E @ Hardcastle Ave.



6. OR 99E @ Lincoln St.



7. OR 99E @ Young St.

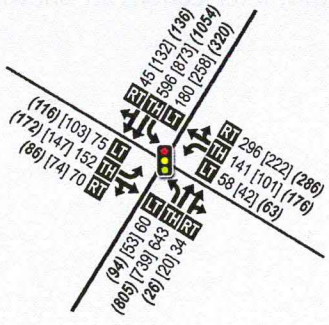


Table 2.6 displays the projected 2036 traffic operations for the study intersections. As shown, the OR 214/OR99E, OR 214/Front Street, and OR 99E/Mt. Jefferson Avenue intersections fail to meet mobility targets during the Midday or PM peak periods.

The unsignalized study intersections are expected to fail in 2036 as a result of heavy through volumes on the highway which provide few gaps for vehicles on the side street to enter the traffic stream. The signalized intersection of OR 214/OR 99E is also expected to fail in 2036 due to increased traffic volumes and limited capacity.

Table 2.6: 2036 Future Peak Hour Study Intersection Operating Conditions

INTERSECTION	MOBILITY TARGETS	AM PEAK HOUR			MIDDAY PEAK HOUR			PM PEAK HOUR		
		DELAY	LOS	V/C	DELAY	LOS	V/C	DELAY	LOS	V/C
SIGNALIZED										
OR 214/Woodburn Health Center	0.95	4.7	A	0.27	6.0	A	0.39	6.8	A	0.44
OR 214/OR 99E	0.90	36.2	D	0.73	57.1	E	0.92	84.7	F	1.06
OR 99E/Hardcastle Ave	0.90	10.4	B	0.54	14.8	B	0.67	23.6	C	0.81
OR 99E/Lincoln St	0.90	9.4	A	0.51	13.3	B	0.71	17.8	B	0.79
OR 99E/Young St	0.90	14.8	B	0.54	15.1	B	0.62	21.6	C	0.77
UNSIGNALIZED										
OR 214/Front St	0.90	48.8	A/E	0.72	>100	A/F	0.97	>100	B/F	1.35
OR 99E/Mt. Jefferson Ave	0.90	9.3	A/D	0.06	>100	B/F	>1.50	>100	C/F	>1.50

Signalized Intersections:
Delay = Average Stopped Delay per Vehicle (sec)
v/c = Volume-to-Capacity Ratio of Intersection
LOS = Level of Service of Intersection

Unsignalized intersection:
Delay = Critical Movement Approach Delay (sec.)
v/c = Critical Movement Volume-to-Capacity Ratio
LOS = Major Street LOS/Minor Street LOS

Bold/Highlighted: Intersection fails to meet mobility targets.

At the unsignalized intersection of OR 214/Front Street, the critical movement is the southbound left turn and at the intersection of OR 99E/Mt. Jefferson Avenue the critical movement is the northbound left turn in the AM peak hour and the eastbound left turn in the Midday and PM peak hour.

STAKEHOLDER FEEDBACK

The project team conducted in-person, phone, and mail (survey) interviews with several stakeholders in the vicinity of the study area. The purpose of the interviews was to gain a better understanding of the safety issues in the area, the concerns of local businesses and employers, the primary generators of pedestrian traffic, and ideas for improvements.

The following stakeholders participated in the interviews.

- Woodburn High School
- Woodburn Police Department
- Legacy Health/Wellspring Medical Center
- Al's Garden Center
- Woodburn Inn

The following stakeholders were invited but did not participate in the interviews.

- Salud Medical Center
- Bi-Mart
- Coastal Farm & Home
- Assembly Hall of Jehovah's Witnesses
- Abby's Pizza
- The End Zone Bar & Grill
- Woodburn Bowl
- Budget Inn
- Woodburn Inn

Table 2.7 summarizes the feedback received from the participating stakeholders.

Table 2.7: Summary of Stakeholder Feedback

QUESTION	RESPONSES
Do you have any general safety concerns along the study corridors?	▪ The southern end the OR 99E corridor is dark. ▪ There are pavement (potholes) and drainage (standing water) issues on the southern end of the OR 99E corridor, particularly in the outside lanes. ▪ The pavement condition on OR 214 is poor. ▪ There are a lot of heavy vehicles on OR 214 and Front Street due to the nearby garbage facility. ▪ The new Red Light Running Camera at OR 214/OR 211/OR 99E is terrible. People drive more aggressively and speed through the intersection to beat the light.
Are there any specific intersections, crossings, or other locations that you feel are unsafe? Why?	▪ The marked crossing in front of the high school is currently staffed to help "platoon" pedestrians and limit the impact on traffic. The school district would support a PHB or RRFB and would prefer not to staff the crossing if other means can do the job. ▪ The Front Street loop ramp and terminal intersection near the High School are not pedestrian-friendly. Many students walk along/across this area to get to the main school entrance on Front Street.
Where do you observe the highest volume of pedestrians?	▪ The business near James Street on OR 214 draws a lot of pedestrians that tend to bypass the signal and cross mid-block. ▪ Very few pedestrians attempt to cross during peak traffic hours. ▪ A large portion of the High School students live in the residential area south of OR 214. There is no convenient and safe route for them to get to/from the school because there are no pedestrian facilities on the Front Street bridge over OR 214. ▪ Between Laurel Avenue and Young Street, there are several bars and restaurants that have limited parking – patrons tend to park on the opposite side of the street.
Are there any locations where you (or your employees/ coworkers/customers) want to cross the highway but feel unsafe doing so?	▪ Most people drive; very few walk anywhere, partly due to feeling unsafe, but mostly just for convenience purposes.
Do you have any suggestions for safety improvements?	▪ Construct a pedestrian bridge over OR 214 in front of the High School. ▪ The widening/improvements to OR 99E that ended at Lincoln St should be extended south to Young Street. ▪ Improve lighting along the entire corridor. ▪ Install "active" warnings for crossings; static signs and markings do little to make drivers yield/stop.

HIGH PRIORITY LOCATIONS

Based on the previously discussed transportation system performance and stakeholder feedback, the locations shown in Table 2.8 were identified as high-priority locations and were the focus of field observations.

Table 2.8: High Priority Locations

LOCATION	NOTABLE CHARACTERISTICS	FIELD OBSERVATION DETAILS
OR 214		
Progress Way to OR 99E	▪ 2 injury pedestrian crashes, 1 injury bicycle crash ▪ Dense commercial uses on both sides of street and transit stops encourage pedestrian crossings	Daytime Observations (11:30 a.m.-1:00 p.m., 4:30-6:00 p.m.)
Near Bulldog Drive and Front Street Ramp	▪ 1 injury pedestrian crash ▪ Very high volume of vulnerable pedestrians ▪ Limited facilities along Front Street	Daytime Observations consistent with school start and end times (7:00-8:00 a.m., 2:00-3:30 p.m.)
OR 99E		
Laurel Avenue to Young Street	▪ 3 serious injury pedestrian crashes occurring at night ▪ Restaurants, markets, and neighborhoods create pedestrian demand in an area with limited facilities	Daytime and Nighttime Observations (4:30-6:30 p.m., 9:00-10:00 p.m.)
James Street to Lincoln Street	▪ 1 serious injury, 2 injury, and 5 possible injury pedestrian crashes ▪ Mixed land use (restaurants, bars, stores) draws pedestrian traffic	Daytime and Nighttime Observations (4:30-6:30 p.m., 9:00-10:00 p.m.)
Near Mt Jefferson Avenue	▪ 1 fatal pedestrian crash at night, in the rain, at midblock location	Daytime and Nighttime Observations (4:30-6:30 p.m., 9:00-10:00 p.m.)

Field Observation

Field observations were conducted on Tuesday, April 4th and Monday, April 10th by DKS Staff at or near the locations in Table 2.8. The weather on both days was in the low to mid 60s with some clouds and occasional drizzle on April 4th. Additional night time observations were conducted on Wednesday, May 17th when the weather was clear.

Woodburn High School near Bulldog Dr. & Front St. Ramp

Observations were conducted during the afternoon release students. At the crossing location on OR 214, it was observed that when a single student crossed without a staff member present, the drivers did not always yield to the pedestrian. However, due to the large number of students that cross at this location, the school has volunteers that wear safety vests and instruct the students to wait, stay back from the road, and cross in groups when there is little to no traffic in the closest lane (eastbound). This improves the number of drivers who yielded to pedestrians, however there were still at least two observed distracted drivers who did not yield even though the students were just about to cross and had stepped into the bike lane.

Group of students crossing at Highway 214 after school (left) and group of students waiting to cross as a group as directed by the school staff member (right).

The vehicles exiting the school at this location use the time that students cross as a gap to turn onto OR 214. Of the students that cross, approximately 70 to 75% continue west and 25 to 30% continue east.

On the east side of the school, several students (approximately 25) walked towards Front Street where half used the bridge to cross OR 214 southbound and the other half used the Front Street "ramp" to cross under the bridge along OR 214 eastbound. There is a dirt path that has been created through the grass just south of Front Street from where the students walk.

Students leaving towards Front Street (left) and students taking dirt path from Front Street to Highway 214 (right)

Vehicle delay at the Front Street intersection during the pm peak was, on average, 2 to 3 minutes for southbound vehicles.

OR 214 near Woodburn Health Center

Observations were conducted during the lunch hour and the p.m. peak period along OR 214 from OR 99E to approximately 500 feet west of the OR 214/Woodburn Health Center signalized intersection. It was observed that one family crossed midblock to wait at the bus stop in the afternoon period. There were no pedestrians observed crossing at a midblock locations during the p.m. peak, however some used the traffic signals to cross and the majority of pedestrian were already on the south side of OR 214 to use the bus stop.

Family crossing midblock (left) and children crossing at Woodburn Health Center (right)

During observations, a Woodburn Transit bus dropped-off/picked up passengers and a Canby Area Transit (see photo below) van/bus used the parking lot south of the bus stop to also drop-off and pick up passengers.

Pedestrians waiting to board Canby Area Transit in Bi-Mart Parking Lot (left) or waiting to board Woodburn Transit (right)

During the p.m. peak, the queues from the OR 99E signal reached the bus stop twice and were typically as far back as the Oil Can Henry's shop.

OR 99E near Mt Jefferson Avenue

Observations were conducted during the lunch hour and p.m. peak period. It was observed that one cyclist and one pedestrian crossed near the entrance to Safeway during the midday period. The pedestrian used the median to wait for a safe gap in vehicle to complete crossing. During the p.m. peak period there were two pedestrian that crossed near the entrance to Safeway. One pedestrian did not hesitate to cross while the other had to wait for a safe gap to cross and used the median to wait for a second safe gap.

Pedestrians crossing midblock near entrance to Safeway using median as refuge

OR 99E near James Street

Observations were conducted during the p.m. peak period. During this time, there was one observed midblock crossing near Abby's pizza where a pedestrian darted in front of traffic queued for the traffic signal at Hardcastle Avenue.

OR 99E near Young Street

Observations were conducted during the p.m. peak period. During this time, there was one observed midblock crossings near the Collision Repair Center. At the OR 99E/Young Street intersection, vehicles turning right would cross in front of pedestrians crossing from the far side. There were a few close calls between vehicles along this segment turning to/from the many driveways.

OR 99E near Lincoln Street

Observations were conducted during the p.m. peak period. During this time there were two "close" calls of pedestrians crossing near the Goodwill parking lot. There were several pedestrians in the areas, the majority of which traveled along the east side of OR 99E. Many pedestrians used the Key Bank parking lot or 7-Eleven parking lots to "cut through" instead of going to use the traffic signal and sidewalks.

Pedestrian crossing midblock just north of Lincoln Street

Night Observations

Night observations were conducted on Wednesday May 17, 2017 from approximately 8:45 pm to 10:00pm. It was observed that lighting along OR 214 was sufficient for the majority of the highway; however, from the Front Street bridge to the Woodburn Health Center light could be improved. Along OR 99E, the lighting is not sufficient for an urban area and a corridor wide lighting improvement would increase the safety of pedestrians.

NCHRP Results

NCHRP Report 562 provides guidance and considerations for installing pedestrian crossing treatments at unsignalized intersections; in all cases, engineering judgment should be used in selecting a specific treatment for installation. Recommendations range from a proposed signal or enhanced/activated crossing treatments to considering a raised median island or curb extensions. The NCHRP general recommendations for the potential midblock crossing locations along OR 214 and OR 99E are summarized in Table 2.9. The complete worksheets can be found in the appendix.

Table 2.9: NCHRP Crossing Treatment Recommendations

LOCATION	RECOMMENDED CROSSING TREATMENT
OR 214 near Woodburn High School	Signal – Rapid Rectangular Flashing Beacon (RRFB) or Pedestrian Hybrid Beacon (PHB).
OR 99E near Mt. Jefferson Avenue	Consider raised median islands, curb extensions, traffic calming, etc. as feasible.
OR 99E near James Street	Consider raised median islands, curb extensions, traffic calming, etc. as feasible.
OR 99E near Williams Avenue	Consider raised median islands, curb extensions, traffic calming, etc. as feasible.
OR 99E between Blaine Street and Aztec Drive	Consider raised median islands, curb extensions, traffic calming, etc. as feasible.
OR 99E between Laurel Avenue and Tomlin Avenue	Consider raised median islands, curb extensions, traffic calming, etc. as feasible.

CHAPTER 3.0

Crossing Treatment Toolbox

This section summarizes several potential pedestrian crossing enhancements which can be applied to crossing locations along the OR 214 and OR 99E corridors in Woodburn, Oregon. Each crossing location should be reviewed to determine the appropriate combination and application of treatments.[13] The toolbox includes the following treatment options:

- Median Refuge Islands and Curb Extensions
- Rectangular Rapid Flashing Beacon (RRFB) with Raised Median
- Pedestrian Hybrid Beacon (PHB)
- Overhead Flashing Beacons (Standard and RRFB)
- Street Lighting
- Transit Stop Improvements
- Access Management

Cost Estimates

The cost estimates listed with each crossing enhancement are planning level cost estimates based on comparisons to similar, constructed projects. Cost estimates are listed per pedestrian crossing and where possible show the estimated Project Engineering (PE) and Construction Engineering (CE) costs.

Improvements not Included

Items which were considered but left out of the Pedestrian Toolbox include:

- **Traffic Calming Measures:** These measures (i.e. speed humps, narrow lanes) are not consistent with the 'arterial' and 'truck route' classifications of OR 214 and OR 99E and emergency services needs.
- **Lowering Speed Limit:** The speed limit is determined by roadway characteristics and the 85th percentile speed of traffic. Studies show that 'artificially' lowering the speed of a roadway is ineffective at garnering driver compliance. However, some of the other improvements may calm traffic and result in lower travel speeds. Therefore, after other projects have been implemented, future speed limit lowering investigation can be performed to see if lowering the speed is justified.
- **In-Roadway Lighting:** These are highly susceptible to roadway damage (especially snow plows), cost intensive for both installation and maintenance, and are not approved by ODOT for use on state highways.
- **Grade-Separated Pedestrian Crossing (i.e., Pedestrian Bridge or Tunnel):** This measure would be very expensive and require significant right of way to address ADA needs. In addition, such crossings are not always used by pedestrians.

13 All marked crosswalks on the state highway system require State Traffic-Roadway Engineer approval.

Median Refuge Islands And Curb Extensions

Median refuge islands are raised curbs that provide a clear pedestrian area that are placed in the center of the roadway and separate opposing lanes of traffic. They can have a staggered or straight pedestrian cut-through or path configuration. Curb extensions are protracted corner curbs that can be utilized for both signalized and unsignalized intersections and mid-block locations.

Objective

Median refuge islands provide a sheltered place (vertical deflection) in the median where pedestrians can wait for gaps in traffic. They also allow a two-stage crossing to occur where the pedestrian clears one direction of travel movement at a time on two-way streets. A refuge island with a staggered pedestrian cut-through or path requires the pedestrian to turn towards on-coming traffic before crossing, which encourages the pedestrian to look at the on-coming traffic. Curb extensions and median refuge islands provide pedestrians with shorter crosswalk travel length and improve the visibility of pedestrian when on-street parking is present. They also reduce vehicle lane width, thus, vehicle speeds are often reduced as well.

Advantages

- Allows pedestrians to cross one direction of traffic at a time
- Provides a protected area for pedestrians
- Reduces the size of individual gaps needed to make a safe crossing
- Provide a better view of oncoming traffic when using a staggered cut-through path
- Contributes to traffic calming

Disadvantages

- Added obstruction in roadway
- May need additional ROW to meet ADA requirements for ramps by sidewalks.
- Medians can conflict with left turn access to private driveways and public streets
- Curb extensions can adversely affect bicycle mobility; special considerations should be taken when designing these in conjunction with bicycle facilities.

Estimated Cost

- $30,000 per crossing with median refuge island (PE/CE: $8,000).
- $12,000 per curb extension (PE/CE: $2,500).

Rectangular Rapid Flashing Beacon (RRFB) With Raised Median

The Rectangular Rapid Flashing Beacon (RRFB) is a special LED flashing device installed below a crosswalk sign and placed at marked, unsignalized crosswalk locations.[15] The RRFB is pedestrian actuated with either hardwired or wireless pushbuttons. It can also be wireless and solar powered, which would make for easier installation (though monetary cost would be approximately equal due to higher equipment cost).

Objective

The RRFB increases pedestrian visibility by attracting driver attention with the flashing beacons and making them aware of the pedestrian's presence. Studies to date have shown driver stopping compliance rates around 80% when not paired with a median, but upwards of 88% to 90% when paired with a median.

Advantages

- High motorist compliance, while yielding low rear-end resulting vehicle crashes
- Improves pedestrian visibility and safety
- Allows for normal traffic flow when not actuated
- Solar or AC power capable
- Lower installation cost as compared to traffic signal pole type installations

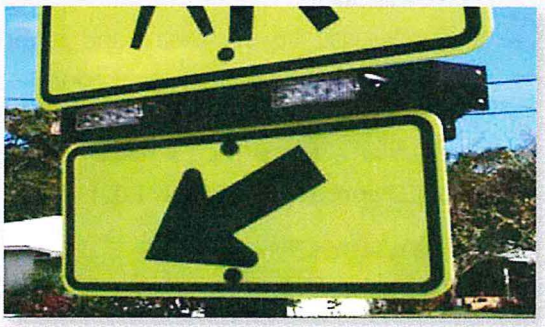
Disadvantages

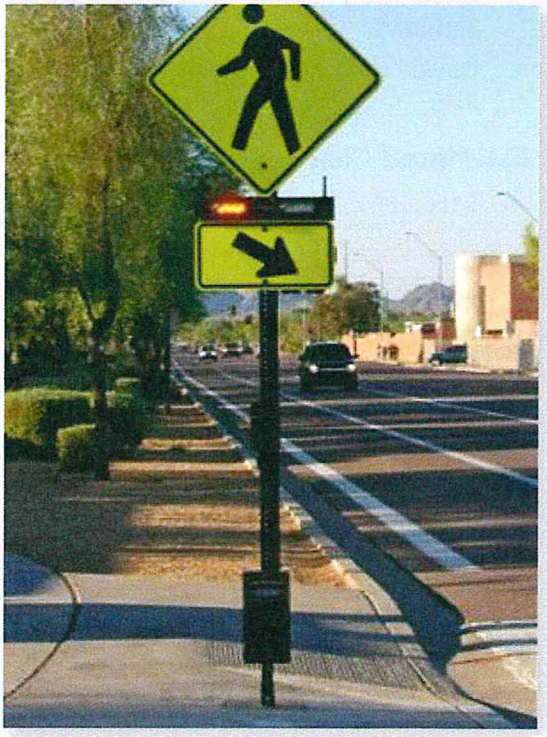
- Interim approval status with FHWA
- Larger roadways can make curb-side signing less obvious to motorists
- Does not provide a 'red' condition which requires vehicles to stop
- Can have a 'dimming' effect when power is low

Estimated Cost

$62,000 per crossing; includes installation of raised median ($30,000) and four sign assemblies ($8,000 each), which include RRFBs, solar panels, and wireless system. Note: only two sign assemblies are needed if no median is installed (PE/CE: $16,500).

14





14 Pictures from Manual on Uniform Traffic Control Devices (MUTCD) website, http://mutcd.fhwa.dot.gov/, 6/16/2010.

15 RRFBs on the state highway system require State Traffic-Roadway Engineer approval.

Pedestrian Hybrid Beacon (PHB)

A pedestrian hybrid beacon (PHB), also known as a High Intensity Activated Crosswalk (HAWK), uses a Yellow-Red lens configuration (two red lens on top and yellow lens on bottom) to provide a signalized, mid-block pedestrian crossing.[16] The PHB is used to warn and control traffic to assist pedestrians in crossing a street at a marked crosswalk.

Objective

The PHB is designed to require traffic to stop for the pedestrian walk interval (steady red) and to allow traffic movement during the flashing 'don't walk' stage of the pedestrian crossing (flashing red) if the pedestrians have cleared. The PHB also provides flashing yellow and solid yellow warning indication to traffic that indicates the upcoming 'walk' stage/steady red. NCHRP Report 562 documented compliance for this type of beacon crosswalk at upwards of 90%.[17]

Advantages

- Provides a 'red' condition which requires vehicles to stop for pedestrians
- Can be installed at locations that do not meet typical traffic signal volume warrants
- Improves visibility of crossing and pedestrians
- Gives drivers an indication that conditions are changing with a flashing yellow and steady yellow indication, and provides a clearance interval
- Pedestrian actuated, not active all of the time
- MUTCD approved (Section 4F.02)

Disadvantages

- High installation and maintenance costs
- Drivers may stop for 'dark' signal, when PHB is not actuated.
- Device is new and drivers are unfamiliar with the PHB.

Estimated Cost

- $150,000 per crossing (PE/CE: $30,000).

16 HAWKs on the state highway system require MUTCD warrant analysis and State Traffic-Roadway Engineer approval.
17 NCHRP 562, pg. 17.

Overhead Flashing Beacons

Overhead flashing beacons are flashing amber beacons installed on traffic signal poles and mast arms along with overhead signs. Warning signs are typically placed in advance of the marked crosswalk or on signs located adjacent to the crosswalk entry. The flashing beacons can be programmed to either operate continuously or be pedestrian actuated. A continuously flashing beacon requires Region Traffic-Roadway Engineer approval while a pedestrian actuated flashing beacon requires State Traffic-Roadway Engineer approval. Recent proposals to the Federal Highway Administration (FHWA) for overhead installations have included the use of RRFB on the mast arm, in lieu of the standard flashing amber beacon. While this was approved for experimental use by FHWA at a crossing in the State of Washington, it has not been implemented in the field to date.

Objective

Overhead flashers are used to increase driver awareness when approaching a marked crosswalk at an uncontrolled location. NCHRP 562 documented wide ranging vehicle yielding compliance for these types of beacons. Compliance was generally higher when some form of pedestrian actuation was used in conjunction with the overhead flashing beacon installation.

Advantages

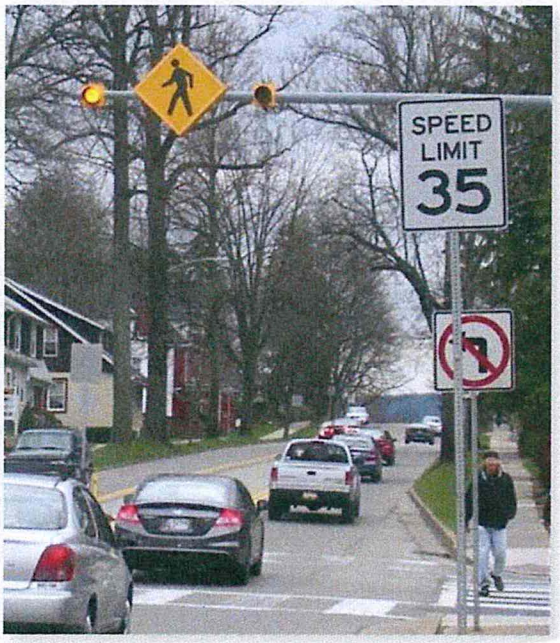
- Increase driver awareness
- Can be pedestrian activated

Disadvantages

- Does not provide a steady red signal indication requiring traffic to stop
- High installation cost and some maintenance costs
- Compliance is highly variable

Estimated Cost

- Standard Flashing Amber: $80,000 per crossing (PE/CE: $15,000)
- Overhead RRFB: $100,000 per crossing (PE/CE: $15,000)



Street Lighting

Street light poles are located near high-pedestrian and bicycle activity locations and can be added on one or both sides of the street. They can also be oriented toward pedestrian activity at key locations such as transit stops, bicycle conflict points and commercial land uses. Light levels should satisfy both the appropriate recommended lighting levels provided by the Roadway Lighting guidelines and applicable ODOT/City of Woodburn standards.[18] It is ODOT policy that urban lineal lighting is the responsibility of the local jurisdiction.

Objective

Street lighting provides increased pedestrian and bicycle visibility during the night and the dawn/dusk periods of the day by providing contrast between the pedestrian and their surroundings.

Advantages

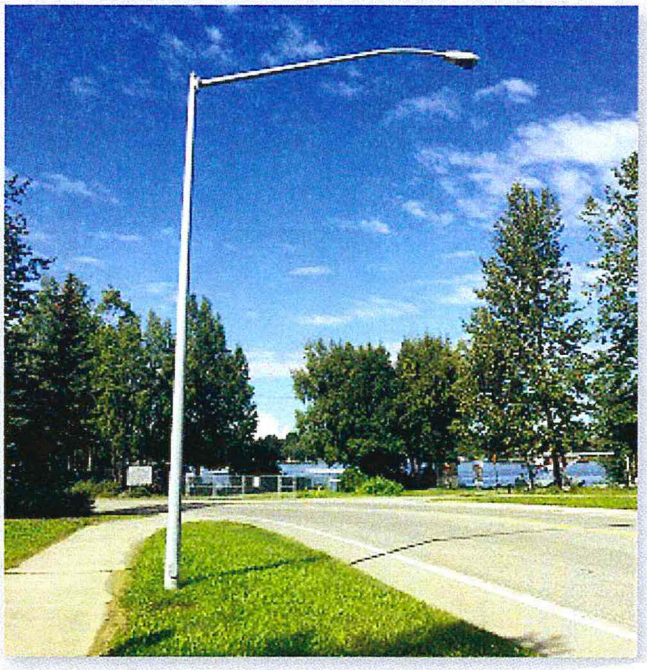
- Improved pedestrian and bicycle visibility during nighttime, dawn, and dusk hours
- Improved vehicle visibility for pedestrians and bicycles to judge gaps in traffic
- Greater pedestrian safety by providing improved visual recognition of approaching pedestrians and bicyclists

Disadvantages

- Installation costs
- Maintenance costs
- ROW constraints may not allow installation of lighting

Estimated Cost

$1,000 per light for utility pole mounted lights and approximately $15,000 per pole for ODOT steel cobra head street light poles (including conduit, wiring and trenching). (PE/CE: $4,000 per light or 27%).



18 *Roadway Lighting RP-8-14*. Illuminating Engineering Society. 2014.

CHAPTER
4.0 Recommendations

This section documents the development of recommended pedestrian safety improvements for the OR 214 and OR 99E corridors in the City of Woodburn, Oregon. These recommendations are based on the findings of safety and operational analyses, field observations, and feedback from the City of Woodburn, the Technical Advisory Committee (TAC), and local stakeholders.

Stakeholder interviews provided important local knowledge of the study corridor and helped in the assessment of existing needs and deficiencies. The safety improvement concepts that were developed for this corridor consist of pedestrian crossing treatments at key locations as well as pedestrian and bicycle related traffic signal and corridor-wide treatments.

PEDESTRIAN CROSSING TREATMENTS

Significant attention was given to the development of pedestrian crossing treatment concepts. The intent of the crossing treatments will be to provide crossing enhancements and facilitate pedestrian movements at key pedestrian crossing locations. The pedestrian crossing treatment discussion involves the pedestrian crossing "toolbox" (as previously discussed in Chapter 3), improvement location prioritization, and explanations of potential crossing improvement concepts for selected locations along the study corridor.

Pedestrian Hybrid Beacon

It is recommended that a pedestrian hybrid beacon (PHB) be installed at the existing midblock crossing on OR 214 near Woodburn High School. At this location, the high number of pedestrian in the morning and afternoon peaks that correlate with the beginning and end of the school period warrant some form of signalization based on the NCHRP analysis results. Both an RRFB and PHB were considered for this location, however the PHB is recommended due to its ability to be programmed and coordinated with nearby signals. With the near constant stream of students going to and from school, an RRFB would be activated continuously during peak periods, significantly impacting traffic flow on the highway. The PHB can be programmed to allow crossings at set intervals, minimizing the impact on through traffic. It should be noted that the installation of a PHB would require approval by the State Traffic-Roadway Engineer.

Prioritization for Midblock Crossing Locations

Potential midblock crossing improvement locations along OR 99E were prioritized based on a variety of factors. The purpose of the prioritization process was to identify where new pedestrian crossing treatments could be constructed where safety needs are evident as well as to facilitate future funding resources. Therefore, the primary locations that were considered were those within the study area located farther than 250 feet from the nearest signalized pedestrian crossing.[13]

The prioritization of potential crossing improvement locations was performed based on feedback from stakeholders and the TAC as well as evaluation criteria established through coordination with the City, ODOT, and TAC. Different weighting factors were applied to provide emphasis to selected criteria, especially to pedestrian and bicycle collisions.

The evaluation criteria include the following (listed in order of greatest weighting):

- Number of collisions in the vicinity during 2011-2015
- Collisions involving pedestrians and bicyclists in the vicinity during 2011-2015
- Pedestrian volumes during AM, Midday, and PM peak hours
- The presence of nearby pedestrian generators including:
  - School Crossings
  - Residential Connections
  - Restaurants/Convenience Markets
  - Motels
  - Nearby Transit Stops

Scores for each location were calculated by summing the applicable weighted criteria scores for each potential location. Each collision was weighted five points and an additional five points were added if it was a pedestrian or bicycle collision, pedestrian volumes were weighted one point if greater than ten pedestrians during the peak hour and two points if greater than 20 pedestrians during the peak hour, and pedestrian generators were weighted by two points per generator. The prioritized list of the top five locations resulting from the application of the evaluation criteria is provided in Table 4.1. A detailed scoring table is provided in the Appendix. It should be noted that locations 2, 3, and 4 have similar weighted scores suggesting very minor differences between sites. The rankings account for the small differences in scoring, however it is suggested that these three locations be prioritized equally for safety improvements.

