

# WEST LINN ATHEY CREEK MIDDLE SCHOOL RELOCATION

## TRANSPORTATION IMPACT STUDY

OCTOBER 21, 2020

### PREPARED FOR:

West Linn-Wilsonville School District



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## INTRODUCTION

The purpose of this transportation evaluation is to determine the transportation impacts of the proposed relocation of Athey Creek Middle School from the current location north of Borland Road to the proposed site approximately three miles southeast along Willamette Falls Drive near Dollar Street. The new school will be approximately 109,000 square feet with an estimated future student population of 850. It is anticipated that the school will be completed and open for the 2023-2024 school year. Table 1 provides more details regarding the study area and characteristics of the proposed project.

**TABLE 1: STUDY AREA AND PROPOSED PROJECT CHARACTERISTICS**

STUDY AREA	
NUMBER OF STUDY INTERSECTIONS	Four
ANALYSIS PERIODS	Weekday AM (8:00 to 10:00) and Midday (3:00 to 5:00) peak hours
PROPOSED DEVELOPMENT	
SIZE AND LAND USE	850 student middle school Currently Vacant 21 Acre Lot
PROJECT TRIPS	279 AM Peak Hour Trips (152 in, 127 out) 211 Midday Peak Hour Trips (98 in, 113 out)
VEHICLE ACCESS POINTS	Access to the school will be provided via a new extension road, Brandon Place. One full access driveway will connect to the Brandon Place extension, and an entrance for busses and staff only will be included off of Dollar Street.
OTHER TRANSPORTATION FACILITIES	
PEDESTRIAN AND BICYCLE FACILITIES	There is an existing multi-use path on the south side of Willamette Falls Drive.
TRANSIT FACILITIES	The nearest bus stops are located approximately 500 feet north of Dollar Street on Ostman Road, on the northwest corner of Willamette Falls Drive/Ostman Road, and approximately 1,000 feet east of Ostman Road on Willamette Falls Drive for Route 154-Willamette/Clackamas Heights.

## EXISTING CONDITIONS

This section discusses the conditions of the existing site including the study area, existing traffic volumes, and traffic operations.

### STUDY AREA

Athey Creek Middle School has a 684-student population<sup>1</sup> and is located just north of I-205 off SW Borland Road in Clackamas County. The proposed location for the relocated Athey Creek Middle School is approximately three miles southeast of the existing location in the City of West Linn. The existing school location and driveways, proposed relocation site, and study intersections are shown in Figure 1. The area where the relocated middle school is proposed is currently zoned as low-density residential (R-10) which allows for schools as a conditional use.

The following sections present the existing characteristics of the study area for the proposed relocation including the bicycle and pedestrian facilities, the public transportation services provided in the study area, and a summary of the roadway network. Additionally, any City projects that are currently planned near the proposed school relocation are discussed.



**FIGURE 1: STUDY AREA**

<sup>1</sup> Student enrollment was 684 in March 2019 when the traffic counts were collected.

## ROADWAY NETWORK

Key roadways near the proposed school site include Willamette Falls Drive, Ostman Road, and Dollar Street. The jurisdiction, functional classifications, and characteristics of each of the study area roadways are listed in Table 2.

**TABLE 2: STUDY AREA ROADWAY CHARACTERISTICS**

ROADWAY	FUNCTIONAL CLASSIFICATION	JURISDICTION	LANES	POSTED SPEED	SIDEWALKS	BIKE FACILITIES
<b>WILLAMETTE FALLS DRIVE</b>	Minor Arterial	West Linn	2	30	Partial <sup>a</sup>	Partial <sup>a</sup>
<b>OSTMAN ROAD</b>	Collector	West Linn	2	25	Partial <sup>b</sup>	No
<b>DOLLAR STREET</b>	Local	West Linn	2	25	Yes	Partial <sup>c</sup>

<sup>a</sup> There are sidewalks and a bicycle lane along the north side of Willamette Falls Drive for approximately 1,350 feet west of Ostman Road to the marked pedestrian crossing. A shared-use path is provided along the south side of Willamette Falls Drive between the marked pedestrian crossing and the Tualatin River Bridge.

<sup>b</sup> Sidewalk currently exists on most of the east side of Ostman and along a some stretches on the west side.

<sup>c</sup> There is an unmarked 6-foot lane along the north side of Dollar Street.

## BICYCLE AND PEDESTRIAN FACILITIES

The site for the proposed relocated middle school is substantially more accessible by walking and biking since it is adjacent to an existing neighborhood within the City of West Linn as compared to the current Athey Creek Middle School location that is in rural Clackamas County. There is a multi-use path that connects Fields Bridge Park to Willamette Falls Drive at Epperly Way. There are sidewalks and bicycle lanes along the north side of Willamette Falls Drive from Ostman Road to Epperly Way, where there is a marked crosswalk with signage connecting to the multi-use path. West of this crossing there are no sidewalks or bicycle lanes along Willamette Falls Drive. Ostman Road and Dollar Street do not have marked bicycle lanes; however, Dollar Street has a large paved shoulder. There are sidewalks along the North side of Dollar Street while there are partial sidewalks along Ostman Road.

## PUBLIC TRANSIT SERVICE

TriMet provides public transportation services between West Linn’s Willamette neighborhood and Clackamas Heights via Oregon City Transit Center, traveling along Willamette Falls Drive, Abernethy, and Holcomb on route 154-Willamette/Clackamas Heights. Currently, the closest bus stops to the proposed school site are located approximately 500 feet north of Dollar Street on Ostman Road, on the northwest corner of the Willamette Falls Drive/Ostman Road intersection, and approximately 1,000 feet east of Ostman Road on Willamette Falls Drive.

## PLANNED PROJECTS

The 2016 City of West Linn Transportation System Plan (TSP) lists the following capital projects that impact the key roadways near the proposed school site.<sup>2</sup>

- Willamette Falls Drive/Ostman Road: Widen Willamette Falls Drive with center median 500' on each side of intersection to allow for two-stage left turn from Ostman Road. Install all-way stop-control when warranted. (Project M4-Low Priority)

It should be noted that an all-way stop-control was installed at the intersection in 2016. The two-way center turn lane has not been installed.

## EXISTING TRAFFIC VOLUMES

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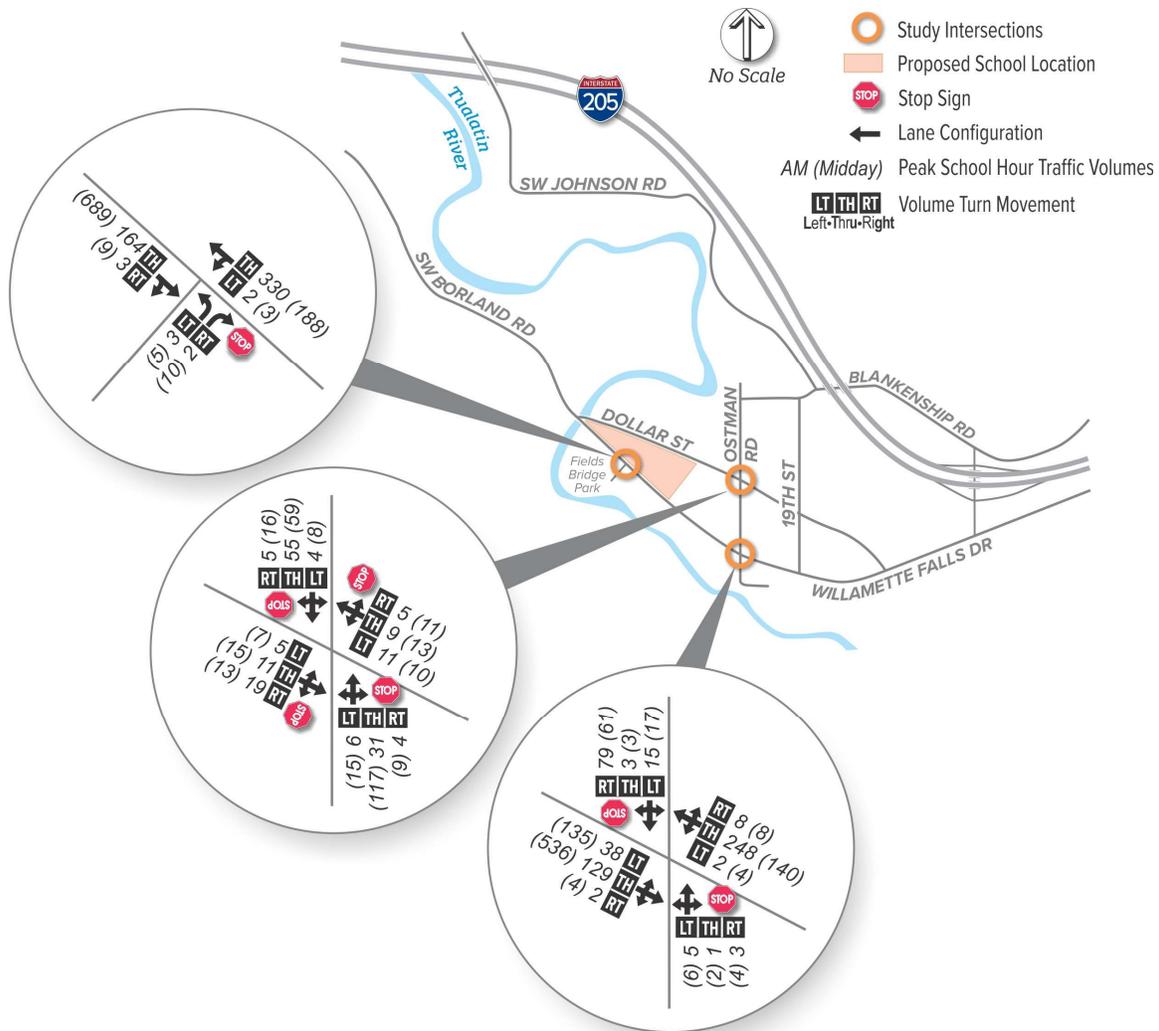
Traffic counts were collected for the AM peak period (8:00 am – 10:00 am) and Midday peak period (3:00 pm – 5:00 pm) on a Thursday when school was in session.<sup>3</sup> These peak periods were selected for traffic count collection in order to capture the start and end of school.

The traffic volumes were collected during the spring of 2019 (prior to the COVID-19 pandemic that has impacted traffic volumes). In order to analyze the study intersections for the 2020 existing conditions, the 2019 traffic volumes were grown by an annual rate of 1.15% for one year. The average annual growth rate was estimated from the Metro Travel Demand Model. The 2020 traffic volumes used in the existing conditions analysis are shown in Figure 2. The detailed two-hour traffic counts are included in Appendix A.

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<sup>2</sup> West Linn Transportation System Plan., March 28, 2016.

<sup>3</sup> Traffic counts were collected on May 16, 2019 by All Traffic Data.



**FIGURE 2: 2020 EXISTING TRAFFIC VOLUMES, LANE GEOMETRIES, AND TRAFFIC CONTROL**

## EXISTING TRAFFIC OPERATIONS

An analysis of the 2020 existing intersection operations was performed for the study intersections to determine the current operating conditions of the study area transportation network. Intersection operations were analyzed for the AM and Midday peak hours, which is when project and study area traffic volumes are expected to be the highest due to typical work, school, and commuter trends. Three existing study intersections were identified for data collection and analysis:

- Willamette Falls Drive/Fields Bridge Park
- Willamette Falls Drive/Ostman Road
- Dollar Street/Ostman Road

## **INTERSECTION PERFORMANCE MEASURES**

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

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

The study intersections are required to meet the City of West Linn standard for an unsignalized intersections to operate at or below LOS D.<sup>4</sup>

## **INTERSECTION ANALYSIS**

The existing traffic operations at the study intersections were evaluated for each peak hour using HCM 6th Edition Highway Capacity Manual methodology for unsignalized intersections.<sup>5</sup>

The volume to capacity (v/c) ratio, delay, and level of service (LOS) of each study intersection are listed in Table 3. The HCM reports are provided in Appendix B. For further explanation on how the LOS is determined, please refer to Appendix B.

As shown, all study intersections meet the operating standard (LOS D) for the existing conditions.

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<sup>4</sup> Comprehensive Plan, Goal 12, Page T-8, West Linn, Updated July 2017.

<sup>5</sup> Highway Capacity Manual, 6th Edition, Transportation Research Board, 2017.

**TABLE 3: EXISTING 2020 STUDY INTERSECTION OPERATIONS**

INTERSECTION	CITY OPERATING STANDARD	AM PEAK			MIDDAY PEAK		
		V/C	DELAY	LOS	V/C	DELAY	LOS
<b>TWO-WAY STOP CONTROLLED</b>							
<b>WILLAMETTE FALLS DR/FIELDS BRIDGE PARK</b>	LOS D	0.01	11.6	A/B	0.05	16.2	A/C
<b>ALL-WAY STOP CONTROLLED</b>							
<b>WILLAMETTE FALLS DR/OSTMAN RD</b>	LOS D	0.35	9.8	A/A	0.91	35.0	B/D
<b>DOLLAR ST/OSTMAN RD</b>	LOS D	0.09	7.9	A/A	0.21	8.7	A/A

v/c = Volume-to-Capacity Ratio of Worst Movement  
 Delay = Critical Movement Approach Delay (sec)  
 LOS = Level of Service of Major Street/Minor Street

### SAFETY ANALYSIS

The most recent five years (2014-2018) of available crash data for the study area was obtained from the ODOT crash database and used to evaluate the safety conditions near the proposed middle school site. Between 2014 and 2018, a total of 11 collisions occurred on the streets near the project site (Willamette Falls Drive, Ostman Road, and Dollar Street were evaluated). All crash data is provided in Appendix G and a map of the 11 crashes are shown in Figure 3.

The severity of the crashes in the study area were predominantly either property damage only (5 crashes, 45%) or possible injury (5 crashes, 45%). One minor injury crash occurred on Willamette Falls Drive at the pedestrian crosswalk (located west of Epperly Drive). This accident was categorized as rear-end and was likely due to pedestrian activity in the crosswalk, which caused vehicles to suddenly stop on Willamette Falls Drive. Between 2013 and 2017, the most common crash type along the corridor was rear-end crashes (10 crashes, 90%) and seven of those rear-end crashes occurred near the pedestrian crosswalk on Willamette Falls Drive west of Epperly Street. The City intends to relocate this pedestrian crosswalk to the intersection of Epperly Street.



**FIGURE 3: 2014–2018 COLLISION**

## SCHOOL RELOCATION

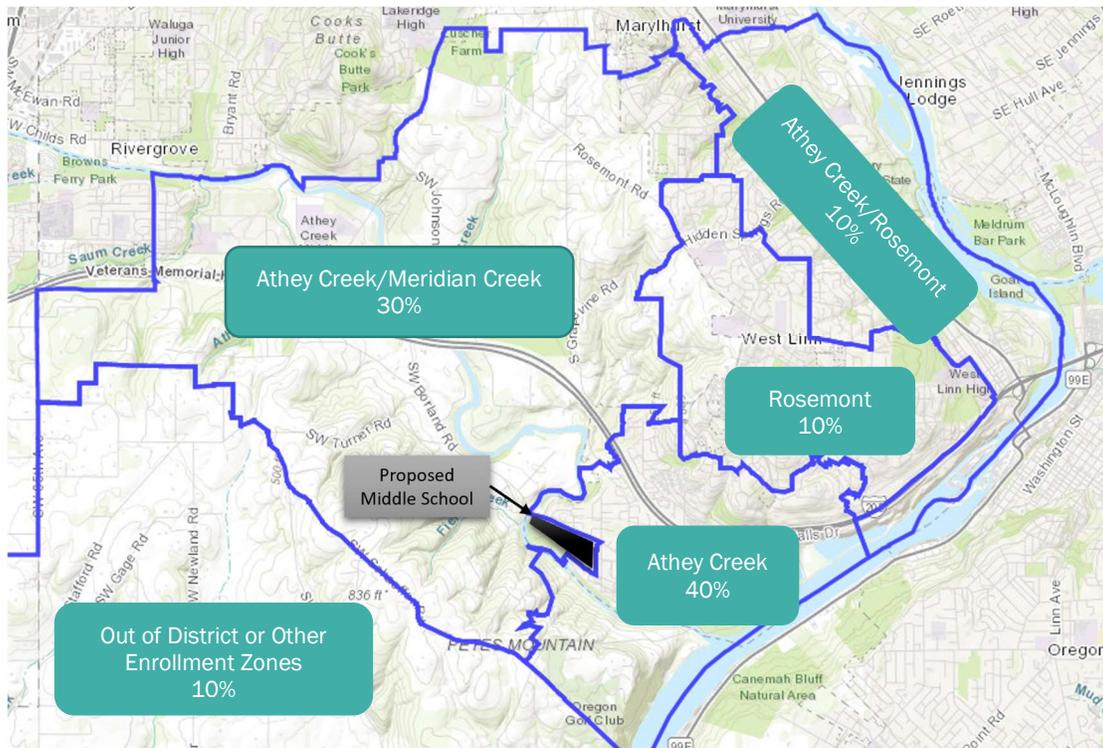
This section presents the methods and assumptions used in estimating the trip generation and trip distribution associated with the relocated middle school. This includes considerations for mode split, enrollment zones, site access, and traffic pattern adjustments after the school is relocated.

## STUDENT ENROLLMENT ZONES

Based on discussion with West Linn-Wilsonville School District staff, the enrollment of the Athey Creek Middle School was 684 students (when traffic counts were collected in 2019) and it is anticipated that the new, relocated middle school will have capacity for 850 students. The West Linn-Wilsonville School District enrollment zone map identifies which schools students can attend based on their residence location.<sup>6</sup> There are three zones that are assigned to Athey Creek Middle School: exclusive Athey Creek zone, Athey Creek/Meridian zone, Rosemont, and Athey Creek/Rosemont zone. It is assumed that these zones will remain the same after the school relocates. Athey Creek middle school is currently located within the split Athey Creek/Meridian zone, while the new site will be located at the edge of the exclusive Athey Creek enrollment zone.

<sup>6</sup> District Maps–School Locator. <https://www.wlww.k12.or.us/Page/195>, Accessed May 26, 2020.

Figure 4 shows the estimated percentages of students of the total enrollment that would come from the three enrollment zones. The percentages are based on the school districts 2018 – 2028 enrollment forecasts. As shown, the exclusive Athey Creek zone would generate the highest percentage of students (approximately 40%) and the Athey Creek/Meridian Creek Zone would generate 30% of the student population. The other zones would generate a much smaller percentage of enrollment (10% from Rosemont, 10% from Athey Creek/Rosemont, and 10% from out of district or other enrollment zones). Percentages were based on review of actual attendance at Athey Creek Middle School from 2018-2019.



**FIGURE 4: APPROXIMATE PROPORTIONS OF TOTAL ENROLLMENT**

## TRIP GENERATION OVERVIEW

This project is unique because the proposed project is to relocate an existing school. There will not be an additional middle school in the City and therefore, the relocated Athey Creek Middle School will not double the existing amount of middle school trips on the existing roadway system; the relocation will redistribute existing trips on the City and County transportation network. Another unique element of this project is that the middle school relocation is expected to have an impact on the mode split for trips to and from school (more walking and biking trips due to the neighborhood proximity). The following steps were conducted to determine the trip generation impact of relocating the middle school:

- Determine mode split and trip generation of the relocated middle school (850 students).
- Add vehicle trips for an 850-student relocated middle school to the study area.
- Remove vehicle trips for a 684-student Athey Creek Middle School from the study area.

## MODAL SPLIT

The modal split for the existing Athey Creek Middle School was provided by the School District and is shown in Table 4. As shown, 72% of Athey Creek Middle School students take the bus to/from school and 28% are driven to/from school. Essentially 0% of the Athey Creek Middle School students walk or bike to school.

**TABLE 4: EXISTING ESTIMATED MODAL SPLIT**

TIME OF DAY	DRIVE	BUS	WALK/BIKE
AM PEAK	29%	71%	0%
MIDDAY PEAK	27%	73%	0%
AVERAGE	28%	72%	0%

The West Linn School District staff estimate that approximately 450 students (about 53% of total students) will be bused to the relocated middle school on 12 school buses. The number students being bused from each school zone was estimated using enrollment information (Figure 4) from the School District as well as engineering judgement.

The remaining students would walk, bike, or be driven. For purposes of modal split estimates, it was assumed that the walking boundary for the new school location would be an approximate 1 mile radius around the school.

Table 5 shows the anticipated modal split for each enrollment zone for the proposed relocated middle school. As shown, it is estimated that 250 (29%) of students will walk or bike to school, 450 (53%) students will take the bus, and 150 (18%) students will be driven.

**TABLE 5: FUTURE PROPOSED MODAL SPLIT**

SCHOOL ZONE	DRIVE	BUS	WALK/BIKE	TOTAL
ATHEY CREEK	30	60	250	340
ATHEY CREEK/MERIDIAN	30	225	0	255
ATHEY CREEK/ROSEMONT	15	70	0	85
ROSEMONT	15	70	0	85
OTHER AREAS	60	25	0	85
<b>TOTAL NUMBER OF STUDENTS</b>	<b>150</b>	<b>450</b>	<b>250</b>	<b>850</b>
<b>TOTAL PERCENTAGE</b>	<b>18%</b>	<b>53%</b>	<b>29%</b>	<b>100%</b>

## TRIP GENERATION RATES COMPARISON

Trip generation is the method used to estimate the number of vehicles a development adds to site driveways and the adjacent roadway network during a specified period (e.g. the AM or Midday peak hour). Table 6 shows three sets of trip generation rates for middle schools.

- The first set of trip generation rates shown is the international average rate found in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition.<sup>7</sup> The ITE trip generation rates include vehicle trips associated with the entire development, which includes both students and staff.
- The second set is the existing Athey Creek trip generation, which was calculated based on driveway counts that were collected in the spring of 2019 when school was in session. These traffic counts included trips for students and staff.
- The third set of trip generation rates are the proposed rates for the relocated Athey Creek Middle School. These trip rates were estimated using the modal split information presented in the previous section. The process is discussed on the following page.

**TABLE 6: VEHICLE TRIP GENERATION COMPARISON**

SOURCE	LAND USE	NUMBER OF STUDENTS	AM PEAK TRIP RATE	AM PEAK TRIPS			MIDDAY PEAK TRIP RATE	MIDDAY PEAK TRIPS		
				IN	OUT	TOTAL		IN	OUT	TOTAL
ITE TRIP GENERATION MANUAL	Middle School (ITE Code 522)	684	0.67 trips per student	253	207	460	0.33 trips per student	103	120	223
COLLECTED TRAFFIC DATA	Athey Creek MS (existing)	684	0.46 trips per student	128	191	319	0.34 trips per student	56	180	236
-	Relocated Athey Creek MS (proposed)	850	0.30 trips per student	140	115	255	0.22 trips per student	86	101	187

<sup>7</sup> Trip Generation Manual, 10th Edition, Institute of Transportation Engineers, 2017.

Over 70% of students currently take the bus to Athey Creek Middle School because it is outside of the exclusive Athey Creek enrollment zone and is not in a walkable location (see Table 4). Therefore, it is expected to have a lower vehicle trip generation rate than a typical middle school, which is reflected in Table 6 (0.67 trips per student vs. 0.46 trips per student).

For the relocated middle school, the estimated future number of students being driven to school (18% from Table 5) is lower than the existing modal split at Athey Creek Middle School (28% from Table 4). This would indicate that the new middle school will have a lower vehicle trip generation rate than the existing Athey Creek Middle School. This is a percentage change of 35%, which was applied to the existing Athey Creek Middle School trip generation rates (0.46 AM peak and 0.34 MIDDAY peak) to determine the proposed relocated middle school trip generation rates (0.30 trips per student and 0.22 trips per student).

### FINAL TRIP GENERATION

The final trip generation is shown in Table 7 and is estimated to generate 279 trips (152 in, 127 out) during the AM peak hour and 211 trips (98 in, 113 out) during the MIDDAY peak hour. These trips account for both staff, student, and bus trips. This trip generation includes the 12 school buses that will be used to transport students to and from the relocated middle school, resulting in a total 24 school bus trips in each peak hour.

The split of vehicle trips in and out of the site were based on the ITE percentages, 55% in and 45% out during the AM peak hour and 46% in and 54% out during the MIDDAY peak hour.

**TABLE 7: PROJECT TRIP GENERATION SUMMARY (VEHICLE AND SCHOOL BUS TRIPS)**

TYPE OF TRIP	NUMBER OF STUDENTS	AM PEAK TRIP RATE	AM PEAK			MIDDAY PEAK TRIP RATE	MIDDAY PEAK		
			IN	OUT	TOTAL		IN	OUT	TOTAL
VEHICLE	850	0.30 trips per student	140	115	255	0.22 trips per student	86	101	187
SCHOOL BUS	-	-	12	12	24	-	12	12	24
<b>TOTAL TRIPS</b>		-	<b>152</b>	<b>127</b>	<b>279</b>	-	<b>98</b>	<b>113</b>	<b>211</b>

## VEHICLE TRIP DISTRIBUTION

Vehicle trip distribution provides an estimation of where vehicles would be coming from and going to. It is given as a percentage at key gateways to the study area and is used to route project trips through the study intersections.

### TRIP ADDITION – RELOCATED MIDDLE SCHOOL

The vehicle trip distribution for the relocated middle school is shown in Figure 5. It is estimated that 40% of vehicle trips will travel to/from the site via Willamette Falls Drive east, 45% will come from the west of the Tualatin River, and the remaining 15% will come from the neighborhoods just to the east of Ostman Road or from the north side of I-205. These trips were distributed amongst the study intersections using existing traffic counts, the Metro Regional Travel Demand Model, and the school district enrollment zones.

