

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

# Attachment A Level-of-Service and Volume-to-Capacity Concepts

## 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.”<sup>3</sup>

### 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.

<sup>3</sup>Most 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"> <li>Nearly all drivers find freedom of operation.</li> <li>Very seldom is there more than one vehicle in queue.</li> </ul>
B	<ul style="list-style-type: none"> <li>Some drivers begin to consider the delay an inconvenience.</li> <li>Occasionally there is more than one vehicle in queue.</li> </ul>
C	<ul style="list-style-type: none"> <li>Many times, there is more than one vehicle in queue.</li> <li>Most drivers feel restricted, but not objectionably so.</li> </ul>
D	<ul style="list-style-type: none"> <li>Often there is more than one vehicle in queue.</li> <li>Drivers feel quite restricted.</li> </ul>
E	<ul style="list-style-type: none"> <li>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.</li> <li>There is almost always more than one vehicle in queue.</li> <li>Drivers find the delays approaching intolerable levels.</li> </ul>
F	<ul style="list-style-type: none"> <li>Forced flow.</li> <li>Represents an intersection failure condition that is caused by geometric and/or operational constraints external to the intersection.</li> </ul>

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 95<sup>th</sup>-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  
 CRASH SUMMARIES BY YEAR BY COLLISION TYPE

OR 224 Clackamas Highway (171) & SE Webster Rd / SE Lake Rd  
 January 1, 2012 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	1	0	1	0	1	0	0	1	1	0	1	0	0
REAR-END	0	4	1	5	0	4	1	4	1	5	0	5	0	0
SIDESWIPE - OVERTAKING	0	1	3	4	0	1	3	4	0	1	3	4	0	0
TURNING MOVEMENTS	0	1	1	2	0	1	0	2	0	2	0	2	0	0
2014 TOTAL	0	7	5	12	0	7	4	10	2	9	3	12	0	0
YEAR: 2013														
REAR-END	0	2	0	2	0	2	0	2	0	2	0	2	0	0
SIDESWIPE - OVERTAKING	0	0	2	2	0	0	0	2	0	0	2	2	0	0
TURNING MOVEMENTS	0	1	3	4	0	1	0	1	3	2	1	4	0	0
2013 TOTAL	0	3	5	8	0	3	0	5	3	4	3	8	0	0
YEAR: 2012														
ANGLE	0	1	1	2	0	2	0	2	0	2	0	2	0	0
REAR-END	0	1	0	1	0	1	0	1	0	0	1	1	0	0
TURNING MOVEMENTS	0	4	1	5	0	4	0	2	3	2	3	5	0	0
2012 TOTAL	0	6	2	8	0	7	0	5	3	4	4	8	0	0
FINAL TOTAL	0	16	12	28	0	17	4	20	8	17	10	28	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  
 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

*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  
 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

*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  
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
----------------	------------------	--------------------------	----------------------------	------------------	------------------	-------------------	--------	-------------	-------------	-----	------	-------------------	------------------------------	--------------

YEAR:

TOTAL

FINAL TOTAL

*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.*

## 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
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	PURSUIING 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
055	SPRAY	BLINDED BY WATER SPRAY
088	OTHER	OTHER ACTION

ACTION CODE TRANSLATION LIST

ACTION CODE	SHORT DESCRIPTION	LONG DESCRIPTION
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 ROAD
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 CLOTHING
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

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

## 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	TURNED FROM WRONG LANE
007	TO WRONG	TURNED INTO WRONG LANE
008	ILLEG U	U-TURNED 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)
040	THRU MED	DRIVING THROUGH SAFETY ZONE OR OVER ISLAND
041	F/ST BUS	FAILED TO STOP FOR SCHOOL BUS

ERROR CODE TRANSLATION LIST

ERROR CODE	SHORT DESCRIPTION	FULL DESCRIPTION
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/ VEHIC
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	JACKNIFE	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
058	OTH SIGN	OTHER SIGN, INCLUDING STREET SIGNS
059	HYDRANT	HYDRANT

## EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
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
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

## EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
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

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

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

**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

**PEDESTRIAN 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

**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	OFCR/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	ILLUM 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

**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



095	BUS STPSGN	BUS STOP SIGN AND RED LIGHTS
099	UNKNOWN	UNKNOWN OR NOT DEFINITE

**VEHICLE TYPE CODE TRANSLATION LIST**

<b>CODE</b>	<b>SHORT DESC</b>	<b>LONG DESCRIPTION</b>
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

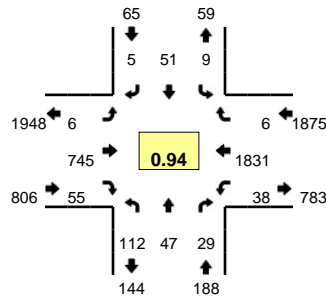
**WEATHER CONDITION CODE TRANSLATION LIST**

