

EXHIBIT B: PARKING ASSESSMENT MEMO

MEMORANDUM

Date: December 13, 2016

To: Jim Swan
Bonaventure Senior Housing
3425 Boone Road SE
Salem OR 97317

From: Frank Charbonneau, PE, PTOE

Subject: Parking Assessment Report FL16126
Bonaventure Senior Living of Vancouver
NE 94th Avenue, Clark County

As requested a parking assessment has been prepared for the Bonaventure Senior Living facility being planned in Clark County at the southwest intersection corner of NE 94th Avenue and 86th Street.

The proposed development will consist of a senior residential building providing 160 units for memory care (28 units), assisted living (60 units), and independent living (72 units). A total of 125 on-site parking spaces will be provided for the residents, employees, and visitors. The property will have vehicular access at one main driveway location on 86th Street plus at a secondary driveway also on 86th Street. Figure `a` in the appendix is a vicinity map showing the site location. Figure `b` is the project site plan.

The following items are addressed in the study.

- Clark County building code parking requirements in terms of unit type and number of units.
- Analysis that documents applicable parking rates and numbers successfully adopted for other Bonaventure sites. Include justifiable parking data.
- Demonstrate that the parking demand established from proven data at numerous other Bonaventure sites will not exceed the on-site parking capacity of 125 on-site spaces.

The Bonaventure Senior Living of Vancouver facility will provide on-site parking for staff, residents, visitors, and a company owned 15-seat passenger van. Six spaces for handicap parking and an 8 feet by 20 feet drop-off zone will be included for a total parking capacity of 125 spaces. One space measuring 15 feet by 21 feet will be reserved for the passenger van.

The residents typically average 82 years of age. Data derived from 40 existing Bonaventure facilities has established that no more than 50% of the independent living residents drive and maintain a vehicle on site. At the Clark County site this would equate to 36 spaces (50% of 72 independent units). A total of 39 spaces are being provided according to the parking utilization plan (see Exhibit 1 - Parking Utilization chart in appendix) and is 55% of the independent living units.

No parking spaces are necessary for the assisted living or memory care residents since they do not drive.

At full occupancy there will be approximately 50 staff members employed over three shifts. The maximum number of employees will equate to 20 staff members during the normal operating hours so 20 spaces are needed for staff use. The number could be lower if any of the employees elect to commute using C-Tran. The parking utilization plan identifies 24 spaces will be available for employees.

Visitors accessing site average a one hour stay with the number of vehicles ranging from five to 10 cars per hour throughout the day between 6:00AM and 8:00PM. The maximum number visitor cars parked (10 vehicles) occurs during the mid-day period between 11:00-1:00PM and again between 5:00-8:00PM. The parking demand by time of day is supported by the parking utilization data contained in the appendix.

Clark County building code parking standards for senior residential facilities include 1.50 spaces per unit for independent living and one space per three beds for assisted living and memory care uses. Applying these rates for the new building equates to a total of 138 spaces.

The Clark County parking requirement for independent living is 1.5 spaces per unit and is applicable to all multi-family developments regardless of type and bedroom count (CCC Table 40.340.010-4). The County code does not have a parking standard for senior housing aka independent living. The independent living section of the new Bonaventure facility will have far less resident parking but more employee parking than for typical apartment use. The industry standard for independent living in a suburban setting is close to one parking space per unit and therefore is much lower than the County requirement.

Bonaventure has developed a range of parking ratios that are specific for their facilities. While many jurisdictions use a parking standard close to 0.50 spaces per residential unit Bonaventure's own experience has determined the ratio must be higher to adequately handle the parking needs. Over the years they have established that an average parking ratio of 0.65 to 0.70 per unit is ideal for a mixed-use facility and is more than adequate for their residents, guests, employees, and service needs without impacting the surrounding properties or nearby streets. Parking assessments of previously developed Bonaventure sites that included input from residents and visitors and observations by staff have been helpful in solidifying the optimum parking standard for Bonaventure. In support of the parking ratio standard adopted by Bonaventure Table 1 is included (following page) and contains a listing of 30 existing senior living facilities operated by Bonaventure (last site listed in table is the proposed development in Clark County) . The data identifies the site location, number of units by type, number of parking spaces, and the parking ratio for each site. It should be noted that six sites on the list were identified as having parking shortage issues (parking ratios lower than 0.56). If these sites are excluded the average parking rate increases to 0.70 spaces/unit.

The new Bonaventure of Vancouver site will incorporate a parking ratio of 0.78 spaces/unit with 125 stalls for the 160 unit facility. This parking ratio is more than adequate for the use, location, and total size of 160 units. Furthermore, a parking ratio of 0.78 spaces per unit is supported by the other comparable Bonaventure locations provided on the next page.

Table 1 Parking Ratios for Bonaventure Senior Communities & Proposed Site							
FACILITY	Year Opened	No. Units			Total Units	Total Spaces	Spaces Per Unit
		AL	IL	MC			
Bridgewood* Vancouver, WA	2003	72	52		124	61	0.49
Cascadia Village Sandy, OR	2000	50	34		84	48	0.57
Five Rivers* Tillamook, OR	2002	64	24		88	33	0.38
Monticello Park Longview, WA	2001	84	60		144	101	0.70
Woodland* Lacey, WA	2004	78	72		150	84	0.56
Olympic Place Arlington, WA	2004	62	46		108	67	0.62
Rosemont Yelm, WA	2004	62	24		86	48	0.56
Columbia Heights Wenatchee, WA	2004	72	64		136	92	0.68
Cedar Ridge Bonney Lake, WA	2007	66	42		108	68	0.63
Silver Creek Puallup, WA	2005	66	42		108	79	0.73
Seaport Port Townsend, WA	2005	66	42		108	73	0.68
Park Vista Port Orchard, WA	2006	66	42		108	78	0.72
Spring Creek* Bellingham, WA	2006	81	81		162	83	0.51
North Creek* Bothell, WA	2008	76	62		138	69	0.50
Bonaventure Place Boise, ID	2007	131	75		206	100	0.49
Riverton* Richland, WA	2008	88	76		164	77	0.47
East Wenatchee East Wenatchee, WA	2009	78	96	19	193	103	0.53
Lacey Lacey, WA	2009	60	116	24	200	120	0.60
Sparks Sparks, NV	2009	80	128	16	224	148	0.66
Idaho Falls Idaho Falls, ID	2009	66	99	16	181	172	0.95
Billings Billings, MT	2009	70	104	16	190	128	0.67
Salem Salem, OR	2012	52	66	24	142	143	1.01
Castle Rock Castle Rock, CO	2012	55	89	18	162	101	0.62
Bonaventure of Salem Salem, OR	2012	52	66	24	142	143	1.01
Bonaventure of Co. Springs Colorado Springs, CO	2014	52	80	17	149	124	0.83
Bonaventure of Pueblo Pueblo, CO	2015	55	65	24	144	118	0.82
Bonaventure of Salmon Creek Salmon Creek, WA	2015	53	63	24	140	91	0.65
Bonaventure of Albany Albany, OR	2015	54	67	22	143	93	0.65
Bonaventure of Tigard Tigard, OR	2016	54	70	23	147	118	0.80
Bonaventure of Gresham Gresham, OR	2016	57	74	24	155	104	0.67
Parking Ratio All Exist Sites					4334	2867	0.66
Park Ratio Exist Sites - Shortage Sites					3508	2460	0.70
PROPOSED							
Bonaventure at Vancouver	2018	60	72	28	160	125	0.78

*Communities that have experienced issues due to parking shortages

Shown in Table 2 is the projected parking demand by use (staff, resident, & visitor), available parking, capacity, and occupancy percentages by time of day for the proposed Bonaventure site.

Table 2 BONAVENTURE OF CLARK COUNTY PARKING DEMAND & CAPACITY SUMMARY

Time	Employee Parking Demand	Resident Parking Demand	Visitor Parking Demand	Total Parking Demand	Available Parking	Open Spaces	% Occupied Spaces
4:00 AM	4	39	0	43	125	82	34%
5:00 AM	5	39	2	46	125	79	37%
6:00 AM	9	39	5	53	125	72	42%
7:00 AM	11	39	5	55	125	70	44%
8:00 AM	17	39	5	61	125	64	49%
9:00 AM	19	39	5	63	125	62	50%
10:00 AM	21	39	5	65	125	60	52%
11:00 AM	23	39	10	72	125	53	58%
12:00 PM	24	39	10	73	125	52	58%
1:00 PM	24	39	8	71	125	54	57%
2:00 PM	24	39	5	68	125	57	54%
3:00 PM	24	39	5	68	125	57	54%
4:00 PM	24	39	5	68	125	57	54%
5:00 PM	22	39	10	71	125	54	57%
6:00 PM	15	39	10	64	125	61	51%
7:00 PM	13	39	10	62	125	63	40%
8:00 PM	8	39	6	53	125	72	42%
9:00 PM	7	39	2	48	125	77	38%
10:00 PM	4	39	0	43	125	82	34%

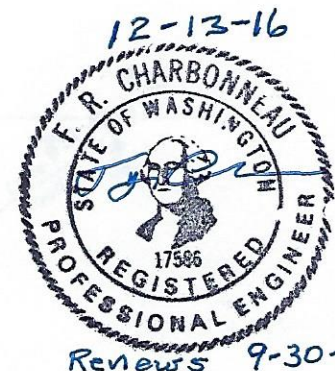
The peak demand will total 73 spaces during the noon hour and remain above 60 spaces between the hours of 8:00AM to 8:00PM. The highest percent occupancy is 58% based on 125 spaces, leaving 52 stalls available for additional parking. Considering the in-depth historical parking data documented by Bonaventure the number of available spaces is considered more than adequate to accommodate the facility at all times and not result in a parking impact to the neighborhood.

Based on the results of the parking analysis it is recommended that Clark County support the proposed site plan containing a total of 125 on-site parking spaces.

If you should have any questions, please contact Frank Charbonneau, PE, PTOE at 503.293.1118.

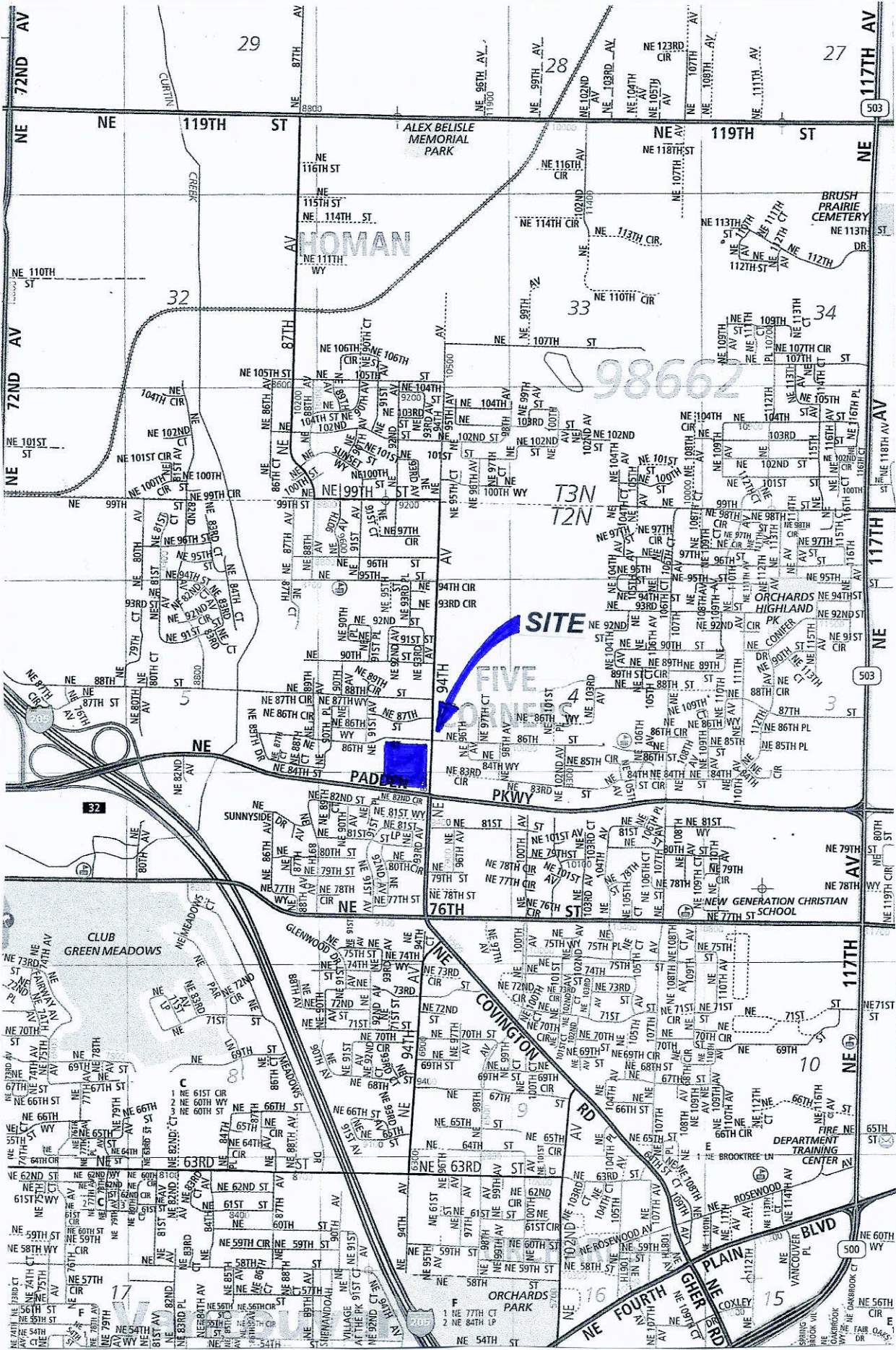
Appendix

Figure 'a' Vicinity Map
 Figure 'b' Site Plan
 Exhibit 1 Parking Demand by Time of Day



FILE NAME: 1639flow.dwg

PLOT DATE: 10.25.16



CHARBONNEAU ENGINEERING LLC
 PROJECT: 16-39

NOTES:
 NO SCALE

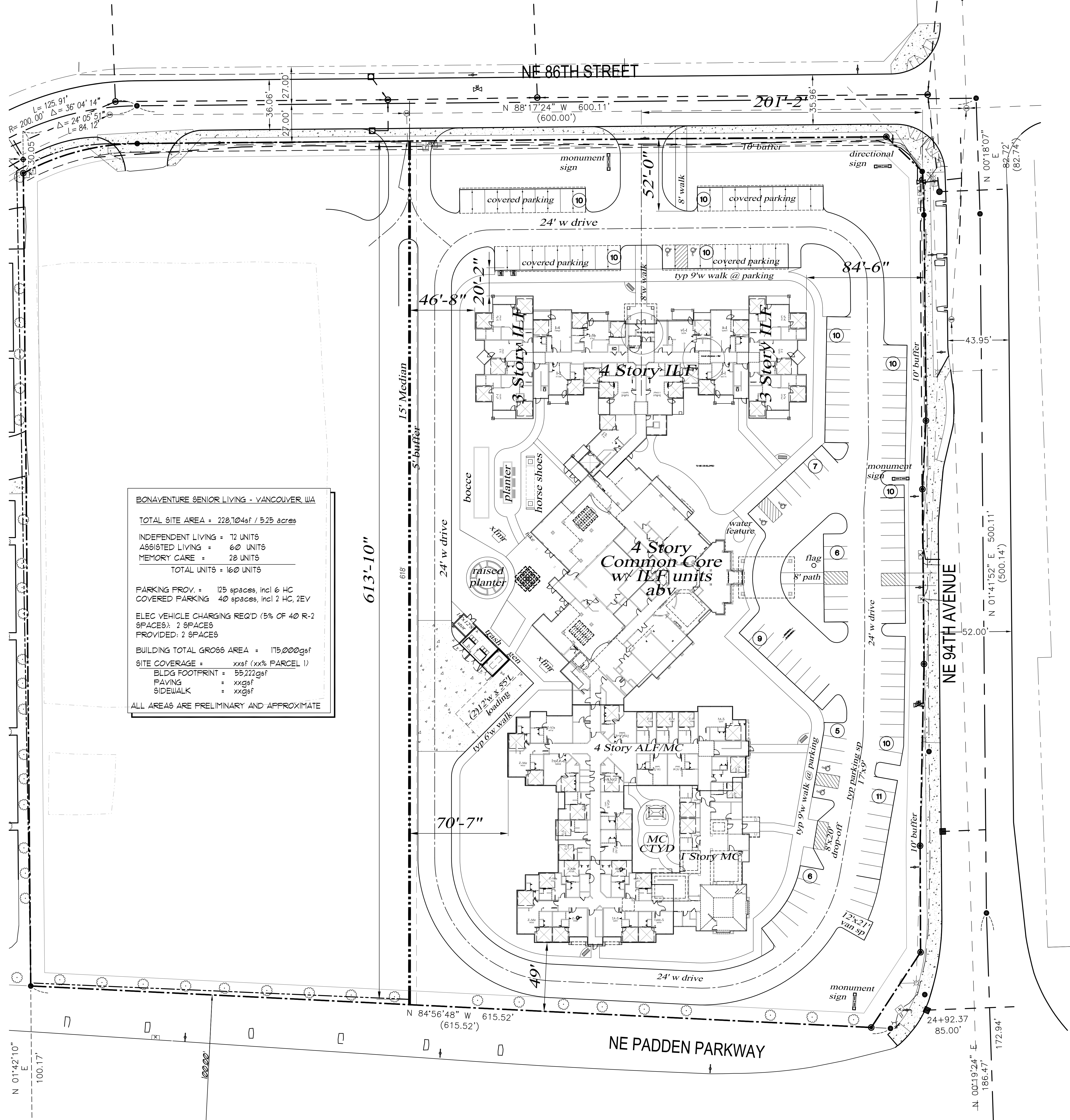


VICINITY MAP
 BONAVENTURE SENIOR LIVING

FIGURE
 a

M:\Drafting\Projects\16xx Vancouver 86th st\BND-Prelim stephan8 Vancouver 86th st 12-1-16 12-01.dwg, Site Plan-Vncvr, 12/1/2016 3:22:59 PM, JClarkson, 12:12

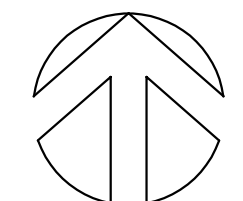
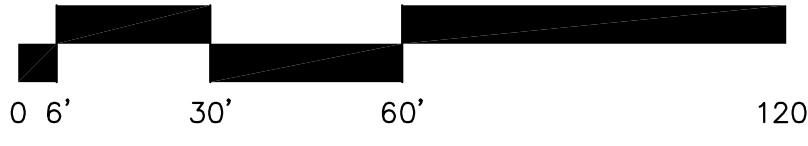
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BONAVENTURE SENIOR LIVING - VANCOUVER, WA	
TOTAL SITE AREA =	228,104sf / 5.25 acres
INDEPENDENT LIVING =	12 UNITS
ASSISTED LIVING =	60 UNITS
MEMORY CARE =	28 UNITS
TOTAL UNITS =	100 UNITS
PARKING PROV. =	125 spaces, incl 6 HC
COVERED PARKING =	40 spaces, incl 2 HC, 2EV
ELEC VEHICLE CHARGING REQ'D (5% OF 40 R-2 SPACES):	2 SPACES
PROVIDED:	2 SPACES
BUILDING TOTAL GROSS AREA =	175,000gsf
SITE COVERAGE =	xxsf (xx% PARCEL 1)
BLDG FOOTPRINT =	55,222gsf
PAVING =	xxgsf
SIDEWALK =	xxgsf
ALL AREAS ARE PRELIMINARY AND APPROXIMATE	

SITE PLAN Figure `b`

SCALE : 1" = 30'-0"



REVISIONS:	
PROJECT TITLE:	Vancouver, Wa
SHEET TITLE:	Bonaventure of Vancouver
DRAWN BY:	
SHEET:	
PROJECT:	XX
DATE:	XX

**PRELIMINARY
NOT FOR
CONSTRUCTION
Dec 01 2016**

Exhibit 1 - Parking Utilization by Time of Day

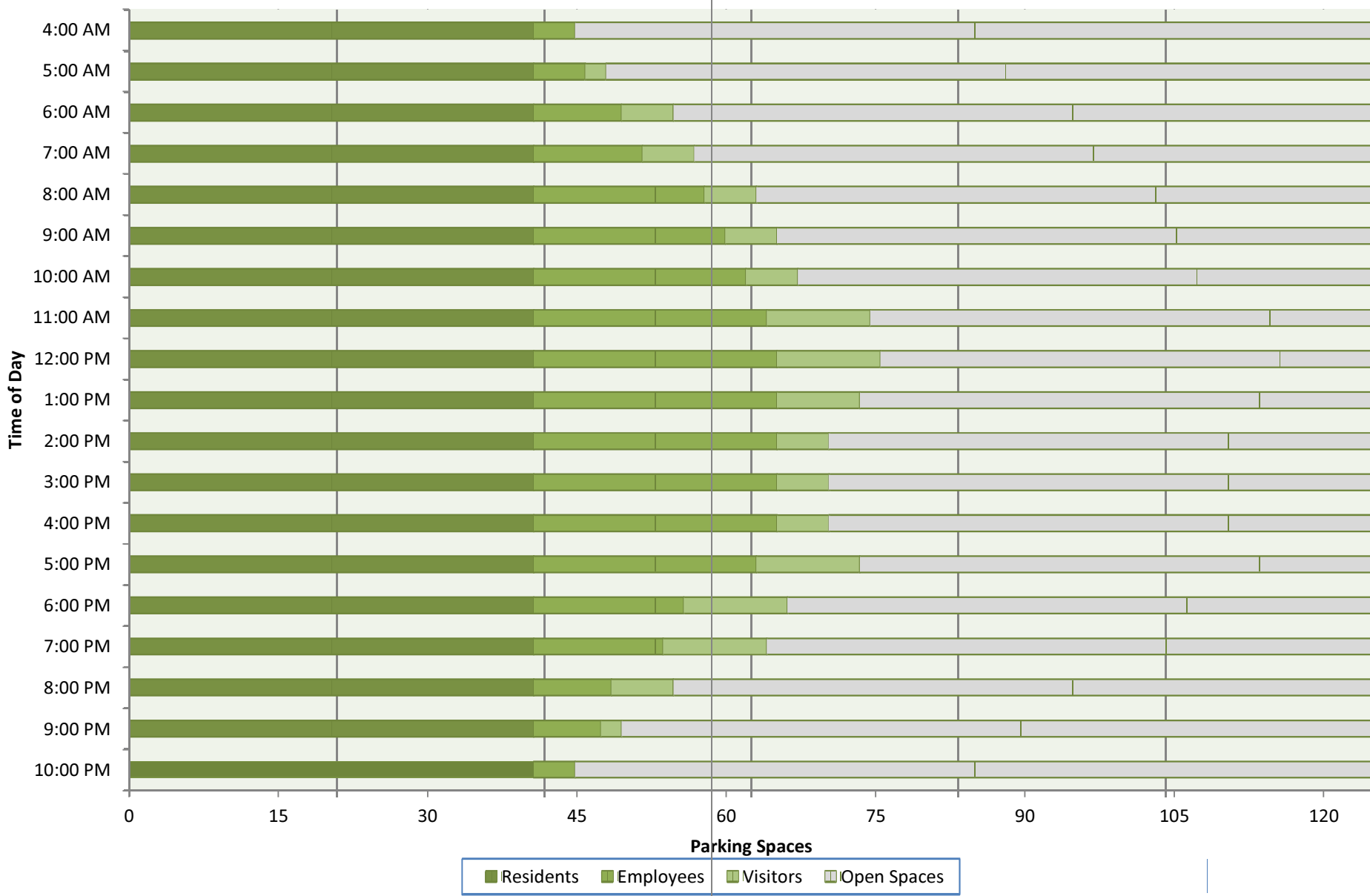


EXHIBIT C: PRE-APPLICATION SUMMARY NOTES



CITY OF MILWAUKIE

September 26, 2018

Serah Breakstone
DOWL
720 SW Washington St, Ste.750
Portland OR 97205

Re: Preapplication Report

Dear Serah:

Enclosed is the Preapplication Report Summary from your meeting with the City on September 6, 2018, concerning your proposal for action on property located at 13333 SE Rusk Rd.

A preapplication conference is required prior to submittal of certain types of land use applications in the City of Milwaukie. Where a preapplication conference is required, please be advised of the following:

- Preapplication conferences are valid for a period of 2 years from the date of the conference. If a land use application or development permit has not been submitted within 2 years of the conference date, the Planning Director may require a new preapplication conference.
- If a development proposal is significantly modified after a preapplication conference occurs, the Planning Director may require a new preapplication conference.

If you have any questions concerning the content of this report, please contact the appropriate City staff.

Sincerely,

Alicia Martin
Administrative Specialist II

Enclosure

cc: Bonaventure - Jim Clarkson, Daniel Dobson, John Eld
Scott Emmens, DOWL
Chris Brehmer, Kittleson & Associates, Inc.

PRE-APPLICATION CONFERENCE REPORT

This report is provided as a follow-up to a meeting that was held on 9/6/2018 at 10:00am

Applicant Name: Serah Breakstone
Company: DOWL
Applicant 'Role': Other
Address Line 1: 720 SW Washington St, Ste. 750
Address Line 2:
City, State Zip: Portland OR 97205
Project Name: Bonadventure Senior Housing
Description: New senior living facility
ProjectAddress: 13333 SE Rusk Rd
Zone: Residential R-3 and R-10
Occupancy Group:
ConstructionType:
Use: Medium Density (MD) and Low Density (LD)
Occupant Load:
AppsPresent: Jim Clarkson, Serah Breakstone, Scott Emmens, Chris Bremmer, Daniel Dobson, John Eld
Staff Attendance: Dennis Egner, Brett Kelper, Alex Roller, Matt Amos

BUILDING ISSUES

ADA: Building will need to be Fully ADA compliant.
Structural: Building will need to meet all of the provisions of the Oregon Structural Specialty Code (OSSC).
Mechanical: Building will need to meet all the provisions of the Oregon Mechanical Specialty Code (OMSC).
Plumbing: Building will need to meet all the provisions of the Oregon Plumbing Specialty Code (OPSC).
Plumb Site Utilities: On site plumbing requires plumbing plan review. Two sets of plans will need to be submitted to the building office separate from any grading, utility, or erosion plans submitted to Engineering for review.
Electrical: Building will need to meet all of the povisions of the National Electrical Code.
Notes:

Please note all drawings must be individually rolled. If the drawings are small enough to fold they must be individually folded.

FIRE MARSHAL ISSUES

- Fire Sprinklers:** Will need to be provided for as per the Oregon Structural Specialty Code (OSSC).
- Fire Alarms:** Will need to be provided for as per the Oregon Structural Specialty Code (OSSC).
- Fire Hydrants:**
- Turn Arounds:**
- Addressing:**
- Fire Protection:**
- Fire Access:**
- Hazardous Mat.:**
- Fire Marshal Notes:** See attached.

PUBLIC WORKS ISSUES

- Water:** An unknown size Clackamas River water main in SE Kellogg Creek Dr is available to provide connection to serve the proposed development. The applicant shall construct adequately sized domestic line and all required fire components (hydrants and/or sprinklers) per Clackamas Fire District (CFD) #1 and building requirements. Water construction will conform to Clackamas River Water (CRW) standards. Betty Johnson (503-723-2571) at CRW will be your contact for construction and System Development Charges (SDC) requirements. Construction of improvements within the public right-of-way shall be completed prior to final building approval. During construction plan review, the Fire Chief and City Engineer may determine that existing fire hydrants are adequate to serve the development. Please refer to CFD #1 memorandum for additional requirements.
- Sewer:** An unknown size Clackamas County Water Environment Services (WES) wastewater main located in Kellogg Creek Dr is available for connection to serve the proposed development. There are no City of Milwaukie utilities being constructed, so development will not pay any Milwaukie SDCs. WES (503-742-4567) will be your contact for sewer requirement. Clackamas County's SDCs are collected with the building permit and forwarded to the County. The wastewater SDC will be assessed and collected at the time the building permits are issued.
- Storm:** Submission of a stormwater management plan by a qualified professional engineer is required as part of the proposed development. The plan shall conform to Section 2 - Stormwater Design Standards of the City of Milwaukie Pubic Works Standards. As referenced in Section 2.0013.B, the City of Milwaukie has adopted City of Portland standards for design of water quality facilities. The stormwater management plan shall demonstrate that the post-development runoff does not exceed the pre-development runoff, including any existing stormwater management facilities serving the development property. Also, the plan shall demonstrate compliance with water quality standards. The presence of the wetland on the west side of the property will add additional stormwater release requirements.

All new impervious surfaces, including replacement of impervious surface with new impervious surfaces, are subject to the water quality standards. See Milwaukie Public Works Standards for design and construction standards and detailed drawings.

The storm SDC is based on the amount of new impervious surface constructed at the site. One storm SDC unit is the equivalent of 2,706 sq ft of impervious surface. The storm SDC is currently \$930 per unit. The storm SDC will be assessed and collected at the time the building permits are issued.

Street:

The proposed development fronts the north side of Kellogg Creek Dr. The portion of Kellogg Creek Dr fronting the proposed development has a right-of-way width of 40 to 50 ft, has a 5-ft wide curb tight sidewalk on the north side, and is unimproved on the south side.

The transportation SDC will be based on the increase in trips generated by the new use per the Trip Generation Handbook from the Institute of Transportation Engineers. The SDC for transportation is \$2,114 per trip generated. Credits will be given for any demolished structures, which shall be based upon the existing use of the structures.

Frontage:

Chapter 19.700 of the Milwaukie Municipal Code, herein referred to as the "Code", applies to partitions, subdivisions, new construction, and modification and or expansions of existing structures or uses that produce a projected increase in vehicle trips.

Transportation Facility Requirements, Code Section 19.708, states that all rights-of-way, streets, sidewalks, necessary public improvements, and other public transportation facilities located in the public right-of-way and abutting the development site shall be adequate at the time of development or shall be made adequate in a timely manner.

Kellogg Creek Dr

According to Code Table 19.708.2 the local street cross section includes the following:

- 10-ft travel lanes
- 8-ft parking lane with curb & gutter
- 5-ft bike lanes
- 5-ft landscape strips
- 5-ft setback sidewalks

Kellogg Creek Dr right-of-way terminates at the entrance to the park property to the west. Per MMC 19.708.1.E.4 permanent turnarounds are only permitted when no opportunity exists for creating a through street connection. There is no foreseeable potential for the street to be extended into the park. The proposed development's frontage includes the entire length of Kellogg Creek Dr. The development will be responsible for constructing a turnaround at the west end as part of the required improvements. The turnaround can be located east of the existing habitat conservation area located in the southwest corner of the property. Right-of-way dedication will be required to accommodate the above frontage improvements.

The required bike lane is identified in the 2013 Transportation System Plan as connecting the southwest corner of the development to the northeast corner of the development at the intersection of Rusk Rd and Highway 224. There are two available options for this bike lane:

1. Construct 5-ft bike lane along entire Kellogg Creek Dr and Rusk Rd frontage.
2. Construct 10-ft bike lane through site with clear signage. Bike lane will connect southwest corner to the northeast corner. Final design will be determined in plan review.

Applicant will be responsible for constructing the above improvements prior to occupancy. In addition,

additional improvements may be required at the conclusion of the Traffic Impact Study (TIS). These may include turning lanes on Rusk Rd at Kellogg Creed Dr or Hwy 224, turning lanes on Kellogg Creek Dr, or restricted access requirements.

Right of Way: The right-of-way width varies between 40 and 50 ft. Right-of-way dedication will be required to accommodate the above frontage improvements.

Driveways: Code Section 12.16.040.A states that access to private property shall be permitted with the use of driveway curb cuts and driveways shall meet all applicable guidelines of the Americans with Disabilities Act (ADA). Driveway approaches shall be improved to meet the requirements of Milwaukie's Public Works Standards, Section 5.0085, at the time of development. Per Code Section 12.16.F.6, the driveway width will be between 12 and 36 ft wide. Per Code Section 12.16.040.C.4.c spacing requirements between driveways and intersections on a local is 100 ft.

Erosion Control: Per Code Section 16.28.020(C), an erosion control permit is required prior to placement of fill, site clearing, or land disturbances, including but not limited to grubbing, clearing or removal of ground vegetation, grading, excavation, or other activities, any of which results in the disturbance or exposure of soils exceeding 500 sq ft. The proposed development exceeds the threshold; therefore, an erosion control permit is required.

Code Section 16.28.020(E) states that an erosion control permit is required prior to issuance of building permits or approval of construction plans. Also, Code Section 16.28.020(B) states that an erosion control plan that meets the requirements of Code Section 16.28.030 is required prior to any approval of an erosion control permit.

Traffic Impact Study: Code Section 19.704.1(A) states that the City will determine whether a TIS is required. In the event the proposed development will significantly increase the intensity of use, a TIS will be required. The City Engineering Director will make the determination based on the availability of sufficient information to determine the impact of the proposed development.

If required, the TIS triggers a Transportation Facilities Review (TFR) Land Use Application to be filed concurrent with the land use application. Once the scope of the proposed development is determined and a deposit of \$1500 is paid, the City will provide a detailed TIS scope for the traffic study. When the TIS is completed in accordance with the scope, the applicant shall schedule a second preapplication meeting with Milwaukie Engineering staff. The second preapplication meeting will allow Engineering staff to review and comment on the applicant's TIS prior to submission of any land use applications. The fee for the second preapplication meeting is \$100 and a deposit of \$2500. Upon completion of the second preapplication meeting, the applicant may submit their land use applications.

The Engineering Director has determined that there is not sufficient information available and a TIS will be required.

PW Notes: APPLICABILITY OF PREAPPLICATION REVIEW
The comments provided are preliminary and intended to address the original application materials submitted unless otherwise specifically called out in the notes. The information contained within these notes may change over time due to changes or additional information presented for the development. This preapplication review is for the following:

The construction of a 165-unit adult care facility with three different levels of care.

SYSTEM DEVELOPMENT CHARGES (SDCS)

There was insufficient information to estimate SDCs with the pre-application submitted. All SDCs are calculated, assessed, and collected at the time of building permit is issued. Any changes in the proposed use may result in a change in the SDCs that are assessed. If the applicant needs an estimate of

SDCs then staff can provide the specific information to be submitted by the applicant required to calculate SDCs for a given proposal.

In addition to the SDCs mentioned earlier, there is a parks and recreation SDC that is triggered when application for a building permit on a new dwelling is received. The City is in communication with North Clackamas Parks and Recreation District about the SDC methodology for adult care facilities. The parks and recreation SDC will be assessed and collected at the time the building permits are issued.

OVERHEAD UTILITIES

No new overhead utilities will be allowed. The development will be required to underground all utilities required due to the development, including all utilities that serve the development.

REQUIREMENTS PRIOR TO OCCUPANCY

- Engineered plans for public improvements (street, sidewalk, and utility) are to be submitted and approved prior to start of construction. Full-engineered design is required along the frontage of the proposed development. Plans shall be prepared by a Professional Engineer licensed in the State of Oregon.

- The applicant shall pay an application, plan review, and inspection fee in accordance with the City Master Fee Schedule prior to the issuance of building permits.

- The applicant shall provide a payment and performance bond for 100% of the cost of the public improvements prior to the start of construction.

- The applicant shall provide a final approved set of Mylar "As Constructed" drawings to the City of Milwaukie prior to the final inspection.

- The applicant shall provide a maintenance bond for 100% of the cost of the public improvements prior to the final inspection

ADDITIONAL NOTES

- All fees mentioned are subject to change in accordance with the City of Milwaukie Master Fee Schedule.

PLANNING ISSUES

Setbacks:

The independent and assisted living portions of the project are a Conditional Use (CU). Conditional uses are subject to the setback requirements of the underlying zone, and additional setbacks can be imposed as conditions of approval (MMC Subsection 19.905.5). In the R-10 zone, front and rear yard setbacks are 20 ft, side yard setbacks are 10 ft, and street-side yard setbacks are 20 ft. In the R-3 zone, front and rear yard setbacks are 15 ft, side yard setbacks are 5 ft, and street-side yard setbacks are 15 ft.

The memory care portion of the project is a Community Service Use (CSU); setbacks for "nursing or convalescent homes" as CSUs are the greater of 25 ft or the setback of an adjacent residential zone or the underlying zone. The 25-ft standard is greater than maximum 20-ft setbacks required for the underlying R-10 and R-3 zones as well as for the adjacent County R-10 zone.

Landscape:

A minimum of 35% of the site must be landscaped (the standards for the R-10 and R-3 zones are the same). Vegetated areas may be planted in trees, grass, shrubs, or bark dust for planting beds, with no

more than 20% of the landscaped area finished in bark dust (as per MMC Subsection 19.504.7). Required landscaping for off-street parking areas may be counted toward the minimum vegetation requirement.

A maximum of 30% of the R-10 portion of the site may be covered by structures; the maximum lot coverage allowed for the R-3 portion of the site is 40%. Additional limitations on lot coverage or building size and location can be imposed as conditions of the CU and/or CSU approval.

Parking:

The off-street parking standards outlined in MMC Table 19.605.1 provide two standards that are relevant: (1) as multifamily dwellings for the independent living suites and assisted living suites; and (2) as nursing, convalescent, and extended-care facilities for the memory care suites.

For multifamily dwellings, the minimum requirement depends on the size of the unit: 1 space for each unit that is 800 sq ft or less, and 1.25 spaces for each unit over 800 sq ft. The maximum parking allowance is 2 spaces per unit regardless of size. For nursing, convalescent, and extended-care facilities, the minimum number required is 1 space per 4 beds and the maximum allowed is 1 space per 3 beds.

Alternately, the applicant can request a parking determination (Type II review) to assert that a different quantity of spaces should be required or allowed. MMC Subsection 19.605.2 establishes the process for parking determinations, including providing data and analysis to support the request.

The design standards for off-street parking areas (including landscaping and lighting) are established in MMC Section 19.606. Note that pedestrian access must be provided through parking areas so that no parking space is more than 100 ft from a building entrance or a walkway. Required walkways must meet the standards of MMC Subsection 19.504.9.E, including for permeability and minimum lighting levels.

The requirements for perimeter landscaping (MMC Subsection 19.606.2.C) are relevant where adjacent to the church site. Adjusting the property boundaries to establish the church on its own single lot will require the applicant to demonstrate that the church parking lot provides a minimum perimeter landscaping buffer of 6 ft. Similarly, the proposed development must provide at least a 6-ft perimeter landscaping buffer on the senior living facility site. If this standard cannot be met, a variance may be requested, subject to the Type III review process and the approval criteria of MMC Subsection 19.911.4.B.

Transportation Review:

As new construction, the project triggers the applicability of MMC Chapter 19.700 Public Facility Improvements. The City's Engineering Department has indicated that a Traffic Impact Study (TIS) will be required, with the scope provided by the City. See the Public Works notes or contact the Engineering Department for more information about the requirements of MMC 19.700, including potential right-of-way dedication, street improvements, or access spacing.

Application Procedures:

The independent and assisted living units will be reviewed as senior and retirement housing, which requires Conditional Use (CU) approval in the R-10 and R-3 zones. The memory care aspect is similar to a nursing or convalescent home and will be reviewed as a Community Service Use (CSU). Both of these applications require Type III review, with a decision by the Planning Commission at a public hearing.

The proposed building exceeds the maximum height allowance of both the R-10 and R-3 zones (the lesser of 2.5 stories or 35 ft). A Type III Variance Request will be required.

As noted below under "Natural Resource Review," some form of Natural Resource (NR) application will be required. The applicant is proposing to amend the City's NR Administrative Map to verify the

natural resource boundaries, which requires Type II review. Additional NR review (either Type I or III) may be required for any non-exempt disturbance of the natural resource.

In addition, since a TIS is required, a Type II Transportation Facilities Review (TFR) application is necessary to address the relevant requirements of MMC Chapter 19.700.

To put the church and proposed senior living facility on their own separate lots, an application for Lot Consolidation (LC) and Property Line Adjustment (PLA) will be required, processed with Type I review. The resulting changes to the church site (playground & parking area landscaping) constitute a minor modification to the church CSU, which will be processed concurrently with the LC/PLA.

Current application fees relevant to the proposal:

Type III review = \$2,000 per application (CSU & CU, NR review for major disturbance if needed, Variance(s))

Type II review = \$1,000 per application (TFR, NR review for map revision, Parking determination if requested)

Type I review = \$200 per application (LC, NR review for limited disturbance if needed)

PLA = specific application fee of \$650

Additional fees or deposits:

TIS = Actual cost for scope of work preparation, with \$1,500 reserve deposit; actual cost for review of TIS, with \$2,500 reserve deposit

Natural Resources = \$3,000 reserve deposit, with actual cost charged for peer review of applicant's natural resource report

For concurrent applications, the most expensive application is charged full price and the fees for all other applications are discounted 25%.

For the City's initial review of the application package, the applicant should submit 5 complete copies of the submittal materials, including all required forms, checklists, narrative, and plans. (Note: Disregard the call for 12 copies noted in the code and on several checklists.) A determination of the application's completeness will be issued within 30 days. If deemed incomplete, additional information will be requested. If deemed complete, additional copies of the application may be required for referral to other departments, the Lake Road Neighborhood District Association (NDA), and other relevant parties and agencies. City staff will inform the applicant of the total number of copies needed.

Once the application is deemed complete, a public hearing with the Planning Commission will be scheduled. Public notice will be provided to property owners and residents within 300 ft of the subject property at least 20 days prior to the public hearing. A sign giving notice of the application must be posted on the subject property at least 14 days prior to the hearing.

Following a determination that the application is complete (estimate at least 1 month for completeness review process, as noted above), processing time to a final decision for Type III review is approximately 2 months. Issuance of a final decision starts a 15-day appeal period for the applicant and any party who establishes standing.

Prior to submitting the application, the applicant is encouraged (but not required) to present the project at a regular meeting of the Lake Road NDA (6:30 p.m. on the second Wednesday of most months, usually at Rowe Middle School, 3606 SE Lake Rd).

Following the Type III review process, a Type I Development Review application (\$200 fee) will be required in conjunction with the development permits for construction of the project.

Natural Resource Review: The site includes Kellogg Creek, a delineated wetland, and floodplain areas. These natural resource features generate Water Quality Resource (WQR) and Habitat Conservation Area (HCA) designations on the site. A stand of old-growth Oregon white oak trees in the southwest corner of the site is not currently designated as an HCA on the City's Natural Resource (NR) Administrative Map, while a sparsely canopied area extending almost 200 ft south of Mt Scott Creek is shown as HCA. The applicant has proposed a detailed boundary verification of the HCA in accordance with the procedures outlined in MMC Subsection 19.402.15.A.2.b. That verification process requires Type II NR review.

Taking the updated HCA boundary into account, the applicant can determine whether any WQR or HCA will be disturbed by the proposed development. Depending on the level of any WQR or HCA disturbance, Type I or III NR review may be required.

Lot Geography: The subject property is comprised of four tax lots that mirror what appear to be underlying lots of record, established by deed in the 1970s or earlier. With the exception of tax lot 900, none of the lots are strictly rectilinear, though they would be if not for their various frontages along Highway 224 (which runs at an angle northwest to southeast) and/or Rusk Rd (which has a curved radius where it turns from a north-south alignment to an east-west alignment at the southeast corner of tax lot 600).

Planning Notes: General Note = These notes represent staff's best evaluation of the applicant's proposal(s) in advance of any official submittal of a land use application. They do not represent approval or denial of the proposed action, only an assessment of the issues and likely requirements.

Church access = A shared access easement will be required as part of the Lot Consolidation and Property Line Adjustment process, to ensure that the church retains access to Kellogg Creek Dr. The boundary adjustment itself will not trigger a review of the church driveway onto Rusk Rd, but the proposed development of the senior living facility will require driveway modifications to eliminate egress to Rusk Rd and to allow right-in-only movements (since the shared access would allow new trips from the senior living facility onto the church site).

Multifamily design = Although the proposed development is not technically a multifamily project, the applicant should expect to address the multifamily design standards of MMC 19.505.3 to demonstrate the project's compatibility as part of the CSU and CU reviews.

Site design suggestions = Consider shifting some parking to the northeast corner of site, to allow the overall development footprint to be moved away from the wetland and WQR area. This may also provide room for the required bicycle connection to be provided on site as well as for the necessary perimeter landscaping (6-ft width) adjacent to the church site.

ADDITIONAL NOTES AND ISSUES

County Health Notes:

Other Notes:

This is only preliminary preapplication conference information based on the applicant's proposal and does not cover all possible development scenarios. Other requirements may be added after an applicant submits land use applications or building permits. City policies and code requirements are subject to change. If you have any questions, please contact the City staff that attended the conference (listed on Page 1). Contact numbers for these staff are City staff listed at the end of the report.

Sincerely,

City of Milwaukie Development Review Team

BUILDING DEPARTMENT

Samantha Vandagriff - Building Official - 503-786-7611

Stephanie Marcinkiewicz

- Inspector/Plans Examiner - 503-786-7613

ENGINEERING DEPARTMENT

Chuck Eaton - Engineering Director - 503-786-7605

Alex Roller - Engineering Tech II - 503-786-7695

COMMUNITY DEVELOPMENT DEPARTMENT

Alma Flores - Comm. Dev. Director - 503-786-7652

Leila Aman - Development Manager - 503-786-7616

Alicia Martin - Admin Specialist - 503-786-7600

PLANNING DEPARTMENT

Dennis Egner - Planning Director - 503-786-7654

David Levitan - Senior Planner - 503-786-7627

Brett Kelter - Associate Planner - 503-786-7657

Vera Kolas - Associate Planner - 503-786-7653

Mary Heberling - Assistant Planner - 503-786-7658

CLACKAMAS FIRE DISTRICT

Mike Boumann - Lieutenant Deputy Fire Marshal - 503-742-2673

Matt Amos - Fire Inspector - 503-742-2661

Clackamas County Fire District #1

Fire Prevention Office



E-mail Memorandum

To: City of Milwaukie Planning Department
From: Matt Amos, Fire Inspector, Clackamas Fire District #1
Date: 9/26/2018
Re: 13333 Rusk Rd. 18-011PA

This review is based upon the current version of the Oregon Fire Code (OFC), as adopted by the Oregon State Fire Marshal's Office. The scope of review is typically limited to fire apparatus access and water supply, although the applicant must comply with all applicable OFC requirements. When buildings are completely protected with an approved automatic fire sprinkler system, the requirements for fire apparatus access and water supply may be modified as approved by the fire code official. The following items should be addressed by the applicant:

COMMENTS:

A Fire Access and Water Supply plan is required for subdivisions and commercial buildings over 1000 square feet in size or when required by Clackamas Fire District #1. The plan shall show fire apparatus access, fire lanes, fire hydrants, fire lines, available fire flow, FDC location (if applicable), building square footage, and type of construction. The applicant shall provide fire flow tests per NFPA 291, and shall be no older than 12 months. Work to be completed by experienced and responsible persons and coordinated with the local water authority.

Access:

- 1) Provide address numbering that is clearly visible from the street.
- 2) The inside turning radius and outside turning radius for a 20' wide road shall not be less than 28 feet and 48 feet respectively, measured from the same center point.
- 3) Buildings exceeding 30 feet in height shall require extra width and proximity provisions for aerial apparatus.