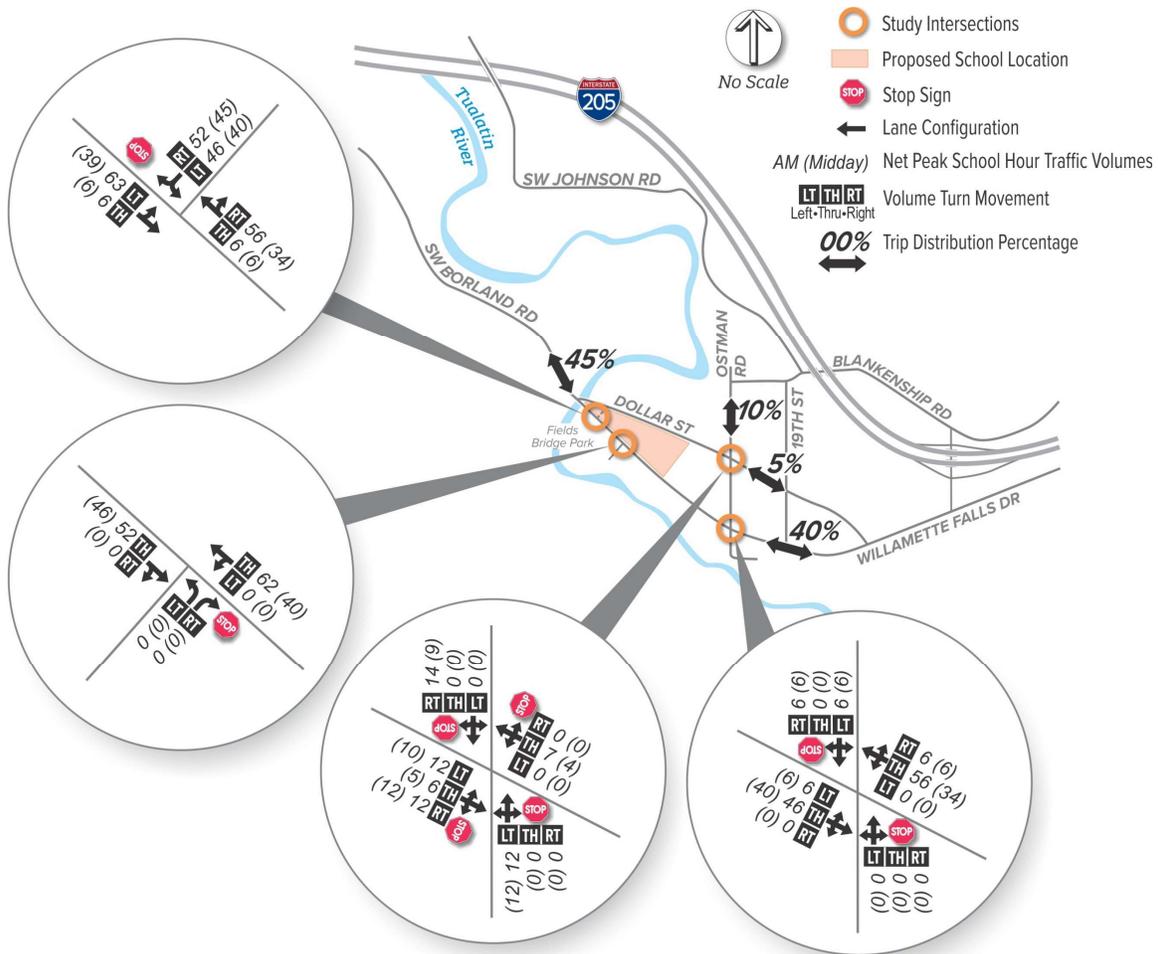
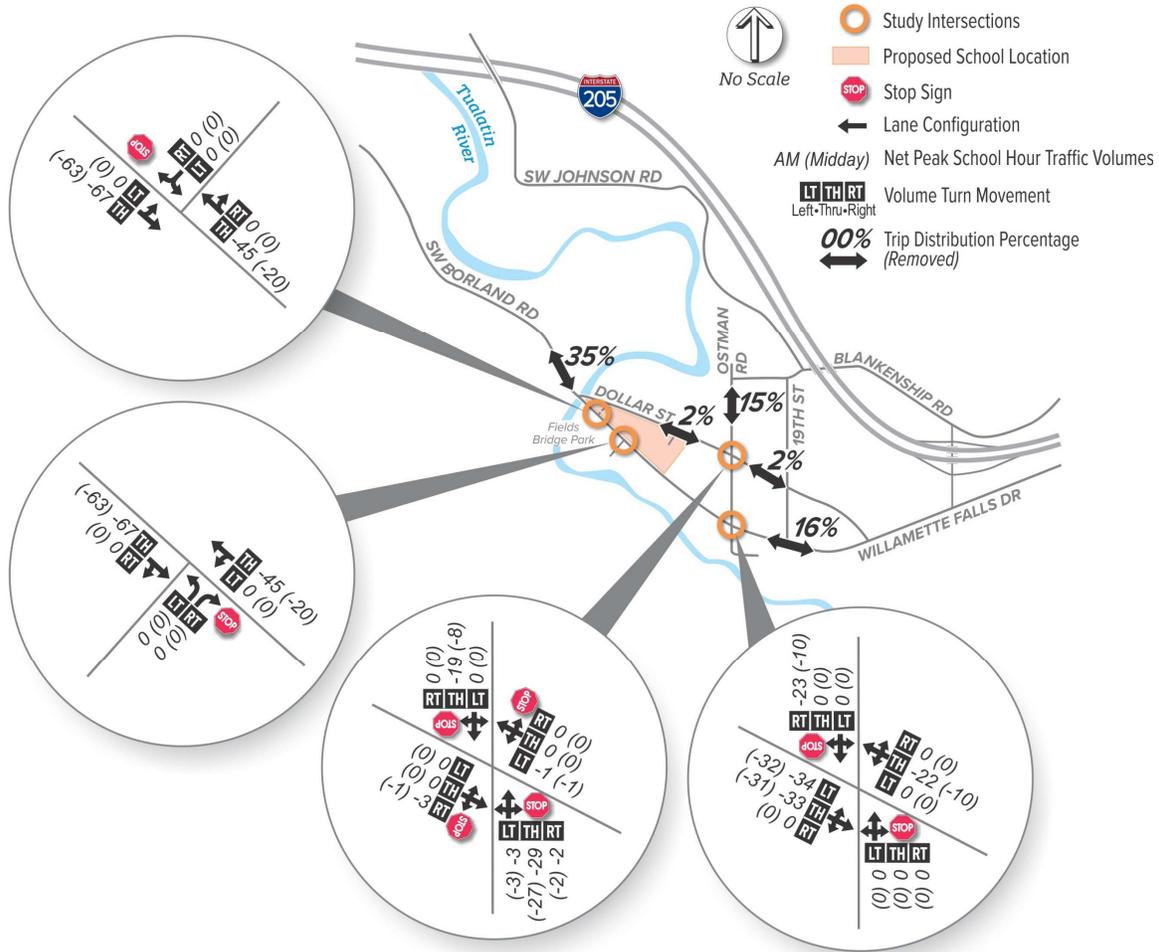


FIGURE 5: RELOCATED MIDDLE SCHOOL TRIP DISTRIBUTION AND PROJECT TRIP ADDITION

## TRIP REMOVAL – EXISTING ATHEY CREEK MIDDLE SCHOOL

The vehicle trips that were removed from the study area at the study intersections for the existing Athey Creek Middle School is shown in Figure 6. Approximately, 35% of trips from the existing Athey Creek Middle School currently travel through the study area near the location of the future middle school. These trips will be removed from the network as they are now accounted for in the new middle school trip generation. The estimated trip distribution percentages for Athey Creek Middle School were determined using existing traffic counts, the Metro Regional Travel Demand Model, and the school district enrollment zones.



**FIGURE 6: EXISTING ATHEY CREEK TRIP DISTRIBUTION AND PROJECT TRIP REMOVAL**

The project trips shown in Figure 5 were added to 2023 No Build traffic volumes (described in the next section) and the project trips shown in Figure 6 were removed from the 2023 No Build traffic volumes. The resulting volumes are the 2023 Build volumes, which are presented in the next section.

## FUTURE CONDITIONS

This section contains an analysis for the AM and Midday peak hours under future conditions as well as a site plan evaluation for the middle school relocation.

### FUTURE 2023 TRAFFIC VOLUMES

The anticipated year of completion and occupancy for the relocated middle school is 2023. The future 2023 No Build traffic volumes were forecasted using future growth estimates from the Metro Future Travel Demand Model (average annual rate of 1.15%). The 2023 No Build scenario only includes the background traffic growth and assumes Athey Creek Middle School remains at its current location. The 2023 Build scenario includes the background traffic growth and project trips modifications as previously discussed. Figure 7 and Figure 8 on the following pages show the peak hour traffic volumes for the 2023 No Build and 2023 Build scenarios, respectively.

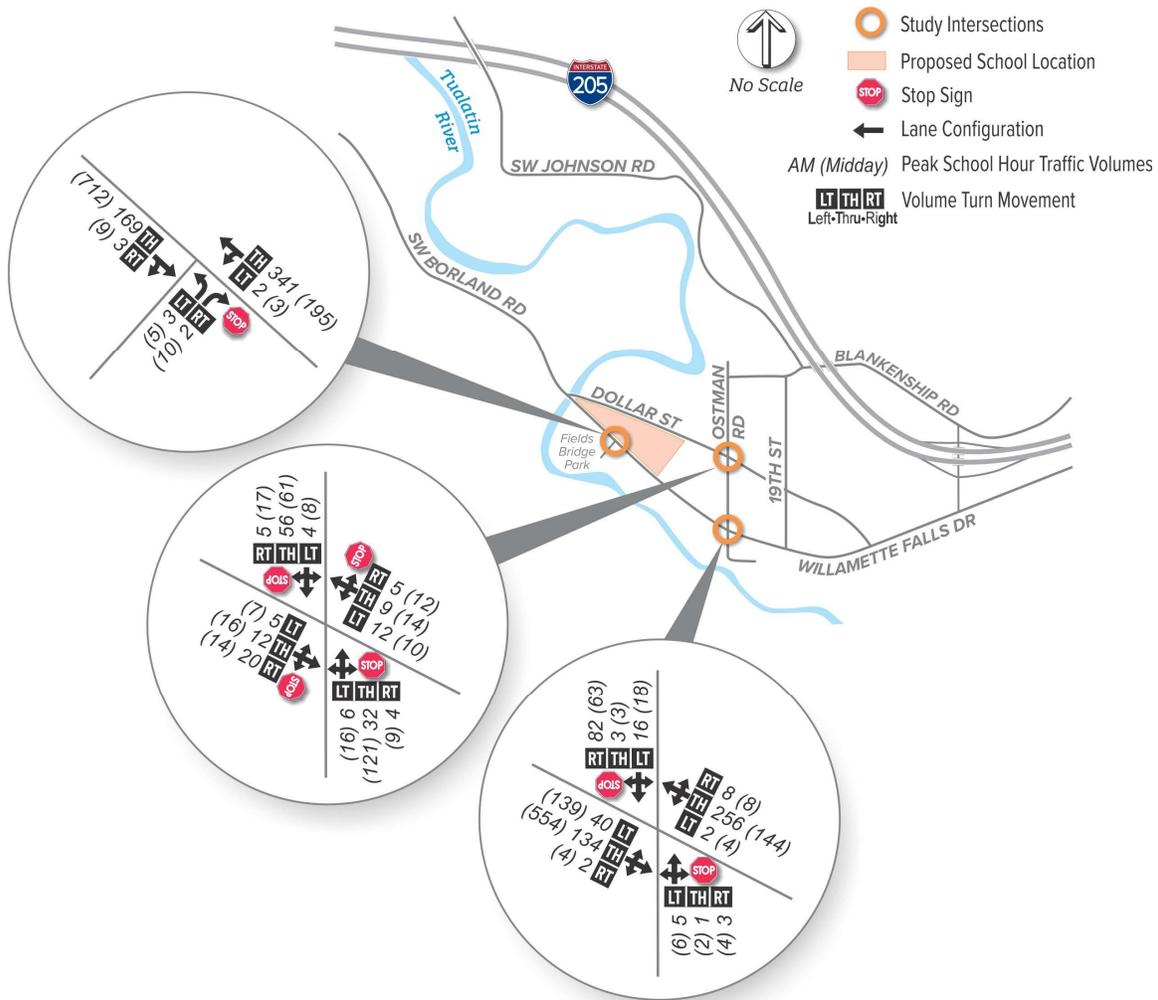
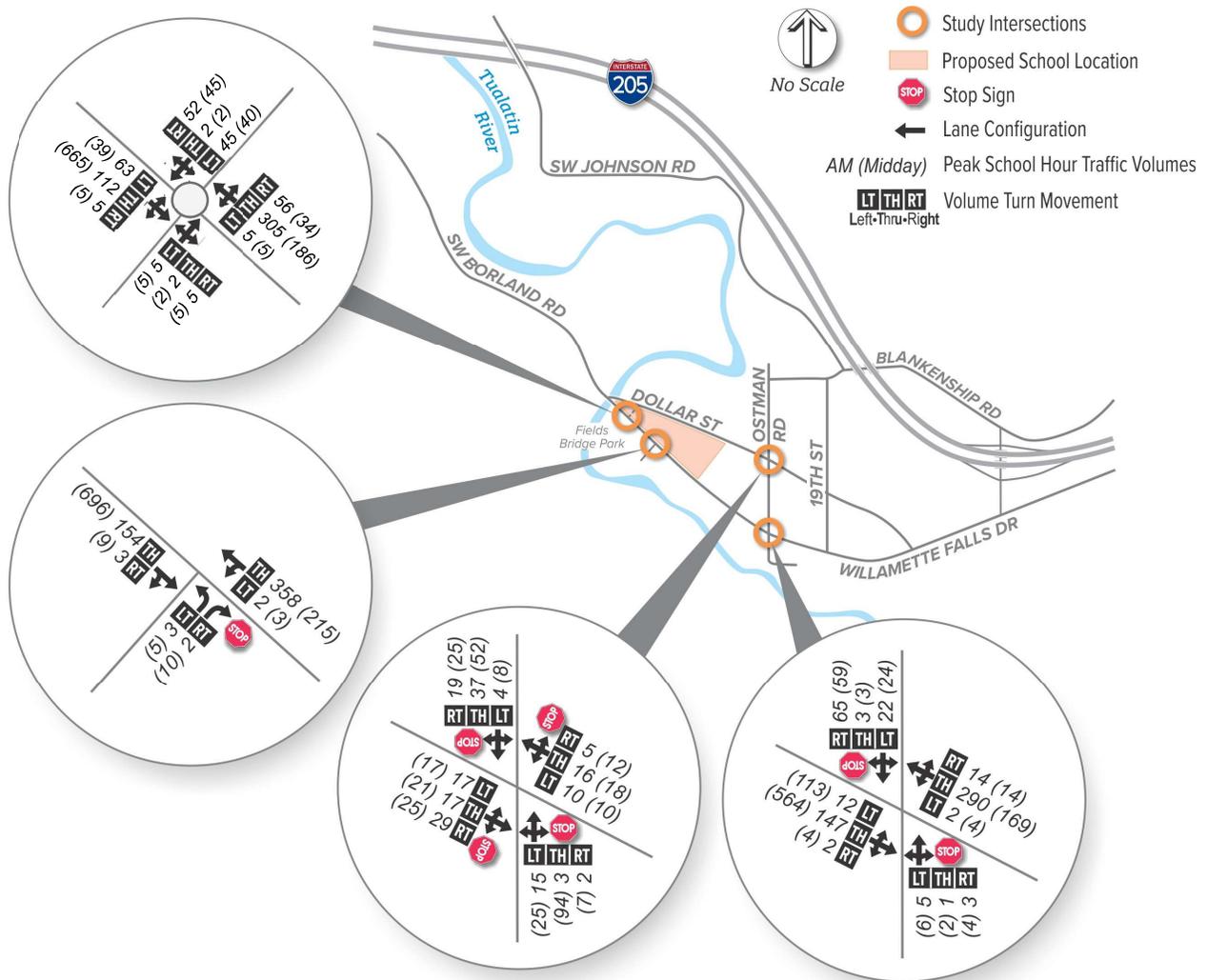


FIGURE 7: 2023 NO BUILD PEAK HOUR TRAFFIC VOLUMES



**FIGURE 8: 2023 BUILD PEAK HOUR TRAFFIC VOLUMES**

## FUTURE TRAFFIC OPERATIONS

Future 2023 operating conditions were analyzed based on the 2023 No Build and 2023 Build traffic volumes. Table 8 shows the intersection operations for the study intersections in the AM and Midday peak hour for the 2023 No Build scenario. As shown, the Willamette Falls Drive/Ostman Road intersection fails to meet operating standard (LOS D) in the Midday peak hour. The HCM reports can be found in Appendix C.

**TABLE 8: 2023 NO BUILD INTERSECTION OPERATIONS**

INTERSECTION	OPERATING STANDARD	AM PEAK			MIDDAY PEAK		
		V/C	DELAY	LOS	V/C	DELAY	LOS
<b>TWO-WAY STOP CONTROLLED</b>							
<b>WILLAMETTE FALLS DR/FIELDS BRIDGE PARK</b>	LOS D	0.01	11.7	A/B	0.05	16.7	A/C
<b>ALL-WAY STOP CONTROLLED</b>							
<b>WILLAMETTE FALLS DR/OSTMAN RD</b>	LOS D	0.37	10.0	A/A	0.94	<b>40.9</b>	<b>B/E</b>
<b>DOLLAR ST/OSTMAN RD</b>	LOS D	0.09	7.9	A/A	0.22	8.8	A/A

v/c = Volume-to-Capacity Ratio of Worst Movement  
 Delay = Critical Movement Approach Delay (sec)  
 LOS = Level of Service of Major Street/Minor Street

**Bold & Highlighted:** The intersection fails to meet the City's operating standard.

## PROPOSED PROJECT CHANGES

Based on the proposed site plan and discussions with the City of West Linn, access to the relocated middle school will be provided via a public road extension of Brandon Place from Dollar Street to Willamette Falls Drive. At the new intersection of Willamette Falls Drive and Brandon Place, a roundabout has been assumed.

Table 9 on the following page shows the intersection operations for the study intersections in the AM and Midday peak hour for the 2023 Build scenario. The HCM reports can be found in Appendix E.

The proposed site driveway (that serves staff and buses only) on Dollar Street was also analyzed under the 2023 Build scenario as well (not pictured to the right). The operations for this intersection are not reported in the following table but the HCM reports can be found in Appendix D.



**TABLE 9: 2023 BUILD INTERSECTION OPERATIONS**

INTERSECTION	OPERATING STANDARD	AM PEAK			MIDDAY PEAK		
		V/C	DELAY	LOS	V/C	DELAY	LOS
<b>TWO-WAY STOP CONTROLLED</b>							
<b>WILLAMETTE FALLS DR/FIELDS BRIDGE PARK</b>	LOS D	0.01	11.7	A/B	0.05	16.6	A/C
<b>ROUNDBOUT</b>							
<b>WILLAMETTE FALLS DR/BRANDON PLACE EXTENSION</b>	LOS D	0.32	5.1	A	0.62	8.5	A
<b>ALL-WAY STOP CONTROLLED</b>							
<b>WILLAMETTE FALLS DR/OSTMAN RD</b>	LOS D	0.42	10.5	A/B	0.93	<b>38.9</b>	<b>B/E</b>
<b>DOLLAR ST/OSTMAN RD</b>	LOS D	0.06	7.8	A/A	0.19	8.7	A/A
v/c = Volume-to-Capacity Ratio of Worst Movement Delay = Critical Movement Approach Delay (sec) [For roundabouts, the average delay for the intersection is reported] LOS = Level of Service of Major Street/Minor Street [For roundabouts, the LOS for the intersection is reported]							
<b>Bold &amp; Highlighted:</b> The intersection fails to meet the City's operating standard.							

As shown, the Willamette Falls Drive/Ostman Road intersection fails to meet operating standard (LOS D) in the Midday peak hour.

**QUEUING**

Vehicle queuing analysis was performed at the proposed roundabout for the AM and Midday peak hour based on the 2023 Build traffic volumes to determine the 95th percentile queues. The 95th percentile queue is the queue length for a given intersection movement that has only a 5% chance of being exceeded during the peak traffic hour.

The 95th percentile queues at the Willamette Falls Drive/Brandon Place Extension intersection were estimated using SIDRA software and the reports can be found in Appendix D. The results are shown in Table 10.

**TABLE 10: 95TH PERCENTILE QUEUES (2023 BUILD SCENARIO)**

APPROACH	AM PEAK HOUR QUEUE	MIDDAY PEAK HOUR QUEUE
<b>EASTBOUND (WILLAMETTE FALLS DR)</b>	25 feet	150 feet
<b>WESTBOUND (WILLAMETTE FALL DR)</b>	50 feet	25 feet
<b>SOUTHBOUND (BRANDON PLACE EXT)</b>	25 feet	25 feet
<b>NORTHBOUND (PARK DRIVEWAY)</b>	0 feet	0 feet

As shown in the table, the longest estimated 95th percentile queue at the intersection is the eastbound movement during the midday peak hour (150 feet or 6 vehicles). This queue will extend onto the Tualatin River bridge. It should be noted that the midday peak hour is 3:10pm – 4:10pm.

### SENSITIVITY ANALYSIS

As requested by the School District, a sensitivity analysis was conducted which evaluated the intersection operations under two alternate modal split assumptions. These are shown in Table 11 below. Sensitivity Analysis #1 assumed that 200 students would walk or bike to school (50 less than the current assumption). Subsequently, the number of students driven to school would increase, increasing the vehicle trip generation. Sensitivity Analysis #2 assumed that 100 students would walk or bike to school.

**TABLE 11: SENSITIVITY ANALYSIS PROPOSED MODAL SPLIT**

MODE OF TRAVEL	CURRENT ASSUMPTION			SENSITIVITY ANALYSIS #1			SENSITIVITY ANALYSIS #2		
	DRIVE	BUS	WALK/BIKE	DRIVE	BUS	WALK/BIKE	DRIVE	BUS	WALK/BIKE
NUMBER OF STUDENTS	150	450	250	200	450	200	300	450	100
<b>TOTAL PERCENTAGE</b>	<b>18%</b>	<b>53%</b>	<b>29%</b>	<b>24%</b>	<b>53%</b>	<b>24%</b>	<b>35%</b>	<b>53%</b>	<b>12%</b>

Table 12 shows the intersection operations for the study intersections in the AM and Midday peak hour for the 2023 Build scenario. The HCM reports can be found in Appendices E and F. As shown, the Willamette Falls Drive/Ostman Road intersection fails to meet operating standard (LOS D) in the Midday peak hour.

**TABLE 12: 2023 BUILD INTERSECTION OPERATIONS (SENSITIVITY ANALYSIS #1)**

INTERSECTION	OPERATING STANDARD	AM PEAK			MIDDAY PEAK		
		V/C	DELAY	LOS	V/C	DELAY	LOS
<b>TWO-WAY STOP CONTROLLED</b>							
WILLAMETTE FALLS DR/FIELDS BRIDGE PARK	LOS D	0.01	12	A/B	0.05	16.9	A/C
<b>ROUNDBOUT</b>							
WILLAMETTE FALLS DR/BRANDON PLACE EXTENSION	LOS D	0.33	5.3	A	0.63	8.7	A
<b>ALL-WAY STOP CONTROLLED</b>							
WILLAMETTE FALLS DR/OSTMAN RD	LOS D	0.44	10.8	A/B	0.95	<b>42.6</b>	<b>B/E</b>
DOLLAR ST/OSTMAN RD	LOS D	0.06	7.8	A/A	0.19	8.8	A/A

v/c = Volume-to-Capacity Ratio of Worst Movement

Delay = Critical Movement Approach Delay (sec) [For roundabouts, the average delay for the intersection is reported]

LOS = Level of Service of Major Street/Minor Street [For roundabouts, the LOS for the intersection is reported]

**Bold & Highlighted:** The intersection fails to meet the City's operating standard.

Table 13 shows the intersection operations for the study intersections in the AM and Midday peak hour for the Sensitivity Analysis #2. As shown, the Willamette Falls Drive/Ostman Road intersection fail to meet operating standard (LOS D) in the Midday peak hour.

**TABLE 13: 2023 BUILD INTERSECTION OPERATIONS (SENSITIVITY ANALYSIS #2)**

INTERSECTION	OPERATING STANDARD	AM PEAK			MIDDAY PEAK		
		V/C	DELAY	LOS	V/C	DELAY	LOS
<b>TWO-WAY STOP CONTROLLED</b>							
WILLAMETTE FALLS DR/FIELDS BRIDGE PARK	LOS D	0.01	12.7	A/B	0.06	17.5	A/C
<b>ROUNDBOUT</b>							
WILLAMETTE FALLS DR/BRANDON PLACE EXTENSION	LOS D	0.38	5.9	A	0.67	9.5	A
<b>ALL-WAY STOP CONTROLLED</b>							
WILLAMETTE FALLS DR/OSTMAN RD	LOS D	0.49	11.7	A/B	1.00	<b>52.5</b>	<b>B/F</b>
DOLLAR ST/OSTMAN RD	LOS D	0.07	7.9	A/A	0.20	8.8	A/A

v/c = Volume-to-Capacity Ratio of Worst Movement  
 Delay = Critical Movement Approach Delay (sec) **[For roundabouts, the average delay for the intersection is reported]**  
 LOS = Level of Service of Major Street/Minor Street **[For roundabouts, the LOS for the intersection is reported]**

**Bold & Highlighted:** The intersection fails to meet the City's operating standard.

As shown, the Willamette Falls Drive/Ostman Road intersection continues to fail to meet standards under both of the Sensitivity Analysis scenarios. However, the other study intersections are expected to meet the City's operating standards.

### WILLAMETTE FALLS DRIVE/OSTMAN ROAD INTERSECTION

As shown in the previous subsections, the Willamette Falls Drive/Ostman Road intersection fails to meet the operating standard under all of the future scenarios. Based on discussions with City staff,<sup>8</sup> the all-way stop control (installed in 2016) at this intersection provides multi-faceted benefits.

- Reduces crash risk associated with sight distance limitations for the southbound approach.
- Reduces side-street delay and allows for improved mobility on the local street system when volumes on Willamette Falls Drive are high (e.g., during I-205 traffic events).
- Discourages drivers from using Willamette Falls Drive as a diversion route when there are traffic events on I-205.

Because of these benefits and the infeasibility of a traffic signal (due to right-of-way constraints), there is currently no desire to change the traffic control at Willamette Falls Drive/Ostman Road.

<sup>8</sup> Meeting with School District and City staff on August 6th, 2020.

Additionally, once the roundabout is built at Willamette Falls Drive/Brandon Place intersection, I-205 cut-through traffic on Willamette Falls Drive may reroute due to the reduced travel speeds. Therefore, the City would like to wait until after school project is built to determine if additional improvements are needed at the Willamette Falls Drive/Ostman Rd intersection. Therefore, no mitigations or capacity improvements are identified or recommended at this time.

## SITE REVIEW

The proposed site plan for relocated middle school is provided in the Appendix H. The following sections summarize the requirements that will be applicable for site plan submittals to the City of West Linn.

Access to the relocated middle school is provided via a public road extension of Brandon Place from Dollar Street to Willamette Falls Drive (see Figure 9) and via a full access driveway on Dollar Street, which will be for staff and school buses only.

The intersection of the Brandon Place extension with Willamette Falls Drive will align with the existing park driveway near the Tualatin River bridge. This intersection of Brandon Place/Willamette Falls Drive is currently proposed to be a roundabout.