<b>CODE</b>	<b>SHORT DESC</b>	<b>LONG DESCRIPTION</b>
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

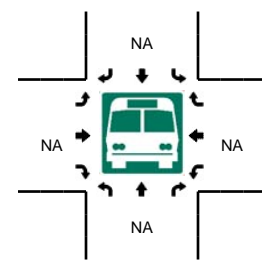
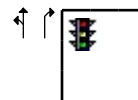
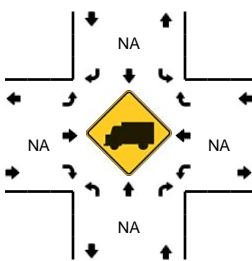
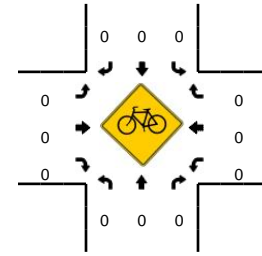
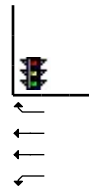
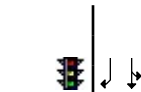
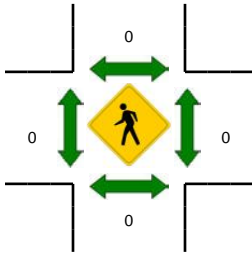
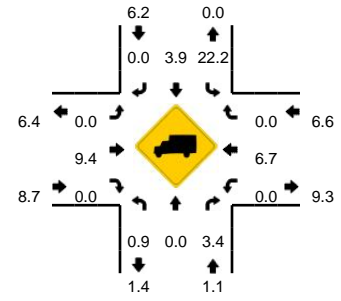
**Attachment C - Traffic Count  
Data**

**LOCATION:** SE Rusk Rd -- Milwaukie Expy  
**CITY/STATE:** Milwaukie, OR

**QC JOB #:** 13929501  
**DATE:** Wed, Nov 02 2016



**Peak-Hour: 7:35 AM -- 8:35 AM**  
**Peak 15-Min: 8:10 AM -- 8:25 AM**

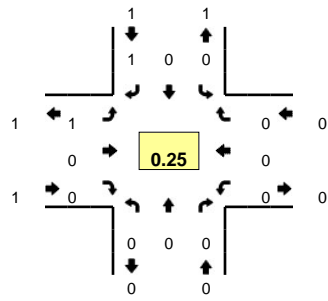


5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				Milwaukie Expy (Eastbound)				Milwaukie Expy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	6	3	1	0	3	4	1	0	0	37	0	0	0	222	0	0	277	
7:05 AM	13	1	2	0	3	0	0	0	0	31	0	0	0	140	1	0	191	
7:10 AM	6	0	1	0	0	0	0	0	0	62	0	0	1	183	1	0	254	
7:15 AM	9	0	6	0	0	0	0	0	0	63	0	0	2	172	2	0	254	
7:20 AM	5	1	3	0	0	2	0	0	0	63	2	0	1	148	1	0	226	
7:25 AM	9	2	5	0	1	3	1	0	0	69	1	0	0	152	1	0	244	
7:30 AM	7	0	2	0	1	0	0	0	0	64	3	0	1	140	1	0	219	
7:35 AM	14	6	1	0	2	1	0	0	0	56	1	0	2	166	0	0	249	
7:40 AM	12	1	1	0	1	6	1	0	0	84	1	0	3	146	1	0	257	
7:45 AM	10	3	1	0	0	1	0	0	0	58	4	0	4	147	0	0	228	
7:50 AM	6	3	5	0	1	8	0	0	0	82	2	0	2	173	2	0	284	
7:55 AM	7	5	1	0	2	3	0	0	2	46	3	0	2	144	0	0	215	2898
8:00 AM	5	2	2	0	0	2	1	0	0	57	3	0	1	164	0	0	237	2858
8:05 AM	9	2	2	0	0	4	0	0	0	54	4	0	3	141	1	0	220	2887
8:10 AM	3	2	2	0	0	1	0	0	2	84	2	0	3	168	1	0	268	2901
8:15 AM	11	9	4	0	0	10	1	0	0	46	6	0	5	140	0	0	232	2879
8:20 AM	10	4	1	0	2	7	0	0	2	72	12	0	4	164	0	0	278	2931
8:25 AM	13	8	4	0	0	5	0	0	0	41	10	0	5	131	0	0	217	2904
8:30 AM	12	2	5	0	1	3	2	0	0	65	7	0	4	147	1	0	249	2934
8:35 AM	14	5	6	0	1	5	0	0	1	51	1	0	2	115	1	0	202	2887
8:40 AM	10	2	2	0	1	4	0	0	0	79	5	0	3	143	0	0	249	2879
8:45 AM	7	8	5	0	2	2	1	0	0	48	6	0	1	119	1	0	200	2851
8:50 AM	7	3	2	0	2	4	0	0	2	74	3	0	1	138	1	0	237	2804
8:55 AM	9	5	2	0	3	3	0	0	1	52	6	0	6	126	2	0	215	2804
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	96	60	28	0	8	72	4	0	16	808	80	0	48	1888	4	0	3112	
Heavy Trucks	0	0	4		4	0	0		0	92	0		0	160	0		260	
Pedestrians		0				0				0				0			0	
Bicycles		0	0			0	0			0	0			0	0		0	
Railroad																	0	
Stopped Buses																	0	