Water Supply

- 1) **Fire Hydrants, Commercial Buildings:** Where a portion of the building is more than 400 feet from a hydrant on a fire apparatus access road, as measured in an approved route around the exterior of the building, on-site fire hydrants and mains shall be provided. Note: This distance may be increased to 600 feet for buildings equipped throughout with an approved automatic sprinkler system.
- 2) All new buildings shall have a firefighting water supply that meets the fire flow requirements of the Fire Code. Maximum spacing between hydrants on street frontage shall not exceed 500 feet. Additional private on-site fire hydrants may be required for larger buildings. Fire sprinklers may reduce the water supply requirements.
- 3) Prior to the start of combustible construction required fire hydrants shall be operational and accessible.
- 4) The fire department connection (FDC) for any fire sprinkler system shall be placed as near as possible to the street, and within 100 feet of a fire hydrant.

Note:

Emergency responder radio coverage must be tested or provided due to the following

- 1. Any building with one or more basement or below-grade building levels.**
- 2. Any underground building.**
- 3. Any building more than five stories in height.**
- 4. Any building 50,000 square feet in size or larger.**
- 5. Any building that, through performance testing, does not meet the requirement of section 510.**

EXHIBIT D: TRAFFIC IMPACT STUDY

MEMORANDUM

Date: November 8, 2018 Project #: 23248

To: Alex Roller – City of Milwaukie
Christian Snuffin, PE, PTOE – Clackamas County
Avi Tayar, PE – Oregon Department of Transportation
Reah Flisakowski, PE – DKS Associates

CC: Serah Breakstone and Scott Emmons, PE – DOWL
Daniel Dobson – Bonaventure

From: Kristine Connolly, PE, and Chris Brehmer, PE – Kittelson & Associates, Inc.

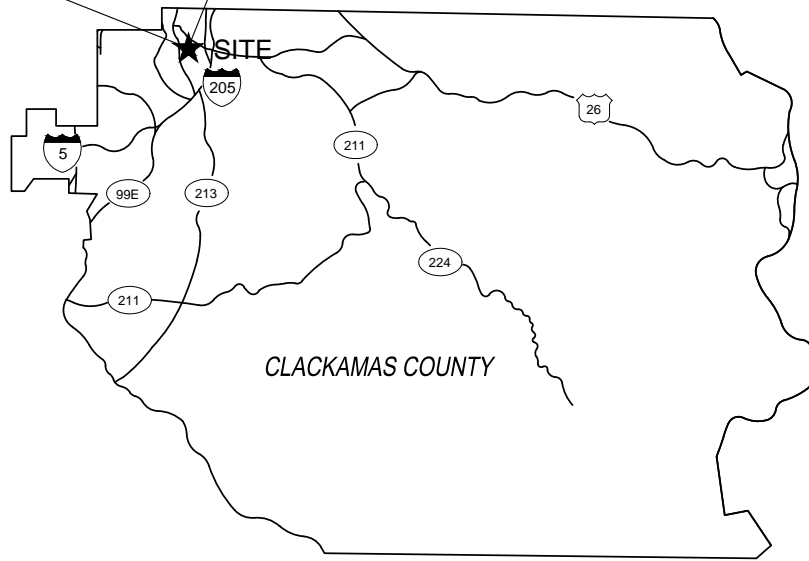
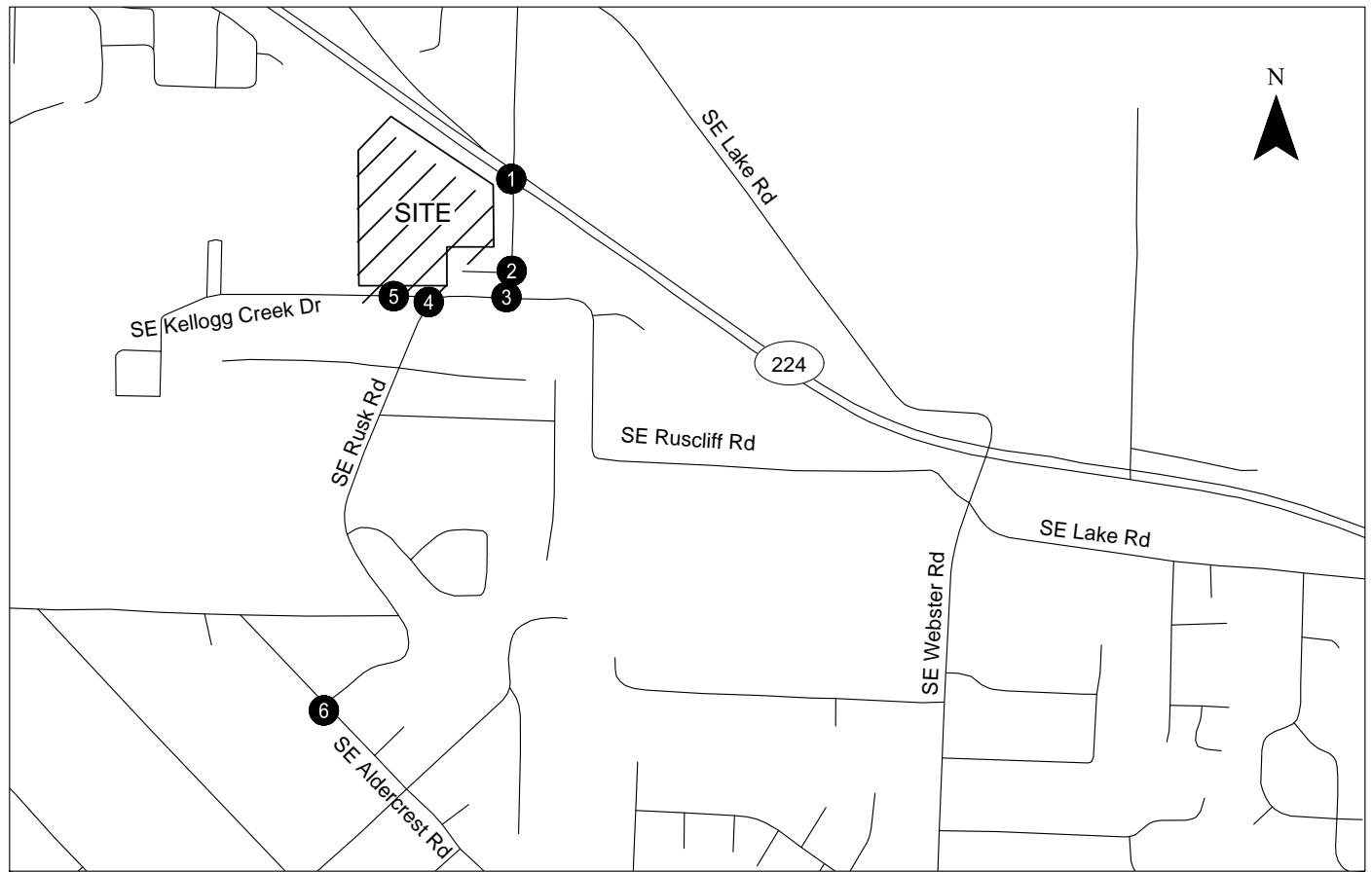
Project: Rusk Road Senior Housing

Subject: Transportation Impact Study

Bonaventure is proposing to develop vacant property located at 13333 SE Rusk Road. The proposed development site is bordered by Turning Point Church to the east. As proposed, the development will include 170 senior housing units accessible via a SE Kellogg Creek Drive driveway shared with the church. The site location and overall site vicinity are shown in **Figure 1**, and a conceptual site plan is shown in **Figure 2**. This transportation impact study report documents the transportation impacts associated with site development. Key findings and recommendations are summarized below.

SUMMARY OF FINDINGS

- All study intersections are forecast to operate within the applicable review agency volume-to-capacity ratio and delay standards under existing and site opening year 2019 conditions during the weekday AM, midday, and PM peak hours.
- Some vehicles were observed making wrong-way egress movements at the existing church driveway on SE Rusk Road.
- Existing weekday AM peak hour northbound queuing on SE Rusk Road at OR-224 extends past SE Ruscliff Road and west towards SE Kellogg Creek Drive.
- With the provision of a northbound right-turn lane on SE Rusk Road at OR-224, projected 95th percentile AM, midday and PM peak hour queues can be accommodated within the existing storage areas at the study intersections and queuing on SE Rusk Road after site development will be less than the amount experienced today.
- Historical crash data for the study area intersections indicate no patterns or trends that require mitigation associated with the proposed development.



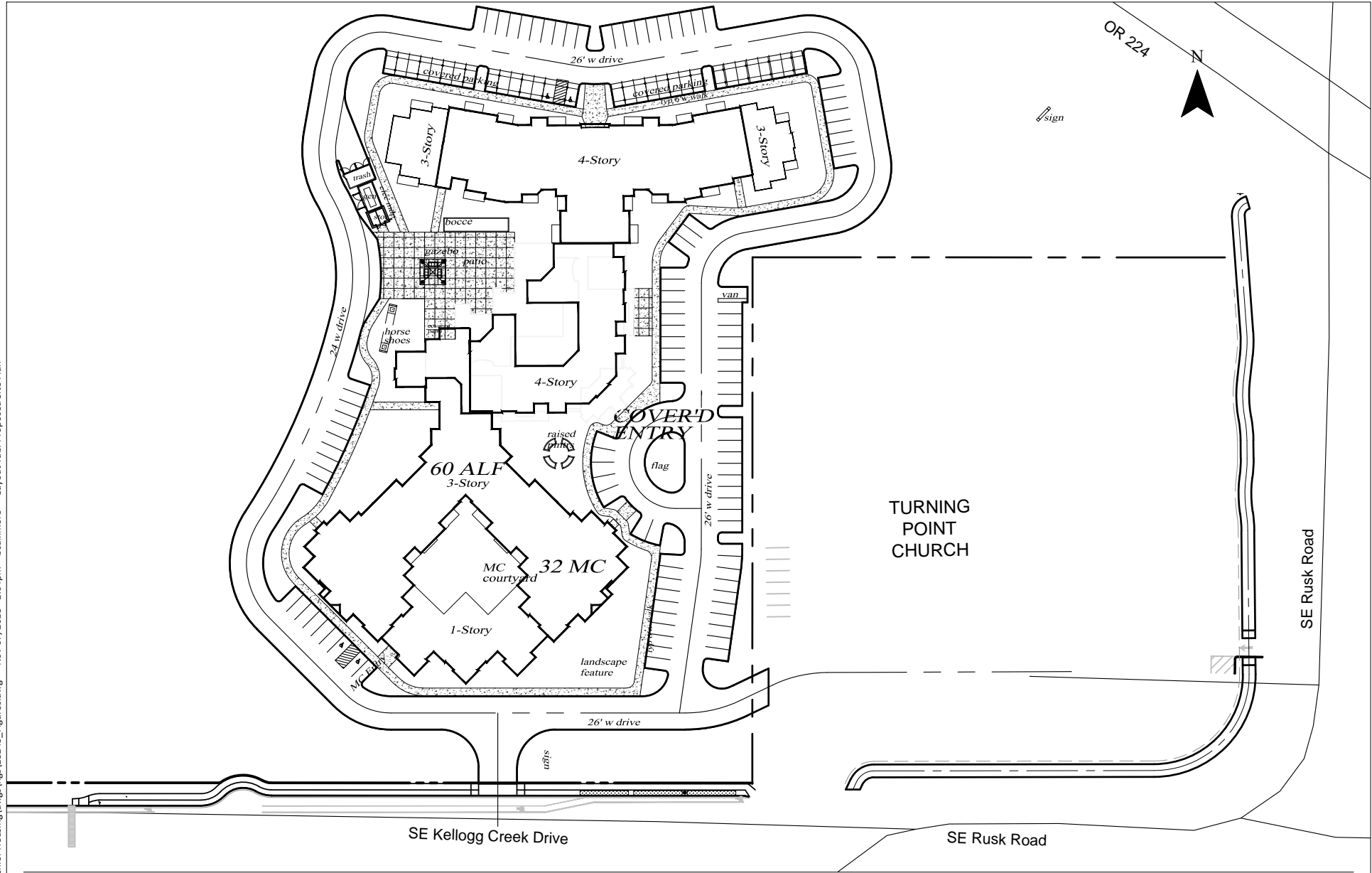
- Study Intersections

Site Vicinity Map
Milwaukie, Oregon

Figure
1

H:\23\23248 - Rusk Road Senior Housing\dwgs\figs\23248_Figures.dwg Nov 07, 2018 - 2:04pm - bcaillimore Layout Tab: Site Vicinity Map

H:\23\23248 - Rusk Road Senior Housing\dwgs\figs\23248_Figures.dwg Nov 07, 2018 - 2:04pm - bcullimore - Layout Tab: Proposed Site Plan



Site Plan Provided By DOWL 2018-11-05

Proposed Site Plan
Milwaukie, Oregon

Figure
2

RECOMMENDATIONS

- Subject to City approval and regardless of the proposed development, “DO NOT ENTER” and/or “ONE WAY” signs should be installed at the SE Rusk Road/Church driveway in accordance with the *Manual on Uniform Traffic Control Devices* (MUTCD) to restrict vehicles from exiting the church driveway onto SE Rusk Road.
- The Applicant should collaborate with the City of Milwaukie to construct a northbound right-turn lane on SE Rusk Road at OR-224 in conjunction with site development subject to available right-of-way and Transportation System Development Charges (TSDC) credits. The turn lane design and construction will be creditable towards the project TSDC.
- Intersection sight distance should be provided at the proposed site access per applicable City of Milwaukie and Clackamas County design requirements. Landscaping, above ground utilities, and signing should be located and maintained in a manner that provides adequate intersection sight distance.

REPORT SCOPE

This report identifies the transportation-related impacts associated with the proposed development and was prepared in accordance with the City of Milwaukie, Clackamas County, and Oregon Department of Transportation (ODOT) requirements. Per City, County, and ODOT staff direction, operational analyses were performed at the following study intersections during the weekday AM, midday, and PM peak periods:

1. SE Rusk Road/OR-224
2. SE Rusk Road/Church Driveway
3. SE Rusk Road/SE Ruscliff Road
4. SE Rusk Road/SE Kellogg Creek Drive
5. SE Kellogg Creek Drive/Church Driveway
6. SE Rusk Road/SE Aldercrest Road

This report evaluates the following transportation issues:

- Existing land use and transportation system conditions within the site vicinity during the weekday AM, midday, and PM peak periods;
- Forecast year 2019 background traffic conditions during the weekday AM, midday, and PM peak periods, considering other development and transportation improvements planned in the study area;
- Trip generation and distribution estimates for the proposed development;
- Forecast year 2019 total traffic conditions during the weekday AM, midday and PM peak periods with build-out of the site;
- Review of applicable City of Milwaukie requirements, including sight distance, access standards, and turn-lane warrants; and
- Findings and recommendations.

Analysis Methodology

All level-of-service (LOS) analyses described in this report were performed in accordance with the procedures stated in the *2010 Highway Capacity Manual* (HCM 2010 – Reference 1) or the *2000 Highway Capacity Manual* (HCM 2000 – Reference 2) using Synchro 10 software. The signalized intersection of SE Rusk Road/OR-224 was analyzed using HCM 2000 to obtain overall intersection volume-to-capacity (v/c) ratios for comparison to ODOT-maintained intersection operating standards. All unsignalized intersections were analyzed using HCM 2010 methodology. The peak 15-minute flow rates were used in the evaluation of all intersection LOS and v/c ratios to provide analyses based on a reasonable worst-case scenario. For this reason, the analyses reflect conditions that are only likely to occur for 15 minutes out of each average peak hour (*refer to Attachment A for additional details*).

Applicable Operating Standards

Chapter 3 of the *City of Milwaukie Transportation System Plan* (Reference 3) defines the minimum acceptable measure of effectiveness for intersections during the peak hour as LOS “D” for both signalized and stop-controlled intersections.

Chapter 5 of the *Clackamas County Comprehensive Plan* (Reference 4) sets performance evaluation standards for the urban area (Table 5-2a). Per these standards, a maximum v/c ratio of 0.90 must be maintained during the midday peak hour and a maximum of 0.99 during the weekday PM peak hour.

The *Oregon Highway Plan* (OHP) (Reference 5) requires a maximum v/c ratio of 0.99 at ODOT-maintained intersections.

Table 1 lists the study intersections, the responsible jurisdiction, and the corresponding operating standard.

Table 1. Study Intersection Operating Standards

Study Intersection	Jurisdiction	Intersection Operating Standard
SE Rusk Road/OR-224	ODOT	Intersection V/C \leq 0.99
SE Rusk Road/Church Driveway	City of Milwaukie & Clackamas County	LOS "D" & Midday V/C \leq 0.90, PM V/C \leq 0.99
SE Rusk Road/SE Ruscliff Road	City of Milwaukie & Clackamas County	LOS "D" & Midday V/C \leq 0.90, PM V/C \leq 0.99
SE Rusk Road/SE Kellogg Creek Drive	City of Milwaukie & Clackamas County	LOS "D" & Midday V/C \leq 0.90, PM V/C \leq 0.99
SE Kellogg Creek Drive/Church Driveway	City of Milwaukie	LOS "D"
SE Rusk Road/SE Aldercrest Road	City of Milwaukie & Clackamas County	LOS "D" & Midday V/C \leq 0.90, PM V/C \leq 0.99

EXISTING CONDITIONS

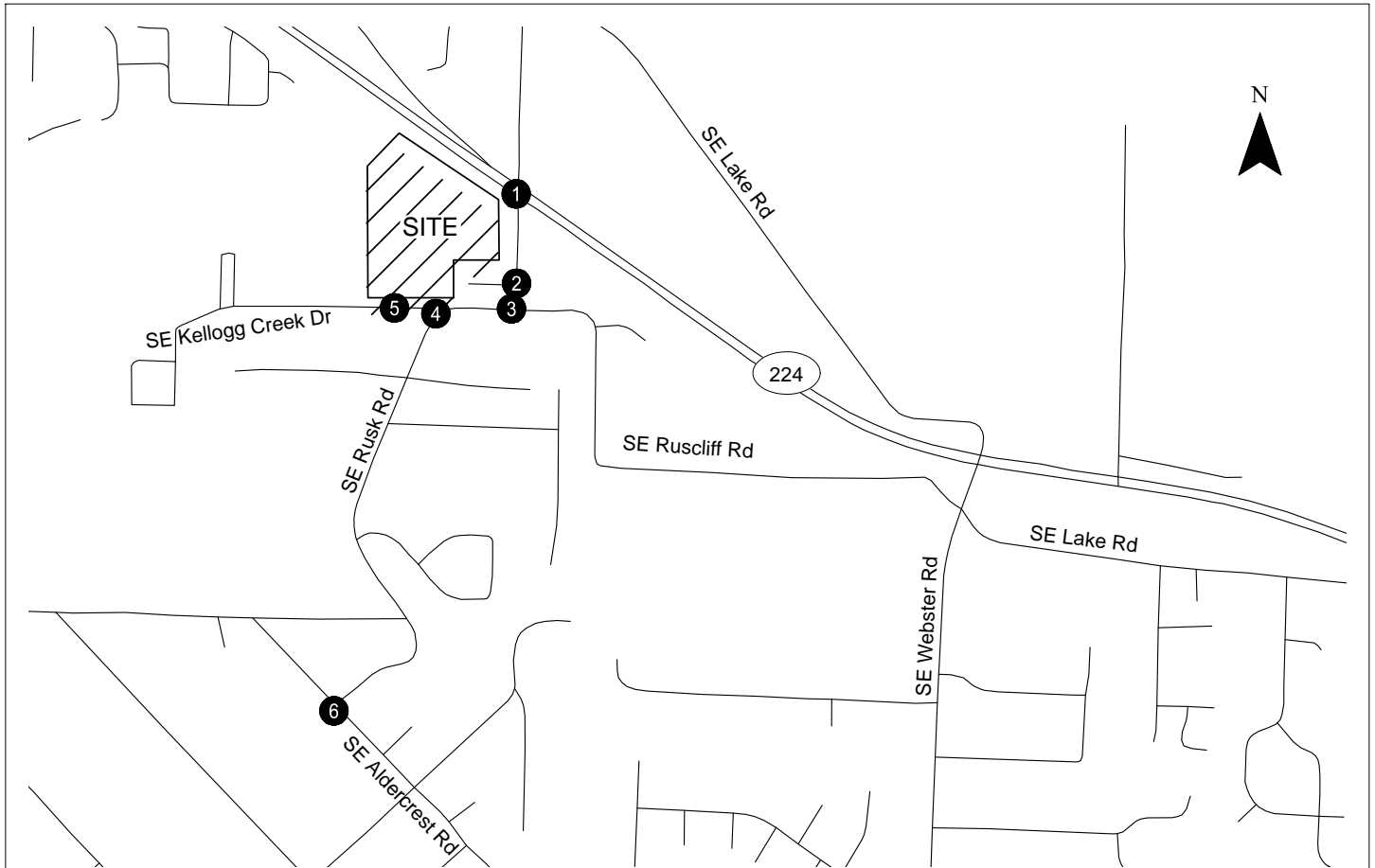
This section summarizes the existing characteristics of the transportation system and adjacent land uses in the vicinity of the proposed development, including an inventory of the existing multimodal transportation facilities and options, an evaluation of existing intersection operations for motor vehicles at the study intersections, and a summary of recent study intersection crash history.

Site Conditions and Adjacent Land Uses

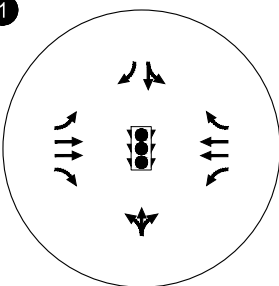
The proposed development site is located within the City of Milwaukie, south of the Milwaukie Expressway (referred to as OR-224 in the remainder of this report), west of SE Rusk Road, and north of SE Kellogg Creek Drive. While the site is within the City of Milwaukie, SE Rusk Road is one of the dividing lines between the City and unincorporated Clackamas County to the east. The development site is mostly open space and interfaces with Turning Point Church and its surface parking lot. Today, there are two access points that serve the church: one located at the east end of the property on SE Rusk Road and one located on the south side of the property on SE Kellogg Creek Drive.

Transportation Facilities

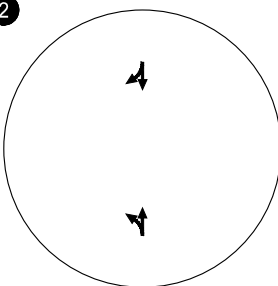
Figure 3 illustrates the existing lane configurations and traffic control devices at the study intersections. **Table 2** summarizes the attributes of key roadways in the vicinity.



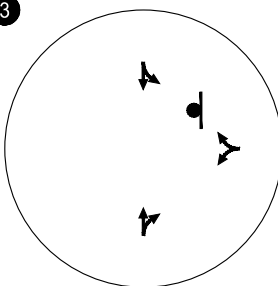
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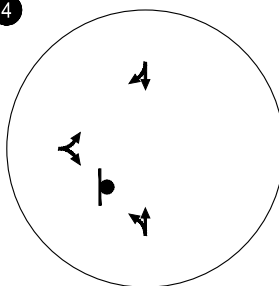
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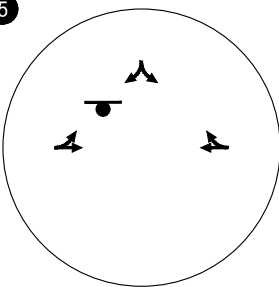
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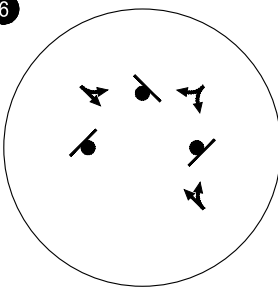
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5



6



For analysis, SE Rusk Road was assumed to be north/south throughout the study area.

-  - STOP SIGN
-  - TRAFFIC SIGNAL

Existing Lane Configurations
& Traffic Control Devices
Milwaukie, Oregon

Figure
3

Table 2. Street Characteristics in Site Vicinity

Street	Classification ¹	Motor Vehicle Travel Lanes	Posted Speed (mph)	Sidewalks	Striped Bicycle Lanes	On-Street Parking
OR-224	Freeway/Regional Route (Milwaukie) Freeway/Expressway (Clackamas County) Urban Principal Arterial (ODOT)	4-5	50	No	No	No
SE Rusk Road	Collector	2	30	Partial ²	No	Yes ³
SE Kellogg Creek Drive	Local Street	2	25	Yes ⁴	No	South side
SE Ruscliff Road	Local Street	2	25	No	No	Yes
SE Aldercrest Road	Local Street	2	30	No	No	Yes ³

¹Per *City of Milwaukie Transportation System Plan*, Table 3-4 (Reference 3)

²There is a sidewalk on the east side of SE Rusk Road between SE Eastbrook Drive and SE Robhil Drive. There is a sidewalk on the west side of SE Rusk Road from SE Eric Street north approximately 250'. There is a sidewalk on the north and west sides of SE Rusk Road from SE Kellogg Creek Drive to OR-224.

³Some on-street parking is available in front of homes and/or sections of sidewalk.

⁴There is no sidewalk on the south side of SE Kellogg Creek Drive between Deerfield Village Assisted Living and SE Rusk Road.

Roadway Cross Section Standards

The City of Milwaukie maintains typical cross-sections for roadways based on functional classification, as detailed in the City's *Transportation System Plan* (Reference 3). Milwaukie Municipal Code (MMC) Section 19.708 requires that all rights-of-way, streets, sidewalks, necessary public improvements, and other public transportation facilities located in the public right-of-way and abutting the development site shall be adequate at the time of development or shall be made adequate in a timely manner.

Per MMC Table 19.708.2, the SE Kellogg Creek Drive local street cross section fronting the proposed development site should include 10-foot wide travel lanes, 8-foot wide parking with curb and gutter, 5-foot wide bike lanes, 5-foot landscape strips and 5-foot detached sidewalks.

Pedestrian Facilities

The entire site frontages on both SE Rusk Road and SE Kellogg Creek Drive have sidewalks along their lengths. There are marked crosswalks on three approaches (none on the eastern approach) of the SE Rusk Road/OR-224 intersection. The north side of SE Rusk Road at the three-leg intersection with SE Kellogg Creek Drive has a curb bulb-out. The North Clackamas Park and the Milwaukie Community Center can be reached via sidewalk from the site, and there is a marked crosswalk at the entrance to the park. The closest pedestrian crossing of Mt. Scott Creek is via a trail through the park, which provides access to SE Casa Del Rey Drive and then a completed sidewalk access route to SE Lake Road west of OR-224.

Bicycle Facilities

No striped on-street bicycle facilities are provided within the project vicinity today. The 2013 *City of Milwaukie Transportation System Plan* (Reference 3) identifies the need for a bicycle facility connecting the SE Rusk Road/OR-224 intersection with the southwest corner of the proposed development site.

Transit Facilities

Per TriMet’s online schedule, (Reference 6) weekday bus service is provided by TriMet Route 152 (Milwaukie) along SE Harmony Road and SE International Way between downtown Milwaukie and Clackamas Town Center from 6:30 AM to 6:30 PM. Headways change throughout the day and range from approximately 30 to 40 minutes. The stop closest to the site is at the intersection of SE Lake Road/SE Harmony Road on the north side of OR-224, approximately ½-mile from the site.

TriMet Route 29 (Lake/Webster Road) operates along SE Lake Road between downtown Milwaukie and Clackamas Town Center approximately every 75 minutes on weekdays from 5:30 AM to 8:00 PM. The closest stop to the site is at the intersection of SE Rusk Road/SE Lake Road on the north side of OR-224, slightly less than ½-mile away.

TriMet Route 30 (Estacada) operates along OR-224 between Estacada and downtown Portland via Clackamas Town Center once per weekday in each direction. The closest stop to the site is at the intersection of SE Webster Road/SE Lake Road to the east.

Crash History Analysis

Reported crash history for each study intersection was reviewed in an effort to identify potential intersection safety issues. Reported crash data for the study intersections were obtained from ODOT for the five-year period from January 1, 2014 through December 31, 2016. **Table 3** summarizes the crashes reported at the study intersections. *Attachment B contains the ODOT crash data.*

Table 3. Intersection Crash History (January 1, 2012 through December 31, 2016)

Intersection	Collision Type			Severity			Total Crashes
	Rear End	Turning	Angle	PDO ¹	Injury	Fatality	
SE Rusk Road/OR-224	8	2	3	5	8	0	13
SE Rusk Road/SE Ruscliff Road	0	1	0	1	0	0	1
SE Rusk Road/SE Kellogg Creek Drive	0	3	0	2	1	0	3
SE Rusk Road/SE Aldercrest Road	1	2	0	1	2	0	3

¹PDO – Property damage only

Critical crash rates were calculated for each of the study intersections following the analysis methodology presented in ODOT’s *SPR 667 Assessment of Statewide Intersection Safety Performance* (Reference 7). SPR 667 provided average crash rates at a variety of intersection configurations in Oregon based on number of approaches and traffic control types. The average crash rate represents the approximate number of crashes that are “expected” at a study intersection. Additionally, this average crash rate was used to calculate the critical crash rate for each study intersection, based on the *Highway Safety Manual* methodology (Reference 8). The critical crash rate is calculated for each intersection based on the average crash rate for each facility and serves as a threshold for further analysis.

Table 4 summarizes the critical crash rate for each intersection and compares those values to the observed crash rate. Per ODOT, if the observed crash rate at the study location exceeds the critical rate, it is a possible indication that the location is exceeding average crash rates. As shown in **Table 4**, the observed crash rate at all intersections is less than the critical crash rates.

Table 4. Intersection Crash Rate Assessment

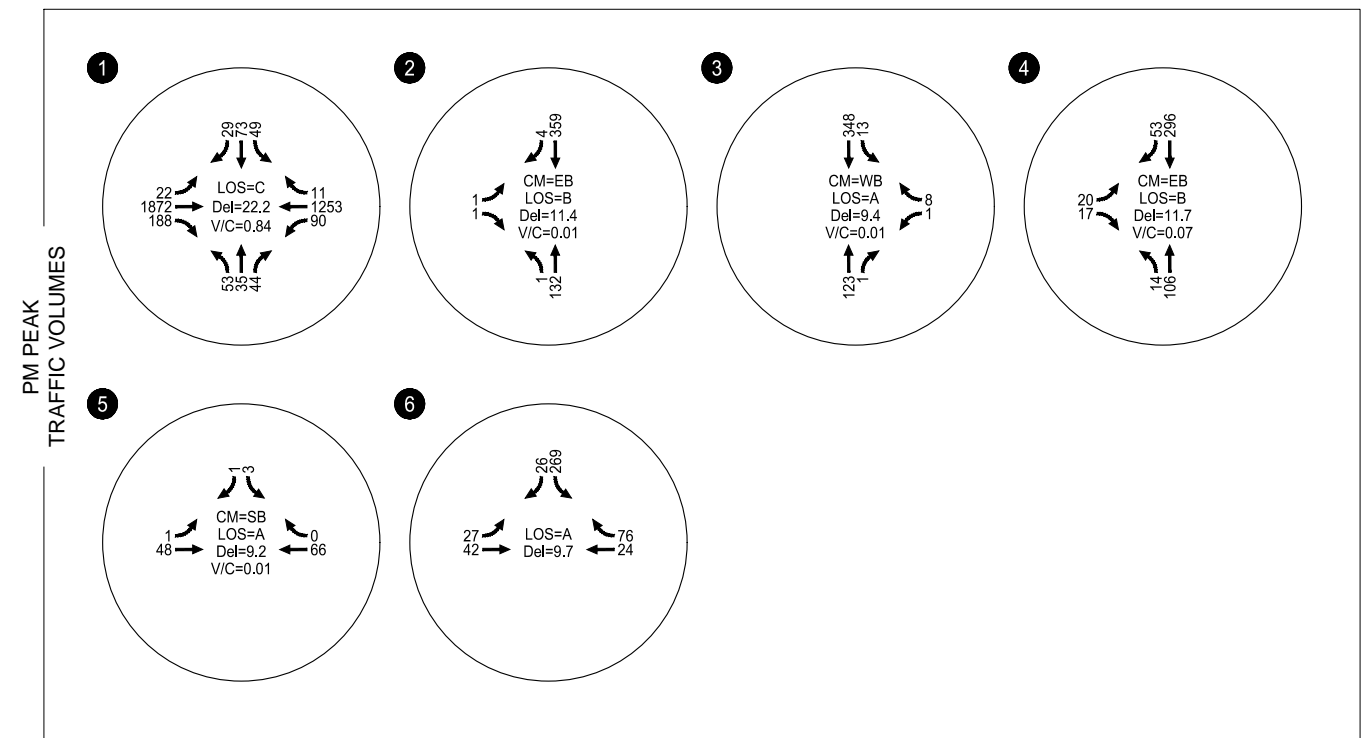
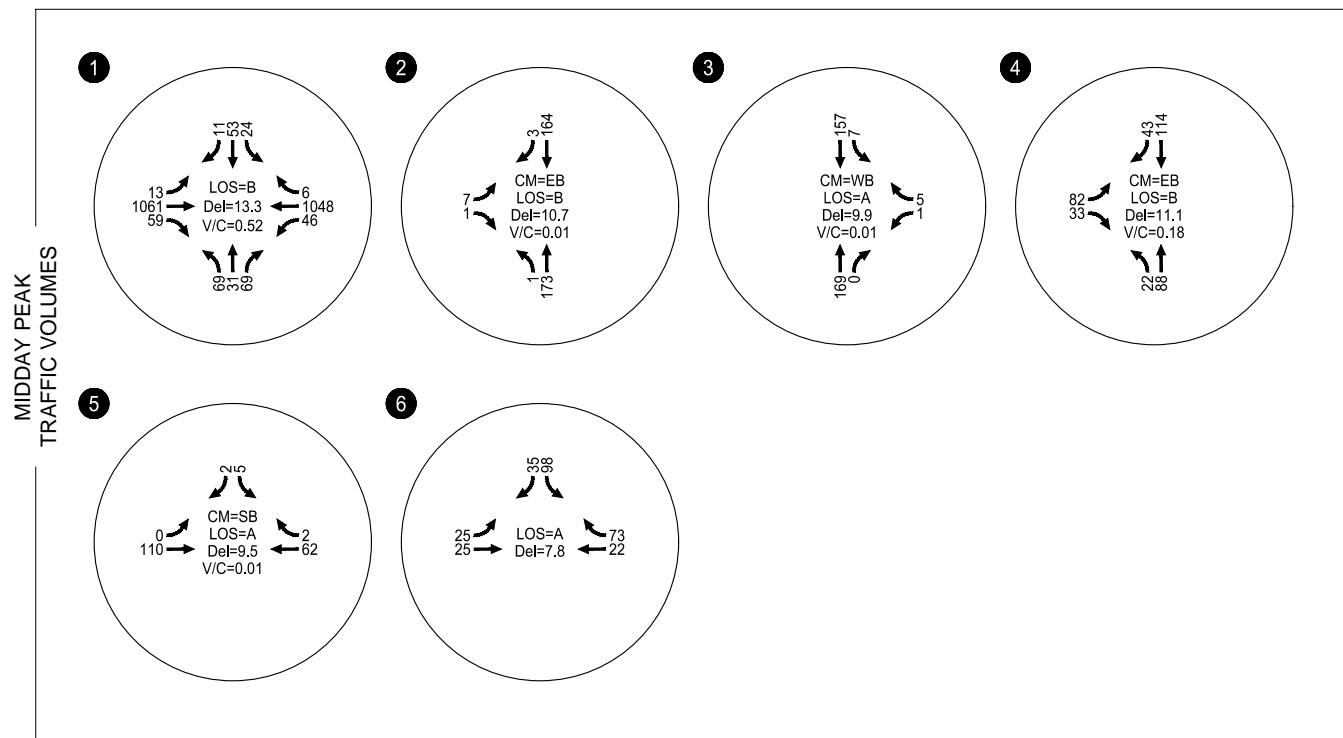
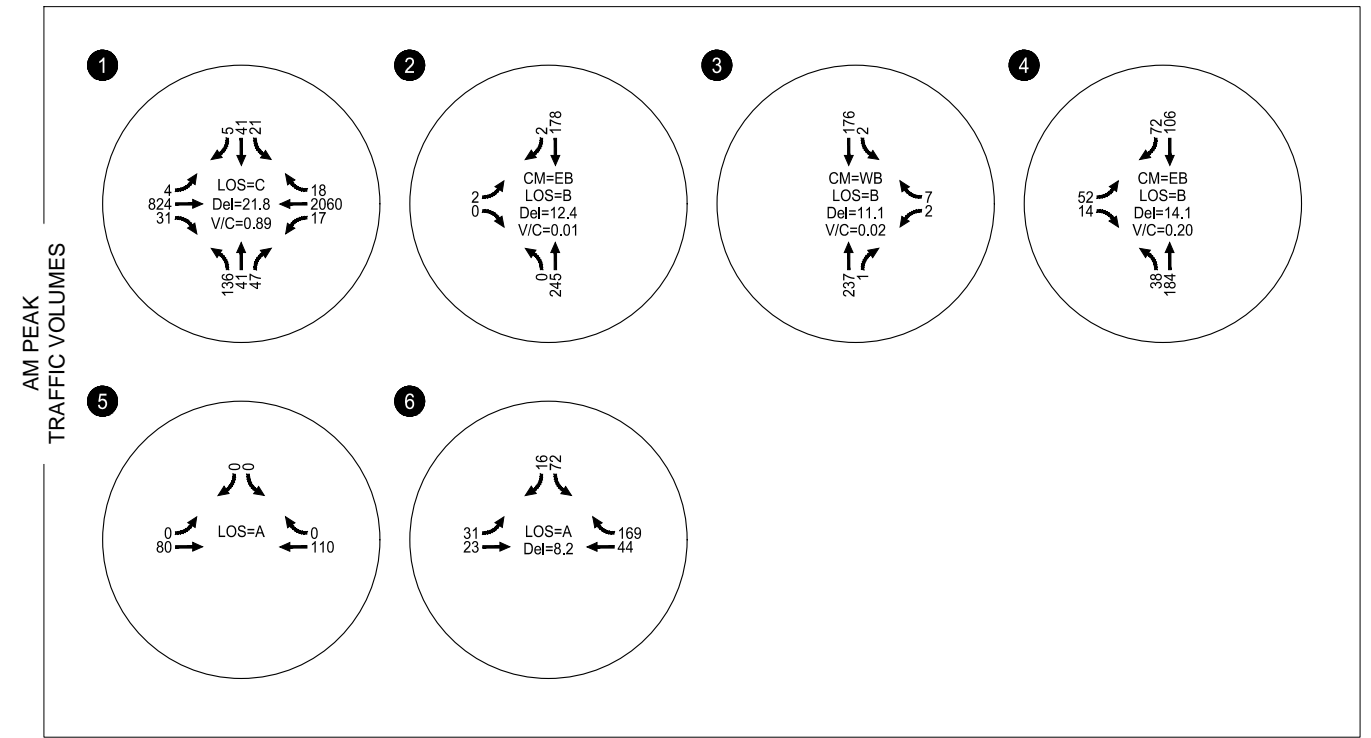
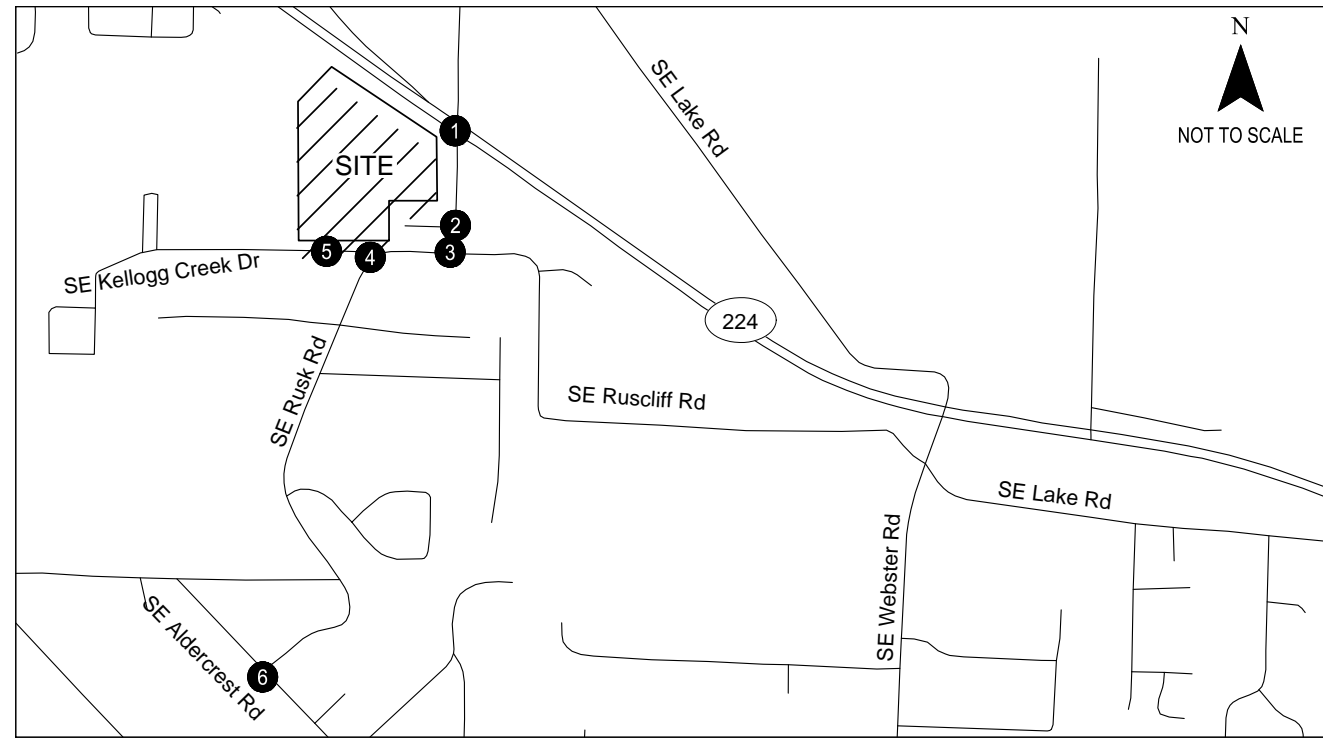
Location	Total Crashes	Critical Crash Rate by Intersection	Critical Crash Rate by Volume	Observed Crash Rate at Intersection	Observed Crash Rate > Critical Crash Rate?
SE Rusk Road/OR-224	13	0.62	0.53	0.19	No
SE Rusk Road /SE Ruscliff Road	1	0.38	0.40	0.11	No
SE Rusk Road/SE Kellogg Creek Drive	3	0.38	0.40	0.32	No
SE Rusk Road/SE Aldercrest Road	3	0.38	0.41	0.35	No

No safety-based mitigations were identified for implementation in conjunction with the proposed development based on review of the historic crash data alone.

Existing Conditions Operational Analysis

Manual turning movement counts were collected at the study intersections in October 2018. Traffic counts were collected during the weekday morning (7:00 AM to 9:00 AM), midday (11:00 AM to 1:00 PM), and evening (4:00 PM to 6:00 PM) peak periods during typical weekday conditions while school was in session. ODOT provided traffic signal phasing and timing for the SE Rusk Road/OR-224 intersection. *Attachment C contains the traffic count worksheets.*

Figure 4 summarizes the existing traffic conditions at the study intersections during the weekday AM, midday, and PM peak hours. As shown in **Figure 4**, all intersections operate within applicable City, County, and ODOT standards during all three peak hours. *Attachment D includes the existing operations analysis worksheets.*



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

Existing Traffic Conditions
 Weekday AM, Midday & PM Peak Hours
 Milwaukie, Oregon

Figure
 4

While the respective operating standards are satisfied, field observations documented existing weekday AM peak hour northbound queuing on SE Rusk Road at OR-224 that extends past SE Ruscliff Road and west towards SE Kellogg Creek Drive. The queuing reflects the signal timing in place at the SE Rusk Road/OR-224 intersection that facilitates east-west progression along OR-224 and the relatively narrow (single lane) northbound intersection approach.