The intersection of Brandon Place and Dollar Street will be realigned to become a three-leg intersection (north, south, and east legs). The west leg of the intersection is proposed to become a private driveway with the implementation of the relocated middle school.



FIGURE 9: BRANDON PLACE EXTENSION CONCEPT

## **SIGHT DISTANCE**

With a posted speed of 25 miles per hour, the sight distance requirement along Dollar Street is 280 feet for turning left from a stopped approach and 240 feet for vehicles turning right from a stopped approach. Preliminary sight distance was evaluated at the proposed staff and bus driveway location on Dollar Street. The driveway was found to be sufficient to meet the stated requirements. Prior to occupancy, sight distance at any new or modified access points will need to be verified, documented, and stamped by a registered professional Civil or Traffic Engineer licensed in the State of Oregon.

It should be noted that the intersection of Willamette Falls Drive/Brandon Place is assumed to be a roundabout and therefore, sight distance requirements for a typical stopped approach would not apply there.

## **ACCESS SPACING**

The required spacing between a driveway and a street intersection on an arterial road (Willamette Falls Drive) is 500 feet from centerline to centerline per the City's TSP.<sup>9</sup> This requirement is met for the proposed extension of Brandon Place at Willamette Falls Drive, which will align with the existing park access near the Tualatin River bridge. The nearest driveway to this intersection is the driveway to Fields Bridge Park, which is approximately 700 feet away.

There is no required spacing between two accesses on a local residential road (Dollar Street). There is, however, a requirement of 35 feet between driveways and street intersections.<sup>10</sup> Because the Brandon Place extension on Dollar Street is proposed to be aligned with Brandon Place, this driveway meets access spacing requirements. The eastern driveway on Dollar Street is located approximately 200 feet to the west of Fields Drive and therefore, also meets the City's spacing requirements.

## **FRONTAGE IMPROVEMENTS**

It is required that half-street improvements be built along the project site frontage on Willamette Falls Drive and Dollar Street.

Half-street frontage improvements to Willamette Falls Drive should be consistent for a minor arterial. This includes upgraded facilities for vehicles, bicycles, and pedestrians as indicated in the City TSP roadway standards.<sup>11</sup> Per the TSP, minor arterial roadways are required to have two 12-foot travel lanes, a 7-foot cycle track on both sides, and a minimum of 6-foot sidewalks on both sides. Optional cross sections include a 14-foot center turn lane, 5-foot planter strips on both sides, and 10- to 12-foot sidewalks on either side.

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<sup>9</sup> West Linn Transportation System Plan, March 28, 2016, Table 15.

<sup>10</sup> West Linn Transportation System Plan, March 28, 2016, Table 15.

<sup>11</sup> West Linn Transportation System Plan, March 28, 2016, Exhibit 6 and Table 27.

Half-street frontage improvements to Dollar Street should be consistent for a local street. This includes upgraded facilities for vehicles, bicycles and pedestrians as indicated in the City TSP roadway standards.<sup>12</sup> Per the TSP, local streets are required to have two 10-foot travel lanes and a minimum of 6-foot sidewalks on both sides. Additionally, the City will require 6-foot landscape strips and 8-foot-wide on-street parking along the project frontage.

The extension of Brandon Place from Dollar Street to Willamette Falls Drive through the project site is required to meet the City’s roadway standards for a local street as well. The anticipated cross section will include two 10-foot travel lanes, 7-foot parking on one side (straight segment only), 6-foot wide landscape strips, and 6-foot wide sidewalks. This local street extension will provide one of two accesses to the school site.

**PARKING**

The proposed project is required to comply with the City code for the number of vehicular parking stalls and bicycle parking spaces that are provided on site.<sup>13</sup> Table 14 lists the vehicular and bicycle parking requirements for the project site. The parking requirements are based on the building use, number of staff, and square footage of the building.

**TABLE 14: VEHICLE AND BICYCLE PARKING REQUIREMENTS**

LAND USE	NUMBER OF STAFF/SIZE <sup>A</sup> /CLASSROOMS	SPACES REQUIRED BY CODE			
		VEHICLE MINIMUM	VEHICLE MAXIMUM	ACCESSIBLE PARKING MINIMUM	BICYCLE MINIMUM
MIDDLE SCHOOL/JUNIOR HIGH SCHOOL	60 Staff 113 KSF 28 Classrooms	173	190	6	112
<b>Proposed Parking Stalls</b>		<b>185 vehicle stalls</b>			<b>100 stalls</b>

<sup>A</sup> KSF= 1,000 square feet

The City code requires a minimum of 1 vehicle parking space per employee, plus 1 vehicle parking space for each 1,000 square feet of floor area. As shown above, 173 vehicular stalls are needed to meet the minimum Code requirements for the project. Of the 173 vehicular stalls, 6 are required to be accessible spaces. The maximum number of parking stalls is 190 stalls according to the rates provided in the City Code.

The current site plan proposes 185 total vehicle parking stalls, meeting the City’s requirement.

The City code requires a minimum of 4 bicycle parking spaces per classroom in a middle school. A minimum of 112 bicycle parking spaces are required at the project site to meet the Code

<sup>12</sup> West Linn Transportation System Plan, March 28, 2016, Exhibit 9 and Table 30.

<sup>13</sup> West Linn Community Development Code, Section 46.090, updated October 2019.

requirements and 50% of the spaces must be covered. The bicycle parking spaces should be located within 50 feet from the primary building entrance, as measured along a direct pedestrian access route. It is recommended that all future site plans show the minimum required number of bicycle parking stalls.

## **OFF-SITE PARKING**

On-street parking will be added to the south side of Dollar Street along the school site frontage as part of the recommended half-street improvements. Approximately 43 to 54 parking spaces are expected to be added to Dollar Street and 8 to 12 on the straight portion of the Brandon Place extension.

## **SAFE ROUTES TO SCHOOL**

Safe Routes to School are safe walking and biking routes to and from schools. They are typically characterized by marked pedestrian crossings, sidewalks, and bike lanes, flashing beacons, and other enhancements. Safe Routes to School aim to make it safe, convenient, and fun for children to walk and bicycle to and from schools. The goal is to improve safety while increasing health and physical activity.

The school walk zone, or walking boundary, is typically a subset of the enrollment zone. School walking boundaries may be defined by State or Local policy, but if not, a general rule of thumb is that the walking boundary is 1/2 mile or 1-mile out from an elementary school, sometimes farther for middle and high schools. Walk zones defined by policy typically indicate the area within which students are NOT provided with bus service.

Ideally, the walking boundary would be represented by a circular area with the school located at the center, but rarely is the walk zone an exact circle. A child's route to school should have a minimal number of busy street crossings or require crossing bodies of water or other barriers. Some students will live too far away from the school to reasonably be expected to walk, and they are typically provided with bus service.

As discussed in the *School Relocation* section, the School District estimated to have approximately 250 students walk or bike to school based on proximity to adjacent neighborhoods. For the proposed middle school location, the walking boundary is assumed to be approximately 1-mile around the school. As stated earlier, it is not an exact circle, however, due to physical barriers such as the Tualatin River and I-205. For purposes of this study, the majority of the students living within the walking boundary are assumed to walk or bike to school.

Based on the existing street network and infrastructure, we do not recommend that Johnson Road (north of 19th Street) be included in 1-mile walking boundary as there are no existing sidewalks or pathways for safe pedestrian or bicycle travel along it, and right of way constraints make sidewalk infill prohibitively expensive.

## **SAFETY PERFORMANCE**

Under the existing conditions on Willamette Falls Drive, most crashes from the last five years of data (2014 – 2018) were rear-end collisions due to pedestrian activity at the pedestrian crossing west of Epperly Street. Because of this, any future school crossing of Willamette Falls Drive should be considered carefully and pedestrian crossing enhancements and advanced warning devices should be installed to increase driver awareness. This is discussed in the *Recommended Improvements Section*.

## **FIELD VISIT**

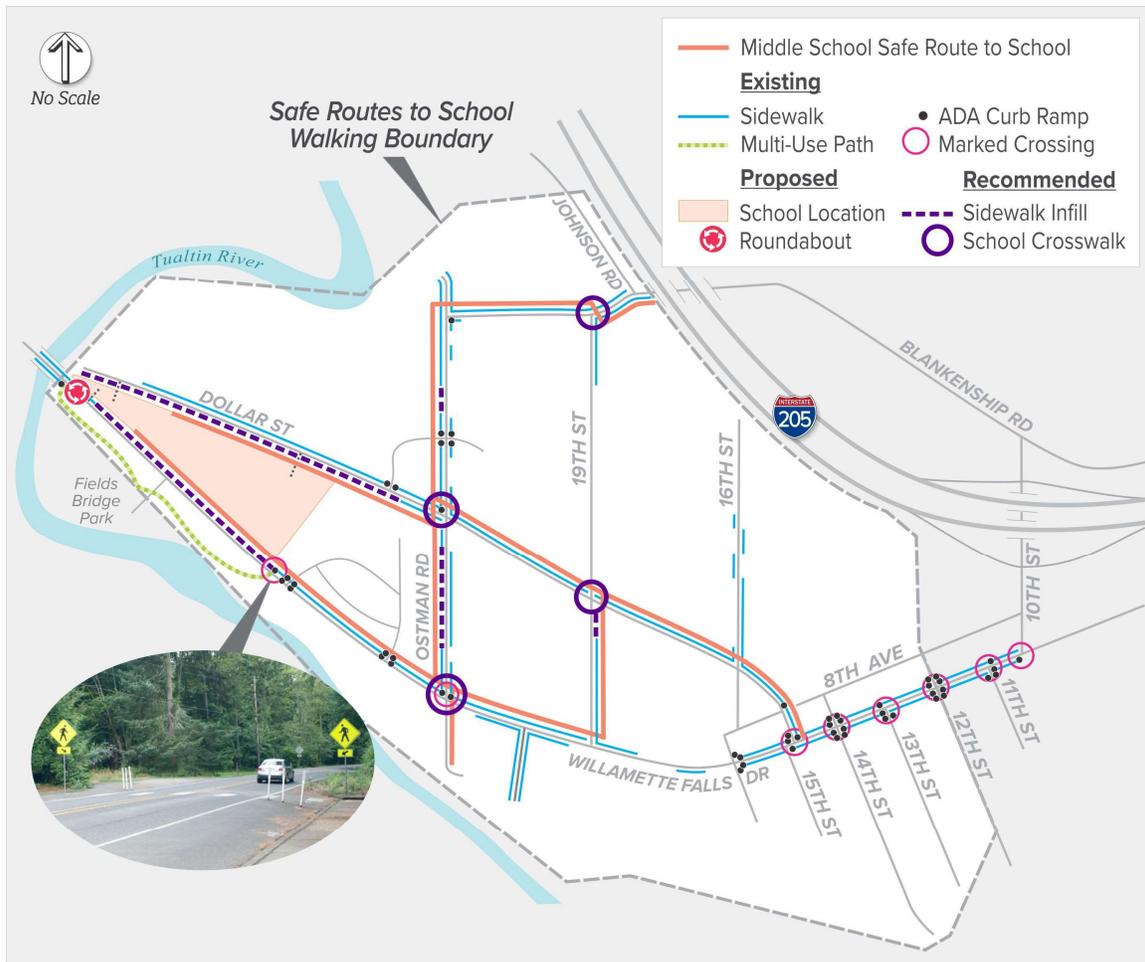
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A field visit to the proposed project site and study area was completed on May 27<sup>th</sup>, 2020. Key locations within the walking boundary were observed to determine the need for pedestrian improvements. Figure 10 supplies a visual representation of where the existing, proposed, and recommended improvements are located. Not shown on the figure are bicycle facilities. There are no existing bike lanes on Willamette Falls Drive or Dollar Street, both of which front the project site.

## **RECOMMENDED IMPROVEMENTS TO SAFE ROUTES TO SCHOOL**

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Recommendations for improved connectivity and continuity of pedestrian and bicycle facilities within the walking boundary were based on an evaluation of the existing infrastructure and safety performance. The location of the recommended improvements can be found in Figure 10 and are discussed in the following sections.



**FIGURE 10: SCHOOL SAFE ROUTES TO SCHOOL AND WALKING BOUNDARY**

### **SIDEWALK INFILL**

Students within the 1-mile walking boundary would not be provided bus transportation to school. As such, it is recommended that sidewalk infill (i.e. new sidewalk) be installed where gaps have been identified in Figure 10. These gaps in sidewalk connectivity are located along the proposed safe routes to the middle school. Proposed safe routes are located on Dollar Street, Ostman Road, 19<sup>th</sup> Street, Willamette Falls Drive, and Blankenship Road. Some of the sidewalk infill are located along the site frontage and are anticipated to be built as part of the frontage improvements. However, for the remaining segments, sidewalk infill is recommended to be completed with asphalt rather than concrete sidewalks to reduce costs while still providing for school safety.

### **MARKED CROSSING IMPROVEMENTS**

Enhancements to key crossing locations are also being recommended to supplement the sidewalk infill previously discussed. The proposed crossing improvements are shown in Figure 10 and include the following:

- **Dollar Street/Ostman Road:** It is recommended to install a marked crossing on the north leg and west leg with ADA improvements on the southwest corner.



- **Dollar Street/19<sup>th</sup> Street:** It is recommended to install a marked crossing on the north leg and east leg with ADA improvements on the northwest, northeast, and southeast corners.



- **Blankenship Road/19<sup>th</sup> Street:** It is recommended to install a marked crossing on the north leg with ADA improvements on the northeast corner.



- **Willamette Falls Drive/Ostman Road:** It is recommended to install a marked school crossing on the west leg of the intersection.

- Enhanced Crossing on Willamette Falls Drive/Dollar Street:** Because this intersection is located on a recommended Safe Route to School, it is recommended that the installation of an enhanced pedestrian crossing treatment, such as an RRFB, be considered. The current layout of Willamette Falls Drive at the Dollar Street intersection is a three-lane cross section with parking. However, this section of roadway is currently under construction and the final Safe Route to School plan should be refined once the construction of Willamette Falls Drive is completed.



- Mid-Block Crossing on Willamette Falls Drive:** As stated earlier in the report, the City plans to relocate this mid-block crossing to the intersection of Epperly Street in the future. It is recommended that the existing crosswalk be thoroughly reviewed and coordinated with the City for safety improvements or relocated to a safer crossing location.
- School Speed Zone:** It is also recommended that a school speed zone 20 mph be installed along Willamette Falls Drive and Dollar Street adjacent to the relocated middle school, as well as on the Brandon Place extension. The reduced vehicle speeds will improve safety for students using Willamette Falls Drive to access the school.



## SUMMARY OF PROJECT IMPACTS

The key findings of this transportation impact study are discussed below.

### INTERSECTION OPERATIONS

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- For the No Build and Build scenarios, the study intersections continue to meet operating standards during the AM and Midday peak periods with the exception of the Willamette Falls Drive/Ostman Road intersection. There is no recommendation for capacity or operations improvements at the intersection per the request of the City.

### FRONTAGE IMPROVEMENTS

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- It is recommended that half-street improvements be made along the project site frontage on Willamette Falls Drive that include cycle tracks and sidewalks.
- It is recommended that half-street improvements be made along the project site frontage on Dollar Street that include sidewalks and on-street parking.

### PARKING

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- The current site plan proposes 185 total parking stalls on-site, meeting the City's requirement.
- Approximately 43 to 54 parking off-site parking spaces are expected to be added to Dollar Street and 8 to 12 parking stalls are expected to be added on the straight portion of the Brandon Place extension.
- The site is required to provide 112 bicycle parking stalls.

### SAFE ROUTES TO SCHOOL

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- It is recommended that sidewalk infill is installed on Dollar Street, Ostman Road, 19th Street, and Willamette Falls Drive as shown in Figure 9.
- Additionally, it is recommended that marked crossings and ADA ramps be installed at five different intersections:
  - Dollar Street/Ostman Road intersection
  - Dollar Street/19th Street intersection
  - Blankenship Road/19th Street intersection
  - Willamette Falls Drive/Ostman Road intersection
- It is recommended that an enhanced pedestrian crossing be considered on the east leg of the Willamette Falls Drive/Dollar Street intersection once the current reconstruction of Willamette Falls Drive is complete.
- It is recommended that the existing crosswalk west of Epperly Street be thoroughly reviewed and coordinated with the City for safety improvements or relocated to a safer crossing location.
- It is also recommended that a school speed zone is installed along Willamette Falls Drive, Dollar Street, and the Brandon Place extension.

# APPENDIX

## CONTENTS

- A. TRAFFIC COUNT DATA
- B. HCM REPORT – EXISTING CONDITIONS
- C. HCM REPORT – NO BUILD CONDITIONS
- D. HCM REPORT – BUILD CONDITIONS
- E. HCM REPORT – SENSITIVITY ANALYSIS # 1
- F. HCM REPORT – SENSITIVITY ANALYSIS # 2
- G. CRASH DATA
- H. SITE PLAN



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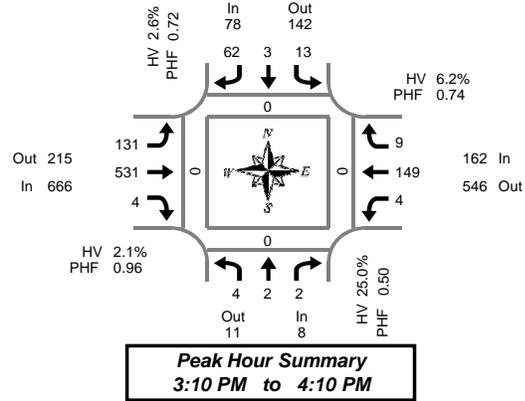
## **APPENDIX A.**

### **TRAFFIC COUNT DATA**

# Total Vehicle Summary



Clay Carney  
(503) 833-2740



## Ostman Rd & Willamette Falls Dr

Thursday, May 16, 2019  
3:00 PM to 5:00 PM

### 5-Minute Interval Summary 3:00 PM to 5:00 PM

Interval Start Time	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Willamette Falls Dr				Westbound Willamette Falls Dr				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	1	0	0	0	3	0	3	0	8	35	0	0	9	2	0	61	0	0	0	0	
3:05 PM	0	0	2	0	1	1	1	0	9	42	0	0	10	1	0	67	0	0	0	0	
3:10 PM	0	0	0	0	2	0	5	0	15	39	0	2	8	0	0	69	0	0	0	0	
3:15 PM	1	0	0	0	2	0	3	0	10	49	0	0	12	1	0	78	0	0	0	0	
3:20 PM	0	0	0	0	0	0	4	0	8	46	0	0	1	17	0	76	0	0	0	0	
3:25 PM	0	0	0	0	0	0	7	0	9	50	0	0	0	12	1	79	0	0	0	0	
3:30 PM	0	0	0	0	1	0	6	0	7	44	0	0	1	18	1	78	0	0	0	0	
3:35 PM	0	0	0	0	2	1	8	0	9	41	0	0	0	19	1	81	0	0	0	0	
3:40 PM	1	0	1	0	0	0	9	0	9	47	1	0	0	15	0	83	0	0	0	0	
3:45 PM	0	0	0	0	2	0	5	0	9	47	0	0	1	15	1	80	0	0	0	0	
3:50 PM	1	0	0	0	0	0	5	0	7	49	2	0	0	5	1	70	0	0	0	0	
3:55 PM	1	1	0	0	0	2	3	0	14	45	0	0	1	10	1	78	0	0	0	0	
4:00 PM	0	0	0	0	1	0	3	0	19	36	0	1	0	13	0	72	0	0	0	0	
4:05 PM	0	1	1	0	3	0	4	0	15	38	1	0	0	5	2	70	0	0	0	0	
4:10 PM	1	0	0	0	3	0	5	0	12	39	0	0	0	8	0	68	0	0	0	0	
4:15 PM	1	0	1	0	0	0	3	0	9	50	0	0	1	13	0	78	0	0	0	0	
4:20 PM	0	0	0	0	1	0	5	0	15	42	0	0	0	7	0	70	1	0	0	0	
4:25 PM	1	0	1	0	4	0	4	0	8	52	0	0	0	10	1	81	0	0	0	0	
4:30 PM	1	0	0	0	0	1	1	0	17	42	0	0	1	13	1	77	0	0	0	0	
4:35 PM	1	0	0	0	0	0	4	0	11	43	0	0	0	9	0	68	0	0	0	0	
4:40 PM	0	0	0	0	0	0	3	0	7	51	0	0	0	11	3	75	0	0	0	0	
4:45 PM	0	0	1	0	0	0	3	0	10	51	0	0	0	17	1	83	0	0	0	0	
4:50 PM	0	0	1	0	3	0	5	0	11	46	1	0	0	14	1	82	0	0	0	0	
4:55 PM	0	0	0	0	0	1	6	0	16	44	0	0	0	8	1	76	0	0	0	0	
Total Survey	10	2	8	0	28	6	105	0	264	1,068	5	3	6	278	20	1,800	1	0	0	0	

### 15-Minute Interval Summary 3:00 PM to 5:00 PM

Interval Start Time	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Willamette Falls Dr				Westbound Willamette Falls Dr				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	1	0	2	0	6	1	9	0	32	116	0	2	0	27	3	197	0	0	0	0	
3:15 PM	1	0	0	0	2	0	14	0	27	145	0	0	1	41	2	233	0	0	0	0	
3:30 PM	1	0	1	0	3	1	23	0	25	132	1	0	1	52	2	242	0	0	0	0	
3:45 PM	2	1	0	0	2	2	13	0	30	141	2	0	2	30	3	228	0	0	0	0	
4:00 PM	1	1	1	0	7	0	12	0	46	113	1	1	0	26	2	210	0	0	0	0	
4:15 PM	2	0	2	0	5	0	12	0	32	144	0	0	1	30	1	229	1	0	0	0	
4:30 PM	2	0	0	0	0	1	8	0	35	136	0	0	1	33	4	220	0	0	0	0	
4:45 PM	0	0	2	0	3	1	14	0	37	141	1	0	0	39	3	241	0	0	0	0	
Total Survey	10	2	8	0	28	6	105	0	264	1,068	5	3	6	278	20	1,800	1	0	0	0	

### Peak Hour Summary 3:10 PM to 4:10 PM

By Approach	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Willamette Falls Dr				Westbound Willamette Falls Dr				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	8	11	19	0	78	142	220	0	666	215	881	3	162	546	708	0	914	0	0	0	0
%HV	25.0%				2.6%				2.1%				6.2%				3.1%				
PHF	0.50				0.72				0.96				0.74				0.94				

By Movement	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Willamette Falls Dr				Westbound Willamette Falls Dr				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	4	2	2	8	13	3	62	78	131	534	3	2	4	150	10	0	914
%HV	25.0%	0.0%	50.0%	25.0%	7.7%	0.0%	1.6%	2.6%	2.3%	2.1%	0.0%	2.1%	25.0%	5.4%	11.1%	6.2%	3.1%
PHF	0.50	0.25	0.50	0.50	0.81	0.38	0.67	0.72	0.68	0.92	0.33	0.96	0.50	0.72	0.75	0.74	0.94

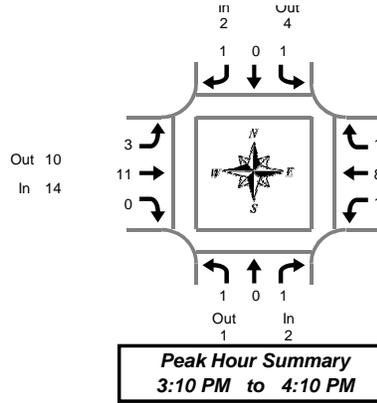
### Rolling Hour Summary 3:00 PM to 5:00 PM

Interval Start Time	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Willamette Falls Dr				Westbound Willamette Falls Dr				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	5	1	3	0	13	4	59	0	114	534	3	2	4	150	10	0	900	0	0	0	0
3:15 PM	5	2	2	0	14	3	62	0	128	531	4	1	4	149	9	0	913	0	0	0	0
3:30 PM	6	2	4	0	17	3	60	0	133	530	4	1	4	138	8	0	909	1	0	0	0
3:45 PM	7	2	3	0	14	3	45	0	143	534	3	1	4	119	10	0	887	1	0	0	0
4:00 PM	5	1	5	0	15	2	46	0	150	534	2	1	2	128	10	0	900	1	0	0	0

# Heavy Vehicle Summary



Clay Carney  
(503) 833-2740



## Ostman Rd & Willamette Falls Dr

Thursday, May 16, 2019  
3:00 PM to 5:00 PM

### Heavy Vehicle 5-Minute Interval Summary 3:00 PM to 5:00 PM

Interval Start Time	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Willamette Falls Dr				Westbound Willamette Falls Dr				Interval Total	
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total		
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:10 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	1	2	1
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
3:20 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2
3:25 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2	2
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1
3:35 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	2	0	2	3	3
3:40 PM	1	0	1	2	0	0	1	1	0	1	0	1	0	1	0	1	5	5
3:45 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1
3:50 PM	0	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	2	2
3:55 PM	0	0	0	0	0	0	0	0	0	2	0	2	1	0	0	1	3	3
4:00 PM	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	4	4
4:05 PM	0	0	0	0	0	0	0	0	1	4	0	5	0	0	1	1	6	6
4:10 PM	1	0	0	1	1	0	0	1	3	3	0	6	0	0	0	0	8	8
4:15 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1
4:20 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	1
4:25 PM	1	0	0	1	0	0	0	0	0	1	0	1	0	3	1	4	6	6
4:30 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1
4:35 PM	0	0	0	0	0	0	0	0	1	2	0	3	0	0	0	0	3	3
4:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:50 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	1
4:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	3	0	1	4	4	0	1	5	7	19	0	26	1	11	2	14	49	49

### Heavy Vehicle 15-Minute Interval Summary 3:00 PM to 5:00 PM

Interval Start Time	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Willamette Falls Dr				Westbound Willamette Falls Dr				Interval Total	
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total		
3:00 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	1	2	2
3:15 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	3	0	3	5	5
3:30 PM	1	0	1	2	0	0	1	1	1	1	0	2	0	4	0	4	9	9
3:45 PM	0	0	0	0	0	0	0	0	1	4	0	5	1	0	0	1	6	6
4:00 PM	1	0	0	1	1	0	0	1	4	7	0	11	0	0	1	1	14	14
4:15 PM	1	0	0	1	1	0	0	1	0	2	0	2	0	3	1	4	8	8
4:30 PM	0	0	0	0	0	0	0	0	1	3	0	4	0	0	0	0	4	4
4:45 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	1
Total Survey	3	0	1	4	4	0	1	5	7	19	0	26	1	11	2	14	49	49