13 Evaluation of Alternative Pedestrian Control Devices, SPR 721, ODOT, 2012.

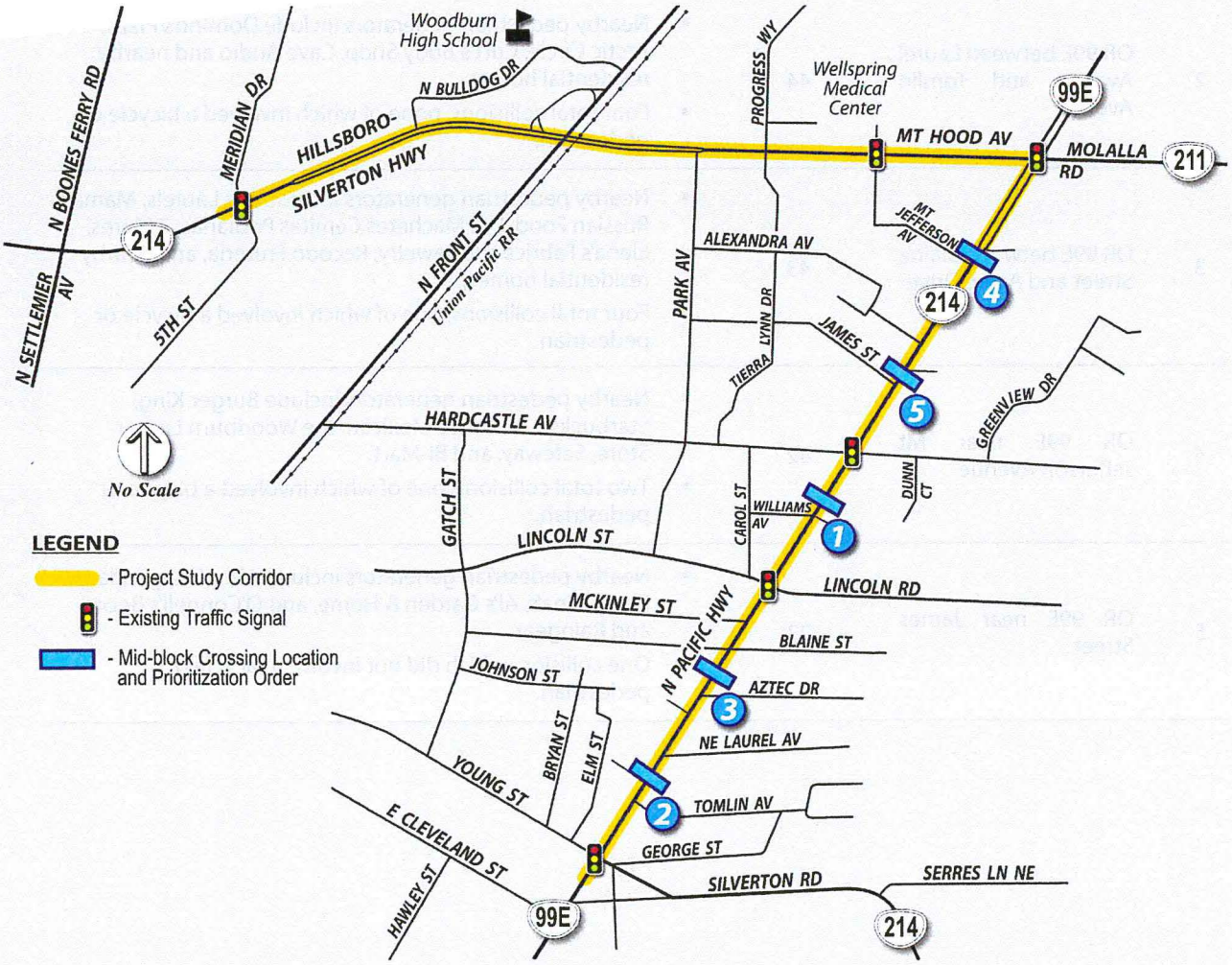
Table 4.1: Weighted Scores and Rankings for New Crossing Locations

RANK	CROSSING LOCATION	WEIGHTED SCORE	SCORING DETAILS
1	OR 99E near Williams Avenue	71	▪ Nearby pedestrian generators include La Tovara, Casa Mexico, Mashita Teriyaki, Tienda Mexicana El Co Cheque, Carniceria El Ranchito, and The Woodburn Inn. ▪ Seven total collisions, two of which involved a bicycle or pedestrian.
2	OR 99E between Laurel Avenue and Tomlin Avenue	44	▪ Nearby pedestrian generators include Domino's Pizza, Arctic Circle, Curt's Body Shop, Cave Audio and nearby residential homes. ▪ Four total collisions, none of which involved a bicycle or pedestrian.
3	OR 99E between Blaine Street and Aztec Drive	43	▪ Nearby pedestrian generators include Los Laurels, Mama's Russian Food, Los Machetes Cemitas Poblanas, 7 Mares, Elena's Fabrics and Jewelry, Recodo Fruteria, and nearby residential homes. ▪ Four total collisions, one of which involved a bicycle or pedestrian.
4	OR 99E near Mt Jefferson Avenue	42	▪ Nearby pedestrian generators include Burger King, Starbucks, Los Cabos Mexican, the Woodburn Liquor Store, Safeway, and Bi-Mart. ▪ Two total collisions, one of which involved a bicycle or pedestrian.
5	OR 99E near James Street	23	▪ Nearby pedestrian generators include Abby's Legendary Pizza, Gina's, Al's Garden & Home, and O'Connell's Boots and Raingear. ▪ One collision, which did not involve a bicycle or pedestrian.

New Crossing Improvements

Potential crossing improvements were evaluated for each of the five high-priority locations. Figure 4.1 shows an overview map of the prioritized locations. Each location is discussed in the sections below from highest to lowest ranking, including pedestrian crossing improvement concept figures and identification of potential street lighting improvements.

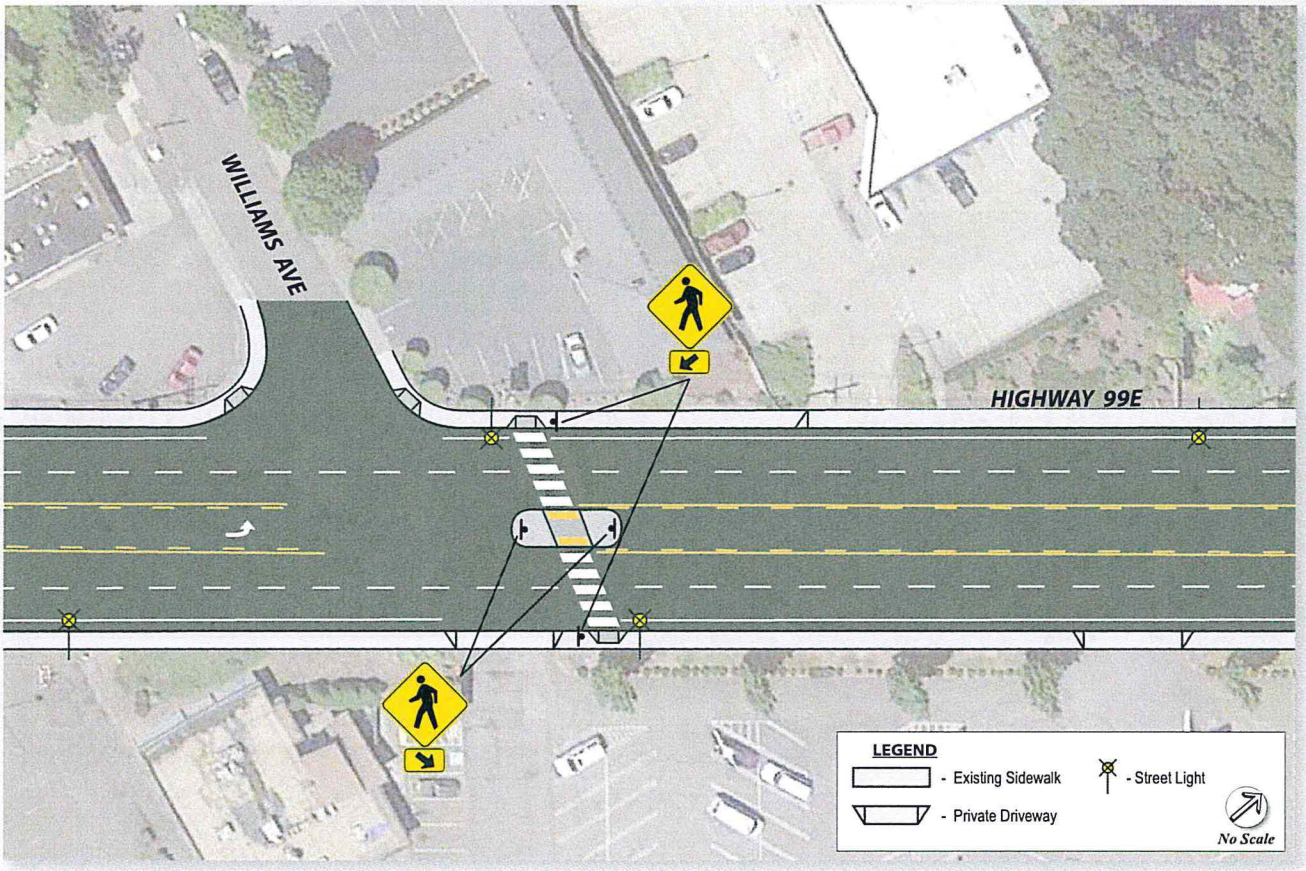
Figure 4.1: Priority Crossing Locations



Priority Location #1 – Williams Avenue

The segment of OR 99E near Williams Avenue just south of Hardcastle Avenue, ranked as the first priority location due to the seven collisions, two of which were bicycle or pedestrians, high number of restaurants and convenience markets, and the Woodburn Inn. A conceptual figure of a raised median and marked crosswalk is provided in Figure 4.2.

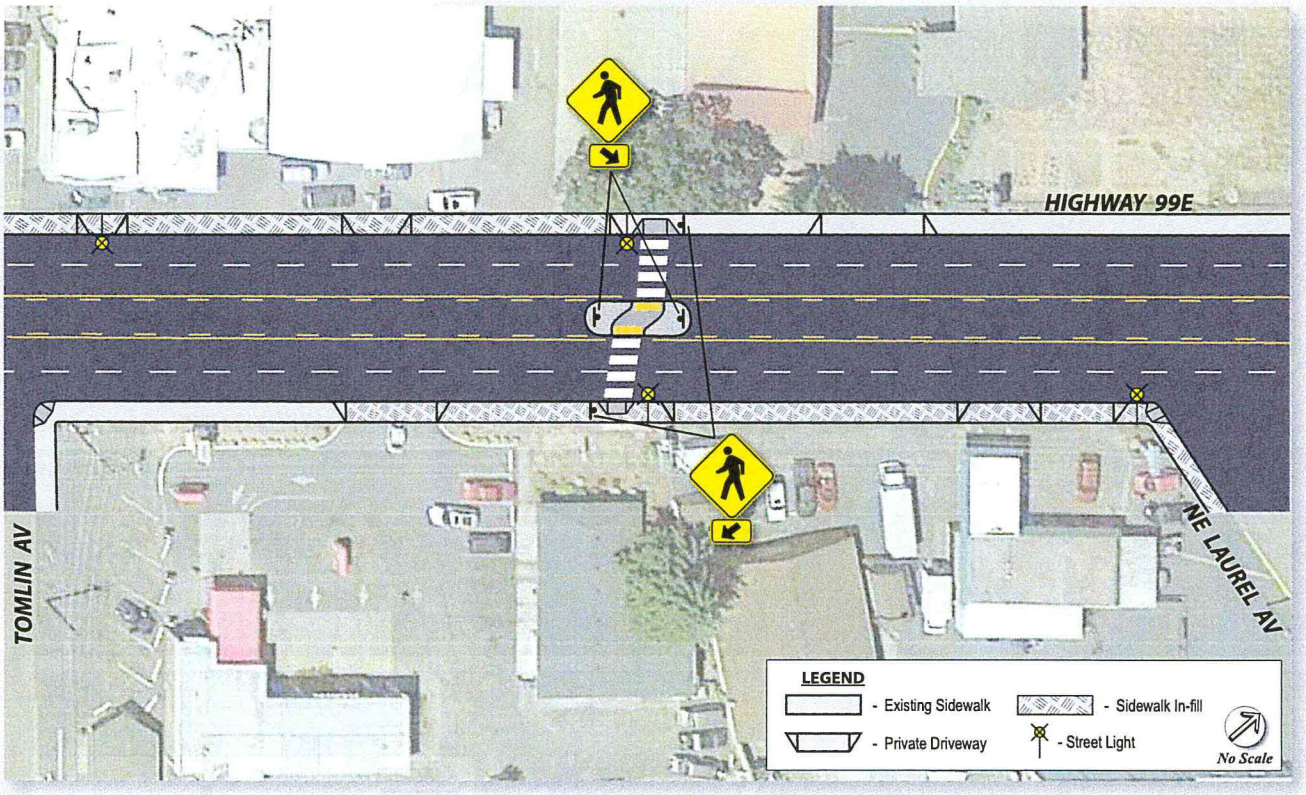
Figure 4.2: Conceptual Figure of Mid-block Crossing near Williams Avenue



Priority Location #2 – Laurel Avenue/Tomlin Avenue

The segment of OR 99E between Laurel Avenue to Tomlin Avenue is ranked as the second priority location due to the four collisions and high number of nearby pedestrian generators and residential areas. A conceptual figure of a raised median and marked crosswalk is provided in Figure 4.3.

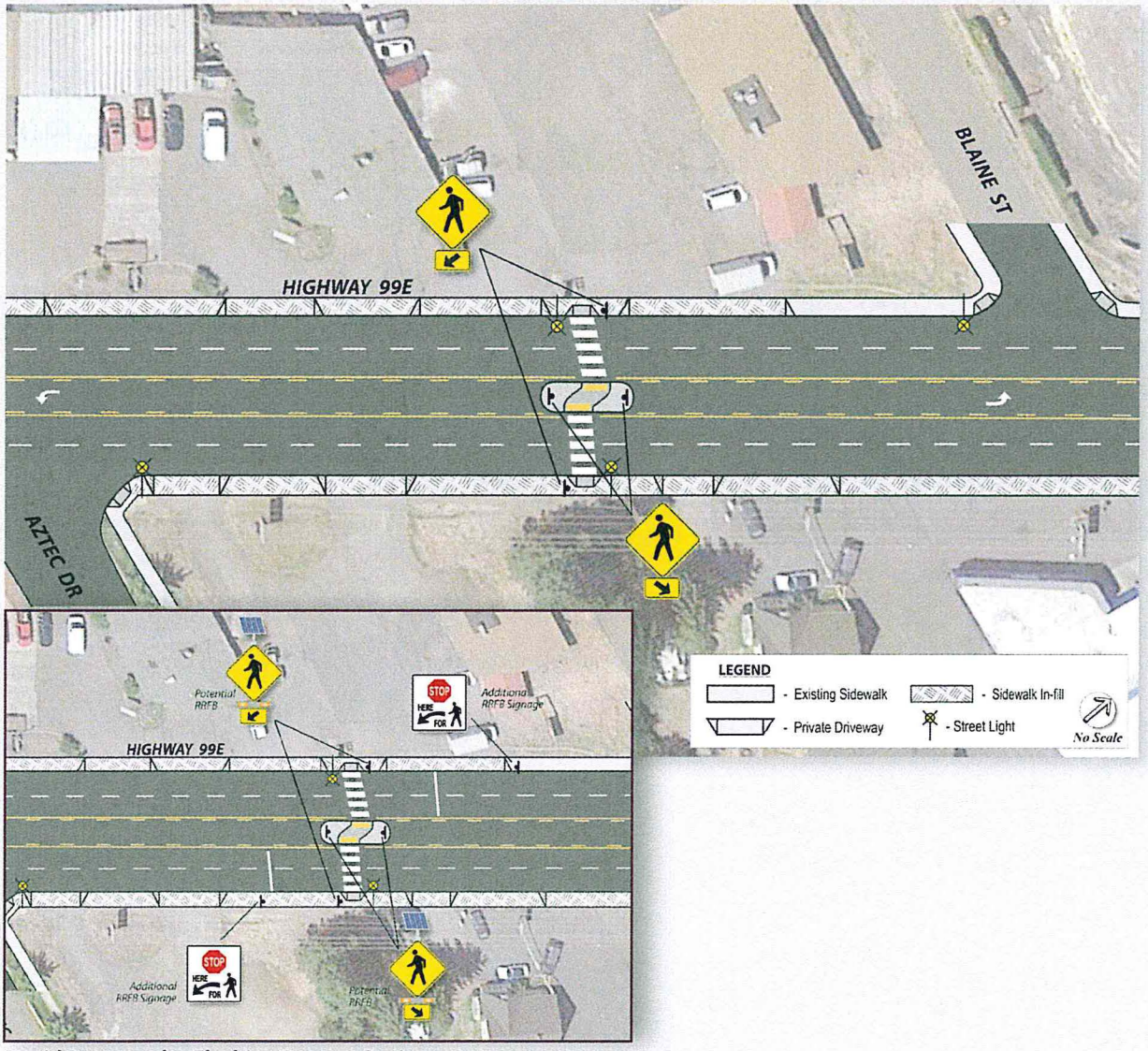
Figure 4.3: Conceptual Figure of Mid-block Crossing between Laurel Avenue to Tomlin Avenue



Priority Location #3 – Blaine Street/Aztec Drive

The segment of OR 99E between Blaine Street to Aztec Drive is ranked as the third priority location due the high number of pedestrians crossing during the mid-day peak hour (eleven) and the pm peak hour (nine). There are also several restaurants along this segment of OR 99E. A conceptual figure of a raised median and marked crosswalk is provided in Figure 4.4. Additionally, the same location is shown with an RRFB option and supplemental signage. The RRFB and supplemental signage could be an option at each location.

Figure 4.4: Conceptual Figure of Mid-block Crossing between Blaine Street to Aztec Drive (with RRFB Option)

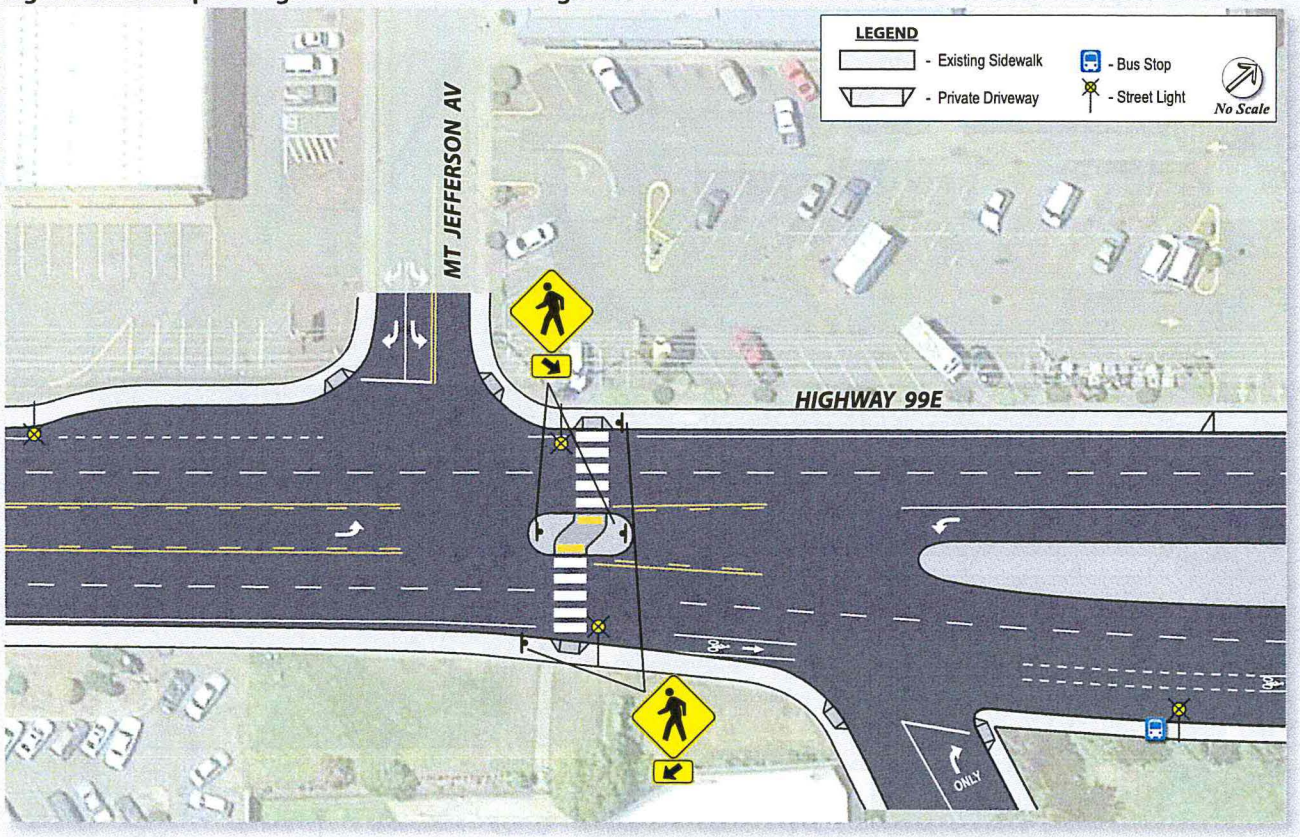


Rapid Rectangular Flashing Beacon Option

Priority Location #4 – Mt Jefferson Avenue

The segment of OR 99E near Mt Jefferson Avenue is ranked as the fourth priority location due to the high number of pedestrians crossing during the pm peak hour (12). There is a transit stop on the east side of OR 99E near the access to the Safeway shopping area. This location has an existing median from the OR 214/OR 99E intersection that is frequently used by pedestrians for two-stage crossing. A conceptual figure of a raised median and marked crosswalk is provided in Figure 4.5.

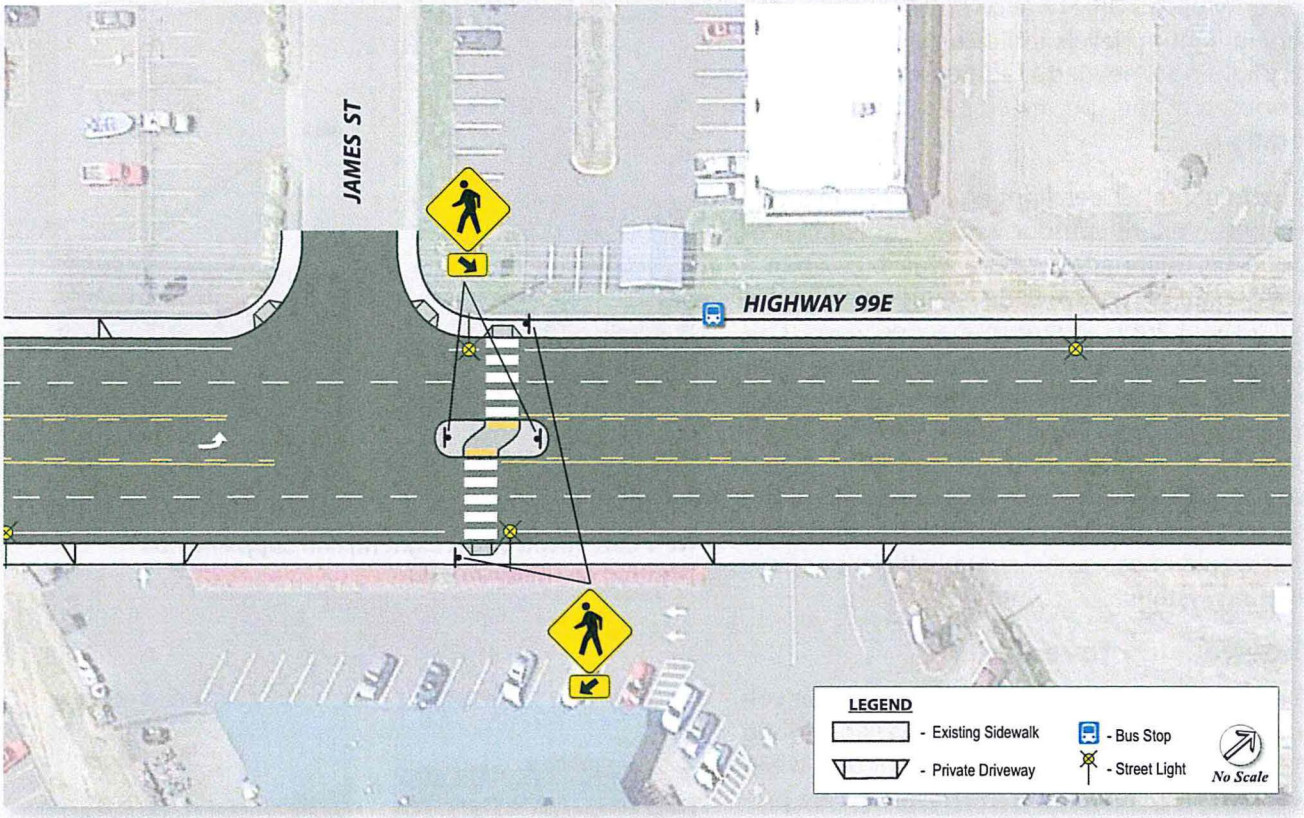
Figure 4.5: Conceptual Figure of Mid-block Crossing near Mt Jefferson Avenue



Priority Location #5 – James Street

The segment of OR 99E near James Street is ranked as the fifth priority location due to the high number of pedestrians crossing during the mid-day peak hour (18) and pm peak hour (15). There is a transit stop on the west side of OR 99E and James Street provides connection to several residential areas. A conceptual figure of a raised median and marked crosswalk is provided in Figure 4.6.

Figure 4.6: Conceptual Figure of Mid-block Crossing near James Street



Corridor-wide Treatments

Corridor-wide pedestrian safety treatments were also considered along the entire length of the study corridor to improve overall pedestrian safety. Treatments include street lighting and sidewalk improvements.

Street Lighting

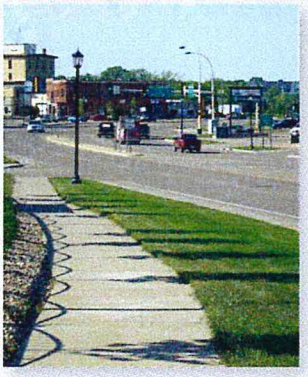
The Highway Safety Manual states that collisions could be reduced by 28% when lighting is provided on roadways where there was previously no lighting present.[14] Even though there is some existing street lighting along the majority of the OR 214 and OR 99E corridor, observed lighting levels indicate that supplementary lighting is needed in addition to the lighting proposed at the specific crossing improvement locations.

Supplemental street lighting is recommended along the entire corridor with street lights provided on utility poles where available. When a utility pole is not available, stand-alone cobrahead street lights are recommended, consistent with the overall vision of future corridor lighting. This supplemental lighting is considered a mid-term priority. Coordination with the utility provider to relocate utility poles will be necessary to provide adequate light levels along the corridor. LED upgrades could also be considered that would improve the energy efficiency of the lighting system.

New Cobrahead Street Light (R) and Supplemental Lighting on Utility Pole (L)

Sidewalk Improvements

A study completed by the FHWA states that collisions involving a pedestrian "walking along roadway crashes" could be reduced by 88% when walkways separated from the travel lane are provided.[15] Separated walkways for pedestrian, increases how comfortable a pedestrian feel using the facilities and they can increase the number of walking trips, practically in areas with mixed land uses. Additionally, sidewalks providing connections to public transit locations increase the transportation options for people who may not be able to drive a vehicle.



New sidewalks along multi-lane roads

14 *Evaluation of Alternative Pedestrian Control Devices*, SPR 721, ODOT, 2012.

15 FHWA, *Safety Benefits of Walkways*, Sidewalks, and Paved Shoulders. FHWA Safety Program: Safe Roads for a Safer Future. February 1, 2013. <https://safety.fhwa.dot.gov/ped_bike/tools_solve/walkways_trifold/>

CHAPTER 5.0

Project Implementation

Project implementation resources were prepared for the recommended crossing improvement concepts and overall corridor treatment options, which were previously discussed. The implementation resources include prioritization of the improvement projects and associated cost estimates.

PROJECT PRIORITIZATION

The recommended projects are listed by improvement type in Table 5.1 based on whether they are short-term or mid-term priority. No long-term priorities were found during this study.

Table 5.1: Prioritized Safety Improvements on the OR 214 and OR 99E Corridor

IMPROVEMENT TYPE	SHORT-TERM	MID-TERM
Pedestrian Crossing Improvement	▪ Midblock crossing at Williams Avenue ▪ Midblock crossing at Laurel Avenue/ Tomlin Avenue ▪ Midblock crossing at Blaine Street/Aztec Drive ▪ Midblock crossing improvements near Woodburn High School	▪ Midblock crossing at Mt Jefferson Avenue ▪ Midblock crossing at James Street
Street Lighting	▪ Lighting at Williams Avenue ▪ Lighting at Laurel Avenue/Tomlin Avenue ▪ Lighting at Blaine Street/Aztec Drive	▪ Lighting at Mt Jefferson Avenue ▪ Lighting at James Street ▪ Corridor lighting
Sidewalk Infill	▪ Sidewalk infill at Williams Avenue ▪ Sidewalk infill at Laurel Avenue/Tomlin Avenue ▪ Sidewalk infill at Blaine Street/Aztec Drive	▪ Sidewalk infill at Mt Jefferson Avenue ▪ Sidewalk infill at James Street ▪ Corridor sidewalk infill

COST ESTIMATES

Cost estimates were prepared for each of the recommended improvements and are listed in Table 5.2. A 20% engineering and construction fee and a 20% contingency were applied individually to the cost estimate for each location.

The total estimated cost is $525,000 for all crossing improvements, which includes five midblock crossings and a pedestrian hybrid signal on OR 214 at the High School crossing location. The cost estimate for each midblock crossings includes a marked crosswalk to a center island, signs, curb ramps, and supplemental lighting. Additional cost estimates include $150,000 for the sidewalk infill along OR 99E between Lincoln Street and Young Street and $300,000 for corridor-wide lighting improvements. The total estimated cost of all recommended improvements is $975,000.

Table 5.2: Cost Estimates of Proposed Safety Projects

SAFETY IMPROVEMENT	ESTIMATED COST[1]
CROSSING IMPROVEMENT LOCATIONS[2]	
Midblock Crossing near Williams Avenue	$75,000
Midblock Crossing between Laurel Avenue/Tomlin Avenue	$75,000
Midblock Crossing between Blaine Street/Aztec Drive	$75,000
Midblock Crossing near Jefferson Avenue	$75,000
Midblock Crossing near James Street	$75,000
Pedestrian Hybrid Signal (OR 214 at High School)	$150,000
Total Cost for Crossing Improvement Locations	$525,000
CORRIDOR-WIDE TREATMENTS	
OR 99E (Lincoln Street to Young Street) Sidewalk Infill	$150,000
Lighting Improvements	$300,000
Total Cost for Corridor-Wide Treatments	$450,000
Total Cost for All Improvement	$975,000

[1] A 20% engineering and construction fee and a 20% contingency were applied to the cost estimate for each location
[2] The estimated cost for installing a RRFB at any of the above midblock crossing locations is an additional $40,000.