TRANSPORTATION IMPACT ANALYSIS

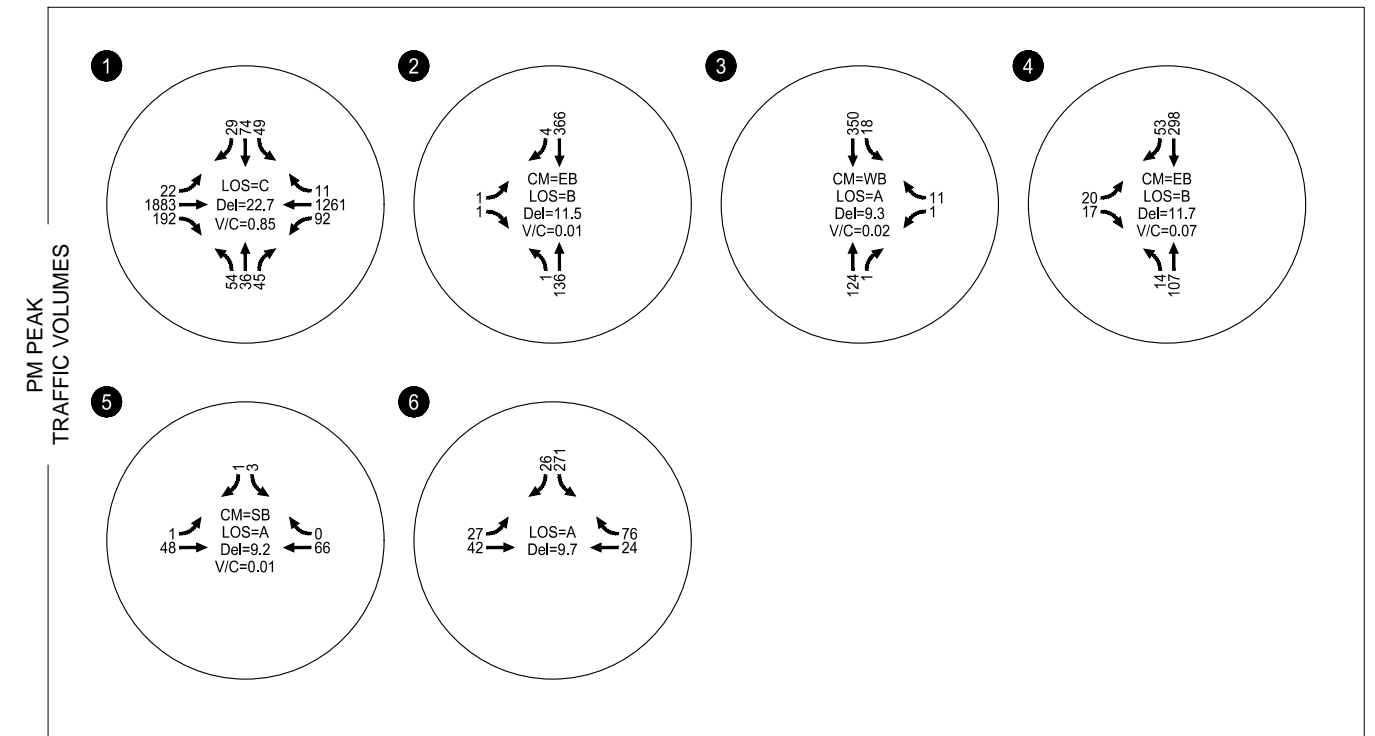
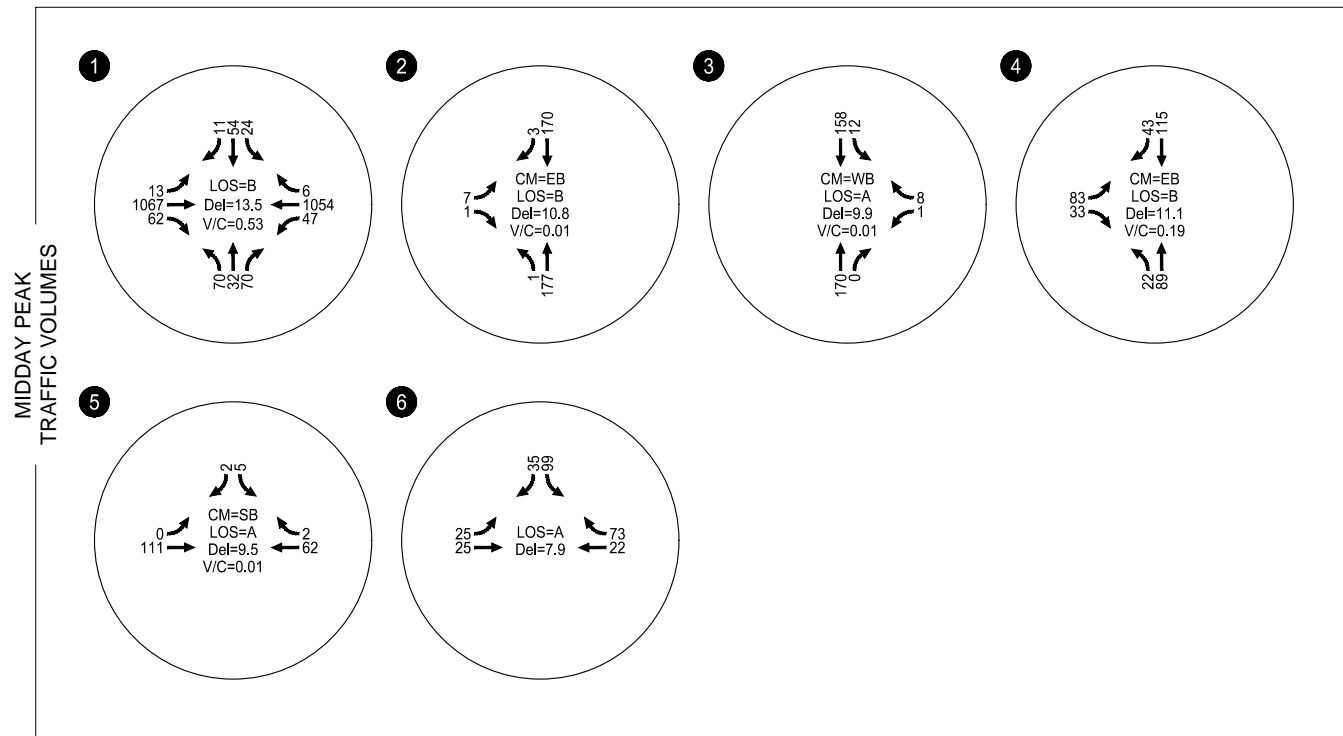
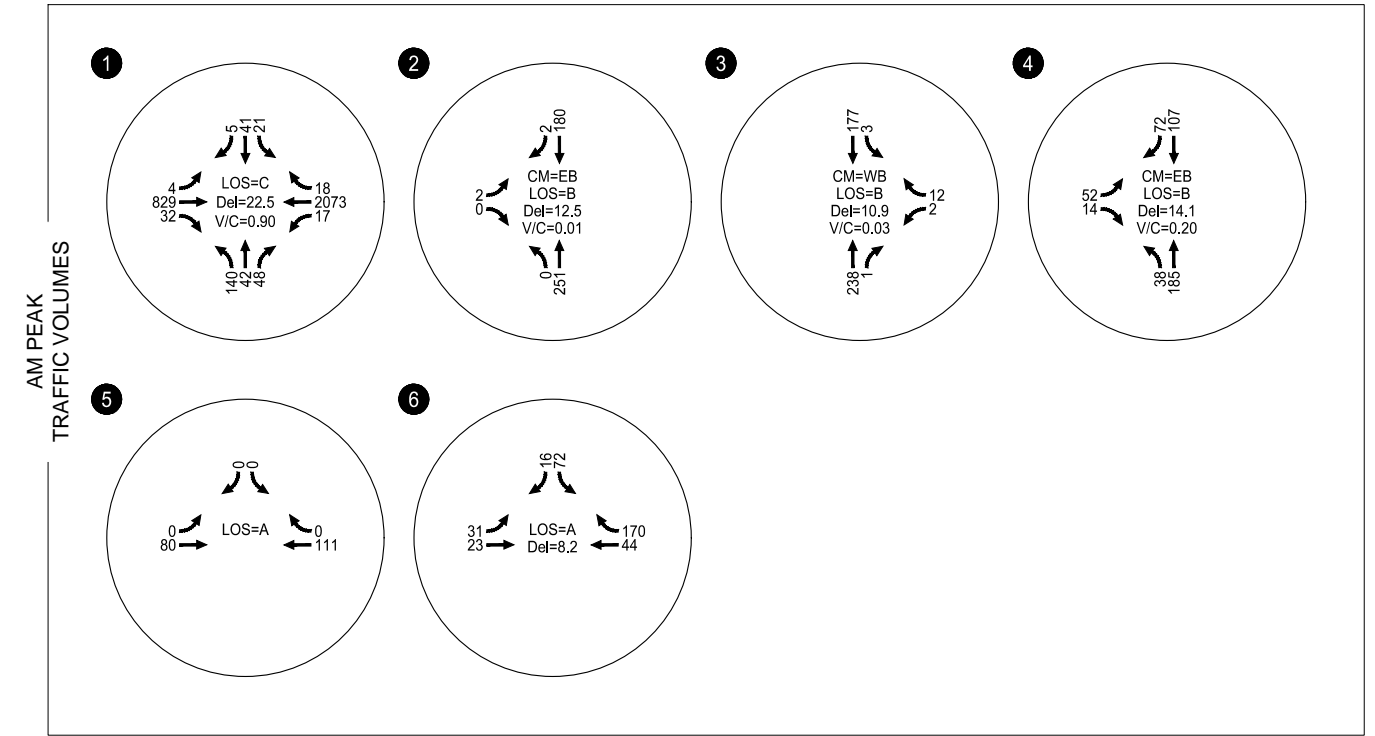
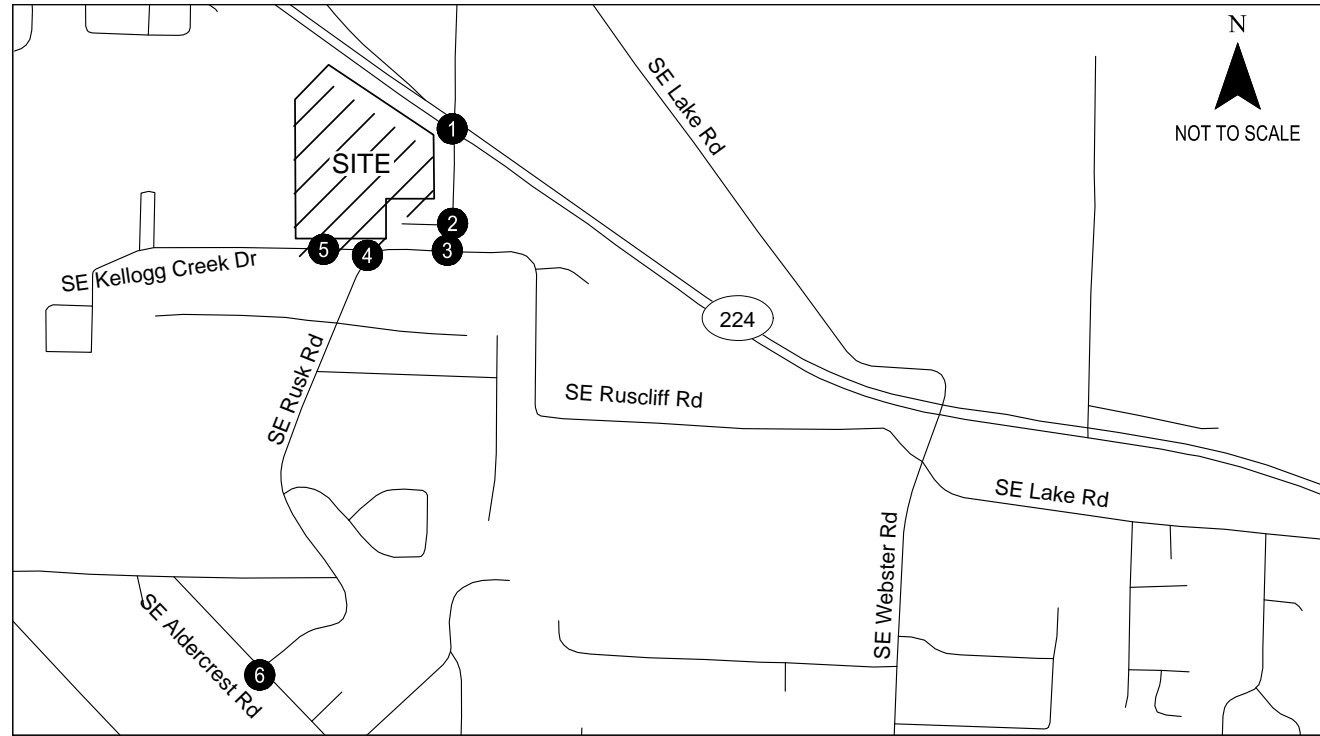
The transportation impact analysis identifies how the study area's transportation system would operate in the year 2019 upon development of the site. This section of the report includes analysis of 2019 background traffic volumes and operations, an estimate of site-generated trips, and analysis of 2019 total traffic volumes and operations with the proposed development.

2019 Background Operational Analysis

Background traffic volumes include changes in volumes due to added trips from in-process developments in the vicinity of the site as well as general regional growth. Per direction from City of Milwaukie staff, no planned transportation improvements are included in the background traffic analysis. A 0.61 percent growth rate¹ was applied to the existing traffic volumes to reflect near-term growth. Additionally, in-process trips were included for a proposed residential development on SE Ruscliff Road with up to eight single-family homes. These trips were all conservatively assigned to the SE Rusk Road/OR-224 intersection, rather than assigning a portion of trips to SE Aldercrest Road. *Attachment E includes the in-process traffic volumes.*

Figure 5 illustrates the 2019 background traffic volumes and corresponding operational analysis for the weekday AM, midday, and PM peak hours. As shown, all of the intersections are expected to continue to satisfy applicable City, County, and ODOT standards under background conditions, though northbound queuing on NE Rusk Road approaching Highway 224 will lengthen. *Attachment E includes the 2019 background operations analysis worksheets.*

¹ Annual traffic growth rate calculated from 2006 count data at the SE Rusk Road/OR-224 intersection in the City of Milwaukie's *Transportation System Plan* and 2018 count data collected at the same intersection for this analysis.



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

2019 Background Traffic Conditions
 Weekday AM, Midday & PM Peak Hours
 Milwaukie, Oregon

Figure
 5

Trip Generation Estimate

Trips for the proposed senior housing development were estimated using trip rates obtained from *Trip Generation Manual, 10th Edition* (Reference 9), as shown in **Table 5**. Note that the weekday AM and PM peak hour trip rates were conservatively calculated using the fitted curve equation in the *Trip Generation Manual*. Based on direction from Clackamas County, the weekday PM peak hour trip generation rates were used for the weekday midday peak hour estimates as shown in **Table 5**. Midday trip rate data is not available through the *Trip Generation Manual*.

Table 5. Trip Generation with Development

Land Use	ITE Code	Size	Total Daily Trips	Weekday AM Peak Hour			Weekday Midday Peak Hour			Weekday PM Peak Hour		
				Total Trips	In	Out	Total Trips	In	Out	Total Trips	In	Out
Continuing Care Retirement Community	255	170 units	408	35	23	12	35	14	21	36	14	22

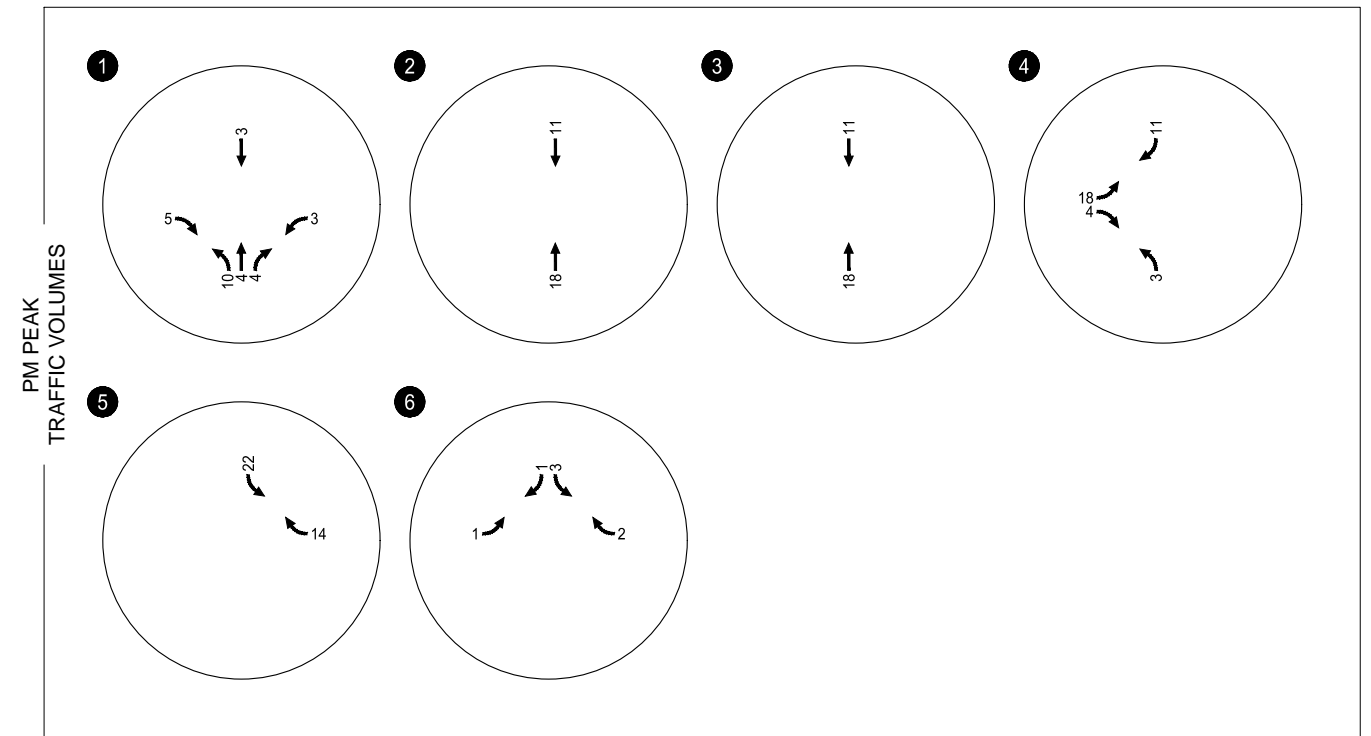
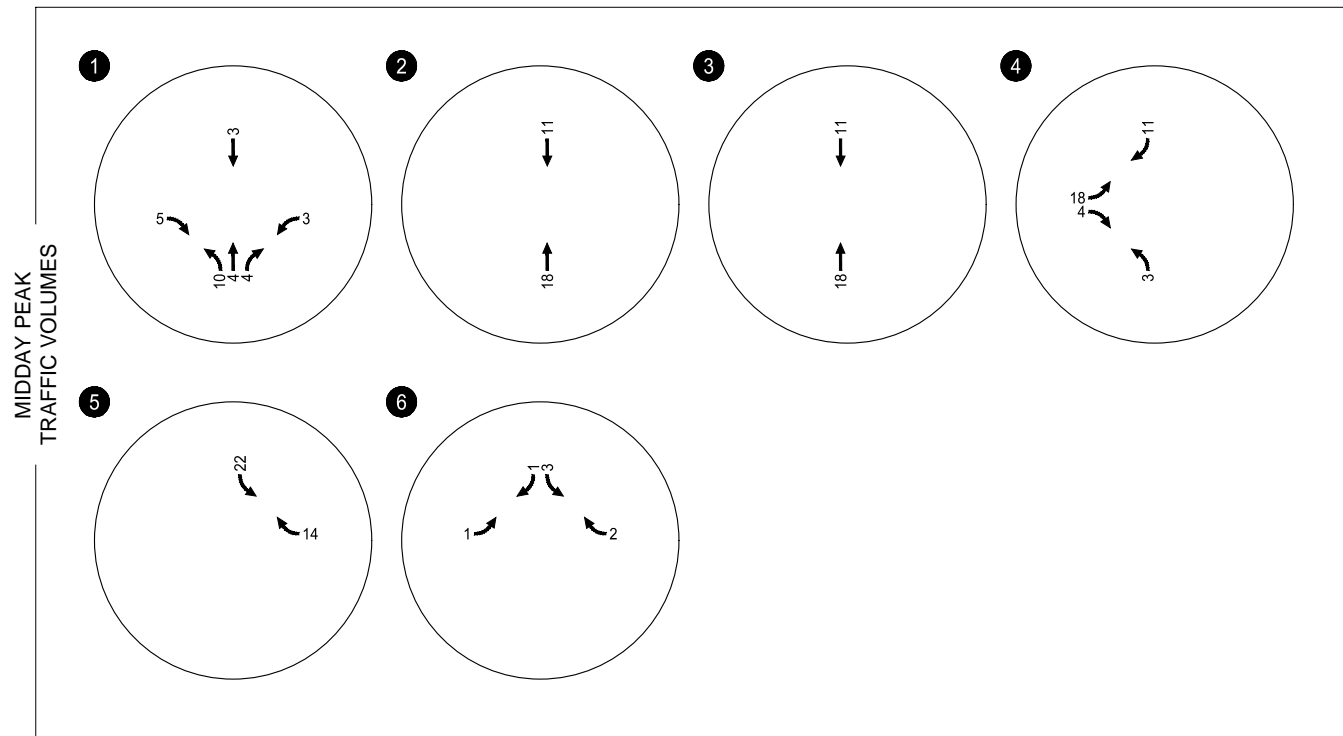
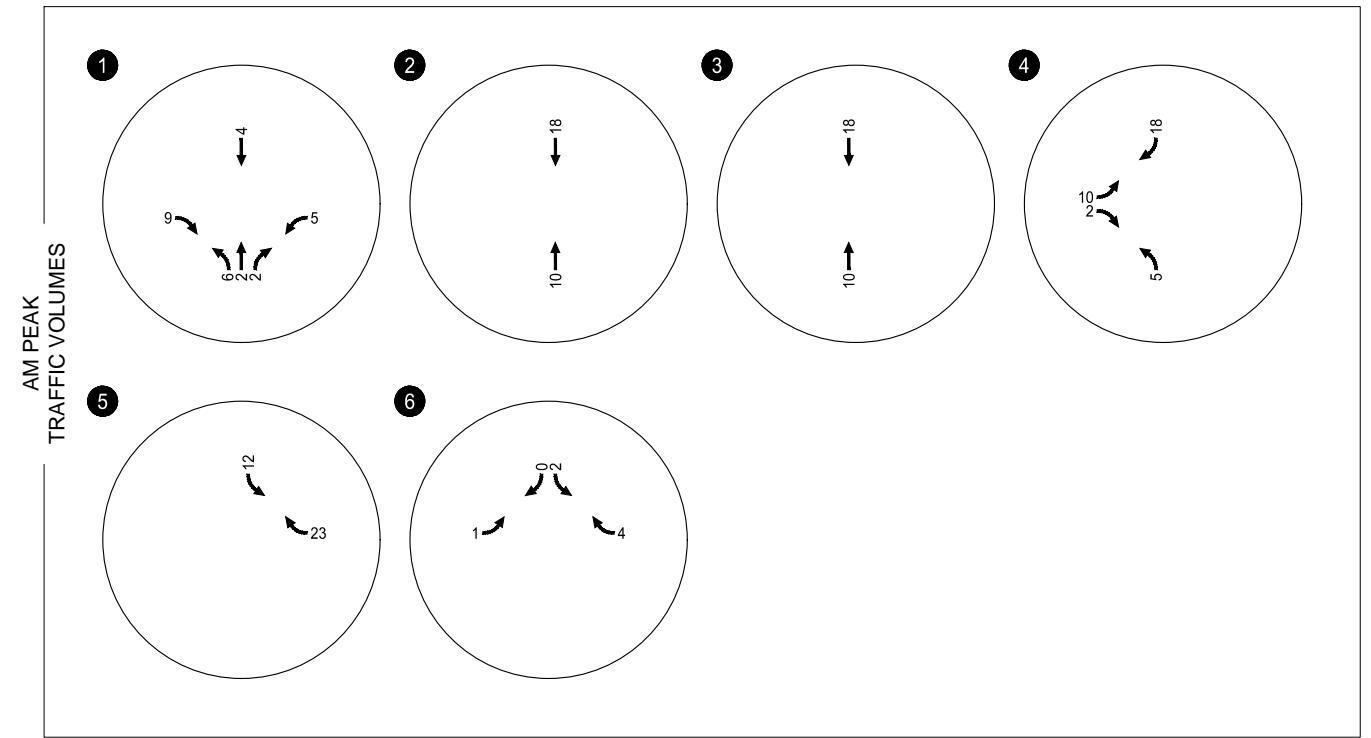
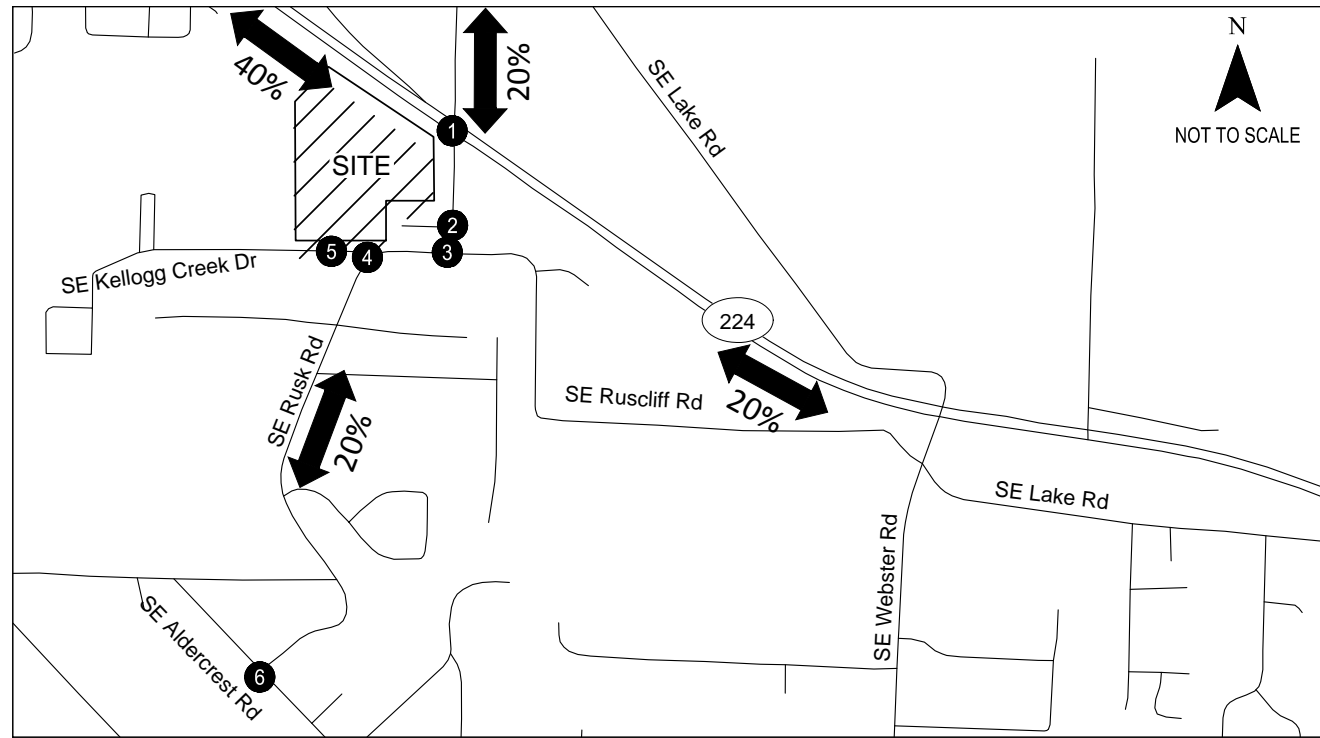
Trip Distribution/Assignment

A trip distribution pattern was identified for the site considering existing traffic patterns at the study intersections as well as the anticipated travel patterns of site residents, visitors, and employees. Site-generated traffic was assigned to the study intersections based on the estimated distribution pattern. **Figure 6** shows the proposed trip distribution and the site-generated trips at each study intersection for the weekday AM, midday, and PM peak hours.

Year 2019 Total Traffic Conditions

The total traffic conditions analysis forecasts the operation of the study area’s transportation system with the inclusion of traffic generated by the proposed site development². Regardless of the proposed development, there is an existing need for a northbound right-turn lane on SE Rusk Road approaching OR-224. Recognizing the existing northbound queuing, the Applicant is collaborating with the City of Milwaukie to construct a northbound right-turn lane with at least 100 feet of storage at the SE Rusk Road/OR-224 intersection (final design parameters to be confirmed in coordination with the City based on available right-of-way and subject to available Transportation System Development Charge credits). **Figure 7** illustrates the study intersection proposed lane configurations and traffic control.

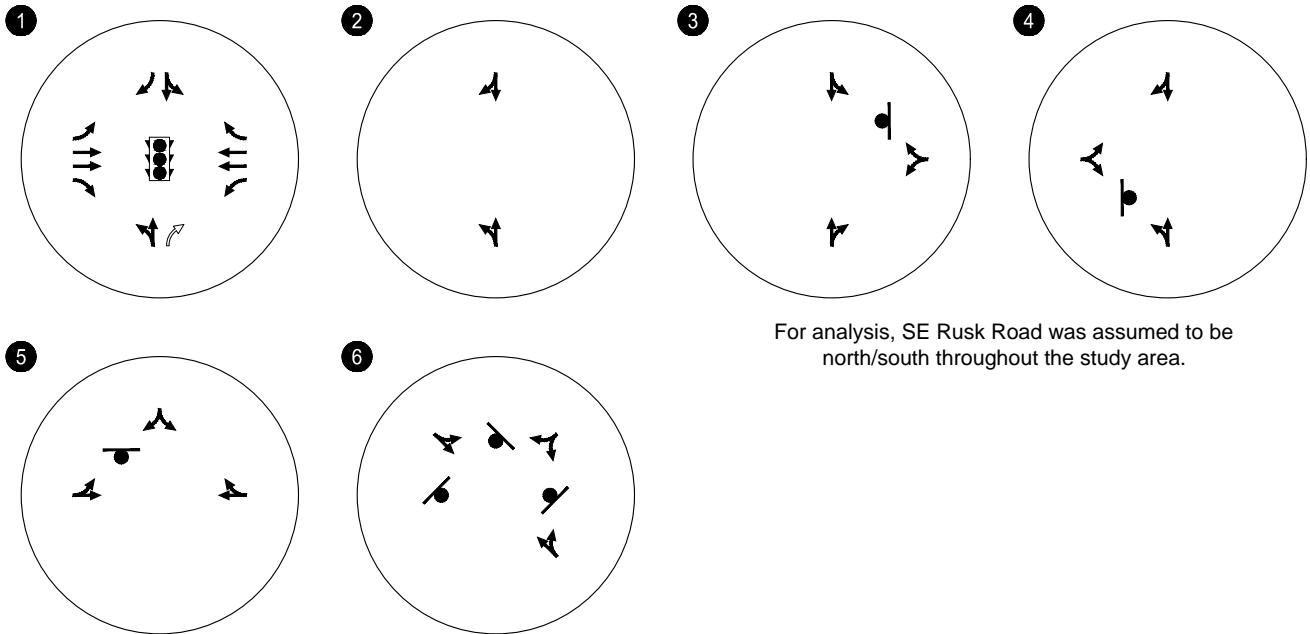
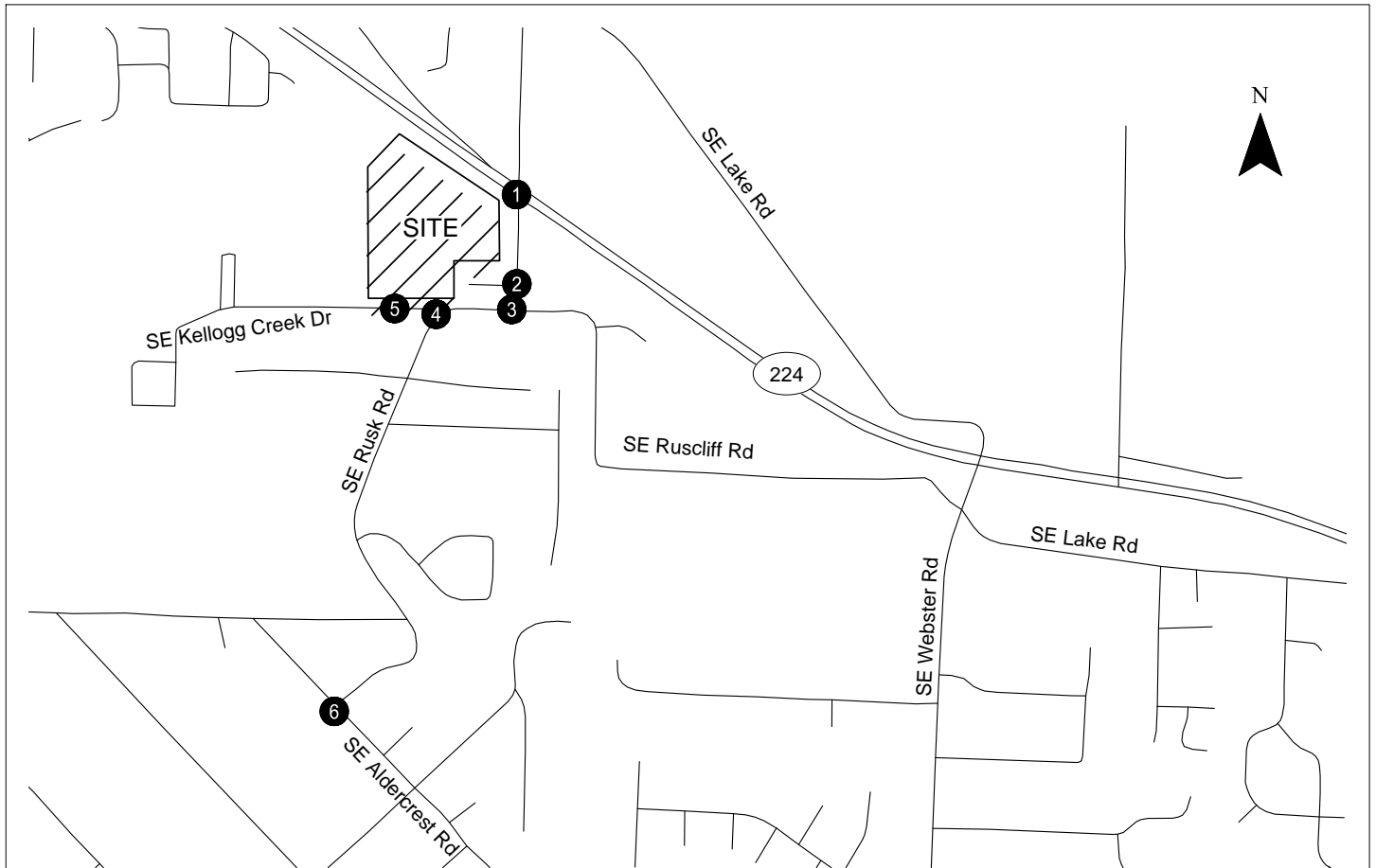
² Note that existing trips exiting the Church driveway to SE Rusk Road were redistributed to the site access under total traffic conditions. *Attachment F includes the redistributed traffic volumes.*






Site-Generated Trip Assignment
 Weekday AM, Midday & PM Peak Hours
 Milwaukie, Oregon

Figure
 6

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For analysis, SE Rusk Road was assumed to be north/south throughout the study area.

-  - STOP SIGN
-  - TRAFFIC SIGNAL
-  - PROPOSED LANE ADDITION

Proposed Lane Configurations
& Traffic Control Devices
Milwaukie, Oregon

Figure
7

Total traffic conditions were determined by adding the estimated site-generated and redistributed traffic to the year 2019 background volumes for the weekday AM, midday, and PM peak hours. **Figure 8** illustrates the 2019 total traffic conditions and corresponding operational analysis for the weekday AM, midday, and PM peak hours.

As shown in **Figure 8**, all of the intersections are expected to continue to satisfy applicable City, County, and ODOT standards under total traffic conditions. *Attachment F includes the 2019 total traffic operations analysis worksheets.*

Year 2019 Queuing Analysis

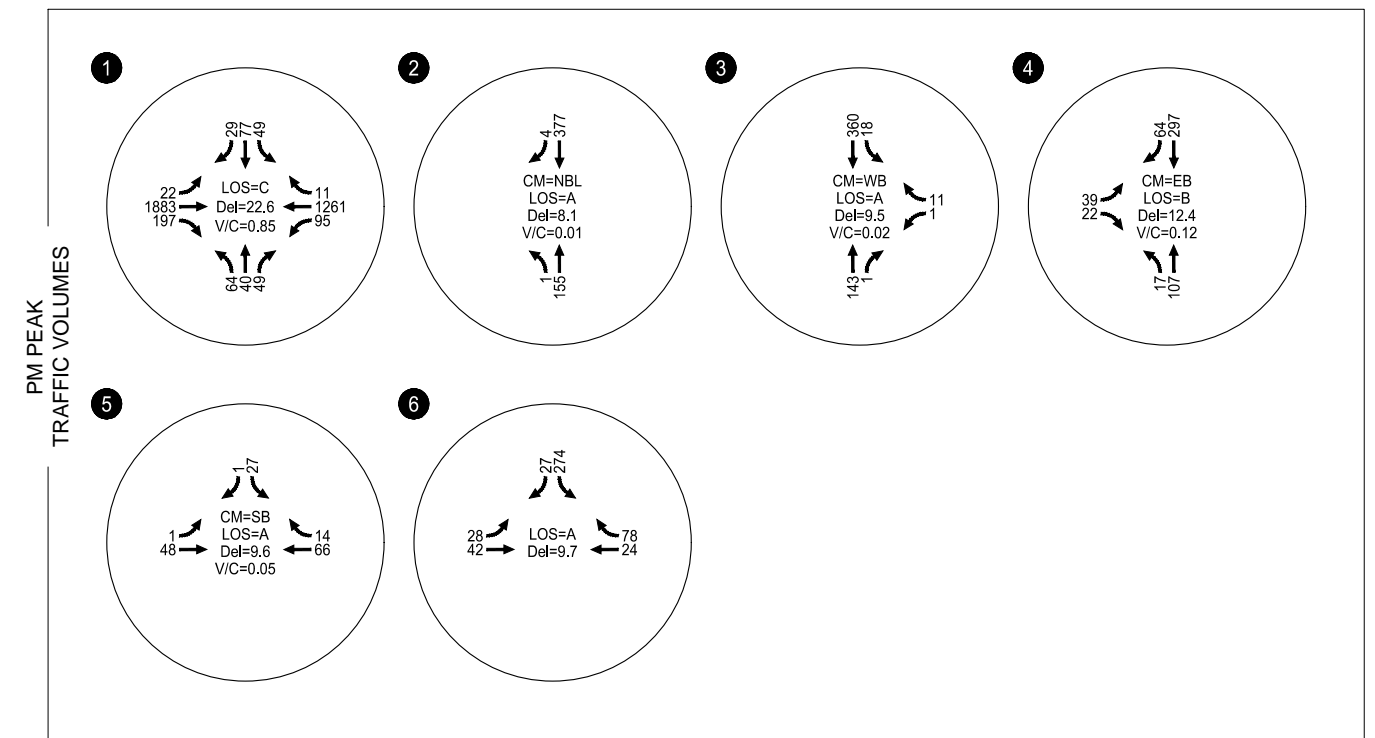
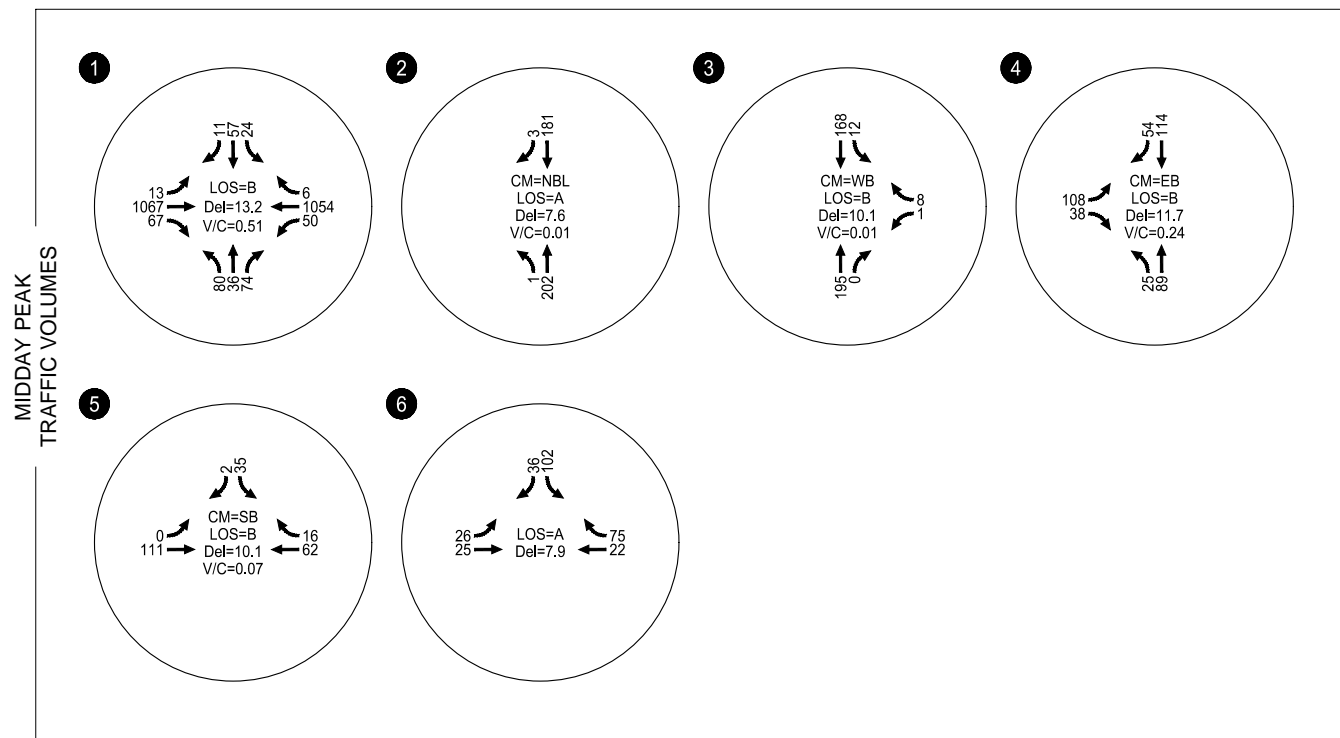
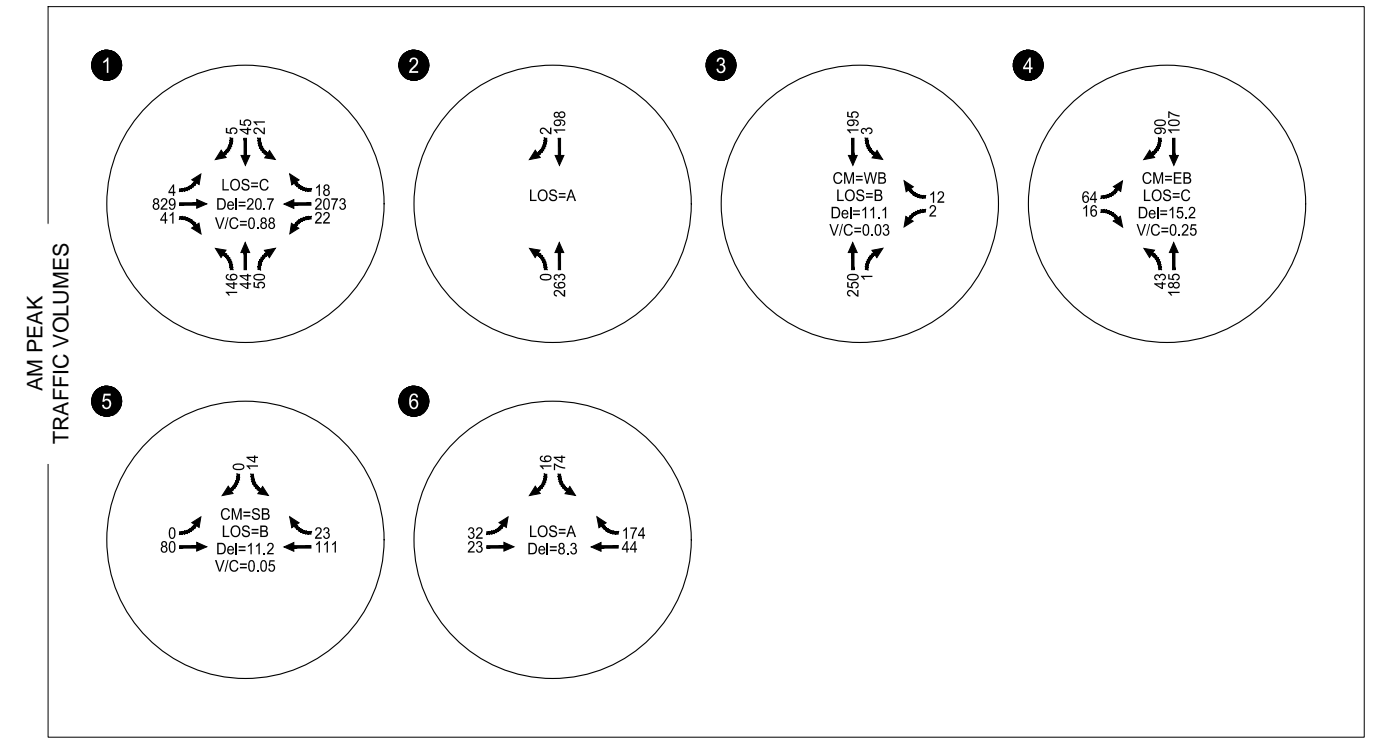
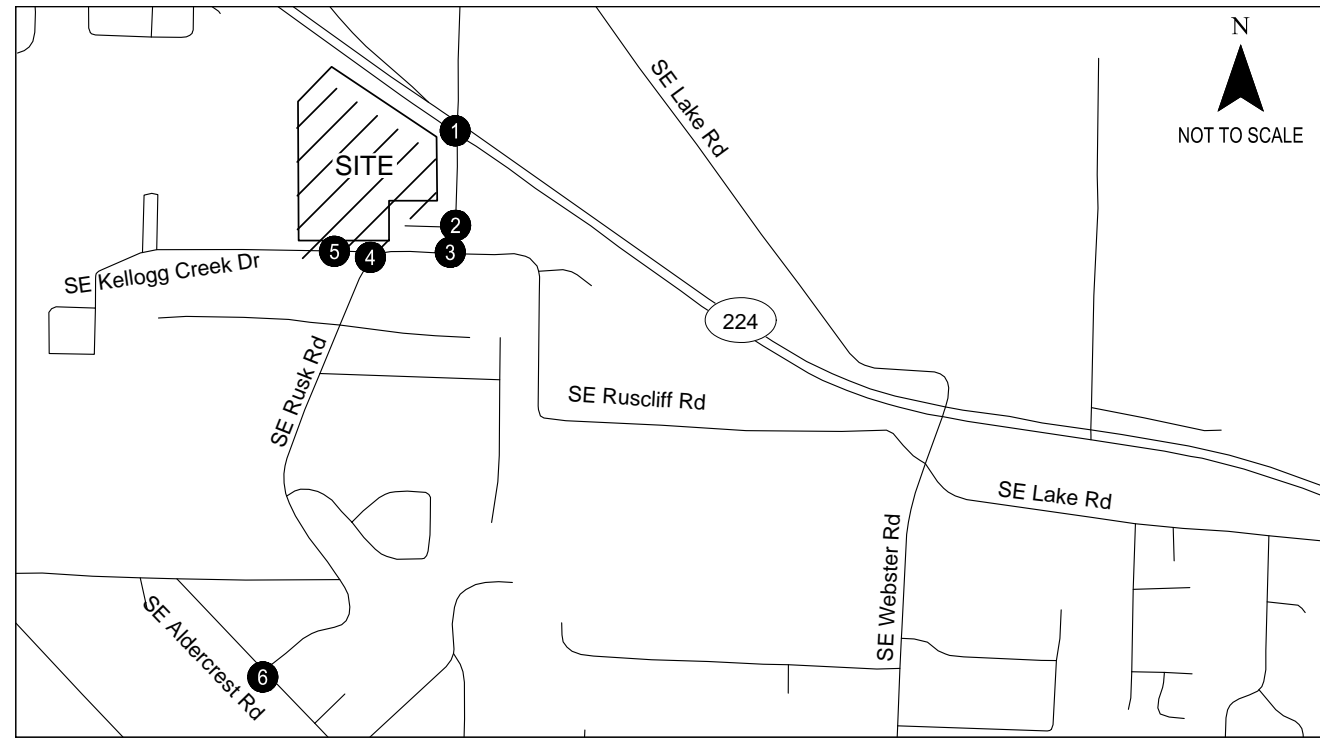
Per Section 19.704.3 and Section 295.16 of the *City of Milwaukie Municipal Code* (Reference 10) and the *Clackamas County Roadway Design Standards*, respectively, 95th percentile queuing at the study intersections site were assessed during the weekday AM, midday, and PM peak hours. The results of this 95th percentile queue length analysis are included in **Table 6**.

Table 6. Summary of 95th Percentile Queues, 2019 Total Traffic Conditions

Intersection	Movement	Available Queue Storage (feet)	95 th Percentile Queue (feet)			Queue Storage Adequate?
			Weekday AM Peak Hour	Weekday Midday Peak Hour	Weekday PM Peak Hour	
SE Rusk Road/OR-224	EBL	470	25	50	50	Yes
	EBR	110	25	25	100	Yes
	WBL	455	50	75	175	Yes
	WBR	100	25	0	0	Yes
	NBLT	>400	275	125	200	Yes
	NBR	50	25	50	50	Yes
	SBLT	745	100	100	200	Yes
	SBR	75	0	0	25	Yes
SE Rusk Road/SE Ruscliff Road	WBLR	360	25	0	0	Yes
SE Rusk Road/SE Kellogg Creek Drive	EBLR	>100	25	25	25	Yes
SE Kellogg Creek Drive/Church Access	SBLR	75	25	25	25	Yes
SE Rusk Road/SE Aldercrest Road	EBLT	Continuous	-	-	-	Yes
	WBTR	Continuous	-	-	-	Yes
	SBLR	Continuous	-	-	-	Yes

Where: EB = eastbound, WB = westbound, NB = northbound, SB = southbound, L = left-turn, T= through, R = right-turn
Queues rounded up to the nearest vehicle length, assumed to be 25 feet

As shown in **Table 6**, all 95th percentile queues during year 2019 total traffic conditions would be accommodated by the available storage. As previously noted, there is an existing need for a northbound right-turn lane at the SE Rusk Road/OR-224 intersection regardless of the proposed development. Provision of the northbound right-turn lane on SE Rusk Road approaching OR-224 reduces northbound queues relative to existing conditions.