### Heavy Vehicle Peak Hour Summary 3:10 PM to 4:10 PM

By Approach	Northbound Ostman Rd			Southbound Ostman Rd			Eastbound Willamette Falls Dr			Westbound Willamette Falls Dr			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	2	1	3	2	4	6	14	10	24	10	13	23	28
PHF	0.25			0.50			0.50			0.63			0.78

By Movement	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Willamette Falls Dr				Westbound Willamette Falls Dr				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	1	0	1	2	1	0	1	2	3	11	0	14	1	8	1	10	28
PHF	0.25	0.00	0.25	0.25	0.25	0.00	0.25	0.50	0.75	0.46	0.00	0.50	0.25	0.50	0.25	0.63	0.78

### Heavy Vehicle Rolling Hour Summary 3:00 PM to 5:00 PM

Interval Start Time	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Willamette Falls Dr				Westbound Willamette Falls Dr				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	1	0	1	2	1	0	1	2	2	7	0	9	1	8	0	9	22
3:15 PM	2	0	1	3	1	0	1	2	6	14	0	20	1	7	1	9	34
3:30 PM	3	0	1	4	2	0	1	3	6	14	0	20	1	7	2	10	37
3:45 PM	2	0	0	2	2	0	0	2	6	16	0	22	1	3	2	6	32
4:00 PM	2	0	0	2	3	0	0	3	5	12	0	17	0	3	2	5	27

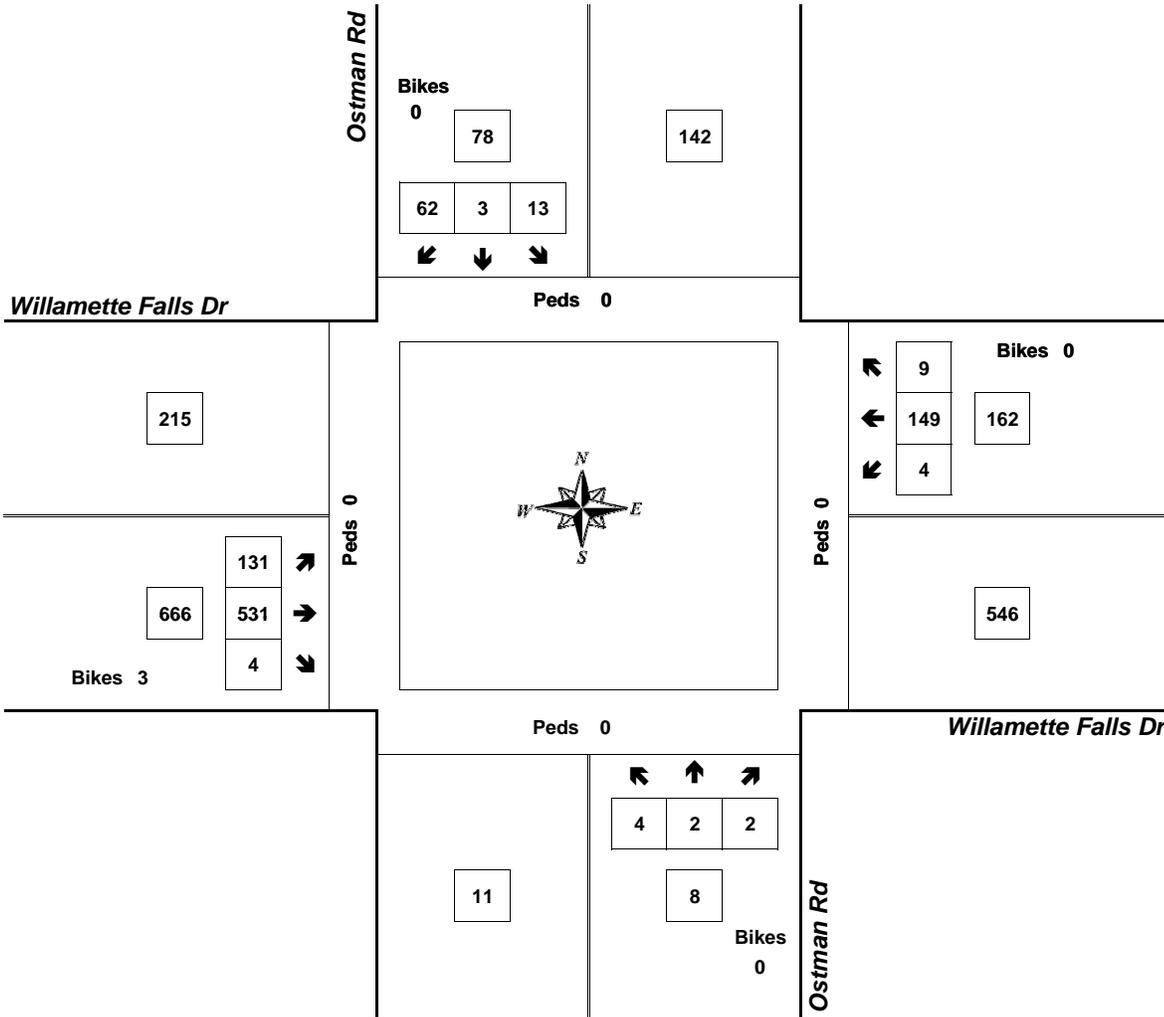
# Peak Hour Summary



Clay Carney  
(503) 833-2740

## Ostman Rd & Willamette Falls Dr

3:10 PM to 4:10 PM  
Thursday, May 16, 2019



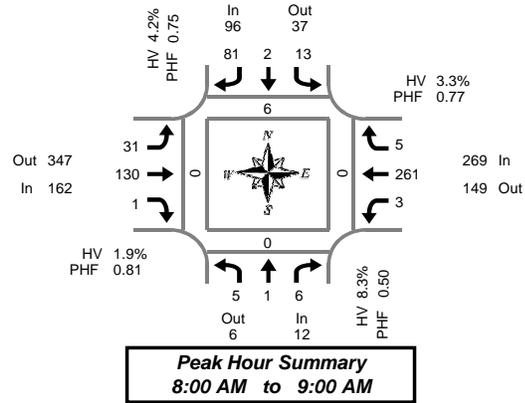
Approach	PHF	HV%	Volume
EB	0.96	2.1%	666
WB	0.74	6.2%	162
NB	0.50	25.0%	8
SB	0.72	2.6%	78
<b>Intersection</b>	<b>0.94</b>	<b>3.1%</b>	<b>914</b>

Count Period: 3:00 PM to 5:00 PM

# Total Vehicle Summary



Clay Carney  
(503) 833-2740



## Ostman Rd & Willamette Falls Dr

Thursday, May 16, 2019  
8:00 AM to 10:00 AM

### 5-Minute Interval Summary 8:00 AM to 10:00 AM

Interval Start Time	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Willamette Falls Dr				Westbound Willamette Falls Dr				Interval Total	Pedestrians Crosswalk				
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West	
8:00 AM	0	1	0	0	0	0	8	0	5	7	0	0	0	26	0	0	0	47	1	0	0	0
8:05 AM	0	0	2	0	1	0	3	0	4	13	0	0	1	23	0	0	0	47	1	0	0	0
8:10 AM	0	0	2	0	1	0	9	0	2	18	0	0	0	16	0	0	0	48	0	0	0	0
8:15 AM	0	0	2	0	1	1	9	0	2	10	1	0	0	22	1	0	0	49	1	0	0	0
8:20 AM	0	0	0	0	4	0	7	0	2	7	0	0	0	18	0	0	0	38	0	0	0	0
8:25 AM	1	0	0	0	1	0	2	0	2	12	0	0	1	21	0	0	0	40	0	0	0	0
8:30 AM	0	0	0	0	0	1	4	0	1	8	0	0	1	26	1	0	0	42	1	0	0	0
8:35 AM	0	0	0	0	0	0	9	0	6	7	0	0	0	28	0	0	0	50	1	0	0	0
8:40 AM	1	0	0	0	2	0	5	0	3	13	0	0	0	30	1	0	0	55	0	0	0	0
8:45 AM	1	0	0	0	1	0	9	0	1	7	0	0	0	19	1	0	0	39	0	0	0	0
8:50 AM	2	0	0	0	1	0	9	0	1	9	0	0	0	18	0	0	0	40	0	0	0	0
8:55 AM	0	0	0	0	1	0	7	0	2	19	0	0	0	14	1	0	0	44	1	0	0	0
9:00 AM	0	0	1	0	3	0	9	0	4	12	0	0	0	14	1	0	0	44	0	0	0	0
9:05 AM	0	0	0	0	0	0	5	0	7	8	1	0	0	17	0	0	0	38	0	0	0	0
9:10 AM	0	0	0	0	1	1	3	0	7	16	0	0	0	18	2	0	0	48	1	0	0	0
9:15 AM	1	0	0	0	0	0	3	0	3	6	0	0	0	15	0	0	0	28	0	0	0	0
9:20 AM	0	0	0	0	0	0	5	0	2	9	1	0	0	18	2	0	0	37	0	0	0	0
9:25 AM	0	0	0	0	0	0	0	0	4	12	0	0	0	13	1	0	0	30	0	0	0	0
9:30 AM	0	0	1	0	0	0	2	0	6	3	1	0	0	3	1	0	0	17	0	0	0	0
9:35 AM	0	1	0	0	0	0	2	0	1	10	0	0	1	10	0	0	0	25	0	0	0	0
9:40 AM	1	0	0	0	0	0	3	0	0	8	0	0	0	11	0	1	0	23	0	0	0	0
9:45 AM	0	0	0	0	0	0	3	0	4	11	0	0	0	13	2	0	0	33	0	0	0	0
9:50 AM	0	0	0	0	0	0	2	0	2	10	0	0	0	5	0	0	0	19	0	0	0	0
9:55 AM	0	0	0	0	0	0	2	0	1	9	0	0	0	7	1	0	0	20	0	0	0	0
Total Survey	7	2	8	0	17	3	120	0	72	244	4	0	4	405	15	1	0	901	7	0	0	0

### 15-Minute Interval Summary 8:00 AM to 10:00 AM

Interval Start Time	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Willamette Falls Dr				Westbound Willamette Falls Dr				Interval Total	Pedestrians Crosswalk				
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West	
8:00 AM	0	1	4	0	2	0	20	0	11	38	0	0	1	65	0	0	0	142	2	0	0	0
8:15 AM	1	0	2	0	6	1	18	0	6	29	1	0	1	61	1	0	0	127	1	0	0	0
8:30 AM	1	0	0	0	2	1	18	0	10	28	0	0	1	84	2	0	0	147	2	0	0	0
8:45 AM	3	0	0	0	3	0	25	0	4	35	0	0	0	51	2	0	0	123	1	0	0	0
9:00 AM	0	0	1	0	4	1	17	0	18	36	1	0	0	49	3	0	0	130	1	0	0	0
9:15 AM	1	0	0	0	0	0	8	0	9	27	1	0	0	46	3	0	0	95	0	0	0	0
9:30 AM	1	1	1	0	0	0	7	0	7	21	1	0	1	24	1	1	0	65	0	0	0	0
9:45 AM	0	0	0	0	0	0	7	0	7	30	0	0	0	25	3	0	0	72	0	0	0	0
Total Survey	7	2	8	0	17	3	120	0	72	244	4	0	4	405	15	1	0	901	7	0	0	0

### Peak Hour Summary 8:00 AM to 9:00 AM

By Approach	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Willamette Falls Dr				Westbound Willamette Falls Dr				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	12	6	18	0	96	37	133	0	162	347	509	0	269	149	418	0	539	6	0	0	0
%HV	8.3%				4.2%				1.9%				3.3%				3.2%				
PHF	0.50				0.75				0.81				0.77				0.92				

By Movement	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Willamette Falls Dr				Westbound Willamette Falls Dr				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	5	1	6	12	13	2	81	96	31	130	1	162	3	261	5	269	539
%HV	20.0%	0.0%	0.0%	8.3%	7.7%	0.0%	3.7%	4.2%	0.0%	2.3%	0.0%	1.9%	0.0%	3.1%	20.0%	3.3%	3.2%
PHF	0.31	0.25	0.25	0.50	0.54	0.50	0.81	0.75	0.70	0.79	0.25	0.81	0.38	0.78	0.63	0.77	0.92

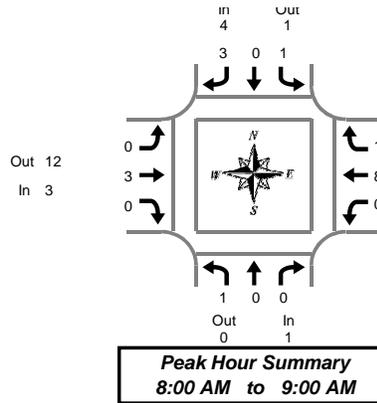
### Rolling Hour Summary 8:00 AM to 10:00 AM

Interval Start Time	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Willamette Falls Dr				Westbound Willamette Falls Dr				Interval Total	Pedestrians Crosswalk				
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West	
8:00 AM	5	1	6	0	13	2	81	0	31	130	1	0	3	261	5	0	0	539	6	0	0	0
8:15 AM	5	0	3	0	15	3	78	0	38	128	2	0	2	245	8	0	0	527	5	0	0	0
8:30 AM	5	0	1	0	9	2	68	0	41	126	2	0	1	230	10	0	0	495	4	0	0	0
8:45 AM	5	1	2	0	7	1	57	0	38	119	3	0	1	170	9	1	0	413	2	0	0	0
9:00 AM	2	1	2	0	4	1	39	0	41	114	3	0	1	144	10	1	0	362	1	0	0	0

# Heavy Vehicle Summary



Clay Carney  
(503) 833-2740



## Ostman Rd & Willamette Falls Dr

Thursday, May 16, 2019  
8:00 AM to 10:00 AM

### Heavy Vehicle 5-Minute Interval Summary 8:00 AM to 10:00 AM

Interval Start Time	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Willamette Falls Dr				Westbound Willamette Falls Dr				Interval Total	
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total		
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:05 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:10 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:15 AM	0	0	0	0	0	1	0	1	2	0	0	0	0	0	1	0	1	3
8:20 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
8:25 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
8:35 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:40 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2
8:45 AM	1	0	0	1	0	0	1	1	1	0	0	0	0	0	3	0	3	5
8:50 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	3
8:55 AM	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	1
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:05 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2
9:10 AM	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:20 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
9:25 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
9:35 AM	0	1	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	2
9:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:50 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:55 AM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
Total Survey	1	1	0	2	2	0	3	5	1	6	1	8	0	9	1	10	25	

### Heavy Vehicle 15-Minute Interval Summary 8:00 AM to 10:00 AM

Interval Start Time	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Willamette Falls Dr				Westbound Willamette Falls Dr				Interval Total	
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total		
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	1	0	1	2	0	2	0	2	0	1	0	1	5
8:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	2	3
8:45 AM	1	0	0	1	0	0	2	2	0	0	0	0	0	6	0	6	9	
9:00 AM	0	0	0	0	0	1	0	0	1	0	1	0	1	0	1	0	1	3
9:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
9:30 AM	0	1	0	1	0	0	0	0	0	0	1	1	2	0	0	0	0	3
9:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
Total Survey	1	1	0	2	2	0	3	5	1	6	1	8	0	9	1	10	25	

### Heavy Vehicle Peak Hour Summary 8:00 AM to 9:00 AM

By Approach	Northbound Ostman Rd			Southbound Ostman Rd			Eastbound Willamette Falls Dr			Westbound Willamette Falls Dr			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	1	0	1	4	1	5	3	12	15	9	4	13	17
PHF	0.25			0.50			0.38			0.32			0.43

By Movement	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Willamette Falls Dr				Westbound Willamette Falls Dr				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	1	0	0	1	1	0	3	4	0	3	0	3	0	8	1	9	17
PHF	0.25	0.00	0.00	0.25	0.25	0.00	0.38	0.50	0.00	0.38	0.00	0.38	0.00	0.29	0.25	0.32	0.43

### Heavy Vehicle Rolling Hour Summary 8:00 AM to 10:00 AM

Interval Start Time	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Willamette Falls Dr				Westbound Willamette Falls Dr				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
8:00 AM	1	0	0	1	1	0	3	4	0	3	0	3	0	8	1	9	17
8:15 AM	1	0	0	1	2	0	3	5	0	4	0	4	0	9	1	10	20
8:30 AM	1	0	0	1	1	0	2	3	0	3	0	3	0	8	1	9	16
8:45 AM	1	1	0	2	1	0	2	3	0	3	1	4	0	7	0	7	16
9:00 AM	0	1	0	1	1	0	0	1	1	3	1	5	0	1	0	1	8

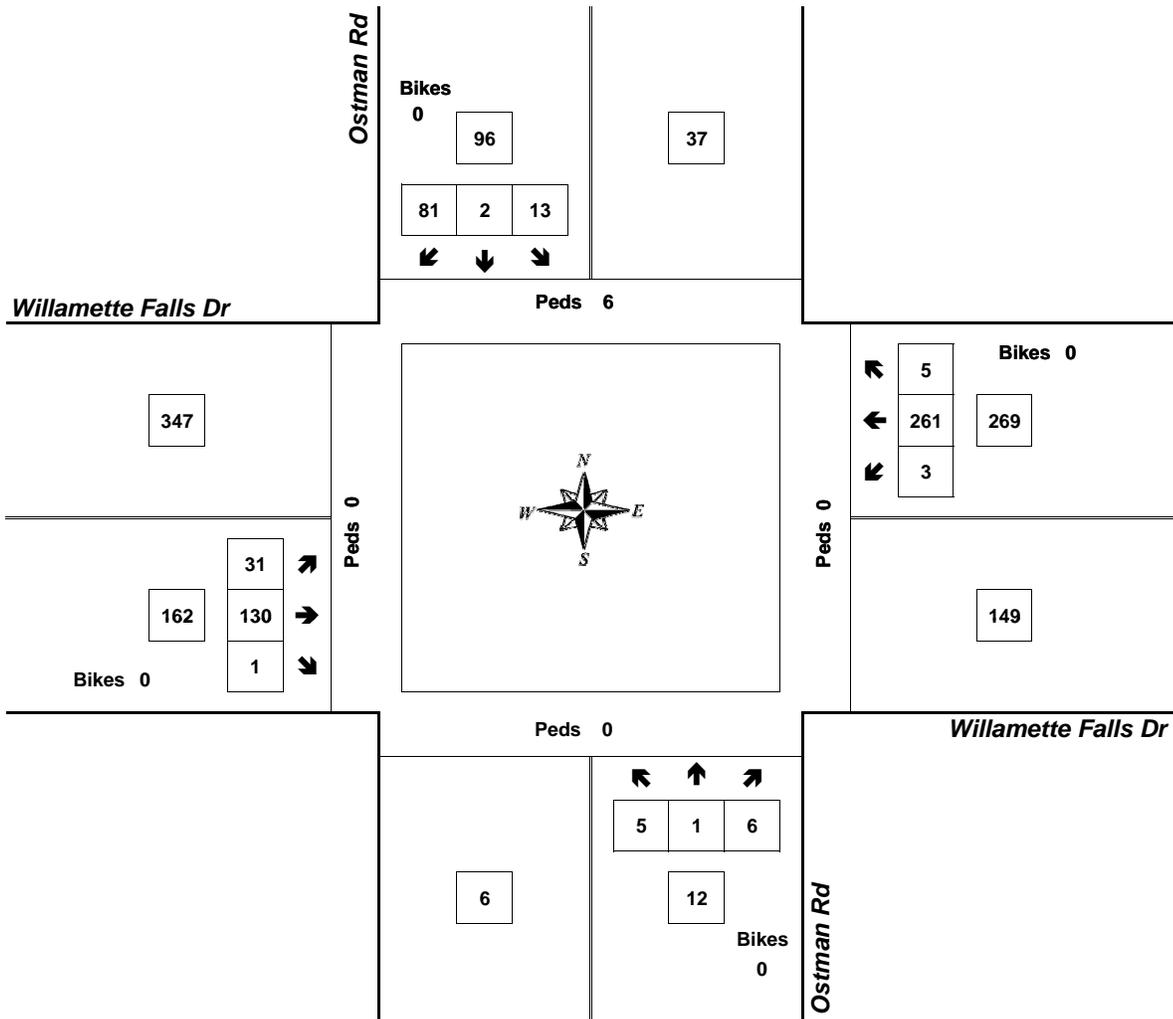
# Peak Hour Summary



Clay Carney  
(503) 833-2740

## Ostman Rd & Willamette Falls Dr

8:00 AM to 9:00 AM  
Thursday, May 16, 2019



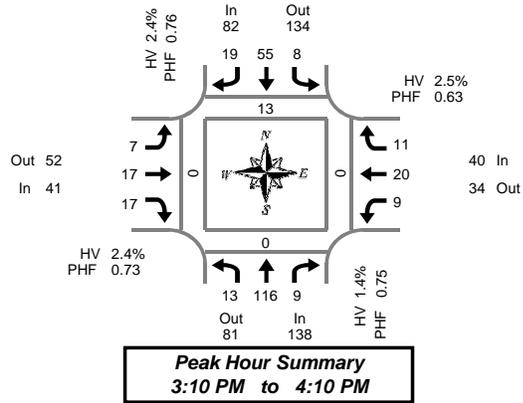
Approach	PHF	HV%	Volume
EB	0.81	1.9%	162
WB	0.77	3.3%	269
NB	0.50	8.3%	12
SB	0.75	4.2%	96
<b>Intersection</b>	<b>0.92</b>	<b>3.2%</b>	<b>539</b>

Count Period: 8:00 AM to 10:00 AM

# Total Vehicle Summary



Clay Carney  
(503) 833-2740



## Ostman Rd & Dollar St

Thursday, May 16, 2019  
3:00 PM to 5:00 PM

### 5-Minute Interval Summary

3:00 PM to 5:00 PM

Interval Start Time	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Dollar St				Westbound Dollar St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	1	7	1	0	1	4	4	0	1	4	1	0	0	5	0	0	29	0	1	0	0
3:05 PM	0	7	2	0	1	1	0	0	2	6	1	0	0	4	1	0	25	0	0	0	0
3:10 PM	2	13	1	0	1	4	2	0	0	3	1	0	0	2	1	0	30	0	0	0	0
3:15 PM	2	6	2	0	1	4	0	0	1	0	3	0	0	2	0	0	21	0	0	0	0
3:20 PM	0	12	0	0	0	1	2	0	1	3	2	0	1	3	0	1	25	0	0	0	0
3:25 PM	1	8	0	0	1	7	1	0	0	1	0	0	1	3	2	0	25	2	0	0	0
3:30 PM	0	8	1	0	1	3	3	0	1	0	1	0	1	4	1	0	24	1	0	0	0
3:35 PM	3	5	0	0	0	8	2	0	1	2	2	0	1	2	0	0	26	2	0	0	0
3:40 PM	3	7	0	0	1	7	1	0	0	3	1	0	2	1	0	0	26	0	0	0	0
3:45 PM	0	6	2	0	1	5	2	0	1	1	3	0	0	1	1	0	23	3	0	0	0
3:50 PM	0	9	1	0	0	2	0	0	0	1	2	0	1	0	0	0	16	4	0	0	0
3:55 PM	1	12	0	0	0	4	2	0	0	3	0	0	0	0	0	0	22	0	0	0	0
4:00 PM	0	12	2	0	1	4	2	0	1	0	1	0	0	1	6	0	30	0	0	0	0
4:05 PM	1	18	0	1	1	6	2	0	1	0	1	0	2	1	0	0	33	1	0	0	0
4:10 PM	1	10	1	0	2	2	0	0	0	2	0	0	0	1	0	0	19	0	0	0	0
4:15 PM	3	5	2	0	0	4	1	0	0	0	2	0	0	0	1	0	18	1	0	1	0
4:20 PM	2	11	0	0	0	6	0	0	1	1	0	0	1	0	2	0	24	0	0	0	0
4:25 PM	1	13	0	0	1	7	1	0	1	2	0	0	2	2	0	0	30	0	0	0	0
4:30 PM	1	9	1	0	0	2	0	0	1	0	0	0	0	1	0	0	15	5	2	1	0
4:35 PM	1	11	2	0	1	1	1	0	1	0	1	0	0	1	0	0	20	1	0	0	0
4:40 PM	2	7	1	0	0	1	3	0	1	0	2	0	0	0	1	0	18	1	0	0	0
4:45 PM	1	6	2	0	0	2	4	0	0	2	1	0	0	1	1	0	20	1	0	0	0
4:50 PM	1	8	0	0	1	6	0	0	1	0	2	0	0	2	1	0	22	0	0	0	0
4:55 PM	0	13	1	0	0	6	1	0	3	2	1	0	1	2	1	0	31	0	0	0	0
Total Survey	27	223	22	1	15	97	34	0	19	36	28	0	13	39	19	1	572	22	3	2	0

### 15-Minute Interval Summary

3:00 PM to 5:00 PM

Interval Start Time	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Dollar St				Westbound Dollar St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	3	27	4	0	3	9	6	0	3	13	3	0	0	11	2	0	84	0	1	0	0
3:15 PM	3	26	2	0	2	12	3	0	2	4	5	0	2	8	2	1	71	2	0	0	0
3:30 PM	6	20	1	0	2	18	6	0	2	5	4	0	4	7	1	0	76	3	0	0	0
3:45 PM	1	27	3	0	1	11	4	0	1	5	5	0	1	1	1	0	61	7	0	0	0
4:00 PM	2	40	3	1	4	12	4	0	2	2	2	0	2	3	6	0	82	1	0	0	0
4:15 PM	6	29	2	0	1	17	2	0	2	3	2	0	3	2	3	0	72	1	0	1	0
4:30 PM	4	27	4	0	1	4	4	0	3	0	3	0	0	2	1	0	53	7	2	1	0
4:45 PM	2	27	3	0	1	14	5	0	4	4	4	0	1	5	3	0	73	1	0	0	0
Total Survey	27	223	22	1	15	97	34	0	19	36	28	0	13	39	19	1	572	22	3	2	0

### Peak Hour Summary

3:10 PM to 4:10 PM

By Approach	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Dollar St				Westbound Dollar St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	138	81	219	1	82	134	216	0	41	52	93	0	40	34	74	1	301	13	0	0	0
%HV	1.4%				2.4%				2.4%				2.5%				2.0%				
PHF	0.75				0.76				0.73				0.63				0.89				

By Movement	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Dollar St				Westbound Dollar St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	13	116	9	138	8	55	19	82	7	17	17	41	9	20	11	40	301
%HV	7.7%	0.9%	0.0%	1.4%	0.0%	3.6%	0.0%	2.4%	0.0%	5.9%	0.0%	2.4%	0.0%	0.0%	9.1%	2.5%	2.0%
PHF	0.54	0.69	0.75	0.75	1.00	0.69	0.79	0.76	0.88	0.71	0.71	0.73	0.56	0.50	0.46	0.63	0.89