APPENDIX

A

Existing Peak Hour Traffic Counts

DKS

Traffic Count Axle Factor Sheet
Transportation Development Division

Site: 11041
County: Marion
City: Woodburn
Milepoint: 38.85
Count Number: 1.00

Date: 10/11/2016-10/12/2016
Hours: 10/11/2016 4:00 AM-10/12/2016 4:00 AM
Highway #: 140
On Hillsboro-Silverton Hwy 140 (OR 214)
Location: Between Park Ave and Terra Lynn Dr /
Weather: Cloudy

Direction From-To	Car	Lt Truck	Sgl. Unit Truck			Sgl. Trailer Truck			Multi Trailer Truck			Bus	Motor-cycle	Total All Vehicle	
			2 Axl	3 Axl	4+ Axl	4- Axl	5 Axl	6+ Axl	5- Axl	6 Axl	7+ Axl				
East-West	6447	1705	538	24	7	328	131	36	15	3	14	126	35	9409	
West-East	6196	2107	558	30	2	157	131	36	10	2	22	113	30	9394	
Total Volume	12643	3812	1096	54	9	485	262	72	25	5	36	239	65	18803	
Axle Factor	1.1	1.1	1	1.5	2	2	2.5	3	2.5	3	3.5	1.1	1	0.868	East Leg
Veh O/Count	13907	4193	1096	81	18	970	655	216	63	15	126	263	65	21668	
East-West	6447	1705	538	24	7	328	131	36	15	3	14	126	35	9409	
West-East	6196	2107	558	30	2	157	131	36	10	2	22	113	30	9394	
Total Volume	12643	3812	1096	54	9	485	262	72	25	5	36	239	65	18803	
Axle Factor	1.1	1.1	1	1.5	2	2	2.5	3	2.5	3	3.5	1.1	1	0.868	West Leg
Veh O/Count	13907	4193	1096	81	18	970	655	216	63	15	126	263	65	21668	

Traffic Count Axle Factor Sheet
Transportation Development Division

Site: 11042
County: Marion
City: Woodburn
Milepoint: 32.03
Count Number: 1.00

Date: 10/11/2016-10/12/2016
Hours: 10/11/2016 3:15 AM-10/12/2016 3:15 AM
Highway #: 081
On Pacific Hwy East Hwy 81 (OR 99E)
Location: between Alexandra Ave and Jame Ave
Weather: Cloudy

Direction From-To	Car	Lt Truck	Sgl. Unit Truck			Sgl. Trailer Truck			Multi Trailer Truck			Bus	Motor-cycle	Total All Vehicle	
			2 Axl	3 Axl	4+ Axl	4- Axl	5 Axl	6+ Axl	5- Axl	6 Axl	7+ Axl				
North-South	7473	2158	637	42	25	361	132	64	61	12	41	118	57	11181	
South-North	7643	1973	600	40	3	343	126	52	61	10	65	159	79	11154	
Total Volume	15116	4131	1237	82	28	704	258	116	122	22	106	277	136	22335	
Axle Factor	1.1	1.1	1	1.5	2	2	2.5	3	2.5	3	3.5	1.1	1	0.853	North Leg
Veh O/Count	16628	4544	1237	123	56	1408	645	348	305	66	371	305	136	26172	
North-South	7473	2158	637	42	25	361	132	64	61	12	41	118	57	11181	
South-North	7643	1973	600	40	3	343	126	52	61	10	65	159	79	11154	
Total Volume	15116	4131	1237	82	28	704	258	116	122	22	106	277	136	22335	
Axle Factor	1.1	1.1	1	1.5	2	2	2.5	3	2.5	3	3.5	1.1	1	0.853	South Leg
Veh O/Count	16628	4544	1237	123	56	1408	645	348	305	66	371	305	136	26172	

Traffic Count Axle Factor Sheet
Transportation Development Division

Site: 11043
County: Marion
City: Woodburn
Milepoint: 32.64
Count Number: 1.00

Date: 10/11/2016-10/12/2016
Hours: 10/11/2016 2:45 AM-10/12/2016 2:45 AM
Highway #: 081
On Pacific Hwy East Hwy 81 (OR 99E)
Location: between Aztec Dr and Laurel Ave
Weather: Cloudy

Direction From-To	Car	Lt Truck	Sgl. Unit Truck			Sgl. Trailer Truck			Multi Trailer Truck			Bus	Motor-cycle	Total All Vehicle	
			2 Axl	3 Axl	4+ Axl	4- Axl	5 Axl	6+ Axl	5- Axl	6 Axl	7+ Axl				
North-South	6554	2158	666	34		390	97	29	54	10	43	169	56	10260	
South-North	7450	2074	628	26	4	331	143	60	61	7	45	118	42	10989	
Total Volume	14004	4232	1294	60	4	721	240	89	115	17	88	287	98	21249	
Axle Factor	1.1	1.1	1	1.5	2	2	2.5	3	2.5	3	3.5	1.1	1	0.856	North Leg
Veh O/Count	15404	4655	1294	90	8	1442	600	267	288	51	308	316	98	24821	
North-South	6554	2158	666	34		390	97	29	54	10	43	169	56	10260	
South-North	7450	2074	628	26	4	331	143	60	61	7	45	118	42	10989	
Total Volume	14004	4232	1294	60	4	721	240	89	115	17	88	287	98	21249	
Axle Factor	1.1	1.1	1	1.5	2	2	2.5	3	2.5	3	3.5	1.1	1	0.856	South Leg
Veh O/Count	15404	4655	1294	90	8	1442	600	267	288	51	308	316	98	24821	

Summary Of Traffic Count
Transportation Development Division

Site: 11044
County: Marion
City: Woodburn
Milepoint: 38.56
Count Number: 1.00

Date: 10/11/2016
Hours: 6:00 AM-10:00 PM
Highway #: 140
On Hillsboro-Silverton Hwy
Location: 140 (OR 214) @ Front Street
Weather: Clear

Time of Day	Total Volume	North and South	% of Total	East and West	% of Total				Entering Volumes		
									North	East	West
6:00	126	12	9.5	114	90.5				12	54	60
6:15	209	20	9.6	189	90.4				20	86	103
6:30	214	18	8.4	196	91.6				18	60	136
6:45	245	24	9.8	221	90.2				24	80	141
7:00	278	30	10.8	248	89.2				30	123	125
7:15	282	34	12.1	248	87.9				34	127	121
7:30	308	39	12.7	269	87.3				39	119	150
7:45	337	45	13.4	292	86.6				45	110	182
8:00	267	24	9	243	91				24	96	147
8:15	246	17	6.9	229	93.1				17	105	124
8:30	229	10	4.4	219	95.6				10	100	119
8:45	264	15	5.7	249	94.3				15	119	130
9:00	1012	79	7.8	933	92.2				79	487	446
9:15	0	0	0	0	0				0	0	0
9:30	0	0	0	0	0				0	0	0
9:45	0	0	0	0	0				0	0	0
10:00	1214	73	6	1141	94				73	581	560
10:15	0	0	0	0	0				0	0	0
10:30	0	0	0	0	0				0	0	0
10:45	0	0	0	0	0				0	0	0
11:00	1350	89	6.6	1261	93.4				89	646	615
11:15	0	0	0	0	0				0	0	0
11:30	0	0	0	0	0				0	0	0
11:45	0	0	0	0	0				0	0	0
12:00	1418	88	6.2	1330	93.8				88	722	608
12:15	0	0	0	0	0				0	0	0
12:30	0	0	0	0	0				0	0	0
12:45	0	0	0	0	0				0	0	0
13:00	1371	102	7.4	1269	92.6				102	629	640
13:15	0	0	0	0	0				0	0	0
13:30	0	0	0	0	0				0	0	0
13:45	0	0	0	0	0				0	0	0
14:00	347	17	4.9	330	95.1				17	189	141
14:15	311	18	5.8	293	94.2				18	157	136
14:30	384	26	6.8	358	93.2				26	163	195

Summary Of Traffic Count
Transportation Development Division

Site: 11044
County: Marion
City: Woodburn

Milepoint: 38.56
Count Number: 1.00

Date: 10/11/2016
Hours: 6:00 AM-10:00 PM
Highway #: 140
On Hillsboro-Silverton Hwy
Location: 140 (OR 214) @ Front Street
Weather: Clear

Time of Day	Total Volume	North and South	% of Total	East and West	% of Total				Entering Volumes		
									North	East	West
14:45	371	26	7	345	93				26	180	165
15:00	368	30	8.2	338	91.8				30	187	151
15:15	370	32	8.6	338	91.4				32	172	166
15:30	387	27	7	360	93				27	177	183
15:45	381	21	5.5	360	94.5				21	176	184
16:00	391	36	9.2	355	90.8				36	185	170
16:15	397	26	6.5	371	93.5				26	198	173
16:30	425	33	7.8	392	92.2				33	235	157
16:45	419	33	7.9	386	92.1				33	207	179
17:00	439	25	5.7	414	94.3				25	235	179
17:15	408	33	8.1	375	91.9				33	198	177
17:30	410	27	6.6	383	93.4				27	197	186
17:45	360	26	7.2	334	92.8				26	164	170
18:00	1325	95	7.2	1230	92.8				95	654	576
18:15	0	0	0	0	0				0	0	0
18:30	0	0	0	0	0				0	0	0
18:45	0	0	0	0	0				0	0	0
19:00	920	58	6.3	862	93.7				58	480	382
19:15	0	0	0	0	0				0	0	0
19:30	0	0	0	0	0				0	0	0
19:45	0	0	0	0	0				0	0	0
20:00	553	34	6.1	519	93.9				34	275	244
20:15	0	0	0	0	0				0	0	0
20:30	0	0	0	0	0				0	0	0
20:45	0	0	0	0	0				0	0	0
21:00	426	21	4.9	405	95.1				21	222	183
21:15	0	0	0	0	0				0	0	0
21:30	0	0	0	0	0				0	0	0
21:45	0	0	0	0	0				0	0	0
Total Count	18762		0	17399	93	0			1363	8895	8504
24hr Factor	1.1			1.1		1.1			1.1	1.1	1.1
24hr Volume	20639		0	19139	93	0			1500	9785	9355

Summary Of Traffic Count
Transportation Development Division

Site: 11045
County: Marion
City: Woodburn
Milepoint: 39.07
Count Number: 1.00

Date: 10/11/2016
Hours: 6:00 AM-10:00 PM
Highway #: 140
Hillsboro-Silverton Hwy 140
Location: (OR 214) @ Woodburn
Weather: Clear

Time of Day	Total Volume	North and South	% of Total	East and West	% of Total				Entering Volumes			
									North	East	South	West
6:00	111	9	8.1	102	91.9				1	50	8	52
6:15	166	19	11.4	147	88.6				0	67	19	80
6:30	161	8	5	153	95				0	59	8	94
6:45	199	16	8	183	92				0	75	16	108
7:00	207	14	6.8	193	93.2				0	101	14	92
7:15	231	14	6.1	217	93.9				0	130	14	87
7:30	235	16	6.8	219	93.2				2	110	14	109
7:45	294	27	9.2	267	90.8				4	140	23	127
8:00	252	31	12.3	221	87.7				8	109	23	112
8:15	243	22	9.1	221	90.9				4	108	18	113
8:30	244	29	11.9	215	88.1				7	114	22	101
8:45	287	35	12.2	252	87.8				14	126	21	126
9:00	1176	173	14.7	1003	85.3				51	456	122	547
9:15	0	0	0	0	0				0	0	0	0
9:30	0	0	0	0	0				0	0	0	0
9:45	0	0	0	0	0				0	0	0	0
10:00	1335	210	15.7	1125	84.3				66	523	144	602
10:15	0	0	0	0	0				0	0	0	0
10:30	0	0	0	0	0				0	0	0	0
10:45	0	0	0	0	0				0	0	0	0
11:00	1453	263	18.1	1190	81.9				86	557	177	633
11:15	0	0	0	0	0				0	0	0	0
11:30	0	0	0	0	0				0	0	0	0
11:45	0	0	0	0	0				0	0	0	0
12:00	1567	285	18.2	1282	81.8				82	673	203	609
12:15	0	0	0	0	0				0	0	0	0
12:30	0	0	0	0	0				0	0	0	0
12:45	0	0	0	0	0				0	0	0	0
13:00	1413	226	16	1187	84				70	536	156	651
13:15	0	0	0	0	0				0	0	0	0
13:30	0	0	0	0	0				0	0	0	0
13:45	0	0	0	0	0				0	0	0	0
14:00	348	69	19.8	279	80.2				20	133	49	146
14:15	352	58	16.5	294	83.5				17	149	41	145
14:30	378	72	19	306	81				33	131	39	175
14:45	395	56	14.2	339	85.8				15	168	41	171
15:00	369	67	18.2	302	81.8				24	147	43	155

Summary Of Traffic Count
Transportation Development Division

Site: 11045
County: Marion
City: Woodburn
Milepoint: 39.07
Count Number: 1.00

Date: 10/11/2016
Hours: 6:00 AM-10:00 PM
Highway #: 140
Hillsboro-Silverton Hwy 140
Location: (OR 214) @ Woodburn
Weather: Clear

Time of Day	Total Volume	North and South	% of Total	East and West	% of Total				Entering Volumes			
									North	East	South	West
15:15	396	56	14.1	340	85.9				23	166	33	174
15:30	400	70	17.5	330	82.5				23	133	47	197
15:45	404	58	14.4	346	85.6				16	158	42	188
16:00	384	73	19	311	81				37	145	36	166
16:15	443	77	17.4	366	82.6				29	167	48	199
16:30	459	86	18.7	373	81.3				42	172	44	201
16:45	425	75	17.6	350	82.4				29	170	46	180
17:00	422	80	19	342	81				28	161	52	181
17:15	394	68	17.3	326	82.7				25	150	43	176
17:30	381	56	14.7	325	85.3				16	151	40	174
17:45	369	51	13.8	318	86.2				13	149	38	169
18:00	1398	222	15.9	1176	84.1				52	533	170	643
18:15	0	0	0	0	0				0	0	0	0
18:30	0	0	0	0	0				0	0	0	0
18:45	0	0	0	0	0				0	0	0	0
19:00	925	147	15.9	778	84.1				23	380	124	398
19:15	0	0	0	0	0				0	0	0	0
19:30	0	0	0	0	0				0	0	0	0
19:45	0	0	0	0	0				0	0	0	0
20:00	558	58	10.4	500	89.6				2	257	56	243
20:15	0	0	0	0	0				0	0	0	0
20:30	0	0	0	0	0				0	0	0	0
20:45	0	0	0	0	0				0	0	0	0
21:00	419	46	11	373	89				3	206	43	167
21:15	0	0	0	0	0				0	0	0	0
21:30	0	0	0	0	0				0	0	0	0
21:45	0	0	0	0	0				0	0	0	0
Total Count	19193	2942	16	16251	85	0			865	7760	2077	8491
24hr Factor	1.1	1.1		1.1		1.1			1.1	1.1	1.1	1.1
24hr Volume	21113	3236	16	17876	85	0			952	8536	2285	9341

Summary of Traffic Count
Transportation Development Division

Site: 24212010
County: Marion
City: Woodburn
Milepoint: 31.70
Count Number: 1.00

Date: 2/24/2010
Hours: 6:00 AM-10:00 PM
Highway #: 081
OR99E @ OR 211 & OR214
Location: OR211(east) OR214(west)
Weather: Cloudy;Rain

Time of Day	Summary By Movements													Entering Volumes			
	NE-E	NE-SW	NE-W	E-NE	E-SW	E-W	SW-NE	SW-E	SW-W	W-NE	W-E	W-SW	TOTAL	North-East	East	South-West	West
6:00	2	26	9	8	5	22	71	6	9	12	13	4	187	37	35	86	29
6:15	5	21	6	11	10	26	93	16	14	11	31	12	256	32	47	123	54
6:30	8	42	7	11	13	48	123	24	17	23	33	8	357	57	72	164	64
6:45	10	50	13	22	12	56	118	24	27	34	33	19	418	73	90	169	86
7:00	15	65	13	12	24	48	74	36	19	23	31	10	370	93	84	129	64
7:15	11	71	12	17	27	51	104	36	28	24	38	17	436	94	95	168	79
7:30	6	79	19	21	28	43	109	31	42	20	47	22	467	104	92	182	89
7:45	24	96	20	18	28	47	138	14	55	19	26	27	512	140	93	207	72
8:00	6	69	18	18	27	34	81	10	29	21	29	18	360	93	79	120	68
8:15	20	64	19	21	20	35	67	14	34	22	31	31	378	103	76	115	84
8:30	4	67	22	18	19	42	79	7	36	17	26	24	361	93	79	122	67
8:45	17	58	30	15	30	48	65	15	41	18	23	20	380	105	93	121	61
9:00	52	220	93	51	96	180	252	42	149	80	126	145	1486	365	327	443	351
9:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00	54	262	78	63	116	177	163	54	222	85	170	196	1640	394	356	439	451
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	87	315	114	56	122	156	258	52	245	127	177	212	1921	516	334	555	516
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00	76	324	118	64	141	198	296	51	254	110	169	256	2057	518	403	601	535
12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00	71	339	96	58	134	196	277	53	227	119	197	211	1978	506	388	557	527
13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00	87	276	118	51	126	204	251	80	239	104	210	218	1964	481	381	570	532
14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00	29	117	36	14	37	49	107	15	52	23	43	43	565	182	100	174	109
15:15	14	119	29	15	46	35	79	13	43	30	73	49	545	162	96	135	152
15:30	34	159	40	13	42	48	111	17	68	38	52	54	676	233	103	196	144
15:45	33	108	30	18	46	47	75	20	56	37	60	55	585	171	111	151	152
16:00	36	121	33	15	47	53	92	29	49	30	56	50	611	190	115	170	136
16:15	34	135	40	8	52	76	100	18	56	53	72	46	690	209	136	174	171
16:30	36	142	40	17	50	76	90	19	60	31	67	42	670	218	143	169	140
16:45	18	152	27	21	54	72	76	24	58	30	74	55	661	197	147	158	159
17:00	37	134	37	10	46	54	120	30	63	35	66	60	692	208	110	213	161
17:15	37	141	37	13	49	56	87	23	50	34	82	36	645	215	118	160	152
17:30	38	130	31	17	54	51	92	28	47	28	64	58	638	199	122	167	150
17:45	26	120	39	8	38	52	78	28	53	43	65	44	594	185	98	159	152
18:00	89	325	97	51	146	138	196	85	158	93	224	148	1750	511	335	439	465
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19:00	62	186	57	37	100	87	143	44	108	79	156	109	1168	305	224	295	344
19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:00	44	133	79	33	73	133	95	31	71	57	96	66	911	256	239	197	219
20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Summary of Traffic Count
Transportation Development Division

Site: 24212010
County: Marion
City: Woodburn
Milepoint: 31.70
Count Number: 1.00

Date: 2/24/2010
Hours: 6:00 AM-10:00 PM
Highway #: 081
OR99E @ OR 211 & OR214
Location: OR211(east) OR214(west)
Weather: Cloudy;Rain

	Summary By Movements													Entering Volumes			
Time of Day	NE-E	NE-SW	NE-W	E-NE	E-SW	E-W	SW-NE	SW-E	SW-W	W-NE	W-E	W-SW		TOTAL	North-East	East	South-West	West
20:30	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0
20:45	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0
21:00	18	117	42	34	54	92	77	22	51	34	95	32		668	177	180	150	161
21:15	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0
21:30	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0
21:45	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0
Total Count	1140	4783	1499	859	1912	2730	4237	1011	2730	1544	2755	2397		27597	7422	5501	7978	6696
24hr Factor	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1		1.1	1.1	1.1	1.1	1.1
24hr Volume	1254	5262	1649	945	2104	3003	4661	1113	3003	1699	3031	2637		30357	8165	6052	8776	7366

Summary Of Traffic Count
Transportation Development Division

Site: 11046
County: Marion
City: Woodburn
Milepoint: 31.87
Count Number: 1.00

Date: 10/11/2016
Hours: 6:00 AM-10:00 PM
Highway #: 081
Location: Pacific Hwy East Hwy 81 (OR 99E) @ Mt Jefferson Ave
Weather: Clear

Time of Day	Total Volume	North and South	% of Total	West and East	% of Total				Entering Volumes		
									North	South	West
6:00	203	200	98.5	3	1.5				54	146	3
6:15	213	210	98.6	3	1.4				52	158	3
6:30	286	280	97.9	6	2.1				83	197	6
6:45	279	279	100	0	0				106	173	0
7:00	296	291	98.3	5	1.7				111	180	5
7:15	311	306	98.4	5	1.6				113	193	5
7:30	321	318	99.1	3	0.9				137	181	3
7:45	386	377	97.7	9	2.3				151	226	9
8:00	295	284	96.3	11	3.7				132	152	11
8:15	286	271	94.8	15	5.2				122	149	15
8:30	315	305	96.8	10	3.2				129	176	10
8:45	313	292	93.3	21	6.7				130	162	21
9:00	1286	1195	92.9	91	7.1				582	613	91
9:15	0	0	0	0	0				0	0	0
9:30	0	0	0	0	0				0	0	0
9:45	0	0	0	0	0				0	0	0
10:00	1447	1327	91.7	120	8.3				654	673	120
10:15	0	0	0	0	0				0	0	0
10:30	0	0	0	0	0				0	0	0
10:45	0	0	0	0	0				0	0	0
11:00	1573	1431	91	142	9				682	749	142
11:15	0	0	0	0	0				0	0	0
11:30	0	0	0	0	0				0	0	0
11:45	0	0	0	0	0				0	0	0
12:00	1746	1583	90.7	163	9.3				717	866	163
12:15	0	0	0	0	0				0	0	0
12:30	0	0	0	0	0				0	0	0
12:45	0	0	0	0	0				0	0	0
13:00	1652	1494	90.4	158	9.6				706	788	158
13:15	0	0	0	0	0				0	0	0
13:30	0	0	0	0	0				0	0	0
13:45	0	0	0	0	0				0	0	0
14:00	406	371	91.4	35	8.6				181	190	35
14:15	446	406	91	40	9				189	217	40
14:30	432	391	90.5	41	9.5				188	203	41

Summary Of Traffic Count
Transportation Development Division

Site: 11046
County: Marion
City: Woodburn
Milepoint: 31.87
Count Number: 1.00

Date: 10/11/2016
Hours: 6:00 AM-10:00 PM
Highway #: 081
Location: Pacific Hwy East Hwy 81 (OR 99E) @ Mt Jefferson Ave
Weather: Clear

Time of Day	Total Volume	North and South	% of Total	West and East	% of Total				Entering Volumes		
									North	South	West
14:45	462	421	91.1	41	8.9				205	216	41
15:00	462	411	89	51	11				191	220	51
15:15	483	435	90.1	48	9.9				198	237	48
15:30	572	524	91.6	48	8.4				289	235	48
15:45	524	459	87.6	65	12.4				224	235	65
16:00	489	439	89.8	50	10.2				241	198	50
16:15	562	506	90	56	10				276	230	56
16:30	586	529	90.3	57	9.7				306	223	57
16:45	557	509	91.4	48	8.6				281	228	48
17:00	558	525	94.1	33	5.9				279	246	33
17:15	556	490	88.1	66	11.9				252	238	66
17:30	493	430	87.2	63	12.8				213	217	63
17:45	474	431	90.9	43	9.1				236	195	43
18:00	1646	1459	88.6	187	11.4				790	669	187
18:15	0	0	0	0	0				0	0	0
18:30	0	0	0	0	0				0	0	0
18:45	0	0	0	0	0				0	0	0
19:00	1098	959	87.3	139	12.7				523	436	139
19:15	0	0	0	0	0				0	0	0
19:30	0	0	0	0	0				0	0	0
19:45	0	0	0	0	0				0	0	0
20:00	667	593	88.9	74	11.1				293	300	74
20:15	0	0	0	0	0				0	0	0
20:30	0	0	0	0	0				0	0	0
20:45	0	0	0	0	0				0	0	0
21:00	434	393	90.6	41	9.4				222	171	41
21:15	0	0	0	0	0				0	0	0
21:30	0	0	0	0	0				0	0	0
21:45	0	0	0	0	0				0	0	0
Total Count	23115	21124	92	1991	9	0			10238	10886	1991
24hr Factor	1.1	1.1		1.1		1.1			1.1	1.1	1.1
24hr Volume	25427	23236	92	2190	9	0			11262	11975	2191

Summary Of Traffic Count
Transportation Development Division

Site: 24112010
County: Marion
City: Woodburn
Milepoint: 32.19
Count Number: 2.00

Date: 10/11/2016
Hours: 6:00 AM-10:00 PM
Highway #: 081
Location: Pacific Hwy East(OR99E) @ Hardcastle Ave.
Weather: Clear

Time of Day	Total Volume	NE and SW	% of Total	East and West	% of Total				Entering Volumes			
									North-East	East	South-West	West
6:00	236	199	84.3	37	15.7				53	16	146	21
6:15	251	213	84.9	38	15.1				58	20	155	18
6:30	330	278	84.2	52	15.8				84	23	194	29
6:45	357	313	87.7	44	12.3				120	18	193	26
7:00	337	271	80.4	66	19.6				97	38	174	28
7:15	358	298	83.2	60	16.8				106	36	192	24
7:30	413	347	84	66	16				154	43	193	23
7:45	472	392	83.1	80	16.9				163	34	229	46
8:00	306	269	87.9	37	12.1				121	19	148	18
8:15	316	276	87.3	40	12.7				142	27	134	13
8:30	337	300	89	37	11				125	15	175	22
8:45	346	304	87.9	42	12.1				135	25	169	17
9:00	1314	1176	89.5	138	10.5				602	76	574	62
9:15	0	0	0	0	0				0	0	0	0
9:30	0	0	0	0	0				0	0	0	0
9:45	0	0	0	0	0				0	0	0	0
10:00	1478	1352	91.5	126	8.5				714	62	638	64
10:15	0	0	0	0	0				0	0	0	0
10:30	0	0	0	0	0				0	0	0	0
10:45	0	0	0	0	0				0	0	0	0
11:00	1588	1432	90.2	156	9.8				706	76	726	80
11:15	0	0	0	0	0				0	0	0	0
11:30	0	0	0	0	0				0	0	0	0
11:45	0	0	0	0	0				0	0	0	0
12:00	1772	1587	89.6	185	10.4				782	83	805	102
12:15	0	0	0	0	0				0	0	0	0
12:30	0	0	0	0	0				0	0	0	0
12:45	0	0	0	0	0				0	0	0	0
13:00	1733	1581	91.2	152	8.8				794	66	787	86
13:15	0	0	0	0	0				0	0	0	0
13:30	0	0	0	0	0				0	0	0	0
13:45	0	0	0	0	0				0	0	0	0
14:00	446	401	89.9	45	10.1				216	22	185	23
14:15	489	450	92	39	8				235	21	215	18
14:30	412	355	86.2	57	13.8				168	28	187	29
14:45	534	475	89	59	11				239	29	236	30
15:00	495	430	86.9	65	13.1				216	29	214	36

Summary Of Traffic Count
Transportation Development Division

Site: 24112010
County: Marion
City: Woodburn
Milepoint: 32.19
Count Number: 2.00

Date: 10/11/2016
Hours: 6:00 AM-10:00 PM
Highway #: 081
Location: Pacific Hwy East(OR99E) @ Hardcastle Ave.
Weather: Clear

Time of Day	Total Volume	NE and SW	% of Total	East and West	% of Total				Entering Volumes			
									North-East	East	South-West	West
15:15	518	465	89.8	53	10.2				226	25	239	28
15:30	581	506	87.1	75	12.9				274	43	232	32
15:45	582	483	83	99	17				278	62	205	37
16:00	548	486	88.7	62	11.3				272	33	214	29
16:15	620	530	85.5	90	14.5				289	55	241	35
16:30	645	554	85.9	91	14.1				335	47	219	44
16:45	626	539	86.1	87	13.9				324	46	215	41
17:00	608	528	86.8	80	13.2				276	36	252	44
17:15	607	521	85.8	86	14.2				290	51	231	35
17:30	583	495	84.9	88	15.1				258	47	237	41
17:45	515	452	87.8	63	12.2				253	35	199	28
18:00	1900	1615	85	285	15				911	146	704	139
18:15	0	0	0	0	0				0	0	0	0
18:30	0	0	0	0	0				0	0	0	0
18:45	0	0	0	0	0				0	0	0	0
19:00	1271	1045	82.2	226	17.8				605	112	440	114
19:15	0	0	0	0	0				0	0	0	0
19:30	0	0	0	0	0				0	0	0	0
19:45	0	0	0	0	0				0	0	0	0
20:00	816	683	83.7	133	16.3				372	81	311	52
20:15	0	0	0	0	0				0	0	0	0
20:30	0	0	0	0	0				0	0	0	0
20:45	0	0	0	0	0				0	0	0	0
21:00	517	460	89	57	11				254	27	206	30
21:15	0	0	0	0	0				0	0	0	0
21:30	0	0	0	0	0				0	0	0	0
21:45	0	0	0	0	0				0	0	0	0
Total Count	25257	22061	88	3196	13	0			11247	1652	10814	1544
24hr Factor	1.1	1.1		1.1		1.1			1.1	1.1	1.1	1.1
24hr Volume	27783	24267	88	3516	13	0			12372	1818	11896	1699

Summary Of Traffic Count
Transportation Development Division

Site: 24262010
County: Marion
City: Woodburn
Milepoint: 32.41
Count Number: 2.00

Date: 10/11/2016
Hours: 6:00 AM-10:00 PM
Highway #: 081
Pacific Hwy East(OR99E) @
Location: Lincoln Ave.
Weather: Clear

Time of Day	Total Volume	NE and SW	% of Total	East and West	% of Total				Entering Volumes			
									North-East	East	South-West	West
6:00	223	207	92.8	16	7.2				68	1	139	15
6:15	228	206	90.4	22	9.6				60	3	146	19
6:30	306	275	89.9	31	10.1				97	4	178	27
6:45	357	333	93.3	24	6.7				138	6	195	18
7:00	326	298	91.4	28	8.6				124	4	174	24
7:15	361	335	92.8	26	7.2				143	10	192	16
7:30	404	380	94.1	24	5.9				170	4	210	20
7:45	422	382	90.5	40	9.5				174	6	208	34
8:00	274	248	90.5	26	9.5				112	4	136	22
8:15	310	288	92.9	22	7.1				144	9	144	13
8:30	311	286	92	25	8				122	3	164	22
8:45	314	292	93	22	7				131	7	161	15
9:00	1244	1132	91	112	9				608	13	524	99
9:15	0	0	0	0	0				0	0	0	0
9:30	0	0	0	0	0				0	0	0	0
9:45	0	0	0	0	0				0	0	0	0
10:00	1380	1265	91.7	115	8.3				679	20	586	95
10:15	0	0	0	0	0				0	0	0	0
10:30	0	0	0	0	0				0	0	0	0
10:45	0	0	0	0	0				0	0	0	0
11:00	1507	1357	90	150	10				674	22	683	128
11:15	0	0	0	0	0				0	0	0	0
11:30	0	0	0	0	0				0	0	0	0
11:45	0	0	0	0	0				0	0	0	0
12:00	1681	1524	90.7	157	9.3				769	43	755	114
12:15	0	0	0	0	0				0	0	0	0
12:30	0	0	0	0	0				0	0	0	0
12:45	0	0	0	0	0				0	0	0	0
13:00	1633	1484	90.9	149	9.1				753	33	731	116
13:15	0	0	0	0	0				0	0	0	0
13:30	0	0	0	0	0				0	0	0	0
13:45	0	0	0	0	0				0	0	0	0
14:00	403	361	89.6	42	10.4				206	8	155	34
14:15	424	391	92.2	33	7.8				186	7	205	26
14:30	423	377	89.1	46	10.9				205	9	172	37
14:45	479	443	92.5	36	7.5				229	10	214	26
15:00	562	513	91.3	49	8.7				313	12	200	37

Summary Of Traffic Count
Transportation Development Division

Site: 24262010
County: Marion
City: Woodburn
Milepoint: 32.41
Count Number: 2.00

Date: 10/11/2016
Hours: 6:00 AM-10:00 PM
Highway #: 081
Location: Pacific Hwy East(OR99E) @ Lincoln Ave.
Weather: Clear