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 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED/AWSC) / CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
 Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED/AWSC) / CRITICAL MOVEMENT CONTROL DELAY (TWSC)
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2019 Total Traffic Conditions
 Weekday AM, Midday & PM Peak Hours
 Milwaukie, Oregon

Figure
 8

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Intersection Sight Distance

Section 240 of the *Clackamas County Roadway Design Standards* (Reference 11) establishes the intersection sight distance requirements associated with the existing driveway along SE Kellogg Creek Drive. Per Table 2-6 of Section 240 of the *Clackamas County Roadway Design Standards*, an intersection sight distance of 335 feet shall be provided for a left turn from a stop on a road with a 30 mile per hour design speed (posted 25 mph speed)³. Intersection sight distance was observed at the existing site driveway on SE Kellogg Creek Drive and was found to be at least 400 feet to the west, and at least 400 feet to the east for vehicles traveling west on SE Rusk Road⁴.

However, sight distance for a southbound left-turn at the driveway would be approximately 300 feet facing east towards a vehicle northbound on SE Rusk Road turning left onto SE Kellogg Creek Drive. The northbound left-turning vehicles on SE Rusk Road are required to yield to southbound vehicles on SE Rusk Road. Based on a field review of traffic and vehicular speeds entering SE Kellogg Creek Drive from SE Rusk Road, 300 feet is sufficient intersection sight distance for the southbound left-turn at the driveway because vehicles negotiating a left turn onto SE Kellogg Creek Drive would be operating at less than 20 miles per hour. The 25-foot radius of the curve corresponds to a design speed of approximately 11 miles per hour (NCHRP Report 672, Reference 12). Furthermore, the required minimum stopping sight distance for a northbound left-turn vehicle traveling at 20 miles per hour is 115 feet per Table 2-10 of Section 240 of the *Clackamas County Roadway Design Standards*, which will be satisfied. Subject to agency approval, the Applicant proposes to relocate the existing access 45 feet to the west of its existing location, increasing the sight lines and travel distance to SE Rusk Road.

Landscaping, above ground utilities, and signing should be located and maintained in a manner that provides adequate intersection sight distance.

Analysis of Access Standards

Per Section 12.16.040 of the *City of Milwaukie Municipal Code* (Reference 10) driveway access to the nearest intersecting street face shall be a minimum of 100 feet. The existing driveway on SE Kellogg Creek Drive is located approximately 200 feet from SE Rusk Road, which satisfies the City standard. The Applicant proposes to relocate this access 45 feet to the west of its existing location, increasing access spacing with respect to SE Rusk Road.

The existing SE Rusk Road church driveway is signed for one-way inbound movement. Egress movements were recorded at the driveway despite the one-way signing. Regardless of the proposed

³ Clackamas County Roadway Design Standards Section 250.1.2.c.2 defines the design speed of roadways as the existing regulatory speed plus five mph.

⁴ Per Clackamas County Roadway Design Standards Section 240.4, intersection sight distance shall typically be measured from a driver's eye height of 3.5 feet and 14.5 feet from the edge of the nearest travel lane to an object height of 3.5 feet above the roadway surface.

development, "DO NOT ENTER" and/or "ONE WAY" signs should be installed at the SE Rusk Road/Church driveway in accordance with the *Manual on Uniform Traffic Control Devices (MUTCD)* (Reference 13) to restrict vehicles from exiting the church driveway onto SE Rusk Road.

Emergency Access

Emergency access to the proposed senior housing site will be provided via this existing driveway, which will remain ungated for Church use.

Parking Supply Analysis

The Applicant proposes a total of 136 parking spaces, plus one additional dedicated space for an activities van. A minimum of 162 parking spaces are required by City Code:

- Once space per unit for 75 independent and assisted living units under 800 square feet.
- 1.25 spaces per unit for 63 independent and assisted living units over 800 square feet.
- 0.25 spaces per bed for 32 memory care beds.

The Applicant will be requesting a Parking Modification and will supply evidence in support of the request under separate cover.

FINDINGS AND RECOMMENDATIONS

Based on the results of the transportation impact analysis, the proposed development can be constructed while maintaining acceptable operations at the study intersections. The analysis developed the following findings and recommendations.

Findings

- All study intersections are forecast to operate within the applicable review agency volume-to-capacity ratio and delay standards under existing and site opening year 2019 conditions during the weekday AM, midday, and PM peak hours.
- Some vehicles were observed making wrong-way egress movements at the existing church driveway on SE Rusk Road.
- Existing weekday AM peak hour northbound queuing on SE Rusk Road at OR-224 extends past SE Ruscliff Road and west towards SE Kellogg Creek Drive.
- With the provision of a northbound right-turn lane on SE Rusk Road at OR-224, projected 95th percentile AM, midday and PM peak hour queues can be accommodated within the existing storage areas at the study intersections and queuing on SE Rusk Road after site development will be less than the amount experienced today.
- Historical crash data for the study area intersections indicate no patterns or trends that require mitigation associated with the proposed development.

RECOMMENDATIONS

- Subject to City approval and regardless of the proposed development, “DO NOT ENTER” and/or “ONE WAY” signs should be installed at the SE Rusk Road/Church driveway in accordance with the *Manual on Uniform Traffic Control Devices* (MUTCD) to restrict vehicles from exiting the church driveway onto SE Rusk Road.
- The Applicant should collaborate with the City of Milwaukie to construct a northbound right-turn lane on SE Rusk Road at OR-224 in conjunction with site development subject to available right-of-way and Transportation System Development Charges (TSDC) credits. The turn lane design and construction will be creditable towards the project TSDC.
- Intersection sight distance should be provided at the proposed site access per applicable City of Milwaukie and Clackamas County design requirements. Landscaping, above ground utilities, and signing should be located and maintained in a manner that provides adequate intersection sight distance.

Please contact us if you need any additional information regarding our analyses.

REFERENCES

1. Transportation Research Board. *2010 Highway Capacity Manual*. 2010.
2. Transportation Research Board. *2000 Highway Capacity Manual*. 2000.
3. *City of Milwaukie Transportation System Plan*. Revised October 2018.
4. *Clackamas County Comprehensive Plan*. Amended January 2017.
5. Oregon Department of Transportation. *1999 Oregon Highway Plan*. Amended May 2015.
6. TriMet. "Bus Services." Accessed on-line at www.trimet.org. November 2018.
7. Oregon Department of Transportation Research Section. *SPR 667 Assessment of Statewide Intersection Safety Performance*. June 2011.
8. American Association of State Highway and Transportation Officials. *Highway Safety Manual*. 2010.
9. Institute of Transportation Engineers. *Trip Generation, 10th Edition*. 2017.
10. *City of Milwaukie Municipal Code*. Revised May 2018. Accessed November 2018.
11. *Clackamas County Roadway Design Standards*. Updated April 2018.
12. Transportation Research Board of the National Academies. *National Cooperative Highway Research Program (NCHRP) Report 672 Roundabouts: An Informational Guide*. Exhibit 6-52, Speed-Radius Relationship. Page 6-57.
13. *Manual on Uniform Traffic Control Devices*. USDOT, Federal Highway Administration. 2009, Revision 2, May 2012.

ATTACHMENTS

Attachment A – Description of Level-of-Service and Volume-to-Capacity Methods and Criteria

Attachment B – Crash Data

Attachment C – Traffic Count Data

Attachment D – Existing Traffic Level-of-Service Worksheets

Attachment E – 2019 Background Traffic Level-of-Service Worksheets

Attachment F – 2019 Total Traffic Level-of-Service Worksheets

**Attachment A - Description of
Level-of-Service and Volume-
to-Capacity Methods and
Criteria**

LEVEL-OF-SERVICE CONCEPT

Level of service (LOS) is a concept developed to quantify the degree of comfort (including such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles) afforded to drivers as they travel through an intersection or roadway segment. Six grades are used to denote the various level of service from “A” to “F.”⁵

Signalized Intersections

The six level-of-service grades are described qualitatively for signalized intersections in Table A1. Additionally, Table A2 identifies the relationship between level of service and average control delay per vehicle. Control delay is defined to include initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Using this definition, Level of Service “D” is generally considered to represent the minimum acceptable design standard.

Table A1 Level-of-Service Definitions (Signalized Intersections)

Level of Service	Average Delay per Vehicle
A	Very low average control delay, less than 10 seconds per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	Average control delay is greater than 10 seconds per vehicle and less than or equal to 20 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for a level of service A, causing higher levels of average delay.
C	Average control delay is greater than 20 seconds per vehicle and less than or equal to 35 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	Average control delay is greater than 35 seconds per vehicle and less than or equal to 55 seconds per vehicle. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle length, or high volume/capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Average control delay is greater than 55 seconds per vehicle and less than or equal to 80 seconds per vehicle. This is usually considered to be the limit of acceptable delay. These high delay values generally (but not always) indicate poor progression, long cycle lengths, and high volume/capacity ratios. Individual cycle failures are frequent occurrences.
F	Average control delay is in excess of 80 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation. It may also occur at high volume/capacity ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such high delay values.

⁵Most of the material in this appendix is adapted from the Transportation Research Board, *Highway Capacity Manual*, 2000.

Table A2 Level-of-Service Criteria for Signalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

Unsignalized Intersections

Unsignalized intersections include two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections. The *2000 Highway Capacity Manual (HCM)* provides models for estimating control delay at both TWSC and AWSC intersections. A qualitative description of the various service levels associated with an unsignalized intersection is presented in Table A3. A quantitative definition of level of service for unsignalized intersections is presented in Table A4. Using this definition, Level of Service “E” is generally considered to represent the minimum acceptable design standard.

Table A3 Level-of-Service Definitions (Unsignalized Intersections)

Level of Service	Average Delay per Vehicle to Minor Street
A	<ul style="list-style-type: none"> Nearly all drivers find freedom of operation. Very seldom is there more than one vehicle in queue.
B	<ul style="list-style-type: none"> Some drivers begin to consider the delay an inconvenience. Occasionally there is more than one vehicle in queue.
C	<ul style="list-style-type: none"> Many times, there is more than one vehicle in queue. Most drivers feel restricted, but not objectionably so.
D	<ul style="list-style-type: none"> Often there is more than one vehicle in queue. Drivers feel quite restricted.
E	<ul style="list-style-type: none"> Represents a condition in which the demand is near or equal to the probable maximum number of vehicles that can be accommodated by the movement. There is almost always more than one vehicle in queue. Drivers find the delays approaching intolerable levels.
F	<ul style="list-style-type: none"> Forced flow. Represents an intersection failure condition that is caused by geometric and/or operational constraints external to the intersection.

Table A4 Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10.0 and ≤ 15.0
C	>15.0 and ≤ 25.0
D	>25.0 and ≤ 35.0
E	>35.0 and ≤ 50.0
F	>50.0

It should be noted that the level-of-service criteria for unsignalized intersections are somewhat different than the criteria used for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Additionally, there are a number of driver behavior considerations that combine to make delays at signalized intersections less galling than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, while drivers on the minor street approaches to TWSC intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized intersections than signalized intersections. For these reasons, it is considered that the control delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection. While overall intersection level of service is calculated for AWSC intersections, level of service is only calculated for the minor approaches and the major street left turn movements at TWSC intersections. No delay is assumed to the major street through movements. For TWSC intersections, the overall intersection level of service remains undefined: level of service is only calculated for each minor street lane.

In the performance evaluation of TWSC intersections, it is important to consider other measures of effectiveness (MOEs) in addition to delay, such as v/c ratios for individual movements, average queue lengths, and 95th-percentile queue lengths. By focusing on a single MOE for the worst movement only, such as delay for the minor-street left turn, users may make inappropriate traffic control decisions. The potential for making such inappropriate decisions is likely to be particularly pronounced when the HCM level-of-service thresholds are adopted as legal standards, as is the case in many public agencies.

Attachment B - Crash Data

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 CRASH SUMMARIES BY YEAR BY COLLISION TYPE

OR 224 Clackamas Highway (171) & Rusk Road
 January 1, 2010 through December 31, 2014

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2014														
ANGLE	0	0	1	1	0	0	0	0	1	1	0	1	0	0
REAR-END	0	2	0	2	0	2	0	1	1	2	0	2	0	0
2014 TOTAL	0	2	1	3	0	2	0	1	2	3	0	3	0	0
YEAR: 2011														
REAR-END	0	2	0	2	0	2	0	1	1	2	0	2	0	0
TURNING MOVEMENTS	0	2	0	2	0	2	0	0	2	0	2	2	0	0
2011 TOTAL	0	4	0	4	0	4	0	1	3	2	2	4	0	0
YEAR: 2010														
REAR-END	0	0	1	1	0	0	0	1	0	1	0	1	0	0
2010 TOTAL	0	0	1	1	0	0	0	1	0	1	0	1	0	0
FINAL TOTAL	0	6	2	8	0	6	0	3	5	6	2	8	0	0

Disclaimer: A higher number of crashes may be reported as of 2011 compared to prior years. This does not reflect an increase in annual crashes. The higher numbers result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics.

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
COUNTY ROAD CRASH LISTING

CLACKAMAS COUNTY

OR 224 Clackamas Highway (171) & Rusk Road
January 1, 2010 through December 31, 2014

SER#	E A U C O DATE	MILEPNT	COUNTY ROADS		RD CHAR	INT-TYP			CRASH TYP	SPCL USE		MOVE	A S					ACTN	EVENT	CAUSE				
			FIRST STREET	SECOND STREET		(MEDIAN)	INT-REL	OFF-RD		WTHR	TRLR QTY		OWNER	PRTC INJ	G E	LICNS	PED				LOC	ERROR		
INVEST	E L G H R DAY/TIME	DIST FROM	INTERSECT	INTERSECTION SEQ #	DIRECT	LEGS	TRAF-	RNDBT	SURF	COLL TYP	OWNER	FROM	P#	TYPE	SVRTY	E X	RES	LOC	ERROR	ACTN	EVENT	CAUSE		
UNLOC?	D C S L K LAT/LONG	INTERSECT	INTERSECTION SEQ #		LOCTN	(#LANES)	CONTL	DRVWY	LIGHT	SVRTY	V#	VEH TYPE	TO											
01538	N N N 4/22/2014	0.56	SE RUSK RD		INTER	CROSS	N	N	RAIN	S-1STOP	01	NONE	0	STRGHT								07		
NONE	Tue 11A				S		UNKNOWN	N	WET	REAR		PRVTE	S N							000		00		
No	45 25 40.02 -122 36 4.56				06	2		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	69	M	OR-Y		026	000	07	
																						OR<25		
												02	NONE	0	STOP								011	00
												PRVTE	S N									000	000	00
												PSNGR CAR		01	DRVR	INJC	56	M	OR-Y		000		000	00
																							OR<25	
01893	N N N 5/16/2014	0.56	SE RUSK RD		INTER	CROSS	N	N	CLR	S-1STOP	01	NONE	0	STRGHT								29,27		
NONE	Fri 5P				S		TRF SIGNAL	N	DRY	REAR		PRVTE	S N								000		00	
No	45 25 40.02 -122 36 4.56				06	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	54	M	OR-Y		016,026	038	29,27	
																							OR<25	
												02	NONE	0	STOP								011	00
												PRVTE	S N									000	000	00
												PSNGR CAR		01	DRVR	INJC	60	M	OR-Y		000		000	00
																							OR<25	

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 CRASH SUMMARIES BY YEAR BY COLLISION TYPE

SE Rusk Rd & Hwy 224 (Milwaukie Expressway)
 January 1, 2015 through December 31, 2016

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2016														
ANGLE	0	1	0	1	0	5	0	1	0	1	0	1	0	0
REAR-END	0	1	1	2	0	1	1	1	1	1	1	2	0	0
TURNING MOVEMENTS	0	1	0	1	0	2	0	1	0	0	1	1	0	0
2016 TOTAL	0	3	1	4	0	8	1	3	1	2	2	4	0	0
YEAR: 2015														
ANGLE	0	1	0	1	0	1	0	1	0	1	0	1	0	0
REAR-END	0	2	2	4	0	2	0	3	0	2	2	4	0	0
TURNING MOVEMENTS	0	0	1	1	0	0	0	1	0	0	1	1	0	0
2015 TOTAL	0	3	3	6	0	3	0	5	0	3	3	6	0	0
FINAL TOTAL	0	6	4	10	0	11	1	8	1	5	5	10	0	0

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OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Rusk Road & Ruscliffe Rd
 January 1, 2010 through December 31, 2014

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2013														
TURNING MOVEMENTS	0	0	1	1	0	0	0	1	0	1	0	1	0	0
2013 TOTAL	0	0	1	1	0	0	0	1	0	1	0	1	0	0
FINAL TOTAL	0	0	1	1	0	0	0	1	0	1	0	1	0	0

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OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

SE Rusk Rd & SE Ruscliff Rd
January 1, 2015 through December 31, 2016

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR:														
TOTAL														
FINAL TOTAL														

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OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Rusk Road & Kellogg Creek Drive
 January 1, 2010 through December 31, 2014

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2013														
TURNING MOVEMENTS	0	0	2	2	0	0	0	2	0	2	0	2	0	0
2013 TOTAL	0	0	2	2	0	0	0	2	0	2	0	2	0	0
FINAL TOTAL	0	0	2	2	0	0	0	2	0	2	0	2	0	0

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OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 CRASH SUMMARIES BY YEAR BY COLLISION TYPE

SE Rusk Rd & SE Kellogg Creek Dr
 January 1, 2015 through December 31, 2016

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2016														
TURNING MOVEMENTS	0	1	0	1	0	1	0	1	0	1	0	1	0	0
2016 TOTAL	0	1	0	1	0	1	0	1	0	1	0	1	0	0
FINAL TOTAL	0	1	0	1	0	1	0	1	0	1	0	1	0	0

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OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Rusk Road & Aldercrest Rd
January 1, 2010 through December 31, 2014

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
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YEAR:

TOTAL

FINAL TOTAL

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OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 CRASH SUMMARIES BY YEAR BY COLLISION TYPE

SE Rusk Rd & SE Aldercrest Rd
 January 1, 2015 through December 31, 2016

COLLISION TYPE	FATAL CRASHES	NON- FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER- SECTION	INTER- SECTION RELATED	OFF- ROAD
YEAR: 2016														
REAR-END	0	1	0	1	0	1	0	0	1	0	1	1	0	0
2016 TOTAL	0	1	0	1	0	1	0	0	1	0	1	1	0	0
YEAR: 2015														
TURNING MOVEMENTS	0	1	1	2	0	2	0	1	1	2	0	2	0	0
2015 TOTAL	0	1	1	2	0	2	0	1	1	2	0	2	0	0
FINAL TOTAL	0	2	1	3	0	3	0	1	2	2	1	3	0	0

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ACTION CODE TRANSLATION LIST

ACTION CODE	SHORT DESCRIPTION	LONG DESCRIPTION
000	NONE	NO ACTION OR NON-WARRANTED
001	SKIDDED	SKIDDED
002	ON/OFF V	GETTING ON OR OFF STOPPED OR PARKED VEHICLE
003	LOAD OVR	OVERHANGING LOAD STRUCK ANOTHER VEHICLE, ETC.
006	SLOW DN	SLOWED DOWN
007	AVOIDING	AVOIDING MANEUVER
008	PAR PARK	PARALLEL PARKING
009	ANG PARK	ANGLE PARKING
010	INTERFERE	PASSENGER INTERFERING WITH DRIVER
011	STOPPED	STOPPED IN TRAFFIC NOT WAITING TO MAKE A LEFT TURN
012	STP/L TRN	STOPPED BECAUSE OF LEFT TURN SIGNAL OR WAITING, ETC.
013	STP TURN	STOPPED WHILE EXECUTING A TURN
014	EMR V PKD	EMERGENCY VEHICLE LEGALLY PARKED IN THE ROADWAY
015	GO A/STOP	PROCEED AFTER STOPPING FOR A STOP SIGN/FLASHING RED.
016	TRN A/RED	TURNED ON RED AFTER STOPPING
017	LOSTCTRL	LOST CONTROL OF VEHICLE
018	EXIT DWY	ENTERING STREET OR HIGHWAY FROM ALLEY OR DRIVEWAY
019	ENTR DWY	ENTERING ALLEY OR DRIVEWAY FROM STREET OR HIGHWAY
020	STR ENTR	BEFORE ENTERING ROADWAY, STRUCK PEDESTRIAN, ETC. ON SIDEWALK OR SHOULDER
021	NO DRVR	CAR RAN AWAY - NO DRIVER
022	PREV COL	STRUCK, OR WAS STRUCK BY, VEHICLE OR PEDESTRIAN IN PRIOR COLLISION BEFORE ACC. STABILIZED
023	STALLED	VEHICLE STALLED OR DISABLED
024	DRVR DEAD	DEAD BY UNASSOCIATED CAUSE
025	FATIGUE	FATIGUED, SLEEPY, ASLEEP
026	SUN	DRIVER BLINDED BY SUN
027	HDLGHTS	DRIVER BLINDED BY HEADLIGHTS
028	ILLNESS	PHYSICALLY ILL
029	THRU MED	VEHICLE CROSSED, PLUNGED OVER, OR THROUGH MEDIAN BARRIER
030	PURSUIT	PURSUING OR ATTEMPTING TO STOP A VEHICLE
031	PASSING	PASSING SITUATION
032	PRKOFFRD	VEHICLE PARKED BEYOND CURB OR SHOULDER
033	CROS MED	VEHICLE CROSSED EARTH OR GRASS MEDIAN
034	X N/SGNL	CROSSING AT INTERSECTION - NO TRAFFIC SIGNAL PRESENT
035	X W/ SGNL	CROSSING AT INTERSECTION - TRAFFIC SIGNAL PRESENT
036	DIAGONAL	CROSSING AT INTERSECTION - DIAGONALLY
037	BTWN INT	CROSSING BETWEEN INTERSECTIONS
038	DISTRACT	DRIVER'S ATTENTION DISTRACTED
039	W/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER WITH TRAFFIC
040	A/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER FACING TRAFFIC
041	W/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT WITH TRAFFIC
042	A/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT FACING TRAFFIC
043	PLAYINRD	PLAYING IN STREET OR ROAD
044	PUSH MV	PUSHING OR WORKING ON VEHICLE IN ROAD OR ON SHOULDER
045	WORK ON	WORKING IN ROADWAY OR ALONG SHOULDER
046	W/ TRAFIC	NON-MOTORIST WALKING, RUNNING, RIDING, ETC. WITH TRAFFIC
047	A/ TRAFIC	NON-MOTORIST WALKING, RUNNING, RIDING, ETC. FACING TRAFFIC
050	LAY ON RD	STANDING OR LYING IN ROADWAY
051	ENT OFFRD	ENTERING / STARTING IN TRAFFIC LANE FROM OFF ROAD
052	MERGING	MERGING

ACTION CODE TRANSLATION LIST

ACTION CODE	SHORT DESCRIPTION	LONG DESCRIPTION
055	SPRAY	BLINDED BY WATER SPRAY
088	OTHER	OTHER ACTION
099	UNK	UNKNOWN ACTION

CAUSE CODE TRANSLATION LIST

CAUSE CODE	SHORT DESCRIPTION	LONG DESCRIPTION
00	NO CODE	NO CAUSE ASSOCIATED AT THIS LEVEL
01	TOO-FAST	TOO FAST FOR CONDITIONS (NOT EXCEED POSTED SPEED
02	NO-YIELD	DID NOT YIELD RIGHT-OF-WAY
03	PAS-STOP	PASSED STOP SIGN OR RED FLASHER
04	DIS SIG	DISREGARDED TRAFFIC SIGNAL
05	LEFT-CTR	DROVE LEFT OF CENTER ON TWO-WAY ROAD; STRADDLING
06	IMP-OVER	IMPROPER OVERTAKING
07	TOO-CLOS	FOLLOWED TOO CLOSELY
08	IMP-TURN	MADE IMPROPER TURN
09	DRINKING	ALCOHOL OR DRUG INVOLVED
10	OTHR-IMP	OTHER IMPROPER DRIVING
11	MECH-DEF	MECHANICAL DEFECT
12	OTHER	OTHER (NOT IMPROPER DRIVING)
13	IMP LN C	IMPROPER CHANGE OF TRAFFIC LANES
14	DIS TCD	DISREGARDED OTHER TRAFFIC CONTROL DEVICE
15	WRNG WAY	WRONG WAY ON ONE-WAY ROAD; WRONG SIDE DIVIDED RO
16	FATIGUE	DRIVER DROWSY/FATIGUED/SLEEPY
17	ILLNESS	PHYSICAL ILLNESS
18	IN RDWY	NON-MOTORIST ILLEGALLY IN ROADWAY
19	NT VISBL	NON-MOTORIST NOT VISIBLE; NON-REFLECTIVE CLOTHIN
20	IMP PKNG	VEHICLE IMPROPERLY PARKED
21	DEF STER	DEFECTIVE STEERING MECHANISM
22	DEF BRKE	INADEQUATE OR NO BRAKES
24	LOADSHFT	VEHICLE LOST LOAD OR LOAD SHIFTED
25	TIREFAIL	TIRE FAILURE
26	PHANTOM	PHANTOM / NON-CONTACT VEHICLE
27	INATTENT	INATTENTION
28	NM INATT	NON-MOTORIST INATTENTION
29	F AVOID	FAILED TO AVOID VEHICLE AHEAD
30	SPEED	DRIVING IN EXCESS OF POSTED SPEED
31	RACING	SPEED RACING (PER PAR)
32	CARELESS	CARELESS DRIVING (PER PAR)
33	RECKLESS	RECKLESS DRIVING (PER PAR)
34	AGGRESV	AGGRESSIVE DRIVING (PER PAR)
35	RD RAGE	ROAD RAGE (PER PAR)
40	VIEW OBS	VIEW OBSCURED
50	USED MDN	IMPROPER USE OF MEDIAN OR SHOULDER
51	FAIL LN	FAILED TO MAINTAIN LANE
52	OFF RD	RAN OFF ROAD

COLLISION TYPE CODE TRANSLATION LIST

COLL CODE	SHORT DESCRIPTION	LONG DESCRIPTION
&	OTH	MISCELLANEOUS
-	BACK	BACKING
0	PED	PEDESTRIAN
1	ANGL	ANGLE
2	HEAD	HEAD-ON
3	REAR	REAR-END
4	SS-M	SIDESWIPE - MEETING
5	SS-O	SIDESWIPE - OVERTAKING
6	TURN	TURNING MOVEMENT
7	PARK	PARKING MANEUVER
8	NCOL	NON-COLLISION
9	FIX	FIXED OBJECT OR OTHER OBJECT

CRASH TYPE CODE TRANSLATION LIST

CRASH TYPE	SHORT DESCRIPTION	LONG DESCRIPTION
&	OVERTURN	OVERTURNED
0	NON-COLL	OTHER NON-COLLISION
1	OTH RDWY	MOTOR VEHICLE ON OTHER ROADWAY
2	PRKD MV	PARKED MOTOR VEHICLE
3	PED	PEDESTRIAN
4	TRAIN	RAILWAY TRAIN
6	BIKE	PEDALCYCLIST
7	ANIMAL	ANIMAL
8	FIX OBJ	FIXED OBJECT
9	OTH OBJ	OTHER OBJECT
A	ANGL-STP	ENTERING AT ANGLE - ONE VEHICLE STOPPED
B	ANGL-OTH	ENTERING AT ANGLE - ALL OTHERS
C	S-STRGHT	FROM SAME DIRECTION - BOTH GOING STRAIGHT
D	S-1TURN	FROM SAME DIRECTION - ONE TURN, ONE STRAIGHT
E	S-1STOP	FROM SAME DIRECTION - ONE STOPPED
F	S-OTHER	FROM SAME DIRECTION-ALL OTHERS, INCLUDING PARKING
G	O-STRGHT	FROM OPPOSITE DIRECTION - BOTH GOING STRAIGHT
H	O-1 L-TURN	FROM OPPOSITE DIRECTION-ONE LEFT TURN, ONE STRAIGHT
I	O-1STOP	FROM OPPOSITE DIRECTION - ONE STOPPED
J	O-OTHER	FROM OPPOSITE DIRECTION-ALL OTHERS INCL. PARKING

DRIVER LICENSE CODE TRANSLATION LIST

LIC CODE	SHORT DESC	LONG DESCRIPTION
0	NONE	NOT LICENSED (HAD NEVER BEEN LICENSED)
1	OR-Y	VALID OREGON LICENSE
2	OTH-Y	VALID LICENSE, OTHER STATE OR COUNTRY
3	SUSP	SUSPENDED/REVOKED
4	EXP	EXPIRED
8	N-VAL	OTHER NON-VALID LICENSE
9	UNK	UNKNOWN IF DRIVER WAS LICENSED AT TIME OF CRASH

DRIVER RESIDENCE CODE TRANSLATION LIST

RES CODE	SHORT DESC	LONG DESCRIPTION
1	OR<25	OREGON RESIDENT WITHIN 25 MILE OF HOME
2	OR>25	OREGON RESIDENT 25 OR MORE MILES FROM HOME
3	OR-?	OREGON RESIDENT - UNKNOWN DISTANCE FROM HOME
4	N-RES	NON-RESIDENT
9	UNK	UNKNOWN IF OREGON RESIDENT

ERROR CODE TRANSLATION LIST

ERROR CODE	SHORT DESCRIPTION	FULL DESCRIPTION
000	NONE	NO ERROR
001	WIDE TRN	WIDE TURN
002	CUT CORN	CUT CORNER ON TURN
003	FAIL TRN	FAILED TO OBEY MANDATORY TRAFFIC TURN SIGNAL, SIGN OR LANE MARKINGS
004	L IN TRF	LEFT TURN IN FRONT OF ONCOMING TRAFFIC
005	L PROHIB	LEFT TURN WHERE PROHIBITED
006	FRM WRNG	TURNUED FROM WRONG LANE
007	TO WRONG	TURNUED INTO WRONG LANE
008	ILLEG U	U-TURNUED ILLEGALLY
009	IMP STOP	IMPROPERLY STOPPED IN TRAFFIC LANE
010	IMP SIG	IMPROPER SIGNAL OR FAILURE TO SIGNAL
011	IMP BACK	BACKING IMPROPERLY (NOT PARKING)
012	IMP PARK	IMPROPERLY PARKED
013	UNPARK	IMPROPER START LEAVING PARKED POSITION
014	IMP STRT	IMPROPER START FROM STOPPED POSITION
015	IMP LGHT	IMPROPER OR NO LIGHTS (VEHICLE IN TRAFFIC)
016	INATTENT	INATTENTION (FAILURE TO DIM LIGHTS PRIOR TO 4/1/97)
017	UNSF VEH	DRIVING UNSAFE VEHICLE (NO OTHER ERROR APPARENT)
018	OTH PARK	ENTERING/EXITING PARKED POSITION W/ INSUFFICIENT CLEARANCE; OTHER IMPROPER PARKING MANEUVER
019	DIS DRIV	DISREGARDED OTHER DRIVER'S SIGNAL
020	DIS SGNL	DISREGARDED TRAFFIC SIGNAL
021	RAN STOP	DISREGARDED STOP SIGN OR FLASHING RED
022	DIS SIGN	DISREGARDED WARNING SIGN, FLARES OR FLASHING AMBER
023	DIS OFCR	DISREGARDED POLICE OFFICER OR FLAGMAN
024	DIS EMER	DISREGARDED SIREN OR WARNING OF EMERGENCY VEHICLE
025	DIS RR	DISREGARDED RR SIGNAL, RR SIGN, OR RR FLAGMAN
026	REAR-END	FAILED TO AVOID STOPPED OR PARKED VEHICLE AHEAD OTHER THAN SCHOOL BUS
027	BIKE ROW	DID NOT HAVE RIGHT-OF-WAY OVER PEDALCYCLIST
028	NO ROW	DID NOT HAVE RIGHT-OF-WAY
029	PED ROW	FAILED TO YIELD RIGHT-OF-WAY TO PEDESTRIAN
030	PAS CURV	PASSING ON A CURVE
031	PAS WRNG	PASSING ON THE WRONG SIDE
032	PAS TANG	PASSING ON STRAIGHT ROAD UNDER UNSAFE CONDITIONS
033	PAS X-WK	PASSED VEHICLE STOPPED AT CROSSWALK FOR PEDESTRIAN
034	PAS INTR	PASSING AT INTERSECTION
035	PAS HILL	PASSING ON CREST OF HILL
036	N/PAS ZN	PASSING IN "NO PASSING" ZONE
037	PAS TRAF	PASSING IN FRONT OF ONCOMING TRAFFIC
038	CUT-IN	CUTTING IN (TWO LANES - TWO WAY ONLY)
039	WRNGSIDE	DRIVING ON WRONG SIDE OF THE ROAD (2-WAY UNDIVIDED ROADWAYS)

ERROR CODE TRANSLATION LIST

ERROR CODE	SHORT DESCRIPTION	FULL DESCRIPTION
040	THRU MED	DRIVING THROUGH SAFETY ZONE OR OVER ISLAND
041	F/ST BUS	FAILED TO STOP FOR SCHOOL BUS
042	F/SLO MV	FAILED TO DECREASE SPEED FOR SLOWER MOVING VEHICLE
043	TOO CLOSE	FOLLOWING TOO CLOSELY (MUST BE ON OFFICER'S REPORT)
044	STRDL LN	STRADDLING OR DRIVING ON WRONG LANES
045	IMP CHG	IMPROPER CHANGE OF TRAFFIC LANES
046	WRNG WAY	WRONG WAY ON ONE-WAY ROADWAY; WRONG SIDE DIVIDED ROAD
047	BASCRULE	DRIVING TOO FAST FOR CONDITIONS (NOT EXCEEDING POSTED SPEED)
048	OPN DOOR	OPENED DOOR INTO ADJACENT TRAFFIC LANE
049	IMPEDING	IMPEDING TRAFFIC
050	SPEED	DRIVING IN EXCESS OF POSTED SPEED
051	RECKLESS	RECKLESS DRIVING (PER PAR)
052	CARELESS	CARELESS DRIVING (PER PAR)
053	RACING	SPEED RACING (PER PAR)
054	X N/SGNL	CROSSING AT INTERSECTION, NO TRAFFIC SIGNAL PRESENT
055	X W/SGNL	CROSSING AT INTERSECTION, TRAFFIC SIGNAL PRESENT
056	DIAGONAL	CROSSING AT INTERSECTION - DIAGONALLY
057	BTWN INT	CROSSING BETWEEN INTERSECTIONS
059	W/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER WITH TRAFFIC
060	A/TRAF-S	WALKING, RUNNING, RIDING, ETC., ON SHOULDER FACING TRAFFIC
061	W/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT WITH TRAFFIC
062	A/TRAF-P	WALKING, RUNNING, RIDING, ETC., ON PAVEMENT FACING TRAFFIC
063	PLAYINRD	PLAYING IN STREET OR ROAD
064	PUSH MV	PUSHING OR WORKING ON VEHICLE IN ROAD OR ON SHOULDER
065	WORK IN RD	WORKING IN ROADWAY OR ALONG SHOULDER
070	LAY ON RD	STANDING OR LYING IN ROADWAY
071	NM IMP USE	IMPROPER USE OF TRAFFIC LANE BY NON-MOTORIST
073	ELUDING	ELUDING / ATTEMPT TO ELUDE
079	F NEG CURV	FAILED TO NEGOTIATE A CURVE
080	FAIL LN	FAILED TO MAINTAIN LANE
081	OFF RD	RAN OFF ROAD
082	NO CLEAR	DRIVER MISJUDGED CLEARANCE
083	OVRSTEER	OVER-CORRECTING
084	NOT USED	CODE NOT IN USE
085	OVRLOAD	OVERLOADING OR IMPROPER LOADING OF VEHICLE WITH CARGO OR PASSENGERS
097	UNA DIS TC	UNABLE TO DETERMINE WHICH DRIVER DISREGARDED TRAFFIC CONTROL DEVICE

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
001	FEL/JUMP	OCCUPANT FELL, JUMPED OR WAS EJECTED FROM MOVING VEHICLE
002	INTERFER	PASSENGER INTERFERED WITH DRIVER
003	BUG INTF	ANIMAL OR INSECT IN VEHICLE INTERFERED WITH DRIVER
004	INDRCT PED	PEDESTRIAN INDIRECTLY INVOLVED (NOT STRUCK)
005	SUB-PED	"SUB-PED": PEDESTRIAN INJURED SUBSEQUENT TO COLLISION, ETC.
006	INDRCT BIK	PEDALCYCLIST INDIRECTLY INVOLVED (NOT STRUCK)
007	HITCHIKR	HITCHHIKER (SOLICITING A RIDE)
008	PSNGR TOW	PASSENGER OR NON-MOTORIST BEING TOWED OR PUSHED ON CONVEYANCE
009	ON/OFF V	GETTING ON/OFF STOPPED/PARKED VEHICLE (OCCUPANTS ONLY; MUST HAVE PHYSICAL CONTACT W/ VEHICLE)
010	SUB OTRN	OVERTURNED AFTER FIRST HARMFUL EVENT
011	MV PUSHD	VEHICLE BEING PUSHED
012	MV TOWED	VEHICLE TOWED OR HAD BEEN TOWING ANOTHER VEHICLE
013	FORCED	VEHICLE FORCED BY IMPACT INTO ANOTHER VEHICLE, PEDALCYCLIST OR PEDESTRIAN
014	SET MOTN	VEHICLE SET IN MOTION BY NON-DRIVER (CHILD RELEASED BRAKES, ETC.)
015	RR ROW	AT OR ON RAILROAD RIGHT-OF-WAY (NOT LIGHT RAIL)
016	LT RL ROW	AT OR ON LIGHT-RAIL RIGHT-OF-WAY
017	RR HIT V	TRAIN STRUCK VEHICLE
018	V HIT RR	VEHICLE STRUCK TRAIN
019	HIT RR CAR	VEHICLE STRUCK RAILROAD CAR ON ROADWAY
020	JACKKNIFE	JACKKNIFE; TRAILER OR TOWED VEHICLE STRUCK TOWING VEHICLE
021	TRL OTRN	TRAILER OR TOWED VEHICLE OVERTURNED
022	CN BROKE	TRAILER CONNECTION BROKE
023	DETACH TRL	DETACHED TRAILING OBJECT STRUCK OTHER VEHICLE, NON-MOTORIST, OR OBJECT
024	V DOOR OPN	VEHICLE DOOR OPENED INTO ADJACENT TRAFFIC LANE
025	WHEELOFF	WHEEL CAME OFF
026	HOOD UP	HOOD FLEW UP
028	LOAD SHIFT	LOST LOAD, LOAD MOVED OR SHIFTED
029	TIREFAIL	TIRE FAILURE
030	PET	PET: CAT, DOG AND SIMILAR
031	LVSTOCK	STOCK: COW, CALF, BULL, STEER, SHEEP, ETC.
032	HORSE	HORSE, MULE, OR DONKEY
033	HRSE&RID	HORSE AND RIDER
034	GAME	WILD ANIMAL, GAME (INCLUDES BIRDS; NOT DEER OR ELK)
035	DEER ELK	DEER OR ELK, WAPITI
036	ANML VEH	ANIMAL-DRAWN VEHICLE
037	CULVERT	CULVERT, OPEN LOW OR HIGH MANHOLE
038	ATENUATN	IMPACT ATTENUATOR
039	PK METER	PARKING METER
040	CURB	CURB (ALSO NARROW SIDEWALKS ON BRIDGES)
041	JIGGLE	JIGGLE BAR OR TRAFFIC SNAKE FOR CHANNELIZATION
042	GDRL END	LEADING EDGE OF GUARDRAIL
043	GARDRAIL	GUARD RAIL (NOT METAL MEDIAN BARRIER)
044	BARRIER	MEDIAN BARRIER (RAISED OR METAL)
045	WALL	RETAINING WALL OR TUNNEL WALL
046	BR RAIL	BRIDGE RAILING OR PARAPET (ON BRIDGE OR APPROACH)
047	BR ABUTMNT	BRIDGE ABUTMENT (INCLUDED "APPROACH END" THRU 2013)
048	BR COLMN	BRIDGE PILLAR OR COLUMN
049	BR GIRDR	BRIDGE GIRDER (HORIZONTAL BRIDGE STRUCTURE OVERHEAD)
050	ISLAND	TRAFFIC RAISED ISLAND
051	GORE	GORE
052	POLE UNK	POLE - TYPE UNKNOWN
053	POLE UTL	POLE - POWER OR TELEPHONE
054	ST LIGHT	POLE - STREET LIGHT ONLY
055	TRF SGNL	POLE - TRAFFIC SIGNAL AND PED SIGNAL ONLY
056	SGN BRDG	POLE - SIGN BRIDGE
057	STOPSIGN	STOP OR YIELD SIGN

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
058	OTH SIGN	OTHER SIGN, INCLUDING STREET SIGNS
059	HYDRANT	HYDRANT
060	MARKER	DELINEATOR OR MARKER (REFLECTOR POSTS)
061	MAILBOX	MAILBOX
062	TREE	TREE, STUMP OR SHRUBS
063	VEG OHED	TREE BRANCH OR OTHER VEGETATION OVERHEAD, ETC.
064	WIRE/CBL	WIRE OR CABLE ACROSS OR OVER THE ROAD
065	TEMP SGN	TEMPORARY SIGN OR BARRICADE IN ROAD, ETC.
066	PERM SGN	PERMANENT SIGN OR BARRICADE IN/OFF ROAD
067	SLIDE	SLIDES, FALLEN OR FALLING ROCKS
068	FRGN OBJ	FOREIGN OBSTRUCTION/DEBRIS IN ROAD (NOT GRAVEL)
069	EQP WORK	EQUIPMENT WORKING IN/OFF ROAD
070	OTH EQP	OTHER EQUIPMENT IN OR OFF ROAD (INCLUDES PARKED TRAILER, BOAT)
071	MAIN EQP	WRECKER, STREET SWEEPER, SNOW PLOW OR SANDING EQUIPMENT
072	OTHER WALL	ROCK, BRICK OR OTHER SOLID WALL
073	IRRGL PVMT	OTHER BUMP (NOT SPEED BUMP), POTHOLE OR PAVEMENT IRREGULARITY (PER PAR)
074	OVERHD OBJ	OTHER OVERHEAD OBJECT (HIGHWAY SIGN, SIGNAL HEAD, ETC.); NOT BRIDGE
075	CAVE IN	BRIDGE OR ROAD CAVE IN
076	HI WATER	HIGH WATER
077	SNO BANK	SNOW BANK
078	LO-HI EDGE	LOW OR HIGH SHOULDER AT PAVEMENT EDGE
079	DITCH	CUT SLOPE OR DITCH EMBANKMENT
080	OBJ FRM MV	STRUCK BY ROCK OR OTHER OBJECT SET IN MOTION BY OTHER VEHICLE (INCL. LOST LOADS)
081	FLY-OBJ	STRUCK BY ROCK OR OTHER MOVING OR FLYING OBJECT (NOT SET IN MOTION BY VEHICLE)
082	VEH HID	VEHICLE OBSCURED VIEW
083	VEG HID	VEGETATION OBSCURED VIEW
084	BLDG HID	VIEW OBSCURED BY FENCE, SIGN, PHONE BOOTH, ETC.
085	WIND GUST	WIND GUST
086	IMMERSED	VEHICLE IMMERSED IN BODY OF WATER
087	FIRE/EXP	FIRE OR EXPLOSION
088	FENC/BLD	FENCE OR BUILDING, ETC.
089	OTHR CRASH	CRASH RELATED TO ANOTHER SEPARATE CRASH
090	TO 1 SIDE	TWO-WAY TRAFFIC ON DIVIDED ROADWAY ALL ROUTED TO ONE SIDE
091	BUILDING	BUILDING OR OTHER STRUCTURE
092	PHANTOM	OTHER (PHANTOM) NON-CONTACT VEHICLE
093	CELL PHONE	CELL PHONE (ON PAR OR DRIVER IN USE)
094	VIOL GDL	TEENAGE DRIVER IN VIOLATION OF GRADUATED LICENSE PGM
095	GUY WIRE	GUY WIRE
096	BERM	BERM (EARTHEN OR GRAVEL MOUND)
097	GRAVEL	GRAVEL IN ROADWAY
098	ABR EDGE	ABRUPT EDGE
099	CELL WTNSD	CELL PHONE USE WITNESSED BY OTHER PARTICIPANT
100	UNK FIXD	FIXED OBJECT, UNKNOWN TYPE.
101	OTHER OBJ	NON-FIXED OBJECT, OTHER OR UNKNOWN TYPE
102	TEXTING	TEXTING
103	WZ WORKER	WORK ZONE WORKER
104	ON VEHICLE	PASSENGER RIDING ON VEHICLE EXTERIOR
105	PEDAL PSGR	PASSENGER RIDING ON PEDALCYCLE
106	MAN WHLCHR	PEDESTRIAN IN NON-MOTORIZED WHEELCHAIR
107	MTR WHLCHR	PEDESTRIAN IN MOTORIZED WHEELCHAIR
108	OFFICER	LAW ENFORCEMENT / POLICE OFFICER
109	SUB-BIKE	"SUB-BIKE": PEDALCYCLIST INJURED SUBSEQUENT TO COLLISION, ETC.
110	N-MTR	NON-MOTORIST STRUCK VEHICLE
111	S CAR VS V	STREET CAR/TROLLEY (ON RAILS OR OVERHEAD WIRE SYSTEM) STRUCK VEHICLE
112	V VS S CAR	VEHICLE STRUCK STREET CAR/TROLLEY (ON RAILS OR OVERHEAD WIRE SYSTEM)
113	S CAR ROW	AT OR ON STREET CAR OR TROLLEY RIGHT-OF-WAY

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
114	RR EQUIP	VEHICLE STRUCK RAILROAD EQUIPMENT (NOT TRAIN) ON TRACKS
115	DSTRCT GPS	DISTRACTED BY NAVIGATION SYSTEM OR GPS DEVICE
116	DSTRCT OTH	DISTRACTED BY OTHER ELECTRONIC DEVICE
117	RR GATE	RAIL CROSSING DROP-ARM GATE
118	EXPNSN JNT	EXPANSION JOINT
119	JERSEY BAR	JERSEY BARRIER
120	WIRE BAR	WIRE OR CABLE MEDIAN BARRIER
121	FENCE	FENCE
123	OBJ IN VEH	LOOSE OBJECT IN VEHICLE STRUCK OCCUPANT
124	SLIPPERY	SLIDING OR SWERVING DUE TO WET, ICY, SLIPPERY OR LOOSE SURFACE (NOT GRAVEL)
125	SHLDR	SHOULDER GAVE WAY
126	BOULDER	ROCK(S), BOULDER (NOT GRAVEL; NOT ROCK SLIDE)
127	LAND SLIDE	ROCK SLIDE OR LAND SLIDE
128	CURVE INV	CURVE PRESENT AT CRASH LOCATION
129	HILL INV	VERTICAL GRADE / HILL PRESENT AT CRASH LOCATION
130	CURVE HID	VIEW OBSCURED BY CURVE
131	HILL HID	VIEW OBSCURED BY VERTICAL GRADE / HILL
132	WINDOW HID	VIEW OBSCURED BY VEHICLE WINDOW CONDITIONS
133	SPRAY HID	VIEW OBSCURED BY WATER SPRAY
134	TORRENTIAL	TORRENTIAL RAIN (EXCEPTIONALLY HEAVY RAIN)