### Rolling Hour Summary

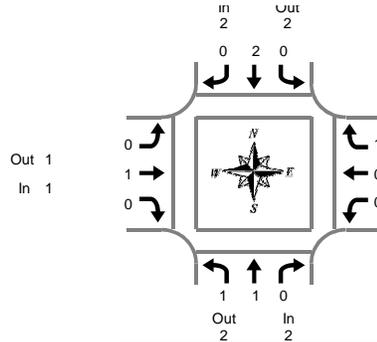
3:00 PM to 5:00 PM

Interval Start Time	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Dollar St				Westbound Dollar St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
3:00 PM	13	100	10	0	8	50	19	0	8	27	17	0	7	27	6	1	292	12	1	0	0
3:15 PM	12	113	9	1	9	53	17	0	7	16	16	0	9	19	10	1	290	13	0	0	0
3:30 PM	15	116	9	1	8	58	16	0	7	15	13	0	10	13	11	0	291	12	0	1	0
3:45 PM	13	123	12	1	7	44	14	0	8	10	12	0	6	8	11	0	268	16	2	2	0
4:00 PM	14	123	12	1	7	47	15	0	11	9	11	0	6	12	13	0	280	10	2	2	0

# Heavy Vehicle Summary



Clay Carney  
(503) 833-2740



## Ostman Rd & Dollar St

Thursday, May 16, 2019  
3:00 PM to 5:00 PM

**Peak Hour Summary**  
3:10 PM to 4:10 PM

### Heavy Vehicle 5-Minute Interval Summary

3:00 PM to 5:00 PM

Interval Start Time	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Dollar St				Westbound Dollar St				Interval Total	
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total		
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:10 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
3:35 PM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:40 PM	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0	0	0	2
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:50 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:10 PM	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3
4:15 PM	1	0	1	2	0	0	0	0	0	1	1	1	0	0	0	0	0	3
4:20 PM	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0	0	0	2
4:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:40 PM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	3	4	1	8	0	3	0	3	0	2	1	3	0	0	1	1	15	15

### Heavy Vehicle 15-Minute Interval Summary

3:00 PM to 5:00 PM

Interval Start Time	Northbound Ostman Rd			Total	Southbound Ostman Rd			Total	Eastbound Dollar St			Total	Westbound Dollar St			Total	
	L	T	R		L	T	R		L	T	R		L	T	R		
3:00 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	1	0	0	1	0	1	0	1	0	1	0	1	0	0	1	1	4
3:45 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4:00 PM	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
4:15 PM	1	0	1	2	0	1	0	1	0	1	1	2	0	0	0	0	5
4:30 PM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	3	4	1	8	0	3	0	3	0	2	1	3	0	0	1	1	15

### Heavy Vehicle Peak Hour Summary

3:10 PM to 4:10 PM

By Approach	Northbound Ostman Rd			Total	Southbound Ostman Rd			Total	Eastbound Dollar St			Total	Westbound Dollar St			Total	
	In	Out	Total		In	Out	Total		In	Out	Total		In	Out	Total		
Volume	2	2	4		2	2	4		1	1	2		1	1	2		6
PHF	0.50				0.50				0.25				0.25				0.38

By Movement	Northbound Ostman Rd			Total	Southbound Ostman Rd			Total	Eastbound Dollar St			Total	Westbound Dollar St			Total	
	L	T	R		L	T	R		L	T	R		L	T	R		
Volume	1	1	0	2	0	2	0	2	0	1	0	1	0	0	1	1	6
PHF	0.25	0.25	0.00	0.50	0.00	0.50	0.00	0.50	0.00	0.25	0.00	0.25	0.00	0.00	0.25	0.25	0.38

### Heavy Vehicle Rolling Hour Summary

3:00 PM to 5:00 PM

Interval Start Time	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Dollar St				Westbound Dollar St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
3:00 PM	1	1	0	2	0	2	0	2	0	1	0	1	0	0	1	1	6
3:15 PM	1	4	0	5	0	1	0	1	0	1	0	1	0	0	1	1	8
3:30 PM	2	4	1	7	0	2	0	2	0	2	1	3	0	0	1	1	13
3:45 PM	2	4	1	7	0	1	0	1	0	1	1	2	0	0	0	0	10
4:00 PM	2	3	1	6	0	1	0	1	0	1	1	2	0	0	0	0	9

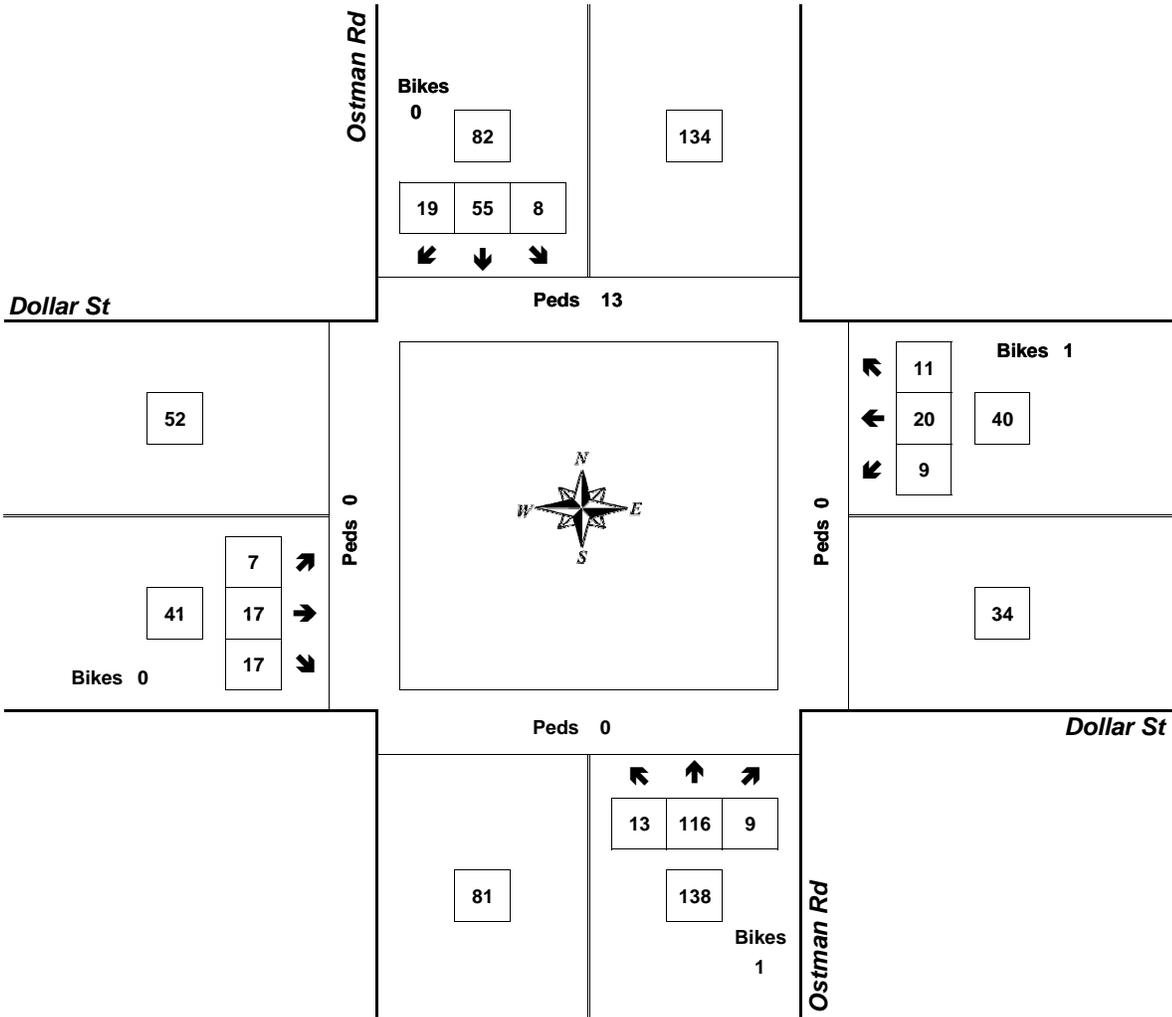
# Peak Hour Summary



Clay Carney  
(503) 833-2740

## Ostman Rd & Dollar St

3:10 PM to 4:10 PM  
Thursday, May 16, 2019



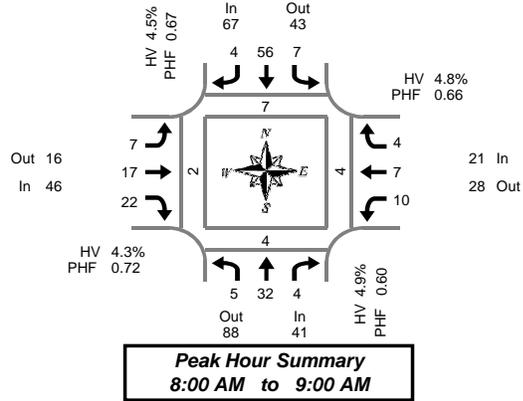
Approach	PHF	HV%	Volume
EB	0.73	2.4%	41
WB	0.63	2.5%	40
NB	0.75	1.4%	138
SB	0.76	2.4%	82
<b>Intersection</b>	<b>0.89</b>	<b>2.0%</b>	<b>301</b>

Count Period: 3:00 PM to 5:00 PM

# Total Vehicle Summary



Clay Carney  
(503) 833-2740



## Ostman Rd & Dollar St

Thursday, May 16, 2019  
8:00 AM to 10:00 AM

### 5-Minute Interval Summary 8:00 AM to 10:00 AM

Interval Start Time	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Dollar St				Westbound Dollar St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
8:00 AM	4	6	0	0	0	2	0	0	0	4	3	0	1	0	2	0	22	2	0	0	0
8:05 AM	0	4	0	0	1	2	1	0	0	2	1	0	0	2	0	0	13	0	1	0	0
8:10 AM	0	2	1	0	2	7	0	0	2	2	2	0	0	1	0	0	19	1	0	1	2
8:15 AM	0	4	1	0	1	8	0	0	1	1	1	0	0	0	0	0	17	0	0	0	0
8:20 AM	0	1	0	0	0	6	1	0	0	0	1	0	1	0	0	0	10	0	0	0	0
8:25 AM	0	2	0	0	1	1	0	0	0	0	0	0	1	0	1	0	6	2	0	0	0
8:30 AM	0	1	0	0	1	2	1	0	3	0	2	0	1	0	1	0	12	0	0	0	0
8:35 AM	0	4	1	0	0	6	0	0	0	4	2	0	1	1	0	0	19	0	0	0	0
8:40 AM	1	3	0	0	0	4	0	0	1	1	1	0	0	0	0	0	11	1	0	0	0
8:45 AM	0	2	1	0	0	8	1	0	0	2	0	0	2	0	0	0	16	0	3	3	0
8:50 AM	0	0	0	0	0	5	0	0	0	0	2	0	3	1	0	0	11	1	0	0	0
8:55 AM	0	3	0	0	1	5	0	0	0	1	7	0	0	2	0	0	19	0	0	0	0
9:00 AM	1	0	0	0	0	5	1	0	0	0	0	0	1	2	1	0	11	1	0	0	1
9:05 AM	1	8	1	0	0	1	1	0	0	1	3	0	0	2	1	0	19	0	0	0	0
9:10 AM	3	3	0	0	0	3	0	0	0	1	0	0	1	1	1	0	13	0	0	0	0
9:15 AM	1	4	0	0	0	2	1	0	0	1	0	0	0	1	0	0	10	0	0	0	0
9:20 AM	1	1	0	0	0	3	0	0	1	1	2	0	1	0	0	0	10	2	0	0	0
9:25 AM	0	1	0	0	0	0	0	0	1	2	1	0	0	0	1	0	6	0	0	0	0
9:30 AM	2	5	0	0	0	1	1	0	0	0	0	0	0	0	0	0	9	0	0	0	0
9:35 AM	1	2	0	0	1	2	0	0	0	2	1	0	0	0	1	0	10	0	0	0	0
9:40 AM	1	0	1	0	1	3	0	0	1	2	0	0	0	1	0	0	10	0	0	1	0
9:45 AM	2	1	0	0	0	1	1	0	0	2	1	0	0	0	0	0	8	0	0	0	0
9:50 AM	1	2	0	0	0	1	0	0	2	0	1	0	0	1	1	0	9	0	0	0	1
9:55 AM	1	1	0	0	1	1	0	0	3	1	1	0	0	1	0	0	10	0	0	0	0
Total Survey	20	60	6	0	10	79	9	0	15	30	32	0	13	16	10	0	300	10	4	5	4

### 15-Minute Interval Summary 8:00 AM to 10:00 AM

Interval Start Time	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Dollar St				Westbound Dollar St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
8:00 AM	4	12	1	0	3	11	1	0	2	8	6	0	1	3	2	0	54	3	1	1	2
8:15 AM	0	7	1	0	2	15	1	0	1	1	2	0	2	0	1	0	33	2	0	0	0
8:30 AM	1	8	1	0	1	12	1	0	4	5	5	0	2	1	1	0	42	1	0	0	0
8:45 AM	0	5	1	0	1	18	1	0	0	3	9	0	5	3	0	0	46	1	3	3	0
9:00 AM	5	11	1	0	0	9	2	0	0	2	3	0	2	5	3	0	43	1	0	0	1
9:15 AM	2	6	0	0	0	5	1	0	2	4	3	0	1	1	1	0	26	2	0	0	0
9:30 AM	4	7	1	0	2	6	1	0	1	4	1	0	0	1	1	0	29	0	0	1	0
9:45 AM	4	4	0	0	1	3	1	0	5	3	3	0	0	2	1	0	27	0	0	0	1
Total Survey	20	60	6	0	10	79	9	0	15	30	32	0	13	16	10	0	300	10	4	5	4

### Peak Hour Summary 8:00 AM to 9:00 AM

By Approach	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Dollar St				Westbound Dollar St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	41	88	129	0	67	43	110	0	46	16	62	0	21	28	49	0	175	7	4	4	2
%HV	4.9%				4.5%				4.3%				4.8%				4.6%				
PHF	0.60				0.67				0.72				0.66				0.81				

By Movement	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Dollar St				Westbound Dollar St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	5	32	4	41	7	56	4	67	7	17	22	46	10	7	4	21	175
%HV	20.0%	3.1%	0.0%	4.9%	0.0%	5.4%	0.0%	4.5%	0.0%	5.9%	4.5%	4.3%	0.0%	14.3%	0.0%	4.8%	4.6%
PHF	0.31	0.67	0.50	0.60	0.44	0.67	0.50	0.67	0.44	0.53	0.61	0.72	0.50	0.58	0.50	0.66	0.81

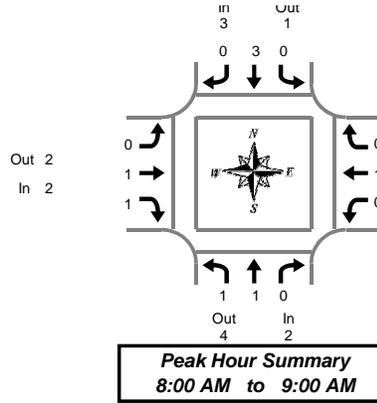
### Rolling Hour Summary 8:00 AM to 10:00 AM

Interval Start Time	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Dollar St				Westbound Dollar St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
8:00 AM	5	32	4	0	7	56	4	0	7	17	22	0	10	7	4	0	175	7	4	4	2
8:15 AM	6	31	4	0	4	54	5	0	5	11	19	0	11	9	5	0	164	5	3	3	1
8:30 AM	8	30	3	0	2	44	5	0	6	14	20	0	10	10	5	0	157	5	3	3	1
8:45 AM	11	29	3	0	3	38	5	0	3	13	16	0	8	10	5	0	144	4	3	4	1
9:00 AM	15	28	2	0	3	23	5	0	8	13	10	0	3	9	6	0	125	3	0	1	2

# Heavy Vehicle Summary



Clay Carney  
(503) 833-2740



## Ostman Rd & Dollar St

Thursday, May 16, 2019  
8:00 AM to 10:00 AM

### Heavy Vehicle 5-Minute Interval Summary 8:00 AM to 10:00 AM

Interval Start Time	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Dollar St				Westbound Dollar St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
8:00 AM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8:05 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
8:10 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
8:20 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:25 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:35 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:50 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:55 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	2
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:05 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:10 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
9:20 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:25 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:35 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:40 AM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
9:45 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
9:50 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
9:55 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Total Survey	2	2	0	4	0	4	0	4	0	2	1	3	0	1	1	2	13

### Heavy Vehicle 15-Minute Interval Summary 8:00 AM to 10:00 AM

Interval Start Time	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Dollar St				Westbound Dollar St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
8:00 AM	1	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	2
8:15 AM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
8:30 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	1	0	1	0	0	1	1	0	1	0	1	3
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
9:30 AM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
9:45 AM	0	1	0	1	0	0	0	0	0	1	0	1	0	0	1	1	3
Total Survey	2	2	0	4	0	4	0	4	0	2	1	3	0	1	1	2	13

### Heavy Vehicle Peak Hour Summary 8:00 AM to 9:00 AM

By Approach	Northbound Ostman Rd			Southbound Ostman Rd			Eastbound Dollar St			Westbound Dollar St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	2	4	6	3	1	4	2	2	4	1	1	2	8
PHF	0.50			0.38			0.50			0.25			0.67

By Movement	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Dollar St				Westbound Dollar St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	1	1	0	2	0	3	0	3	0	1	1	2	0	1	0	1	8
PHF	0.25	0.25	0.00	0.50	0.00	0.38	0.00	0.38	0.00	0.25	0.25	0.50	0.00	0.25	0.00	0.25	0.67

### Heavy Vehicle Rolling Hour Summary 8:00 AM to 10:00 AM

Interval Start Time	Northbound Ostman Rd				Southbound Ostman Rd				Eastbound Dollar St				Westbound Dollar St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
8:00 AM	1	1	0	2	0	3	0	3	0	1	1	2	0	1	0	1	8
8:15 AM	0	1	0	1	0	3	0	3	0	0	1	1	0	1	0	1	6
8:30 AM	0	1	0	1	0	2	0	2	0	0	1	1	0	1	0	1	5
8:45 AM	1	0	0	1	0	2	0	2	0	0	1	1	0	1	0	1	5
9:00 AM	1	1	0	2	0	1	0	1	0	1	0	1	0	0	1	1	5

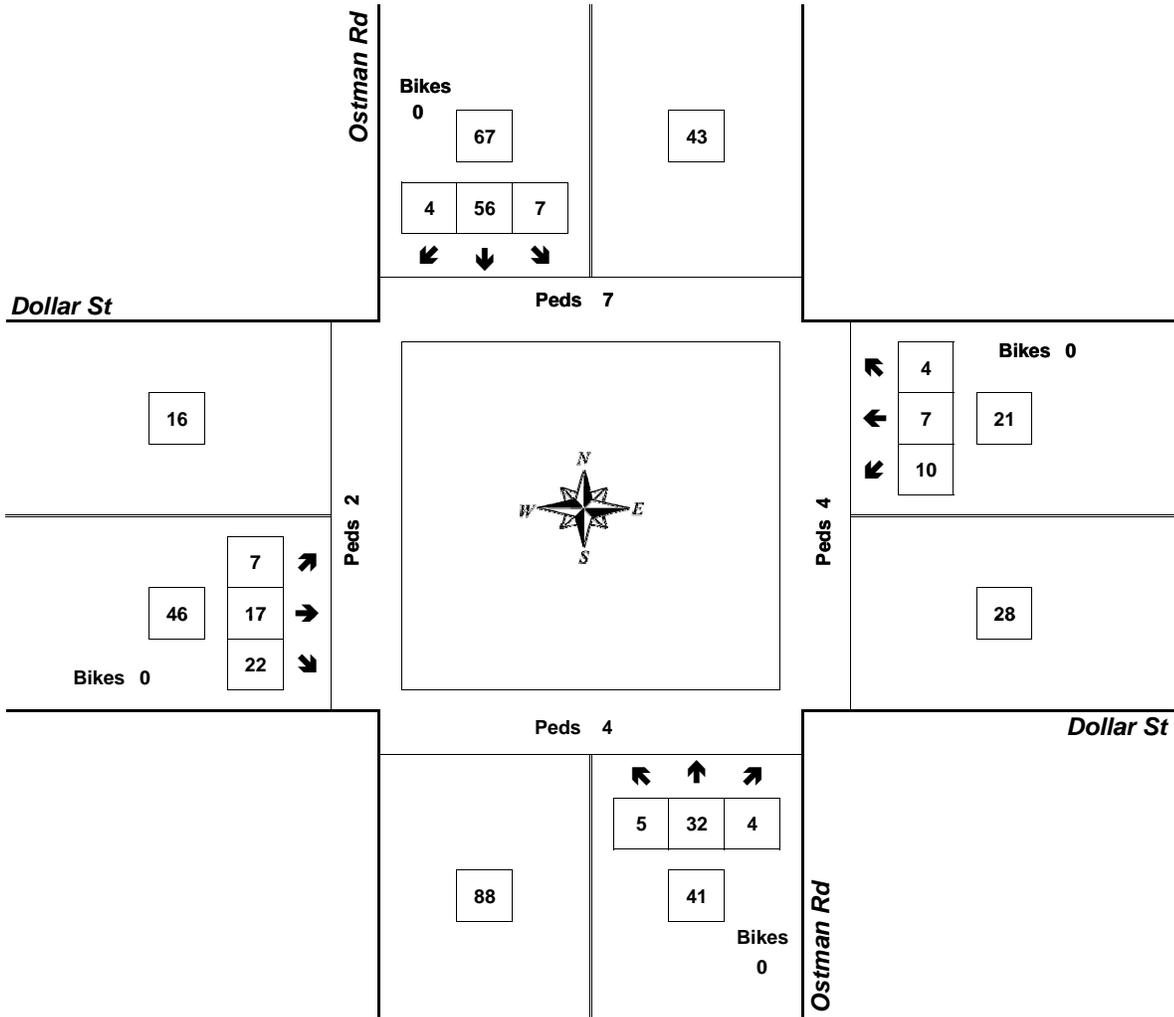
# Peak Hour Summary



Clay Carney  
(503) 833-2740

## Ostman Rd & Dollar St

8:00 AM to 9:00 AM  
Thursday, May 16, 2019



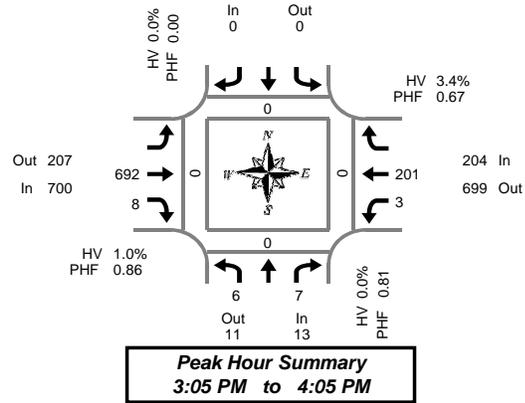
Approach	PHF	HV%	Volume
EB	0.72	4.3%	46
WB	0.66	4.8%	21
NB	0.60	4.9%	41
SB	0.67	4.5%	67
<b>Intersection</b>	<b>0.81</b>	<b>4.6%</b>	<b>175</b>

Count Period: 8:00 AM to 10:00 AM

# Total Vehicle Summary



Clay Carney  
(503) 833-2740



## Fields Bridge Park & Willamette Falls Dr

Thursday, May 16, 2019  
3:00 PM to 5:00 PM

### 5-Minute Interval Summary 3:00 PM to 5:00 PM

Interval Start Time	Northbound Fields Bridge Park			Southbound Fields Bridge Park			Eastbound Willamette Falls Dr			Westbound Willamette Falls Dr			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
3:00 PM	0	0	0			0	44	1	2	0	15	0	60	0	0	0	0
3:05 PM	0	0	0			0	53	0	0	0	5	0	58	0	0	0	0
3:10 PM	0	2	2			0	50	1	0	1	14	0	68	0	0	0	0
3:15 PM	1	0	0			0	62	0	0	1	14	0	78	0	0	0	0
3:20 PM	1	0	0			0	55	1	0	1	20	0	78	0	0	0	0
3:25 PM	0	0	0			0	61	2	0	0	20	0	83	0	0	0	0
3:30 PM	0	1	0			0	52	0	0	0	16	0	69	0	0	0	0
3:35 PM	3	0	0			0	46	1	0	0	30	0	80	0	0	0	0
3:40 PM	0	0	0			0	53	2	0	0	19	0	74	0	0	0	0
3:45 PM	0	1	0			0	57	1	0	0	27	0	86	0	0	0	0
3:50 PM	0	1	0			0	59	0	0	0	12	0	72	0	0	0	0
3:55 PM	0	2	0			0	77	0	0	0	10	0	89	0	0	0	0
4:00 PM	1	0	0			0	67	0	1	0	14	0	82	0	0	0	0
4:05 PM	0	0	0			0	43	0	0	0	7	0	50	0	0	0	0
4:10 PM	0	1	0			0	62	0	0	1	11	0	75	0	0	0	0
4:15 PM	1	1	0			0	54	3	0	0	13	0	72	0	0	0	0
4:20 PM	0	1	0			0	62	2	0	0	11	0	76	0	0	0	0
4:25 PM	0	2	0			0	49	0	0	2	16	0	69	0	0	0	0
4:30 PM	0	0	0			0	60	0	0	1	9	0	70	0	0	0	0
4:35 PM	1	1	0			0	40	3	0	1	15	0	61	0	0	0	0
4:40 PM	0	0	0			0	56	0	0	0	19	0	75	0	0	0	0
4:45 PM	0	1	0			0	51	1	0	2	13	0	68	0	0	0	0
4:50 PM	0	2	0			0	65	2	0	2	14	0	85	0	0	0	0
4:55 PM	1	1	0			0	53	1	0	3	13	0	72	0	0	0	0
Total Survey	9	17	2			0	1,331	21	3	15	357	0	1,750	0	0	0	0

### 15-Minute Interval Summary 3:00 PM to 5:00 PM

Interval Start Time	Northbound Fields Bridge Park			Southbound Fields Bridge Park			Eastbound Willamette Falls Dr			Westbound Willamette Falls Dr			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
3:00 PM	0	2	2			0	147	2	2	1	34	0	186	0	0	0	0
3:15 PM	2	0	0			0	178	3	0	2	54	0	239	0	0	0	0
3:30 PM	3	1	0			0	151	3	0	0	65	0	223	0	0	0	0
3:45 PM	0	4	0			0	193	1	0	0	49	0	247	0	0	0	0
4:00 PM	1	1	0			0	172	0	1	1	32	0	207	0	0	0	0
4:15 PM	1	4	0			0	165	5	0	2	40	0	217	0	0	0	0
4:30 PM	1	1	0			0	156	3	0	2	43	0	206	0	0	0	0
4:45 PM	1	4	0			0	169	4	0	7	40	0	225	0	0	0	0
Total Survey	9	17	2			0	1,331	21	3	15	357	0	1,750	0	0	0	0