Time of Day	Total Volume	NE and SW	% of Total	East and West	% of Total				Entering Volumes			
									North-East	East	South-West	West
15:15	484	435	89.9	49	10.1				223	13	212	36
15:30	519	479	92.3	40	7.7				262	10	217	30
15:45	538	483	89.8	55	10.2				294	12	189	43
16:00	505	471	93.3	34	6.7				259	10	212	24
16:15	551	499	90.6	52	9.4				290	9	209	43
16:30	647	597	92.3	50	7.7				356	19	241	31
16:45	568	518	91.2	50	8.8				317	9	201	41
17:00	574	520	90.6	54	9.4				261	8	259	46
17:15	591	554	93.7	37	6.3				315	9	239	28
17:30	523	473	90.4	50	9.6				262	10	211	40
17:45	505	463	91.7	42	8.3				259	9	204	33
18:00	1925	1790	93	135	7				931	31	859	104
18:15	0	0	0	0	0				0	0	0	0
18:30	0	0	0	0	0				0	0	0	0
18:45	0	0	0	0	0				0	0	0	0
19:00	1141	1038	91	103	9				626	15	412	88
19:15	0	0	0	0	0				0	0	0	0
19:30	0	0	0	0	0				0	0	0	0
19:45	0	0	0	0	0				0	0	0	0
20:00	725	650	89.7	75	10.3				365	9	285	66
20:15	0	0	0	0	0				0	0	0	0
20:30	0	0	0	0	0				0	0	0	0
20:45	0	0	0	0	0				0	0	0	0
21:00	485	443	91.3	42	8.7				255	5	188	37
21:15	0	0	0	0	0				0	0	0	0
21:30	0	0	0	0	0				0	0	0	0
21:45	0	0	0	0	0				0	0	0	0
Total Count	23853	21790	92	2063	9	0			11380	416	10410	1647
24hr Factor	1.1	1.1		1.1		1.1			1.1	1.1	1.1	1.1
24hr Volume	26239	23969	92	2269	9	0			12518	458	11451	1812

Summary Of Traffic Count
Transportation Development Division

Site: 24272010
County: Marion
City: Woodburn
Milepoint: 32.87
Count Number: 2.00

Date: 10/11/2016
Hours: 6:00 AM-10:00 PM
Highway #: 081
Location: OR99E @ OR214 & Young St. (OR99E & OR214 common
Weather: Clear

Time of Day	Total Volume	NE and SW	% of Total	East and West	% of Total				Entering Volumes			
									North-East	East	South-West	West
6:00	264	165	62.5	99	37.5				63	62	102	37
6:15	294	170	57.8	124	42.2				86	74	84	50
6:30	394	248	62.9	146	37.1				111	81	137	65
6:45	393	262	66.7	131	33.3				130	92	132	39
7:00	412	281	68.2	131	31.8				147	86	134	45
7:15	413	265	64.2	148	35.8				138	94	127	54
7:30	462	302	65.4	160	34.6				161	93	141	67
7:45	491	330	67.2	161	32.8				175	102	155	59
8:00	311	212	68.2	99	31.8				116	57	96	42
8:15	352	231	65.6	121	34.4				134	88	97	33
8:30	334	233	69.8	101	30.2				126	70	107	31
8:45	305	206	67.5	99	32.5				128	67	78	32
9:00	1272	918	72.2	354	27.8				544	246	374	108
9:15	0	0	0	0	0				0	0	0	0
9:30	0	0	0	0	0				0	0	0	0
9:45	0	0	0	0	0				0	0	0	0
10:00	1433	1068	74.5	365	25.5				639	232	429	133
10:15	0	0	0	0	0				0	0	0	0
10:30	0	0	0	0	0				0	0	0	0
10:45	0	0	0	0	0				0	0	0	0
11:00	1574	1143	72.6	431	27.4				633	267	510	164
11:15	0	0	0	0	0				0	0	0	0
11:30	0	0	0	0	0				0	0	0	0
11:45	0	0	0	0	0				0	0	0	0
12:00	1765	1314	74.4	451	25.6				760	266	554	185
12:15	0	0	0	0	0				0	0	0	0
12:30	0	0	0	0	0				0	0	0	0
12:45	0	0	0	0	0				0	0	0	0
13:00	1647	1237	75.1	410	24.9				724	261	513	149
13:15	0	0	0	0	0				0	0	0	0
13:30	0	0	0	0	0				0	0	0	0
13:45	0	0	0	0	0				0	0	0	0
14:00	434	305	70.3	129	29.7				182	75	123	54
14:15	446	332	74.4	114	25.6				193	63	139	51
14:30	458	342	74.7	116	25.3				186	54	156	62
14:45	502	361	71.9	141	28.1				219	76	142	65
15:00	489	366	74.8	123	25.2				212	66	154	57

Summary Of Traffic Count
Transportation Development Division

Site: 24272010
County: Marion
City: Woodburn
Milepoint: 32.87
Count Number: 2.00

Date: 10/11/2016
Hours: 6:00 AM-10:00 PM
Highway #: 081
Location: OR99E @ OR214 & Young St. (OR99E & OR214 common
Weather: Clear

Time of Day	Total Volume	NE and SW	% of Total	East and West	% of Total				Entering Volumes			
									North-East	East	South-West	West
15:15	504	392	77.8	112	22.2				229	58	163	54
15:30	557	410	73.6	147	26.4				251	85	159	62
15:45	540	401	74.3	139	25.7				263	67	138	72
16:00	581	459	79	122	21				252	65	207	57
16:15	595	435	73.1	160	26.9				263	86	172	74
16:30	657	462	70.3	195	29.7				299	130	163	65
16:45	667	516	77.4	151	22.6				322	94	194	57
17:00	603	429	71.1	174	28.9				258	87	171	87
17:15	593	447	75.4	146	24.6				294	82	153	64
17:30	557	392	70.4	165	29.6				233	88	159	77
17:45	512	386	75.4	126	24.6				241	69	145	57
18:00	1814	1394	76.8	420	23.2				894	208	500	212
18:15	0	0	0	0	0				0	0	0	0
18:30	0	0	0	0	0				0	0	0	0
18:45	0	0	0	0	0				0	0	0	0
19:00	1225	904	73.8	321	26.2				585	152	319	169
19:15	0	0	0	0	0				0	0	0	0
19:30	0	0	0	0	0				0	0	0	0
19:45	0	0	0	0	0				0	0	0	0
20:00	744	551	74.1	193	25.9				343	88	208	105
20:15	0	0	0	0	0				0	0	0	0
20:30	0	0	0	0	0				0	0	0	0
20:45	0	0	0	0	0				0	0	0	0
21:00	516	391	75.8	125	24.2				262	47	129	78
21:15	0	0	0	0	0				0	0	0	0
21:30	0	0	0	0	0				0	0	0	0
21:45	0	0	0	0	0				0	0	0	0
Total Count	25110	18260	73	6850	28	0			10796	3978	7464	2872
24hr Factor	1.1	1.1		1.1		1.1			1.1	1.1	1.1	1.1
24hr Volume	27621	20086	73	7535	28	0			11876	4376	8211	3160

APPENDIX

B

Level of Service Description

TRAFFIC LEVELS OF SERVICE

Analysis of traffic volumes is useful in understanding the general nature of traffic in an area, but by itself indicates neither the ability of the street network to carry additional traffic nor the quality of service afforded by the street facilities. For this, the concept of level of service has been developed to subjectively describe traffic performance. Level of service can be measured at intersections and along key roadway segments.

Levels of service categories are similar to report card ratings for traffic performance. Intersections are typically the controlling bottlenecks of traffic flow and the ability of a roadway system to carry traffic efficiently is generally diminished in their vicinities. Levels of Service A, B and C indicate conditions where traffic moves without significant delays over periods of peak travel demand. Level of service D and E are progressively worse peak hour operating conditions and F conditions represent where demand exceeds the capacity of an intersection. Most urban communities set level of service D as the minimum acceptable level of service for peak hour operation and plan for level of service C or better for all other times of the day. The Highway Capacity Manual provides level of service calculation methodology for both intersections and arterials[1]. The following two sections provide interpretations of the analysis approaches.

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[1] *2000 Highway Capacity Manual*, Transportation Research Board, Washington D.C., 2000, Chapter 16 and 17.

UNSIGNALIZED INTERSECTIONS (Two-Way Stop Controlled)

Unsignalized intersection level of service is reported for the major street and minor street (generally, left turn movements). The method assesses available and critical gaps in the traffic stream which make it possible for side street traffic to enter the main street flow. The 2010 Highway Capacity Manual describes the detailed methodology. It is not unusual for an intersection to experience level of service E or F conditions for the minor street left turn movement. It should be understood that, often, a poor level of service is experienced by only a few vehicles and the intersection as a whole operates acceptably.

Unsignalized intersection levels of service are described in the following table.

Level-of-Service Criteria: Automobile Mode

Control Delay (s/vehicle)	**LOS by Volume-to-Capacity Ratio**	
	***v/c* ≤ 1.0**	***v/c* > 1.0**
0-10	A	F
>10-15	B	F
>15-25	C	F
>25-35	D	F
>35-50	E	F
>50	F	F

Note: The LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole

APPENDIX

C

Collision Data

DKS

Crash ID	Crash Date	Hour	1st Street	2nd Street	Lat	Long	Road Character	Collision Type	Crash Severity	Weather	Road Surface	Lighting	Cause
1440833	10/11/2011	19	PACIFIC HY 99E	MT JEFFERSON ST	45.149065	-122.833172	Straight	Pedestrian	Fatal	Rain	Wet	Dark-No Street Lights	Failed to Yield
1521327	8/17/2013	22	PACIFIC HY 99E	BLAINE ST	45.141148	-122.840226	Straight	Pedestrian	Serious Injury	Clear	Dry	Dark-Street Lights	Failed to Yield
1568353	10/18/2014	20	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843908	Intersection	Pedestrian	Serious Injury	Clear	Dry	Dark-No Street Lights	Disregarded the Traffic Signal
1607292	4/26/2015	2	PACIFIC HY 99E	YOUNG ST	45.137267	-122.843692	Straight	Pedestrian	Serious Injury	Clear	Dry	Dark-No Street Lights	Illegally in Roadway
1620227	10/10/2015	20	PACIFIC HY 99E	TOMLIN AVE	45.137747	-122.843264	Straight	Pedestrian	Serious Injury	Cloudy	Wet	Dark-No Street Lights	Illegally in Roadway
1404156	2/11/2011	20	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843907	Intersection	Turning	Injury	Cloudy	Dry	Dark-No Street Lights	Failed to Yield
1412003	5/26/2011	16	PACIFIC HY 99E	WILLIAMS AVE	45.144034	-122.837652	Alley	Turning	Injury	Rain	Wet	Daylight	Failed to Yield
1413388	6/3/2011	17	HILLSBORO-SILV HY	MERIDIAN DR	45.150250	-122.854938	Straight	Read end	Injury	Clear	Dry	Daylight	Folloing Too Close
1420418	8/13/2011	13	HILLSBORO-SILV HY	PROGRESS WAY	45.151413	-122.835860	Alley	Turning	Injury	Cloudy	Dry	Daylight	Failed to Yield
1425099	9/26/2011	15	HILLSBORO-SILV HY	MERIDIAN DR	45.150364	-122.854543	Straight	Read end	Injury	Cloudy	Dry	Daylight	Folloing Too Close
1434905	12/11/2011	17	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843907	Intersection	Turning	Injury	Cloudy	Dry	Dusk	Failed to Yield
1435017	12/14/2011	18	HILLSBORO-SILV HY	PROGRESS WAY	45.151426	-122.836454	Alley	Turning	Injury	Cloudy	Wet	Dark-No Street Lights	Failed to Yield
1458136	4/10/2012	16	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151359	-122.833750	Alley	Turning	Injury	Cloudy	Dry	Daylight	Careless
1458060	4/12/2012	15	HILLSBORO-SILV HY	PARK AVE	45.151556	-122.841469	Straight	Pedestrian	Injury	Cloudy	Dry	Daylight	Illegally in Roadway
1460409	5/1/2012	13	HILLSBORO-SILV HY	TIERRA LYNN DR	45.151483	-122.839029	Intersection	Read end	Injury	Clear	Dry	Daylight	Inattention
1463524	6/10/2012	18	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151295	-122.831216	Intersection	Read end	Injury	Clear	Dry	Daylight	Inattention
1465132	6/27/2012	16	HILLSBORO-SILV HY	MERIDIAN DR	45.150875	-122.852847	Straight	Read end	Injury	Clear	Dry	Daylight	Folloing Too Close
1469721	8/16/2012	20	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843907	Intersection	Read end	Injury	Clear	Dry	Daylight	Folloing Too Close
1473837	9/17/2012	17	HILLSBORO-SILV HY	PARK AVE	45.151541	-122.840836	Straight	Turning	Injury	Clear	Dry	Daylight	Improper Turn
1479413	11/3/2012	16	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151359	-122.833749	Alley	Turning	Injury	Cloudy	Dry	Daylight	Failed to Yield
1479831	11/3/2012	23	PACIFIC HY 99E	TOMLIN AVE	45.137868	-122.843155	Straight	Pedestrian	Injury	Rain	Wet	Dark-No Street Lights	Illegally in Roadway
1479829	11/8/2012	20	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151359	-122.833749	Straight	Bike	Injury	Clear	Dry	Dark-No Street Lights	Illegally in Roadway
1507551	6/21/2013	10	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151327	-122.832482	Alley	Turning	Injury	Cloudy	Dry	Daylight	Failed to Yield
1508607	7/1/2013	15	PACIFIC HY 99E	YOUNG ST	45.137627	-122.843370	Straight	Read end	Injury	Clear	Dry	Daylight	Folloing Too Close
1509881	7/13/2013	6	HILLSBORO-SILV HY	MERIDIAN DR	45.150420	-122.854345	Intersection	Turning	Injury	Clear	Dry	Daylight	Disregarded the Traffic Signal
1511615	7/30/2013	6	PACIFIC HY 99E	YOUNG ST	45.137024	-122.843908	Intersection	Angle	Injury	Clear	Dry	Daylight	Disregarded the Traffic Signal
1513394	8/16/2013	17	HILLSBORO-SILV HY	PARK AVE	45.151548	-122.841062	Intersection	Turning	Injury	Clear	Dry	Daylight	Careless
1521393	10/1/2013	12	HILLSBORO-SILV HY	PARK AVE	45.151533	-122.840609	Straight	Read end	Injury	Rain	Wet	Daylight	Reckless
1550393	1/10/2014	13	HILLSBORO-SILV HY	PROGRESS WAY	45.151483	-122.839029	Intersection	Angle	Injury	Clear	Dry	Daylight	Passed Stop Sign
1559900	7/11/2014	15	PACIFIC HY 99E	HILLSBORO-SILV HY	45.151795	-122.830780	Straight	Read end	Injury	Clear	Dry	Daylight	Folloing Too Close
1560555	7/22/2014	15	HILLSBORO-SILV HY	PARK AVE	45.151548	-122.841062	Intersection	Read end	Injury	Clear	Dry	Daylight	Folloing Too Close
1561608	8/2/2014	12	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151295	-122.831216	Intersection	Head On	Injury	Clear	Dry	Daylight	Improper Driving
1565307	9/13/2014	16	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151348	-122.833327	Straight	Fixed Object	Injury	Clear	Dry	Daylight	Improper Turn
1568109	10/16/2014	13	PACIFIC HY 99E	MCKINLEY ST	45.141628	-122.839797	Alley	Turning	Injury	Clear	Dry	Daylight	Failed to Yield
1571432	11/12/2014	14	HILLSBORO-SILV HY	PROGRESS WAY	45.151483	-122.839031	Intersection	Turning	Injury	Clear	Dry	Daylight	Failed to Yield
1575080	12/14/2014	15	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151358	-122.833750	Alley	Turning	Injury	Cloudy	Dry	Daylight	Failed to Yield
1603729	2/21/2015	9	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843908	Intersection	Angle	Injury	Clear	Dry	Daylight	Disregarded the Traffic Signal
1604337	3/3/2015	17	PACIFIC HY 99E	HILLSBORO-SILV HY	45.152669	-122.830017	Alley	Turning	Injury	Clear	Dry	Daylight	Failed to Yield
1604403	3/5/2015	15	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151358	-122.833750	Alley	Angle	Injury	Clear	Dry	Daylight	Careless
1605025	3/15/2015	21	PACIFIC HY 99E	YOUNG ST	45.136642	-122.844253	Straight	Pedestrian	Injury	Cloudy	Dry	Dark-No Street Lights	Illegally in Roadway
1627480	4/21/2015	17	HILLSBORO-SILV HY	FRONT - HOOD CN	45.151981	-122.849086	Straight	Pedestrian	Injury	Clear	Dry	Daylight	Failed to Yield
1608156	5/10/2015	21	HILLSBORO-SILV HY	PROGRESS WAY	45.151414	-122.835858	Alley	Turning	Injury	Clear	Dry	Dark-No Street Lights	Disregarded the Traffic Signal
1616662	9/10/2015	14	PACIFIC HY 99E	BLAINE ST	45.141025	-122.840336	Alley	Turning	Injury	Clear	Dry	Daylight	Failed to Yield
1617177	9/19/2015	19	HILLSBORO-SILV HY	PROGRESS WAY	45.151422	-122.836256	Straight	Read end	Injury	Clear	Dry	Dusk	Folloing Too Close
1620466	10/14/2015	12	PACIFIC HY 99E	WILLIAMS AVE	45.143683	-122.837969	Alley	Bike	Injury	Clear	Dry	Daylight	Driving too Fast for Conditions
1621074	10/23/2015	19	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843908	Intersection	Angle	Injury	Clear	Dry	Dark-No Street Lights	Disregarded the Traffic Signal
1623213	11/23/2015	16	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843908	Intersection	Turning	Injury	Rain	Wet	Dusk	Disregarded the Traffic Signal
1405231	1/3/2011	16	PACIFIC HY 99E	JAMES ST	45.146240	-122.835665	Alley	Turning	Possible Injury	Clear	Dry	Daylight	Failed to Yield
1405119	1/4/2011	19	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151300	-122.831427	Intersection	Read end	Possible Injury	Clear	Dry	Dark-No Street Lights	Folloing Too Close
1405386	1/21/2011	10	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151295	-122.831216	Intersection	Read end	Possible Injury	Cloudy	Wet	Daylight	Folloing Too Close
1405237	1/25/2011	15	PACIFIC HY 99E	HILLSBORO-SILV HY	45.151420	-122.831107	Straight	Read end	Possible Injury	Clear	Dry	Daylight	Folloing Too Close
1405245	2/1/2011	12	PACIFIC HY 99E	LAUREL AVE	45.139553	-122.841653	Alley	Turning	Possible Injury	Clear	Dry	Daylight	Failed to Yield
1405282	2/14/2011	18	PACIFIC HY 99E	HILLSBORO-SILV HY	45.151420	-122.831107	Straight	Sideswipe	Possible Injury	Rain	Wet	Dusk	Folloing Too Close
1408913	4/6/2011	10	HILLSBORO-SILV HY	FRONT - HOOD CN	45.151981	-122.849086	Straight	Read end	Possible Injury	Cloudy	Wet	Daylight	Folloing Too Close
1411979	5/25/2011	16	PACIFIC HY 99E	HARDCASTLE AVE	45.145406	-122.836402	Straight	Read end	Possible Injury	Clear	Dry	Daylight	Folloing Too Close
1411995	5/25/2011	12	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151300	-122.831427	Straight	Read end	Possible Injury	Cloudy	Wet	Daylight	Folloing Too Close
1413401	6/20/2011	17	PACIFIC HY 99E	HARDCASTLE AVE	45.145162	-122.836622	Straight	Read end	Possible Injury	Clear	Dry	Daylight	Folloing Too Close
1419709	8/1/2011	12	HILLSBORO-SILV HY	PARK AVE	45.151552	-122.841261	Straight	Read end	Possible Injury	Clear	Dry	Daylight	Folloing Too Close

Crash ID	Crash Date	Hour	1st Street	2nd Street	Lat	Long	Road Character	Collision Type	Crash Severity	Weather	Road Surface	Lighting	Cause
1419647	8/1/2011	12	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843907	Intersection	Turning	Possible Injury	Clear	Dry	Daylight	Failed to Yield
1419997	8/10/2011	14	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151295	-122.831216	Intersection	Read end	Possible Injury	Clear	Dry	Daylight	Following Too Close
1420415	8/16/2011	11	PACIFIC HY 99E	HARDCASTLE AVE	45.145763	-122.836086	Straight	Sideswipe	Possible Injury	Clear	Dry	Daylight	Following Too Close
1420950	8/20/2011	16	PACIFIC HY 99E	TOMLIN AVE	45.138109	-122.842941	Intersection	Turning	Possible Injury	Clear	Dry	Daylight	Careless
1423258	9/4/2011	12	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843907	Intersection	Read end	Possible Injury	Clear	Dry	Daylight	Following Too Close
1426622	10/4/2011	15	HILLSBORO-SILV HY	TIERRA LYNN DR	45.151413	-122.835860	Alley	Turning	Possible Injury	Cloudy	Wet	Daylight	Disregarded the Traffic Signal
1429971	10/31/2011	16	HILLSBORO-SILV HY	MERIDIAN DR	45.150420	-122.854345	Intersection	Read end	Possible Injury	Clear	Dry	Daylight	Following Too Close
1431221	11/7/2011	5	PACIFIC HY 99E	TOMLIN AVE	45.138466	-122.842623	Straight	Fixed Object	Possible Injury	Clear	Dry	Dark-No Street Lights	Fatigue
1431283	11/15/2011	17	HILLSBORO-SILV HY	FRONT - HOOD CN	45.151981	-122.849086	Straight	Read end	Possible Injury	Cloudy	Dry	Dusk	Following Too Close
1435023	11/23/2011	13	HILLSBORO-SILV HY	PROGRESS WAY	45.151426	-122.836454	Alley	Pedestrian	Possible Injury	Rain	Wet	Daylight	Failed to Yield
1452363	2/7/2012	7	HILLSBORO-SILV HY	MERIDIAN DR	45.149912	-122.856115	Straight	Read end	Possible Injury	Clear	Dry	Daylight	Inattention
1454311	2/27/2012	12	HILLSBORO-SILV HY	PARK AVE	45.151548	-122.841062	Intersection	Read end	Possible Injury	Clear	Dry	Daylight	Following Too Close
1454317	2/29/2012	15	HILLSBORO-SILV HY	PARK AVE	45.150762	-122.853220	Straight	Read end	Possible Injury	Cloudy	Wet	Daylight	Speeding
1457811	4/4/2012	11	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151359	-122.833753	Alley	Turning	Possible Injury	Clear	Dry	Daylight	Failed to Yield
1459499	4/27/2012	13	HILLSBORO-SILV HY	MERIDIAN DR	45.150192	-122.855139	Straight	Read end	Possible Injury	Cloudy	Dry	Daylight	Following Too Close
1461360	5/9/2012	18	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151322	-122.832275	Alley	Turning	Possible Injury	Clear	Dry	Daylight	Failed to Yield
1461351	5/16/2012	14	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843907	Intersection	Turning	Possible Injury	Clear	Dry	Daylight	Failed to Yield
1465124	6/20/2012	16	HILLSBORO-SILV HY	PROGRESS WAY	45.151413	-122.835858	Alley	Turning	Possible Injury	Clear	Dry	Daylight	Disregarded the Traffic Signal
1467550	7/17/2012	14	HILLSBORO-SILV HY	PROGRESS WAY	45.151483	-122.839029	Intersection	Turning	Possible Injury	Cloudy	Dry	Daylight	Failed to Yield
1472996	9/6/2012	13	PACIFIC HY 99E	HILLSBORO-SILV HY	45.137387	-122.843585	Straight	Read end	Possible Injury	Clear	Dry	Daylight	Following Too Close
1473414	9/13/2012	6	PACIFIC HY 99E	YOUNG ST	45.137267	-122.843692	Straight	Read end	Possible Injury	Clear	Dry	Dawn	Following Too Close
1473994	9/20/2012	15	HILLSBORO-SILV HY	MERIDIAN DR	45.150420	-122.854345	Intersection	Read end	Possible Injury	Clear	Dry	Daylight	Following Too Close
1476354	10/6/2012	15	PACIFIC HY 99E	JAMES ST	45.146480	-122.835452	Alley	Turning	Possible Injury	Clear	Dry	Daylight	Failed to Yield
1483437	12/14/2012	11	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151359	-122.833749	Alley	Turning	Possible Injury	Cloudy	Wet	Daylight	Failed to Yield
1500465	1/4/2013	18	PACIFIC HY 99E	YOUNG ST	45.137024	-122.843908	Intersection	Angle	Possible Injury	Clear	Dry	Dark-No Street Lights	Disregarded the Traffic Signal
1503179	1/17/2013	18	PACIFIC HY 99E	YOUNG ST	45.137627	-122.843370	Alley	Turning	Possible Injury	Clear	Dry	Dark-No Street Lights	Failed to Yield
1500653	1/21/2013	18	PACIFIC HY 99E	HARDCASTLE AVE	45.146001	-122.835876	Alley	Pedestrian	Possible Injury	Fog	Dry	Dark-No Street Lights	Failed to Yield
1502893	4/27/2013	13	PACIFIC HY 99E	JAMES ST	45.146478	-122.835455	Straight	Read end	Possible Injury	Clear	Dry	Daylight	Inattention
1502899	4/27/2013	14	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151359	-122.833748	Alley	Angle	Possible Injury	Clear	Dry	Daylight	Failed to Yield
1503708	5/8/2013	12	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151295	-122.831216	Intersection	Read end	Possible Injury	Clear	Dry	Daylight	Following Too Close
1504743	5/22/2013	10	PACIFIC HY 99E	LINCOLN ST	45.142377	-122.839136	Straight	Read end	Possible Injury	Rain	Wet	Daylight	Following Too Close
1506474	6/9/2013	3	PACIFIC HY 99E	LINCOLN ST	45.142249	-122.839248	Straight	Fixed Object	Possible Injury	Clear	Dry	Dark-No Street Lights	Fatigue
1507943	6/28/2013	19	PACIFIC HY 99E	ALEXANDRA AVE	45.148199	-122.833938	Straight	Sideswipe	Possible Injury	Clear	Dry	Daylight	Following Too Close
1508939	7/2/2013	12	HILLSBORO-SILV HY	PARK AVE	45.151548	-122.841062	Intersection	Read end	Possible Injury	Clear	Dry	Daylight	Following Too Close
1508948	7/3/2013	16	PACIFIC HY 99E	LINCOLN ST	45.142505	-122.839023	Straight	Read end	Possible Injury	Clear	Dry	Daylight	Following Too Close
1508987	7/7/2013	15	PACIFIC HY 99E	YOUNG ST	45.137024	-122.843908	Intersection	Angle	Possible Injury	Clear	Dry	Daylight	Disregarded the Traffic Signal
1510926	7/19/2013	15	PACIFIC HY 99E	BLAINE ST	45.141148	-122.840226	Straight	Read end	Possible Injury	Clear	Dry	Daylight	Following Too Close
1517781	9/3/2013	16	HILLSBORO-SILV HY	MERIDIAN DR	45.150591	-122.853783	Straight	Read end	Possible Injury	Clear	Dry	Daylight	Following Too Close
1518859	9/13/2013	15	HILLSBORO-SILV HY	FRONT - HOOD CN	45.151943	-122.849272	Straight	Read end	Possible Injury	Clear	Dry	Daylight	Following Too Close
1519001	9/16/2013	17	PACIFIC HY 99E	YOUNG ST	45.137024	-122.843908	Intersection	Turning	Possible Injury	Cloudy	Dry	Daylight	Failed to Yield
1521639	10/4/2013	17	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151316	-122.832060	Straight	Read end	Possible Injury	Clear	Dry	Daylight	Following Too Close
1522284	10/10/2013	6	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151294	-122.831216	Intersection	Turning	Possible Injury	Cloudy	Wet	Dawn	Failed to Yield
1529213	11/26/2013	13	HILLSBORO-SILV HY	PARK AVE	45.151548	-122.841062	Intersection	Sideswipe	Possible Injury	Clear	Dry	Daylight	Careless
1544878	12/8/2013	17	HILLSBORO-SILV HY	TIERRA LYNN DR	45.151526	-122.840384	Straight	Head On	Possible Injury	Clear	Dry	Dusk	Crossed Centerline
1542714	12/29/2013	19	HILLSBORO-SILV HY	MERIDIAN DR	45.150250	-122.854939	Straight	Read end	Possible Injury	Fog	Dry	Dark-No Street Lights	Following Too Close
1550176	1/7/2014	15	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151316	-122.832060	Straight	Read end	Possible Injury	Rain	Wet	Daylight	Following Too Close
1551650	1/17/2014	17	PACIFIC HY 99E	HARDCASTLE AVE	45.144911	-122.836851	Alley	Pedestrian	Possible Injury	Fog	Dry	Dark-No Street Lights	Failed to Yield
1551786	1/20/2014	14	HILLSBORO-SILV HY	MERIDIAN DR	45.151217	-122.851719	Straight	Read end	Possible Injury	Clear	Dry	Daylight	Following Too Close
1551826	1/22/2014	13	HILLSBORO-SILV HY	TIERRA LYNN DR	45.151413	-122.835860	Alley	Angle	Possible Injury	Cloudy	Dry	Daylight	Disregarded the Traffic Signal
1552595	2/6/2014	15	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843907	Intersection	Angle	Possible Injury	Snow	Snow	Daylight	Disregarded the Traffic Signal
1554828	3/22/2014	18	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843907	Intersection	Angle	Possible Injury	Clear	Dry	Daylight	Disregarded the Traffic Signal
1556198	4/20/2014	12	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151359	-122.833749	Alley	Turning	Possible Injury	Clear	Dry	Daylight	Failed to Yield
1557107	5/8/2014	16	PACIFIC HY 99E	JAMES ST	45.146964	-122.835027	Straight	Read end	Possible Injury	Clear	Dry	Daylight	Following Too Close
1564684	5/25/2014	14	PACIFIC HY 99E	WILLIAMS AVE	45.143917	-122.837758	Straight	Read end	Possible Injury	Fog	Dry	Daylight	Following Too Close
1559340	7/5/2014	14	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151294	-122.831217	Intersection	Read end	Possible Injury	Clear	Dry	Daylight	Following Too Close
1560100	7/17/2014	19	PACIFIC HY 99E	MT JEFFERSON ST	45.149939	-122.832425	Alley	Turning	Possible Injury	Clear	Dry	Daylight	Following Too Close
1560272	7/23/2014	16	PACIFIC HY 99E	HILLSBORO-SILV HY	45.153294	-122.829469	Alley	Turning	Possible Injury	Cloudy	Dry	Daylight	Failed to Yield
1562463	8/13/2014	14	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151295	-122.831216	Intersection	Pedestrian	Possible Injury	Clear	Dry	Daylight	Failed to Yield