FUNCTIONAL CLASSIFICATION TRANSLATION LIST

FUNC CLASS	DESCRIPTION
01	RURAL PRINCIPAL ARTERIAL - INTERSTATE
02	RURAL PRINCIPAL ARTERIAL - OTHER
06	RURAL MINOR ARTERIAL
07	RURAL MAJOR COLLECTOR
08	RURAL MINOR COLLECTOR
09	RURAL LOCAL
11	URBAN PRINCIPAL ARTERIAL - INTERSTATE
12	URBAN PRINCIPAL ARTERIAL - OTHER FREEWAYS AND EXP
14	URBAN PRINCIPAL ARTERIAL - OTHER
16	URBAN MINOR ARTERIAL
17	URBAN MAJOR COLLECTOR
18	URBAN MINOR COLLECTOR
19	URBAN LOCAL
78	UNKNOWN RURAL SYSTEM
79	UNKNOWN RURAL NON-SYSTEM
98	UNKNOWN URBAN SYSTEM
99	UNKNOWN URBAN NON-SYSTEM

HIGHWAY COMPONENT TRANSLATION LIST

CODE	DESCRIPTION
0	MAINLINE STATE HIGHWAY
1	COUPLET
3	FRONTAGE ROAD
6	CONNECTION
8	HIGHWAY - OTHER

INJURY SEVERITY CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
1	KILL	FATAL INJURY
2	INJA	INCAPACITATING INJURY - BLEEDING, BROKEN BONES
3	INJB	NON-INCAPACITATING INJURY
4	INJC	POSSIBLE INJURY - COMPLAINT OF PAIN
5	PRI	DIED PRIOR TO CRASH
7	NO<5	NO INJURY - 0 TO 4 YEARS OF AGE
9	NONE	PARTICIPANT UNINJURED, OVER THE AGE OF 4

LIGHT CONDITION CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	DAY	DAYLIGHT
2	DLIT	DARKNESS - WITH STREET LIGHTS
3	DARK	DARKNESS - NO STREET LIGHTS
4	DAWN	DAWN (TWILIGHT)
5	DUSK	DUSK (TWILIGHT)

MEDIAN TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	NONE	NO MEDIAN
1	RSDMD	SOLID MEDIAN BARRIER
2	DIVMD	EARTH, GRASS OR PAVED MEDIAN

MILEAGE TYPE CODE TRANSLATION LIST

CODE	LONG DESCRIPTION
0	REGULAR MILEAGE
T	TEMPORARY
Y	SPUR
Z	OVERLAPPING

MOVEMENT TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	STRGHT	STRAIGHT AHEAD
2	TURN-R	TURNING RIGHT
3	TURN-L	TURNING LEFT
4	U-TURN	MAKING A U-TURN
5	BACK	BACKING
6	STOP	STOPPED IN TRAFFIC
7	PRKD-P	PARKED - PROPERLY
8	PRKD-I	PARKED - IMPROPERLY
9	PARKNG	PARKING MANEUVER

NON-MOTORIST LOCATION CODE TRANSLATION LIST

CODE	LONG DESCRIPTION
00	AT INTERSECTION - NOT IN ROADWAY
01	AT INTERSECTION - INSIDE CROSSWALK
02	AT INTERSECTION - IN ROADWAY, OUTSIDE CROSSWALK
03	AT INTERSECTION - IN ROADWAY, XWALK AVAIL UNKNWN
04	NOT AT INTERSECTION - IN ROADWAY
05	NOT AT INTERSECTION - ON SHOULDER
06	NOT AT INTERSECTION - ON MEDIAN
07	NOT AT INTERSECTION - WITHIN TRAFFIC RIGHT-OF-WAY
08	NOT AT INTERSECTION - IN BIKE PATH OR PARKING LANE
09	NOT-AT INTERSECTION - ON SIDEWALK
10	OUTSIDE TRAFFICWAY BOUNDARIES
13	AT INTERSECTION - IN BIKE LANE
14	NOT AT INTERSECTION - IN BIKE LANE
15	NOT AT INTERSECTION - INSIDE MID-BLOCK CROSSWALK
16	NOT AT INTERSECTION - IN PARKING LANE
18	OTHER, NOT IN ROADWAY
99	UNKNOWN LOCATION

ROAD CHARACTER CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	INTER	INTERSECTION
2	ALLEY	DRIVEWAY OR ALLEY
3	STRGHT	STRAIGHT ROADWAY
4	TRANS	TRANSITION
5	CURVE	CURVE (HORIZONTAL CURVE)
6	OPENAC	OPEN ACCESS OR TURNOUT
7	GRADE	GRADE (VERTICAL CURVE)
8	BRIDGE	BRIDGE STRUCTURE
9	TUNNEL	TUNNEL

PARTICIPANT TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	OCC	UNKNOWN OCCUPANT TYPE
1	DRVR	DRIVER
2	PSNG	PASSENGER
3	PED	PEDESTRIAN
4	CONV	PEDESTRIAN USING A PEDESTRIAN CONVEYANCE
5	PTOW	PEDESTRIAN TOWING OR TRAILERING AN OBJECT
6	BIKE	PEDALCYCLIST
7	BTOW	PEDALCYCLIST TOWING OR TRAILERING AN OBJECT
8	PRKD	OCCUPANT OF A PARKED MOTOR VEHICLE
9	UNK	UNKNOWN TYPE OF NON-MOTORIST

TRAFFIC CONTROL DEVICE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
000	NONE	NO CONTROL
001	TRF SIGNAL	TRAFFIC SIGNALS
002	FLASHBCN-R	FLASHING BEACON - RED (STOP)
003	FLASHBCN-A	FLASHING BEACON - AMBER (SLOW)
004	STOP SIGN	STOP SIGN
005	SLOW SIGN	SLOW SIGN
006	REG-SIGN	REGULATORY SIGN
007	YIELD	YIELD SIGN
008	WARNING	WARNING SIGN
009	CURVE	CURVE SIGN
010	SCHL X-ING	SCHOOL CROSSING SIGN OR SPECIAL SIGNAL
011	OFCCR/FLAG	POLICE OFFICER, FLAGMAN - SCHOOL PATROL
012	BRDG-GATE	BRIDGE GATE - BARRIER
013	TEMP-BARR	TEMPORARY BARRIER
014	NO-PASS-ZN	NO PASSING ZONE
015	ONE-WAY	ONE-WAY STREET
016	CHANNEL	CHANNELIZATION
017	MEDIAN BAR	MEDIAN BARRIER
018	PILOT CAR	PILOT CAR
019	SP PED SIG	SPECIAL PEDESTRIAN SIGNAL
020	X-BUCK	CROSSBUCK
021	THR-GN-SIG	THROUGH GREEN ARROW OR SIGNAL
022	L-GRN-SIG	LEFT TURN GREEN ARROW, LANE MARKINGS, OR SIGNAL
023	R-GRN-SIG	RIGHT TURN GREEN ARROW, LANE MARKINGS, OR SIGNAL
024	WIGWAG	WIGWAG OR FLASHING LIGHTS W/O DROP-ARM GATE
025	X-BUCK WRN	CROSSBUCK AND ADVANCE WARNING
026	WW W/ GATE	FLASHING LIGHTS WITH DROP-ARM GATES
027	OVRHD SGNL	SUPPLEMENTAL OVERHEAD SIGNAL (RR XING ONLY)
028	SP RR STOP	SPECIAL RR STOP SIGN
029	ILUM GRD X	ILLUMINATED GRADE CROSSING
037	RAMP METER	METERED RAMPS
038	RUMBLE STR	RUMBLE STRIP
090	L-TURN REF	LEFT TURN REFUGE (WHEN REFUGE IS INVOLVED)
091	R-TURN ALL	RIGHT TURN AT ALL TIMES SIGN, ETC.
092	EMR SGN/FL	EMERGENCY SIGNS OR FLARES
093	ACCEL LANE	ACCELERATION OR DECELERATION LANES
094	R-TURN PRO	RIGHT TURN PROHIBITED ON RED AFTER STOPPING
095	BUS STPSGN	BUS STOP SIGN AND RED LIGHTS

VEHICLE TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
00	PDO	NOT COLLECTED FOR PDO CRASHES
01	PSNGR CAR	PASSENGER CAR, PICKUP, LIGHT DELIVERY, ETC.
02	BOBTAIL	TRUCK TRACTOR WITH NO TRAILERS (BOBTAIL)
03	FARM TRCTR	FARM TRACTOR OR SELF-PROPELLED FARM EQUIPMENT
04	SEMI TOW	TRUCK TRACTOR WITH TRAILER/MOBILE HOME IN TOW
05	TRUCK	TRUCK WITH NON-DETACHABLE BED, PANEL, ETC.
06	MOPED	MOPED, MINIBIKE, SEATED MOTOR SCOOTER, MOTOR BIKE
07	SCHL BUS	SCHOOL BUS (INCLUDES VAN)
08	OTH BUS	OTHER BUS
09	MTRCYCLE	MOTORCYCLE, DIRT BIKE
10	OTHER	OTHER: FORKLIFT, BACKHOE, ETC.
11	MOTRHOME	MOTORHOME
12	TROLLEY	MOTORIZED STREET CAR/TROLLEY (NO RAILS/WIRES)
13	ATV	ATV
14	MTRSCTR	MOTORIZED SCOOTER (STANDING)
15	SNOWMOBILE	SNOWMOBILE
99	UNKNOWN	UNKNOWN VEHICLE TYPE

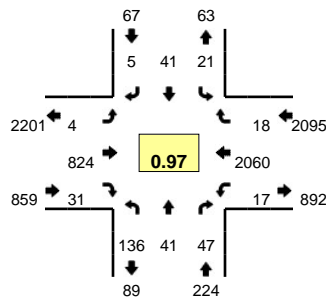
WEATHER CONDITION CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
0	UNK	UNKNOWN
1	CLR	CLEAR
2	CLD	CLOUDY
3	RAIN	RAIN
4	SLT	SLEET
5	FOG	FOG
6	SNOW	SNOW
7	DUST	DUST
8	SMOK	SMOKE
9	ASH	ASH

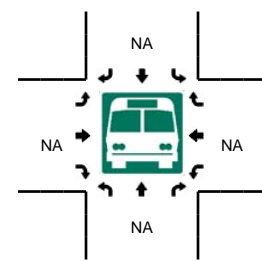
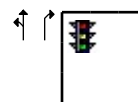
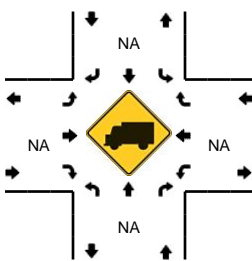
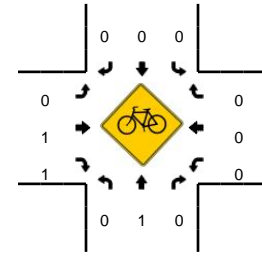
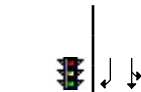
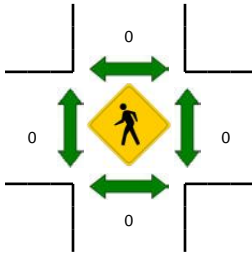
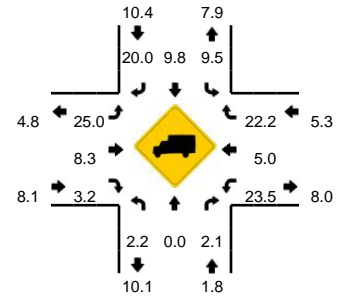
**Attachment C - Traffic Count
Data**

LOCATION: 1. SE Rusk Rd -- Milwaukie Expy (Hwy 224)
CITY/STATE: Milwaukie, OR

QC JOB #: 14793001
DATE: Tue, Oct 09 2018



Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:40 AM -- 7:55 AM

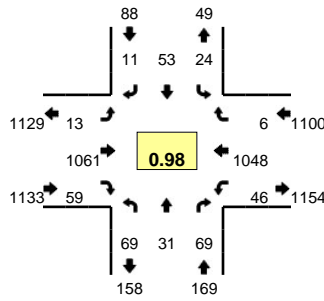


5-Min Count Period Beginning At	1. SE Rusk Rd (Northbound)				1. SE Rusk Rd (Southbound)				Milwaukie Expy (Hwy 224) (Eastbound)				Milwaukie Expy (Hwy 224) (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	16	0	0	0	1	0	1	0	0	53	3	0	2	210	0	0	286	
7:05 AM	12	4	7	0	0	3	2	0	1	66	0	0	0	160	2	0	257	
7:10 AM	2	3	5	0	1	1	0	0	0	60	4	0	1	198	3	0	278	
7:15 AM	19	2	4	0	2	5	0	0	0	70	0	0	0	159	1	0	262	
7:20 AM	13	2	3	0	3	3	0	0	0	52	1	0	0	165	1	0	243	
7:25 AM	8	6	5	0	3	1	1	0	2	80	5	0	1	177	0	0	289	
7:30 AM	5	6	3	0	0	6	0	0	0	61	2	0	3	161	1	0	248	
7:35 AM	16	7	4	0	4	6	1	0	0	76	4	0	0	168	2	0	288	
7:40 AM	6	2	5	0	1	1	0	0	0	76	2	0	1	180	1	0	275	
7:45 AM	13	3	3	0	4	1	0	0	0	61	1	0	4	179	3	0	272	
7:50 AM	4	2	2	0	0	6	0	0	0	87	5	0	4	182	1	0	293	
7:55 AM	22	4	6	0	2	8	0	0	1	82	4	0	1	121	3	0	254	3245
8:00 AM	13	2	4	0	0	4	1	0	3	67	2	0	4	154	3	0	257	3216
8:05 AM	8	3	4	0	2	6	0	0	2	75	9	0	2	163	1	0	275	3234
8:10 AM	6	1	3	0	1	5	0	0	0	75	2	0	5	156	1	0	255	3211
8:15 AM	8	1	5	0	2	12	0	0	1	67	10	0	4	132	1	0	243	3192
8:20 AM	9	7	5	0	1	6	0	0	2	48	8	0	6	158	0	0	250	3199
8:25 AM	15	2	7	0	4	12	0	0	1	68	8	0	7	131	1	0	256	3166
8:30 AM	11	6	4	0	0	3	0	0	1	65	2	0	7	155	1	0	255	3173
8:35 AM	15	5	14	0	1	7	3	0	0	70	2	0	3	154	0	0	274	3159
8:40 AM	14	5	7	0	1	2	2	0	0	78	2	0	4	144	0	0	259	3143
8:45 AM	12	2	5	0	1	1	0	0	0	80	5	0	2	127	1	0	236	3107
8:50 AM	12	3	9	0	2	2	1	0	1	75	4	0	5	141	0	0	255	3069
8:55 AM	5	3	4	0	2	4	2	0	1	57	5	0	4	124	1	0	212	3027
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	92	28	40	0	20	32	0	0	0	896	32	0	36	2164	20	0	3360	
Heavy Trucks	4	0	0		4	4	0		0	72	0		8	92	4		188	
Pedestrians		0				0				0				0			0	
Bicycles		0	0			0	0			0	0			0	0		0	
Railroad																	0	
Stopped Buses																	0	

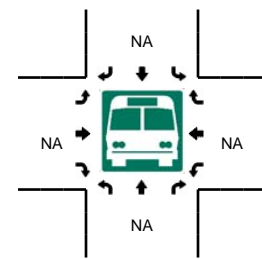
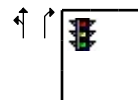
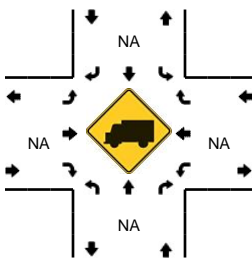
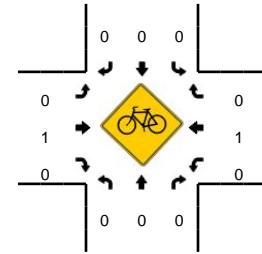
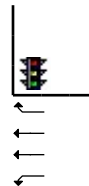
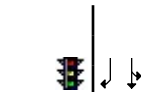
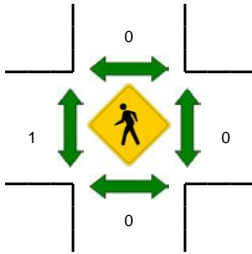
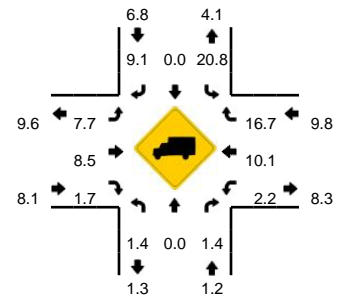
Comments:

LOCATION: 1. SE Rusk Rd -- Milwaukie Expy (Hwy 224)
CITY/STATE: Milwaukie, OR

QC JOB #: 14793002
DATE: Tue, Oct 09 2018



Peak-Hour: 11:40 AM -- 12:40 PM
Peak 15-Min: 12:00 PM -- 12:15 PM

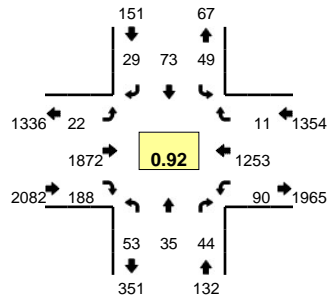


5-Min Count Period Beginning At	1. SE Rusk Rd (Northbound)				1. SE Rusk Rd (Southbound)				Milwaukie Expy (Hwy 224) (Eastbound)				Milwaukie Expy (Hwy 224) (Westbound)				Total	Hourly Totals	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
11:00 AM	2	0	3	0	3	3	2	0	0	72	4	1	7	87	0	0	184		
11:05 AM	7	1	4	0	1	1	1	0	1	86	3	0	6	86	0	0	197		
11:10 AM	10	3	5	0	0	7	0	0	1	74	5	0	7	86	0	0	198		
11:15 AM	5	5	7	0	0	3	2	0	0	68	3	0	8	78	1	0	180		
11:20 AM	5	1	2	0	2	0	0	0	0	87	3	0	3	80	1	0	184		
11:25 AM	4	3	2	0	0	1	2	0	2	80	6	0	1	94	1	0	196		
11:30 AM	3	4	5	0	3	3	0	0	1	87	6	0	5	93	0	0	210		
11:35 AM	5	3	2	0	2	4	1	0	1	88	1	0	0	63	3	0	173		
11:40 AM	2	4	1	0	3	4	2	0	1	78	5	0	3	116	2	0	221		
11:45 AM	9	0	3	0	8	3	0	0	2	83	4	0	2	77	0	0	191		
11:50 AM	7	3	2	0	0	4	1	0	0	91	4	0	1	106	0	0	219		
11:55 AM	5	0	2	0	1	2	1	0	1	67	4	0	2	92	1	0	178	2331	
12:00 PM	7	3	5	0	1	3	1	0	0	96	9	1	2	85	1	0	214	2361	
12:05 PM	2	3	7	0	2	6	1	0	1	92	9	0	3	76	0	0	202	2366	
12:10 PM	10	5	9	0	1	7	1	0	0	77	1	0	4	106	0	0	221	2389	
12:15 PM	5	2	9	0	3	7	1	0	1	91	6	0	5	66	0	0	196	2405	
12:20 PM	6	3	7	0	0	2	0	0	3	98	5	0	8	79	1	0	212	2433	
12:25 PM	4	1	8	0	4	7	0	0	2	92	5	0	5	81	1	0	210	2447	
12:30 PM	4	5	4	0	0	5	1	0	1	94	4	0	6	81	0	0	205	2442	
12:35 PM	8	2	12	0	1	3	2	0	0	102	3	0	5	83	0	0	221	2490	
12:40 PM	7	1	3	0	2	3	0	0	1	77	5	0	1	68	1	0	169	2438	
12:45 PM	6	4	3	0	3	5	1	0	1	80	4	0	5	98	0	0	210	2457	
12:50 PM	9	5	2	0	1	0	0	0	0	88	7	0	6	70	1	0	189	2427	
12:55 PM	7	3	1	0	3	7	0	0	3	97	2	0	3	83	2	0	211	2460	
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total		
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
All Vehicles	76	44	84	0	16	64	12	0	4	1060	76	4	36	1068	4	0	2548		
Heavy Trucks	0	0	0	0	0	0	0	0	0	92	4	0	0	124	0	0	220		
Pedestrians	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4		
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Railroad																			
Stopped Buses																			

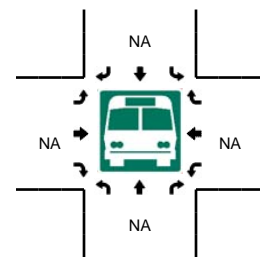
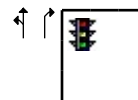
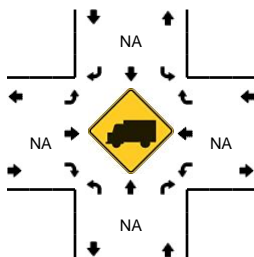
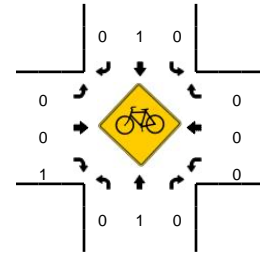
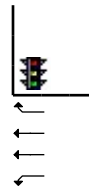
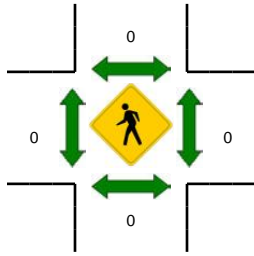
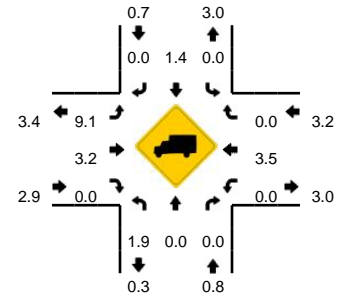
Comments:

LOCATION: 1. SE Rusk Rd -- Milwaukie Expy (Hwy 224)
CITY/STATE: Milwaukie, OR

QC JOB #: 14793003
DATE: Tue, Oct 09 2018



Peak-Hour: 4:35 PM -- 5:35 PM
Peak 15-Min: 5:10 PM -- 5:25 PM

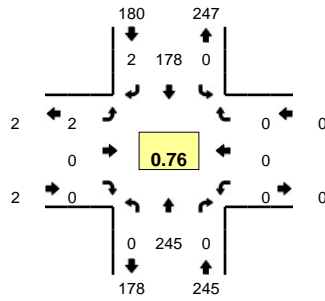


5-Min Count Period Beginning At	1. SE Rusk Rd (Northbound)				1. SE Rusk Rd (Southbound)				Milwaukie Expy (Hwy 224) (Eastbound)				Milwaukie Expy (Hwy 224) (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	6	8	4	0	6	5	2	0	0	110	9	0	8	97	0	0	255	
4:05 PM	2	1	1	0	9	9	0	0	0	171	9	0	7	96	0	0	305	
4:10 PM	4	1	1	0	8	11	1	0	2	197	17	0	6	103	3	0	354	
4:15 PM	8	3	6	0	14	8	2	0	0	174	18	0	0	93	0	0	326	
4:20 PM	2	2	4	0	3	6	1	0	0	141	18	0	7	111	0	0	295	
4:25 PM	1	2	3	0	3	9	2	0	3	140	18	0	6	84	1	0	272	
4:30 PM	2	3	7	0	6	6	3	0	5	133	14	0	3	87	2	0	271	
4:35 PM	3	2	2	0	3	3	2	0	2	158	23	0	12	114	0	0	324	
4:40 PM	1	1	3	0	2	5	4	0	0	169	14	0	4	107	1	0	311	
4:45 PM	4	4	3	0	2	3	0	0	7	142	13	0	7	99	1	0	285	
4:50 PM	5	3	2	0	4	8	0	0	0	134	19	0	14	115	1	0	305	
4:55 PM	3	3	3	0	4	2	5	0	1	175	20	0	3	98	2	0	319	3622
5:00 PM	5	2	5	0	4	2	1	0	3	150	11	0	5	92	1	0	281	3648
5:05 PM	7	4	3	0	7	12	5	0	3	139	12	1	12	95	1	0	301	3644
5:10 PM	12	4	5	0	4	7	3	0	0	183	15	0	3	137	0	0	373	3663
5:15 PM	4	1	6	0	5	6	1	0	0	157	18	0	6	96	1	0	301	3638
5:20 PM	2	5	3	0	8	11	5	0	3	145	18	0	13	123	1	0	337	3680
5:25 PM	6	5	3	0	1	9	1	0	2	155	19	0	8	96	1	0	306	3714
5:30 PM	1	1	6	0	5	5	2	0	0	165	6	0	3	81	1	0	276	3719
5:35 PM	1	7	3	0	2	5	2	0	0	162	7	0	7	94	2	0	292	3687
5:40 PM	9	0	3	0	4	3	2	0	1	146	7	0	3	108	2	0	288	3664
5:45 PM	6	2	3	0	1	6	1	0	0	144	9	0	4	78	1	0	255	3634
5:50 PM	3	1	6	0	1	5	1	0	1	161	14	0	4	66	0	0	263	3592
5:55 PM	4	3	2	0	3	4	0	0	0	118	10	0	8	87	1	0	240	3513
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	72	40	56	0	68	96	36	0	12	1940	204	0	88	1424	8	0	4044	
Heavy Trucks	0	0	0	0	0	0	0	0	4	80	0	0	0	44	0	0	128	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	
Railroad																		
Stopped Buses																		

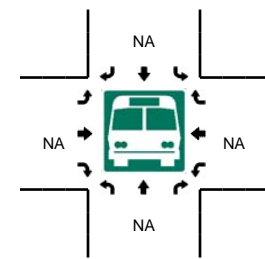
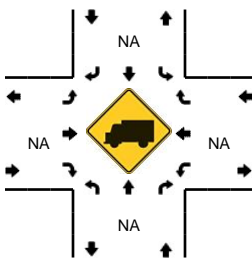
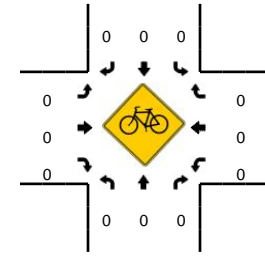
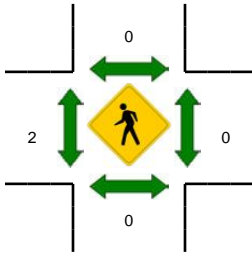
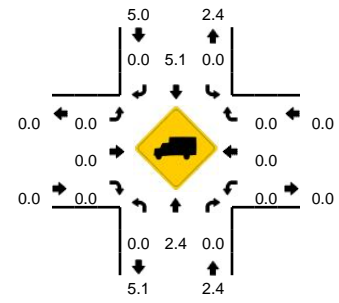
Comments:

LOCATION: 2. SE Rusk Rd -- Church Driveway
CITY/STATE: Milwaukie, OR

QC JOB #: 14793004
DATE: Tue, Oct 09 2018



Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 8:15 AM -- 8:30 AM

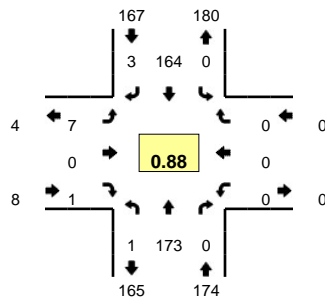


5-Min Count Period Beginning At	2. SE Rusk Rd (Northbound)				2. SE Rusk Rd (Southbound)				Church Driveway (Eastbound)				Church Driveway (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	14	0	0	0	4	0	0	0	0	0	0	0	0	0	0	18	
7:05 AM	0	22	0	0	0	4	0	0	0	0	0	0	0	0	0	0	26	
7:10 AM	0	12	0	0	0	6	0	0	0	0	0	0	0	0	0	0	18	
7:15 AM	0	21	0	0	0	5	0	0	0	0	0	0	0	0	0	0	26	
7:20 AM	0	18	0	0	0	4	0	0	0	0	0	0	0	0	0	0	22	
7:25 AM	0	20	0	0	0	7	0	0	0	0	0	0	0	0	0	0	27	
7:30 AM	0	18	0	0	0	9	0	0	0	0	0	0	0	0	0	0	27	
7:35 AM	0	21	0	0	0	12	0	0	0	0	0	0	0	0	0	0	33	
7:40 AM	0	20	0	0	0	4	0	0	0	0	0	0	0	0	0	0	24	
7:45 AM	0	19	0	0	0	8	0	0	0	0	0	0	0	0	0	0	27	
7:50 AM	0	18	0	0	0	15	0	0	0	0	0	0	0	0	0	0	33	
7:55 AM	0	23	0	0	0	13	1	0	0	0	0	0	0	0	0	0	37	318
8:00 AM	0	20	0	0	0	10	0	0	1	0	0	0	0	0	0	0	31	331
8:05 AM	0	11	0	0	0	16	0	0	0	0	0	0	0	0	0	0	27	332
8:10 AM	0	11	0	0	0	12	0	0	0	0	0	0	0	0	0	0	23	337
8:15 AM	0	17	0	0	0	27	0	0	0	0	0	0	0	0	0	0	44	355
8:20 AM	0	30	0	0	0	18	0	0	0	0	0	0	0	0	0	0	48	381
8:25 AM	0	21	0	0	0	28	0	0	0	0	0	0	0	0	0	0	49	403
8:30 AM	0	22	0	0	0	12	0	0	0	0	0	0	0	0	0	0	34	410
8:35 AM	0	32	0	0	0	12	0	0	0	0	0	0	0	0	0	0	44	421
8:40 AM	0	21	0	0	0	7	1	0	1	0	0	0	0	0	0	0	30	427
8:45 AM	0	18	0	0	0	8	0	0	0	0	0	0	0	0	0	0	26	426
8:50 AM	0	21	0	0	0	8	0	0	0	0	0	0	0	0	0	0	29	422
8:55 AM	0	12	0	0	0	16	0	0	0	0	0	0	0	0	0	0	28	413
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	272	0	0	0	292	0	0	0	0	0	0	0	0	0	0	564	
Heavy Trucks	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

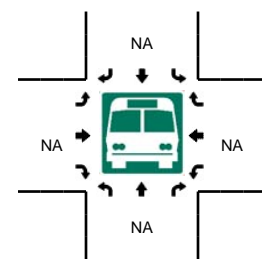
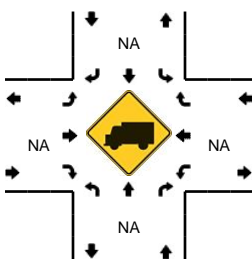
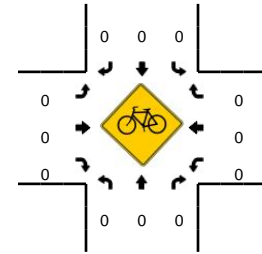
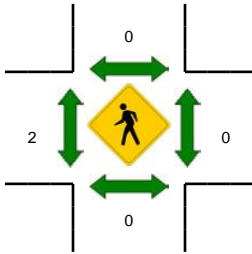
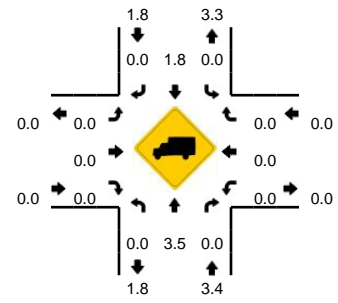
Comments:

LOCATION: 2. SE Rusk Rd -- Church Driveway
CITY/STATE: Milwaukie, OR

QC JOB #: 14793005
DATE: Tue, Oct 09 2018



Peak-Hour: 12:00 PM -- 1:00 PM
Peak 15-Min: 12:15 PM -- 12:30 PM

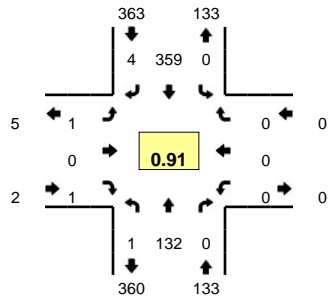


5-Min Count Period Beginning At	2. SE Rusk Rd (Northbound)				2. SE Rusk Rd (Southbound)				Church Driveway (Eastbound)				Church Driveway (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:00 AM	0	11	0	0	0	13	0	0	0	0	0	0	0	0	0	0	24	
11:05 AM	0	13	0	0	0	8	0	0	0	0	0	0	0	0	0	0	21	
11:10 AM	0	18	0	0	0	20	0	0	0	0	0	0	0	0	0	0	38	
11:15 AM	0	14	0	0	0	15	0	0	0	0	0	0	0	0	0	0	29	
11:20 AM	0	10	0	0	0	6	0	0	0	0	0	0	0	0	0	0	16	
11:25 AM	0	8	0	0	0	9	0	0	0	0	0	0	0	0	0	0	17	
11:30 AM	0	9	0	0	0	14	0	0	0	0	0	0	0	0	0	0	23	
11:35 AM	0	10	0	0	0	6	0	0	0	0	0	0	0	0	0	0	16	
11:40 AM	0	10	0	0	0	11	0	0	0	0	0	0	0	0	0	0	21	
11:45 AM	0	9	0	0	0	9	0	0	0	0	0	0	0	0	0	0	18	
11:50 AM	0	12	0	0	0	8	0	0	0	0	0	0	0	0	0	0	20	
11:55 AM	0	10	0	0	0	8	0	0	0	0	0	0	0	0	0	0	18	261
12:00 PM	0	13	0	0	0	14	0	0	0	0	0	0	0	0	0	0	27	264
12:05 PM	0	16	0	0	0	16	0	0	1	0	0	0	0	0	0	0	33	276
12:10 PM	0	19	0	0	0	13	0	0	0	0	0	0	0	0	0	0	32	270
12:15 PM	0	12	0	0	0	15	1	0	0	0	0	0	0	0	0	0	28	269
12:20 PM	1	16	0	0	0	16	0	0	3	0	0	0	0	0	0	0	36	289
12:25 PM	0	17	0	0	0	16	0	0	1	0	1	0	0	0	0	0	35	307
12:30 PM	0	11	0	0	0	16	1	0	0	0	0	0	0	0	0	0	28	312
12:35 PM	0	21	0	0	0	9	0	0	0	0	0	0	0	0	0	0	30	326
12:40 PM	0	9	0	0	0	12	0	0	0	0	0	0	0	0	0	0	21	326
12:45 PM	0	14	0	0	0	12	0	0	1	0	0	0	0	0	0	0	27	335
12:50 PM	0	15	0	0	0	14	1	0	1	0	0	0	0	0	0	0	31	346
12:55 PM	0	10	0	0	0	11	0	0	0	0	0	0	0	0	0	0	21	349
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	4	180	0	0	0	188	4	0	16	0	4	0	0	0	0	0	396	
Heavy Trucks	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

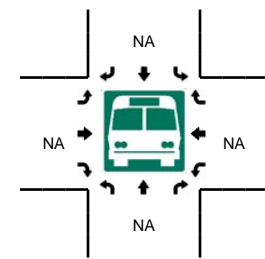
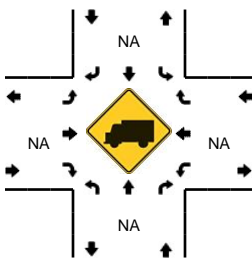
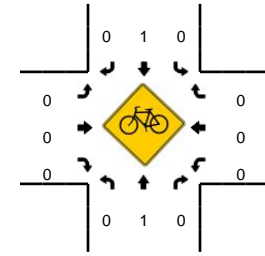
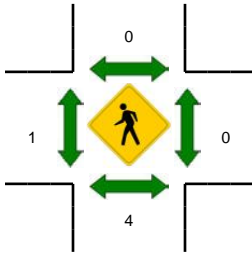
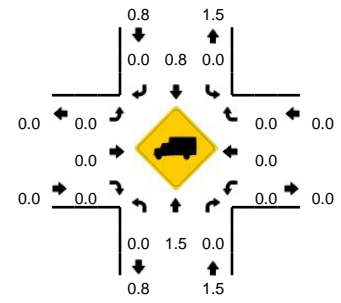
Comments:

LOCATION: 2. SE Rusk Rd -- Church Driveway
CITY/STATE: Milwaukie, OR

QC JOB #: 14793006
DATE: Tue, Oct 09 2018



Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

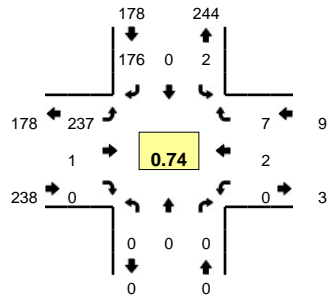


5-Min Count Period Beginning At	2. SE Rusk Rd (Northbound)				2. SE Rusk Rd (Southbound)				Church Driveway (Eastbound)				Church Driveway (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	13	0	0	0	20	1	0	0	0	0	0	0	0	0	0	34	
4:05 PM	0	5	0	0	0	25	1	0	0	0	1	0	0	0	0	0	32	
4:10 PM	0	10	0	0	0	33	0	0	1	0	0	0	0	0	0	0	44	
4:15 PM	0	14	0	0	0	26	0	0	0	0	0	0	0	0	0	0	40	
4:20 PM	0	9	0	0	0	32	1	0	0	0	0	0	0	0	0	0	42	
4:25 PM	0	5	0	0	0	31	0	0	0	0	0	0	0	0	0	0	36	
4:30 PM	0	11	0	0	0	26	0	0	0	0	0	0	0	0	0	0	37	
4:35 PM	0	7	0	0	0	37	1	0	0	0	0	0	0	0	0	0	45	
4:40 PM	1	8	0	0	0	22	0	0	1	0	1	0	0	0	0	0	33	
4:45 PM	0	8	0	0	0	25	0	0	0	0	0	0	0	0	0	0	33	
4:50 PM	0	8	0	0	0	38	0	0	0	0	0	0	0	0	0	0	46	
4:55 PM	0	12	0	0	0	27	0	0	0	0	0	0	0	0	0	0	39	461
5:00 PM	0	12	0	0	0	19	1	0	0	0	0	0	0	0	0	0	32	459
5:05 PM	0	17	0	0	0	32	1	0	0	0	0	0	0	0	0	0	50	477
5:10 PM	0	20	0	0	0	26	0	0	0	0	0	0	0	0	0	0	46	479
5:15 PM	0	6	0	0	0	32	0	0	0	0	0	0	0	0	0	0	38	477
5:20 PM	0	10	0	0	0	35	1	0	0	0	0	0	0	0	0	0	46	481
5:25 PM	0	13	0	0	0	40	0	0	0	0	0	0	0	0	0	0	53	498
5:30 PM	0	8	0	0	0	13	0	0	0	0	0	0	0	0	0	0	21	482
5:35 PM	0	10	0	0	0	20	0	0	0	0	0	0	0	0	0	0	30	467
5:40 PM	0	12	0	0	0	13	0	0	0	0	0	0	0	0	0	0	25	459
5:45 PM	0	11	0	0	0	19	0	0	0	0	0	0	0	0	0	0	30	456
5:50 PM	0	11	0	0	0	19	0	0	1	0	0	0	0	0	0	0	31	441
5:55 PM	0	7	0	0	0	24	0	0	0	0	0	0	0	0	0	0	31	433
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	116	0	0	0	428	4	0	0	0	0	0	0	0	0	0	548	
Heavy Trucks	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	4	
Pedestrians		4				0					0			0			4	
Bicycles	0	1	0		0	1	0		0	0	0		0	0	0		2	
Railroad																		
Stopped Buses																		

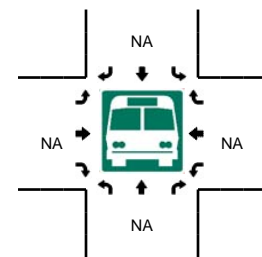
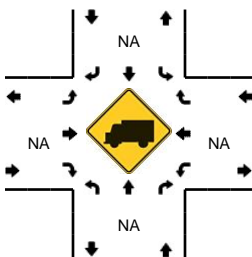
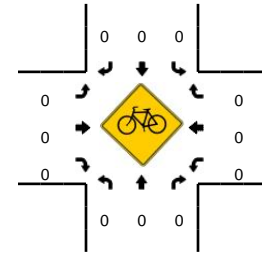
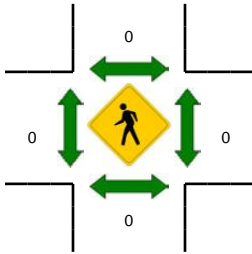
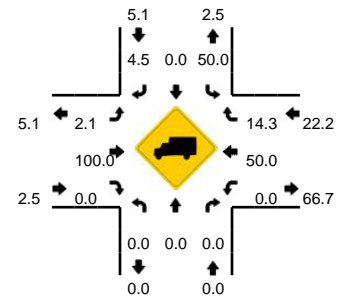
Comments:

LOCATION: 3. SE Rusk Rd -- SE Ruscliffe Rd
CITY/STATE: Milwaukie, OR

QC JOB #: 14793007
DATE: Tue, Oct 09 2018



Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 8:15 AM -- 8:30 AM

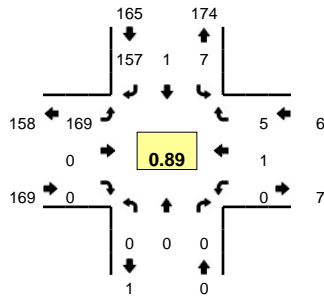


5-Min Count Period Beginning At	3. SE Rusk Rd (Northbound)				3. SE Rusk Rd (Southbound)				SE Ruscliffe Rd (Eastbound)				SE Ruscliffe Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	0	0	4	0	12	2	0	0	0	1	1	0	20	
7:05 AM	0	0	0	0	1	0	3	0	20	1	0	0	0	0	0	2	27	
7:10 AM	0	0	0	0	2	0	4	0	10	0	0	0	0	0	2	0	18	
7:15 AM	0	0	0	0	0	0	5	0	21	0	0	0	0	0	0	0	26	
7:20 AM	0	0	0	0	0	0	4	0	16	0	0	0	0	2	2	0	24	
7:25 AM	0	0	0	0	0	0	6	0	20	1	0	0	0	0	1	0	28	
7:30 AM	0	0	0	0	1	0	8	0	17	0	0	0	0	0	1	0	27	
7:35 AM	0	0	0	0	1	0	10	0	17	0	0	0	0	4	5	0	37	
7:40 AM	0	0	0	0	1	0	3	0	17	0	0	0	0	0	2	0	23	
7:45 AM	0	0	0	0	0	0	8	0	17	0	0	0	0	0	2	0	27	
7:50 AM	0	0	0	0	0	0	15	0	19	1	0	0	0	1	0	0	36	
7:55 AM	0	0	0	0	0	0	13	0	21	0	0	0	0	1	1	0	36	329
8:00 AM	0	0	0	0	1	0	9	0	19	0	0	0	0	0	1	0	30	339
8:05 AM	0	0	0	0	0	0	15	0	8	0	0	0	0	0	1	0	24	336
8:10 AM	0	0	0	0	1	0	12	0	11	0	0	0	0	0	0	0	24	342
8:15 AM	0	0	0	0	0	0	27	0	17	0	0	0	0	0	0	0	44	360
8:20 AM	0	0	0	0	0	0	18	0	31	0	0	0	0	0	0	0	49	385
8:25 AM	0	0	0	0	0	0	28	0	22	0	0	0	0	0	0	0	50	407
8:30 AM	0	0	0	0	0	0	12	0	22	0	0	0	0	0	1	0	35	415
8:35 AM	0	0	0	0	0	0	12	0	29	0	0	0	0	0	1	0	42	420
8:40 AM	0	0	0	0	0	0	7	0	21	0	0	0	0	0	0	0	28	425
8:45 AM	0	0	0	0	0	0	8	0	18	0	0	0	0	0	0	0	26	424
8:50 AM	0	0	0	0	2	0	6	0	20	0	0	0	0	0	2	0	30	418
8:55 AM	0	0	0	0	0	0	16	0	10	0	0	0	0	0	1	0	27	409
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	0	0	0	0	0	292	0	280	0	0	0	0	0	0	0	0	572
Heavy Trucks	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railroad																		
Stopped Buses																		

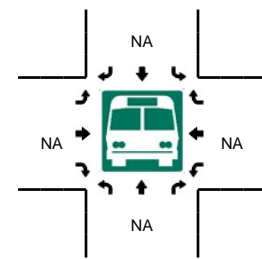
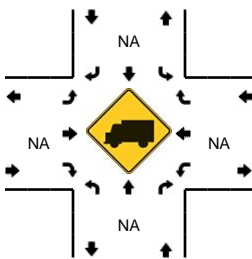
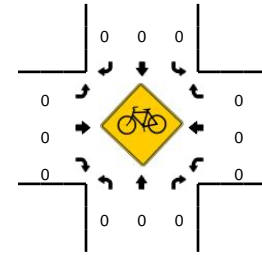
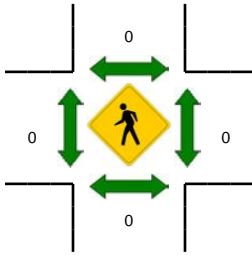
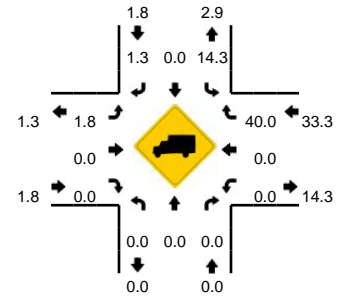
Comments:

LOCATION: 3. SE Rusk Rd -- SE Ruscliffe Rd
CITY/STATE: Milwaukie, OR

QC JOB #: 14793008
DATE: Tue, Oct 09 2018



Peak-Hour: 12:00 PM -- 1:00 PM
Peak 15-Min: 12:15 PM -- 12:30 PM

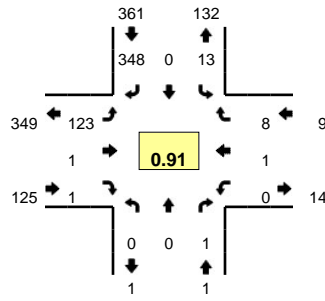


5-Min Count Period Beginning At	3. SE Rusk Rd (Northbound)				3. SE Rusk Rd (Southbound)				SE Ruscliffe Rd (Eastbound)				SE Ruscliffe Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:00 AM	0	0	0	0	0	0	13	0	11	1	0	0	0	0	0	0	25	
11:05 AM	0	0	0	0	0	0	8	0	13	0	0	0	0	0	1	0	22	
11:10 AM	0	0	0	0	1	0	19	0	18	1	0	0	0	0	2	0	41	
11:15 AM	0	0	0	0	0	0	14	0	13	0	0	0	0	0	0	1	28	
11:20 AM	0	0	0	0	0	0	6	0	11	2	0	0	0	0	0	0	19	
11:25 AM	0	0	0	0	0	0	10	0	8	0	0	0	0	0	0	0	18	
11:30 AM	0	0	0	0	1	0	12	0	7	0	0	0	0	0	1	0	21	
11:35 AM	0	0	0	0	1	0	6	0	10	0	0	0	0	0	0	0	17	
11:40 AM	0	0	0	0	0	0	10	0	10	0	0	0	0	0	0	0	20	
11:45 AM	0	0	0	0	0	0	10	0	8	0	0	0	0	0	0	1	19	
11:50 AM	0	0	0	0	0	0	8	0	11	0	0	0	0	0	0	1	20	
11:55 AM	0	0	0	0	0	0	8	0	10	0	0	0	0	0	1	0	19	269
12:00 PM	0	0	0	0	1	0	13	0	13	0	0	0	0	0	0	0	27	271
12:05 PM	0	0	0	0	2	0	14	0	16	0	0	0	0	0	0	0	32	281
12:10 PM	0	0	0	0	0	0	12	0	17	0	0	0	0	0	1	0	30	270
12:15 PM	0	0	0	0	0	0	16	0	10	0	0	0	0	0	1	2	29	271
12:20 PM	0	0	0	0	0	0	15	0	17	0	0	0	0	0	0	0	32	284
12:25 PM	0	0	0	0	0	0	18	0	16	0	0	0	0	0	0	1	35	301
12:30 PM	0	0	0	0	1	0	14	0	11	0	0	0	0	0	0	0	26	306
12:35 PM	0	0	0	0	1	0	9	0	21	0	0	0	0	0	0	0	31	320
12:40 PM	0	0	0	0	0	0	12	0	8	0	0	0	0	0	0	1	21	321
12:45 PM	0	0	0	0	2	0	9	0	14	0	0	0	0	0	0	0	25	327
12:50 PM	0	0	0	0	0	0	15	0	17	0	0	0	0	0	0	0	32	339
12:55 PM	0	0	0	0	0	1	10	0	9	0	0	0	0	0	0	0	20	340
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	0	0	0	0	0	196	0	172	0	0	0	0	0	4	12	384	
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

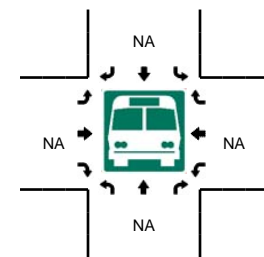
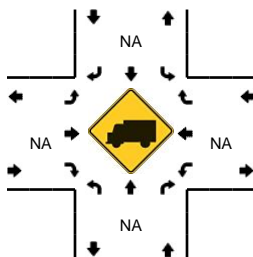
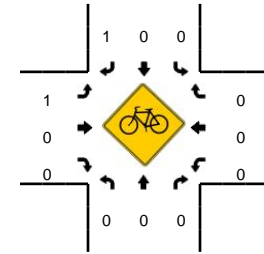
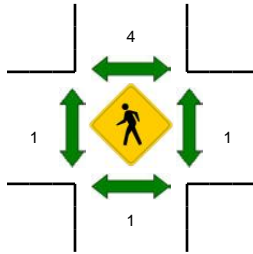
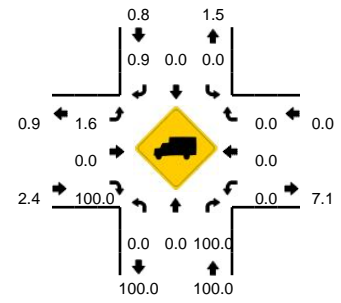
Comments:

LOCATION: 3. SE Rusk Rd -- SE Ruscliffe Rd
CITY/STATE: Milwaukie, OR

QC JOB #: 14793009
DATE: Tue, Oct 09 2018



Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

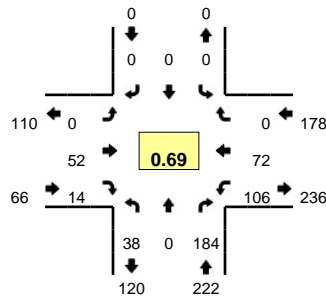


5-Min Count Period Beginning At	3. SE Rusk Rd (Northbound)				3. SE Rusk Rd (Southbound)				SE Ruscliffe Rd (Eastbound)				SE Ruscliffe Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	19	0	13	0	0	0	0	0	0	0	32	
4:05 PM	0	0	0	0	0	0	25	0	5	0	0	0	0	0	0	0	30	
4:10 PM	0	0	0	0	1	0	33	0	10	0	0	0	0	0	0	0	44	
4:15 PM	0	0	0	0	0	0	26	0	14	0	0	0	0	0	0	0	40	
4:20 PM	0	0	0	0	2	0	30	0	7	2	0	0	0	0	2	0	43	
4:25 PM	0	0	0	0	1	0	30	0	5	0	0	0	0	0	1	0	37	
4:30 PM	0	0	0	0	1	0	24	0	10	1	0	0	0	0	0	0	36	
4:35 PM	0	0	0	0	1	0	36	0	7	0	0	0	0	0	0	0	44	
4:40 PM	0	0	0	0	0	0	24	0	9	0	0	0	0	0	0	0	33	
4:45 PM	0	0	0	0	1	0	24	0	7	0	0	0	0	0	1	0	33	
4:50 PM	0	0	0	0	2	0	35	0	7	0	0	0	0	0	1	0	45	
4:55 PM	0	0	0	0	2	0	26	0	11	0	1	0	0	0	2	0	42	459
5:00 PM	0	0	1	0	1	0	17	1	8	0	0	0	0	1	2	0	31	458
5:05 PM	0	0	0	0	1	0	31	0	17	0	0	0	0	0	0	0	49	477
5:10 PM	0	0	0	0	0	0	27	0	19	0	0	0	0	0	1	0	47	480
5:15 PM	0	0	0	0	1	0	30	0	5	0	0	0	0	0	1	0	37	477
5:20 PM	0	0	0	0	1	0	34	0	10	0	0	0	0	0	0	0	45	479
5:25 PM	0	0	0	0	1	0	40	0	13	0	0	0	0	0	0	0	54	496
5:30 PM	0	0	0	0	0	0	13	0	8	1	0	0	0	0	0	0	22	482
5:35 PM	0	0	0	0	0	0	20	0	10	0	0	0	0	0	0	0	30	468
5:40 PM	0	0	0	0	0	0	13	0	10	0	0	0	0	0	2	0	25	460
5:45 PM	0	0	0	0	1	0	19	0	11	0	0	0	0	0	1	0	32	459
5:50 PM	0	0	0	0	1	0	18	0	10	0	0	0	0	1	0	0	30	444
5:55 PM	0	0	0	0	0	0	24	0	7	1	0	0	0	0	0	0	32	434
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	0	0	0	12	0	416	0	112	0	0	0	0	0	4	0	544	
Heavy Trucks	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4	
Pedestrians		4				4				4				4			16	
Bicycles	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2	
Railroad																		
Stopped Buses																		

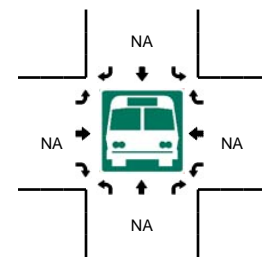
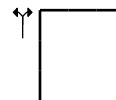
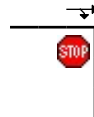
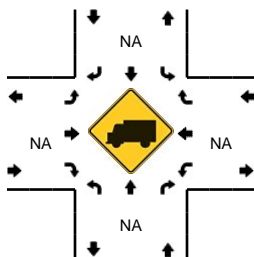
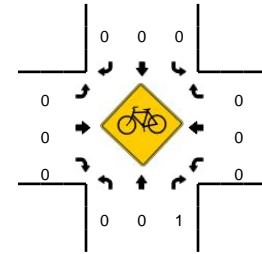
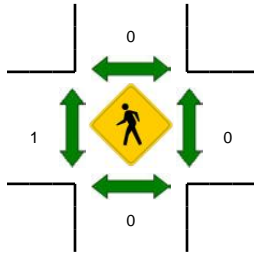
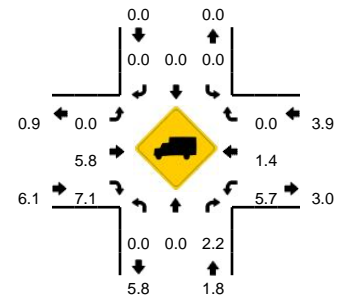
Comments:

LOCATION: 4. SE Rusk Rd -- SE Kellogg Creek Dr
CITY/STATE: Milwaukie, OR

QC JOB #: 14793010
DATE: Tue, Oct 09 2018



Peak-Hour: 7:50 AM -- 8:50 AM
Peak 15-Min: 8:15 AM -- 8:30 AM

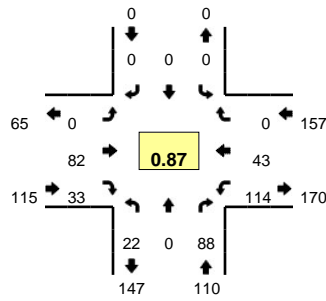


5-Min Count Period Beginning At	4. SE Rusk Rd (Northbound)				4. SE Rusk Rd (Southbound)				SE Kellogg Creek Dr (Eastbound)				SE Kellogg Creek Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	14	0	0	0	0	0	0	0	0	0	3	2	0	0	19	
7:05 AM	0	0	21	0	0	0	0	0	0	0	0	0	2	1	0	0	24	
7:10 AM	0	0	10	0	0	0	0	0	0	0	0	0	3	1	0	0	14	
7:15 AM	0	0	20	0	0	0	0	0	0	1	1	0	4	1	0	0	27	
7:20 AM	0	0	15	0	0	0	0	0	0	1	0	0	5	1	0	0	22	
7:25 AM	1	0	22	0	0	0	0	0	0	0	0	0	5	2	0	0	30	
7:30 AM	1	0	16	0	0	0	0	0	0	0	0	0	7	1	0	0	25	
7:35 AM	0	0	17	0	0	0	0	0	0	1	0	0	10	4	0	0	32	
7:40 AM	2	0	18	0	0	0	0	0	0	0	0	0	2	1	0	0	23	
7:45 AM	1	0	15	0	0	0	0	0	0	1	0	0	5	3	0	0	25	
7:50 AM	2	0	19	0	0	0	0	0	0	0	0	0	13	2	0	0	36	
7:55 AM	1	0	21	0	0	0	0	0	0	1	0	0	14	1	0	0	38	315
8:00 AM	1	0	18	0	0	0	0	0	0	1	1	0	9	0	0	0	30	326
8:05 AM	0	0	6	0	0	0	0	0	0	1	0	0	14	1	0	0	22	324
8:10 AM	4	0	10	0	0	0	0	0	0	1	0	0	5	7	0	0	27	337
8:15 AM	2	0	14	0	0	0	0	0	0	2	1	0	8	18	0	0	45	355
8:20 AM	10	0	24	0	0	0	0	0	0	8	0	0	7	12	0	0	61	394
8:25 AM	8	0	11	0	0	0	0	0	0	11	5	0	10	18	0	0	63	427
8:30 AM	6	0	16	0	0	0	0	0	0	7	3	0	6	7	0	0	45	447
8:35 AM	1	0	15	0	0	0	0	0	0	12	2	0	9	1	0	0	40	455
8:40 AM	1	0	16	0	0	0	0	0	0	5	2	0	6	3	0	0	33	465
8:45 AM	2	0	14	0	0	0	0	0	0	3	0	0	5	2	0	0	26	466
8:50 AM	0	0	12	0	0	0	0	0	0	8	1	0	5	2	0	0	28	458
8:55 AM	1	0	9	0	0	0	0	0	0	3	3	0	11	5	0	0	32	452
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	80	0	196	0	0	0	0	0	0	84	24	0	100	192	0	0	676	
Heavy Trucks	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Railroad																		
Stopped Buses																		

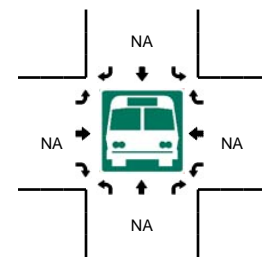
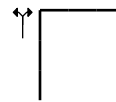
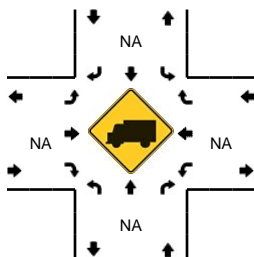
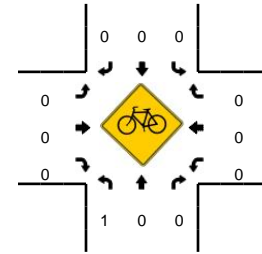
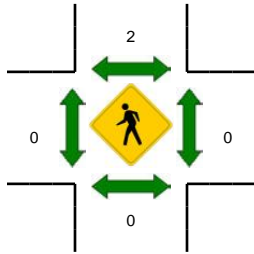
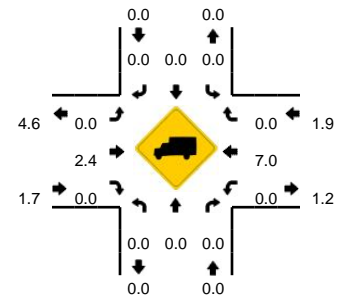
Comments:

LOCATION: 4. SE Rusk Rd -- SE Kellogg Creek Dr
CITY/STATE: Milwaukie, OR

QC JOB #: 14793011
DATE: Tue, Oct 09 2018



Peak-Hour: 11:55 AM -- 12:55 PM
Peak 15-Min: 12:15 PM -- 12:30 PM

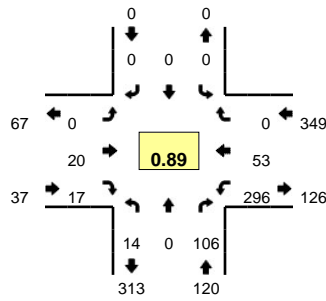


5-Min Count Period Beginning At	4. SE Rusk Rd (Northbound)				4. SE Rusk Rd (Southbound)				SE Kellogg Creek Dr (Eastbound)				SE Kellogg Creek Dr (Westbound)				Total	Hourly Totals	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
11:00 AM	3	0	9	0	0	0	0	0	0	0	3	3	0	7	6	0	0	31	
11:05 AM	2	0	8	0	0	0	0	0	0	0	5	1	0	6	3	0	0	25	
11:10 AM	2	0	12	0	0	0	0	0	0	0	7	5	0	11	10	0	0	47	
11:15 AM	1	0	9	0	0	0	0	0	0	0	3	2	0	3	11	0	0	29	
11:20 AM	3	0	11	0	0	0	0	0	0	0	2	5	0	3	3	0	0	27	
11:25 AM	0	0	5	0	0	0	0	0	0	0	3	3	0	6	4	0	0	21	
11:30 AM	0	0	3	0	0	0	0	0	0	0	4	1	0	8	4	0	0	20	
11:35 AM	1	0	7	0	0	0	0	0	0	0	3	3	0	5	1	0	0	20	
11:40 AM	0	0	7	0	0	0	0	0	0	0	3	2	0	10	0	0	0	22	
11:45 AM	4	0	7	0	0	0	0	0	0	0	3	2	0	7	3	0	0	26	
11:50 AM	3	0	6	0	0	0	0	0	0	0	3	0	0	6	2	0	0	20	
11:55 AM	0	0	2	0	0	0	0	0	0	0	8	3	0	5	4	0	0	22	310
12:00 PM	1	0	6	0	0	0	0	0	0	0	7	3	0	11	2	0	0	30	309
12:05 PM	2	0	9	0	0	0	0	0	0	0	10	2	0	13	1	0	0	37	321
12:10 PM	3	0	10	0	0	0	0	0	0	0	7	4	0	6	6	0	0	36	310
12:15 PM	2	0	4	0	0	0	0	0	0	0	4	4	0	11	6	0	0	31	312
12:20 PM	3	0	9	0	0	0	0	0	0	0	8	6	0	10	5	0	0	41	326
12:25 PM	3	0	8	0	0	0	0	0	0	0	7	2	0	12	6	0	0	38	343
12:30 PM	0	0	5	0	0	0	0	0	0	0	7	3	0	8	6	0	0	29	352
12:35 PM	1	0	14	0	0	0	0	0	0	0	6	4	0	6	3	0	0	34	366
12:40 PM	0	0	7	0	0	0	0	0	0	0	4	0	0	12	0	0	0	23	367
12:45 PM	4	0	6	0	0	0	0	0	0	0	5	1	0	7	2	0	0	25	366
12:50 PM	3	0	8	0	0	0	0	0	0	0	9	1	0	13	2	0	0	36	382
12:55 PM	0	0	7	0	0	0	0	0	0	0	2	1	0	8	2	0	0	20	380
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total		
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
All Vehicles	32	0	84	0	0	0	0	0	0	0	76	48	0	132	68	0	0	440	
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																			
Stopped Buses																			

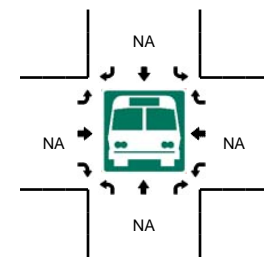
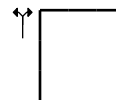
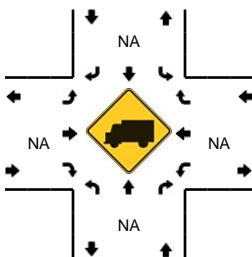
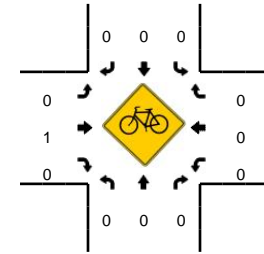
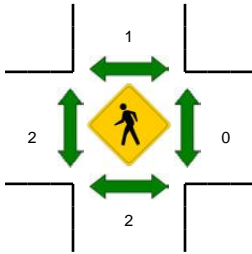
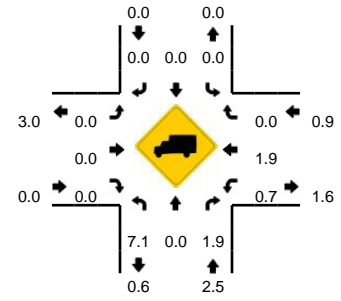
Comments:

LOCATION: 4. SE Rusk Rd -- SE Kellogg Creek Dr
CITY/STATE: Milwaukie, OR

QC JOB #: 14793012
DATE: Tue, Oct 09 2018



Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

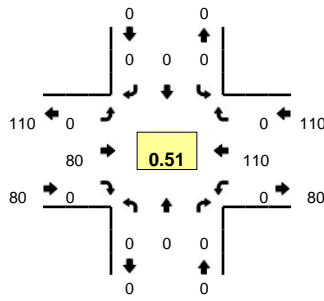


5-Min Count Period Beginning At	4. SE Rusk Rd (Northbound)				4. SE Rusk Rd (Southbound)				SE Kellogg Creek Dr (Eastbound)				SE Kellogg Creek Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	9	0	0	0	0	0	0	4	0	0	19	1	0	0	33	
4:05 PM	0	0	4	0	0	0	0	0	0	1	2	0	21	2	0	0	30	
4:10 PM	2	0	8	0	0	0	0	0	0	3	1	0	31	1	0	0	46	
4:15 PM	1	0	11	0	0	0	0	0	0	2	0	0	27	0	0	0	41	
4:20 PM	2	0	8	0	0	0	0	0	0	2	2	0	30	2	0	0	46	
4:25 PM	0	0	3	0	0	0	0	0	0	1	1	0	29	0	0	0	34	
4:30 PM	1	0	11	0	0	0	0	0	0	0	2	0	25	0	0	0	39	
4:35 PM	1	0	6	0	0	0	0	0	0	1	2	0	26	6	0	0	42	
4:40 PM	1	0	9	0	0	0	0	0	0	1	1	0	23	5	0	0	40	
4:45 PM	1	0	6	0	0	0	0	0	0	1	1	0	21	3	0	0	33	
4:50 PM	1	0	7	0	0	0	0	0	0	1	1	0	27	6	0	0	43	
4:55 PM	1	0	11	0	0	0	0	0	0	0	1	0	22	5	0	0	40	467
5:00 PM	1	0	9	0	0	0	0	0	0	1	2	0	17	1	0	0	31	465
5:05 PM	0	0	12	0	0	0	0	0	0	3	1	0	26	4	0	0	46	481
5:10 PM	2	0	15	0	0	0	0	0	0	4	1	0	24	4	0	0	50	485
5:15 PM	2	0	4	0	0	0	0	0	0	2	1	0	25	4	0	0	38	482
5:20 PM	1	0	5	0	0	0	0	0	0	4	0	0	27	4	0	0	41	477
5:25 PM	2	0	11	0	0	0	0	0	0	2	4	0	33	11	0	0	63	506
5:30 PM	0	0	6	0	0	0	0	0	0	3	0	0	12	1	0	0	22	489
5:35 PM	1	0	6	0	0	0	0	0	0	4	2	0	17	1	0	0	31	478
5:40 PM	2	0	8	0	0	0	0	0	0	2	0	0	13	2	0	0	27	465
5:45 PM	4	0	8	0	0	0	0	0	0	3	3	0	14	5	0	0	37	469
5:50 PM	0	0	6	0	0	0	0	0	0	5	3	0	11	8	0	0	33	459
5:55 PM	1	0	6	0	0	0	0	0	0	1	0	0	18	4	0	0	30	449
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	20	0	80	0	0	0	0	0	0	32	20	0	340	76	0	0	568	
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	
Pedestrians	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	4	
Bicycles	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	
Railroad																		
Stopped Buses																		

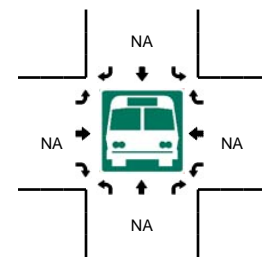
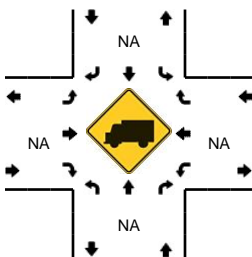
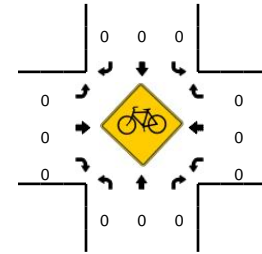
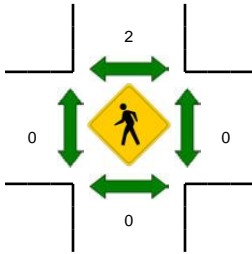
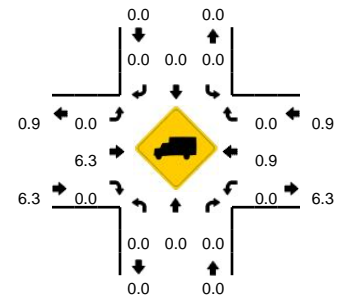
Comments:

LOCATION: 5. Church Driveway -- SE Kellogg Creek Dr
CITY/STATE: Milwaukie, OR

QC JOB #: 14793013
DATE: Tue, Oct 09 2018



Peak-Hour: 8:00 AM -- 9:00 AM
Peak 15-Min: 8:20 AM -- 8:35 AM

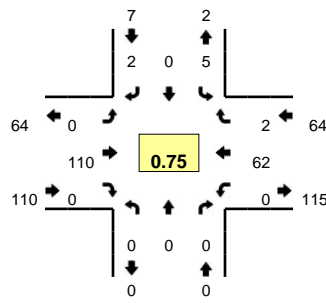


5-Min Count Period Beginning At	5. Church Driveway (Northbound)				5. Church Driveway (Southbound)				SE Kellogg Creek Dr (Eastbound)				SE Kellogg Creek Dr (Westbound)				Total	Hourly Totals	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	
7:05 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	
7:10 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	
7:15 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	
7:20 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	3	
7:25 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	
7:35 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	4	0	0	0	5	
7:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	
7:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	4	0	0	0	5	
7:50 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4	
7:55 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	3	34
8:00 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	3	35
8:05 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2	36
8:10 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	10	0	0	0	11	46
8:15 AM	0	0	0	0	0	0	0	0	0	4	0	0	0	19	0	0	0	23	67
8:20 AM	0	0	0	0	0	0	0	0	0	8	0	0	0	24	0	0	0	32	96
8:25 AM	0	0	0	0	0	0	0	0	0	15	0	0	0	23	0	0	0	38	131
8:30 AM	0	0	0	0	0	0	0	0	0	10	0	0	0	14	0	0	0	24	153
8:35 AM	0	0	0	0	0	0	0	0	0	14	0	0	0	2	0	0	0	16	164
8:40 AM	0	0	0	0	0	0	0	0	0	7	0	0	0	4	0	0	0	11	172
8:45 AM	0	0	0	0	0	0	0	0	0	4	0	0	0	4	0	0	0	8	175
8:50 AM	0	0	0	0	0	0	0	0	0	8	0	0	0	2	0	0	0	10	181
8:55 AM	0	0	0	0	0	0	0	0	0	6	0	0	0	6	0	0	0	12	190
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total		
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
All Vehicles	0	0	0	0	0	0	0	0	0	132	0	0	0	244	0	0	0	376	
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																			
Stopped Buses																			

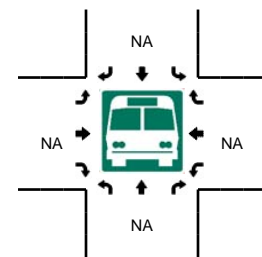
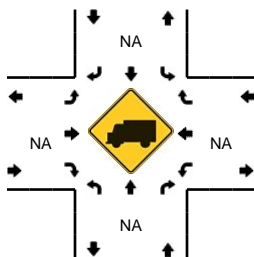
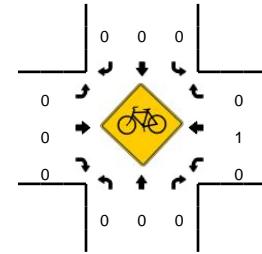
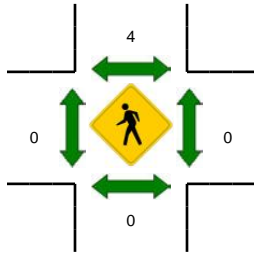
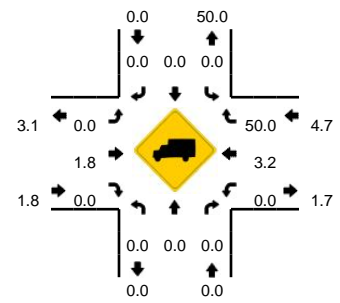
Comments:

LOCATION: 5. Church Driveway -- SE Kellogg Creek Dr
CITY/STATE: Milwaukie, OR

QC JOB #: 14793014
DATE: Tue, Oct 09 2018



Peak-Hour: 11:55 AM -- 12:55 PM
Peak 15-Min: 12:20 PM -- 12:35 PM

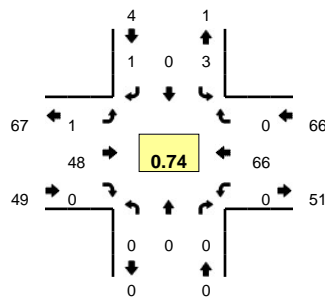


5-Min Count Period Beginning At	5. Church Driveway (Northbound)				5. Church Driveway (Southbound)				SE Kellogg Creek Dr (Eastbound)				SE Kellogg Creek Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:00 AM	0	0	0	0	0	0	0	0	0	6	0	0	0	9	0	0	15	
11:05 AM	0	0	0	0	0	0	0	0	0	6	0	0	0	5	0	0	11	
11:10 AM	0	0	0	0	0	0	0	0	0	12	0	0	0	12	0	0	24	
11:15 AM	0	0	0	0	0	0	0	0	0	5	0	0	0	11	0	0	16	
11:20 AM	0	0	0	0	1	0	0	0	0	6	0	0	0	6	0	0	13	
11:25 AM	0	0	0	0	0	0	1	0	0	7	0	0	0	4	0	0	12	
11:30 AM	0	0	0	0	0	0	0	0	0	3	0	0	0	4	0	0	7	
11:35 AM	0	0	0	0	0	0	0	0	0	6	0	0	0	2	0	0	8	
11:40 AM	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	5	
11:45 AM	0	0	0	0	0	0	0	0	0	4	0	0	0	7	0	0	11	
11:50 AM	0	0	0	0	0	0	0	0	0	3	0	0	0	5	0	0	8	
11:55 AM	0	0	0	0	0	0	0	0	0	11	0	0	0	3	1	0	15	145
12:00 PM	0	0	0	0	0	0	0	0	0	10	0	0	0	3	0	0	13	143
12:05 PM	0	0	0	0	0	0	0	0	0	12	0	0	0	3	0	0	15	147
12:10 PM	0	0	0	0	0	0	0	0	0	11	0	0	0	9	0	0	20	143
12:15 PM	0	0	0	0	2	0	0	0	0	6	0	0	0	8	0	0	16	143
12:20 PM	0	0	0	0	1	0	1	0	0	13	0	0	0	8	0	0	23	153
12:25 PM	0	0	0	0	2	0	0	0	0	7	0	0	0	9	0	0	18	159
12:30 PM	0	0	0	0	0	0	1	0	0	12	0	0	0	6	0	0	19	171
12:35 PM	0	0	0	0	0	0	0	0	0	8	0	0	0	4	0	0	12	175
12:40 PM	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	5	175
12:45 PM	0	0	0	0	0	0	0	0	0	5	0	0	0	5	1	0	11	175
12:50 PM	0	0	0	0	0	0	0	0	0	10	0	0	0	4	0	0	14	181
12:55 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0	0	6	172
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	0	0	0	12	0	8	0	0	128	0	0	0	0	92	0	0	240
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

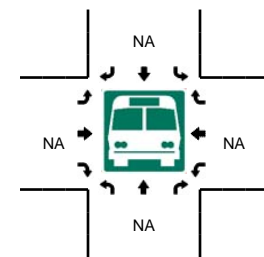
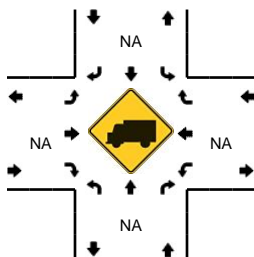
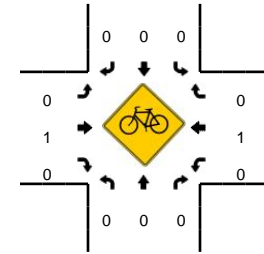
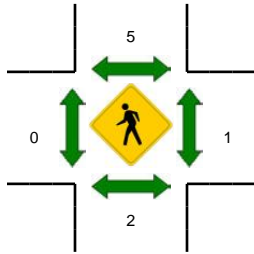
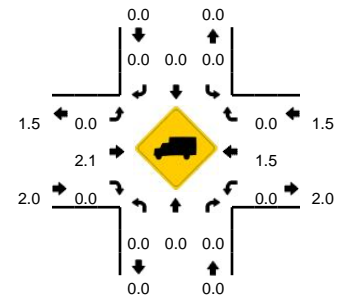
Comments:

LOCATION: 5. Church Driveway -- SE Kellogg Creek Dr
CITY/STATE: Milwaukie, OR

QC JOB #: 14793015
DATE: Tue, Oct 09 2018



Peak-Hour: 4:55 PM -- 5:55 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

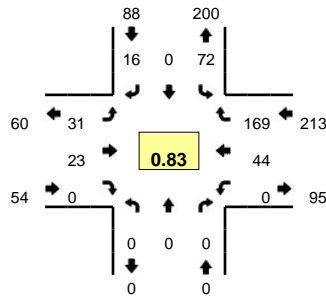


5-Min Count Period Beginning At	5. Church Driveway (Northbound)				5. Church Driveway (Southbound)				SE Kellogg Creek Dr (Eastbound)				SE Kellogg Creek Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	1	0	0	5	
4:05 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	0	5	
4:10 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	3	0	0	7	
4:15 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	4	
4:20 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0	0	6	
4:25 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	3	
4:30 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	3	
4:35 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	7	0	0	10	
4:40 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	6	0	0	8	
4:45 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0	0	6	
4:50 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	7	0	0	8	
4:55 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	7	0	0	9	74
5:00 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	0	5	74
5:05 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	3	0	0	7	76
5:10 PM	0	0	0	0	0	0	0	0	0	5	0	0	0	6	0	0	11	80
5:15 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	5	0	0	8	84
5:20 PM	0	0	0	0	0	0	1	0	0	5	0	0	0	6	0	0	12	90
5:25 PM	0	0	0	0	1	0	0	0	0	6	0	0	0	13	0	0	20	107
5:30 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	3	107
5:35 PM	0	0	0	0	0	0	0	0	0	5	0	0	0	2	0	0	7	104
5:40 PM	0	0	0	0	1	0	0	0	0	1	0	0	0	4	0	0	6	102
5:45 PM	0	0	0	0	0	0	0	0	0	6	0	0	0	9	0	0	15	111
5:50 PM	0	0	0	0	1	0	0	0	0	7	0	0	0	8	0	0	16	119
5:55 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	5	0	0	6	116
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	0	0	0	4	0	4	0	0	56	0	0	0	0	96	0	0	160
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4
Pedestrians		4				8				0					4			16
Bicycles	0	0	0		0	0	0		0	0	0		0	1	0		1	
Railroad																		
Stopped Buses																		

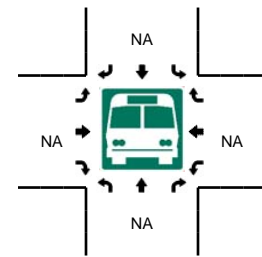
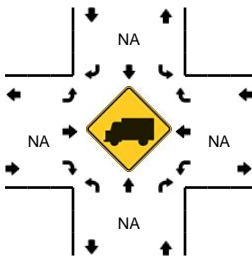
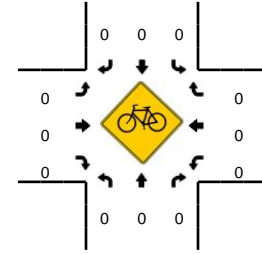
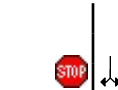
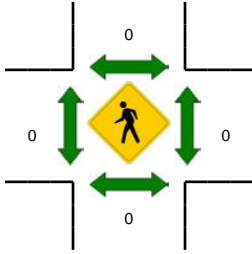
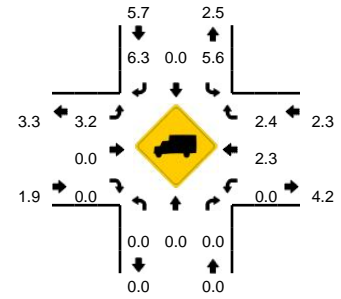
Comments:

LOCATION: 6. SE Rusk Rd -- SE Aldercrest Rd
CITY/STATE: Milwaukie, OR

QC JOB #: 14793016
DATE: Tue, Oct 09 2018



Peak-Hour: 7:25 AM -- 8:25 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

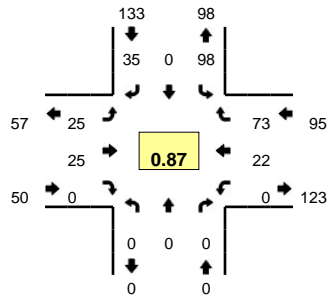


5-Min Count Period Beginning At	6. SE Rusk Rd (Northbound)				6. SE Rusk Rd (Southbound)				SE Aldercrest Rd (Eastbound)				SE Aldercrest Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	4	0	0	0	5	1	0	0	0	1	8	0	19	
7:05 AM	0	0	0	0	1	0	0	0	3	0	0	0	0	5	13	0	22	
7:10 AM	0	0	0	0	5	0	0	0	0	1	0	0	0	5	10	0	21	
7:15 AM	0	0	0	0	4	0	1	0	1	1	0	0	0	3	17	0	27	
7:20 AM	0	0	0	0	4	0	0	0	1	2	0	0	0	2	14	0	23	
7:25 AM	0	0	0	0	6	0	0	0	6	3	0	0	0	4	18	0	37	
7:30 AM	0	0	0	0	6	0	1	0	1	2	0	0	0	4	11	0	25	
7:35 AM	0	0	0	0	8	0	2	0	2	0	0	0	0	0	11	0	23	
7:40 AM	0	0	0	0	2	0	0	0	6	4	0	0	0	7	14	0	33	
7:45 AM	0	0	0	0	4	0	2	0	0	3	0	0	0	5	15	0	29	
7:50 AM	0	0	0	0	8	0	3	0	3	1	0	0	0	3	19	0	37	
7:55 AM	0	0	0	0	11	0	1	0	1	3	0	0	0	6	19	0	41	337
8:00 AM	0	0	0	0	7	0	2	0	4	0	0	0	0	3	11	0	27	345
8:05 AM	0	0	0	0	6	0	1	0	1	1	0	0	0	2	4	0	15	338
8:10 AM	0	0	0	0	5	0	1	0	0	0	0	0	0	6	12	0	24	341
8:15 AM	0	0	0	0	5	0	1	0	4	5	0	0	0	4	17	0	36	350
8:20 AM	0	0	0	0	4	0	2	0	3	1	0	0	0	0	18	0	28	355
8:25 AM	0	0	0	0	6	0	1	0	6	2	0	0	0	1	15	0	31	349
8:30 AM	0	0	0	0	8	0	4	0	4	2	0	0	0	4	9	0	31	355
8:35 AM	0	0	0	0	5	0	1	0	2	4	0	0	0	1	9	0	22	354
8:40 AM	0	0	0	0	7	0	4	0	5	1	0	0	0	0	8	0	25	346
8:45 AM	0	0	0	0	2	0	1	0	5	1	0	0	0	0	7	0	16	333
8:50 AM	0	0	0	0	6	0	2	0	4	2	0	0	0	5	8	0	27	323
8:55 AM	0	0	0	0	9	0	1	0	4	3	0	0	0	3	3	0	23	305
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	0	0	0	92	0	24	0	16	28	0	0	0	56	212	0	428	
Heavy Trucks	0	0	0	0	8	0	4	0	0	0	0	0	0	4	4	0	20	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

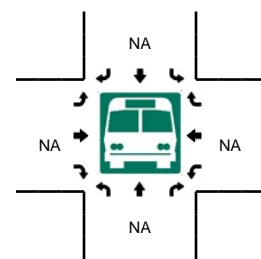
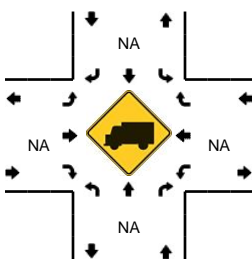
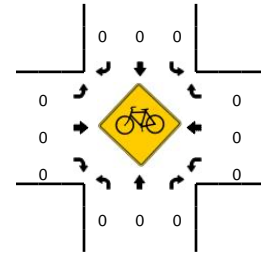
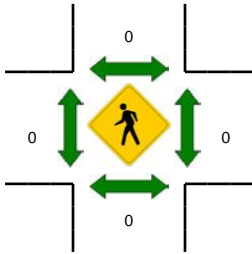
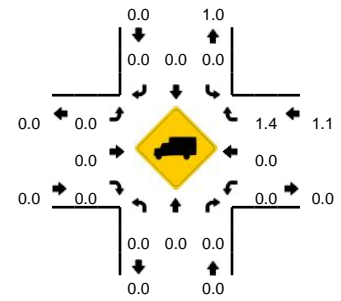
Comments:

LOCATION: 6. SE Rusk Rd -- SE Aldercrest Rd
CITY/STATE: Milwaukie, OR

QC JOB #: 14793017
DATE: Tue, Oct 09 2018



Peak-Hour: 12:00 PM -- 1:00 PM
Peak 15-Min: 12:15 PM -- 12:30 PM

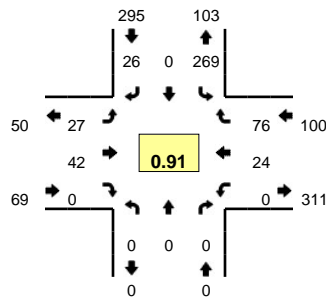


5-Min Count Period Beginning At	6. SE Rusk Rd (Northbound)				6. SE Rusk Rd (Southbound)				SE Aldercrest Rd (Eastbound)				SE Aldercrest Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:00 AM	0	0	0	0	7	0	0	0	1	2	0	0	0	0	5	0	15	
11:05 AM	0	0	0	0	6	0	1	0	3	2	0	0	0	3	8	0	23	
11:10 AM	0	0	0	0	7	0	2	0	2	0	0	0	0	0	8	0	19	
11:15 AM	0	0	0	0	8	0	1	0	1	3	0	0	0	2	6	0	21	
11:20 AM	0	0	0	0	7	0	0	0	5	2	0	0	0	3	9	0	26	
11:25 AM	0	0	0	0	7	0	1	0	0	1	0	0	0	0	3	0	12	
11:30 AM	0	0	0	0	7	0	0	0	0	2	0	0	0	1	1	0	11	
11:35 AM	0	0	0	0	5	0	3	0	5	1	0	0	0	2	4	0	20	
11:40 AM	0	0	0	0	8	0	2	0	1	1	0	0	0	1	7	0	20	
11:45 AM	0	0	0	0	6	0	2	0	0	1	0	0	0	2	8	0	19	
11:50 AM	0	0	0	0	4	0	1	0	1	0	0	0	0	1	6	0	13	
11:55 AM	0	0	0	0	6	0	1	0	0	0	0	0	0	2	2	0	11	210
12:00 PM	0	0	0	0	7	0	3	0	1	2	0	0	0	2	5	0	20	215
12:05 PM	0	0	0	0	12	0	3	0	1	1	0	0	0	1	7	0	25	217
12:10 PM	0	0	0	0	9	0	1	0	3	2	0	0	0	1	10	0	26	224
12:15 PM	0	0	0	0	13	0	3	0	2	2	0	0	0	2	5	0	27	230
12:20 PM	0	0	0	0	9	0	4	0	4	2	0	0	0	0	7	0	26	230
12:25 PM	0	0	0	0	9	0	3	0	3	3	0	0	0	2	7	0	27	245
12:30 PM	0	0	0	0	8	0	0	0	1	2	0	0	0	3	2	0	16	250
12:35 PM	0	0	0	0	6	0	2	0	2	2	0	0	0	3	10	0	25	255
12:40 PM	0	0	0	0	9	0	2	0	2	0	0	0	0	2	4	0	19	254
12:45 PM	0	0	0	0	5	0	3	0	4	3	0	0	0	0	4	0	19	254
12:50 PM	0	0	0	0	4	0	10	0	1	2	0	0	0	3	7	0	27	268
12:55 PM	0	0	0	0	7	0	1	0	1	4	0	0	0	3	5	0	21	278
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	0	0	0	124	0	40	0	36	28	0	0	0	16	76	0	320	
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

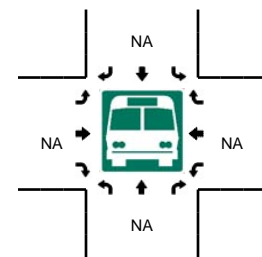
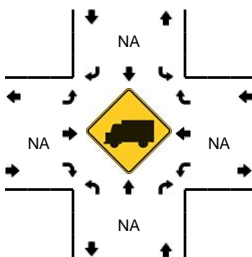
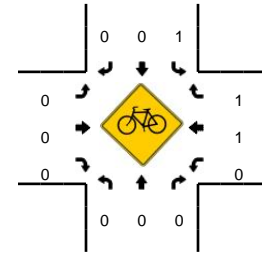
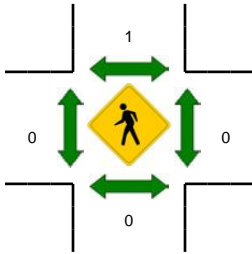
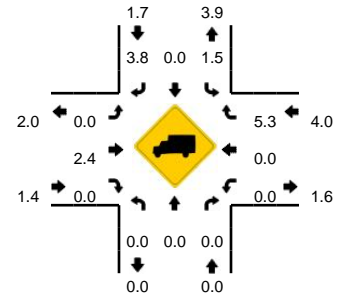
Comments:

LOCATION: 6. SE Rusk Rd -- SE Aldercrest Rd
CITY/STATE: Milwaukie, OR

QC JOB #: 14793018
DATE: Tue, Oct 09 2018



Peak-Hour: 4:15 PM -- 5:15 PM
Peak 15-Min: 4:20 PM -- 4:35 PM



5-Min Count Period Beginning At	6. SE Rusk Rd (Northbound)				6. SE Rusk Rd (Southbound)				SE Aldercrest Rd (Eastbound)				SE Aldercrest Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	14	0	3	0	0	0	0	0	0	1	5	0	23	
4:05 PM	0	0	0	0	17	0	4	0	0	7	0	0	0	4	5	0	37	
4:10 PM	0	0	0	0	23	0	4	0	1	2	0	0	0	3	11	0	44	
4:15 PM	0	0	0	0	27	0	0	0	3	2	0	0	0	3	6	0	41	
4:20 PM	0	0	0	0	28	0	2	0	2	6	0	0	0	1	5	0	44	
4:25 PM	0	0	0	0	25	0	2	0	2	4	0	0	0	3	4	0	40	
4:30 PM	0	0	0	0	24	0	2	0	1	1	0	0	0	4	11	0	43	
4:35 PM	0	0	0	0	24	0	1	0	1	5	0	0	0	2	4	0	37	
4:40 PM	0	0	0	0	21	0	6	0	6	2	0	0	0	2	3	0	40	
4:45 PM	0	0	0	0	19	0	1	0	2	3	0	0	0	1	8	0	34	
4:50 PM	0	0	0	0	20	0	1	0	0	4	0	0	0	1	5	0	31	
4:55 PM	0	0	0	0	22	0	0	0	1	2	0	0	0	1	5	0	31	445
5:00 PM	0	0	0	0	25	0	2	0	1	3	0	0	0	1	6	0	38	460
5:05 PM	0	0	0	0	12	0	4	0	3	6	0	0	0	5	9	0	39	462
5:10 PM	0	0	0	0	22	0	5	0	5	4	0	0	0	0	10	0	46	464
5:15 PM	0	0	0	0	22	0	3	0	1	8	0	0	0	1	5	0	40	463
5:20 PM	0	0	0	0	20	0	5	0	0	5	0	0	0	3	8	0	41	460
5:25 PM	0	0	0	0	22	0	4	0	4	2	0	0	0	2	8	0	42	462
5:30 PM	0	0	0	0	20	0	2	0	2	3	0	0	0	5	2	0	34	453
5:35 PM	0	0	0	0	15	0	3	0	2	2	0	0	0	3	8	0	33	449
5:40 PM	0	0	0	0	7	0	0	0	3	2	0	0	0	3	7	0	22	431
5:45 PM	0	0	0	0	16	0	2	0	2	2	0	0	0	1	7	0	30	427
5:50 PM	0	0	0	0	9	0	1	0	3	2	0	0	0	4	2	0	21	417
5:55 PM	0	0	0	0	8	0	5	0	2	1	0	0	0	3	6	0	25	411
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	0	0	0	308	0	24	0	20	44	0	0	0	32	80	0	508	
Heavy Trucks	0	0	0	0	8	0	4	0	0	4	0	0	0	0	4	0	20	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	2	
Railroad																		
Stopped Buses																		

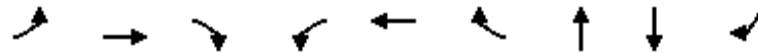
Comments:

**Attachment D - Existing Traffic
Level-of-Service Worksheets**

Queues

1: SE Rusk Rd & Milwaukie Expy (Hwy 224)