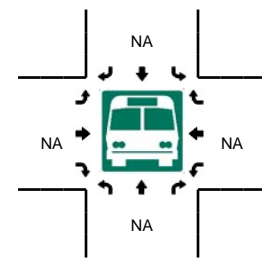
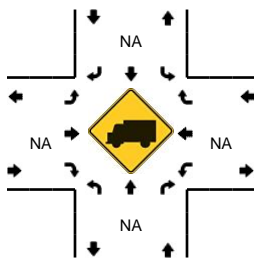
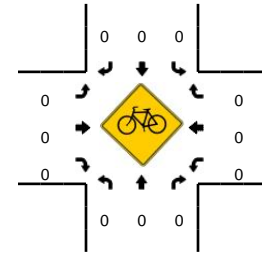
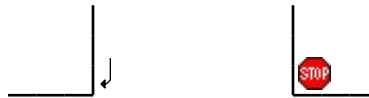
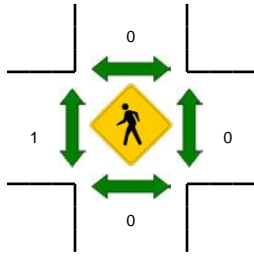
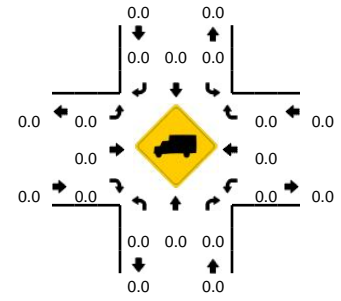
Comments:

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

**QC JOB #:** 13929511  
**DATE:** Wed, Nov 02 2016



**Peak-Hour: 7:35 AM -- 8:35 AM**  
**Peak 15-Min: 7:40 AM -- 7:55 AM**

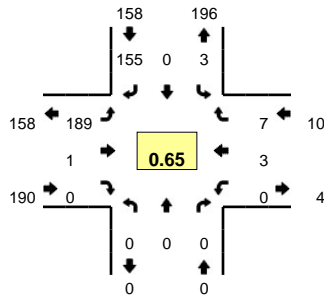


5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				Church Driveway (Eastbound)				Church Driveway (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:05 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:10 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:15 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	
7:20 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:25 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:35 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:40 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	
7:45 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	
7:50 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	
7:55 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
8:05 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
8:10 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
8:20 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
8:25 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
8:35 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
8:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
8:50 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:55 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
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	4	0	4	0	0	0	0	0	0	0	8	
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																		

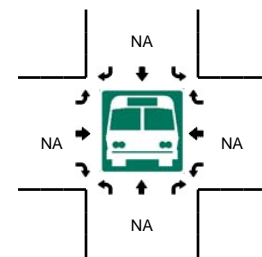
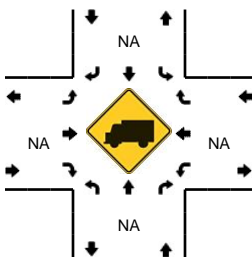
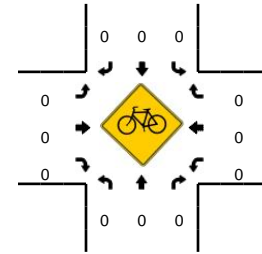
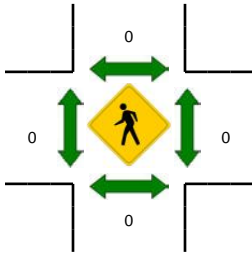
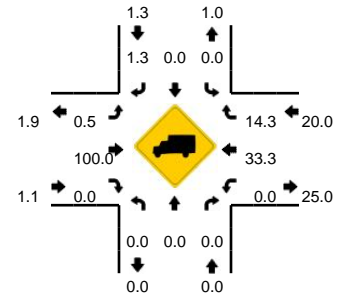
Comments:

**LOCATION:** SE Ruscliffe Ln -- SE Rusk Rd  
**CITY/STATE:** Milwaukie, OR

**QC JOB #:** 13929503  
**DATE:** Wed, Nov 02 2016



**Peak-Hour: 7:35 AM -- 8:35 AM**  
**Peak 15-Min: 8:20 AM -- 8:35 AM**

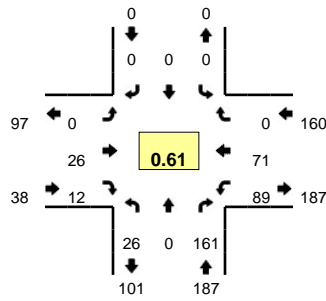


5-Min Count Period Beginning At	SE Ruscliffe Ln (Northbound)				SE Ruscliffe Ln (Southbound)				SE Rusk Rd (Eastbound)				SE Rusk Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	1	0	3	0	11	1	0	0	0	0	1	0	17	
7:05 AM	0	0	0	0	0	0	1	0	15	0	0	0	0	0	0	0	16	
7:10 AM	0	0	0	0	0	0	1	0	10	0	0	0	0	0	1	0	12	
7:15 AM	0	0	0	0	1	0	2	0	14	1	0	0	0	0	0	0	18	
7:20 AM	0	0	0	0	0	0	7	0	15	0	0	0	0	0	1	1	24	
7:25 AM	0	0	0	0	0	0	5	0	10	0	0	0	0	0	0	1	16	
7:30 AM	0	0	0	0	0	0	3	0	20	0	0	0	0	0	1	0	24	
7:35 AM	0	0	0	0	0	0	7	0	15	0	0	0	0	0	0	0	22	
7:40 AM	0	0	0	0	0	0	11	0	18	0	0	0	0	0	0	0	29	
7:45 AM	0	0	0	0	2	0	6	0	12	0	0	0	0	0	1	0	21	
7:50 AM	0	0	0	0	0	0	13	0	14	0	0	0	0	0	0	2	29	
7:55 AM	0	0	0	0	0	0	8	0	12	0	0	0	0	0	1	0	21	249
8:00 AM	0	0	0	0	0	0	6	0	10	0	0	0	0	0	0	1	17	249
8:05 AM	0	0	0	0	0	0	10	0	11	0	0	0	0	0	0	1	22	255
8:10 AM	0	0	0	0	0	0	8	0	10	0	0	0	0	0	1	1	20	263
8:15 AM	0	0	0	0	0	0	18	0	20	0	0	0	0	0	0	2	40	285
8:20 AM	0	0	0	0	0	0	28	0	21	0	0	0	0	0	0	0	49	310
8:25 AM	0	0	0	0	0	0	24	0	21	0	0	0	0	0	0	0	45	339
8:30 AM	0	0	0	0	1	0	16	0	25	1	0	0	0	0	0	0	43	358
8:35 AM	0	0	0	0	0	0	7	0	20	0	0	0	0	0	0	1	28	364
8:40 AM	0	0	0	0	0	0	14	0	18	0	0	0	0	0	0	0	32	367
8:45 AM	0	0	0	0	0	0	8	0	19	0	0	0	0	0	0	0	27	373
8:50 AM	0	0	0	0	0	0	10	0	17	0	0	0	0	0	3	2	32	376
8:55 AM	0	0	0	0	1	0	12	0	15	0	0	0	0	0	0	0	28	383
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	272	0	268	4	0	0	0	0	0	0	548	
Heavy Trucks	0	0	0	0	0	0	0	0	0	4	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																		

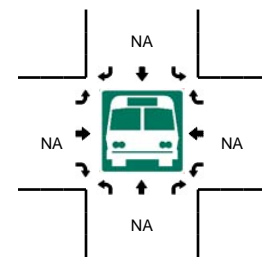
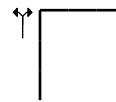
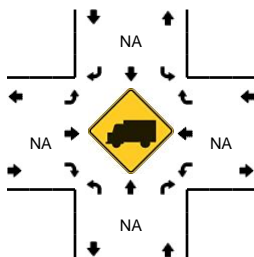
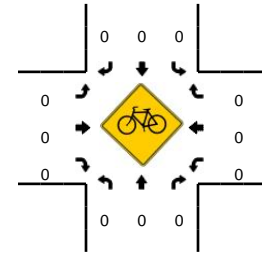
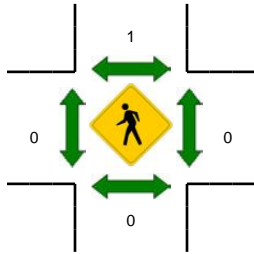
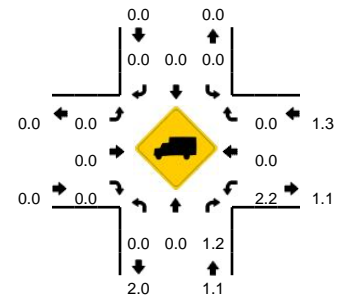
Comments:

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

**QC JOB #:** 13929505  
**DATE:** Wed, Nov 02 2016



**Peak-Hour: 7:35 AM -- 8:35 AM**  
**Peak 15-Min: 8:20 AM -- 8:35 AM**

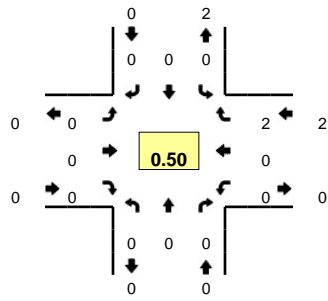


5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				SE Kellogg Creek Dr (Eastbound)				SE Kellogg Creek Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	12	0	0	0	0	0	0	0	0	0	2	1	0	0	15	
7:05 AM	0	0	15	0	0	0	0	0	0	0	1	0	0	0	0	0	16	
7:10 AM	1	0	10	0	0	0	0	0	0	0	0	0	3	0	0	0	14	
7:15 AM	1	0	15	0	0	0	0	0	0	0	0	0	1	1	0	0	18	
7:20 AM	1	0	14	0	0	0	0	0	0	0	0	0	6	2	0	0	23	
7:25 AM	2	0	10	0	0	0	0	0	0	1	0	0	3	0	0	0	16	
7:30 AM	0	0	18	0	0	0	0	0	0	2	0	0	3	3	0	0	26	
7:35 AM	1	0	15	0	0	0	0	0	0	0	0	0	6	0	0	0	22	
7:40 AM	1	0	18	0	0	0	0	0	0	0	0	0	11	1	0	0	31	
7:45 AM	2	0	11	0	0	0	0	0	0	1	0	0	4	2	0	0	20	
7:50 AM	1	0	13	0	0	0	0	0	0	1	0	0	10	3	0	0	28	
7:55 AM	0	0	12	0	0	0	0	0	0	0	1	0	7	2	0	0	22	251
8:00 AM	1	0	9	0	0	0	0	0	0	1	0	0	4	3	0	0	18	254
8:05 AM	1	0	11	0	0	0	0	0	0	0	0	0	5	3	0	0	20	258
8:10 AM	0	0	10	0	0	0	0	0	0	0	0	0	5	7	0	0	22	266
8:15 AM	6	0	17	0	0	0	0	0	0	1	1	0	6	12	0	0	43	291
8:20 AM	5	0	15	0	0	0	0	0	0	6	2	0	15	13	0	0	56	324
8:25 AM	3	0	15	0	0	0	0	0	0	6	4	0	11	14	0	0	53	361
8:30 AM	5	0	15	0	0	0	0	0	0	10	4	0	5	11	0	0	50	385
8:35 AM	0	0	11	0	0	0	0	0	0	10	3	0	3	2	0	0	29	392
8:40 AM	1	0	16	0	0	0	0	0	0	2	0	0	10	6	0	0	35	396
8:45 AM	2	0	15	0	0	0	0	0	0	3	0	0	7	2	0	0	29	405
8:50 AM	2	0	16	0	0	0	0	0	0	2	1	0	8	2	0	0	31	408
8:55 AM	0	0	13	0	0	0	0	0	0	2	1	0	7	7	0	0	30	416
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	52	0	180	0	0	0	0	0	0	88	40	0	124	152	0	0	636	
Heavy Trucks	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
Pedestrians																	0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																	0	
Stopped Buses																	0	

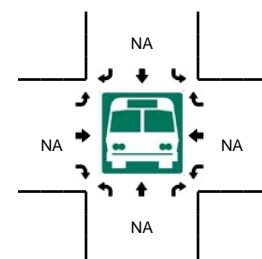
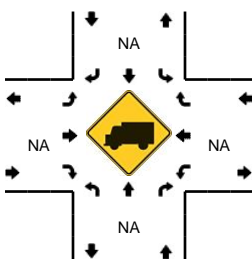
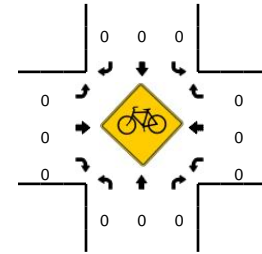
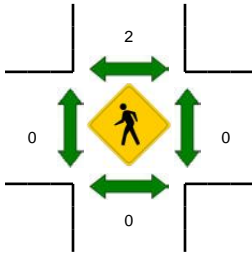
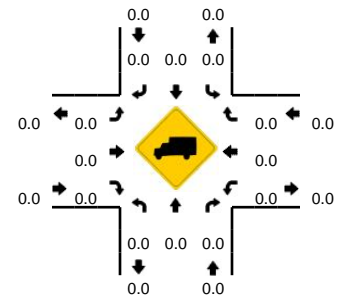
Comments:

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

**QC JOB #:** 13929509  
**DATE:** Wed, Nov 02 2016



**Peak-Hour: 7:35 AM -- 8:35 AM**  
**Peak 15-Min: 8:05 AM -- 8:20 AM**

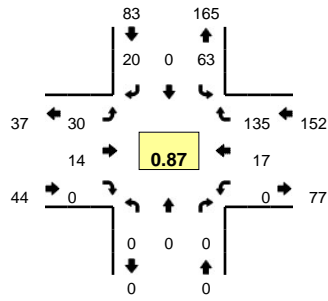


5-Min Count Period Beginning At	Church Driveway (Northbound)				Church Driveway (Southbound)				SE Kellogg Creek Dr (Eastbound)				SE Kellogg Creek Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:05 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:10 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:20 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:25 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:35 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:50 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:55 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:05 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:10 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	
8:20 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
8:25 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	
8:35 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	3	
8:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
8:50 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
8:55 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
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	0	0	0	0	0	4	0	4	
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians						4									0		4	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

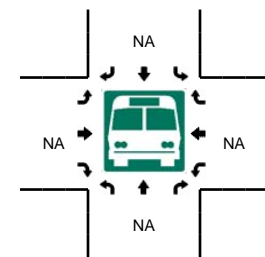
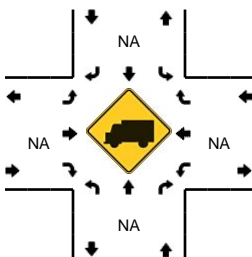
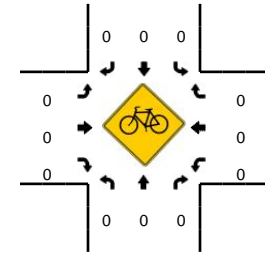
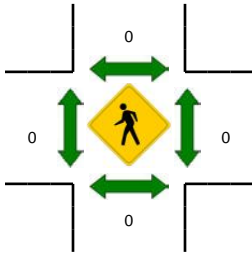
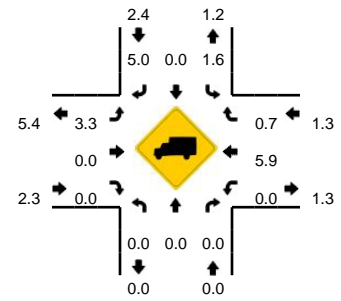
Comments:

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

**QC JOB #:** 13929507  
**DATE:** Wed, Nov 02 2016



**Peak-Hour: 7:35 AM -- 8:35 AM**  
**Peak 15-Min: 8:15 AM -- 8:30 AM**



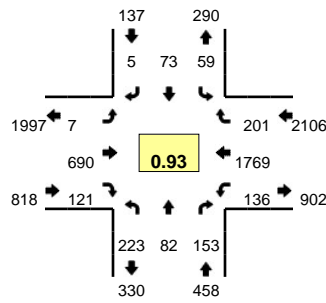
5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				SE Aldercrest Rd (Eastbound)				SE Aldercrest Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	2	7	0	10	
7:05 AM	0	0	0	0	2	0	1	0	2	1	0	0	0	2	12	0	20	
7:10 AM	0	0	0	0	2	0	1	0	2	3	0	0	0	1	8	0	17	
7:15 AM	0	0	0	0	0	0	1	0	3	1	0	0	0	1	8	0	14	
7:20 AM	0	0	0	0	4	0	0	0	5	0	0	0	0	1	8	0	18	
7:25 AM	0	0	0	0	4	0	1	0	2	2	0	0	0	2	9	0	20	
7:30 AM	0	0	0	0	4	0	1	0	2	0	0	0	0	3	12	0	22	
7:35 AM	0	0	0	0	6	0	0	0	4	0	0	0	0	0	14	0	24	
7:40 AM	0	0	0	0	6	0	2	0	1	2	0	0	0	1	15	0	27	
7:45 AM	0	0	0	0	2	0	0	0	1	0	0	0	0	3	11	0	17	
7:50 AM	0	0	0	0	6	0	2	0	0	1	0	0	0	2	11	0	22	
7:55 AM	0	0	0	0	7	0	3	0	1	3	0	0	0	1	8	0	23	
8:00 AM	0	0	0	0	4	0	0	0	1	0	0	0	0	1	8	0	14	234
8:05 AM	0	0	0	0	6	0	1	0	4	6	0	0	0	2	8	0	27	245
8:10 AM	0	0	0	0	3	0	2	0	4	0	0	0	0	3	9	0	21	249
8:15 AM	0	0	0	0	3	0	2	0	4	1	0	0	0	2	18	0	30	265
8:20 AM	0	0	0	0	8	0	1	0	3	0	0	0	0	1	12	0	25	272
8:25 AM	0	0	0	0	4	0	4	0	4	1	0	0	0	0	12	0	25	277
8:30 AM	0	0	0	0	8	0	3	0	3	0	0	0	0	1	9	0	24	279
8:35 AM	0	0	0	0	3	0	1	0	0	2	0	0	0	0	7	0	13	268
8:40 AM	0	0	0	0	8	0	3	0	3	1	0	0	0	2	11	0	28	269
8:45 AM	0	0	0	0	5	0	3	0	7	1	0	0	0	3	10	0	29	281
8:50 AM	0	0	0	0	4	0	3	0	4	2	0	0	0	1	9	0	23	282
8:55 AM	0	0	0	0	2	0	6	0	5	2	0	0	0	3	7	0	25	284
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	60	0	28	0	44	8	0	0	0	12	168	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:

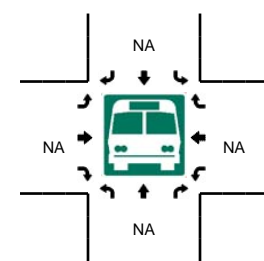
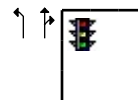
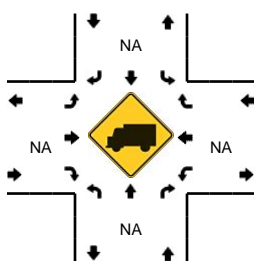
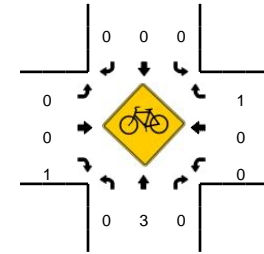
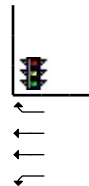
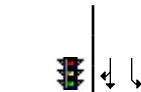
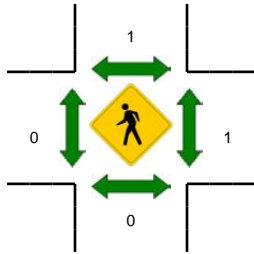
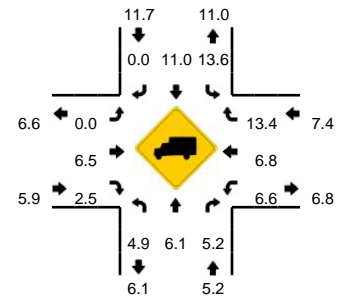