Crash ID	Crash Date	Hour	1st Street	2nd Street	Lat	Long	Road Character	Collision Type	Crash Severity	Weather	Road Surface	Lighting	Cause
1563093	8/21/2014	21	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151305	-122.831638	Straight	Read end	Possible Injury	Clear	Dry	Dark-No Street Lights	Driving too Fast for Conditions
1571958	11/5/2014	15	HILLSBORO-SILV HY	5TH ST	45.150419	-122.854344	Intersection	Read end	Possible Injury	Cloudy	Dry	Daylight	Folloing Too Close
1572199	11/20/2014	15	HILLSBORO-SILV HY	PROGRESS WAY	45.151414	-122.835858	Alley	Turning	Possible Injury	Clear	Dry	Daylight	Failed to Yield
1575036	12/14/2014	17	PACIFIC HY 99E	HARDCASTLE AVE	45.144786	-122.836967	Straight	Read end	Possible Injury	Clear	Dry	Dark-No Street Lights	Reckless
1575823	12/22/2014	18	PACIFIC HY 99E	LAUREL AVE	45.139061	-122.842094	Alley	Turning	Possible Injury	Cloudy	Dry	Dark-Street Lights	Failed to Yield
1579268	12/23/2014	8	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843908	Intersection	Read end	Possible Injury	Cloudy	Wet	Daylight	Folloing Too Close
1602196	1/16/2015	16	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151328	-122.832483	Alley	Turning	Possible Injury	Clear	Dry	Daylight	Failed to Yield
1603625	2/19/2015	18	PACIFIC HY 99E	HARDCASTLE AVE	45.144911	-122.836850	Straight	Read end	Possible Injury	Cloudy	Dry	Dark-No Street Lights	Inattention
1604591	3/9/2015	13	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151342	-122.833117	Straight	Read end	Possible Injury	Clear	Dry	Daylight	Folloing Too Close
1605246	3/18/2015	11	PACIFIC HY 99E	HARDCASTLE AVE	45.145036	-122.836736	Straight	Read end	Possible Injury	Clear	Dry	Daylight	Inattention
1605431	3/25/2015	14	HILLSBORO-SILV HY	PARK AVE	45.151547	-122.841061	Intersection	Angle	Possible Injury	Cloudy	Dry	Daylight	Failed to Yield
1605459	3/26/2015	14	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151358	-122.833750	Alley	Turning	Possible Injury	Clear	Dry	Daylight	Failed to Yield
1605507	3/28/2015	11	PACIFIC HY 99E	HARDCASTLE AVE	45.145883	-122.835981	Straight	Read end	Possible Injury	Cloudy	Dry	Daylight	Folloing Too Close
1605731	3/31/2015	15	PACIFIC HY 99E	LINCOLN ST	45.142378	-122.839136	Straight	Read end	Possible Injury	Cloudy	Dry	Daylight	Folloing Too Close
1627474	4/15/2015	12	HILLSBORO-SILV HY	PARK AVE	45.151558	-122.841658	Straight	Read end	Possible Injury	Clear	Dry	Daylight	Folloing Too Close
1607509	5/1/2015	19	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151333	-122.832694	Straight	Read end	Possible Injury	Clear	Dry	Daylight	Folloing Too Close
1607951	5/6/2015	7	HILLSBORO-SILV HY	FRONT - HOOD CN	45.152047	-122.846969	Straight	Read end	Possible Injury	Clear	Dry	Daylight	Folloing Too Close
1608140	5/6/2015	11	PACIFIC HY 99E	WILLIAMS AVE	45.144408	-122.837308	Alley	Pedestrian	Possible Injury	Clear	Dry	Daylight	Failed to Yield
1611518	6/18/2015	14	PACIFIC HY 99E	MCKINLEY ST	45.141744	-122.839692	Straight	Read end	Possible Injury	Clear	Dry	Daylight	Careless
1612788	7/13/2015	0	HILLSBORO-SILV HY	MERIDIAN DR	45.150875	-122.852844	Straight	Read end	Possible Injury	Clear	Dry	Dark-Street Lights	Inattention
1615089	8/14/2015	11	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151358	-122.833750	Alley	Turning	Possible Injury	Cloudy	Dry	Daylight	Failed to Yield
1615351	8/24/2015	13	HILLSBORO-SILV HY	PARK AVE	45.151547	-122.841061	Intersection	Read end	Possible Injury	Clear	Dry	Daylight	Folloing Too Close
1615543	8/26/2015	9	PACIFIC HY 99E	HILLSBORO-SILV HY	45.151544	-122.830997	Straight	Read end	Possible Injury	Clear	Dry	Daylight	Folloing Too Close
1616680	9/10/2015	9	PACIFIC HY 99E	YOUNG ST	45.136833	-122.844081	Straight	Sideswipe	Possible Injury	Clear	Dry	Daylight	Folloing Too Close
1620221	10/10/2015	20	PACIFIC HY 99E	MT JEFFERSON ST	45.148694	-122.833500	Alley	Turning	Possible Injury	Rain	Wet	Dark-No Street Lights	Failed to Yield
1621317	10/27/2015	16	PACIFIC HY 99E	HILLSBORO-SILV HY	45.152669	-122.830017	Alley	Turning	Possible Injury	Cloudy	Dry	Daylight	Other
1628491	11/7/2015	11	PACIFIC HY 99E	HARDCASTLE AVE	45.145525	-122.836297	Alley	Turning	Possible Injury	Unknown	Unknown	Daylight	Careless
1622854	11/12/2015	16	HILLSBORO-SILV HY	TIERRA LYNN DR	45.151414	-122.835858	Alley	Turning	Possible Injury	Rain	Wet	Daylight	Failed to Yield
1622935	11/14/2015	13	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151358	-122.833750	Alley	Angle	Possible Injury	Cloudy	Dry	Daylight	Failed to Yield
1623085	11/17/2015	10	PACIFIC HY 99E	TOMLIN AVE	45.137989	-122.843047	Straight	Fixed Object	Possible Injury	Rain	Wet	Daylight	Careless
1623247	11/28/2015	21	HILLSBORO-SILV HY	TIERRA LYNN DR	45.151431	-122.836653	Alley	Turning	Possible Injury	Clear	Dry	Dark-No Street Lights	Other
1624804	12/14/2015	17	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151347	-122.833328	Straight	Read end	Possible Injury	Rain	Wet	Dark-No Street Lights	Other
1624831	12/14/2015	15	HILLSBORO-SILV HY	5TH ST	45.150417	-122.854356	Intersection	Read end	Possible Injury	Cloudy	Wet	Daylight	Careless
1625377	12/22/2015	8	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843908	Intersection	Turning	Possible Injury	Cloudy	Wet	Daylight	Improper Turn
1625470	12/23/2015	13	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151294	-122.831217	Intersection	Backing	Possible Injury	Rain	Wet	Daylight	Improper Driving
1405450	2/10/2011	13	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151343	-122.833116	Alley	Turning	Property Damage Only	Clear	Dry	Daylight	Improper Turn
1405458	2/12/2011	19	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151295	-122.831216	Intersection	Turning	Property Damage Only	Rain	Wet	Dark-No Street Lights	Improper Turn
1405321	3/3/2011	17	PACIFIC HY 99E	SILVERTON AVE	45.136448	-122.844426	Alley	Turning	Property Damage Only	Cloudy	Dry	Daylight	Failed to Yield
1406473	3/9/2011	17	PACIFIC HY 99E	YOUNG ST	45.136833	-122.844080	Alley	Turning	Property Damage Only	Rain	Wet	Dusk	Failed to Yield
1410737	4/19/2011	16	HILLSBORO-SILV HY	PROGRESS WAY	45.151413	-122.835860	Alley	Turning	Property Damage Only	Clear	Dry	Daylight	Failed to Yield
1410750	4/22/2011	13	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151370	-122.834171	Alley	Turning	Property Damage Only	Clear	Dry	Daylight	Failed to Yield
1410621	4/28/2011	14	PACIFIC HY 99E	LINCOLN ST	45.142377	-122.839136	Alley	Turning	Property Damage Only	Rain	Wet	Daylight	Failed to Yield
1416023	5/16/2011	17	PACIFIC HY 99E	HARDCASTLE AVE	45.145406	-122.836402	Straight	Read end	Property Damage Only	Rain	Wet	Daylight	Driving too Fast for Conditions
1413880	6/7/2011	6	PACIFIC HY 99E	YOUNG ST	45.136641	-122.844253	Straight	Read end	Property Damage Only	Cloudy	Dry	Daylight	Improper Driving
1413883	6/14/2011	16	HILLSBORO-SILV HY	PARK AVE	45.151548	-122.841062	Intersection	Read end	Property Damage Only	Clear	Dry	Daylight	Folloing Too Close
1416710	7/14/2011	13	HILLSBORO-SILV HY	PARK AVE	45.151548	-122.841062	Intersection	Angle	Property Damage Only	Clear	Dry	Daylight	Failed to Yield
1416737	7/17/2011	14	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151295	-122.831216	Intersection	Read end	Property Damage Only	Rain	Wet	Daylight	Careless
1416690	7/19/2011	13	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843907	Intersection	Angle	Property Damage Only	Clear	Dry	Daylight	Failed to Yield
1419659	8/2/2011	20	PACIFIC HY 99E	BLAINE ST	45.141389	-122.840010	Straight	Read end	Property Damage Only	Clear	Dry	Dusk	Folloing Too Close
1419714	8/6/2011	15	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151370	-122.834171	Alley	Sideswipe	Property Damage Only	Clear	Dry	Daylight	Failed to Yield
1420408	8/11/2011	20	PACIFIC HY 99E	HARDCASTLE AVE	45.145036	-122.836736	Alley	Read end	Property Damage Only	Unknown	Unknown	Dusk	Driving too Fast for Conditions
1421579	8/28/2011	16	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151370	-122.834171	Alley	Turning	Property Damage Only	Clear	Dry	Daylight	Failed to Yield
1423266	9/13/2011	16	PACIFIC HY 99E	LINCOLN ST	45.142377	-122.839136	Alley	Read end	Property Damage Only	Clear	Dry	Daylight	Folloing Too Close
1426605	10/6/2011	17	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151370	-122.834171	Alley	Turning	Property Damage Only	Cloudy	Dry	Daylight	Failed to Yield
1432276	11/30/2011	7	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843907	Intersection	Angle	Property Damage Only	Cloudy	Wet	Daylight	Disregarded the Traffic Signal
1432333	11/30/2011	9	HILLSBORO-SILV HY	FRONT - HOOD CN	45.151794	-122.844829	Straight	Read end	Property Damage Only	Cloudy	Wet	Daylight	Folloing Too Close
1432274	11/30/2011	19	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843907	Intersection	Backing	Property Damage Only	Clear	Dry	Dark-No Street Lights	Improper Driving
1432911	12/5/2011	13	PACIFIC HY 99E	YOUNG ST	45.136448	-122.844426	Alley	Turning	Property Damage Only	Clear	Dry	Daylight	Failed to Yield

Crash ID	Crash Date	Hour	1st Street	2nd Street	Lat	Long	Road Character	Collision Type	Crash Severity	Weather	Road Surface	Lighting	Cause
1434911	12/16/2011	17	PACIFIC HY 99E	HARDCASTLE AVE	45.145406	-122.836402	Straight	Read end	Property Damage Only	Cloudy	Dry	Dusk	Other
1435801	12/23/2011	11	HILLSBORO-SILV HY	PARK AVE	45.151548	-122.841062	Intersection	Read end	Property Damage Only	Clear	Dry	Daylight	Inattention
1435804	12/28/2011	6	HILLSBORO-SILV HY	PARK AVE	45.151552	-122.841261	Straight	Read end	Property Damage Only	Rain	Wet	Dawn	Folloing Too Close
1450667	1/13/2012	8	HILLSBORO-SILV HY	PACIFIC HY 99E	45.152178	-122.830445	Alley	Turning	Property Damage Only	Unknown	Unknown	Daylight	Failed to Yield
1450670	1/14/2012	19	PACIFIC HY 99E	TOMLIN AVE	45.138109	-122.842941	Intersection	Turning	Property Damage Only	Cloudy	Wet	Dark-No Street Lights	Failed to Yield
1451583	1/26/2012	14	PACIFIC HY 99E	YOUNG ST	45.136648	-122.844246	Straight	Read end	Property Damage Only	Clear	Dry	Daylight	Folloing Too Close
1451602	1/29/2012	18	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843907	Intersection	Turning	Property Damage Only	Rain	Wet	Dark-No Street Lights	Disregarded the Traffic Signal
1452353	2/1/2012	16	HILLSBORO-SILV HY	FRONT - HOOD CN	45.151944	-122.849267	Straight	Read end	Property Damage Only	Clear	Dry	Daylight	Driving too Fast for Conditions
1454307	2/23/2012	15	HILLSBORO-SILV HY	MERIDIAN DR	45.150363	-122.854544	Straight	Read end	Property Damage Only	Clear	Dry	Daylight	Folloing Too Close
1453891	2/28/2012	18	PACIFIC HY 99E	LINCOLN ST	45.142250	-122.839247	Straight	Read end	Property Damage Only	Rain	Wet	Dark-Street Lights	Folloing Too Close
1453890	2/28/2012	11	PACIFIC HY 99E	LINCOLN ST	45.142250	-122.839247	Straight	Sideswipe	Property Damage Only	Cloudy	Dry	Daylight	Folloing Too Close
1454303	2/29/2012	6	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843907	Intersection	Angle	Property Damage Only	Snow	Snow	Dawn	Disregarded the Traffic Signal
1454301	2/29/2012	17	PACIFIC HY 99E	WILLIAMS AVE	45.143803	-122.837861	Straight	Fixed Object	Property Damage Only	Cloudy	Dry	Daylight	Reckless
1459471	3/1/2012	6	PACIFIC HY 99E	TOMLIN AVE	45.138230	-122.842833	Straight	Fixed Object	Property Damage Only	Unknown	Unknown	Dark-No Street Lights	Improper Driving
1456252	3/13/2012	10	PACIFIC HY 99E	LINCOLN ST	45.143569	-122.838072	Alley	Read end	Property Damage Only	Rain	Wet	Daylight	Folloing Too Close
1456259	3/16/2012	10	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843907	Intersection	Sideswipe	Property Damage Only	Clear	Dry	Daylight	Improper Overtake
1456942	3/27/2012	10	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151375	-122.834383	Straight	Turning	Property Damage Only	Rain	Wet	Daylight	Failed to Yield
1456944	3/30/2012	12	PACIFIC HY 99E	YOUNG ST	45.136833	-122.844080	Straight	Sideswipe	Property Damage Only	Rain	Wet	Daylight	Folloing Too Close
1458142	4/9/2012	17	HILLSBORO-SILV HY	MERIDIAN DR	45.150420	-122.854345	Intersection	Read end	Property Damage Only	Clear	Dry	Daylight	Folloing Too Close
1461705	5/24/2012	18	PACIFIC HY 99E	LINCOLN ST	45.142381	-122.839132	Alley	Read end	Property Damage Only	Rain	Wet	Daylight	Driving too Fast for Conditions
1462776	5/30/2012	16	PACIFIC HY 99E	HILLSBORO-SILV HY	45.151420	-122.831107	Straight	Read end	Property Damage Only	Clear	Dry	Daylight	Improper Driving
1462779	6/1/2012	16	HILLSBORO-SILV HY	MERIDIAN DR	45.150761	-122.853222	Straight	Read end	Property Damage Only	Clear	Dry	Daylight	Folloing Too Close
1464006	6/2/2012	0	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151348	-122.833331	Alley	Fixed Object	Property Damage Only	Rain	Wet	Dark-Street Lights	Driving too Fast for Conditions
1465115	6/24/2012	13	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843907	Intersection	Read end	Property Damage Only	Unknown	Unknown	Daylight	Folloing Too Close
1468041	7/21/2012	21	PACIFIC HY 99E	HARDCASTLE AVE	45.145408	-122.836400	Straight	Sideswipe	Property Damage Only	Clear	Dry	Dark-No Street Lights	Folloing Too Close
1474399	9/22/2012	7	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151327	-122.832483	Straight	Sideswipe	Property Damage Only	Clear	Dry	Daylight	Folloing Too Close
1476324	10/1/2012		PACIFIC HY 99E	YOUNG ST	45.137025	-122.843907	Intersection	Angle	Property Damage Only	Clear	Dry	Dark-No Street Lights	Disregarded the Traffic Signal
1481091	11/26/2012	9	HILLSBORO-SILV HY	PROGRESS WAY	45.151483	-122.839029	Intersection	Turning	Property Damage Only	Clear	Dry	Daylight	Improper Overtake
1481714	12/2/2012	19	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843907	Intersection	Turning	Property Damage Only	Rain	Wet	Dark-No Street Lights	Failed to Yield
1483075	12/4/2012	17	HILLSBORO-SILV HY	MERIDIAN DR	45.150250	-122.854940	Straight	Read end	Property Damage Only	Rain	Wet	Dusk	Driving too Fast for Conditions
1483417	12/14/2012	17	HILLSBORO-SILV HY	MERIDIAN DR	45.150534	-122.853970	Straight	Read end	Property Damage Only	Cloudy	Wet	Dusk	Driving too Fast for Conditions
1484475	12/20/2012	18	PACIFIC HY 99E	HILLSBORO-SILV HY	45.150555	-122.831882	Alley	Turning	Property Damage Only	Cloudy	Wet	Dark-No Street Lights	Failed to Yield
1500956	1/28/2013	14	HILLSBORO-SILV HY	PARK AVE	45.151548	-122.841062	Intersection	Read end	Property Damage Only	Rain	Wet	Daylight	Folloing Too Close
1500984	2/7/2013	15	PACIFIC HY 99E	YOUNG ST	45.137024	-122.843908	Intersection	Turning	Property Damage Only	Cloudy	Wet	Daylight	Failed to Yield
1501238	3/5/2013	18	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151295	-122.831216	Intersection	Read end	Property Damage Only	Rain	Wet	Dusk	Folloing Too Close
1501296	3/11/2013	19	PACIFIC HY 99E	YOUNG ST	45.137145	-122.843800	Straight	Read end	Property Damage Only	Clear	Dry	Dark-No Street Lights	Folloing Too Close
1501425	3/22/2013	18	HILLSBORO-SILV HY	FRONT - HOOD CN	45.152016	-122.848898	Straight	Read end	Property Damage Only	Rain	Wet	Dark-Street Lights	Folloing Too Close
1501471	3/30/2013	10	PACIFIC HY 99E	WILLIAMS AVE	45.144284	-122.837424	Alley	Turning	Property Damage Only	Clear	Dry	Daylight	Failed to Yield
1501894	4/6/2013	9	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151305	-122.831638	Intersection	Read end	Property Damage Only	Clear	Dry	Daylight	Folloing Too Close
1502157	4/19/2013	20	PACIFIC HY 99E	TOMLIN AVE	45.138109	-122.842941	Intersection	Turning	Property Damage Only	Clear	Dry	Dark-No Street Lights	Improper Turn
1503932	5/10/2013	7	HILLSBORO-SILV HY	MERIDIAN DR	45.150477	-122.854157	Straight	Read end	Property Damage Only	Clear	Dry	Daylight	Folloing Too Close
1504730	5/21/2013	14	PACIFIC HY 99E	WILLIAMS AVE	45.144660	-122.837080	Straight	Read end	Property Damage Only	Rain	Wet	Daylight	Folloing Too Close
1505711	6/4/2013	15	HILLSBORO-SILV HY	TIERRA LYNN DR	45.151483	-122.839029	Intersection	Turning	Property Damage Only	Clear	Dry	Daylight	Failed to Yield
1506795	6/12/2013	11	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151295	-122.831216	Intersection	Read end	Property Damage Only	Clear	Dry	Daylight	Folloing Too Close
1507844	6/25/2013	13	PACIFIC HY 99E	WILLIAMS AVE	45.143569	-122.838072	Straight	Sideswipe	Property Damage Only	Cloudy	Wet	Daylight	Folloing Too Close
1507918	6/27/2013	16	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151359	-122.833748	Alley	Angle	Property Damage Only	Clear	Dry	Daylight	Failed to Yield
1507921	6/27/2013	16	HILLSBORO-SILV HY	MERIDIAN DR	45.150193	-122.855138	Straight	Read end	Property Damage Only	Clear	Dry	Daylight	Driving too Fast for Conditions
1511829	7/29/2013	9	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151294	-122.831216	Intersection	Turning	Property Damage Only	Clear	Dry	Daylight	Failed to Yield
1512239	8/4/2013	22	HILLSBORO-SILV HY	PARK AVE	45.151548	-122.841062	Intersection	Angle	Property Damage Only	Clear	Dry	Dark-No Street Lights	Passed Stop Sign
1519546	9/23/2013	17	HILLSBORO-SILV HY	MERIDIAN DR	45.150420	-122.854345	Intersection	Read end	Property Damage Only	Rain	Wet	Daylight	Folloing Too Close
1519526	9/23/2013	22	HILLSBORO-SILV HY	TIERRA LYNN DR	45.151483	-122.839029	Intersection	Angle	Property Damage Only	Rain	Wet	Dark-Street Lights	Passed Stop Sign
1522288	10/11/2013	15	HILLSBORO-SILV HY	MERIDIAN DR	45.150648	-122.853595	Straight	Read end	Property Damage Only	Clear	Dry	Daylight	Inattention
1523455	10/24/2013	15	PACIFIC HY 99E	HARDCASTLE AVE	45.145525	-122.836297	Alley	Read end	Property Damage Only	Clear	Dry	Daylight	Folloing Too Close
1525682	11/1/2013	21	HILLSBORO-SILV HY	PROGRESS WAY	45.151461	-122.838038	Alley	Turning	Property Damage Only	Rain	Wet	Dark-Street Lights	Failed to Yield
1527317	11/8/2013	17	HILLSBORO-SILV HY	MERIDIAN DR	45.151501	-122.850785	Straight	Read end	Property Damage Only	Cloudy	Wet	Dusk	Folloing Too Close
1528234	11/15/2013	17	HILLSBORO-SILV HY	MERIDIAN DR	45.150307	-122.854741	Straight	Read end	Property Damage Only	Rain	Wet	Dusk	Folloing Too Close
1534930	11/27/2013	15	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151311	-122.831849	Straight	Sideswipe	Property Damage Only	Clear	Dry	Daylight	Folloing Too Close
1541143	12/14/2013	13	HILLSBORO-SILV HY	MERIDIAN DR	45.150420	-122.854345	Intersection	Turning	Property Damage Only	Cloudy	Dry	Daylight	Disregarded the Traffic Signal

Crash ID	Crash Date	Hour	1st Street	2nd Street	Lat	Long	Road Character	Collision Type	Crash Severity	Weather	Road Surface	Lighting	Cause
1542537	12/27/2013	13	PACIFIC HY 99E	YOUNG ST	45.137024	-122.843908	Intersection	Fixed Object	Property Damage Only	Clear	Dry	Daylight	Other
1550105	1/3/2014	17	HILLSBORO-SILV HY		45.152339	-122.851936	Straight	Read end	Property Damage Only	Rain	Wet	Dark-No Street Lights	Folloing Too Close
1551676	1/17/2014	18	HILLSBORO-SILV HY	FRONT - HOOD CN	45.151943	-122.849272	Straight	Read end	Property Damage Only	Fog	Dry	Dark-No Street Lights	Folloing Too Close
1551931	1/24/2014	15	HILLSBORO-SILV HY	TIERRA LYNN DR	45.151483	-122.839029	Intersection	Angle	Property Damage Only	Clear	Dry	Daylight	Failed to Yield
1553402	2/8/2014	16	PACIFIC HY 99E		45.152339	-122.851936	Straight	Fixed Object	Property Damage Only	Rain	Wet	Daylight	Improper Driving
1553273	2/19/2014	17	PACIFIC HY 99E	YOUNG ST	45.137266	-122.843692	Alley	Fixed Object	Property Damage Only	Rain	Wet	Dark-No Street Lights	Improper Turn
1554882	3/11/2014	17	PACIFIC HY 99E	LAUREL AVE	45.138941	-122.842199	Alley	Parking	Property Damage Only	Clear	Dry	Daylight	Improper Driving
1555166	4/1/2014	17	HILLSBORO-SILV HY	PROGRESS WAY	45.151413	-122.835860	Straight	Read end	Property Damage Only	Rain	Wet	Daylight	Folloing Too Close
1555544	4/12/2014	18	HILLSBORO-SILV HY	FRONT - HOOD CN	45.151943	-122.849272	Straight	Read end	Property Damage Only	Clear	Dry	Daylight	Folloing Too Close
1556131	4/18/2014	15	HILLSBORO-SILV HY	FRONT - HOOD CN	45.151943	-122.849272	Straight	Read end	Property Damage Only	Clear	Dry	Daylight	Folloing Too Close
1557619	5/22/2014	6	HILLSBORO-SILV HY	PARK AVE	45.151548	-122.841062	Intersection	Turning	Property Damage Only	Clear	Dry	Daylight	Failed to Yield
1557706	5/23/2014	18	HILLSBORO-SILV HY	MERIDIAN DR	45.150534	-122.853970	Straight	Read end	Property Damage Only	Cloudy	Dry	Daylight	Inattention
1558720	6/19/2014	18	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151545	-122.830998	Straight	Sideswipe	Property Damage Only	Clear	Dry	Daylight	Folloing Too Close
1564701	6/27/2014	16	PACIFIC HY 99E	HILLSBORO-SILV HY	45.151316	-122.832060	Straight	Head On	Property Damage Only	Cloudy	Dry	Daylight	Crossed Centerline
1563592	8/25/2014	16	HILLSBORO-SILV HY	PARK AVE	45.151548	-122.841062	Intersection	Read end	Property Damage Only	Clear	Dry	Daylight	Folloing Too Close
1564349	9/1/2014	14	PACIFIC HY 99E	HARDCASTLE AVE	45.145162	-122.836622	Straight	Read end	Property Damage Only	Clear	Dry	Daylight	Folloing Too Close
1566326	9/23/2014	21	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843908	Intersection	Turning	Property Damage Only	Rain	Wet	Dark-No Street Lights	Improper Turn
1567949	10/15/2014	15	PACIFIC HY 99E		45.152339	-122.851936	Straight	Sideswipe	Property Damage Only	Unknown	Unknown	Daylight	Folloing Too Close
1568057	10/16/2014	11	HILLSBORO-SILV HY	PARK AVE	45.151556	-122.841461	Straight	Read end	Property Damage Only	Cloudy	Dry	Daylight	Folloing Too Close
1568389	10/18/2014	22	HILLSBORO-SILV HY	PACIFIC HY 99E	45.137025	-122.843908	Intersection	Turning	Property Damage Only	Fog	Dry	Dark-No Street Lights	Failed to Yield
1568920	10/26/2014	16	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151294	-122.831217	Intersection	Read end	Property Damage Only	Rain	Wet	Daylight	Folloing Too Close
1570822	11/4/2014	8	HILLSBORO-SILV HY	MERIDIAN DR	45.150306	-122.854739	Straight	Read end	Property Damage Only	Cloudy	Wet	Daylight	Folloing Too Close
1574097	11/6/2014	10	HILLSBORO-SILV HY	MERIDIAN DR	45.150419	-122.854344	Intersection	Read end	Property Damage Only	Rain	Wet	Daylight	Folloing Too Close
1571960	11/10/2014	16	HILLSBORO-SILV HY	5TH ST	45.150306	-122.854739	Straight	Read end	Property Damage Only	Clear	Dry	Daylight	Inattention
1572636	11/23/2014	16	PACIFIC HY 99E	YOUNG ST	45.137025	-122.843908	Intersection	Turning	Property Damage Only	Clear	Dry	Daylight	Failed to Yield
1572718	11/25/2014	20	PACIFIC HY 99E	JAMES ST	45.146358	-122.835558	Alley	Turning	Property Damage Only	Cloudy	Wet	Dark-Street Lights	Failed to Yield
1579345	12/24/2014	11	HILLSBORO-SILV HY	5TH ST	45.150819	-122.853033	Straight	Read end	Property Damage Only	Rain	Wet	Daylight	Folloing Too Close
1580920	12/29/2014	17	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151317	-122.832061	Straight	Read end	Property Damage Only	Clear	Dry	Dusk	Folloing Too Close
1630417	1/2/2015	12	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151328	-122.832483	Alley	Turning	Property Damage Only	Clear	Dry	Daylight	Failed to Yield
1633145	2/8/2015	3	HILLSBORO-SILV HY	PARK AVE	45.151547	-122.841061	Intersection	Angle	Property Damage Only	Rain	Wet	Dark-No Street Lights	Failed to Yield
1633741	2/9/2015	99	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151294	-122.831211	Intersection	Read end	Property Damage Only	Clear	Dry	Daylight	Other
1634584	3/6/2015	8	PACIFIC HY 99E	YOUNG ST	45.137028	-122.843914	Intersection	Turning	Property Damage Only	Fog	Dry	Daylight	Improper Turn
1635151	3/20/2015	6	PACIFIC HY 99E	YOUNG ST	45.137028	-122.843911	Intersection	Turning	Property Damage Only	Clear	Dry	Daylight	Failed to Yield
1636465	4/18/2015	13	HILLSBORO-SILV HY	TIERRA LYNN DR	45.151458	-122.838042	Alley	Turning	Property Damage Only	Clear	Dry	Daylight	Failed to Yield
1637437	5/6/2015	14	HILLSBORO-SILV HY	MERIDIAN DR	45.150647	-122.853597	Straight	Read end	Property Damage Only	Clear	Dry	Daylight	Other
1637483	5/7/2015	14	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151294	-122.831217	Intersection	Read end	Property Damage Only	Clear	Dry	Daylight	Folloing Too Close
1638510	5/20/2015	11	HILLSBORO-SILV HY	PARK AVE	45.151547	-122.841061	Intersection	Read end	Property Damage Only	Clear	Dry	Daylight	Other
1640027	5/28/2015	15	HILLSBORO-SILV HY	PACIFIC HY 99E	45.151358	-122.833744	Alley	Turning	Property Damage Only	Clear	Unknown	Daylight	Failed to Yield
1640766	6/30/2015	14	PACIFIC HY 99E	YOUNG ST	45.136831	-122.844081	Alley	Turning	Property Damage Only	Clear	Dry	Daylight	Failed to Yield

APPENDIX

D

HCM Analysis Results

DKS

Intersection	
Intersection Delay, s/veh	5.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	86	528	424	85	68	89
Conflicting Peds, #/hr	17	0	0	17	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	250	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	7	9	12	9	8	8
Mvmt Flow	97	593	476	96	76	100

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	476	0	-	0	1263	493
Stage 1	-	-	-	-	476	-
Stage 2	-	-	-	-	787	-
Follow-up Headway	2	-	-	-	4	3
Pot Capacity-1 Maneuver	1061	-	-	-	182	564
Stage 1	-	-	-	-	613	-
Stage 2	-	-	-	-	438	-
Time blocked-Platoon, %		-	-	-		
Mov Capacity-1 Maneuver	1046	-	-	-	165	556
Mov Capacity-2 Maneuver	-	-	-	-	165	-
Stage 1	-	-	-	-	613	-
Stage 2	-	-	-	-	397	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	39

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1046	-	-	-	274
HCM Lane V/C Ratio	0.092	-	-	-	0.644
HCM Control Delay (s)	8.792	-	-	-	39.1
HCM Lane LOS	A				E
HCM 95th %tile Q(veh)	0.305	-	-	-	4.067