11/05/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	4	849	32	18	2124	19	230	64	5
v/c Ratio	0.06	0.36	0.03	0.21	0.85	0.02	0.90	0.24	0.02
Control Delay	55.5	8.7	0.1	58.8	17.7	0.4	82.5	44.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.5	8.7	0.1	58.8	17.7	0.4	82.5	44.8	0.0
Queue Length 50th (ft)	3	108	0	14	528	0	168	43	0
Queue Length 95th (ft)	15	205	0	38	#1001	2	#312	85	0
Internal Link Dist (ft)		263			1187		389	744	
Turn Bay Length (ft)	470		110	455		100			75
Base Capacity (vph)	132	2337	1097	254	2485	969	266	275	328
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.36	0.03	0.07	0.85	0.02	0.86	0.23	0.02

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: SE Rusk Rd & Milwaukie Expy (Hwy 224)

11/05/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↑↑	↗	↖	↑↑	↗		↕			↖	↗	
Traffic Volume (vph)	4	824	31	17	2060	18	136	41	47	21	41	5	
Future Volume (vph)	4	824	31	17	2060	18	136	41	47	21	41	5	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0			4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00			1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00		1.00			1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.97			1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97			0.98	1.00	
Satd. Flow (prot)	1444	3343	1536	1456	3438	1324		1758			1698	1346	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.78			0.87	1.00	
Satd. Flow (perm)	1444	3343	1536	1456	3438	1324		1407			1502	1346	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	4	849	32	18	2124	19	140	42	48	22	42	5	
RTOR Reduction (vph)	0	0	10	0	0	6	0	8	0	0	0	4	
Lane Group Flow (vph)	4	849	22	18	2124	13	0	222	0	0	64	1	
Confl. Bikes (#/hr)			1						1				
Heavy Vehicles (%)	25%	8%	3%	24%	5%	22%	2%	0%	2%	10%	10%	20%	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm	
Protected Phases	5	2		1	6			8			4		
Permitted Phases			2			6	8			4		4	
Actuated Green, G (s)	1.4	81.5	81.5	3.4	83.5	83.5		21.1			21.1	21.1	
Effective Green, g (s)	1.4	81.5	81.5	3.4	83.5	83.5		21.1			21.1	21.1	
Actuated g/C Ratio	0.01	0.68	0.68	0.03	0.70	0.70		0.18			0.18	0.18	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0			4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0	
Lane Grp Cap (vph)	16	2270	1043	41	2392	921		247			264	236	
v/s Ratio Prot	0.00	0.25		c0.01	c0.62								
v/s Ratio Perm			0.01			0.01		c0.16			0.04	0.00	
v/c Ratio	0.25	0.37	0.02	0.44	0.89	0.01		0.90			0.24	0.00	
Uniform Delay, d1	58.8	8.3	6.3	57.4	14.5	5.6		48.4			42.6	40.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2	8.1	0.5	0.0	7.3	5.4	0.0		31.4			0.5	0.0	
Delay (s)	66.8	8.8	6.3	64.7	19.9	5.6		79.8			43.0	40.8	
Level of Service	E	A	A	E	B	A		E			D	D	
Approach Delay (s)		8.9			20.2			79.8			42.9		
Approach LOS		A			C			E			D		
Intersection Summary													
HCM 2000 Control Delay			21.8									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.89										
Actuated Cycle Length (s)			120.0									Sum of lost time (s)	14.0
Intersection Capacity Utilization			86.2%									ICU Level of Service	E
Analysis Period (min)			15										

c Critical Lane Group

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	0	0	245	178	2
Future Vol, veh/h	2	0	0	245	178	2
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	76	76	76	76
Heavy Vehicles, %	0	0	0	2	5	0
Mvmt Flow	3	0	0	322	234	3

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	560	238	239	0	0
Stage 1	238	-	-	-	-
Stage 2	322	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	493	806	1340	-	-
Stage 1	806	-	-	-	-
Stage 2	739	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	491	805	1338	-	-
Mov Cap-2 Maneuver	491	-	-	-	-
Stage 1	804	-	-	-	-
Stage 2	738	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1338	-	491	-	-
HCM Lane V/C Ratio	-	-	0.005	-	-
HCM Control Delay (s)	0	-	12.4	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	2	7	237	1	2	176
Future Vol, veh/h	2	7	237	1	2	176
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	74	74	74	74	74	74
Heavy Vehicles, %	50	14	2	100	50	5
Mvmt Flow	3	9	320	1	3	238

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	565	321	0	0	321
Stage 1	321	-	-	-	-
Stage 2	244	-	-	-	-
Critical Hdwy	6.9	6.34	-	-	4.6
Critical Hdwy Stg 1	5.9	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-
Follow-up Hdwy	3.95	3.426	-	-	2.65
Pot Cap-1 Maneuver	414	693	-	-	1012
Stage 1	639	-	-	-	-
Stage 2	696	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	413	693	-	-	1012
Mov Cap-2 Maneuver	413	-	-	-	-
Stage 1	637	-	-	-	-
Stage 2	696	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.1	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	602	1012
HCM Lane V/C Ratio	-	-	0.02	0.003
HCM Control Delay (s)	-	-	11.1	8.6
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Intersection						
Int Delay, s/veh	2.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	52	14	38	184	106	72
Future Vol, veh/h	52	14	38	184	106	72
Conflicting Peds, #/hr	0	0	1	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	69	69	69	69	69	69
Heavy Vehicles, %	6	7	0	2	6	1
Mvmt Flow	75	20	55	267	154	104

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	584	207	259	0	0
Stage 1	207	-	-	-	-
Stage 2	377	-	-	-	-
Critical Hdwy	6.46	6.27	4.1	-	-
Critical Hdwy Stg 1	5.46	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-
Follow-up Hdwy	3.554	3.363	2.2	-	-
Pot Cap-1 Maneuver	467	821	1317	-	-
Stage 1	818	-	-	-	-
Stage 2	685	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	443	820	1316	-	-
Mov Cap-2 Maneuver	443	-	-	-	-
Stage 1	777	-	-	-	-
Stage 2	684	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.1	1.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1316	-	491	-	-
HCM Lane V/C Ratio	0.042	-	0.195	-	-
HCM Control Delay (s)	7.9	0	14.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	-	-




Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	
Traffic Vol, veh/h	0	80	110	0	0	0
Future Vol, veh/h	0	80	110	0	0	0
Conflicting Peds, #/hr	2	0	0	2	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	51	51	51	51	51	51
Heavy Vehicles, %	0	6	1	0	0	0
Mvmt Flow	0	157	216	0	0	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	218	0	-	0	375
Stage 1	-	-	-	-	218
Stage 2	-	-	-	-	157
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	1364	-	-	-	630
Stage 1	-	-	-	-	823
Stage 2	-	-	-	-	876
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1362	-	-	-	627
Mov Cap-2 Maneuver	-	-	-	-	627
Stage 1	-	-	-	-	821
Stage 2	-	-	-	-	874

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1362	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	31	23	44	169	72	16
Future Vol, veh/h	31	23	44	169	72	16
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	3	0	2	2	6	6
Mvmt Flow	37	28	53	204	87	19
Number of Lanes	0	1	1	0	1	0

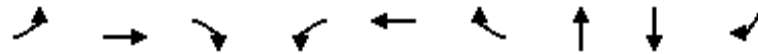
Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8	8.2	8.5
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	57%	0%	82%
Vol Thru, %	43%	21%	0%
Vol Right, %	0%	79%	18%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	54	213	88
LT Vol	31	0	72
Through Vol	23	44	0
RT Vol	0	169	16
Lane Flow Rate	65	257	106
Geometry Grp	1	1	1
Degree of Util (X)	0.083	0.271	0.139
Departure Headway (Hd)	4.569	3.796	4.713
Convergence, Y/N	Yes	Yes	Yes
Cap	787	950	762
Service Time	2.582	1.805	2.733
HCM Lane V/C Ratio	0.083	0.271	0.139
HCM Control Delay	8	8.2	8.5
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.3	1.1	0.5

Queues

1: SE Rusk Rd & Milwaukie Expy (Hwy 224)

11/05/2018
























Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	13	1083	60	47	1069	6	172	78	11
v/c Ratio	0.12	0.48	0.06	0.33	0.45	0.01	0.70	0.34	0.04
Control Delay	46.2	11.0	3.5	48.9	7.7	0.0	47.5	40.5	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.2	11.0	3.5	48.9	7.7	0.0	47.5	40.5	0.3
Queue Length 50th (ft)	8	182	1	29	110	0	87	45	0
Queue Length 95th (ft)	27	301	20	64	275	0	148	83	0
Internal Link Dist (ft)		263			1187		389	741	
Turn Bay Length (ft)	470		110	455		100			75
Base Capacity (vph)	183	2273	1072	194	2397	1002	282	265	317
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.48	0.06	0.24	0.45	0.01	0.61	0.29	0.03

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 1: SE Rusk Rd & Milwaukie Expy (Hwy 224)

11/05/2018

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	13	1061	59	46	1048	6	69	31	69	24	53	11	
Future Volume (vph)	13	1061	59	46	1048	6	69	31	69	24	53	11	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0			4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00			1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98		1.00			1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.95			1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98			0.98	1.00	
Satd. Flow (prot)	1671	3343	1551	1770	3282	1352		1745			1758	1463	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.83			0.85	1.00	
Satd. Flow (perm)	1671	3343	1551	1770	3282	1352		1484			1519	1463	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	
Adj. Flow (vph)	13	1083	60	47	1069	6	70	32	70	24	54	11	
RTOR Reduction (vph)	0	0	19	0	0	2	0	25	0	0	0	9	
Lane Group Flow (vph)	13	1083	41	47	1069	4	0	147	0	0	78	2	
Confl. Peds. (#/hr)							1					1	
Confl. Bikes (#/hr)			1			1							
Heavy Vehicles (%)	8%	8%	2%	2%	10%	17%	1%	0%	1%	21%	0%	9%	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm	
Protected Phases	5	2		1	6			8			4		
Permitted Phases			2			6	8			4		4	
Actuated Green, G (s)	1.6	65.4	65.4	5.6	69.4	69.4		15.0			15.0	15.0	
Effective Green, g (s)	1.6	65.4	65.4	5.6	69.4	69.4		15.0			15.0	15.0	
Actuated g/C Ratio	0.02	0.65	0.65	0.06	0.69	0.69		0.15			0.15	0.15	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0			4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0	
Lane Grp Cap (vph)	26	2186	1014	99	2277	938		222			227	219	
v/s Ratio Prot	0.01	c0.32		c0.03	c0.33								
v/s Ratio Perm			0.03			0.00		c0.10			0.05	0.00	
v/c Ratio	0.50	0.50	0.04	0.47	0.47	0.00		0.66			0.34	0.01	
Uniform Delay, d1	48.8	8.9	6.1	45.8	6.9	4.7		40.1			38.1	36.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2	14.3	0.8	0.1	3.6	0.7	0.0		7.3			0.9	0.0	
Delay (s)	63.1	9.7	6.2	49.3	7.6	4.7		47.4			39.0	36.2	
Level of Service	E	A	A	D	A	A		D			D	D	
Approach Delay (s)		10.1			9.4			47.4			38.7		
Approach LOS		B			A			D			D		
Intersection Summary													
HCM 2000 Control Delay			13.3									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.52										
Actuated Cycle Length (s)			100.0									Sum of lost time (s)	14.0
Intersection Capacity Utilization			60.7%									ICU Level of Service	B
Analysis Period (min)			15										
c Critical Lane Group													

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	1	1	173	164	3
Future Vol, veh/h	7	1	1	173	164	3
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	3	2	0
Mvmt Flow	8	1	1	197	186	3

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	389	190	191	0	0
Stage 1	190	-	-	-	-
Stage 2	199	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	619	857	1395	-	-
Stage 1	847	-	-	-	-
Stage 2	839	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	616	856	1393	-	-
Mov Cap-2 Maneuver	616	-	-	-	-
Stage 1	844	-	-	-	-
Stage 2	837	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.7	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1393	-	638	-	-
HCM Lane V/C Ratio	0.001	-	0.014	-	-
HCM Control Delay (s)	7.6	0	10.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	1	5	169	0	7	157
Future Vol, veh/h	1	5	169	0	7	157
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	40	2	0	14	1
Mvmt Flow	1	6	190	0	8	176

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	382	190	0	0	190
Stage 1	190	-	-	-	-
Stage 2	192	-	-	-	-
Critical Hdwy	6.4	6.6	-	-	4.24
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.66	-	-	2.326
Pot Cap-1 Maneuver	624	764	-	-	1315
Stage 1	847	-	-	-	-
Stage 2	845	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	620	764	-	-	1315
Mov Cap-2 Maneuver	620	-	-	-	-
Stage 1	841	-	-	-	-
Stage 2	845	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.9	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	736	1315
HCM Lane V/C Ratio	-	-	0.009	0.006
HCM Control Delay (s)	-	-	9.9	7.8
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

Intersection						
Int Delay, s/veh	3.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	82	33	22	88	114	43
Future Vol, veh/h	82	33	22	88	114	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	0	0	0	0	7
Mvmt Flow	94	38	25	101	131	49

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	307	156	180	0	0
Stage 1	156	-	-	-	-
Stage 2	151	-	-	-	-
Critical Hdwy	6.42	6.2	4.1	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.3	2.2	-	-
Pot Cap-1 Maneuver	685	895	1408	-	-
Stage 1	872	-	-	-	-
Stage 2	877	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	672	895	1408	-	-
Mov Cap-2 Maneuver	672	-	-	-	-
Stage 1	855	-	-	-	-
Stage 2	877	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.1	1.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1408	-	724	-	-
HCM Lane V/C Ratio	0.018	-	0.183	-	-
HCM Control Delay (s)	7.6	0	11.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	-	-

Intersection

Int Delay, s/veh 0.4

Movement EBL EBT WBT WBR SBL SBR

Lane Configurations		↶	↷		↶	
Traffic Vol, veh/h	0	110	62	2	5	2
Future Vol, veh/h	0	110	62	2	5	2
Conflicting Peds, #/hr	4	0	0	4	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	75	75	75	75	75	75
Heavy Vehicles, %	0	2	3	50	0	0
Mvmt Flow	0	147	83	3	7	3

Major/Minor Major1 Major2 Minor2

Conflicting Flow All	90	0	-	0	236	89
Stage 1	-	-	-	-	89	-
Stage 2	-	-	-	-	147	-
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	1518	-	-	-	757	975
Stage 1	-	-	-	-	940	-
Stage 2	-	-	-	-	885	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1513	-	-	-	752	972
Mov Cap-2 Maneuver	-	-	-	-	752	-
Stage 1	-	-	-	-	937	-
Stage 2	-	-	-	-	882	-




Approach EB WB SB

HCM Control Delay, s	0	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

Capacity (veh/h)	1513	-	-	-	804
HCM Lane V/C Ratio	-	-	-	-	0.012
HCM Control Delay (s)	0	-	-	-	9.5
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	25	22	73	98	35
Future Vol, veh/h	25	25	22	73	98	35
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	0	0	0	1	0	0
Mvmt Flow	29	29	25	84	113	40
Number of Lanes	0	1	1	0	1	0

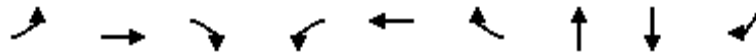
Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	7.8	7.3	8.2
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	50%	0%	74%
Vol Thru, %	50%	23%	0%
Vol Right, %	0%	77%	26%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	50	95	133
LT Vol	25	0	98
Through Vol	25	22	0
RT Vol	0	73	35
Lane Flow Rate	57	109	153
Geometry Grp	1	1	1
Degree of Util (X)	0.07	0.114	0.177
Departure Headway (Hd)	4.355	3.751	4.175
Convergence, Y/N	Yes	Yes	Yes
Cap	809	937	852
Service Time	2.453	1.85	2.243
HCM Lane V/C Ratio	0.07	0.116	0.18
HCM Control Delay	7.8	7.3	8.2
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0.4	0.6

Queues

1: SE Rusk Rd & Milwaukie Expy (Hwy 224)

11/05/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	24	2035	204	98	1362	12	144	132	32
v/c Ratio	0.26	0.86	0.18	0.64	0.54	0.01	0.90	0.72	0.12
Control Delay	64.5	22.7	5.9	76.8	10.3	0.0	97.1	74.5	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.5	22.7	5.9	76.8	10.3	0.0	97.1	74.5	3.9
Queue Length 50th (ft)	20	685	37	80	272	0	107	108	0
Queue Length 95th (ft)	49	889	74	#157	400	0	#198	172	10
Internal Link Dist (ft)		263			1187		389	767	
Turn Bay Length (ft)	470		110	455		100			75
Base Capacity (vph)	140	2361	1113	161	2539	1192	206	243	330
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.86	0.18	0.61	0.54	0.01	0.70	0.54	0.10

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: SE Rusk Rd & Milwaukie Expy (Hwy 224)

11/05/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑	↗		↕			↗	↗
Traffic Volume (vph)	22	1872	188	90	1253	11	53	35	44	49	73	29
Future Volume (vph)	22	1872	188	90	1253	11	53	35	44	49	73	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.95			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98			0.98	1.00
Satd. Flow (prot)	1656	3505	1615	1805	3471	1615		1756			1852	1593
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.61			0.73	1.00
Satd. Flow (perm)	1656	3505	1615	1805	3471	1615		1086			1374	1593
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	2035	204	98	1362	12	58	38	48	53	79	32
RTOR Reduction (vph)	0	0	25	0	0	3	0	15	0	0	0	28
Lane Group Flow (vph)	24	2035	179	98	1362	9	0	129	0	0	132	4
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	9%	3%	0%	0%	4%	0%	2%	0%	0%	0%	1%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	5.1	87.6	87.6	11.0	93.5	93.5		17.4			17.4	17.4
Effective Green, g (s)	5.1	87.6	87.6	11.0	93.5	93.5		17.4			17.4	17.4
Actuated g/C Ratio	0.04	0.67	0.67	0.08	0.72	0.72		0.13			0.13	0.13
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	64	2361	1088	152	2496	1161		145			183	213
v/s Ratio Prot	0.01	c0.58		c0.05	0.39							
v/s Ratio Perm			0.11			0.01		c0.12			0.10	0.00
v/c Ratio	0.38	0.86	0.16	0.64	0.55	0.01		0.89			0.72	0.02
Uniform Delay, d1	60.9	16.5	7.8	57.6	8.4	5.2		55.4			54.0	48.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	3.7	4.4	0.3	9.0	0.9	0.0		44.2			13.1	0.0
Delay (s)	64.6	20.9	8.1	66.6	9.3	5.2		99.5			67.1	48.9
Level of Service	E	C	A	E	A	A		F			E	D
Approach Delay (s)		20.2			13.1			99.5			63.5	
Approach LOS		C			B			F			E	
Intersection Summary												
HCM 2000 Control Delay			22.2			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			130.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			82.5%			ICU Level of Service			E			
Analysis Period (min)			15									

c Critical Lane Group

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	1	1	132	359	4
Future Vol, veh/h	1	1	1	132	359	4
Conflicting Peds, #/hr	0	4	1	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	0	2	1	0
Mvmt Flow	1	1	1	145	395	4

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	545	402	400	0	-	0
Stage 1	398	-	-	-	-	-
Stage 2	147	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	503	653	1170	-	-	-
Stage 1	683	-	-	-	-	-
Stage 2	885	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	501	650	1169	-	-	-
Mov Cap-2 Maneuver	501	-	-	-	-	-
Stage 1	682	-	-	-	-	-
Stage 2	884	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.4	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1169	-	566	-	-
HCM Lane V/C Ratio	0.001	-	0.004	-	-
HCM Control Delay (s)	8.1	0	11.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	1	8	123	1	13	348
Future Vol, veh/h	1	8	123	1	13	348
Conflicting Peds, #/hr	0	4	0	0	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	2	0	0	1
Mvmt Flow	1	9	135	1	14	382

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	547	141	0	0	137
Stage 1	137	-	-	-	-
Stage 2	410	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	502	912	-	-	1459
Stage 1	895	-	-	-	-
Stage 2	674	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	495	908	-	-	1458
Mov Cap-2 Maneuver	495	-	-	-	-
Stage 1	883	-	-	-	-
Stage 2	674	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	831	1458
HCM Lane V/C Ratio	-	-	0.012	0.01
HCM Control Delay (s)	-	-	9.4	7.5
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	20	17	14	106	296	53
Future Vol, veh/h	20	17	14	106	296	53
Conflicting Peds, #/hr	0	2	2	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	7	2	1	2
Mvmt Flow	22	19	16	119	333	60

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	516	367	395	0	0
Stage 1	365	-	-	-	-
Stage 2	151	-	-	-	-
Critical Hdwy	6.4	6.2	4.17	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.263	-	-
Pot Cap-1 Maneuver	523	683	1137	-	-
Stage 1	707	-	-	-	-
Stage 2	882	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	513	681	1135	-	-
Mov Cap-2 Maneuver	513	-	-	-	-
Stage 1	695	-	-	-	-
Stage 2	880	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.7	1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1135	-	579	-	-
HCM Lane V/C Ratio	0.014	-	0.072	-	-
HCM Control Delay (s)	8.2	0	11.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-




Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	1	48	66	0	3	1
Future Vol, veh/h	1	48	66	0	3	1
Conflicting Peds, #/hr	5	0	0	5	1	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	74	74	74	74	74	74
Heavy Vehicles, %	0	2	2	0	0	0
Mvmt Flow	1	65	89	0	4	1

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	94	0	-	0	162
Stage 1	-	-	-	-	94
Stage 2	-	-	-	-	68
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	1513	-	-	-	834
Stage 1	-	-	-	-	935
Stage 2	-	-	-	-	960
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1507	-	-	-	826
Mov Cap-2 Maneuver	-	-	-	-	826
Stage 1	-	-	-	-	930
Stage 2	-	-	-	-	956

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	9.2
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1507	-	-	-	857
HCM Lane V/C Ratio	0.001	-	-	-	0.006
HCM Control Delay (s)	7.4	0	-	-	9.2
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

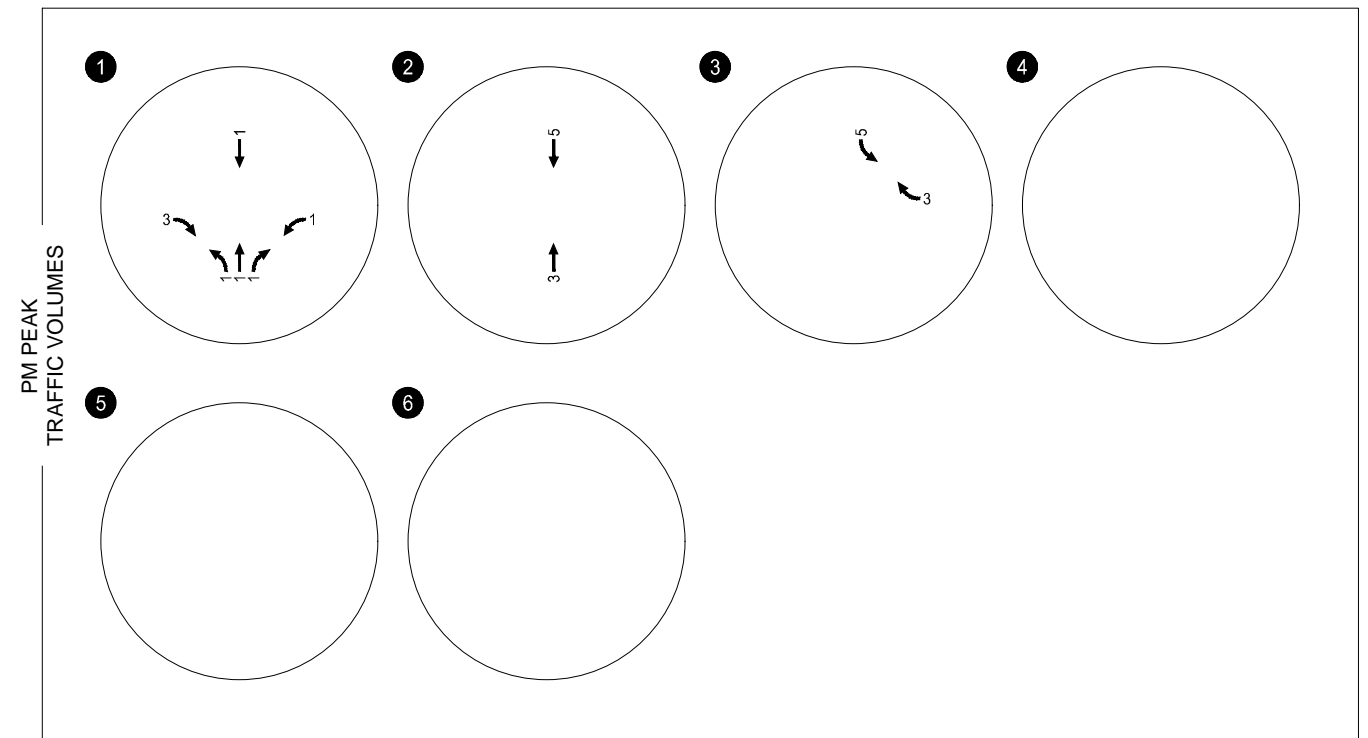
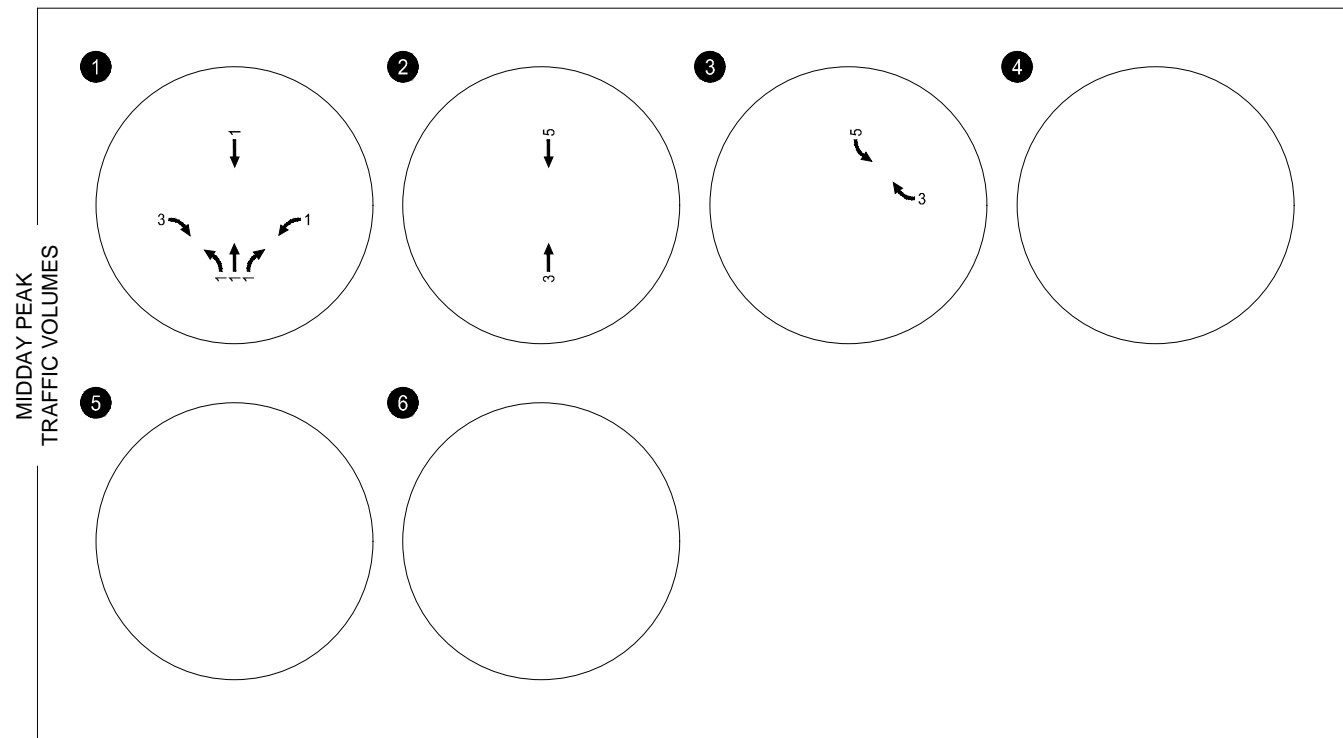
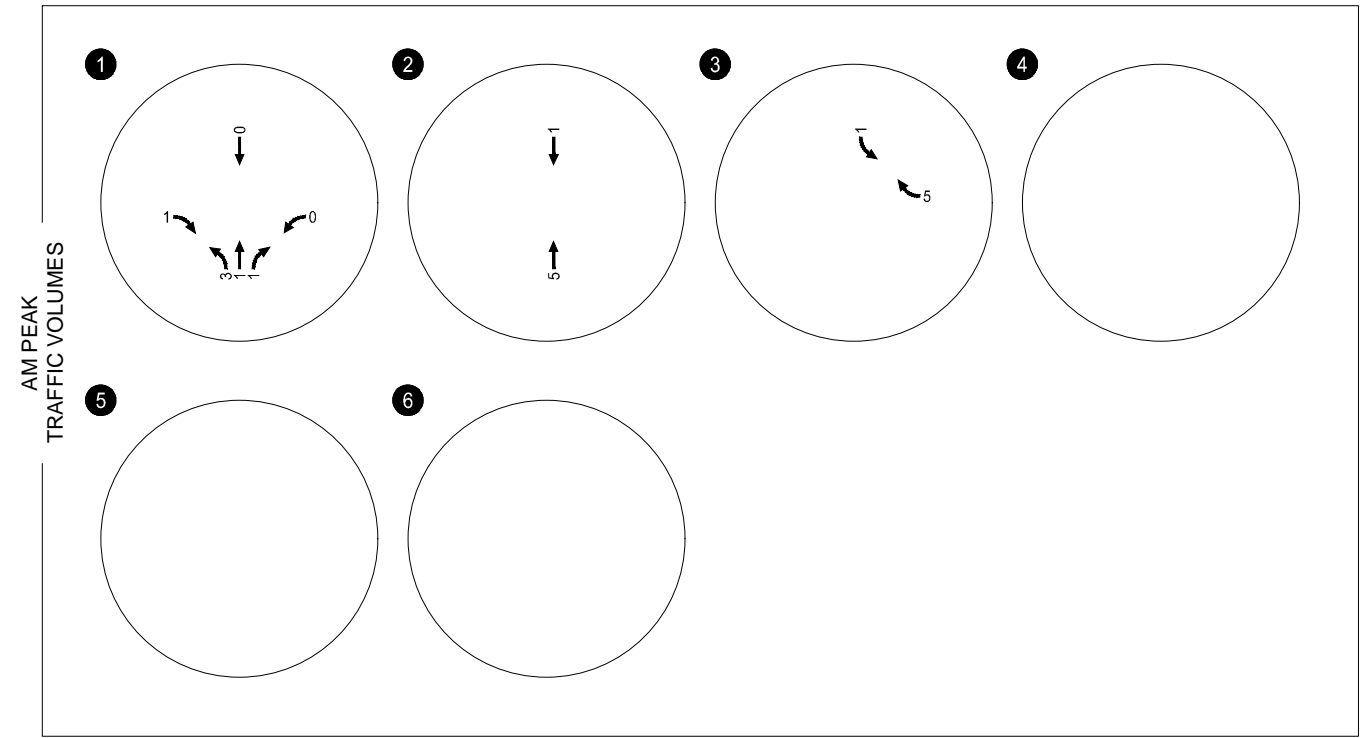
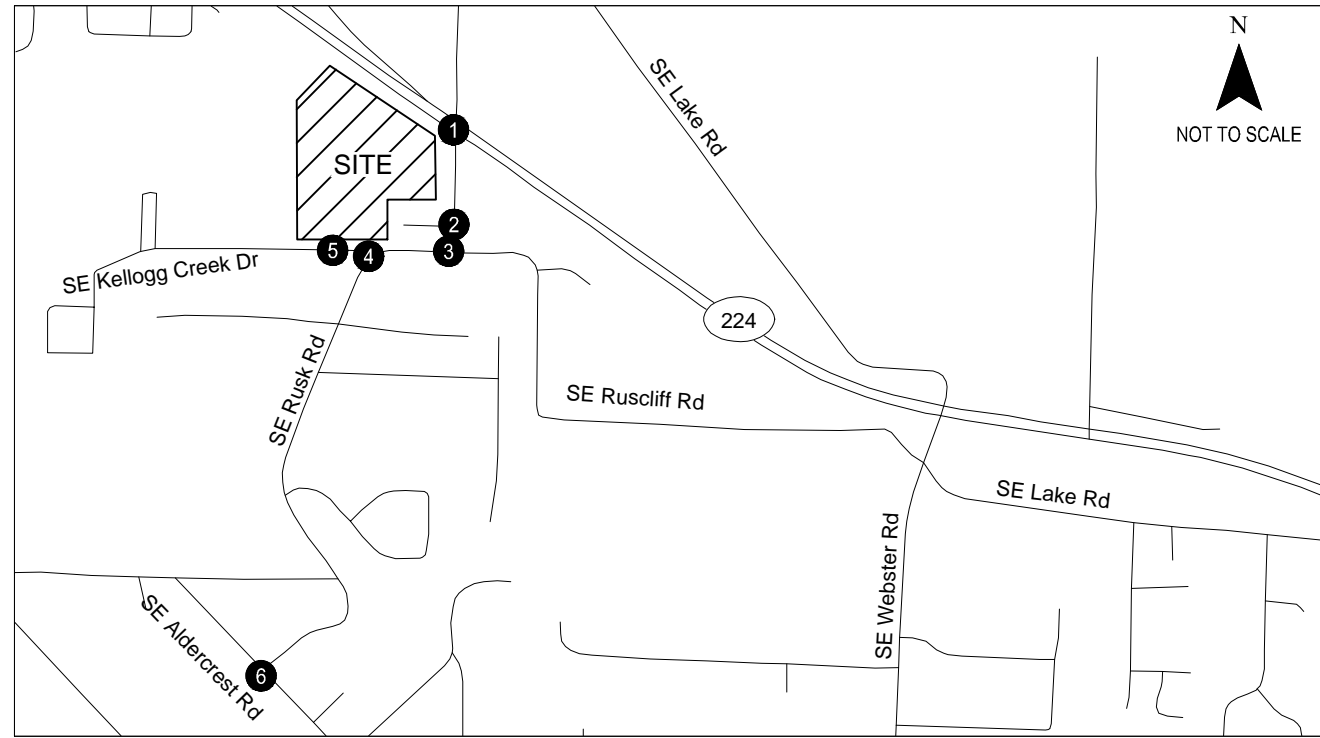
Intersection	
Intersection Delay, s/veh	9.7
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	27	42	24	76	269	26
Future Vol, veh/h	27	42	24	76	269	26
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	0	2	0	5	1	4
Mvmt Flow	30	46	26	84	296	29
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.5	8	10.5
HCM LOS	A	A	B

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	39%	0%	91%
Vol Thru, %	61%	24%	0%
Vol Right, %	0%	76%	9%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	69	100	295
LT Vol	27	0	269
Through Vol	42	24	0
RT Vol	0	76	26
Lane Flow Rate	76	110	324
Geometry Grp	1	1	1
Degree of Util (X)	0.103	0.132	0.403
Departure Headway (Hd)	4.878	4.313	4.472
Convergence, Y/N	Yes	Yes	Yes
Cap	735	832	804
Service Time	2.906	2.338	2.497
HCM Lane V/C Ratio	0.103	0.132	0.403
HCM Control Delay	8.5	8	10.5
HCM Lane LOS	A	A	B
HCM 95th-tile Q	0.3	0.5	2

**Attachment E – 2019 Background
Traffic Level-of-Service Worksheets**



In-Process Trip Assignment
AM, Midday & PM Peak Hours
Milwaukie, Oregon

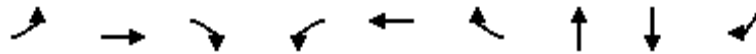
Figure
E-1

H:\23\23248 - Rusk Road Senior Housing\dwgs\Figs\23248_Figures.dwg Nov 02, 2018 - 11:31am - bcllmore Layout Tab: In-Process 11x17

Queues

1: SE Rusk Rd & Milwaukie Expy (Hwy 224)

11/05/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	4	855	33	18	2137	19	236	64	5
v/c Ratio	0.06	0.37	0.03	0.21	0.86	0.02	0.92	0.24	0.02
Control Delay	55.5	8.8	0.1	58.8	18.1	0.4	86.0	44.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.5	8.8	0.1	58.8	18.1	0.4	86.0	44.7	0.0
Queue Length 50th (ft)	3	109	0	14	536	0	173	43	0
Queue Length 95th (ft)	15	206	0	38	#1013	2	#324	85	0
Internal Link Dist (ft)		263			1187		389	744	
Turn Bay Length (ft)	470		110	455		100			75
Base Capacity (vph)	132	2332	1095	254	2480	967	265	275	328
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.37	0.03	0.07	0.86	0.02	0.89	0.23	0.02






















Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: SE Rusk Rd & Milwaukie Expy (Hwy 224)

11/05/2018

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	4	829	32	17	2073	18	140	42	48	21	41	5	
Future Volume (vph)	4	829	32	17	2073	18	140	42	48	21	41	5	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0			4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00			1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00		1.00			1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.97			1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97			0.98	1.00	
Satd. Flow (prot)	1444	3343	1536	1456	3438	1324		1758			1698	1346	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.78			0.87	1.00	
Satd. Flow (perm)	1444	3343	1536	1456	3438	1324		1406			1502	1346	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	4	855	33	18	2137	19	144	43	49	22	42	5	
RTOR Reduction (vph)	0	0	11	0	0	6	0	8	0	0	0	4	
Lane Group Flow (vph)	4	855	22	18	2137	13	0	228	0	0	64	1	
Confl. Bikes (#/hr)			1						1				
Heavy Vehicles (%)	25%	8%	3%	24%	5%	22%	2%	0%	2%	10%	10%	20%	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm	
Protected Phases	5	2		1	6			8			4		
Permitted Phases			2			6	8			4		4	
Actuated Green, G (s)	1.4	81.4	81.4	3.4	83.4	83.4		21.2			21.2	21.2	
Effective Green, g (s)	1.4	81.4	81.4	3.4	83.4	83.4		21.2			21.2	21.2	
Actuated g/C Ratio	0.01	0.68	0.68	0.03	0.70	0.70		0.18			0.18	0.18	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0			4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0	
Lane Grp Cap (vph)	16	2267	1041	41	2389	920		248			265	237	
v/s Ratio Prot	0.00	0.26		c0.01	c0.62								
v/s Ratio Perm			0.01			0.01		c0.16			0.04	0.00	
v/c Ratio	0.25	0.38	0.02	0.44	0.89	0.01		0.92			0.24	0.00	
Uniform Delay, d1	58.8	8.3	6.3	57.4	14.8	5.6		48.6			42.5	40.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2	8.1	0.5	0.0	7.3	5.7	0.0		35.5			0.5	0.0	
Delay (s)	66.8	8.8	6.3	64.7	20.5	5.7		84.1			43.0	40.7	
Level of Service	E	A	A	E	C	A		F			D	D	
Approach Delay (s)		9.0			20.7			84.1			42.8		
Approach LOS		A			C			F			D		
Intersection Summary													
HCM 2000 Control Delay			22.5	HCM 2000 Level of Service						C			
HCM 2000 Volume to Capacity ratio			0.90										
Actuated Cycle Length (s)			120.0	Sum of lost time (s)						14.0			
Intersection Capacity Utilization			86.9%	ICU Level of Service						E			
Analysis Period (min)			15										

c Critical Lane Group

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	0	0	251	180	2
Future Vol, veh/h	2	0	0	251	180	2
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	76	76	76	76
Heavy Vehicles, %	0	0	0	2	5	0
Mvmt Flow	3	0	0	330	237	3

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	571	241	242	0	0
Stage 1	241	-	-	-	-
Stage 2	330	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	486	803	1336	-	-
Stage 1	804	-	-	-	-
Stage 2	733	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	484	802	1334	-	-
Mov Cap-2 Maneuver	484	-	-	-	-
Stage 1	802	-	-	-	-
Stage 2	732	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.5	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1334	-	484	-	-
HCM Lane V/C Ratio	-	-	0.005	-	-
HCM Control Delay (s)	0	-	12.5	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T	R	L	T
Traffic Vol, veh/h	2	12	238	1	3	177
Future Vol, veh/h	2	12	238	1	3	177
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	74	74	74	74	74	74
Heavy Vehicles, %	50	14	2	100	50	5
Mvmt Flow	3	16	322	1	4	239

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	570	323	0	0	323
Stage 1	323	-	-	-	-
Stage 2	247	-	-	-	-
Critical Hdwy	6.9	6.34	-	-	4.6
Critical Hdwy Stg 1	5.9	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-
Follow-up Hdwy	3.95	3.426	-	-	2.65
Pot Cap-1 Maneuver	411	691	-	-	1010
Stage 1	638	-	-	-	-
Stage 2	694	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	409	691	-	-	1010
Mov Cap-2 Maneuver	409	-	-	-	-
Stage 1	635	-	-	-	-
Stage 2	694	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.9	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	629	1010
HCM Lane V/C Ratio	-	-	0.03	0.004
HCM Control Delay (s)	-	-	10.9	8.6
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Intersection						
Int Delay, s/veh	2.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	52	14	38	185	107	72
Future Vol, veh/h	52	14	38	185	107	72
Conflicting Peds, #/hr	0	0	1	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	69	69	69	69	69	69
Heavy Vehicles, %	6	7	0	2	6	1
Mvmt Flow	75	20	55	268	155	104

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	586	208	260	0	-	0
Stage 1	208	-	-	-	-	-
Stage 2	378	-	-	-	-	-
Critical Hdwy	6.46	6.27	4.1	-	-	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.363	2.2	-	-	-
Pot Cap-1 Maneuver	466	820	1316	-	-	-
Stage 1	817	-	-	-	-	-
Stage 2	684	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	442	819	1315	-	-	-
Mov Cap-2 Maneuver	442	-	-	-	-	-
Stage 1	776	-	-	-	-	-
Stage 2	683	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.1	1.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1315	-	490	-	-
HCM Lane V/C Ratio	0.042	-	0.195	-	-
HCM Control Delay (s)	7.9	0	14.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	-	-

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Vol, veh/h	0	80	111	0	0	0
Future Vol, veh/h	0	80	111	0	0	0
Conflicting Peds, #/hr	2	0	0	2	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	51	51	51	51	51	51
Heavy Vehicles, %	0	6	1	0	0	0
Mvmt Flow	0	157	218	0	0	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	220	0	-	0	377 220
Stage 1	-	-	-	-	220 -
Stage 2	-	-	-	-	157 -
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	1361	-	-	-	629 825
Stage 1	-	-	-	-	821 -
Stage 2	-	-	-	-	876 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1359	-	-	-	626 824
Mov Cap-2 Maneuver	-	-	-	-	626 -
Stage 1	-	-	-	-	819 -
Stage 2	-	-	-	-	874 -

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1359	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection

Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	31	23	44	170	72	16
Future Vol, veh/h	31	23	44	170	72	16
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	3	0	2	2	6	6
Mvmt Flow	37	28	53	205	87	19
Number of Lanes	0	1	1	0	1	0

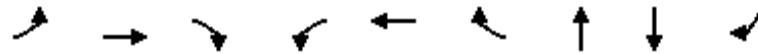
Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8	8.2	8.5
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	57%	0%	82%
Vol Thru, %	43%	21%	0%
Vol Right, %	0%	79%	18%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	54	214	88
LT Vol	31	0	72
Through Vol	23	44	0
RT Vol	0	170	16
Lane Flow Rate	65	258	106
Geometry Grp	1	1	1
Degree of Util (X)	0.083	0.272	0.139
Departure Headway (Hd)	4.57	3.795	4.715
Convergence, Y/N	Yes	Yes	Yes
Cap	787	951	762
Service Time	2.583	1.804	2.735
HCM Lane V/C Ratio	0.083	0.271	0.139
HCM Control Delay	8	8.2	8.5
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.3	1.1	0.5

Queues

1: SE Rusk Rd & Milwaukie Expy (Hwy 224)

11/05/2018
























Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	13	1089	63	48	1076	6	175	79	11
v/c Ratio	0.12	0.49	0.06	0.33	0.45	0.01	0.70	0.34	0.04
Control Delay	46.2	11.3	3.7	48.8	7.9	0.0	47.3	40.1	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.2	11.3	3.7	48.8	7.9	0.0	47.3	40.1	0.3
Queue Length 50th (ft)	8	186	2	29	113	0	89	46	0
Queue Length 95th (ft)	27	306	21	64	280	0	150	84	0
Internal Link Dist (ft)		263			1187		389	741	
Turn Bay Length (ft)	470		110	455		100			75
Base Capacity (vph)	183	2268	1070	194	2390	999	284	268	319
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.48	0.06	0.25	0.45	0.01	0.62	0.29	0.03

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: SE Rusk Rd & Milwaukie Expy (Hwy 224)

11/05/2018

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	13	1067	62	47	1054	6	70	32	70	24	54	11	
Future Volume (vph)	13	1067	62	47	1054	6	70	32	70	24	54	11	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0			4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00			1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98		1.00			1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.95			1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98			0.99	1.00	
Satd. Flow (prot)	1671	3343	1551	1770	3282	1352		1746			1759	1463	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.83			0.85	1.00	
Satd. Flow (perm)	1671	3343	1551	1770	3282	1352		1484			1525	1463	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	
Adj. Flow (vph)	13	1089	63	48	1076	6	71	33	71	24	55	11	
RTOR Reduction (vph)	0	0	19	0	0	2	0	25	0	0	0	9	
Lane Group Flow (vph)	13	1089	44	48	1076	4	0	150	0	0	79	2	
Confl. Peds. (#/hr)							1					1	
Confl. Bikes (#/hr)			1			1							
Heavy Vehicles (%)	8%	8%	2%	2%	10%	17%	1%	0%	1%	21%	0%	9%	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm	
Protected Phases	5	2		1	6			8				4	
Permitted Phases			2			6	8			4		4	
Actuated Green, G (s)	1.6	65.0	65.0	5.7	69.1	69.1		15.3			15.3	15.3	
Effective Green, g (s)	1.6	65.0	65.0	5.7	69.1	69.1		15.3			15.3	15.3	
Actuated g/C Ratio	0.02	0.65	0.65	0.06	0.69	0.69		0.15			0.15	0.15	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0			4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0	
Lane Grp Cap (vph)	26	2172	1008	100	2267	934		227			233	223	
v/s Ratio Prot	0.01	c0.33		c0.03	0.33								
v/s Ratio Perm			0.03			0.00		c0.10			0.05	0.00	
v/c Ratio	0.50	0.50	0.04	0.48	0.47	0.00		0.66			0.34	0.01	
Uniform Delay, d1	48.8	9.1	6.3	45.7	7.1	4.8		39.9			37.8	35.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2	14.3	0.8	0.1	3.6	0.7	0.0		7.1			0.9	0.0	
Delay (s)	63.1	9.9	6.4	49.3	7.8	4.8		47.0			38.7	35.9	
Level of Service	E	A	A	D	A	A		D			D	D	
Approach Delay (s)		10.3			9.6			47.0			38.4		
Approach LOS		B			A			D			D		
Intersection Summary													
HCM 2000 Control Delay			13.5									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.53										
Actuated Cycle Length (s)			100.0									Sum of lost time (s)	14.0
Intersection Capacity Utilization			61.0%									ICU Level of Service	B
Analysis Period (min)			15										
c Critical Lane Group													