### Peak Hour Summary 3:05 PM to 4:05 PM

By Approach	Northbound Fields Bridge Park			Southbound Fields Bridge Park			Eastbound Willamette Falls Dr			Westbound Willamette Falls Dr			Total	Pedestrians Crosswalk						
	In	Out	Total		North	South	East	West												
Volume	13	11	24	2	0	0	0	700	207	907	1	204	699	903	0	917	0	0	0	0
%HV	0.0%			0.0%			1.0%			3.4%			1.5%							
PHF	0.81			0.00			0.86			0.67			0.93							

By Movement	Northbound Fields Bridge Park			Southbound Fields Bridge Park			Eastbound Willamette Falls Dr			Westbound Willamette Falls Dr			Total				
	L	R	Total			Total	T	R	Total	L	T	Total					
Volume	6	7	13			0	692	8	700	3	201	204	917				
%HV	0.0%	NA	0.0%	0.0%	NA	NA	NA	0.0%	NA	1.0%	0.0%	1.0%	0.0%	3.5%	NA	3.4%	1.5%
PHF	0.50		0.44	0.81		0.00	0.85	0.50	0.86	0.25	0.66	0.67	0.93				

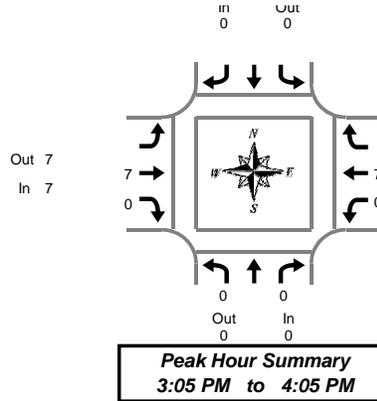
### Rolling Hour Summary 3:00 PM to 5:00 PM

Interval Start Time	Northbound Fields Bridge Park			Southbound Fields Bridge Park			Eastbound Willamette Falls Dr			Westbound Willamette Falls Dr			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
3:00 PM	5	7	2			0	669	9	2	3	202	0	895	0	0	0	0
3:15 PM	6	6	0			0	694	7	1	3	200	0	916	0	0	0	0
3:30 PM	5	10	0			0	681	9	1	3	186	0	894	0	0	0	0
3:45 PM	3	10	0			0	686	9	1	5	164	0	877	0	0	0	0
4:00 PM	4	10	0			0	662	12	1	12	155	0	855	0	0	0	0

# Heavy Vehicle Summary



Clay Carney  
(503) 833-2740



## Fields Bridge Park & Willamette Falls Dr

Thursday, May 16, 2019  
3:00 PM to 5:00 PM

### Heavy Vehicle 5-Minute Interval Summary 3:00 PM to 5:00 PM

Interval Start Time	Northbound Fields Bridge Park			Southbound Fields Bridge Park			Eastbound Willamette Falls Dr			Westbound Willamette Falls Dr			Interval Total		
	L	R	Total			Total	T	R	Total	L	T	Total			
3:00 PM	0	0	0			0			0	0	0	0	0		
3:05 PM	0	0	0			0			0	0	0	0	0		
3:10 PM	0	0	0			0			0	0	0	0	0		
3:15 PM	0	0	0			0			0	0	0	1	1		
3:20 PM	0	0	0			0			0	0	0	0	0		
3:25 PM	0	0	0			0			1	0	1	0	2		
3:30 PM	0	0	0			0			0	0	0	0	0		
3:35 PM	0	0	0			0			0	0	0	1	1		
3:40 PM	0	0	0			0			1	0	1	0	3		
3:45 PM	0	0	0			0			0	0	0	1	1		
3:50 PM	0	0	0			0			3	0	3	0	3		
3:55 PM	0	0	0			0			1	0	1	0	1		
4:00 PM	0	0	0			0			1	0	1	0	1		
4:05 PM	0	0	0			0			8	0	8	0	8		
4:10 PM	0	0	0			0			3	0	3	0	3		
4:15 PM	1	0	1			0			0	1	1	0	2		
4:20 PM	0	0	0			0			0	0	0	1	1		
4:25 PM	0	0	0			0			1	0	1	0	2		
4:30 PM	0	0	0			0			2	0	2	0	4		
4:35 PM	0	0	0			0			1	0	1	0	1		
4:40 PM	0	0	0			0			0	0	0	0	0		
4:45 PM	0	0	0			0			0	0	0	0	0		
4:50 PM	0	0	0			0			0	0	0	0	0		
4:55 PM	0	0	0			0			0	0	0	0	0		
Total Survey	1	0	1			0			22	1	23	0	11	11	35

### Heavy Vehicle 15-Minute Interval Summary 3:00 PM to 5:00 PM

Interval Start Time	Northbound Fields Bridge Park			Southbound Fields Bridge Park			Eastbound Willamette Falls Dr			Westbound Willamette Falls Dr			Interval Total		
	L	R	Total			Total	T	R	Total	L	T	Total			
3:00 PM	0	0	0			0			0	0	0	0	0		
3:15 PM	0	0	0			0			1	0	1	0	2		
3:30 PM	0	0	0			0			1	0	1	0	4		
3:45 PM	0	0	0			0			4	0	4	0	5		
4:00 PM	0	0	0			0			12	0	12	0	0		
4:15 PM	1	0	1			0			1	1	2	0	2		
4:30 PM	0	0	0			0			3	0	3	0	2		
4:45 PM	0	0	0			0			0	0	0	0	0		
Total Survey	1	0	1			0			22	1	23	0	11	11	35

### Heavy Vehicle Peak Hour Summary 3:05 PM to 4:05 PM

By Approach	Northbound Fields Bridge Park			Southbound Fields Bridge Park			Eastbound Willamette Falls Dr			Westbound Willamette Falls Dr			Total
	In	Out	Total										
Volume	0	0	0	0	0	0	7	7	14	7	7	14	14
PHF	0.00			0.00			0.35			0.35			0.44

By Movement	Northbound Fields Bridge Park			Southbound Fields Bridge Park			Eastbound Willamette Falls Dr			Westbound Willamette Falls Dr			Total		
	L	R	Total			Total	T	R	Total	L	T	Total			
Volume	0	0	0			0			7	0	7	0	7	14	
PHF	0.00	0.00	0.00			0.00			0.35	0.00	0.35	0.00	0.35	0.35	0.44

### Heavy Vehicle Rolling Hour Summary 3:00 PM to 5:00 PM

Interval Start Time	Northbound Fields Bridge Park			Southbound Fields Bridge Park			Eastbound Willamette Falls Dr			Westbound Willamette Falls Dr			Interval Total	
	L	R	Total			Total	T	R	Total	L	T	Total		
3:00 PM	0	0	0			0			6	0	6	0	7	13
3:15 PM	0	0	0			0			18	0	18	0	7	25
3:30 PM	1	0	1			0			18	1	19	0	7	27
3:45 PM	1	0	1			0			20	1	21	0	5	27
4:00 PM	1	0	1			0			16	1	17	0	4	22

# Peak Hour Summary



Clay Carney  
(503) 833-2740

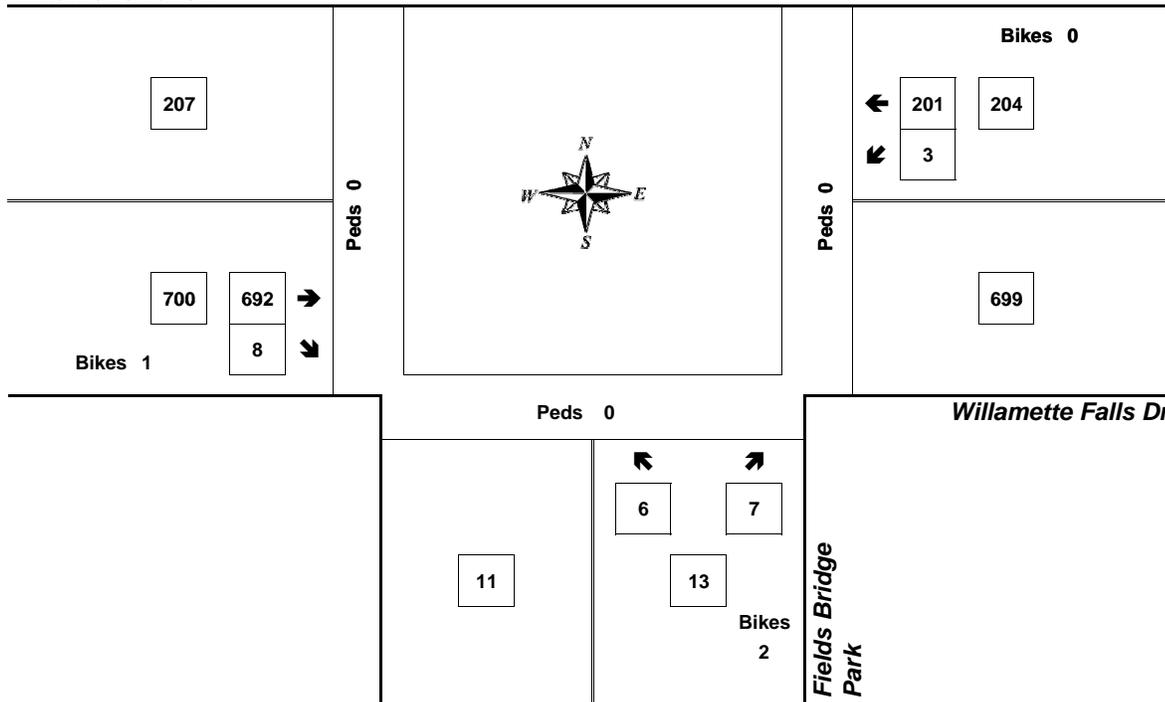
## Fields Bridge Park & Willamette Falls Dr

3:05 PM to 4:05 PM  
Thursday, May 16, 2019

Bikes  
0

**Willamette Falls Dr**

Peds 0



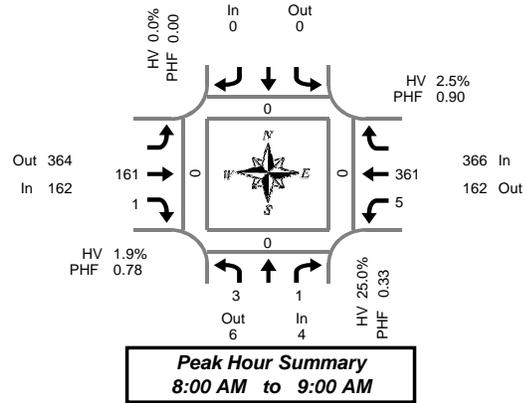
Approach	PHF	HV%	Volume
EB	0.86	1.0%	700
WB	0.67	3.4%	204
NB	0.81	0.0%	13
SB	0.00	0.0%	0
<b>Intersection</b>	<b>0.93</b>	<b>1.5%</b>	<b>917</b>

Count Period: 3:00 PM to 5:00 PM

# Total Vehicle Summary



Clay Carney  
(503) 833-2740



## Fields Bridge Park & Willamette Falls Dr

Thursday, May 16, 2019  
8:00 AM to 10:00 AM

### 5-Minute Interval Summary 8:00 AM to 10:00 AM

Interval Start Time	Northbound Fields Bridge Park			Southbound Fields Bridge Park			Eastbound Willamette Falls Dr			Westbound Willamette Falls Dr			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
8:00 AM	0	0	0			0	18	0	0	1	39	0	58	0	0	0	0
8:05 AM	1	0	0			0	17	0	0	1	27	0	46	0	0	0	0
8:10 AM	0	0	0			0	17	0	0	1	29	0	47	0	0	0	0
8:15 AM	1	1	0			0	12	0	0	0	21	0	35	0	0	0	0
8:20 AM	0	0	0			0	8	0	0	0	27	0	35	0	0	0	0
8:25 AM	0	0	0			0	16	0	0	0	29	0	45	0	0	0	0
8:30 AM	0	0	0			0	5	0	0	1	30	0	36	0	0	0	0
8:35 AM	0	0	0			0	14	0	0	0	35	0	49	0	0	0	0
8:40 AM	1	0	0			0	15	0	0	0	36	0	52	0	0	0	0
8:45 AM	0	0	0			0	6	0	0	0	31	0	37	0	0	0	0
8:50 AM	0	0	0			0	13	1	0	0	24	0	38	0	0	0	0
8:55 AM	0	0	0			0	20	0	0	1	33	0	54	0	0	0	0
9:00 AM	0	0	0			0	16	1	0	0	21	0	38	0	0	0	0
9:05 AM	1	0	0			0	17	0	0	0	23	0	41	0	0	0	0
9:10 AM	0	1	0			0	20	1	0	0	16	0	38	0	0	0	0
9:15 AM	0	0	0			0	8	0	0	1	23	0	32	0	0	0	0
9:20 AM	0	0	0			0	12	0	0	0	19	0	31	0	0	0	0
9:25 AM	0	0	0			0	15	1	0	0	17	0	33	0	0	0	0
9:30 AM	0	1	0			0	11	2	0	0	10	0	24	0	0	0	0
9:35 AM	0	1	0			0	9	0	0	0	9	0	19	0	0	0	0
9:40 AM	0	0	0			0	10	0	0	0	16	0	26	0	0	0	0
9:45 AM	0	1	0			0	12	0	0	0	11	1	24	0	0	0	0
9:50 AM	1	0	0			0	7	0	0	0	15	0	23	0	0	0	0
9:55 AM	0	0	0			0	13	0	0	0	8	0	21	0	0	0	0
Total Survey	5	5	0			0	311	6	0	6	549	1	882	0	0	0	0

### 15-Minute Interval Summary 8:00 AM to 10:00 AM

Interval Start Time	Northbound Fields Bridge Park			Southbound Fields Bridge Park			Eastbound Willamette Falls Dr			Westbound Willamette Falls Dr			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
8:00 AM	1	0	0			0	52	0	0	3	95	0	151	0	0	0	0
8:15 AM	1	1	0			0	36	0	0	0	77	0	115	0	0	0	0
8:30 AM	1	0	0			0	34	0	0	1	101	0	137	0	0	0	0
8:45 AM	0	0	0			0	39	1	0	1	88	0	129	0	0	0	0
9:00 AM	1	1	0			0	53	2	0	0	60	0	117	0	0	0	0
9:15 AM	0	0	0			0	35	1	0	1	59	0	96	0	0	0	0
9:30 AM	0	2	0			0	30	2	0	0	35	0	69	0	0	0	0
9:45 AM	1	1	0			0	32	0	0	0	34	1	68	0	0	0	0
Total Survey	5	5	0			0	311	6	0	6	549	1	882	0	0	0	0

### Peak Hour Summary 8:00 AM to 9:00 AM

By Approach	Northbound Fields Bridge Park			Southbound Fields Bridge Park			Eastbound Willamette Falls Dr			Westbound Willamette Falls Dr			Total	Pedestrians Crosswalk					
	In	Out	Total		Bikes	North	South	East	West										
Volume	4	6	10	0	0	0	162	364	526	0	366	162	528	0	532	0	0	0	0
%HV	25.0%			0.0%			1.9%			2.5%				2.4%					
PHF	0.33			0.00			0.78			0.90			0.88						

By Movement	Northbound Fields Bridge Park			Southbound Fields Bridge Park			Eastbound Willamette Falls Dr			Westbound Willamette Falls Dr			Total				
	L	R	Total			Total	T	R	Total	L	T	Total					
Volume	3	1	4			0	161	1	162	5	361	366	532				
%HV	33.3%	NA	0.0%	25.0%	NA	NA	NA	0.0%	NA	1.9%	0.0%	1.9%	0.0%	2.5%	NA	2.5%	2.4%
PHF	0.38		0.25	0.33		0.00	0.77	0.25	0.78	0.42	0.88	0.90	0.88				

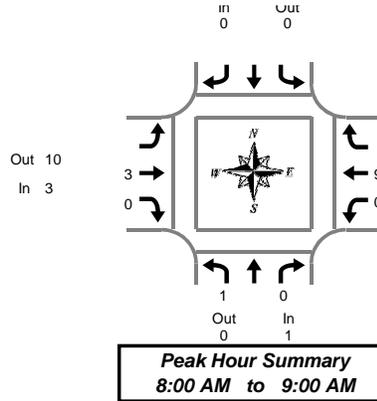
### Rolling Hour Summary 8:00 AM to 10:00 AM

Interval Start Time	Northbound Fields Bridge Park			Southbound Fields Bridge Park			Eastbound Willamette Falls Dr			Westbound Willamette Falls Dr			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
8:00 AM	3	1	0			0	161	1	0	5	361	0	532	0	0	0	0
8:15 AM	3	2	0			0	162	3	0	2	326	0	498	0	0	0	0
8:30 AM	2	1	0			0	161	4	0	3	308	0	479	0	0	0	0
8:45 AM	1	3	0			0	157	6	0	2	242	0	411	0	0	0	0
9:00 AM	2	4	0			0	150	5	0	1	188	1	350	0	0	0	0

# Heavy Vehicle Summary



Clay Carney  
(503) 833-2740



## Fields Bridge Park & Willamette Falls Dr

Thursday, May 16, 2019  
8:00 AM to 10:00 AM

### Heavy Vehicle 5-Minute Interval Summary 8:00 AM to 10:00 AM

Interval Start Time	Northbound Fields Bridge Park			Southbound Fields Bridge Park			Eastbound Willamette Falls Dr			Westbound Willamette Falls Dr			Interval Total	
	L	R	Total			Total	T	R	Total	L	T	Total		
8:00 AM	0	0	0			0	1	0	1	0	0	0	0	1
8:05 AM	0	0	0			0	0	0	0	0	0	0	0	0
8:10 AM	0	0	0			0	0	0	0	0	0	0	0	0
8:15 AM	1	0	1			0	0	0	0	0	0	0	0	1
8:20 AM	0	0	0			0	1	0	1	0	1	1	1	2
8:25 AM	0	0	0			0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0			0	0	0	0	0	0	0	0	0
8:35 AM	0	0	0			0	0	0	0	0	0	0	0	0
8:40 AM	0	0	0			0	1	0	1	0	1	1	1	2
8:45 AM	0	0	0			0	0	0	0	0	3	3	3	3
8:50 AM	0	0	0			0	0	0	0	0	3	3	3	3
8:55 AM	0	0	0			0	0	0	0	0	1	1	1	1
9:00 AM	0	0	0			0	0	0	0	0	1	1	1	1
9:05 AM	0	0	0			0	0	0	0	0	1	1	1	1
9:10 AM	0	0	0			0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0			0	0	0	0	0	0	0	0	0
9:20 AM	0	0	0			0	0	0	0	0	0	0	0	0
9:25 AM	0	0	0			0	1	0	1	0	0	0	0	1
9:30 AM	0	0	0			0	0	1	1	0	0	0	0	1
9:35 AM	0	1	1			0	1	0	1	0	0	0	0	2
9:40 AM	0	0	0			0	0	0	0	0	1	1	1	1
9:45 AM	0	0	0			0	0	0	0	0	0	0	0	0
9:50 AM	0	0	0			0	0	0	0	0	0	0	0	0
9:55 AM	0	0	0			0	1	0	1	0	0	0	0	1
Total Survey	1	1	2			0	6	1	7	0	12	12	21	21

### Heavy Vehicle 15-Minute Interval Summary 8:00 AM to 10:00 AM

Interval Start Time	Northbound Fields Bridge Park			Southbound Fields Bridge Park			Eastbound Willamette Falls Dr			Westbound Willamette Falls Dr			Interval Total	
	L	R	Total			Total	T	R	Total	L	T	Total		
8:00 AM	0	0	0			0	1	0	1	0	0	0	0	1
8:15 AM	1	0	1			0	1	0	1	0	1	1	1	3
8:30 AM	0	0	0			0	1	0	1	0	1	1	1	2
8:45 AM	0	0	0			0	0	0	0	0	7	7	7	7
9:00 AM	0	0	0			0	0	0	0	0	2	2	2	2
9:15 AM	0	0	0			0	1	0	1	0	0	0	0	1
9:30 AM	0	1	1			0	1	1	2	0	1	1	1	4
9:45 AM	0	0	0			0	1	0	1	0	0	0	0	1
Total Survey	1	1	2			0	6	1	7	0	12	12	21	21

### Heavy Vehicle Peak Hour Summary 8:00 AM to 9:00 AM

By Approach	Northbound Fields Bridge Park			Southbound Fields Bridge Park			Eastbound Willamette Falls Dr			Westbound Willamette Falls Dr			Total
	In	Out	Total										
Volume	1	0	1	0	0	0	3	10	13	9	3	12	13
PHF	0.25			0.00			0.75			0.32			0.41

By Movement	Northbound Fields Bridge Park			Southbound Fields Bridge Park			Eastbound Willamette Falls Dr			Westbound Willamette Falls Dr			Total
	L	R	Total			Total	T	R	Total	L	T	Total	
Volume	1	0	1			0	3	0	3	0	9	9	13
PHF	0.25	0.00	0.25			0.00	0.75	0.00	0.75	0.00	0.32	0.32	0.41

### Heavy Vehicle Rolling Hour Summary 8:00 AM to 10:00 AM

Interval Start Time	Northbound Fields Bridge Park			Southbound Fields Bridge Park			Eastbound Willamette Falls Dr			Westbound Willamette Falls Dr			Interval Total
	L	R	Total			Total	T	R	Total	L	T	Total	
8:00 AM	1	0	1			0	3	0	3	0	9	9	13
8:15 AM	1	0	1			0	2	0	2	0	11	11	14
8:30 AM	0	0	0			0	2	0	2	0	10	10	12
8:45 AM	0	1	1			0	2	1	3	0	10	10	14
9:00 AM	0	1	1			0	3	1	4	0	3	3	8

# Peak Hour Summary



Clay Carney  
(503) 833-2740

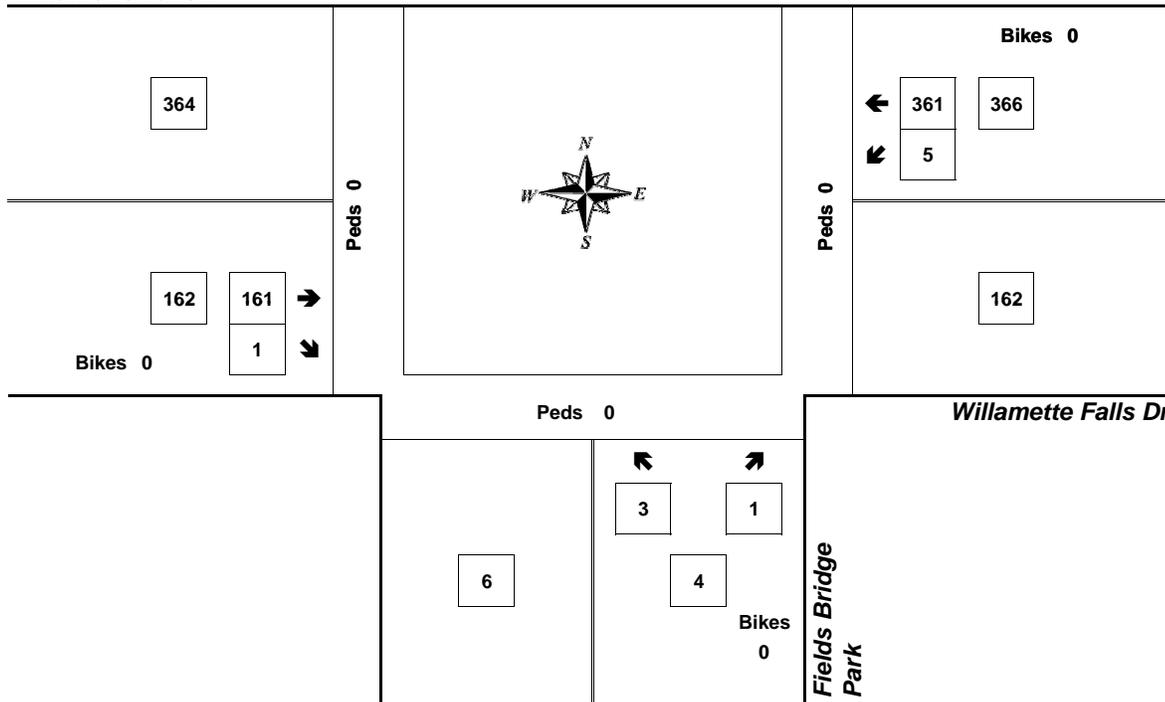
## Fields Bridge Park & Willamette Falls Dr

8:00 AM to 9:00 AM  
Thursday, May 16, 2019

Bikes  
0

**Willamette Falls Dr**

Peds 0



Approach	PHF	HV%	Volume
EB	0.78	1.9%	162
WB	0.90	2.5%	366
NB	0.33	25.0%	4
SB	0.00	0.0%	0
<b>Intersection</b>	<b>0.88</b>	<b>2.4%</b>	<b>532</b>

Count Period: 8:00 AM to 10:00 AM

**APPENDIX B**

**HCM REPORT – EXISTING CONDITIONS**

## **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<sup>1</sup>. The following two sections provide interpretations of the analysis approaches.