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	39	399	44	34	425	41	43	6	43	11	6	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.87		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1800	3351		1751	3341		1768	1622		1805	1736	
Flt Permitted	0.46	1.00		0.47	1.00		0.93	1.00		0.93	1.00	
Satd. Flow (perm)	862	3351		861	3341		1731	1622		1767	1736	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	44	453	50	39	483	47	49	7	49	12	7	8
RTOR Reduction (vph)	0	12	0	0	11	0	0	43	0	0	7	0
Lane Group Flow (vph)	44	491	0	39	519	0	49	13	0	12	8	0
Confl. Peds. (#/hr)	7		2	2		7	3					3
Heavy Vehicles (%)	0%	6%	5%	3%	7%	0%	2%	0%	2%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	18.2	18.2		18.2	18.2		4.3	4.3		4.3	4.3	
Effective Green, g (s)	18.2	18.2		18.2	18.2		4.3	4.3		4.3	4.3	
Actuated g/C Ratio	0.56	0.56		0.56	0.56		0.13	0.13		0.13	0.13	
Clearance Time (s)	5.5	5.5		5.5	5.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	482	1876		482	1870		229	214		233	229	
v/s Ratio Prot		0.15			c0.16			0.01			0.00	
v/s Ratio Perm	0.05			0.05			c0.03			0.01		
v/c Ratio	0.09	0.26		0.08	0.28		0.21	0.06		0.05	0.04	
Uniform Delay, d1	3.3	3.7		3.3	3.7		12.6	12.3		12.3	12.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.1		0.1	0.1		0.5	0.1		0.1	0.1	
Delay (s)	3.4	3.8		3.4	3.8		13.1	12.5		12.4	12.4	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		3.7			3.8			12.7			12.4	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	4.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	32.5	Sum of lost time (s)	10.0
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	111	183	98	138	244	88	186	548	151	72	401	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5	5.5	4.5	5.5		4.5	5.5	5.5	4.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1703	1792	1429	1770	1785		3127	3471	1568	1736	3329	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1703	1792	1429	1770	1785		3127	3471	1568	1736	3329	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	128	210	113	159	280	101	214	630	174	83	461	94
RTOR Reduction (vph)	0	0	84	0	9	0	0	0	119	0	15	0
Lane Group Flow (vph)	128	210	29	159	372	0	214	630	55	83	540	0
Heavy Vehicles (%)	6%	6%	13%	2%	3%	0%	12%	4%	3%	4%	5%	9%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	12.7	24.1	24.1	14.0	25.4		11.8	26.8	26.8	8.5	23.5	
Effective Green, g (s)	12.7	24.1	24.1	14.0	25.4		11.8	26.8	26.8	8.5	23.5	
Actuated g/C Ratio	0.14	0.26	0.26	0.15	0.27		0.13	0.29	0.29	0.09	0.25	
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5		4.5	5.5	5.5	4.5	5.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	231	462	368	265	485		395	995	449	157	837	
v/s Ratio Prot	0.08	0.12		c0.09	c0.21		c0.07	c0.18		0.05	0.16	
v/s Ratio Perm			0.02						0.04			
v/c Ratio	0.55	0.45	0.08	0.60	0.77		0.54	0.63	0.12	0.53	0.65	
Uniform Delay, d1	37.7	29.1	26.2	37.1	31.3		38.3	29.0	24.6	40.5	31.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.9	0.7	0.1	3.6	7.2		1.5	1.3	0.1	3.2	1.7	
Delay (s)	40.6	29.8	26.3	40.7	38.4		39.8	30.3	24.7	43.7	32.9	
Level of Service	D	C	C	D	D		D	C	C	D	C	
Approach Delay (s)		32.0			39.1			31.4			34.3	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	33.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	93.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	2	21	44	786	538	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	60	0	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	5	0	5	8	0
Mvmt Flow	2	25	52	925	633	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1202	320	640	0	-	0
Stage 1	636	-	-	-	-	-
Stage 2	566	-	-	-	-	-
Follow-up Headway	4	3	2	-	-	-
Pot Capacity-1 Maneuver	180	667	954	-	-	-
Stage 1	495	-	-	-	-	-
Stage 2	537	-	-	-	-	-
Time blocked-Platoon, %				-	-	-
Mov Capacity-1 Maneuver	170	667	954	-	-	-
Mov Capacity-2 Maneuver	170	-	-	-	-	-
Stage 1	495	-	-	-	-	-
Stage 2	508	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12	0	0

Minor Lane / Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	954	-	170	667	-	-
HCM Lane V/C Ratio	0.054	-	0.014	0.037	-	-
HCM Control Delay (s)	8.99	-	26.5	10.6	-	-
HCM Lane LOS	A		D	B		
HCM 95th %tile Q(veh)	0.172	-	0.042	0.115	-	-

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	46	37	46	52	33	75	29	755	54	11	514	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	1.00		1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.97	1.00		0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1848	1615		1677	1533	1736	3405		1504	3277	
Flt Permitted		0.78	1.00		0.76	1.00	0.36	1.00		0.25	1.00	
Satd. Flow (perm)		1479	1615		1307	1533	661	3405		396	3277	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	55	44	55	62	39	89	35	899	64	13	612	33
RTOR Reduction (vph)	0	0	44	0	0	71	0	3	0	0	3	0
Lane Group Flow (vph)	0	99	11	0	101	18	35	960	0	13	642	0
Confl. Peds. (#/hr)	1					1			2	2		
Heavy Vehicles (%)	0%	0%	0%	8%	13%	4%	4%	5%	2%	20%	9%	15%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)		9.8	9.8		9.8	9.8	26.8	24.6		24.2	23.3	
Effective Green, g (s)		9.8	9.8		9.8	9.8	26.8	24.6		24.2	23.3	
Actuated g/C Ratio		0.20	0.20		0.20	0.20	0.55	0.50		0.50	0.48	
Clearance Time (s)		4.5	4.5		4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		297	324		262	307	411	1716		216	1564	
v/s Ratio Prot							c0.00	c0.28		0.00	0.20	
v/s Ratio Perm		0.07	0.01		c0.08	0.01	0.04			0.03		
v/c Ratio		0.33	0.03		0.39	0.06	0.09	0.56		0.06	0.41	
Uniform Delay, d1		16.7	15.7		16.9	15.8	5.1	8.4		6.4	8.3	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.7	0.0		0.9	0.1	0.1	0.4		0.1	0.2	
Delay (s)		17.4	15.7		17.8	15.8	5.2	8.8		6.5	8.5	
Level of Service		B	B		B	B	A	A		A	A	
Approach Delay (s)		16.8			16.9			8.6			8.4	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	48.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	62	7	31	10	4	12	45	780	9	7	601	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.96			1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.97			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1721			1596	1462	1719	3433		1583	3335	
Flt Permitted		0.80			0.80	1.00	0.31	1.00		0.32	1.00	
Satd. Flow (perm)		1423			1318	1462	564	3433		538	3335	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	69	8	34	11	4	13	50	867	10	8	668	46
RTOR Reduction (vph)	0	20	0	0	0	11	0	0	0	0	4	0
Lane Group Flow (vph)	0	91	0	0	15	2	50	877	0	8	710	0
Confl. Peds. (#/hr)	2		2	2		2	1		1	1		1
Heavy Vehicles (%)	2%	0%	3%	11%	25%	9%	5%	5%	0%	14%	7%	8%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		7.2			7.2	7.2	30.9	27.1		25.1	24.2	
Effective Green, g (s)		7.2			7.2	7.2	30.9	27.1		25.1	24.2	
Actuated g/C Ratio		0.15			0.15	0.15	0.63	0.56		0.52	0.50	
Clearance Time (s)		4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		210			194	216	447	1910		296	1657	
v/s Ratio Prot							c0.01	c0.26		0.00	0.21	
v/s Ratio Perm		c0.06			0.01	0.00	0.06			0.01		
v/c Ratio		0.43			0.08	0.01	0.11	0.46		0.03	0.43	
Uniform Delay, d1		18.9			17.9	17.7	3.6	6.4		5.7	7.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.4			0.2	0.0	0.1	0.2		0.0	0.2	
Delay (s)		20.3			18.1	17.7	3.7	6.6		5.8	8.0	
Level of Service		C			B	B	A	A		A	A	
Approach Delay (s)		20.3			17.9			6.5			8.0	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	48.7	Sum of lost time (s)	13.5
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	122	56	47	114	238	48	517	28	145	479	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00			1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95			1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1625	1756			1768	1533	1805	3421		1752	3297	
Flt Permitted	0.65	1.00			0.85	1.00	0.44	1.00		0.29	1.00	
Satd. Flow (perm)	1105	1756			1528	1533	835	3421		535	3297	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	67	134	62	52	125	262	53	568	31	159	526	40
RTOR Reduction (vph)	0	18	0	0	0	200	0	3	0	0	5	0
Lane Group Flow (vph)	67	178	0	0	177	62	53	596	0	159	561	0
Confl. Peds. (#/hr)	1		1	1		1			3	3		
Heavy Vehicles (%)	11%	3%	2%	20%	0%	4%	0%	4%	15%	3%	7%	26%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	12.2	12.2			12.2	12.2	21.4	17.6		30.0	21.9	
Effective Green, g (s)	12.2	12.2			12.2	12.2	21.4	17.6		30.0	21.9	
Actuated g/C Ratio	0.24	0.24			0.24	0.24	0.42	0.34		0.58	0.43	
Clearance Time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	262	416			362	363	419	1171		504	1404	
v/s Ratio Prot		0.10					0.01	c0.17		c0.05	0.17	
v/s Ratio Perm	0.06				c0.12	0.04	0.04			0.13		
v/c Ratio	0.26	0.43			0.49	0.17	0.13	0.51		0.32	0.40	
Uniform Delay, d1	15.9	16.6			16.9	15.6	9.0	13.5		5.5	10.2	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.7			1.0	0.2	0.1	0.3		0.4	0.2	
Delay (s)	16.4	17.3			18.0	15.8	9.2	13.8		5.9	10.4	
Level of Service	B	B			B	B	A	B		A	B	
Approach Delay (s)		17.1			16.7			13.4			9.4	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	51.4	Sum of lost time (s)	13.5
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	4.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	61	667	644	113	65	52
Conflicting Peds, #/hr	12	0	0	12	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	250	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	12	7	3	4	5	6
Mvmt Flow	63	688	664	116	67	54

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	664	0	-	0	1477	676
Stage 1	-	-	-	-	664	-
Stage 2	-	-	-	-	813	-
Follow-up Headway	2	-	-	-	4	3
Pot Capacity-1 Maneuver	879	-	-	-	137	447
Stage 1	-	-	-	-	506	-
Stage 2	-	-	-	-	431	-
Time blocked-Platoon, %		-	-	-		
Mov Capacity-1 Maneuver	870	-	-	-	127	443
Mov Capacity-2 Maneuver	-	-	-	-	127	-
Stage 1	-	-	-	-	506	-
Stage 2	-	-	-	-	400	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	54

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	870	-	-	-	186
HCM Lane V/C Ratio	0.072	-	-	-	0.648
HCM Control Delay (s)	9.46	-	-	-	54.4
HCM Lane LOS	A				F
HCM 95th %tile Q(veh)	0.233	-	-	-	3.783

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	33	611	115	51	573	18	47	6	122	35	13	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	0.86		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)	1797	3386		1767	3424		1761	1586		1797	1657	
Flt Permitted	0.42	1.00		0.37	1.00		0.72	1.00		0.70	1.00	
Satd. Flow (perm)	796	3386		683	3424		1333	1586		1327	1657	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	34	630	119	53	591	19	48	6	126	36	13	45
RTOR Reduction (vph)	0	23	0	0	3	0	0	105	0	0	38	0
Lane Group Flow (vph)	34	726	0	53	607	0	48	27	0	36	20	0
Confl. Peds. (#/hr)	12		4	4		12	13		14	14		13
Heavy Vehicles (%)	0%	4%	2%	2%	5%	0%	2%	0%	1%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	18.9	18.9		18.9	18.9		5.7	5.7		5.7	5.7	
Effective Green, g (s)	18.9	18.9		18.9	18.9		5.7	5.7		5.7	5.7	
Actuated g/C Ratio	0.55	0.55		0.55	0.55		0.16	0.16		0.16	0.16	
Clearance Time (s)	5.5	5.5		5.5	5.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	434	1849		373	1870		219	261		218	272	
v/s Ratio Prot		c0.21			0.18			0.02			0.01	
v/s Ratio Perm	0.04			0.08			c0.04			0.03		
v/c Ratio	0.08	0.39		0.14	0.32		0.22	0.10		0.17	0.08	
Uniform Delay, d1	3.7	4.5		3.9	4.3		12.5	12.3		12.4	12.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.1		0.2	0.1		0.5	0.2		0.4	0.1	
Delay (s)	3.8	4.7		4.0	4.4		13.0	12.5		12.8	12.3	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		4.6			4.4			12.6			12.5	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	5.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	34.6	Sum of lost time (s)	10.0
Intersection Capacity Utilization	64.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	294	259	220	231	77	282	480	84	142	648	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5	5.5	4.5	5.5		4.5	5.5	5.5	4.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1827	1583	1736	1705		3303	3471	1495	1719	3393	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1827	1583	1736	1705		3303	3471	1495	1719	3393	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	188	334	294	250	262	88	320	545	95	161	736	198
RTOR Reduction (vph)	0	0	232	0	8	0	0	0	66	0	19	0
Lane Group Flow (vph)	188	334	62	250	342	0	320	545	29	161	915	0
Heavy Vehicles (%)	2%	4%	2%	4%	9%	2%	6%	4%	8%	5%	3%	3%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	17.7	24.4	24.4	21.3	28.0		14.8	35.1	35.1	15.8	36.1	
Effective Green, g (s)	17.7	24.4	24.4	21.3	28.0		14.8	35.1	35.1	15.8	36.1	
Actuated g/C Ratio	0.15	0.21	0.21	0.18	0.24		0.13	0.30	0.30	0.14	0.31	
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5		4.5	5.5	5.5	4.5	5.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	268	382	331	317	409		419	1044	450	232	1050	
v/s Ratio Prot	0.11	0.18		c0.14	c0.20		c0.10	0.16		0.09	c0.27	
v/s Ratio Perm			0.04						0.02			
v/c Ratio	0.70	0.87	0.19	0.79	0.84		0.76	0.52	0.06	0.69	0.87	
Uniform Delay, d1	46.9	44.6	37.9	45.5	42.1		49.2	33.8	29.0	48.1	38.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.0	19.3	0.3	12.2	13.7		8.1	0.5	0.1	8.7	8.1	
Delay (s)	55.0	64.0	38.2	57.7	55.8		57.3	34.3	29.1	56.8	46.1	
Level of Service	D	E	D	E	E		E	C	C	E	D	
Approach Delay (s)		52.6			56.6			41.4			47.7	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	48.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	116.6	Sum of lost time (s)	20.0
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	6.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	41	184	128	858	918	40
Conflicting Peds, #/hr	1	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	60	0	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	3	0	0	7	6	0
Mvmt Flow	46	207	144	964	1031	45

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1825	541	1077	0	-	0
Stage 1	1055	-	-	-	-	-
Stage 2	770	-	-	-	-	-
Follow-up Headway	4	3	2	-	-	-
Pot Capacity-1 Maneuver	68	491	655	-	-	-
Stage 1	294	-	-	-	-	-
Stage 2	415	-	-	-	-	-
Time blocked-Platoon, %				-	-	-
Mov Capacity-1 Maneuver	53	490	654	-	-	-
Mov Capacity-2 Maneuver	53	-	-	-	-	-
Stage 1	294	-	-	-	-	-
Stage 2	323	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	52	2	0

Minor Lane / Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	654	-	53	490	-	-
HCM Lane V/C Ratio	0.22	-	0.869	0.422	-	-
HCM Control Delay (s)	12.05	-	209.1	17.6	-	-
HCM Lane LOS	B		F	C		
HCM 95th %tile Q(veh)	0.835	-	3.746	2.069	-	-

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	32	39	96	38	35	38	864	44	43	957	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.98		1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.97	1.00		0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1803	1586		1786	1412	1751	3353		1719	3372	
Flt Permitted		0.71	1.00		0.72	1.00	0.19	1.00		0.23	1.00	
Satd. Flow (perm)		1319	1586		1331	1412	350	3353		417	3372	
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)	75	34	42	103	41	38	41	929	47	46	1029	61
RTOR Reduction (vph)	0	0	34	0	0	31	0	2	0	0	3	0
Lane Group Flow (vph)	0	109	8	0	144	7	41	974	0	46	1087	0
Confl. Peds. (#/hr)	11		7	7		11	16		2	2		16
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	2%	0%	0%	1%	6%	12%	3%	7%	2%	5%	6%	4%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)		12.3	12.3		12.3	12.3	37.0	33.5		37.0	33.5	
Effective Green, g (s)		12.3	12.3		12.3	12.3	37.0	33.5		37.0	33.5	
Actuated g/C Ratio		0.20	0.20		0.20	0.20	0.59	0.53		0.59	0.53	
Clearance Time (s)		4.5	4.5		4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		258	310		260	276	284	1788		318	1798	
v/s Ratio Prot							0.01	0.29		c0.01	c0.32	
v/s Ratio Perm		0.08	0.01		c0.11	0.01	0.08			0.08		
v/c Ratio		0.42	0.03		0.55	0.03	0.14	0.54		0.14	0.60	
Uniform Delay, d1		22.1	20.4		22.8	20.4	6.2	9.6		5.9	10.1	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.1	0.0		2.5	0.0	0.2	0.3		0.2	0.6	
Delay (s)		23.3	20.4		25.3	20.5	6.4	10.0		6.1	10.7	
Level of Service		C	C		C	C	A	A		A	B	
Approach Delay (s)		22.5			24.3			9.8			10.5	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	62.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	10	61	27	9	15	33	832	4	16	1075	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.95			1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.97			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1718			1778	1009	1805	3400		1421	3436	
Flt Permitted		0.81			0.77	1.00	0.16	1.00		0.29	1.00	
Satd. Flow (perm)		1428			1418	1009	306	3400		439	3436	
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)	90	11	65	29	10	16	35	885	4	17	1144	74
RTOR Reduction (vph)	0	29	0	0	0	13	0	0	0	0	2	0
Lane Group Flow (vph)	0	137	0	0	39	3	35	889	0	17	1216	0
Confl. Peds. (#/hr)	9		2	2		9	8		1	1		8
Confl. Bikes (#/hr)									3			
Heavy Vehicles (%)	2%	0%	0%	4%	0%	57%	0%	6%	25%	27%	4%	2%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		11.2			11.2	11.2	42.2	39.7		39.4	38.3	
Effective Green, g (s)		11.2			11.2	11.2	42.2	39.7		39.4	38.3	
Actuated g/C Ratio		0.17			0.17	0.17	0.64	0.61		0.60	0.58	
Clearance Time (s)		4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		244			242	172	254	2060		280	2009	
v/s Ratio Prot							c0.01	0.26		0.00	c0.35	
v/s Ratio Perm		c0.10			0.03	0.00	0.08			0.04		
v/c Ratio		0.56			0.16	0.02	0.14	0.43		0.06	0.61	
Uniform Delay, d1		24.9			23.1	22.6	5.4	6.9		5.3	8.7	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.9			0.3	0.0	0.2	0.1		0.1	0.5	
Delay (s)		27.8			23.5	22.6	5.7	7.0		5.4	9.3	
Level of Service		C			C	C	A	A		A	A	
Approach Delay (s)		27.8			23.2			7.0			9.2	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	65.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	83	118	60	34	81	179	43	594	16	207	702	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95			1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1671	1757			1802	1509	1719	3427		1719	3373	
Flt Permitted	0.68	1.00			0.86	1.00	0.33	1.00		0.27	1.00	
Satd. Flow (perm)	1194	1757			1574	1509	594	3427		491	3373	
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)	88	126	64	36	86	190	46	632	17	220	747	113
RTOR Reduction (vph)	0	21	0	0	0	149	0	2	0	0	9	0
Lane Group Flow (vph)	88	169	0	0	122	41	46	647	0	220	851	0
Confl. Peds. (#/hr)							2		1	1		2
Heavy Vehicles (%)	8%	3%	2%	6%	3%	7%	5%	5%	0%	5%	5%	2%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	11.4	11.4			11.4	11.4	23.3	19.5		32.9	24.6	
Effective Green, g (s)	11.4	11.4			11.4	11.4	23.3	19.5		32.9	24.6	
Actuated g/C Ratio	0.21	0.21			0.21	0.21	0.44	0.37		0.62	0.46	
Clearance Time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	255	375			336	322	339	1253		508	1556	
v/s Ratio Prot		c0.10					0.01	0.19		c0.07	c0.25	
v/s Ratio Perm	0.07				0.08	0.03	0.05			0.19		
v/c Ratio	0.35	0.45			0.36	0.13	0.14	0.52		0.43	0.55	
Uniform Delay, d1	17.8	18.2			17.9	16.9	8.7	13.2		5.3	10.3	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.9			0.7	0.2	0.2	0.4		0.6	0.4	
Delay (s)	18.6	19.1			18.5	17.1	8.9	13.6		5.9	10.7	
Level of Service	B	B			B	B	A	B		A	B	
Approach Delay (s)		18.9			17.7			13.3			9.8	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	53.3	Sum of lost time (s)	13.5
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	8.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	64	672	777	153	70	62
Conflicting Peds, #/hr	4	0	0	4	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	250	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	2	3	3	3	2
Mvmt Flow	67	700	809	159	73	65

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	809	0	-	0	1642	813
Stage 1	-	-	-	-	809	-
Stage 2	-	-	-	-	833	-
Follow-up Headway	2	-	-	-	4	3
Pot Capacity-1 Maneuver	825	-	-	-	109	378
Stage 1	-	-	-	-	436	-
Stage 2	-	-	-	-	425	-
Time blocked-Platoon, %		-	-	-		
Mov Capacity-1 Maneuver	822	-	-	-	100	377
Mov Capacity-2 Maneuver	-	-	-	-	100	-
Stage 1	-	-	-	-	436	-
Stage 2	-	-	-	-	390	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	106

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	822	-	-	-	153
HCM Lane V/C Ratio	0.081	-	-	-	0.899
HCM Control Delay (s)	9.766	-	-	-	105.9
HCM Lane LOS	A				F
HCM 95th %tile Q(veh)	0.264	-	-	-	6.277

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	654	121	62	632	18	58	10	134	75	18	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	0.86		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1797	3386		1766	3425		1765	1595		1798	1682	
Flt Permitted	0.39	1.00		0.34	1.00		0.72	1.00		0.66	1.00	
Satd. Flow (perm)	741	3386		640	3425		1329	1595		1250	1682	
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)	36	688	127	65	665	19	61	11	141	79	19	45
RTOR Reduction (vph)	0	22	0	0	3	0	0	116	0	0	37	0
Lane Group Flow (vph)	36	793	0	65	681	0	61	36	0	79	27	0
Confl. Peds. (#/hr)	11		7	7		11	7		12	12		7
Heavy Vehicles (%)	0%	4%	2%	2%	5%	0%	2%	0%	1%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	21.5	21.5		21.5	21.5		6.8	6.8		6.8	6.8	
Effective Green, g (s)	21.5	21.5		21.5	21.5		6.8	6.8		6.8	6.8	
Actuated g/C Ratio	0.56	0.56		0.56	0.56		0.18	0.18		0.18	0.18	
Clearance Time (s)	5.5	5.5		5.5	5.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	415	1900		359	1922		235	283		221	298	
v/s Ratio Prot		c0.23			0.20			0.02			0.02	
v/s Ratio Perm	0.05			0.10			0.05			c0.06		
v/c Ratio	0.09	0.42		0.18	0.35		0.26	0.13		0.36	0.09	
Uniform Delay, d1	3.9	4.8		4.1	4.6		13.6	13.3		13.8	13.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.1		0.2	0.1		0.6	0.2		1.0	0.1	
Delay (s)	4.0	5.0		4.3	4.7		14.2	13.5		14.8	13.3	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		4.9			4.7			13.7			14.1	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	38.3	Sum of lost time (s)	10.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	192	360	262	260	358	72	305	498	117	161	726	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5	5.5	4.5	5.5		4.5	5.5	5.5	4.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1881	1599	1787	1807		3400	3539	1615	1770	3451	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1881	1599	1787	1807		3400	3539	1615	1770	3451	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	196	367	267	265	365	73	311	508	119	164	741	190
RTOR Reduction (vph)	0	0	210	0	5	0	0	0	84	0	19	0
Lane Group Flow (vph)	196	367	57	265	433	0	311	508	35	164	912	0
Heavy Vehicles (%)	2%	1%	1%	1%	3%	0%	3%	2%	0%	2%	1%	3%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	18.3	24.8	24.8	21.6	28.1		14.5	34.6	34.6	15.8	35.9	
Effective Green, g (s)	18.3	24.8	24.8	21.6	28.1		14.5	34.6	34.6	15.8	35.9	
Actuated g/C Ratio	0.16	0.21	0.21	0.18	0.24		0.12	0.30	0.30	0.14	0.31	
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5		4.5	5.5	5.5	4.5	5.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	277	399	339	330	434		422	1048	478	239	1060	
v/s Ratio Prot	0.11	0.20		c0.15	c0.24		0.09	0.14		c0.09	c0.26	
v/s Ratio Perm			0.04						0.02			
v/c Ratio	0.71	0.92	0.17	0.80	1.00		0.74	0.48	0.07	0.69	0.86	
Uniform Delay, d1	46.7	45.0	37.6	45.6	44.3		49.3	33.8	29.6	48.1	38.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.0	25.8	0.2	13.2	42.1		6.6	0.4	0.1	7.9	7.3	
Delay (s)	54.7	70.8	37.8	58.7	86.4		55.9	34.1	29.6	56.1	45.4	
Level of Service	D	E	D	E	F		E	C	C	E	D	
Approach Delay (s)		56.4			76.0			40.8			47.0	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	53.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	116.8	Sum of lost time (s)	20.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	5.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	37	169	125	860	1169	45
Conflicting Peds, #/hr	0	0	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	60	0	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	0	8	0	4	3	0
Mvmt Flow	38	174	129	887	1205	46

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1929	629	1252	0	-	0
Stage 1	1228	-	-	-	-	-
Stage 2	701	-	-	-	-	-
Follow-up Headway	4	3	2	-	-	-
Pot Capacity-1 Maneuver	60	411	563	-	-	-
Stage 1	244	-	-	-	-	-
Stage 2	459	-	-	-	-	-
Time blocked-Platoon, %				-	-	-
Mov Capacity-1 Maneuver	46	410	562	-	-	-
Mov Capacity-2 Maneuver	46	-	-	-	-	-
Stage 1	244	-	-	-	-	-
Stage 2	354	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	56	2	0

Minor Lane / Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	562	-	46	410	-	-
HCM Lane V/C Ratio	0.229	-	0.829	0.425	-	-
HCM Control Delay (s)	13.301	-	220	20.1	-	-
HCM Lane LOS	B		F	C		
HCM 95th %tile Q(veh)	0.878	-	3.323	2.071	-	-

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	67	58	49	117	44	35	49	870	67	48	1175	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99		1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.97	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1823	1592		1831	1579	1805	3432		1804	3473	
Flt Permitted		0.73	1.00		0.70	1.00	0.13	1.00		0.24	1.00	
Satd. Flow (perm)		1359	1592		1336	1579	248	3432		447	3473	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	69	60	51	121	45	36	51	897	69	49	1211	81
RTOR Reduction (vph)	0	0	41	0	0	29	0	4	0	0	3	0
Lane Group Flow (vph)	0	129	10	0	166	7	51	962	0	49	1289	0
Confl. Peds. (#/hr)	12		3	3		12	3		5	5		3
Heavy Vehicles (%)	2%	0%	0%	0%	0%	0%	0%	4%	2%	0%	3%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)		13.8	13.8		13.8	13.8	40.9	37.1		40.7	37.0	
Effective Green, g (s)		13.8	13.8		13.8	13.8	40.9	37.1		40.7	37.0	
Actuated g/C Ratio		0.20	0.20		0.20	0.20	0.60	0.54		0.60	0.54	
Clearance Time (s)		4.5	4.5		4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		275	322		270	319	235	1869		340	1886	
v/s Ratio Prot							c0.01	0.28		0.01	c0.37	
v/s Ratio Perm		0.09	0.01		c0.12	0.00	0.12			0.08		
v/c Ratio		0.47	0.03		0.61	0.02	0.22	0.51		0.14	0.68	
Uniform Delay, d1		23.9	21.8		24.7	21.7	7.4	9.8		6.1	11.3	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.3	0.0		4.1	0.0	0.5	0.2		0.2	1.0	
Delay (s)		25.2	21.8		28.8	21.8	7.8	10.0		6.3	12.3	
Level of Service		C	C		C	C	A	B		A	B	
Approach Delay (s)		24.2			27.6			9.9			12.1	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	68.1	Sum of lost time (s)	13.5
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	86	10	60	24	7	16	56	937	6	18	1222	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.95			1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.97			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1720			1773	1195	1770	3501		1455	3500	
Flt Permitted		0.81			0.77	1.00	0.10	1.00		0.25	1.00	
Satd. Flow (perm)		1432			1417	1195	189	3501		387	3500	
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)	93	11	65	26	8	17	61	1018	7	20	1328	95
RTOR Reduction (vph)	0	28	0	0	0	14	0	0	0	0	3	0
Lane Group Flow (vph)	0	141	0	0	34	3	61	1025	0	20	1420	0
Confl. Peds. (#/hr)	5		4	4		5	4		5	5		4
Heavy Vehicles (%)	2%	0%	0%	4%	0%	33%	2%	3%	0%	24%	2%	1%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		11.6			11.6	11.6	46.4	42.2		40.4	39.2	
Effective Green, g (s)		11.6			11.6	11.6	46.4	42.2		40.4	39.2	
Actuated g/C Ratio		0.17			0.17	0.17	0.68	0.62		0.59	0.57	
Clearance Time (s)		4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		242			239	202	224	2156		246	2002	
v/s Ratio Prot							c0.02	0.29		0.00	c0.41	
v/s Ratio Perm		c0.10			0.02	0.00	0.17			0.05		
v/c Ratio		0.58			0.14	0.01	0.27	0.48		0.08	0.71	
Uniform Delay, d1		26.2			24.2	23.7	7.0	7.1		6.0	10.5	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		3.5			0.3	0.0	0.7	0.2		0.1	1.2	
Delay (s)		29.7			24.5	23.7	7.7	7.3		6.1	11.7	
Level of Service		C			C	C	A	A		A	B	
Approach Delay (s)		29.7			24.2			7.3			11.6	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	68.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	94	138	69	51	141	230	75	647	21	257	847	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95			1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1763			1875	1583	1805	3417		1770	3447	
Flt Permitted	0.57	1.00			0.84	1.00	0.22	1.00		0.25	1.00	
Satd. Flow (perm)	1043	1763			1601	1583	424	3417		468	3447	
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)	99	145	73	54	148	242	79	681	22	271	892	115
RTOR Reduction (vph)	0	21	0	0	0	175	0	2	0	0	7	0
Lane Group Flow (vph)	99	197	0	0	202	67	79	701	0	271	1000	0
Confl. Peds. (#/hr)							3					3
Heavy Vehicles (%)	3%	2%	3%	0%	0%	2%	0%	5%	10%	2%	3%	0%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	14.2	14.2			14.2	14.2	29.4	23.6		38.2	28.0	
Effective Green, g (s)	14.2	14.2			14.2	14.2	29.4	23.6		38.2	28.0	
Actuated g/C Ratio	0.23	0.23			0.23	0.23	0.48	0.38		0.62	0.46	
Clearance Time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	240	407			369	365	332	1311		506	1569	
v/s Ratio Prot		0.11					0.02	0.21		c0.09	c0.29	
v/s Ratio Perm	0.09				c0.13	0.04	0.09			0.24		
v/c Ratio	0.41	0.48			0.55	0.18	0.24	0.53		0.54	0.64	
Uniform Delay, d1	20.1	20.5			20.8	19.0	9.0	14.7		6.4	12.9	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.9			1.7	0.2	0.4	0.4		1.1	0.9	
Delay (s)	21.3	21.4			22.5	19.2	9.4	15.1		7.5	13.7	
Level of Service	C	C			C	B	A	B		A	B	
Approach Delay (s)		21.4			20.7			14.5			12.4	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	61.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	6.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	96	590	473	95	76	100
Conflicting Peds, #/hr	17	0	0	17	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	250	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	7	9	12	9	8	8
Mvmt Flow	101	621	498	100	80	105

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	498	0	-	0	1321	515
Stage 1	-	-	-	-	498	-
Stage 2	-	-	-	-	823	-
Follow-up Headway	2	-	-	-	4	3
Pot Capacity-1 Maneuver	1041	-	-	-	168	548
Stage 1	-	-	-	-	598	-
Stage 2	-	-	-	-	421	-
Time blocked-Platoon, %		-	-	-		
Mov Capacity-1 Maneuver	1026	-	-	-	151	540
Mov Capacity-2 Maneuver	-	-	-	-	151	-
Stage 1	-	-	-	-	598	-
Stage 2	-	-	-	-	380	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	49

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1026	-	-	-	256
HCM Lane V/C Ratio	0.098	-	-	-	0.724
HCM Control Delay (s)	8.892	-	-	-	48.8
HCM Lane LOS	A				E
HCM 95th %tile Q(veh)	0.327	-	-	-	5.014