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	1	1	177	170	3
Future Vol, veh/h	7	1	1	177	170	3
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	3	2	0
Mvmt Flow	8	1	1	201	193	3

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	400	197	198	0	0
Stage 1	197	-	-	-	-
Stage 2	203	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	610	849	1387	-	-
Stage 1	841	-	-	-	-
Stage 2	836	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	607	848	1385	-	-
Mov Cap-2 Maneuver	607	-	-	-	-
Stage 1	838	-	-	-	-
Stage 2	834	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1385	-	629	-	-
HCM Lane V/C Ratio	0.001	-	0.014	-	-
HCM Control Delay (s)	7.6	0	10.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	1	8	170	0	12	158
Future Vol, veh/h	1	8	170	0	12	158
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	40	2	0	14	1
Mvmt Flow	1	9	191	0	13	178

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	395	191	0	0	191
Stage 1	191	-	-	-	-
Stage 2	204	-	-	-	-
Critical Hdwy	6.4	6.6	-	-	4.24
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.66	-	-	2.326
Pot Cap-1 Maneuver	614	762	-	-	1314
Stage 1	846	-	-	-	-
Stage 2	835	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	607	762	-	-	1314
Mov Cap-2 Maneuver	607	-	-	-	-
Stage 1	837	-	-	-	-
Stage 2	835	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.9	0	0.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	741	1314
HCM Lane V/C Ratio	-	-	0.014	0.01
HCM Control Delay (s)	-	-	9.9	7.8
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

Intersection						
Int Delay, s/veh	3.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T		T		T	
Traffic Vol, veh/h	83	33	22	89	115	43
Future Vol, veh/h	83	33	22	89	115	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	0	0	0	0	7
Mvmt Flow	95	38	25	102	132	49

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	309	157	181	0	0
Stage 1	157	-	-	-	-
Stage 2	152	-	-	-	-
Critical Hdwy	6.42	6.2	4.1	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.3	2.2	-	-
Pot Cap-1 Maneuver	683	894	1407	-	-
Stage 1	871	-	-	-	-
Stage 2	876	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	670	894	1407	-	-
Mov Cap-2 Maneuver	670	-	-	-	-
Stage 1	854	-	-	-	-
Stage 2	876	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.1	1.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1407	-	721	-	-
HCM Lane V/C Ratio	0.018	-	0.185	-	-
HCM Control Delay (s)	7.6	0	11.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	-	-




Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Vol, veh/h	0	111	62	2	5	2
Future Vol, veh/h	0	111	62	2	5	2
Conflicting Peds, #/hr	4	0	0	4	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	75	75	75	75	75	75
Heavy Vehicles, %	0	2	3	50	0	0
Mvmt Flow	0	148	83	3	7	3

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	90	0	-	0	237 89
Stage 1	-	-	-	-	89 -
Stage 2	-	-	-	-	148 -
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	1518	-	-	-	756 975
Stage 1	-	-	-	-	940 -
Stage 2	-	-	-	-	884 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1513	-	-	-	751 972
Mov Cap-2 Maneuver	-	-	-	-	751 -
Stage 1	-	-	-	-	937 -
Stage 2	-	-	-	-	881 -

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1513	-	-	-	803
HCM Lane V/C Ratio	-	-	-	-	0.012
HCM Control Delay (s)	0	-	-	-	9.5
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	25	22	73	99	35
Future Vol, veh/h	25	25	22	73	99	35
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	0	0	0	1	0	0
Mvmt Flow	29	29	25	84	114	40
Number of Lanes	0	1	1	0	1	0

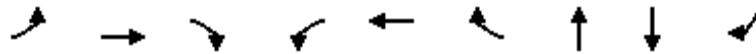
Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	7.8	7.4	8.2
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	50%	0%	74%
Vol Thru, %	50%	23%	0%
Vol Right, %	0%	77%	26%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	50	95	134
LT Vol	25	0	99
Through Vol	25	22	0
RT Vol	0	73	35
Lane Flow Rate	57	109	154
Geometry Grp	1	1	1
Degree of Util (X)	0.071	0.117	0.179
Departure Headway (Hd)	4.46	3.854	4.177
Convergence, Y/N	Yes	Yes	Yes
Cap	808	936	849
Service Time	2.46	1.855	2.253
HCM Lane V/C Ratio	0.071	0.116	0.181
HCM Control Delay	7.8	7.4	8.2
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0.4	0.6

Queues

1: SE Rusk Rd & Milwaukie Expy (Hwy 224)

11/05/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	24	2047	209	100	1371	12	147	133	32
v/c Ratio	0.26	0.87	0.19	0.66	0.54	0.01	0.91	0.72	0.12
Control Delay	64.5	23.3	6.0	77.8	10.4	0.0	99.0	73.9	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.5	23.3	6.0	77.8	10.4	0.0	99.0	73.9	3.9
Queue Length 50th (ft)	20	704	38	82	278	0	110	108	0
Queue Length 95th (ft)	49	903	76	#160	404	0	#205	174	10
Internal Link Dist (ft)		263			1187		389	767	
Turn Bay Length (ft)	470		110	455		100			75
Base Capacity (vph)	140	2355	1111	161	2532	1189	205	242	330
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.87	0.19	0.62	0.54	0.01	0.72	0.55	0.10






















Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: SE Rusk Rd & Milwaukie Expy (Hwy 224)

11/05/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	1883	192	92	1261	11	54	36	45	49	74	29
Future Volume (vph)	22	1883	192	92	1261	11	54	36	45	49	74	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.95			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.98			0.98	1.00
Satd. Flow (prot)	1656	3505	1615	1805	3471	1615		1757			1852	1593
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.60			0.73	1.00
Satd. Flow (perm)	1656	3505	1615	1805	3471	1615		1084			1374	1593
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	2047	209	100	1371	12	59	39	49	53	80	32
RTOR Reduction (vph)	0	0	26	0	0	3	0	15	0	0	0	28
Lane Group Flow (vph)	24	2047	183	100	1371	9	0	132	0	0	133	4
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	9%	3%	0%	0%	4%	0%	2%	0%	0%	0%	1%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	5.1	87.4	87.4	11.0	93.3	93.3		17.6			17.6	17.6
Effective Green, g (s)	5.1	87.4	87.4	11.0	93.3	93.3		17.6			17.6	17.6
Actuated g/C Ratio	0.04	0.67	0.67	0.08	0.72	0.72		0.14			0.14	0.14
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	64	2356	1085	152	2491	1159		146			186	215
v/s Ratio Prot	0.01	c0.58		c0.06	0.39							
v/s Ratio Perm			0.11			0.01		c0.12			0.10	0.00
v/c Ratio	0.38	0.87	0.17	0.66	0.55	0.01		0.91			0.72	0.02
Uniform Delay, d1	60.9	16.8	7.9	57.7	8.6	5.2		55.4			53.8	48.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	3.7	4.7	0.3	9.8	0.9	0.0		47.2			12.3	0.0
Delay (s)	64.6	21.5	8.2	67.5	9.4	5.2		102.6			66.1	48.8
Level of Service	E	C	A	E	A	A		F			E	D
Approach Delay (s)		20.7			13.3			102.6			62.7	
Approach LOS		C			B			F			E	
Intersection Summary												
HCM 2000 Control Delay			22.7			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			130.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			83.1%			ICU Level of Service			E			
Analysis Period (min)			15									

c Critical Lane Group

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		T
Traffic Vol, veh/h	1	1	1	136	366	4
Future Vol, veh/h	1	1	1	136	366	4
Conflicting Peds, #/hr	0	4	1	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	0	2	1	0
Mvmt Flow	1	1	1	149	402	4

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	556	409	407	0	-	0
Stage 1	405	-	-	-	-	-
Stage 2	151	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	496	647	1163	-	-	-
Stage 1	678	-	-	-	-	-
Stage 2	882	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	495	644	1162	-	-	-
Mov Cap-2 Maneuver	495	-	-	-	-	-
Stage 1	677	-	-	-	-	-
Stage 2	881	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.5	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1162	-	560	-	-
HCM Lane V/C Ratio	0.001	-	0.004	-	-
HCM Control Delay (s)	8.1	0	11.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	11	124	1	18	350
Future Vol, veh/h	1	11	124	1	18	350
Conflicting Peds, #/hr	0	4	0	0	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	2	0	0	1
Mvmt Flow	1	12	136	1	20	385

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	563	142	0	0	138
Stage 1	138	-	-	-	-
Stage 2	425	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	491	911	-	-	1458
Stage 1	894	-	-	-	-
Stage 2	664	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	482	907	-	-	1457
Mov Cap-2 Maneuver	482	-	-	-	-
Stage 1	878	-	-	-	-
Stage 2	664	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.3	0	0.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	845	1457
HCM Lane V/C Ratio	-	-	0.016	0.014
HCM Control Delay (s)	-	-	9.3	7.5
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	20	17	14	107	298	53
Future Vol, veh/h	20	17	14	107	298	53
Conflicting Peds, #/hr	0	2	2	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	7	2	1	2
Mvmt Flow	22	19	16	120	335	60

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	519	369	397	0	0
Stage 1	367	-	-	-	-
Stage 2	152	-	-	-	-
Critical Hdwy	6.4	6.2	4.17	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.263	-	-
Pot Cap-1 Maneuver	521	681	1135	-	-
Stage 1	705	-	-	-	-
Stage 2	881	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	511	679	1133	-	-
Mov Cap-2 Maneuver	511	-	-	-	-
Stage 1	693	-	-	-	-
Stage 2	879	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.7	1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1133	-	577	-	-
HCM Lane V/C Ratio	0.014	-	0.072	-	-
HCM Control Delay (s)	8.2	0	11.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	1	48	66	0	3	1
Future Vol, veh/h	1	48	66	0	3	1
Conflicting Peds, #/hr	5	0	0	5	1	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	74	74	74	74	74	74
Heavy Vehicles, %	0	2	2	0	0	0
Mvmt Flow	1	65	89	0	4	1

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	94	0	-	0	162
Stage 1	-	-	-	-	94
Stage 2	-	-	-	-	68
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	1513	-	-	-	834
Stage 1	-	-	-	-	935
Stage 2	-	-	-	-	960
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1507	-	-	-	826
Mov Cap-2 Maneuver	-	-	-	-	826
Stage 1	-	-	-	-	930
Stage 2	-	-	-	-	956

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	9.2
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1507	-	-	-	857
HCM Lane V/C Ratio	0.001	-	-	-	0.006
HCM Control Delay (s)	7.4	0	-	-	9.2
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

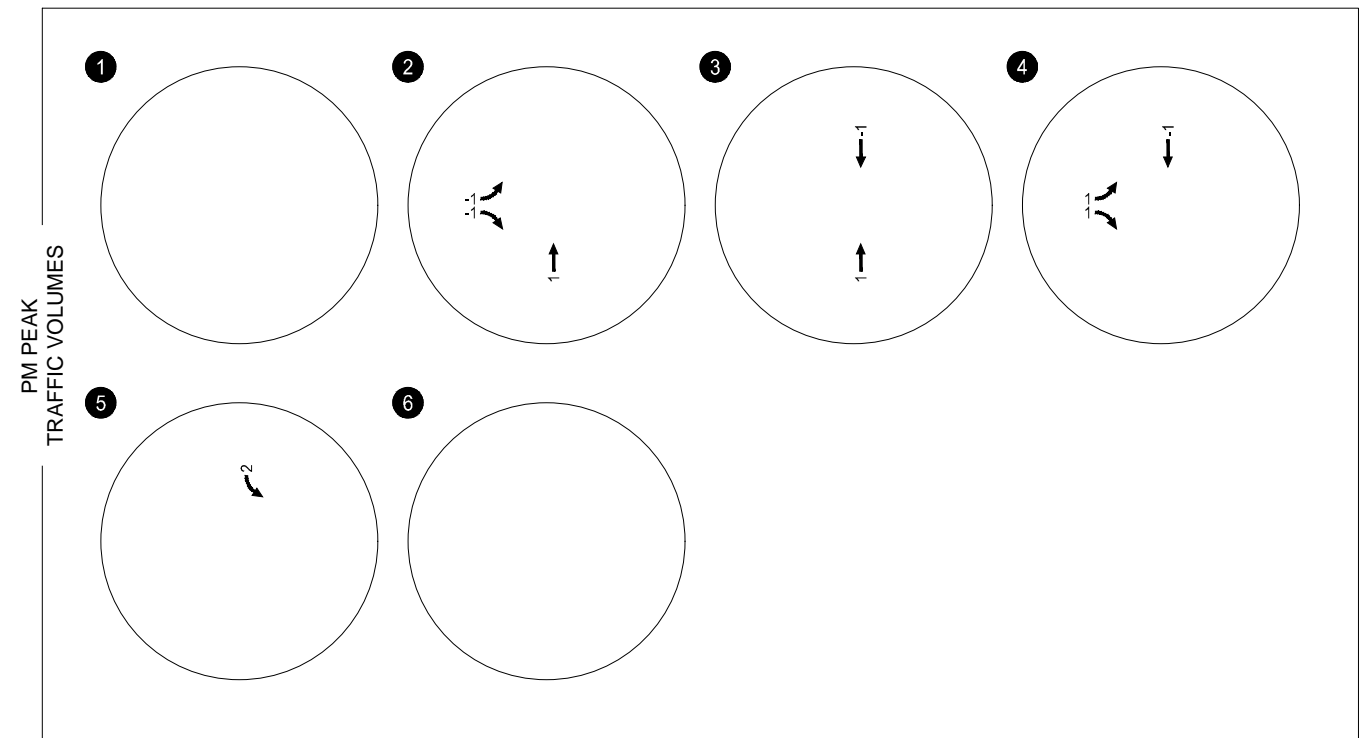
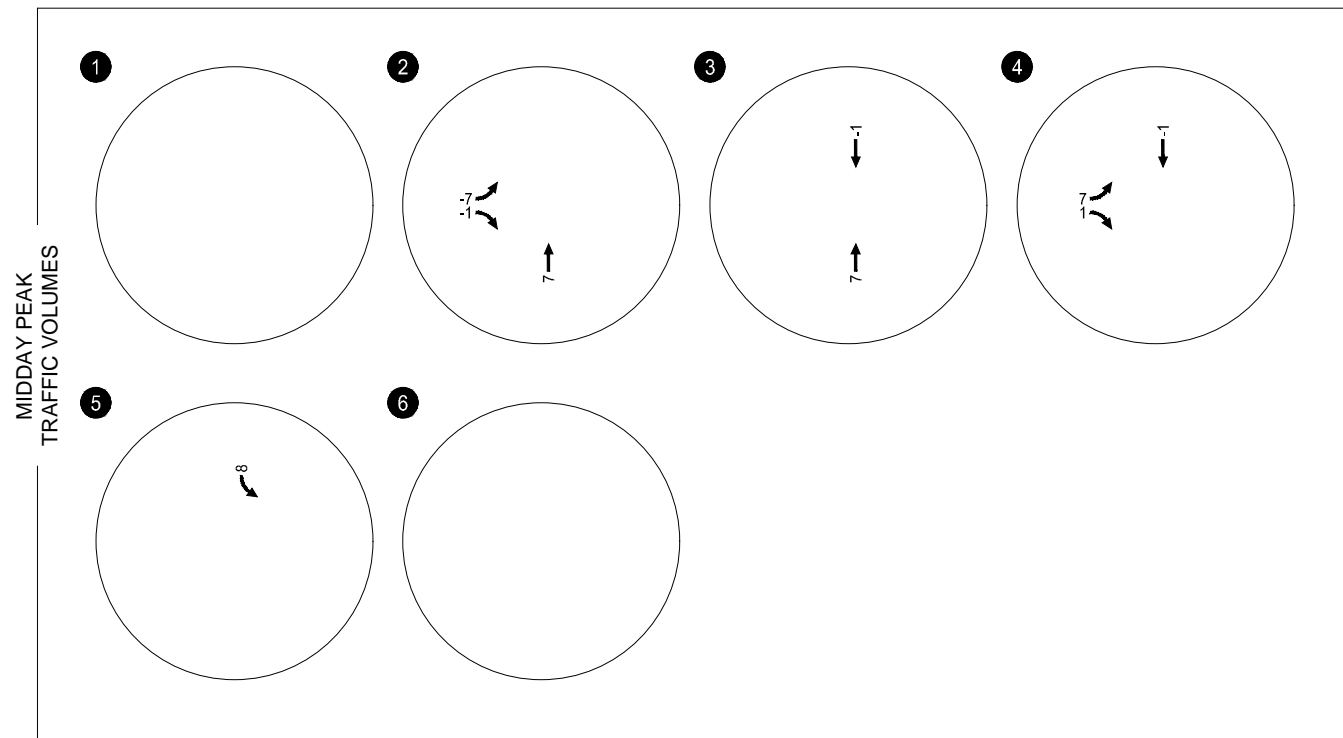
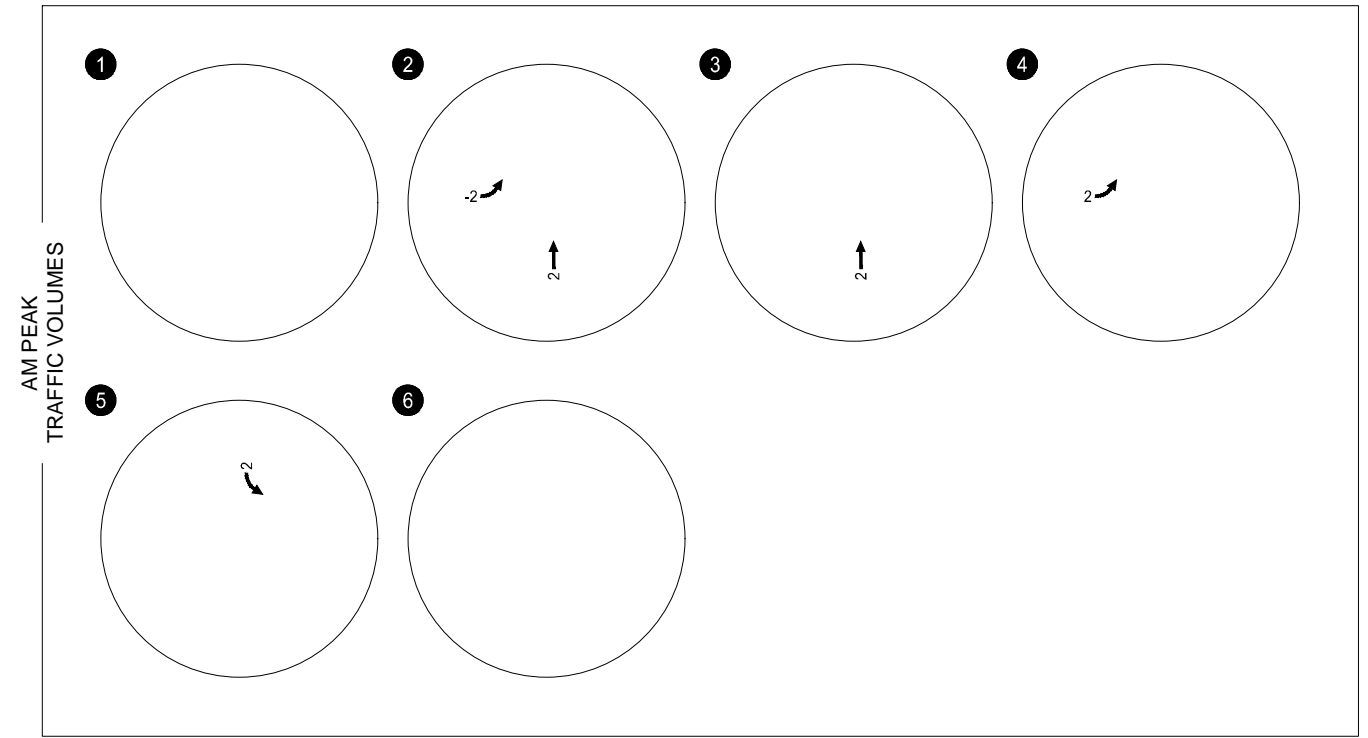
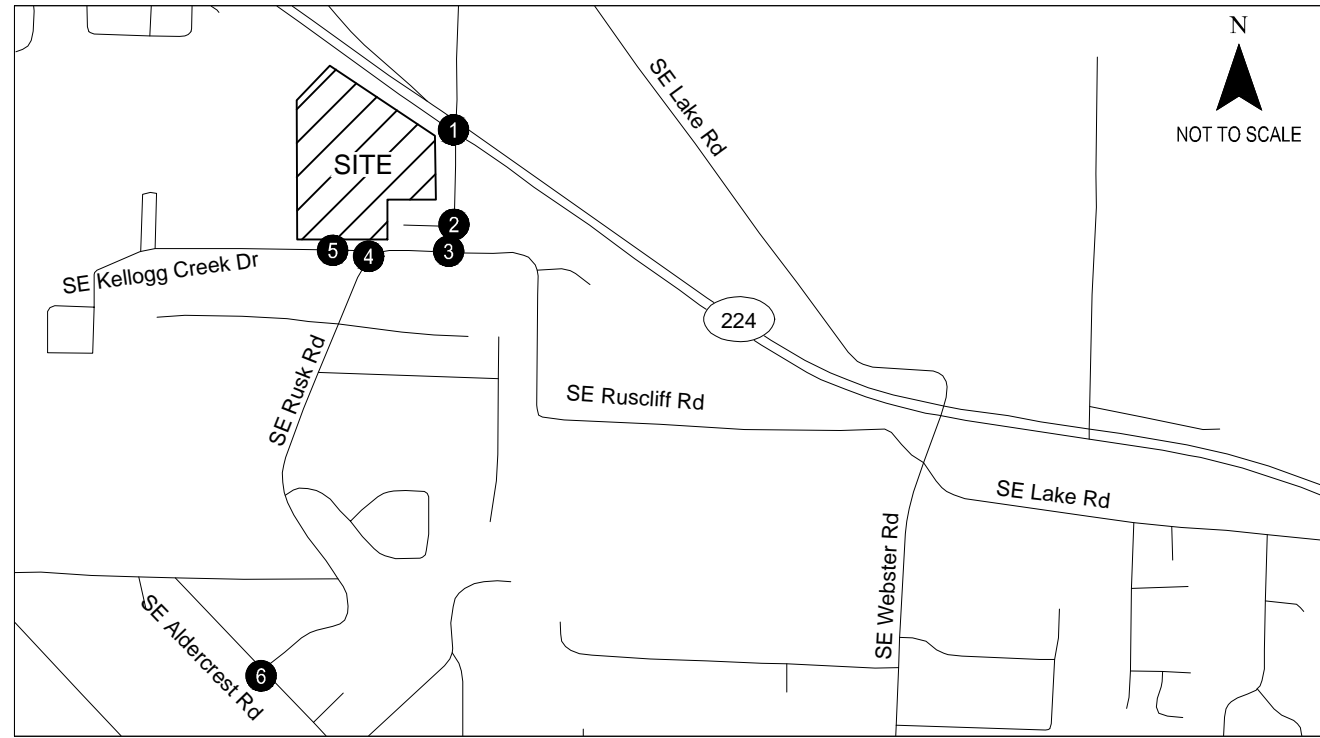
Intersection	
Intersection Delay, s/veh	9.7
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	27	42	24	76	271	26
Future Vol, veh/h	27	42	24	76	271	26
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	0	2	0	5	1	4
Mvmt Flow	30	46	26	84	298	29
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.5	8	10.5
HCM LOS	A	A	B

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	39%	0%	91%
Vol Thru, %	61%	24%	0%
Vol Right, %	0%	76%	9%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	69	100	297
LT Vol	27	0	271
Through Vol	42	24	0
RT Vol	0	76	26
Lane Flow Rate	76	110	326
Geometry Grp	1	1	1
Degree of Util (X)	0.103	0.132	0.406
Departure Headway (Hd)	4.884	4.319	4.473
Convergence, Y/N	Yes	Yes	Yes
Cap	734	831	806
Service Time	2.912	2.344	2.497
HCM Lane V/C Ratio	0.104	0.132	0.404
HCM Control Delay	8.5	8	10.5
HCM Lane LOS	A	A	B
HCM 95th-tile Q	0.3	0.5	2

**Attachment F – 2019 Total Traffic
Level-of-Service Worksheets**



Redistributed Trip Assignment
AM, Midday & PM Peak Hours
Milwaukie, Oregon

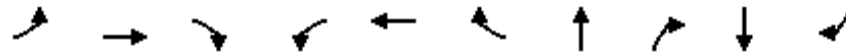
Figure
F-1

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Queues

1: SE Rusk Rd & Milwaukie Expy (Hwy 224)

11/05/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	4	855	42	23	2137	19	196	52	68	5
v/c Ratio	0.06	0.37	0.04	0.26	0.85	0.02	0.86	0.15	0.30	0.02
Control Delay	55.5	9.6	0.3	59.8	17.2	0.4	80.3	1.4	46.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.5	9.6	0.3	59.8	17.2	0.4	80.3	1.4	46.8	0.0
Queue Length 50th (ft)	3	156	0	17	536	0	146	0	46	0
Queue Length 95th (ft)	15	210	2	44	#1013	2	#265	3	90	0
Internal Link Dist (ft)		263			1187		389		744	
Turn Bay Length (ft)	470		110	455		100		100		75
Base Capacity (vph)	132	2293	1079	254	2512	979	250	368	246	328
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.37	0.04	0.09	0.85	0.02	0.78	0.14	0.28	0.02























Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: SE Rusk Rd & Milwaukie Expy (Hwy 224)

11/05/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	829	41	22	2073	18	146	44	50	21	45	5
Future Volume (vph)	4	829	41	22	2073	18	146	44	50	21	45	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00		1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00		0.98	1.00
Satd. Flow (prot)	1444	3343	1536	1456	3438	1324		1802	1562		1700	1346
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.73	1.00		0.78	1.00
Satd. Flow (perm)	1444	3343	1536	1456	3438	1324		1367	1562		1343	1346
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	4	855	42	23	2137	19	151	45	52	22	46	5
RTOR Reduction (vph)	0	0	14	0	0	6	0	0	43	0	0	4
Lane Group Flow (vph)	4	855	28	23	2137	13	0	196	9	0	68	1
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	25%	8%	3%	24%	5%	22%	2%	0%	2%	10%	10%	20%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	1.4	80.8	80.8	5.1	84.5	84.5		20.1	20.1		20.1	20.1
Effective Green, g (s)	1.4	80.8	80.8	5.1	84.5	84.5		20.1	20.1		20.1	20.1
Actuated g/C Ratio	0.01	0.67	0.67	0.04	0.70	0.70		0.17	0.17		0.17	0.17
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	16	2250	1034	61	2420	932		228	261		224	225
v/s Ratio Prot	0.00	0.26		c0.02	c0.62							
v/s Ratio Perm			0.02			0.01		c0.14	0.01		0.05	0.00
v/c Ratio	0.25	0.38	0.03	0.38	0.88	0.01		0.86	0.03		0.30	0.00
Uniform Delay, d1	58.8	8.6	6.5	55.9	13.9	5.3		48.6	41.8		43.8	41.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	8.1	0.5	0.0	3.9	5.1	0.0		26.0	0.1		0.8	0.0
Delay (s)	66.8	9.1	6.6	59.8	19.0	5.3		74.6	41.9		44.6	41.6
Level of Service	E	A	A	E	B	A		E	D		D	D
Approach Delay (s)		9.2			19.3			67.7			44.4	
Approach LOS		A			B			E			D	
Intersection Summary												
HCM 2000 Control Delay			20.7									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			120.0									Sum of lost time (s) 14.0
Intersection Capacity Utilization			84.4%									ICU Level of Service E
Analysis Period (min)			15									

c Critical Lane Group

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		T
Traffic Vol, veh/h	0	0	0	263	198	2
Future Vol, veh/h	0	0	0	263	198	2
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	76	76	76	76
Heavy Vehicles, %	0	0	0	2	5	0
Mvmt Flow	0	0	0	346	261	3

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	611	265	266	0	0
Stage 1	265	-	-	-	-
Stage 2	346	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	460	779	1310	-	-
Stage 1	784	-	-	-	-
Stage 2	721	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	458	778	1308	-	-
Mov Cap-2 Maneuver	458	-	-	-	-
Stage 1	782	-	-	-	-
Stage 2	720	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1308	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	2	12	250	1	3	195
Future Vol, veh/h	2	12	250	1	3	195
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	74	74	74	74	74	74
Heavy Vehicles, %	50	14	2	100	50	5
Mvmt Flow	3	16	338	1	4	264

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	611	339	0	0	339
Stage 1	339	-	-	-	-
Stage 2	272	-	-	-	-
Critical Hdwy	6.9	6.34	-	-	4.6
Critical Hdwy Stg 1	5.9	-	-	-	-
Critical Hdwy Stg 2	5.9	-	-	-	-
Follow-up Hdwy	3.95	3.426	-	-	2.65
Pot Cap-1 Maneuver	388	677	-	-	995
Stage 1	626	-	-	-	-
Stage 2	675	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	386	677	-	-	995
Mov Cap-2 Maneuver	386	-	-	-	-
Stage 1	623	-	-	-	-
Stage 2	675	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.1	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	611	995
HCM Lane V/C Ratio	-	-	0.031	0.004
HCM Control Delay (s)	-	-	11.1	8.6
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Intersection						
Int Delay, s/veh	3.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		
Traffic Vol, veh/h	64	16	43	185	107	90
Future Vol, veh/h	64	16	43	185	107	90
Conflicting Peds, #/hr	0	0	1	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	69	69	69	69	69	69
Heavy Vehicles, %	6	7	0	2	6	1
Mvmt Flow	93	23	62	268	155	130

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	613	221	286	0	-	0
Stage 1	221	-	-	-	-	-
Stage 2	392	-	-	-	-	-
Critical Hdwy	6.46	6.27	4.1	-	-	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.363	2.2	-	-	-
Pot Cap-1 Maneuver	449	806	1288	-	-	-
Stage 1	806	-	-	-	-	-
Stage 2	674	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	423	805	1287	-	-	-
Mov Cap-2 Maneuver	423	-	-	-	-	-
Stage 1	759	-	-	-	-	-
Stage 2	673	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.2	1.5	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1287	-	467	-	-
HCM Lane V/C Ratio	0.048	-	0.248	-	-
HCM Control Delay (s)	7.9	0	15.2	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.2	-	1	-	-




Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	0	80	111	23	14	0
Future Vol, veh/h	0	80	111	23	14	0
Conflicting Peds, #/hr	2	0	0	2	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	51	51	51	51	51	51
Heavy Vehicles, %	0	6	1	0	0	0
Mvmt Flow	0	157	218	45	27	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	265	0	-	0	400
Stage 1	-	-	-	-	243
Stage 2	-	-	-	-	157
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	1311	-	-	-	610
Stage 1	-	-	-	-	802
Stage 2	-	-	-	-	876
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1309	-	-	-	608
Mov Cap-2 Maneuver	-	-	-	-	608
Stage 1	-	-	-	-	800
Stage 2	-	-	-	-	874

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1309	-	-	-	608
HCM Lane V/C Ratio	-	-	-	-	0.045
HCM Control Delay (s)	0	-	-	-	11.2
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	32	23	44	174	74	16
Future Vol, veh/h	32	23	44	174	74	16
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	3	0	2	2	6	6
Mvmt Flow	39	28	53	210	89	19
Number of Lanes	0	1	1	0	1	0

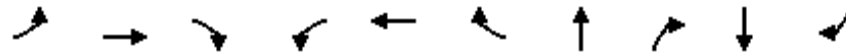
Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8	8.3	8.5
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	58%	0%	82%
Vol Thru, %	42%	20%	0%
Vol Right, %	0%	80%	18%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	55	218	90
LT Vol	32	0	74
Through Vol	23	44	0
RT Vol	0	174	16
Lane Flow Rate	66	263	108
Geometry Grp	1	1	1
Degree of Util (X)	0.084	0.277	0.143
Departure Headway (Hd)	4.583	3.801	4.733
Convergence, Y/N	Yes	Yes	Yes
Cap	784	948	759
Service Time	2.598	1.811	2.75
HCM Lane V/C Ratio	0.084	0.277	0.142
HCM Control Delay	8	8.3	8.5
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.3	1.1	0.5

Queues

1: SE Rusk Rd & Milwaukie Expy (Hwy 224)

11/05/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	13	1089	68	51	1076	6	119	76	82	11
v/c Ratio	0.12	0.49	0.07	0.35	0.44	0.01	0.63	0.27	0.38	0.04
Control Delay	46.2	11.2	3.6	49.0	7.0	0.0	54.5	10.9	42.8	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.2	11.2	3.6	49.0	7.0	0.0	54.5	10.9	42.8	0.3
Queue Length 50th (ft)	8	176	3	31	103	0	73	0	48	0
Queue Length 95th (ft)	27	291	22	67	263	0	124	38	88	0
Internal Link Dist (ft)		263			1187		389		741	
Turn Bay Length (ft)	470		110	455		100		100		75
Base Capacity (vph)	183	2228	1052	195	2428	1014	231	329	265	307
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.49	0.06	0.26	0.44	0.01	0.52	0.23	0.31	0.04

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: SE Rusk Rd & Milwaukie Expy (Hwy 224)

11/05/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘		↖	↗		↖	↗
Traffic Volume (vph)	13	1067	67	50	1054	6	80	36	74	24	57	11
Future Volume (vph)	13	1067	67	50	1054	6	80	36	74	24	57	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98		1.00	1.00		1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00		0.99	1.00
Satd. Flow (prot)	1671	3343	1551	1770	3282	1352		1823	1599		1764	1463
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.74	1.00		0.89	1.00
Satd. Flow (perm)	1671	3343	1551	1770	3282	1352		1390	1599		1594	1463
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	13	1089	68	51	1076	6	82	37	76	24	58	11
RTOR Reduction (vph)	0	0	20	0	0	2	0	0	66	0	0	9
Lane Group Flow (vph)	13	1089	48	51	1076	4	0	119	10	0	82	2
Confl. Peds. (#/hr)							1					1
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	8%	8%	2%	2%	10%	17%	1%	0%	1%	21%	0%	9%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	1.6	65.1	65.1	7.2	70.7	70.7		13.7	13.7		13.7	13.7
Effective Green, g (s)	1.6	65.1	65.1	7.2	70.7	70.7		13.7	13.7		13.7	13.7
Actuated g/C Ratio	0.02	0.65	0.65	0.07	0.71	0.71		0.14	0.14		0.14	0.14
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	26	2176	1009	127	2320	955		190	219		218	200
v/s Ratio Prot	0.01	c0.33		c0.03	0.33							
v/s Ratio Perm			0.03			0.00		c0.09	0.01		0.05	0.00
v/c Ratio	0.50	0.50	0.05	0.40	0.46	0.00		0.63	0.05		0.38	0.01
Uniform Delay, d1	48.8	9.0	6.3	44.3	6.4	4.3		40.7	37.5		39.3	37.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	14.3	0.8	0.1	2.1	0.7	0.0		6.3	0.1		1.1	0.0
Delay (s)	63.1	9.9	6.4	46.4	7.1	4.3		47.0	37.6		40.4	37.3
Level of Service	E	A	A	D	A	A		D	D		D	D
Approach Delay (s)		10.2			8.8			43.3			40.0	
Approach LOS		B			A			D			D	

Intersection Summary		
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.51	B
Actuated Cycle Length (s)	100.0	Sum of lost time (s)
Intersection Capacity Utilization	57.5%	14.0
Analysis Period (min)	15	ICU Level of Service
		B
c Critical Lane Group		

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	1	202	181	3
Future Vol, veh/h	0	0	1	202	181	3
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	3	2	0
Mvmt Flow	0	0	1	230	206	3

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	442	210	211	0	0
Stage 1	210	-	-	-	-
Stage 2	232	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	577	835	1372	-	-
Stage 1	830	-	-	-	-
Stage 2	811	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	574	834	1370	-	-
Mov Cap-2 Maneuver	574	-	-	-	-
Stage 1	828	-	-	-	-
Stage 2	809	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1370	-	-	-	-
HCM Lane V/C Ratio	0.001	-	-	-	-
HCM Control Delay (s)	7.6	0	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	1	8	195	0	12	168
Future Vol, veh/h	1	8	195	0	12	168
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	40	2	0	14	1
Mvmt Flow	1	9	219	0	13	189

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	434	219	0	0	219	0
Stage 1	219	-	-	-	-	-
Stage 2	215	-	-	-	-	-
Critical Hdwy	6.4	6.6	-	-	4.24	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.66	-	-	2.326	-
Pot Cap-1 Maneuver	583	734	-	-	1282	-
Stage 1	822	-	-	-	-	-
Stage 2	826	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	577	734	-	-	1282	-
Mov Cap-2 Maneuver	577	-	-	-	-	-
Stage 1	813	-	-	-	-	-
Stage 2	826	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.1	0	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	712	1282
HCM Lane V/C Ratio	-	-	0.014	0.011
HCM Control Delay (s)	-	-	10.1	7.8
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0	0

Intersection						
Int Delay, s/veh	4.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		T
Traffic Vol, veh/h	108	38	25	89	114	54
Future Vol, veh/h	108	38	25	89	114	54
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	2	0	0	0	0	7
Mvmt Flow	124	44	29	102	131	62

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	322	162	193	0	0
Stage 1	162	-	-	-	-
Stage 2	160	-	-	-	-
Critical Hdwy	6.42	6.2	4.1	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.3	2.2	-	-
Pot Cap-1 Maneuver	672	888	1392	-	-
Stage 1	867	-	-	-	-
Stage 2	869	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	657	888	1392	-	-
Mov Cap-2 Maneuver	657	-	-	-	-
Stage 1	848	-	-	-	-
Stage 2	869	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.7	1.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1392	-	705	-	-
HCM Lane V/C Ratio	0.021	-	0.238	-	-
HCM Control Delay (s)	7.6	0	11.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.9	-	-




Intersection						
Int Delay, s/veh	1.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Traffic Vol, veh/h	0	111	62	16	35	2
Future Vol, veh/h	0	111	62	16	35	2
Conflicting Peds, #/hr	4	0	0	4	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	75	75	75	75	75	75
Heavy Vehicles, %	0	2	3	50	0	0
Mvmt Flow	0	148	83	21	47	3

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	108	0	-	0	246 98
Stage 1	-	-	-	-	98 -
Stage 2	-	-	-	-	148 -
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	1495	-	-	-	747 963
Stage 1	-	-	-	-	931 -
Stage 2	-	-	-	-	884 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1490	-	-	-	743 960
Mov Cap-2 Maneuver	-	-	-	-	743 -
Stage 1	-	-	-	-	928 -
Stage 2	-	-	-	-	881 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1490	-	-	-	752
HCM Lane V/C Ratio	-	-	-	-	0.066
HCM Control Delay (s)	0	-	-	-	10.1
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	26	25	22	75	102	36
Future Vol, veh/h	26	25	22	75	102	36
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	0	0	0	1	0	0
Mvmt Flow	30	29	25	86	117	41
Number of Lanes	0	1	1	0	1	0

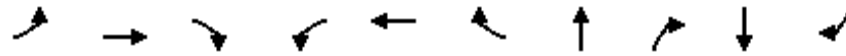
Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	7.8	7.4	8.2
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	51%	0%	74%
Vol Thru, %	49%	23%	0%
Vol Right, %	0%	77%	26%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	51	97	138
LT Vol	26	0	102
Through Vol	25	22	0
RT Vol	0	75	36
Lane Flow Rate	59	111	159
Geometry Grp	1	1	1
Degree of Util (X)	0.073	0.12	0.184
Departure Headway (Hd)	4.471	3.862	4.183
Convergence, Y/N	Yes	Yes	Yes
Cap	805	933	847
Service Time	2.475	1.864	2.262
HCM Lane V/C Ratio	0.073	0.119	0.188
HCM Control Delay	7.8	7.4	8.2
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0.4	0.7

Queues

1: SE Rusk Rd & Milwaukie Expy (Hwy 224)

11/05/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	24	2047	214	103	1371	12	113	53	137	32
v/c Ratio	0.26	0.87	0.19	0.66	0.54	0.01	0.89	0.20	0.78	0.12
Control Delay	64.5	23.3	6.1	77.3	10.3	0.0	108.5	11.5	81.5	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.5	23.3	6.1	77.3	10.3	0.0	108.5	11.5	81.5	3.9
Queue Length 50th (ft)	20	700	40	84	274	0	94	0	113	0
Queue Length 95th (ft)	49	903	78	#167	404	0	#176	33	179	10
Internal Link Dist (ft)		263			1187		389		767	
Turn Bay Length (ft)	470		110	455		100		100		75
Base Capacity (vph)	140	2354	1111	164	2539	1192	169	330	234	330
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.87	0.19	0.63	0.54	0.01	0.67	0.16	0.59	0.10

























Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: SE Rusk Rd & Milwaukie Expy (Hwy 224)

11/05/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (vph)	22	1883	197	95	1261	11	64	40	49	49	77	29
Future Volume (vph)	22	1883	197	95	1261	11	64	40	49	49	77	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	0.99		1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00		0.98	1.00
Satd. Flow (prot)	1656	3505	1615	1805	3471	1615		1820	1593		1853	1593
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.51	1.00		0.70	1.00
Satd. Flow (perm)	1656	3505	1615	1805	3471	1615		957	1593		1324	1593
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	2047	214	103	1371	12	70	43	53	53	84	32
RTOR Reduction (vph)	0	0	26	0	0	3	0	0	46	0	0	28
Lane Group Flow (vph)	24	2047	188	103	1371	9	0	113	7	0	137	4
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	9%	3%	0%	0%	4%	0%	2%	0%	0%	0%	1%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Actuated Green, G (s)	5.1	87.3	87.3	11.3	93.5	93.5		17.4	17.4		17.4	17.4
Effective Green, g (s)	5.1	87.3	87.3	11.3	93.5	93.5		17.4	17.4		17.4	17.4
Actuated g/C Ratio	0.04	0.67	0.67	0.09	0.72	0.72		0.13	0.13		0.13	0.13
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	64	2353	1084	156	2496	1161		128	213		177	213
v/s Ratio Prot	0.01	c0.58		c0.06	0.39							
v/s Ratio Perm			0.12			0.01		c0.12	0.00		0.10	0.00
v/c Ratio	0.38	0.87	0.17	0.66	0.55	0.01		0.88	0.03		0.77	0.02
Uniform Delay, d1	60.9	16.9	7.9	57.5	8.5	5.2		55.3	49.0		54.4	48.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	3.7	4.7	0.3	10.0	0.9	0.0		45.8	0.1		18.8	0.0
Delay (s)	64.6	21.6	8.3	67.5	9.3	5.2		101.1	49.0		73.2	48.9
Level of Service	E	C	A	E	A	A		F	D		E	D
Approach Delay (s)		20.8			13.3			84.5			68.6	
Approach LOS		C			B			F			E	
Intersection Summary												
HCM 2000 Control Delay			22.6				HCM 2000 Level of Service		C			
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			130.0				Sum of lost time (s)		14.0			
Intersection Capacity Utilization			82.4%				ICU Level of Service		E			
Analysis Period (min)			15									

c Critical Lane Group

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		T
Traffic Vol, veh/h	0	0	1	155	377	4
Future Vol, veh/h	0	0	1	155	377	4
Conflicting Peds, #/hr	0	4	1	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	0	2	1	0
Mvmt Flow	0	0	1	170	414	4

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	589	421	419	0	-	0
Stage 1	417	-	-	-	-	-
Stage 2	172	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	474	637	1151	-	-	-
Stage 1	669	-	-	-	-	-
Stage 2	863	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	473	634	1150	-	-	-
Mov Cap-2 Maneuver	473	-	-	-	-	-
Stage 1	668	-	-	-	-	-
Stage 2	862	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1150	-	-	-	-
HCM Lane V/C Ratio	0.001	-	-	-	-
HCM Control Delay (s)	8.1	0	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	11	143	1	18	360
Future Vol, veh/h	1	11	143	1	18	360
Conflicting Peds, #/hr	0	4	0	0	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	2	0	0	1
Mvmt Flow	1	12	157	1	20	396

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	595	163	0	0	159
Stage 1	159	-	-	-	-
Stage 2	436	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	470	887	-	-	1433
Stage 1	875	-	-	-	-
Stage 2	656	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	461	883	-	-	1432
Mov Cap-2 Maneuver	461	-	-	-	-
Stage 1	858	-	-	-	-
Stage 2	656	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	0.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	820	1432
HCM Lane V/C Ratio	-	-	0.016	0.014
HCM Control Delay (s)	-	-	9.5	7.5
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

Intersection						
Int Delay, s/veh	1.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T		T		T	
Traffic Vol, veh/h	39	22	17	107	297	64
Future Vol, veh/h	39	22	17	107	297	64
Conflicting Peds, #/hr	0	2	2	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	7	2	1	2
Mvmt Flow	44	25	19	120	334	72

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	530	374	408	0	0
Stage 1	372	-	-	-	-
Stage 2	158	-	-	-	-
Critical Hdwy	6.4	6.2	4.17	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.263	-	-
Pot Cap-1 Maneuver	513	677	1124	-	-
Stage 1	702	-	-	-	-
Stage 2	875	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	502	675	1122	-	-
Mov Cap-2 Maneuver	502	-	-	-	-
Stage 1	688	-	-	-	-
Stage 2	873	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.4	1.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1122	-	553	-	-
HCM Lane V/C Ratio	0.017	-	0.124	-	-
HCM Control Delay (s)	8.3	0	12.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-

Intersection						
Int Delay, s/veh	1.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	1	48	66	14	27	1
Future Vol, veh/h	1	48	66	14	27	1
Conflicting Peds, #/hr	5	0	0	5	1	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	74	74	74	74	74	74
Heavy Vehicles, %	0	2	2	0	0	0
Mvmt Flow	1	65	89	19	36	1

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	113	0	-	0	172
Stage 1	-	-	-	-	104
Stage 2	-	-	-	-	68
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	1489	-	-	-	823
Stage 1	-	-	-	-	925
Stage 2	-	-	-	-	960
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1483	-	-	-	816
Mov Cap-2 Maneuver	-	-	-	-	816
Stage 1	-	-	-	-	920
Stage 2	-	-	-	-	956

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	9.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1483	-	-	-	820
HCM Lane V/C Ratio	0.001	-	-	-	0.046
HCM Control Delay (s)	7.4	0	-	-	9.6
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Intersection Delay, s/veh	9.7
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	28	42	24	78	274	27
Future Vol, veh/h	28	42	24	78	274	27
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	0	2	0	5	1	4
Mvmt Flow	31	46	26	86	301	30
Number of Lanes	0	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.5	8	10.6
HCM LOS	A	A	B

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	40%	0%	91%
Vol Thru, %	60%	24%	0%
Vol Right, %	0%	76%	9%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	70	102	301
LT Vol	28	0	274
Through Vol	42	24	0
RT Vol	0	78	27
Lane Flow Rate	77	112	331
Geometry Grp	1	1	1
Degree of Util (X)	0.105	0.135	0.412
Departure Headway (Hd)	4.899	4.327	4.479
Convergence, Y/N	Yes	Yes	Yes
Cap	732	828	804
Service Time	2.929	2.355	2.505
HCM Lane V/C Ratio	0.105	0.135	0.412
HCM Control Delay	8.5	8	10.6
HCM Lane LOS	A	A	B
HCM 95th-tile Q	0.4	0.5	2