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<sup>1</sup> *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	
	$v/c \leq 1.0$	$v/c > 1.0$
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

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	164	3	2	330	3	2
Future Vol, veh/h	164	3	2	330	3	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	1	0	0	3	33	0
Mvmt Flow	182	3	2	367	3	2

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	185	0	555
Stage 1	-	-	-	-	184
Stage 2	-	-	-	-	371
Critical Hdwy	-	-	4.1	-	6.73
Critical Hdwy Stg 1	-	-	-	-	5.73
Critical Hdwy Stg 2	-	-	-	-	5.73
Follow-up Hdwy	-	-	2.2	-	3.797
Pot Cap-1 Maneuver	-	-	1402	-	444
Stage 1	-	-	-	-	778
Stage 2	-	-	-	-	635
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1402	-	443
Mov Cap-2 Maneuver	-	-	-	-	443
Stage 1	-	-	-	-	776
Stage 2	-	-	-	-	635

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	550	-	-	1402	-
HCM Lane V/C Ratio	0.01	-	-	0.002	-
HCM Control Delay (s)	11.6	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Intersection Delay, s/veh	9.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	38	129	2	2	248	8	5	1	3	15	3	79
Future Vol, veh/h	38	129	2	2	248	8	5	1	3	15	3	79
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	3	0	0	4	12	20	0	0	13	0	4
Mvmt Flow	43	145	2	2	279	9	6	1	3	17	3	89
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9	9.8	8.5	8.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	56%	22%	1%	15%
Vol Thru, %	11%	76%	96%	3%
Vol Right, %	33%	1%	3%	81%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	9	169	258	97
LT Vol	5	38	2	15
Through Vol	1	129	248	3
RT Vol	3	2	8	79
Lane Flow Rate	10	190	290	109
Geometry Grp	1	1	1	1
Degree of Util (X)	0.015	0.239	0.353	0.144
Departure Headway (Hd)	5.378	4.538	4.383	4.744
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	664	792	820	755
Service Time	3.425	2.567	2.409	2.78
HCM Lane V/C Ratio	0.015	0.24	0.354	0.144
HCM Control Delay	8.5	9	9.8	8.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0	0.9	1.6	0.5

Intersection

Intersection Delay, s/veh 7.5  
Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Traffic Vol, veh/h	5	11	19	11	9	5	6	31	4	4	55	5
Future Vol, veh/h	5	11	19	11	9	5	6	31	4	4	55	5
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	0	0	5	0	11	0	0	3	0	0	6	0
Mvmt Flow	6	13	22	13	10	6	7	36	5	5	64	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	7.1	7.3	7.4	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	15%	14%	44%	7%	0%
Vol Thru, %	76%	31%	36%	93%	0%
Vol Right, %	10%	54%	20%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	41	35	25	59	5
LT Vol	6	5	11	4	0
Through Vol	31	11	9	55	0
RT Vol	4	19	5	0	5
Lane Flow Rate	48	41	29	69	6
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.055	0.043	0.033	0.089	0.007
Departure Headway (Hd)	4.148	3.832	4.106	4.68	4.047
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	858	919	859	764	882
Service Time	2.201	1.92	2.194	2.415	1.782
HCM Lane V/C Ratio	0.056	0.045	0.034	0.09	0.007
HCM Control Delay	7.4	7.1	7.3	7.9	6.8
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.2	0.1	0.1	0.3	0

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	689	9	3	188	5	10
Future Vol, veh/h	689	9	3	188	5	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	11	0	4	20	0
Mvmt Flow	766	10	3	209	6	11

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	776	0	986
Stage 1	-	-	-	-	771
Stage 2	-	-	-	-	215
Critical Hdwy	-	-	4.1	-	6.6
Critical Hdwy Stg 1	-	-	-	-	5.6
Critical Hdwy Stg 2	-	-	-	-	5.6
Follow-up Hdwy	-	-	2.2	-	3.68
Pot Cap-1 Maneuver	-	-	849	-	255
Stage 1	-	-	-	-	426
Stage 2	-	-	-	-	780
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	849	-	254
Mov Cap-2 Maneuver	-	-	-	-	254
Stage 1	-	-	-	-	424
Stage 2	-	-	-	-	780

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	16.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	337	-	-	849	-
HCM Lane V/C Ratio	0.049	-	-	0.004	-
HCM Control Delay (s)	16.2	-	-	9.3	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Intersection Delay, s/veh	28.4
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	135	536	4	4	140	8	6	2	4	17	3	61
Future Vol, veh/h	135	536	4	4	140	8	6	2	4	17	3	61
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	5	3	0	25	5	25	50	0	25	12	0	2
Mvmt Flow	145	576	4	4	151	9	6	2	4	18	3	66
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	35	10.2	10.2	9.8
HCM LOS	D	B	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	50%	20%	3%	21%
Vol Thru, %	17%	79%	92%	4%
Vol Right, %	33%	1%	5%	75%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	12	675	152	81
LT Vol	6	135	4	17
Through Vol	2	536	140	3
RT Vol	4	4	8	61
Lane Flow Rate	13	726	163	87
Geometry Grp	1	1	1	1
Degree of Util (X)	0.025	0.91	0.244	0.139
Departure Headway (Hd)	6.99	4.516	5.375	5.742
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	515	798	664	618
Service Time	4.99	2.563	3.448	3.837
HCM Lane V/C Ratio	0.025	0.91	0.245	0.141
HCM Control Delay	10.2	35	10.2	9.8
HCM Lane LOS	B	D	B	A
HCM 95th-tile Q	0.1	12.6	1	0.5

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Traffic Vol, veh/h	7	15	13	10	13	11	15	117	9	8	59	16
Future Vol, veh/h	7	15	13	10	13	11	15	117	9	8	59	16
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles, %	0	13	8	0	0	9	13	3	11	0	3	0
Mvmt Flow	8	18	15	12	15	13	18	139	11	10	70	19
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	7.6	7.7	8.7	8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	11%	20%	29%	12%	0%
Vol Thru, %	83%	43%	38%	88%	0%
Vol Right, %	6%	37%	32%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	141	35	34	67	16
LT Vol	15	7	10	8	0
Through Vol	117	15	13	59	0
RT Vol	9	13	11	0	16
Lane Flow Rate	168	42	40	80	19
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.206	0.051	0.05	0.106	0.022
Departure Headway (Hd)	4.422	4.39	4.439	4.791	4.08
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	801	820	811	739	863
Service Time	2.511	2.392	2.441	2.583	1.872
HCM Lane V/C Ratio	0.21	0.051	0.049	0.108	0.022
HCM Control Delay	8.7	7.6	7.7	8.2	7
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.8	0.2	0.2	0.4	0.1

## **APPENDIX C**

### **HCM REPORT – NO BUILD CONDITIONS**

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	169	3	2	341	3	2
Future Vol, veh/h	169	3	2	341	3	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	1	0	0	3	33	0
Mvmt Flow	188	3	2	379	3	2

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	191	0	573
Stage 1	-	-	-	-	190
Stage 2	-	-	-	-	383
Critical Hdwy	-	-	4.1	-	6.73
Critical Hdwy Stg 1	-	-	-	-	5.73
Critical Hdwy Stg 2	-	-	-	-	5.73
Follow-up Hdwy	-	-	2.2	-	3.797
Pot Cap-1 Maneuver	-	-	1395	-	433
Stage 1	-	-	-	-	773
Stage 2	-	-	-	-	626
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1395	-	432
Mov Cap-2 Maneuver	-	-	-	-	432
Stage 1	-	-	-	-	771
Stage 2	-	-	-	-	626

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	539	-	-	1395	-
HCM Lane V/C Ratio	0.01	-	-	0.002	-
HCM Control Delay (s)	11.7	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Intersection Delay, s/veh	9.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	40	134	2	2	256	8	5	1	3	16	3	82
Future Vol, veh/h	40	134	2	2	256	8	5	1	3	16	3	82
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	3	0	0	4	12	20	0	0	13	0	4
Mvmt Flow	45	151	2	2	288	9	6	1	3	18	3	92
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.1	10	8.6	8.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	56%	23%	1%	16%
Vol Thru, %	11%	76%	96%	3%
Vol Right, %	33%	1%	3%	81%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	9	176	266	101
LT Vol	5	40	2	16
Through Vol	1	134	256	3
RT Vol	3	2	8	82
Lane Flow Rate	10	198	299	113
Geometry Grp	1	1	1	1
Degree of Util (X)	0.015	0.251	0.366	0.151
Departure Headway (Hd)	5.426	4.562	4.405	4.785
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	657	787	816	748
Service Time	3.48	2.595	2.435	2.827
HCM Lane V/C Ratio	0.015	0.252	0.366	0.151
HCM Control Delay	8.6	9.1	10	8.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0	1	1.7	0.5

**Intersection**

Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Traffic Vol, veh/h	5	12	20	12	9	5	6	32	4	4	56	5
Future Vol, veh/h	5	12	20	12	9	5	6	32	4	4	56	5
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	0	0	5	0	11	0	0	3	0	0	6	0
Mvmt Flow	6	14	23	14	10	6	7	37	5	5	65	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	7.1	7.4	7.5	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	14%	14%	46%	7%	0%
Vol Thru, %	76%	32%	35%	93%	0%
Vol Right, %	10%	54%	19%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	42	37	26	60	5
LT Vol	6	5	12	4	0
Through Vol	32	12	9	56	0
RT Vol	4	20	5	0	5
Lane Flow Rate	49	43	30	70	6
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.056	0.046	0.035	0.091	0.007
Departure Headway (Hd)	4.156	3.837	4.121	4.686	4.054
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	855	917	855	763	880
Service Time	2.214	1.927	2.212	2.425	1.793
HCM Lane V/C Ratio	0.057	0.047	0.035	0.092	0.007
HCM Control Delay	7.5	7.1	7.4	7.9	6.8
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.2	0.1	0.1	0.3	0

**Intersection**

Int Delay, s/veh 0.3

**Movement** EBT EBR WBL WBT NBL NBR

Lane Configurations						
Traffic Vol, veh/h	712	9	3	195	5	10
Future Vol, veh/h	712	9	3	195	5	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	11	0	4	20	0
Mvmt Flow	791	10	3	217	6	11

**Major/Minor** Major1 Major2 Minor1

Conflicting Flow All	0	0	801	0	1019	796
Stage 1	-	-	-	-	796	-
Stage 2	-	-	-	-	223	-
Critical Hdwy	-	-	4.1	-	6.6	6.2
Critical Hdwy Stg 1	-	-	-	-	5.6	-
Critical Hdwy Stg 2	-	-	-	-	5.6	-
Follow-up Hdwy	-	-	2.2	-	3.68	3.3
Pot Cap-1 Maneuver	-	-	831	-	243	390
Stage 1	-	-	-	-	414	-
Stage 2	-	-	-	-	773	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	831	-	242	390
Mov Cap-2 Maneuver	-	-	-	-	242	-
Stage 1	-	-	-	-	412	-
Stage 2	-	-	-	-	773	-

**Approach** EB WB NB

HCM Control Delay, s	0	0.1	16.7
HCM LOS			C

**Minor Lane/Major Mvmt** NBLn1 EBT EBR WBL WBT

Capacity (veh/h)	324	-	-	831	-
HCM Lane V/C Ratio	0.051	-	-	0.004	-
HCM Control Delay (s)	16.7	-	-	9.3	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Intersection Delay, s/veh	32.7
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	139	554	4	4	144	8	6	2	4	18	3	63
Future Vol, veh/h	139	554	4	4	144	8	6	2	4	18	3	63
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	5	3	0	25	5	25	50	0	25	12	0	2
Mvmt Flow	149	596	4	4	155	9	6	2	4	19	3	68
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	40.9	10.3	10.3	9.9
HCM LOS	E	B	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	50%	20%	3%	21%
Vol Thru, %	17%	79%	92%	4%
Vol Right, %	33%	1%	5%	75%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	12	697	156	84
LT Vol	6	139	4	18
Through Vol	2	554	144	3
RT Vol	4	4	8	63
Lane Flow Rate	13	749	168	90
Geometry Grp	1	1	1	1
Degree of Util (X)	0.025	0.944	0.252	0.148
Departure Headway (Hd)	7.078	4.535	5.417	5.912
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	509	794	658	611
Service Time	5.081	2.588	3.501	3.912
HCM Lane V/C Ratio	0.026	0.943	0.255	0.147
HCM Control Delay	10.3	40.9	10.3	9.9
HCM Lane LOS	B	E	B	A
HCM 95th-tile Q	0.1	14.1	1	0.5

**Intersection**

Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Traffic Vol, veh/h	7	16	14	10	14	12	16	121	9	8	61	17
Future Vol, veh/h	7	16	14	10	14	12	16	121	9	8	61	17
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles, %	0	13	8	0	0	9	13	3	11	0	3	0
Mvmt Flow	8	19	17	12	17	14	19	144	11	10	73	20
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	7.7	7.7	8.8	8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	11%	19%	28%	12%	0%
Vol Thru, %	83%	43%	39%	88%	0%
Vol Right, %	6%	38%	33%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	146	37	36	69	17
LT Vol	16	7	10	8	0
Through Vol	121	16	14	61	0
RT Vol	9	14	12	0	17
Lane Flow Rate	174	44	43	82	20
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.214	0.054	0.053	0.11	0.023
Departure Headway (Hd)	4.434	4.41	4.455	4.8	4.092
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	798	817	808	736	860
Service Time	2.53	2.412	2.458	2.599	1.889
HCM Lane V/C Ratio	0.218	0.054	0.053	0.111	0.023
HCM Control Delay	8.8	7.7	7.7	8.2	7
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.8	0.2	0.2	0.4	0.1

**APPENDIX D**

**HCM REPORT – BUILD CONDITIONS**

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	154	3	2	358	3	2
Future Vol, veh/h	154	3	2	358	3	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	1	0	0	3	33	0
Mvmt Flow	171	3	2	398	3	2

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	174	0	575
Stage 1	-	-	-	-	173
Stage 2	-	-	-	-	402
Critical Hdwy	-	-	4.1	-	6.73
Critical Hdwy Stg 1	-	-	-	-	5.73
Critical Hdwy Stg 2	-	-	-	-	5.73
Follow-up Hdwy	-	-	2.2	-	3.797
Pot Cap-1 Maneuver	-	-	1415	-	432
Stage 1	-	-	-	-	788
Stage 2	-	-	-	-	613
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1415	-	431
Mov Cap-2 Maneuver	-	-	-	-	431
Stage 1	-	-	-	-	788
Stage 2	-	-	-	-	612

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	541	-	-	1415	-
HCM Lane V/C Ratio	0.01	-	-	0.002	-
HCM Control Delay (s)	11.7	-	-	7.5	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Intersection Delay, s/veh	9.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	12	147	2	2	290	14	5	1	3	22	3	65
Future Vol, veh/h	12	147	2	2	290	14	5	1	3	22	3	65
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	3	0	0	4	12	20	0	0	13	0	4
Mvmt Flow	13	165	2	2	326	16	6	1	3	25	3	73
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.9	10.5	8.6	8.7
HCM LOS	A	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	56%	7%	1%	24%
Vol Thru, %	11%	91%	95%	3%
Vol Right, %	33%	1%	5%	72%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	9	161	306	90
LT Vol	5	12	2	22
Through Vol	1	147	290	3
RT Vol	3	2	14	65
Lane Flow Rate	10	181	344	101
Geometry Grp	1	1	1	1
Degree of Util (X)	0.015	0.229	0.416	0.138
Departure Headway (Hd)	5.467	4.549	4.352	4.909
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	652	789	829	729
Service Time	3.519	2.581	2.379	2.951
HCM Lane V/C Ratio	0.015	0.229	0.415	0.139
HCM Control Delay	8.6	8.9	10.5	8.7
HCM Lane LOS	A	A	B	A
HCM 95th-tile Q	0	0.9	2.1	0.5

**Intersection**

Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Traffic Vol, veh/h	17	17	29	10	16	5	15	3	2	4	37	19
Future Vol, veh/h	17	17	29	10	16	5	15	3	2	4	37	19
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	0	0	5	0	11	0	0	3	0	0	6	0
Mvmt Flow	20	20	34	12	19	6	17	3	2	5	43	22
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	7.3	7.3	7.5	7.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	75%	27%	32%	10%	0%
Vol Thru, %	15%	27%	52%	90%	0%
Vol Right, %	10%	46%	16%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	20	63	31	41	19
LT Vol	15	17	10	4	0
Through Vol	3	17	16	37	0
RT Vol	2	29	5	0	19
Lane Flow Rate	23	73	36	48	22
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.028	0.079	0.041	0.063	0.025
Departure Headway (Hd)	4.333	3.864	4.082	4.751	4.103
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	818	916	866	750	867
Service Time	2.401	1.934	2.158	2.501	1.852
HCM Lane V/C Ratio	0.028	0.08	0.042	0.064	0.025
HCM Control Delay	7.5	7.3	7.3	7.8	7
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0.3	0.1	0.2	0.1

# LANE SUMMARY

 Site: 101 [Future Build AM Peak]

Site Category: (None)  
Roundabout

Lane Use and Performance													
	Demand	Flows		Deg.	Lane	Average	Level of	95% Back of Queue		Lane	Lane	Cap.	Prob.
	Total	HV	Cap.	Satn	Util.	Delay	Service	Veh	Dist	Config	Length	Adj.	Block.
	veh/h	%	veh/h	v/c	%	sec			ft		ft	%	%
South: Park Driveway													
Lane 1 <sup>d</sup>	13	0.0	1083	0.012	100	3.4	LOS A	0.0	1.2	Full	1600	0.0	0.0
Approach	13	0.0		0.012		3.4	LOS A	0.0	1.2				
East: Willamette Falls Drive													
Lane 1 <sup>d</sup>	394	2.5	1247	0.316	100	5.8	LOS A	1.8	45.6	Full	1600	0.0	0.0
Approach	394	2.5		0.316		5.8	LOS A	1.8	45.6				
North: Dollar Middle School Driveway													
Lane 1 <sup>d</sup>	106	0.0	967	0.110	100	4.7	LOS A	0.5	11.9	Full	1600	0.0	0.0
Approach	106	0.0		0.110		4.7	LOS A	0.5	11.9				
West: Willamette Falls Drive													
Lane 1 <sup>d</sup>	194	0.6	1295	0.149	100	4.0	LOS A	0.7	18.1	Full	1600	0.0	0.0
Approach	194	0.6		0.149		4.0	LOS A	0.7	18.1				
Intersection	706	1.6		0.316		5.1	LOS A	1.8	45.6				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

<sup>d</sup> Dominant lane on roundabout approach

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Project: \\salfiles3\S-Drive\Projects\2020\P20079-000 (WLWV Dollar Middle School TIA)\Analysis\Willamette Falls Drive Mini RAB.sip8

**Intersection**

Int Delay, s/veh 3.5

**Movement** EBT EBR WBL WBT NBL NBR

Lane Configurations						
Traffic Vol, veh/h	46	0	33	17	0	17
Future Vol, veh/h	46	0	33	17	0	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	58	0	41	21	0	21

**Major/Minor** Major1 Major2 Minor1

Conflicting Flow All	0	0	58	0	161	58
Stage 1	-	-	-	-	58	-
Stage 2	-	-	-	-	103	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1559	-	835	1014
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	926	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1559	-	812	1014
Mov Cap-2 Maneuver	-	-	-	-	812	-
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	901	-

**Approach** EB WB NB

HCM Control Delay, s	0	4.9	8.6
HCM LOS			A

**Minor Lane/Major Mvmt** NBLn1 EBT EBR WBL WBT

Capacity (veh/h)	1014	-	-	1559	-
HCM Lane V/C Ratio	0.021	-	-	0.026	-
HCM Control Delay (s)	8.6	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	696	9	3	215	5	10
Future Vol, veh/h	696	9	3	215	5	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	11	0	4	20	0
Mvmt Flow	773	10	3	239	6	11

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	783	0	1023
Stage 1	-	-	-	-	778
Stage 2	-	-	-	-	245
Critical Hdwy	-	-	4.1	-	6.6
Critical Hdwy Stg 1	-	-	-	-	5.6
Critical Hdwy Stg 2	-	-	-	-	5.6
Follow-up Hdwy	-	-	2.2	-	3.68
Pot Cap-1 Maneuver	-	-	844	-	242
Stage 1	-	-	-	-	423
Stage 2	-	-	-	-	755
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	844	-	241
Mov Cap-2 Maneuver	-	-	-	-	241
Stage 1	-	-	-	-	421
Stage 2	-	-	-	-	755

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	16.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	328	-	-	844	-
HCM Lane V/C Ratio	0.051	-	-	0.004	-
HCM Control Delay (s)	16.6	-	-	9.3	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Intersection Delay, s/veh	30.5
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	113	564	4	4	169	14	6	2	4	24	3	59
Future Vol, veh/h	113	564	4	4	169	14	6	2	4	24	3	59
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	5	3	0	25	5	25	50	0	25	12	0	2
Mvmt Flow	122	606	4	4	182	15	6	2	4	26	3	63
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	38.9	10.8	10.3	10.1
HCM LOS	E	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	50%	17%	2%	28%
Vol Thru, %	17%	83%	90%	3%
Vol Right, %	33%	1%	7%	69%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	12	681	187	86
LT Vol	6	113	4	24
Through Vol	2	564	169	3
RT Vol	4	4	14	59
Lane Flow Rate	13	732	201	92
Geometry Grp	1	1	1	1
Degree of Util (X)	0.026	0.931	0.302	0.154
Departure Headway (Hd)	7.138	4.579	5.399	6.009
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	504	784	660	600
Service Time	5.143	2.642	3.491	4.01
HCM Lane V/C Ratio	0.026	0.934	0.305	0.153
HCM Control Delay	10.3	38.9	10.8	10.1
HCM Lane LOS	B	E	B	B
HCM 95th-tile Q	0.1	13.4	1.3	0.5

**Intersection**

Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Traffic Vol, veh/h	17	21	25	10	18	12	25	94	7	8	52	25
Future Vol, veh/h	17	21	25	10	18	12	25	94	7	8	52	25
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles, %	0	13	8	0	0	9	13	3	11	0	3	0
Mvmt Flow	20	25	30	12	21	14	30	112	8	10	62	30
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	7.8	7.8	8.7	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	20%	27%	25%	13%	0%
Vol Thru, %	75%	33%	45%	87%	0%
Vol Right, %	6%	40%	30%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	126	63	40	60	25
LT Vol	25	17	10	8	0
Through Vol	94	21	18	52	0
RT Vol	7	25	12	0	25
Lane Flow Rate	150	75	48	71	30
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.193	0.091	0.059	0.099	0.035
Departure Headway (Hd)	4.62	4.365	4.45	4.966	4.248
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	779	822	806	724	845
Service Time	2.637	2.384	2.471	2.684	1.965
HCM Lane V/C Ratio	0.193	0.091	0.06	0.098	0.036
HCM Control Delay	8.7	7.8	7.8	8.2	7.1
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.7	0.3	0.2	0.3	0.1

# LANE SUMMARY

 Site: 101 [Future Build Midday Peak]

Site Category: (None)  
Roundabout

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Park Driveway													
Lane 1 <sup>d</sup>	13	0.0	581	0.023	100	6.5	LOS A	0.1	2.1	Full	1600	0.0	0.0
Approach	13	0.0		0.023		6.5	LOS A	0.1	2.1				
East: Willamette Falls Drive													
Lane 1 <sup>d</sup>	250	3.3	1268	0.197	100	4.5	LOS A	1.0	24.9	Full	1600	0.0	0.0
Approach	250	3.3		0.197		4.5	LOS A	1.0	24.9				
North: Dollar Middle School Driveway													
Lane 1 <sup>d</sup>	97	0.0	1096	0.088	100	4.0	LOS A	0.4	9.6	Full	1600	0.0	0.0
Approach	97	0.0		0.088		4.0	LOS A	0.4	9.6				
West: Willamette Falls Drive													
Lane 1 <sup>d</sup>	788	2.8	1273	0.619	100	10.4	LOS B	5.8	149.4	Full	1600	0.0	0.0
Approach	788	2.8		0.619		10.4	LOS B	5.8	149.4				
Intersection	1148	2.7		0.619		8.5	LOS A	5.8	149.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

<sup>d</sup> Dominant lane on roundabout approach

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Project: \\salfiles3\S-Drive\Projects\2020\P20079-000 (WLWV Dollar Middle School TIA)\Analysis\Willamette Falls Drive Mini RAB.sip8

Intersection						
Int Delay, s/veh	2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	43	0	12	56	0	20
Future Vol, veh/h	43	0	12	56	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	54	0	15	70	0	25

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	54	0	154
Stage 1	-	-	-	-	54
Stage 2	-	-	-	-	100
Critical Hdwy	-	-	4.1	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.2	-	3.5
Pot Cap-1 Maneuver	-	-	1564	-	842
Stage 1	-	-	-	-	974
Stage 2	-	-	-	-	929
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1564	-	834
Mov Cap-2 Maneuver	-	-	-	-	834
Stage 1	-	-	-	-	974
Stage 2	-	-	-	-	920

Approach	EB	WB	NB
HCM Control Delay, s	0	1.3	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1019	-	-	1564	-
HCM Lane V/C Ratio	0.025	-	-	0.01	-
HCM Control Delay (s)	8.6	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

## **APPENDIX E**

### **HCM REPORT – SENSITIVITY ANALYSIS #1**

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	170	3	2	373	3	2
Future Vol, veh/h	170	3	2	373	3	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	1	0	0	3	33	0
Mvmt Flow	189	3	2	414	3	2

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	192	0	609
Stage 1	-	-	-	-	191
Stage 2	-	-	-	-	418
Critical Hdwy	-	-	4.1	-	6.73
Critical Hdwy Stg 1	-	-	-	-	5.73
Critical Hdwy Stg 2	-	-	-	-	5.73
Follow-up Hdwy	-	-	2.2	-	3.797
Pot Cap-1 Maneuver	-	-	1394	-	412
Stage 1	-	-	-	-	772
Stage 2	-	-	-	-	603
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1394	-	411
Mov Cap-2 Maneuver	-	-	-	-	411
Stage 1	-	-	-	-	770
Stage 2	-	-	-	-	603

Approach	EB	WB	NB
HCM Control Delay, s	0	0	12
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	519	-	-	1394	-
HCM Lane V/C Ratio	0.011	-	-	0.002	-
HCM Control Delay (s)	12	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Intersection Delay, s/veh	10
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	12	161	2	2	305	14	5	1	3	22	3	65
Future Vol, veh/h	12	161	2	2	305	14	5	1	3	22	3	65
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	3	0	0	4	12	20	0	0	13	0	4
Mvmt Flow	13	181	2	2	343	16	6	1	3	25	3	73
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.1	10.8	8.7	8.8
HCM LOS	A	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	56%	7%	1%	24%
Vol Thru, %	11%	92%	95%	3%
Vol Right, %	33%	1%	4%	72%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	9	175	321	90
LT Vol	5	12	2	22
Through Vol	1	161	305	3
RT Vol	3	2	14	65
Lane Flow Rate	10	197	361	101
Geometry Grp	1	1	1	1
Degree of Util (X)	0.016	0.25	0.438	0.14
Departure Headway (Hd)	5.542	4.572	4.374	4.981
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	643	785	822	718
Service Time	3.601	2.607	2.405	3.027
HCM Lane V/C Ratio	0.016	0.251	0.439	0.141
HCM Control Delay	8.7	9.1	10.8	8.8
HCM Lane LOS	A	A	B	A
HCM 95th-tile Q	0	1	2.2	0.5