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	445	49	38	475	46	47	7	47	12	7	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.87		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1800	3350		1751	3341		1768	1622		1805	1736	
Flt Permitted	0.45	1.00		0.46	1.00		0.93	1.00		0.93	1.00	
Satd. Flow (perm)	847	3350		847	3341		1731	1622		1767	1736	
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)	46	468	52	40	500	48	49	7	49	13	7	8
RTOR Reduction (vph)	0	12	0	0	10	0	0	43	0	0	7	0
Lane Group Flow (vph)	46	508	0	40	538	0	49	13	0	13	8	0
Confl. Peds. (#/hr)	7		2	2		7	3					3
Heavy Vehicles (%)	0%	6%	5%	3%	7%	0%	2%	0%	2%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	18.6	18.6		18.6	18.6		4.3	4.3		4.3	4.3	
Effective Green, g (s)	18.6	18.6		18.6	18.6		4.3	4.3		4.3	4.3	
Actuated g/C Ratio	0.57	0.57		0.57	0.57		0.13	0.13		0.13	0.13	
Clearance Time (s)	5.5	5.5		5.5	5.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	478	1893		478	1888		226	211		230	226	
v/s Ratio Prot		0.15			c0.16			0.01			0.00	
v/s Ratio Perm	0.05			0.05			c0.03			0.01		
v/c Ratio	0.10	0.27		0.08	0.28		0.22	0.06		0.06	0.04	
Uniform Delay, d1	3.3	3.7		3.3	3.7		12.8	12.5		12.5	12.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.1		0.1	0.1		0.5	0.1		0.1	0.1	
Delay (s)	3.4	3.7		3.3	3.8		13.3	12.7		12.6	12.6	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		3.7			3.8			12.9			12.6	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	4.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	32.9	Sum of lost time (s)	10.0
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	124	204	109	154	272	98	231	681	188	90	499	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5	5.5	4.5	5.5		4.5	5.5	5.5	4.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1703	1792	1429	1770	1785		3127	3471	1568	1736	3328	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1703	1792	1429	1770	1785		3127	3471	1568	1736	3328	
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)	131	215	115	162	286	103	243	717	198	95	525	108
RTOR Reduction (vph)	0	0	87	0	9	0	0	0	115	0	15	0
Lane Group Flow (vph)	131	215	28	162	380	0	243	717	83	95	618	0
Heavy Vehicles (%)	6%	6%	13%	2%	3%	0%	12%	4%	3%	4%	5%	9%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	13.3	24.1	24.1	14.7	25.5		12.8	30.6	30.6	9.3	27.1	
Effective Green, g (s)	13.3	24.1	24.1	14.7	25.5		12.8	30.6	30.6	9.3	27.1	
Actuated g/C Ratio	0.13	0.24	0.24	0.15	0.26		0.13	0.31	0.31	0.09	0.27	
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5		4.5	5.5	5.5	4.5	5.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	229	437	348	263	461		405	1076	486	163	913	
v/s Ratio Prot	0.08	0.12		c0.09	c0.21		c0.08	c0.21		0.05	0.19	
v/s Ratio Perm			0.02						0.05			
v/c Ratio	0.57	0.49	0.08	0.62	0.82		0.60	0.67	0.17	0.58	0.68	
Uniform Delay, d1	40.0	32.0	28.8	39.4	34.5		40.5	29.6	24.8	42.8	31.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.4	0.9	0.1	4.2	11.4		2.4	1.6	0.2	5.2	2.0	
Delay (s)	43.5	32.9	28.9	43.6	45.9		42.9	31.2	25.0	48.1	33.9	
Level of Service	D	C	C	D	D		D	C	C	D	C	
Approach Delay (s)		34.9			45.2			32.6			35.8	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	36.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	98.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	3	26	54	977	669	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	60	0	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	5	0	5	8	0
Mvmt Flow	3	27	57	1028	704	8

Major/Minor	Minor2	Major1			Major2	
Conflicting Flow All	1336	356	713	0	-	0
Stage 1	708	-	-	-	-	-
Stage 2	628	-	-	-	-	-
Follow-up Headway	4	3	2	-	-	-
Pot Capacity-1 Maneuver	147	632	896	-	-	-
Stage 1	455	-	-	-	-	-
Stage 2	500	-	-	-	-	-
Time blocked-Platoon, %				-	-	-
Mov Capacity-1 Maneuver	138	632	896	-	-	-
Mov Capacity-2 Maneuver	138	-	-	-	-	-
Stage 1	455	-	-	-	-	-
Stage 2	468	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13	0	0

Minor Lane / Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	896	-	138	632	-	-
HCM Lane V/C Ratio	0.063	-	0.023	0.043	-	-
HCM Control Delay (s)	9.29	-	31.7	11	-	-
HCM Lane LOS	A		D	B		
HCM 95th %tile Q(veh)	0.203	-	0.07	0.136	-	-

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	46	57	65	41	94	36	939	67	13	640	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	1.00		1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.97	1.00		0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1848	1615		1677	1533	1736	3405		1504	3278	
Flt Permitted		0.77	1.00		0.75	1.00	0.33	1.00		0.22	1.00	
Satd. Flow (perm)		1465	1615		1297	1533	603	3405		343	3278	
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)	60	48	60	68	43	99	38	988	71	14	674	36
RTOR Reduction (vph)	0	0	48	0	0	79	0	3	0	0	2	0
Lane Group Flow (vph)	0	108	12	0	111	20	38	1056	0	14	708	0
Confl. Peds. (#/hr)	1					1			2	2		
Heavy Vehicles (%)	0%	0%	0%	8%	13%	4%	4%	5%	2%	20%	9%	15%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)		10.4	10.4		10.4	10.4	30.1	27.8		27.3	26.4	
Effective Green, g (s)		10.4	10.4		10.4	10.4	30.1	27.8		27.3	26.4	
Actuated g/C Ratio		0.20	0.20		0.20	0.20	0.57	0.53		0.52	0.50	
Clearance Time (s)		4.5	4.5		4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		289	319		256	303	394	1799		197	1645	
v/s Ratio Prot							c0.00	c0.31		0.00	0.22	
v/s Ratio Perm		0.07	0.01		c0.09	0.01	0.05			0.04		
v/c Ratio		0.37	0.04		0.43	0.06	0.10	0.59		0.07	0.43	
Uniform Delay, d1		18.3	17.1		18.5	17.1	5.1	8.5		6.4	8.3	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.8	0.0		1.2	0.1	0.1	0.5		0.2	0.2	
Delay (s)		19.1	17.1		19.7	17.2	5.2	9.0		6.6	8.5	
Level of Service		B	B		B	B	A	A		A	A	
Approach Delay (s)		18.4			18.5			8.8			8.5	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	52.6	Sum of lost time (s)	13.5
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	77	9	38	12	5	15	56	971	11	9	747	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.96			1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.97			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1720			1595	1462	1719	3433		1583	3334	
Flt Permitted		0.80			0.79	1.00	0.25	1.00		0.25	1.00	
Satd. Flow (perm)		1418			1304	1462	458	3433		414	3334	
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)	81	9	40	13	5	16	59	1022	12	9	786	55
RTOR Reduction (vph)	0	20	0	0	0	13	0	0	0	0	3	0
Lane Group Flow (vph)	0	110	0	0	18	3	59	1034	0	9	838	0
Confl. Peds. (#/hr)	2		2	2		2	1		1	1		1
Heavy Vehicles (%)	2%	0%	3%	11%	25%	9%	5%	5%	0%	14%	7%	8%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		10.1			10.1	10.1	35.6	31.5		29.2	28.3	
Effective Green, g (s)		10.1			10.1	10.1	35.6	31.5		29.2	28.3	
Actuated g/C Ratio		0.18			0.18	0.18	0.64	0.56		0.52	0.51	
Clearance Time (s)		4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		255			235	263	383	1931		234	1684	
v/s Ratio Prot							c0.01	c0.30		0.00	0.25	
v/s Ratio Perm		c0.08			0.01	0.00	0.09			0.02		
v/c Ratio		0.43			0.08	0.01	0.15	0.54		0.04	0.50	
Uniform Delay, d1		20.4			19.1	18.8	4.4	7.7		6.5	9.2	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.2			0.1	0.0	0.2	0.3		0.1	0.2	
Delay (s)		21.6			19.2	18.9	4.6	8.0		6.6	9.4	
Level of Service		C			B	B	A	A		A	A	
Approach Delay (s)		21.6			19.0			7.8			9.4	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	56.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	152	70	58	141	296	60	643	34	180	596	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00			1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95			1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1625	1756			1769	1533	1805	3422		1752	3298	
Flt Permitted	0.57	1.00			0.82	1.00	0.40	1.00		0.24	1.00	
Satd. Flow (perm)	983	1756			1479	1533	751	3422		436	3298	
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)	79	160	74	61	148	312	63	677	36	189	627	47
RTOR Reduction (vph)	0	18	0	0	0	213	0	3	0	0	4	0
Lane Group Flow (vph)	79	216	0	0	209	99	63	710	0	189	670	0
Confl. Peds. (#/hr)	1		1	1		1			3	3		
Heavy Vehicles (%)	11%	3%	2%	20%	0%	4%	0%	4%	15%	3%	7%	26%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	14.6	14.6			14.6	14.6	25.2	21.2		34.6	26.1	
Effective Green, g (s)	14.6	14.6			14.6	14.6	25.2	21.2		34.6	26.1	
Actuated g/C Ratio	0.25	0.25			0.25	0.25	0.43	0.36		0.59	0.45	
Clearance Time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	246	440			371	384	397	1246		460	1479	
v/s Ratio Prot		0.12					0.01	c0.21		c0.06	0.20	
v/s Ratio Perm	0.08				c0.14	0.06	0.06			0.18		
v/c Ratio	0.32	0.49			0.56	0.26	0.16	0.57		0.41	0.45	
Uniform Delay, d1	17.8	18.6			19.0	17.5	9.7	14.8		6.5	11.1	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.9			2.0	0.4	0.2	0.6		0.6	0.2	
Delay (s)	18.5	19.5			21.0	17.8	9.9	15.4		7.1	11.3	
Level of Service	B	B			C	B	A	B		A	B	
Approach Delay (s)		19.2			19.1			15.0			10.4	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	58.2	Sum of lost time (s)	13.5
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	9.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	68	744	719	126	72	58
Conflicting Peds, #/hr	12	0	0	12	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	250	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	12	7	3	4	5	6
Mvmt Flow	72	783	757	133	76	61

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	757	0	-	0	1683	769
Stage 1	-	-	-	-	757	-
Stage 2	-	-	-	-	926	-
Follow-up Headway	2	-	-	-	4	3
Pot Capacity-1 Maneuver	811	-	-	-	102	395
Stage 1	-	-	-	-	458	-
Stage 2	-	-	-	-	381	-
Time blocked-Platoon, %		-	-	-		
Mov Capacity-1 Maneuver	803	-	-	-	93	391
Mov Capacity-2 Maneuver	-	-	-	-	93	-
Stage 1	-	-	-	-	458	-
Stage 2	-	-	-	-	347	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	130

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	803	-	-	-	141
HCM Lane V/C Ratio	0.089	-	-	-	0.971
HCM Control Delay (s)	9.921	-	-	-	129.7
HCM Lane LOS	A				F
HCM 95th %tile Q(veh)	0.293	-	-	-	6.908

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	37	682	128	57	639	20	52	7	136	39	14	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	0.86		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)	1797	3386		1767	3424		1761	1586		1796	1656	
Flt Permitted	0.39	1.00		0.33	1.00		0.71	1.00		0.66	1.00	
Satd. Flow (perm)	733	3386		617	3424		1322	1586		1251	1656	
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)	39	718	135	60	673	21	55	7	143	41	15	52
RTOR Reduction (vph)	0	21	0	0	3	0	0	120	0	0	44	0
Lane Group Flow (vph)	39	832	0	60	691	0	55	30	0	41	23	0
Confl. Peds. (#/hr)	12		4	4		12	13		14	14		13
Heavy Vehicles (%)	0%	4%	2%	2%	5%	0%	2%	0%	1%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	22.1	22.1		22.1	22.1		6.1	6.1		6.1	6.1	
Effective Green, g (s)	22.1	22.1		22.1	22.1		6.1	6.1		6.1	6.1	
Actuated g/C Ratio	0.58	0.58		0.58	0.58		0.16	0.16		0.16	0.16	
Clearance Time (s)	5.5	5.5		5.5	5.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	424	1958		356	1980		211	253		199	264	
v/s Ratio Prot		c0.25			0.20			0.02			0.01	
v/s Ratio Perm	0.05			0.10			c0.04			0.03		
v/c Ratio	0.09	0.42		0.17	0.35		0.26	0.12		0.21	0.09	
Uniform Delay, d1	3.6	4.5		3.8	4.3		14.1	13.7		13.9	13.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.1		0.2	0.1		0.7	0.2		0.5	0.1	
Delay (s)	3.7	4.6		4.0	4.4		14.7	14.0		14.5	13.8	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		4.6			4.3			14.2			14.1	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	6.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	38.2	Sum of lost time (s)	10.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	184	328	289	246	257	86	351	597	104	176	807	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5	5.5	4.5	5.5		4.5	5.5	5.5	4.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1827	1583	1736	1705		3303	3471	1495	1719	3394	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1827	1583	1736	1705		3303	3471	1495	1719	3394	
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)	194	345	304	259	271	91	369	628	109	185	849	227
RTOR Reduction (vph)	0	0	230	0	8	0	0	0	75	0	19	0
Lane Group Flow (vph)	194	345	74	259	354	0	369	628	34	185	1057	0
Heavy Vehicles (%)	2%	4%	2%	4%	9%	2%	6%	4%	8%	5%	3%	3%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	18.5	24.6	24.6	22.1	28.2		15.5	37.6	37.6	17.2	39.3	
Effective Green, g (s)	18.5	24.6	24.6	22.1	28.2		15.5	37.6	37.6	17.2	39.3	
Actuated g/C Ratio	0.15	0.20	0.20	0.18	0.23		0.13	0.31	0.31	0.14	0.32	
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5		4.5	5.5	5.5	4.5	5.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	269	369	320	315	395		421	1074	462	243	1097	
v/s Ratio Prot	0.11	0.19		c0.15	c0.21		c0.11	0.18		0.11	c0.31	
v/s Ratio Perm			0.05						0.02			
v/c Ratio	0.72	0.93	0.23	0.82	0.90		0.88	0.58	0.07	0.76	0.96	
Uniform Delay, d1	49.0	47.7	40.5	47.8	45.2		52.1	35.4	29.6	50.2	40.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	9.2	30.5	0.4	15.7	21.9		18.1	0.8	0.1	13.1	18.9	
Delay (s)	58.2	78.2	40.9	63.5	67.1		70.2	36.2	29.7	63.3	59.3	
Level of Service	E	E	D	E	E		E	D	C	E	E	
Approach Delay (s)		60.1			65.6			46.9			59.9	
Approach LOS		E			E			D			E	

Intersection Summary			
HCM 2000 Control Delay	57.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	121.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	16.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	52	229	159	1067	1143	50
Conflicting Peds, #/hr	1	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	60	0	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	3	0	0	7	6	0
Mvmt Flow	55	241	167	1123	1203	53

Major/Minor	Minor2	Major1			Major2	
Conflicting Flow All	2126	631	1257	0	-	0
Stage 1	1230	-	-	-	-	-
Stage 2	896	-	-	-	-	-
Follow-up Headway	4	3	2	-	-	-
Pot Capacity-1 Maneuver	# 42	429	560	-	-	-
Stage 1	237	-	-	-	-	-
Stage 2	356	-	-	-	-	-
Time blocked-Platoon, %				-	-	-
Mov Capacity-1 Maneuver	# 29	428	559	-	-	-
Mov Capacity-2 Maneuver	# 29	-	-	-	-	-
Stage 1	237	-	-	-	-	-
Stage 2	249	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	151	2	0

Minor Lane / Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	559	-	29	428	-	-
HCM Lane V/C Ratio	0.299	-	1.887	0.563	-	-
HCM Control Delay (s)	14.169	-	$ 710	23.7	-	-
HCM Lane LOS	B		F	C		
HCM 95th %tile Q(veh)	1.25	-	6.416	3.38	-	-

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	87	40	49	119	48	44	48	1075	54	53	1190	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.98		1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.97	1.00		0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1803	1586		1786	1411	1752	3353		1719	3371	
Flt Permitted		0.63	1.00		0.71	1.00	0.12	1.00		0.16	1.00	
Satd. Flow (perm)		1166	1586		1306	1411	217	3353		283	3371	
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)	92	42	52	125	51	46	51	1132	57	56	1253	75
RTOR Reduction (vph)	0	0	41	0	0	36	0	2	0	0	3	0
Lane Group Flow (vph)	0	134	11	0	176	10	51	1187	0	56	1325	0
Confl. Peds. (#/hr)	11		7	7		11	16		2	2		16
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	2%	0%	0%	1%	6%	12%	3%	7%	2%	5%	6%	4%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)		14.7	14.7		14.7	14.7	40.6	36.8		40.6	36.8	
Effective Green, g (s)		14.7	14.7		14.7	14.7	40.6	36.8		40.6	36.8	
Actuated g/C Ratio		0.21	0.21		0.21	0.21	0.59	0.53		0.59	0.53	
Clearance Time (s)		4.5	4.5		4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		249	338		279	301	212	1793		246	1803	
v/s Ratio Prot							c0.01	0.35		0.01	c0.39	
v/s Ratio Perm		0.11	0.01		c0.13	0.01	0.13			0.12		
v/c Ratio		0.54	0.03		0.63	0.03	0.24	0.66		0.23	0.74	
Uniform Delay, d1		24.0	21.4		24.6	21.4	8.1	11.5		7.3	12.3	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.2	0.0		4.6	0.0	0.6	0.9		0.5	1.6	
Delay (s)		26.3	21.5		29.2	21.5	8.6	12.4		7.8	13.9	
Level of Service		C	C		C	C	A	B		A	B	
Approach Delay (s)		24.9			27.6			12.3			13.6	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	68.8	Sum of lost time (s)	13.5
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	106	12	75	33	11	19	41	1035	5	20	1337	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.95			1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.97			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1718			1778	1009	1805	3400		1421	3436	
Flt Permitted		0.80			0.74	1.00	0.10	1.00		0.22	1.00	
Satd. Flow (perm)		1418			1363	1009	186	3400		329	3436	
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)	112	13	79	35	12	20	43	1089	5	21	1407	92
RTOR Reduction (vph)	0	27	0	0	0	16	0	0	0	0	3	0
Lane Group Flow (vph)	0	177	0	0	47	4	43	1094	0	21	1496	0
Confl. Peds. (#/hr)	9		2	2		9	8		1	1		8
Confl. Bikes (#/hr)									3			
Heavy Vehicles (%)	2%	0%	0%	4%	0%	57%	0%	6%	25%	27%	4%	2%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		13.2			13.2	13.2	44.6	40.8		39.4	38.2	
Effective Green, g (s)		13.2			13.2	13.2	44.6	40.8		39.4	38.2	
Actuated g/C Ratio		0.19			0.19	0.19	0.65	0.59		0.57	0.56	
Clearance Time (s)		4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		272			261	193	210	2019		207	1910	
v/s Ratio Prot							c0.01	0.32		0.00	c0.44	
v/s Ratio Perm		c0.12			0.03	0.00	0.12			0.06		
v/c Ratio		0.65			0.18	0.02	0.20	0.54		0.10	0.78	
Uniform Delay, d1		25.6			23.2	22.5	8.2	8.4		6.6	12.0	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		5.3			0.3	0.0	0.5	0.3		0.2	2.2	
Delay (s)		30.9			23.6	22.5	8.7	8.7		6.8	14.2	
Level of Service		C			C	C	A	A		A	B	
Approach Delay (s)		30.9			23.3			8.7			14.1	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	68.7	Sum of lost time (s)	13.5
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	103	147	74	42	101	222	53	739	20	258	873	132
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95			1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1671	1758			1803	1509	1719	3427		1719	3373	
Flt Permitted	0.66	1.00			0.81	1.00	0.24	1.00		0.21	1.00	
Satd. Flow (perm)	1162	1758			1481	1509	440	3427		386	3373	
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)	108	155	78	44	106	234	56	778	21	272	919	139
RTOR Reduction (vph)	0	21	0	0	0	182	0	2	0	0	8	0
Lane Group Flow (vph)	108	212	0	0	150	52	56	797	0	272	1050	0
Confl. Peds. (#/hr)							2		1	1		2
Heavy Vehicles (%)	8%	3%	2%	6%	3%	7%	5%	5%	0%	5%	5%	2%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	14.1	14.1			14.1	14.1	29.3	25.5		40.8	32.5	
Effective Green, g (s)	14.1	14.1			14.1	14.1	29.3	25.5		40.8	32.5	
Actuated g/C Ratio	0.22	0.22			0.22	0.22	0.46	0.40		0.64	0.51	
Clearance Time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	256	387			326	332	277	1367		471	1715	
v/s Ratio Prot		c0.12					0.01	0.23		c0.10	c0.31	
v/s Ratio Perm	0.09				0.10	0.03	0.08			0.27		
v/c Ratio	0.42	0.55			0.46	0.16	0.20	0.58		0.58	0.61	
Uniform Delay, d1	21.4	22.1			21.6	20.1	9.7	15.0		6.8	11.2	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	1.6			1.0	0.2	0.4	0.6		1.7	0.7	
Delay (s)	22.5	23.7			22.6	20.3	10.1	15.7		8.6	11.9	
Level of Service	C	C			C	C	B	B		A	B	
Approach Delay (s)		23.3			21.2			15.3			11.2	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	63.9	Sum of lost time (s)	13.5
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	20.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	71	750	867	171	78	69
Conflicting Peds, #/hr	4	0	0	4	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	250	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	2	3	3	3	2
Mvmt Flow	75	789	913	180	82	73

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	913	0	-	0	1852	917
Stage 1	-	-	-	-	913	-
Stage 2	-	-	-	-	939	-
Follow-up Headway	2	-	-	-	4	3
Pot Capacity-1 Maneuver	755	-	-	-	#81	330
Stage 1	-	-	-	-	390	-
Stage 2	-	-	-	-	379	-
Time blocked-Platoon, %		-	-	-		
Mov Capacity-1 Maneuver	752	-	-	-	#73	329
Mov Capacity-2 Maneuver	-	-	-	-	#73	-
Stage 1	-	-	-	-	390	-
Stage 2	-	-	-	-	341	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	272

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	752	-	-	-	115
HCM Lane V/C Ratio	0.099	-	-	-	1.346
HCM Control Delay (s)	10.315	-	-	-	272.2
HCM Lane LOS	B				F
HCM 95th %tile Q(veh)	0.33	-	-	-	10.496

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	730	135	69	706	20	65	11	149	84	20	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	0.86		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1797	3385		1766	3425		1764	1594		1797	1682	
Flt Permitted	0.36	1.00		0.30	1.00		0.71	1.00		0.65	1.00	
Satd. Flow (perm)	685	3385		563	3425		1321	1594		1230	1682	
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)	40	768	142	73	743	21	68	12	157	88	21	49
RTOR Reduction (vph)	0	20	0	0	3	0	0	129	0	0	40	0
Lane Group Flow (vph)	40	890	0	73	761	0	68	40	0	88	30	0
Confl. Peds. (#/hr)	11		7	7		11	7		12	12		7
Heavy Vehicles (%)	0%	4%	2%	2%	5%	0%	2%	0%	1%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	25.3	25.3		25.3	25.3		7.5	7.5		7.5	7.5	
Effective Green, g (s)	25.3	25.3		25.3	25.3		7.5	7.5		7.5	7.5	
Actuated g/C Ratio	0.59	0.59		0.59	0.59		0.18	0.18		0.18	0.18	
Clearance Time (s)	5.5	5.5		5.5	5.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	404	2000		332	2024		231	279		215	294	
v/s Ratio Prot		c0.26			0.22			0.02			0.02	
v/s Ratio Perm	0.06			0.13			0.05			c0.07		
v/c Ratio	0.10	0.44		0.22	0.38		0.29	0.14		0.41	0.10	
Uniform Delay, d1	3.8	4.9		4.1	4.6		15.3	14.9		15.7	14.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.2		0.3	0.1		0.7	0.2		1.3	0.2	
Delay (s)	3.9	5.0		4.4	4.7		16.1	15.2		17.0	15.0	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		5.0			4.7			15.4			16.1	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	42.8	Sum of lost time (s)	10.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	214	401	292	291	400	81	380	619	146	200	903	231
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5	5.5	4.5	5.5		4.5	5.5	5.5	4.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1881	1599	1787	1807		3400	3539	1615	1770	3451	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1881	1599	1787	1807		3400	3539	1615	1770	3451	
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)	225	422	307	306	421	85	400	652	154	211	951	243
RTOR Reduction (vph)	0	0	213	0	5	0	0	0	100	0	18	0
Lane Group Flow (vph)	225	422	94	306	501	0	400	652	54	211	1176	0
Heavy Vehicles (%)	2%	1%	1%	1%	3%	0%	3%	2%	0%	2%	1%	3%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			
Actuated Green, G (s)	20.3	24.5	24.5	24.2	28.4		15.5	37.2	37.2	18.5	40.2	
Effective Green, g (s)	20.3	24.5	24.5	24.2	28.4		15.5	37.2	37.2	18.5	40.2	
Actuated g/C Ratio	0.16	0.20	0.20	0.19	0.23		0.12	0.30	0.30	0.15	0.32	
Clearance Time (s)	4.5	5.5	5.5	4.5	5.5		4.5	5.5	5.5	4.5	5.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	288	370	314	347	412		423	1058	482	263	1115	
v/s Ratio Prot	0.13	0.22		c0.17	c0.28		c0.12	0.18		0.12	c0.34	
v/s Ratio Perm			0.06						0.03			
v/c Ratio	0.78	1.14	0.30	0.88	1.22		0.95	0.62	0.11	0.80	1.05	
Uniform Delay, d1	49.9	50.0	42.6	48.7	48.0		54.0	37.5	31.6	51.2	42.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	12.9	90.8	0.5	22.1	117.2		30.0	1.1	0.1	16.0	42.5	
Delay (s)	62.8	140.7	43.2	70.8	165.2		84.1	38.5	31.7	67.2	84.6	
Level of Service	E	F	D	E	F		F	D	C	E	F	
Approach Delay (s)		90.9			129.6			52.8			82.0	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	84.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	124.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	97.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	25.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	46	210	156	1070	1455	56
Conflicting Peds, #/hr	0	0	3	0	0	3
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	60	0	150	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	8	0	4	3	0
Mvmt Flow	48	221	164	1126	1532	59

Major/Minor	Minor2	Major1			Major2	
Conflicting Flow All	2453	798	1591	0	-	0
Stage 1	1561	-	-	-	-	-
Stage 2	892	-	-	-	-	-
Follow-up Headway	4	3	2	-	-	-
Pot Capacity-1 Maneuver	# 26	316	418	-	-	-
Stage 1	162	-	-	-	-	-
Stage 2	366	-	-	-	-	-
Time blocked-Platoon, %				-	-	-
Mov Capacity-1 Maneuver	# 16	315	417	-	-	-
Mov Capacity-2 Maneuver	# 16	-	-	-	-	-
Stage 1	162	-	-	-	-	-
Stage 2	222	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	284	2	0

Minor Lane / Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	417	-	16	315	-	-
HCM Lane V/C Ratio	0.394	-	3.026	0.702	-	-
HCM Control Delay (s)	19.13	-	$ 1403.1	39.4	-	-
HCM Lane LOS	C		F	E		
HCM 95th %tile Q(veh)	1.841	-	6.745	4.962	-	-

Notes

~ : Volume Exceeds Capacity; $: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	83	73	61	145	54	44	61	1082	83	60	1461	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.99		1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.97	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1824	1592		1831	1578	1805	3432		1805	3473	
Flt Permitted		0.65	1.00		0.64	1.00	0.11	1.00		0.13	1.00	
Satd. Flow (perm)		1219	1592		1221	1578	209	3432		245	3473	
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)	87	77	64	153	57	46	64	1139	87	63	1538	103
RTOR Reduction (vph)	0	0	48	0	0	35	0	4	0	0	4	0
Lane Group Flow (vph)	0	164	16	0	210	11	64	1222	0	63	1637	0
Confl. Peds. (#/hr)	12		3	3		12	3		5	5		3
Heavy Vehicles (%)	2%	0%	0%	0%	0%	0%	0%	4%	2%	0%	3%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)		17.8	17.8		17.8	17.8	41.8	36.4		41.6	36.3	
Effective Green, g (s)		17.8	17.8		17.8	17.8	41.8	36.4		41.6	36.3	
Actuated g/C Ratio		0.24	0.24		0.24	0.24	0.57	0.50		0.57	0.50	
Clearance Time (s)		4.5	4.5		4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		297	388		297	384	237	1711		252	1726	
v/s Ratio Prot							c0.02	0.36		0.02	c0.47	
v/s Ratio Perm		0.13	0.01		c0.17	0.01	0.13			0.12		
v/c Ratio		0.55	0.04		0.71	0.03	0.27	0.71		0.25	0.95	
Uniform Delay, d1		24.1	21.1		25.2	21.0	13.2	14.2		9.0	17.5	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.2	0.0		7.5	0.0	0.6	1.4		0.5	11.6	
Delay (s)		26.3	21.1		32.7	21.1	13.8	15.7		9.5	29.1	
Level of Service		C	C		C	C	B	B		A	C	
Approach Delay (s)		24.9			30.6			15.6			28.3	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	23.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	107	12	74	30	9	20	70	1165	8	22	1521	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.95			1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.97			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1720			1771	1194	1770	3501		1455	3500	
Flt Permitted		0.81			0.74	1.00	0.10	1.00		0.17	1.00	
Satd. Flow (perm)		1423			1362	1194	182	3501		266	3500	
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)	113	13	78	32	9	21	74	1226	8	23	1601	114
RTOR Reduction (vph)	0	27	0	0	0	17	0	0	0	0	3	0
Lane Group Flow (vph)	0	177	0	0	41	4	74	1234	0	23	1712	0
Confl. Peds. (#/hr)	5		4	4		5	4		5	5		4
Heavy Vehicles (%)	2%	0%	0%	4%	0%	33%	2%	3%	0%	24%	2%	1%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		13.5			13.5	13.5	46.6	41.0		40.2	37.8	
Effective Green, g (s)		13.5			13.5	13.5	46.6	41.0		40.2	37.8	
Actuated g/C Ratio		0.19			0.19	0.19	0.66	0.58		0.57	0.54	
Clearance Time (s)		4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		272			261	228	246	2038		192	1879	
v/s Ratio Prot							c0.02	c0.35		0.00	c0.49	
v/s Ratio Perm		c0.12			0.03	0.00	0.17			0.06		
v/c Ratio		0.65			0.16	0.02	0.30	0.61		0.12	0.91	
Uniform Delay, d1		26.3			23.7	23.1	12.0	9.5		7.2	14.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		5.3			0.3	0.0	0.7	0.5		0.3	7.1	
Delay (s)		31.5			24.0	23.1	12.7	10.0		7.5	21.9	
Level of Service		C			C	C	B	A		A	C	
Approach Delay (s)		31.5			23.7			10.1			21.7	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	70.4	Sum of lost time (s)	13.5
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	116	172	86	63	176	286	94	805	26	320	1054	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95			1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1763			1875	1583	1805	3417		1770	3446	
Flt Permitted	0.44	1.00			0.65	1.00	0.16	1.00		0.17	1.00	
Satd. Flow (perm)	807	1763			1238	1583	310	3417		321	3446	
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)	122	181	91	66	185	301	99	847	27	337	1109	143
RTOR Reduction (vph)	0	21	0	0	0	174	0	2	0	0	7	0
Lane Group Flow (vph)	122	251	0	0	251	127	99	872	0	337	1245	0
Confl. Peds. (#/hr)							3					3
Heavy Vehicles (%)	3%	2%	3%	0%	0%	2%	0%	5%	10%	2%	3%	0%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	18.5	18.5			18.5	18.5	36.3	30.2		50.2	39.6	
Effective Green, g (s)	18.5	18.5			18.5	18.5	36.3	30.2		50.2	39.6	
Actuated g/C Ratio	0.24	0.24			0.24	0.24	0.47	0.39		0.65	0.51	
Clearance Time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	192	419			294	376	262	1328		496	1756	
v/s Ratio Prot		0.14					0.03	0.26		c0.14	c0.36	
v/s Ratio Perm	0.15				c0.20	0.08	0.15			0.30		
v/c Ratio	0.64	0.60			0.85	0.34	0.38	0.66		0.68	0.71	
Uniform Delay, d1	26.6	26.3			28.3	24.5	12.2	19.5		10.6	14.6	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.7	2.4			20.7	0.5	0.9	1.2		3.7	1.3	
Delay (s)	33.3	28.7			49.0	25.1	13.1	20.7		14.3	16.0	
Level of Service	C	C			D	C	B	C		B	B	
Approach Delay (s)		30.1			35.9			19.9			15.6	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	77.7	Sum of lost time (s)	13.5
Intersection Capacity Utilization	82.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX

E

NCHRP ANALYSIS RESULTS

DKS

GUIDELINES FOR PEDESTRIAN CROSSING TREATMENTS

This spreadsheet combines Worksheet 1 and Worksheet 2 (Appendix A, pages 69-70) of TCRP Report 112/NCHRP Report 562 (*Improving Pedestrian Safety at Unsignalized Intersections*) into an electronic format. This spreadsheet should be used in conjunction with, and not independent of, Appendix A documentation.