**Intersection**

Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Traffic Vol, veh/h	20	19	29	10	18	5	15	3	2	4	37	23
Future Vol, veh/h	20	19	29	10	18	5	15	3	2	4	37	23
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	0	0	5	0	11	0	0	3	0	0	6	0
Mvmt Flow	23	22	34	12	21	6	17	3	2	5	43	27
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	7.3	7.4	7.6	7.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	75%	29%	30%	10%	0%
Vol Thru, %	15%	28%	55%	90%	0%
Vol Right, %	10%	43%	15%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	20	68	33	41	23
LT Vol	15	20	10	4	0
Through Vol	3	19	18	37	0
RT Vol	2	29	5	0	23
Lane Flow Rate	23	79	38	48	27
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.028	0.086	0.044	0.063	0.031
Departure Headway (Hd)	4.35	3.898	4.096	4.765	4.117
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	814	908	863	748	863
Service Time	2.426	1.972	2.177	2.52	1.872
HCM Lane V/C Ratio	0.028	0.087	0.044	0.064	0.031
HCM Control Delay	7.6	7.3	7.4	7.8	7
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0.3	0.1	0.2	0.1

# LANE SUMMARY

 Site: 101 [Future Build AM Peak - Sensitivity #1]

Site Category: (None)  
Roundabout

Lane Use and Performance													
	Demand	Flows		Deg.	Lane	Average	Level of	95% Back of Queue		Lane	Lane	Cap.	Prob.
	Total	HV	Cap.	Satn	Util.	Delay	Service	Veh	Dist	Config	Length	Adj.	Block.
	veh/h	%	veh/h	v/c	%	sec			ft		ft	%	%
South: Park Driveway													
Lane 1 <sup>d</sup>	13	0.0	1052	0.012	100	3.5	LOS A	0.0	1.2	Full	1600	0.0	0.0
Approach	13	0.0		0.012		3.5	LOS A	0.0	1.2				
East: Willamette Falls Drive													
Lane 1 <sup>d</sup>	403	2.4	1225	0.329	100	6.0	LOS A	1.9	47.9	Full	1600	0.0	0.0
Approach	403	2.4		0.329		6.0	LOS A	1.9	47.9				
North: Dollar Middle School Driveway													
Lane 1 <sup>d</sup>	140	0.0	974	0.144	100	5.0	LOS A	0.6	15.9	Full	1600	0.0	0.0
Approach	140	0.0		0.144		5.0	LOS A	0.6	15.9				
West: Willamette Falls Drive													
Lane 1 <sup>d</sup>	205	0.6	1275	0.161	100	4.2	LOS A	0.8	19.6	Full	1600	0.0	0.0
Approach	205	0.6		0.161		4.2	LOS A	0.8	19.6				
Intersection	761	1.4		0.329		5.3	LOS A	1.9	47.9				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

<sup>d</sup> Dominant lane on roundabout approach

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Project: \\salfiles3\S-Drive\Projects\2020\P20079-000 (WLWV Dollar Middle School TIA)\Analysis\Willamette Falls Drive Mini RAB.sip8

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	708	9	3	225	5	10
Future Vol, veh/h	708	9	3	225	5	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	11	0	4	20	0
Mvmt Flow	787	10	3	250	6	11

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	797	0	1048
Stage 1	-	-	-	-	792
Stage 2	-	-	-	-	256
Critical Hdwy	-	-	4.1	-	6.6
Critical Hdwy Stg 1	-	-	-	-	5.6
Critical Hdwy Stg 2	-	-	-	-	5.6
Follow-up Hdwy	-	-	2.2	-	3.68
Pot Cap-1 Maneuver	-	-	834	-	233
Stage 1	-	-	-	-	416
Stage 2	-	-	-	-	747
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	834	-	232
Mov Cap-2 Maneuver	-	-	-	-	232
Stage 1	-	-	-	-	414
Stage 2	-	-	-	-	747

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	16.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	319	-	-	834	-
HCM Lane V/C Ratio	0.052	-	-	0.004	-
HCM Control Delay (s)	16.9	-	-	9.3	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Intersection Delay, s/veh	33.1
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	113	576	4	4	179	14	6	2	4	24	3	59
Future Vol, veh/h	113	576	4	4	179	14	6	2	4	24	3	59
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	5	3	0	25	5	25	50	0	25	12	0	2
Mvmt Flow	122	619	4	4	192	15	6	2	4	26	3	63
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	42.6	11.1	10.4	10.2
HCM LOS	E	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	50%	16%	2%	28%
Vol Thru, %	17%	83%	91%	3%
Vol Right, %	33%	1%	7%	69%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	12	693	197	86
LT Vol	6	113	4	24
Through Vol	2	576	179	3
RT Vol	4	4	14	59
Lane Flow Rate	13	745	212	92
Geometry Grp	1	1	1	1
Degree of Util (X)	0.026	0.951	0.319	0.156
Departure Headway (Hd)	7.204	4.595	5.419	6.067
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	500	782	657	595
Service Time	5.209	2.661	3.516	4.068
HCM Lane V/C Ratio	0.026	0.953	0.323	0.155
HCM Control Delay	10.4	42.6	11.1	10.2
HCM Lane LOS	B	E	B	B
HCM 95th-tile Q	0.1	14.4	1.4	0.5

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Traffic Vol, veh/h	20	22	25	10	19	12	25	94	7	8	52	28
Future Vol, veh/h	20	22	25	10	19	12	25	94	7	8	52	28
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles, %	0	13	8	0	0	9	13	3	11	0	3	0
Mvmt Flow	24	26	30	12	23	14	30	112	8	10	62	33
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	7.9	7.8	8.8	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	20%	30%	24%	13%	0%
Vol Thru, %	75%	33%	46%	87%	0%
Vol Right, %	6%	37%	29%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	126	67	41	60	28
LT Vol	25	20	10	8	0
Through Vol	94	22	19	52	0
RT Vol	7	25	12	0	28
Lane Flow Rate	150	80	49	71	33
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.193	0.097	0.061	0.099	0.039
Departure Headway (Hd)	4.64	4.397	4.47	4.984	4.265
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	776	817	803	721	841
Service Time	2.657	2.413	2.486	2.701	1.982
HCM Lane V/C Ratio	0.193	0.098	0.061	0.098	0.039
HCM Control Delay	8.8	7.9	7.8	8.2	7.2
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.7	0.3	0.2	0.3	0.1

# LANE SUMMARY

 Site: 101 [Future Build Midday Peak - Sensitivity #1]

Site Category: (None)  
Roundabout

Lane Use and Performance													
	Demand	Flows		Deg.	Lane	Average	Level of	95% Back of Queue		Lane	Lane	Cap.	Prob.
	Total	HV	Cap.	Satn	Util.	Delay	Service	Veh	Dist	Config	Length	Adj.	Block.
	veh/h	%	veh/h	v/c	%	sec			ft		ft	%	%
South: Park Driveway													
Lane 1 <sup>d</sup>	13	0.0	570	0.023	100	6.6	LOS A	0.1	2.2	Full	1600	0.0	0.0
Approach	13	0.0		0.023		6.6	LOS A	0.1	2.2				
East: Willamette Falls Drive													
Lane 1 <sup>d</sup>	256	3.1	1254	0.204	100	4.6	LOS A	1.0	25.8	Full	1600	0.0	0.0
Approach	256	3.1		0.204		4.6	LOS A	1.0	25.8				
North: Dollar Middle School Driveway													
Lane 1 <sup>d</sup>	126	0.0	1104	0.114	100	4.2	LOS A	0.5	12.7	Full	1600	0.0	0.0
Approach	126	0.0		0.114		4.2	LOS A	0.5	12.7				
West: Willamette Falls Drive													
Lane 1 <sup>d</sup>	792	2.8	1256	0.631	100	10.8	LOS B	6.0	153.1	Full	1600	0.0	0.0
Approach	792	2.8		0.631		10.8	LOS B	6.0	153.1				
Intersection	1187	2.5		0.631		8.7	LOS A	6.0	153.1				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

<sup>d</sup> Dominant lane on roundabout approach

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Project: \\salfiles3\S-Drive\Projects\2020\P20079-000 (WLWV Dollar Middle School TIA)\Analysis\Willamette Falls Drive Mini RAB.sip8

## **APPENDIX F**

### **HCM REPORT – SENSITIVITY ANALYSIS #2**

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	200	3	2	408	3	2
Future Vol, veh/h	200	3	2	408	3	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	1	0	0	3	33	0
Mvmt Flow	222	3	2	453	3	2

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	225	0	681
Stage 1	-	-	-	-	224
Stage 2	-	-	-	-	457
Critical Hdwy	-	-	4.1	-	6.73
Critical Hdwy Stg 1	-	-	-	-	5.73
Critical Hdwy Stg 2	-	-	-	-	5.73
Follow-up Hdwy	-	-	2.2	-	3.797
Pot Cap-1 Maneuver	-	-	1356	-	372
Stage 1	-	-	-	-	745
Stage 2	-	-	-	-	577
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1356	-	371
Mov Cap-2 Maneuver	-	-	-	-	371
Stage 1	-	-	-	-	744
Stage 2	-	-	-	-	577

Approach	EB	WB	NB
HCM Control Delay, s	0	0	12.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	475	-	-	1356	-
HCM Lane V/C Ratio	0.012	-	-	0.002	-
HCM Control Delay (s)	12.7	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Intersection Delay, s/veh	10.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	12	192	2	2	341	14	5	1	3	22	3	65
Future Vol, veh/h	12	192	2	2	341	14	5	1	3	22	3	65
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	3	0	0	4	12	20	0	0	13	0	4
Mvmt Flow	13	216	2	2	383	16	6	1	3	25	3	73
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.6	11.7	8.9	9.1
HCM LOS	A	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	56%	6%	1%	24%
Vol Thru, %	11%	93%	96%	3%
Vol Right, %	33%	1%	4%	72%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	9	206	357	90
LT Vol	5	12	2	22
Through Vol	1	192	341	3
RT Vol	3	2	14	65
Lane Flow Rate	10	231	401	101
Geometry Grp	1	1	1	1
Degree of Util (X)	0.016	0.297	0.493	0.145
Departure Headway (Hd)	5.722	4.625	4.426	5.147
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	622	775	814	694
Service Time	3.793	2.666	2.46	3.203
HCM Lane V/C Ratio	0.016	0.298	0.493	0.146
HCM Control Delay	8.9	9.6	11.7	9.1
HCM Lane LOS	A	A	B	A
HCM 95th-tile Q	0	1.2	2.8	0.5

**Intersection**

Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Traffic Vol, veh/h	28	23	29	10	23	5	15	3	2	4	37	32
Future Vol, veh/h	28	23	29	10	23	5	15	3	2	4	37	32
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	0	0	5	0	11	0	0	3	0	0	6	0
Mvmt Flow	33	27	34	12	27	6	17	3	2	5	43	37
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	7.5	7.4	7.6	7.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	75%	35%	26%	10%	0%
Vol Thru, %	15%	29%	61%	90%	0%
Vol Right, %	10%	36%	13%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	20	80	38	41	32
LT Vol	15	28	10	4	0
Through Vol	3	23	23	37	0
RT Vol	2	29	5	0	32
Lane Flow Rate	23	93	44	48	37
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.028	0.103	0.051	0.064	0.043
Departure Headway (Hd)	4.394	3.969	4.129	4.8	4.152
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	803	890	854	740	854
Service Time	2.484	2.052	2.22	2.567	1.918
HCM Lane V/C Ratio	0.029	0.104	0.052	0.065	0.043
HCM Control Delay	7.6	7.5	7.4	7.9	7.1
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0.3	0.2	0.2	0.1

# LANE SUMMARY

 Site: 101 [Future Build AM Peak - Sensitivity #2]

Site Category: (None)  
Roundabout

Lane Use and Performance													
	Demand	Flows		Deg.	Lane	Average	Level of	95% Back of Queue		Lane	Lane	Cap.	Prob.
	Total	HV	Cap.	Satn	Util.	Delay	Service	Veh	Dist	Config	Length	Adj.	Block.
	veh/h	%	veh/h	v/c	%	sec			ft		ft	%	%
South: Park Driveway													
Lane 1 <sup>d</sup>	13	0.0	974	0.013	100	3.8	LOS A	0.1	1.3	Full	1600	0.0	0.0
Approach	13	0.0		0.013		3.8	LOS A	0.1	1.3				
East: Willamette Falls Drive													
Lane 1 <sup>d</sup>	441	2.2	1175	0.375	100	6.8	LOS A	2.2	56.4	Full	1600	0.0	0.0
Approach	441	2.2		0.375		6.8	LOS A	2.2	56.4				
North: Dollar Middle School Driveway													
Lane 1 <sup>d</sup>	210	0.0	974	0.215	100	5.8	LOS A	1.0	25.3	Full	1600	0.0	0.0
Approach	210	0.0		0.215		5.8	LOS A	1.0	25.3				
West: Willamette Falls Drive													
Lane 1 <sup>d</sup>	248	0.5	1234	0.201	100	4.7	LOS A	1.0	25.3	Full	1600	0.0	0.0
Approach	248	0.5		0.201		4.7	LOS A	1.0	25.3				
Intersection	912	1.2		0.375		5.9	LOS A	2.2	56.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

<sup>d</sup> Dominant lane on roundabout approach

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Project: \\salfiles3\S-Drive\Projects\2020\P20079-000 (WLWV Dollar Middle School TIA)\Analysis\Willamette Falls Drive Mini RAB.sip8

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	727	9	3	248	5	10
Future Vol, veh/h	727	9	3	248	5	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	11	0	4	20	0
Mvmt Flow	808	10	3	276	6	11

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	818	0	1095
Stage 1	-	-	-	-	813
Stage 2	-	-	-	-	282
Critical Hdwy	-	-	4.1	-	6.6
Critical Hdwy Stg 1	-	-	-	-	5.6
Critical Hdwy Stg 2	-	-	-	-	5.6
Follow-up Hdwy	-	-	2.2	-	3.68
Pot Cap-1 Maneuver	-	-	819	-	218
Stage 1	-	-	-	-	407
Stage 2	-	-	-	-	726
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	819	-	217
Mov Cap-2 Maneuver	-	-	-	-	217
Stage 1	-	-	-	-	405
Stage 2	-	-	-	-	726

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	17.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	305	-	-	819	-
HCM Lane V/C Ratio	0.055	-	-	0.004	-
HCM Control Delay (s)	17.5	-	-	9.4	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Intersection Delay, s/veh	39.9
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	113	602	4	4	202	14	6	2	4	24	3	59
Future Vol, veh/h	113	602	4	4	202	14	6	2	4	24	3	59
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	5	3	0	25	5	25	50	0	25	12	0	2
Mvmt Flow	122	647	4	4	217	15	6	2	4	26	3	63
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	52.5	11.7	10.6	10.4
HCM LOS	F	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	50%	16%	2%	28%
Vol Thru, %	17%	84%	92%	3%
Vol Right, %	33%	1%	6%	69%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	12	719	220	86
LT Vol	6	113	4	24
Through Vol	2	602	202	3
RT Vol	4	4	14	59
Lane Flow Rate	13	773	237	92
Geometry Grp	1	1	1	1
Degree of Util (X)	0.026	0.995	0.366	0.159
Departure Headway (Hd)	7.352	4.632	5.568	6.198
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	489	773	651	582
Service Time	5.368	2.709	3.568	4.207
HCM Lane V/C Ratio	0.027	1	0.364	0.158
HCM Control Delay	10.6	52.5	11.7	10.4
HCM Lane LOS	B	F	B	B
HCM 95th-tile Q	0.1	16.7	1.7	0.6

**Intersection**

Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Traffic Vol, veh/h	27	25	25	10	22	12	25	94	7	8	52	34
Future Vol, veh/h	27	25	25	10	22	12	25	94	7	8	52	34
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles, %	0	13	8	0	0	9	13	3	11	0	3	0
Mvmt Flow	32	30	30	12	26	14	30	112	8	10	62	40
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	8.1	7.9	8.8	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	20%	35%	23%	13%	0%
Vol Thru, %	75%	32%	50%	87%	0%
Vol Right, %	6%	32%	27%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	126	77	44	60	34
LT Vol	25	27	10	8	0
Through Vol	94	25	22	52	0
RT Vol	7	25	12	0	34
Lane Flow Rate	150	92	52	71	40
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.195	0.114	0.066	0.1	0.048
Departure Headway (Hd)	4.685	4.458	4.51	5.024	4.304
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	767	806	795	714	833
Service Time	2.709	2.478	2.533	2.747	2.028
HCM Lane V/C Ratio	0.196	0.114	0.065	0.099	0.048
HCM Control Delay	8.8	8.1	7.9	8.3	7.2
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.7	0.4	0.2	0.3	0.2

# LANE SUMMARY

 Site: 101 [Future Build Midday Peak - Sensitivity #2]

Site Category: (None)  
Roundabout

Lane Use and Performance													
	Demand	Flows		Deg.	Lane	Average	Level of	95% Back of Queue		Lane	Lane	Cap.	Prob.
	Total	HV	Cap.	Satn	Util.	Delay	Service	Veh	Dist	Config	Length	Adj.	Block.
	veh/h	%	veh/h	v/c	%	sec			ft		ft	%	%
South: Park Driveway													
Lane 1 <sup>d</sup>	13	0.0	538	0.025	100	7.0	LOS A	0.1	2.3	Full	1600	0.0	0.0
Approach	13	0.0		0.025		7.0	LOS A	0.1	2.3				
East: Willamette Falls Drive													
Lane 1 <sup>d</sup>	281	2.8	1222	0.230	100	5.0	LOS A	1.2	29.8	Full	1600	0.0	0.0
Approach	281	2.8		0.230		5.0	LOS A	1.2	29.8				
North: Dollar Middle School Driveway													
Lane 1 <sup>d</sup>	187	0.0	1105	0.169	100	4.8	LOS A	0.8	19.8	Full	1600	0.0	0.0
Approach	187	0.0		0.169		4.8	LOS A	0.8	19.8				
West: Willamette Falls Drive													
Lane 1 <sup>d</sup>	821	2.7	1221	0.673	100	12.1	LOS B	6.7	171.0	Full	1600	0.0	0.0
Approach	821	2.7		0.673		12.1	LOS B	6.7	171.0				
Intersection	1302	2.3		0.673		9.5	LOS A	6.7	171.0				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.

LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

<sup>d</sup> Dominant lane on roundabout approach

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Organisation: DKS ASSOCIATES | Processed: Tuesday, August 11, 2020 3:15:21 PM

Project: \\salfiles3\S-Drive\Projects\2020\P20079-000 (WLWV Dollar Middle School TIA)\Analysis\Willamette Falls Drive Mini RAB.sip8

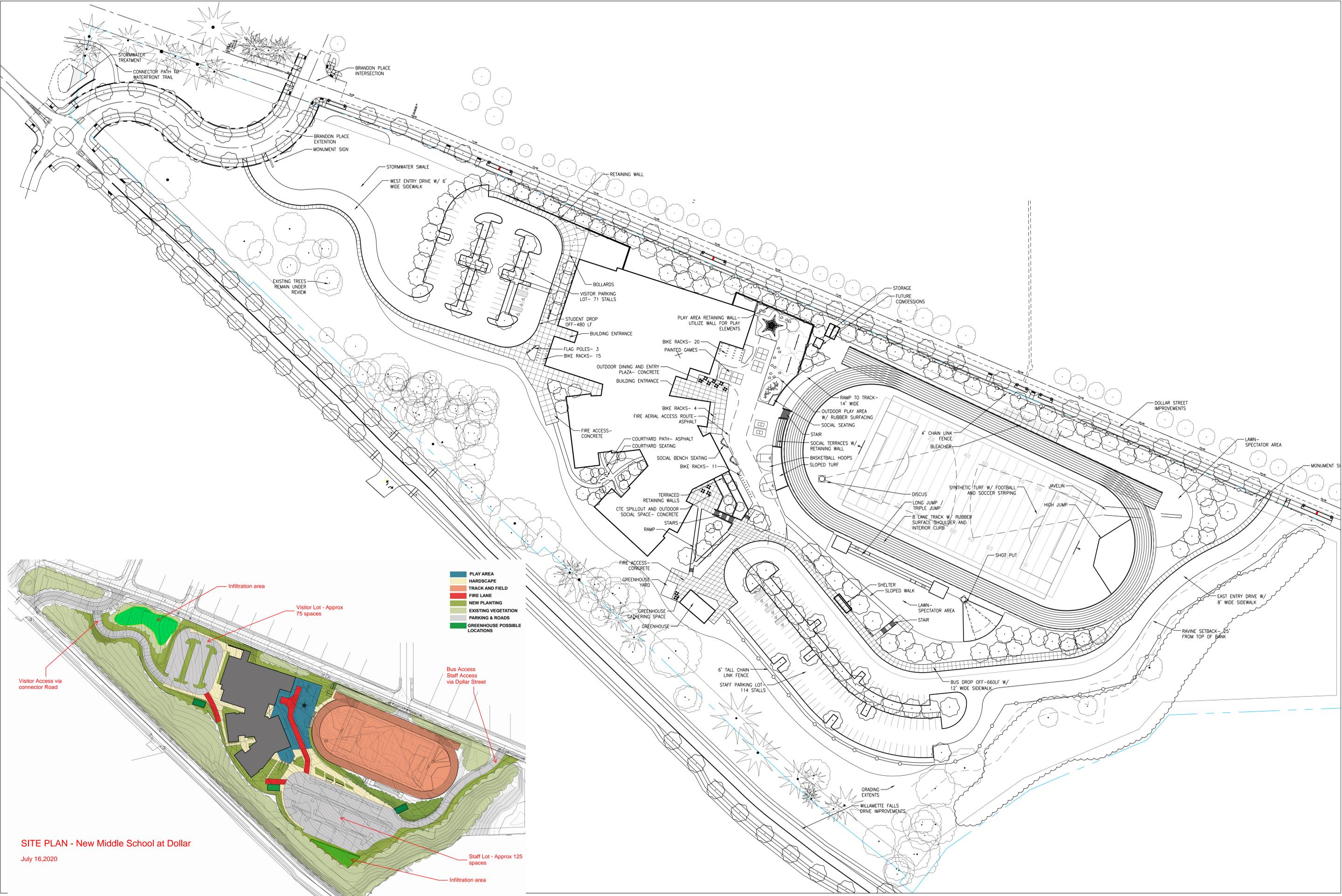
## **APPENDIX G**

### **CRASH DATA**

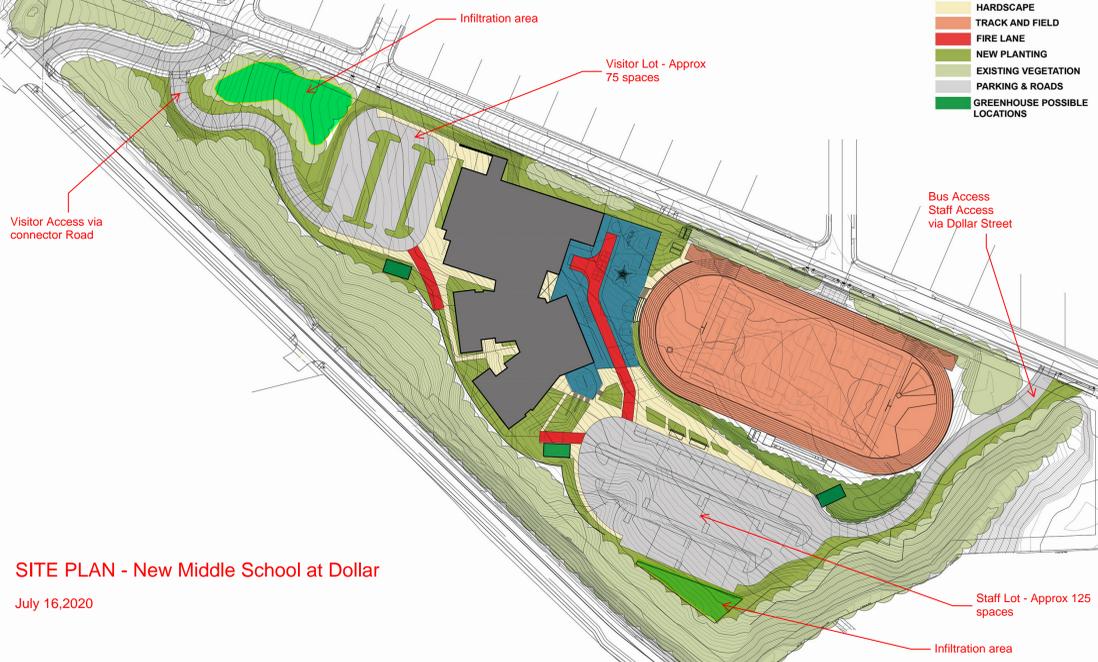
Crash ID	Crash Date	Lat	Long	Collision Type	Crash Severity	KABCO	Weather	Road Surface	Light	Crash Event	Crash Cause
1615911	8/11/2015	45.346661	-122.671767	REAR	INJ	B	CLEAR	DRY	DAYLIGHT		FAILED TO AVOID VEHICLE AHEAD
1664747	4/1/2016	45.346544	-122.671567	REAR	INJ	C	CLEAR	DRY	DAYLIGHT	PED INVOLVED	FAILED TO AVOID VEHICLE AHEAD
1740242	7/21/2017	45.346583	-122.671631	REAR	INJ	C	CLEAR	DRY	DAYLIGHT	PED INVOLVED	FAILED TO AVOID VEHICLE AHEAD
1705382	8/5/2016	45.347383	-122.672931	REAR	PDO	O	CLEAR	DRY	DAYLIGHT		FAILED TO AVOID VEHICLE AHEAD
1742193	8/17/2017	45.346583	-122.671633	REAR	INJ	C	CLEAR	DRY	DAYLIGHT		FOLLOW TOO CLOSE
1643136	6/16/2015	45.345814	-122.670233	REAR	PDO	O	CLEAR	DRY	DAYLIGHT	FORCED BY IMPACT	FOLLOW TOO CLOSE
1739094	7/13/2017	45.344317	-122.666969	REAR	INJ	C	CLEAR	DRY	DARK-NO ST LIGHTS		FAILED TO AVOID VEHICLE AHEAD
1763483	10/12/2017	45.344317	-122.666972	REAR	PDO	O	RAIN	WET	DAYLIGHT		FAILED TO AVOID VEHICLE AHEAD
1583758	8/2/2014	45.346525	-122.671531	REAR	INJ	C	CLEAR	DRY	DAYLIGHT	PED INVOLVED	FAILED TO AVOID VEHICLE AHEAD
1689300	1/28/2016	45.344317	-122.666969	SS-O	PDO	O	CLOUDY	WET	DAYLIGHT		IMPROPER OVERTAKE
1756099	6/6/2017	45.348417	-122.674439	REAR	PDO	O	CLEAR	DRY	DAYLIGHT		INATTENTION

**APPENDIX H**

**SITE PLAN**



- PLAY AREA
- HARDSCAPE
- TRACK AND FIELD
- FIRE LANE
- NEW PLANTING
- EXISTING VEGETATION
- PARKING & ROADS
- GREENHOUSE POSSIBLE LOCATIONS



**SITE PLAN - New Middle School at Dollar**  
 July 16, 2020