This spreadsheet is still under development, please inform TTI if errors are identified.

Key

- Blue fields contain descriptive information.
- Green fields are required and must be completed.
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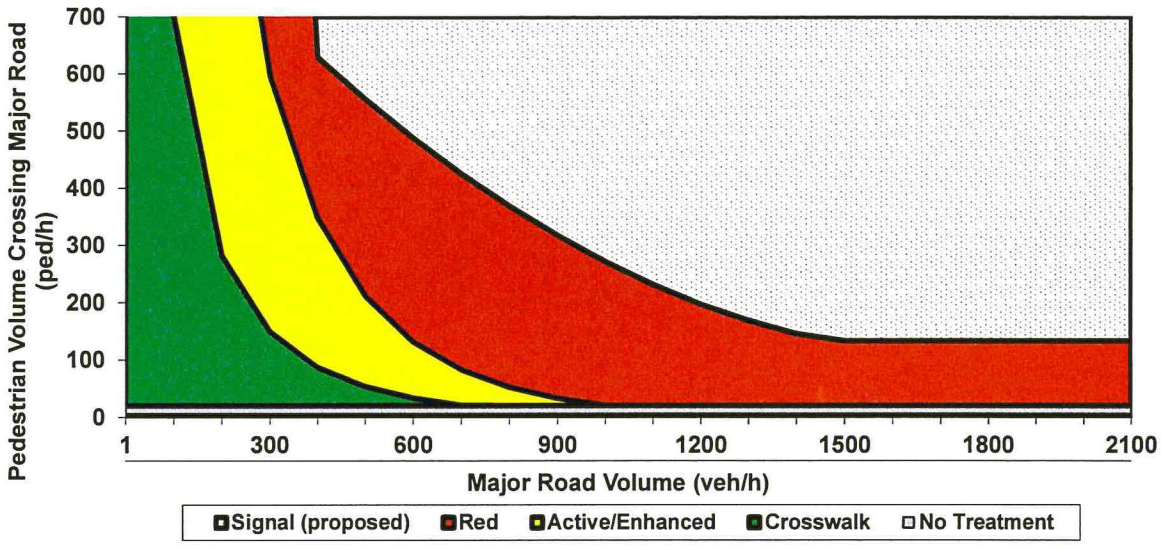
- Gray fields are automatically calculated and should not be edited.

Analyst and Site Information			
Analyst	DKS Associates	Major Street	OR 99E
Analysis Date	July 10, 2017	Minor Street or Location	Laurel Avenue-Tomlin Avenue
Data Collection Date	October 11, 2016	Peak Hour	4:15PM

Step 1: Select worksheet:		
Posted or statutory speed limit (or 85th percentile speed) on the major street (mph)	*1a*	35
Is the population of the surrounding area <10,000? (enter ***YES*** or ***NO***)	*1b*	NO
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a traffic control device?		
Peak-hour pedestrian volume (ped/h), V_p	*2a*	3
Result: Consider raised median islands, curb extensions, traffic calming, etc. as feasible.		
Step 3: Does the crossing meet the pedestrian warrant for a traffic signal?		
Major road volume, total of both approaches during peak hour (veh/h), $V_{maj\text{-}s}$	*3a*	2185
[Calculated automatically] Preliminary (before min. threshold) peak hour pedestrian volume to meet warrant	*3b*	133
[Calculated automatically] Minimum required peak hour pedestrian volume to meet traffic signal warrant	*3c*	133
Is 15th percentile crossing speed of pedestrians less than 3.5 ft/s (1.1 m/s)? (enter ***YES*** or ***NO***)	*3d*	YES
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce *3c* by up to 50%. — % rate of reduction for *3c* (up to 50%)	*3e*	10%
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce *3c* by up to 50%. — Reduced value or *3c*	*3f*	120
Result:		
Step 4: Estimate pedestrian delay.		
Pedestrian crossing distance, curb to curb (ft), L	*4a*	60
Pedestrian walking speed (ft/s), S_p (suggested speed = 3.5 ft/s)	*4b*	3.5
Pedestrian start-up time and end clearance time (s), t_s (suggested start-up time = 3 sec)	*4c*	3
[Calculated automatically] Critical gap required for crossing pedestrian (s), t_c	*4d*	20
Major road volume, total both approaches OR approach being crossed if raised median island is present, during peak hour (veh/h), $V_{maj\text{-}d}$	*4e*	2185
Major road flow rate (veh/s), v	*4f*	0.61
Average pedestrian delay (s/person), d_p	*4g*	355535
Total pedestrian delay (h), D_p The value in 4h is the calculated estimated delay for all pedestrians crossing the major roadway without a crossing treatment (assumes 0% compliance). If the actual total pedestrian delay has been measured at the site, that value can be entered in 4i to replace the calculated value in 4h.	*4h*	296.3
	4i	
Step 5: Select treatment based up on total pedestrian delay and expected motorist compliance.		
Expected motorist compliance at pedestrian crossings in region: enter ***HIGH for High Compliance*** or ***LOW for Low Compliance***	*5a*	LOW
Treatment Category:	**Consider raised median islands, curb extensions, traffic calming, etc. as feasible.**	



The intersection of pedestrian volume and vehicle volume cannot be seen because the vehicle volume exceeds the limits of the graph.

This worksheet provides general recommendations on pedestrian crossing treatments to consider at unsignalized intersections; in all cases, engineering judgment should be used in selecting a specific treatment for installation. This worksheet does not apply to school crossings. In addition to the results provided by this worksheet, users should consider whether a pedestrian treatment could present an increased safety risk to pedestrians, such as where there is poor sight distance, complex geometrics, or nearby traffic signals.

GUIDELINES FOR PEDESTRIAN CROSSING TREATMENTS

This spreadsheet combines Worksheet 1 and Worksheet 2 (Appendix A, pages 69-70) of TCRP Report 112/NCHRP Report 562 (*Improving Pedestrian Safety at Unsignalized Intersections*) into an electronic format. This spreadsheet should be used in conjunction with, and not independent of, Appendix A documentation.

This spreadsheet is still under development, please inform TTI if errors are identified.

Key

- Blue fields contain descriptive information.
- Green fields are required and must be completed.
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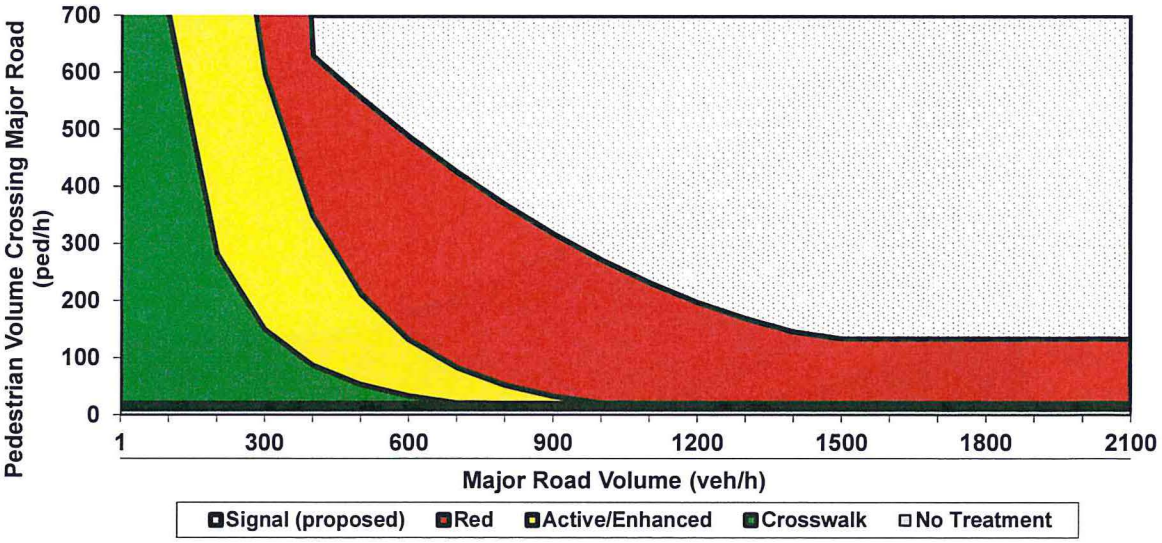
- Gray fields are automatically calculated and should not be edited.

Analyst and Site Information			
Analyst	DKS Associates	Major Street	OR 99E
Analysis Date	July 10, 2017	Minor Street or Location	Blaine Street-Aztec Drive
Data Collection Date	October 11, 2016	Peak Hour	4:15PM

Step 1: Select worksheet:		
Posted or statutory speed limit (or 85th percentile speed) on the major street (mph)	*1a*	35
Is the population of the surrounding area <10,000? (enter ***YES*** or ***NO***)	*1b*	NO
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a traffic control device?		
Peak-hour pedestrian volume (ped/h), V_p	*2a*	11
Result: Consider raised median islands, curb extensions, traffic calming, etc. as feasible.		
Step 3: Does the crossing meet the pedestrian warrant for a traffic signal?		
Major road volume, total of both approaches during peak hour (veh/h), $V_{maj\text{-}s}$	*3a*	2185
[Calculated automatically] Preliminary (before min. threshold) peak hour pedestrian volume to meet warrant	*3b*	133
[Calculated automatically] Minimum required peak hour pedestrian volume to meet traffic signal warrant	*3c*	133
Is 15th percentile crossing speed of pedestrians less than 3.5 ft/s (1.1 m/s)? (enter ***YES*** or ***NO***)	*3d*	YES
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce *3c* by up to 50%. — % rate of reduction for *3c* (up to 50%)	*3e*	10%
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce *3c* by up to 50%. — Reduced value or *3c*	*3f*	120
Result:		
Step 4: Estimate pedestrian delay.		
Pedestrian crossing distance, curb to curb (ft), L	*4a*	60
Pedestrian walking speed (ft/s), S_p (suggested speed = 3.5 ft/s)	*4b*	3.5
Pedestrian start-up time and end clearance time (s), t_s (suggested start-up time = 3 sec)	*4c*	3
[Calculated automatically] Critical gap required for crossing pedestrian (s), t_c	*4d*	20
Major road volume, total both approaches OR approach being crossed if raised median island is present, during peak hour (veh/h), $V_{maj\text{-}d}$	*4e*	2185
Major road flow rate (veh/s), v	*4f*	0.61
Average pedestrian delay (s/person), d_p	*4g*	355535
Total pedestrian delay (h), D_p The value in 4h is the calculated estimated delay for all pedestrians crossing the major roadway without a crossing treatment (assumes 0% compliance). If the actual total pedestrian delay has been measured at the site, that value can be entered in 4i to replace the calculated value in 4h.	*4h*	1086.4
	4i	
Step 5: Select treatment based up on total pedestrian delay and expected motorist compliance.		
Expected motorist compliance at pedestrian crossings in region: enter ***HIGH for High Compliance*** or ***LOW for Low Compliance***	*5a*	LOW
Treatment Category:	**Consider raised median islands, curb extensions, traffic calming, etc. as feasible.**	



The intersection of pedestrian volume and vehicle volume cannot be seen because the vehicle volume exceeds the limits of the graph.

This worksheet provides general recommendations on pedestrian crossing treatments to consider at unsignalized intersections; in all cases, engineering judgment should be used in selecting a specific treatment for installation. This worksheet does not apply to school crossings. In addition to the results provided by this worksheet, users should consider whether a pedestrian treatment could present an increased safety risk to pedestrians, such as where there is poor sight distance, complex geometrics, or nearby traffic signals.

GUIDELINES FOR PEDESTRIAN CROSSING TREATMENTS

This spreadsheet combines Worksheet 1 and Worksheet 2 (Appendix A, pages 69-70) of TCRP Report 112/NCHRP Report 562 (*Improving Pedestrian Safety at Unsignalized Intersections*) into an electronic format. This spreadsheet should be used in conjunction with, and not independent of, Appendix A documentation.

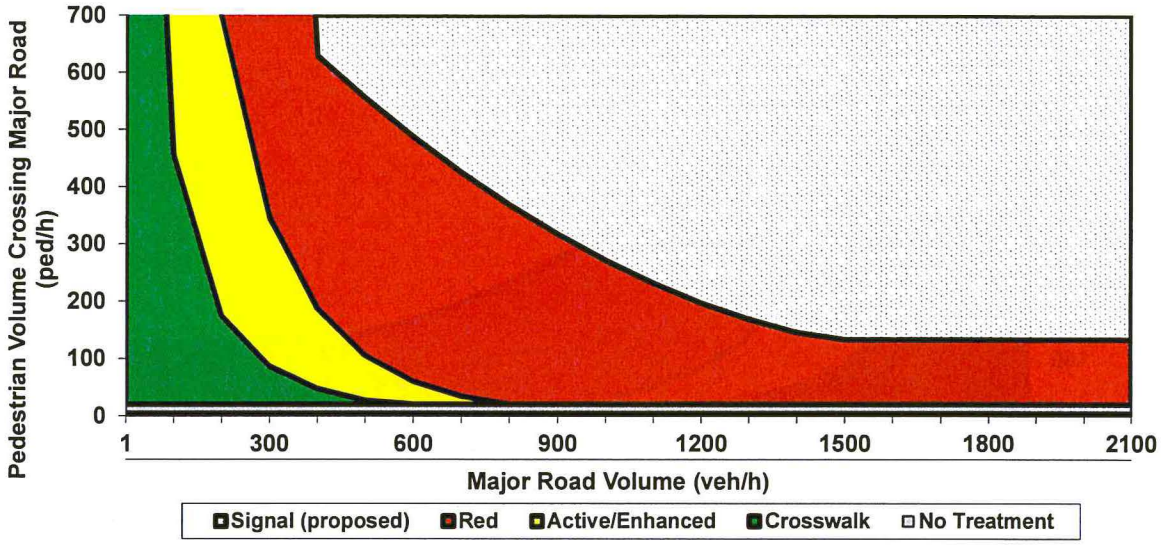
This spreadsheet is still under development, please inform TTI if errors are identified.

Key

- Blue fields contain descriptive information.
- Green fields are required and must be completed.
- Tan fields are adjustments that are filled out only under certain conditions (follow instructions to the left of the cell).
- Gray fields are automatically calculated and should not be edited.

Analyst and Site Information			
Analyst	DKS Associates	Major Street	OR 99E
Analysis Date	July 10, 2017	Minor Street or Location	Williams Avenue
Data Collection Date	October 11, 2016	Peak Hour	4:15PM

Step 1: Select worksheet:			
Posted or statutory speed limit (or 85th percentile speed) on the major street (mph)		*1a*	35
Is the population of the surrounding area <10,000? (enter ***YES*** or ***NO***)		*1b*	NO
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a traffic control device?			
Peak-hour pedestrian volume (ped/h), V_p		*2a*	4
Result: Consider raised median islands, curb extensions, traffic calming, etc. as feasible.			
Step 3: Does the crossing meet the pedestrian warrant for a traffic signal?			
Major road volume, total of both approaches during peak hour (veh/h), $V_{maj\text{-}s}$		*3a*	2365
[Calculated automatically] Preliminary (before min. threshold) peak hour pedestrian volume to meet warrant		*3b*	133
[Calculated automatically] Minimum required peak hour pedestrian volume to meet traffic signal warrant		*3c*	133
Is 15th percentile crossing speed of pedestrians less than 3.5 ft/s (1.1 m/s)? (enter ***YES*** or ***NO***)		*3d*	YES
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce *3c* by up to 50%.	% rate of reduction for *3c* (up to 50%)	*3e*	10%
	Reduced value or *3c*	*3f*	120
Result:			
Step 4: Estimate pedestrian delay.			
Pedestrian crossing distance, curb to curb (ft), L		*4a*	75
Pedestrian walking speed (ft/s), S_p (suggested speed = 3.5 ft/s)		*4b*	3.5
Pedestrian start-up time and end clearance time (s), t_s (suggested start-up time = 3 sec)		*4c*	3
[Calculated automatically] Critical gap required for crossing pedestrian (s), t_c		*4d*	24
Major road volume, total both approaches OR approach being crossed if raised median island is present, during peak hour (veh/h), $V_{maj\text{-}d}$		*4e*	2365
Major road flow rate (veh/s), v		*4f*	0.66
Average pedestrian delay (s/person), d_p		*4g*	15223805
Total pedestrian delay (h), D_p The value in 4h is the calculated estimated delay for all pedestrians crossing the major roadway without a crossing treatment (assumes 0% compliance). If the actual total pedestrian delay has been measured at the site, that value can be entered in 4i to replace the calculated value in 4h.		*4h*	16915.3
		4i	
Step 5: Select treatment based up on total pedestrian delay and expected motorist compliance.			
Expected motorist compliance at pedestrian crossings in region: enter ***HIGH for High Compliance*** or ***LOW for Low Compliance***		*5a*	LOW
Treatment Category:	**Consider raised median islands, curb extensions, traffic calming, etc. as feasible.**		



The intersection of pedestrian volume and vehicle volume cannot be seen because the vehicle volume exceeds the limits of the graph.

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GUIDELINES FOR PEDESTRIAN CROSSING TREATMENTS

This spreadsheet combines Worksheet 1 and Worksheet 2 (Appendix A, pages 69-70) of TCRP Report 112/NCHRP Report 562 (*Improving Pedestrian Safety at Unsignalized Intersections*) into an electronic format. This spreadsheet should be used in conjunction with, and not independent of, Appendix A documentation.

This spreadsheet is still under development, please inform TTI if errors are identified.

Key

- Blue fields contain descriptive information.
- Green fields are required and must be completed.
- Tan fields are adjustments that are filled out only under certain conditions (follow instructions to the left of the cell).
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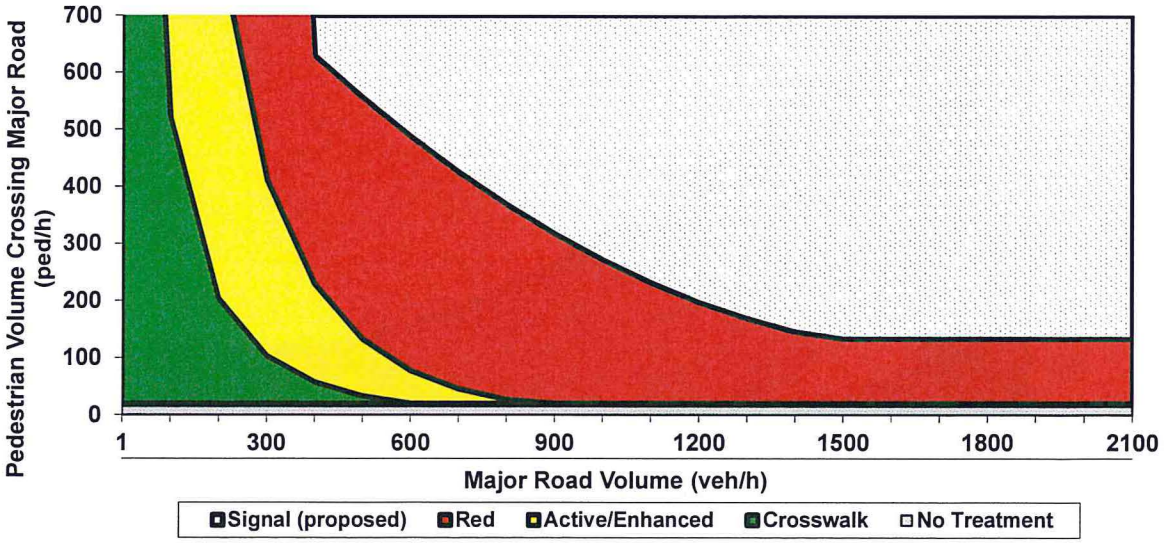
Analyst and Site Information			
Analyst	DKS Associates	Major Street	OR 99E
Analysis Date	July 10, 2017	Minor Street or Location	James Street
Data Collection Date	October 11, 2016	Peak Hour	4:15PM

Step 1: Select worksheet:			
Posted or statutory speed limit (or 85th percentile speed) on the major street (mph)		*1a*	35
Is the population of the surrounding area <10,000? (enter ***YES*** or ***NO***)		*1b*	NO
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a traffic control device?			
Peak-hour pedestrian volume (ped/h), V_p		*2a*	18
Result: Consider raised median islands, curb extensions, traffic calming, etc. as feasible.			
Step 3: Does the crossing meet the pedestrian warrant for a traffic signal?			
Major road volume, total of both approaches during peak hour (veh/h), V_{maj-s}		*3a*	2325
[Calculated automatically] Preliminary (before min. threshold) peak hour pedestrian volume to meet warrant		*3b*	133
[Calculated automatically] Minimum required peak hour pedestrian volume to meet traffic signal warrant		*3c*	133
Is 15th percentile crossing speed of pedestrians less than 3.5 ft/s (1.1 m/s)? (enter ***YES*** or ***NO***)		*3d*	YES
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce *3c* by up to 50%.	% rate of reduction for *3c* (up to 50%)	*3e*	10%
	Reduced value or *3c*	*3f*	120
Result: The signal warrant is not met. Go to step 4.			
Step 4: Estimate pedestrian delay.			
Pedestrian crossing distance, curb to curb (ft), L		*4a*	70
Pedestrian walking speed (ft/s), S_p (suggested speed = 3.5 ft/s)		*4b*	3.5
Pedestrian start-up time and end clearance time (s), t_s (suggested start-up time = 3 sec)		*4c*	3
[Calculated automatically] Critical gap required for crossing pedestrian (s), t_c		*4d*	23
Major road volume, total both approaches OR approach being crossed if raised median island is present, during peak hour (veh/h), V_{maj-d}		*4e*	2325
Major road flow rate (veh/s), v		*4f*	0.65
Average pedestrian delay (s/person), d_p		*4g*	4783953
Total pedestrian delay (h), D_p The value in 4h is the calculated estimated delay for all pedestrians crossing the major roadway without a crossing treatment (assumes 0% compliance). If the actual total pedestrian delay has been measured at the site, that value can be entered in 4i to replace the calculated value in 4h.		*4h*	23919.8
		4i	
Step 5: Select treatment based up on total pedestrian delay and expected motorist compliance.			
Expected motorist compliance at pedestrian crossings in region: enter ***HIGH for High Compliance*** or ***LOW for Low Compliance***		*5a*	LOW
Treatment Category:	**Consider raised median islands, curb extensions, traffic calming, etc. as feasible.**		



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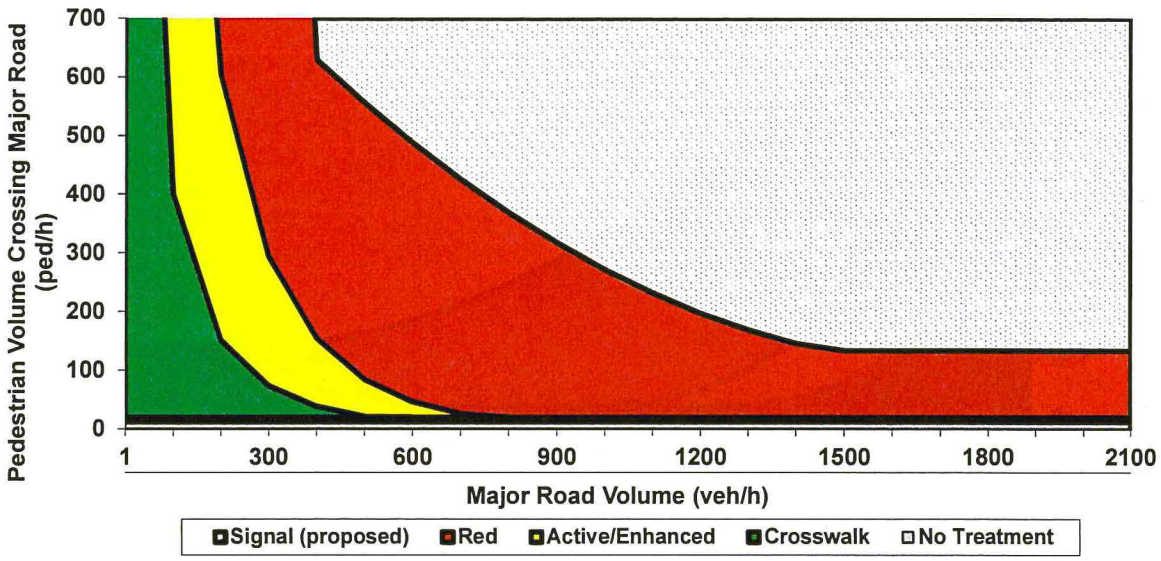
Analyst and Site Information			
Analyst	DKS Associates	Major Street	OR 99E
Analysis Date	July 10, 2017	Minor Street or Location	Mt Jefferson Ave
Data Collection Date	October 11, 2016	Peak Hour	4:15PM

Step 1: Select worksheet:			
Posted or statutory speed limit (or 85th percentile speed) on the major street (mph)		*1a*	35
Is the population of the surrounding area <10,000? (enter ***YES*** or ***NO***)		*1b*	NO
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a traffic control device?			
Peak-hour pedestrian volume (ped/h), V_p		*2a*	12
Result: Consider raised median islands, curb extensions, traffic calming, etc. as feasible.			
Step 3: Does the crossing meet the pedestrian warrant for a traffic signal?			
Major road volume, total of both approaches during peak hour (veh/h), V_{maj-s}		*3a*	2100
[Calculated automatically] Preliminary (before min. threshold) peak hour pedestrian volume to meet warrant		*3b*	133
[Calculated automatically] Minimum required peak hour pedestrian volume to meet traffic signal warrant		*3c*	133
Is 15th percentile crossing speed of pedestrians less than 3.5 ft/s (1.1 m/s)? (enter ***YES*** or ***NO***)		*3d*	YES
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce *3c* by up to 50%.	% rate of reduction for *3c* (up to 50%)	*3e*	10%
	Reduced value or *3c*	*3f*	120
Result:			
Step 4: Estimate pedestrian delay.			
Pedestrian crossing distance, curb to curb (ft), L		*4a*	80
Pedestrian walking speed (ft/s), S_p (suggested speed = 3.5 ft/s)		*4b*	3.5
Pedestrian start-up time and end clearance time (s), t_s (suggested start-up time = 3 sec)		*4c*	3
[Calculated automatically] Critical gap required for crossing pedestrian (s), t_c		*4d*	26
Major road volume, total both approaches OR approach being crossed if raised median island is present, during peak hour (veh/h), V_{maj-d}		*4e*	2100
Major road flow rate (veh/s), v		*4f*	0.58
Average pedestrian delay (s/person), d_p		*4g*	5620129
Total pedestrian delay (h), D_p The value in 4h is the calculated estimated delay for all pedestrians crossing the major roadway without a crossing treatment (assumes 0% compliance). If the actual total pedestrian delay has been measured at the site, that value can be entered in 4i to replace the calculated value in 4h.		*4h*	18733.8
		4i	
Step 5: Select treatment based up on total pedestrian delay and expected motorist compliance.			
Expected motorist compliance at pedestrian crossings in region: enter ***HIGH for High Compliance*** or ***LOW for Low Compliance***		*5a*	LOW
Treatment Category:	**Consider raised median islands, curb extensions, traffic calming, etc. as feasible.**		



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APPENDIX

F

Prioritization Analysis

DKS

Crossing Improvement Location Evaluation Criteria – To Determine Locations for Providing Crossing Improvements

	Evaluation Criteria														
	Collisions		Pedestrian Volumes			Nearby Pedestrian Generators						MV Volumes	Scoring and Ranking		
Weighting Factor (points)	5	5	1 pt. for >10, 2 pts. for >20 per peak hr			2	2	2	2	2	2	1 pt for >5,000, 2 pt for >8,000)			
Locations Considered for Crossing (Nearest Traffic Signal is More than 250 Feet Away)	*Collisions ('11-'15)*	*Pedestrian/Bicycle Collisions ('11-'15)*	*Pedestrian Crossing Volumes*			*School Crossing*	*Restaurant/Convenience Market*	*Hotel*	*Residential Connection*	*Nearby Transit Stop*	*Other?*	*ADT Volumes*	*Score*	*Rank*	**Comments**
			AM	*Mid*	*PM*										
Mt Jefferson Ave	2	1	2	4	12	0	7	0	0	2	3	27400	42	4	Nearby restaurants include Burger King, Starbucks, and Los Cabos Mexican. Nearby convenience markets include Woodburn Liquor Store, Safeway and Bi-Mart.
James St	1	0	1	18	15	0	3	0	1	1	2	30250	23	5	Nearby restaurants include Abby's Legendary Pozza and Gina's. Nearby convenience markeys include Al's Garden & Home and O'Connell's Boots and Raingear.
Williams Ave	7	2	1	2	4	0	7	1	1	1	2	38750	71	1	Nearby restaurants include La Tovara, Casa Mexico, and Mashita Teriyaki. Nearby convenience markets include Tienda Mexicana El Co Cheque and Carniceria El Ranchito. The Woodburn Inn is also located at the OR 99E/Williams Avenue intersections.
Blaine St-Aztec Dr	3	1	4	11	9	0	5	0	2	1	2	29500	43	3	Nearby restaurants include Los Laurels, Mama's Russian Food, Los Machetes Cemitas Poblanas, and 7 Mares. Other nearby pedestrian generators may include the homes along Blaine Street and Aztec Drive, Elena's Fabrics and Jewelry, and Recodo Fruteria.
Laurel Ave-Tomlin Ave	4	0	1	3	2	0	3	1	2	0	5	29500	44	2	Nearby restaurants include Domino's Pizza and Arctic Circle. Nearby convenience markets include Curt's Body Shop, and Cave Audio. Other nearby pedestrian generators may include the homes on Laurel Avenue and Tomlin Avenue and Woodburn Bowl.