**LOCATION:** SE Lake Rd/SE Webster Rd -- Milwaukie Expy  
**CITY/STATE:** Portland, OR

**QC JOB #:** 13929519  
**DATE:** Thu, Nov 17 2016



**Peak-Hour: 7:35 AM -- 8:35 AM**  
**Peak 15-Min: 7:50 AM -- 8:05 AM**

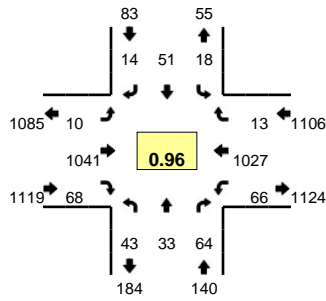


5-Min Count Period Beginning At	SE Lake Rd/SE Webster Rd (Northbound)				SE Lake Rd/SE Webster Rd (Southbound)				Milwaukie Expy (Eastbound)				Milwaukie Expy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	24	4	6	0	4	0	0	0	0	47	5	0	13	182	17	0	302	
7:05 AM	37	14	7	0	5	0	0	0	0	52	6	0	9	136	9	0	275	
7:10 AM	21	6	8	0	1	1	0	0	2	42	3	0	10	165	10	0	269	
7:15 AM	24	11	9	0	4	8	0	0	0	49	6	0	8	155	13	0	287	
7:20 AM	19	8	8	0	1	6	0	0	0	37	5	0	8	126	12	0	230	
7:25 AM	29	10	17	0	5	5	0	0	0	67	7	0	9	136	12	0	297	
7:30 AM	19	6	6	0	3	7	0	0	0	63	8	0	6	157	9	0	284	
7:35 AM	17	9	18	0	9	7	0	0	0	41	18	0	15	122	8	0	264	
7:40 AM	17	3	15	0	8	5	0	0	0	55	7	0	6	171	19	0	306	
7:45 AM	25	10	17	0	4	6	0	0	1	67	9	0	12	117	19	0	287	
7:50 AM	14	6	14	0	4	6	1	0	1	90	8	0	5	175	22	0	346	
7:55 AM	19	9	15	0	2	6	0	0	1	63	10	0	9	152	14	0	300	3447
8:00 AM	14	7	12	0	1	6	1	0	1	54	9	0	10	165	22	0	302	3447
8:05 AM	19	8	11	0	2	6	0	0	0	43	10	0	5	144	17	0	265	3437
8:10 AM	17	3	7	0	5	4	0	0	1	62	10	0	12	166	20	0	307	3475
8:15 AM	26	10	18	0	6	11	0	0	0	37	11	0	13	121	13	0	266	3454
8:20 AM	18	6	6	0	5	6	2	0	2	71	8	0	16	149	15	0	304	3528
8:25 AM	29	6	11	0	5	7	0	0	0	47	12	0	16	140	14	0	287	3518
8:30 AM	8	5	9	0	8	3	1	0	0	60	9	0	17	147	18	0	285	3519
8:35 AM	18	4	13	0	7	6	0	0	0	57	12	0	21	116	7	0	261	3516
8:40 AM	17	6	11	0	4	2	0	0	1	63	12	0	22	152	14	0	304	3514
8:45 AM	23	9	13	0	6	6	1	0	0	54	4	0	24	105	15	0	260	3487
8:50 AM	17	3	4	0	4	4	0	0	1	62	12	0	22	152	23	0	304	3445
8:55 AM	18	4	10	0	10	8	0	0	2	52	4	0	24	97	9	0	238	3383
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	188	88	164	0	28	72	8	0	12	828	108	0	96	1968	232	0	3792	
Heavy Trucks	16	16	8		8	12	0		0	60	0		0	124	32		276	
Pedestrians		0				0				0				4			4	
Bicycles		0	0			0	0			0	0			0	0		0	
Railroad																		
Stopped Buses																		

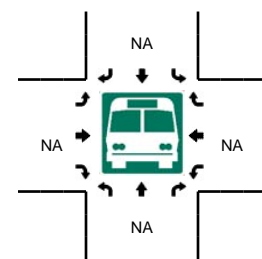
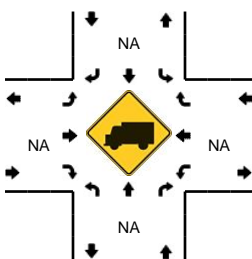
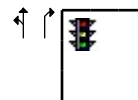
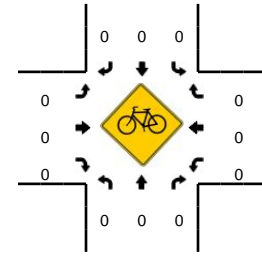
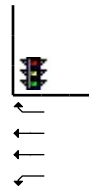
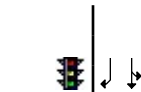
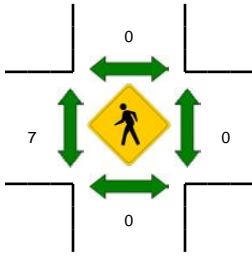
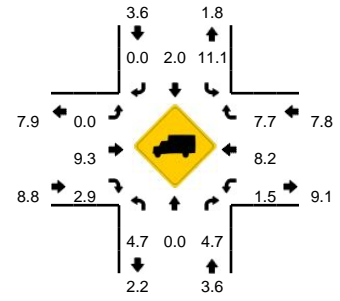
Comments:

**LOCATION:** SE Rusk Rd -- Milwaukie Expy  
**CITY/STATE:** Milwaukie, OR

**QC JOB #:** 13929513  
**DATE:** Wed, Nov 02 2016



**Peak-Hour: 11:55 AM -- 12:55 PM**  
**Peak 15-Min: 12:40 PM -- 12:55 PM**

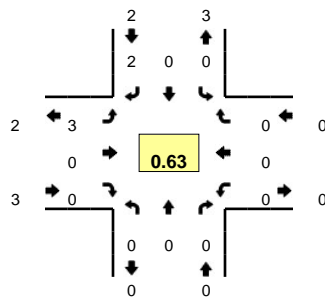


5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				Milwaukie Expy (Eastbound)				Milwaukie Expy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:00 AM	7	3	4	0	0	5	0	0	1	55	2	0	4	100	0	0	181	
11:05 AM	2	1	3	0	2	4	0	0	0	69	3	0	3	79	5	0	171	
11:10 AM	6	5	7	0	1	4	1	0	0	73	4	0	3	69	0	0	173	
11:15 AM	5	4	8	0	1	1	0	0	0	93	3	0	5	99	2	0	221	
11:20 AM	1	7	5	0	1	2	0	0	0	84	0	1	2	81	0	0	184	
11:25 AM	11	5	7	0	3	1	0	0	0	78	2	0	5	95	0	0	207	
11:30 AM	2	1	2	0	3	4	0	0	0	75	7	0	3	93	0	0	190	
11:35 AM	5	1	7	0	0	1	0	0	0	88	5	0	2	95	0	0	204	
11:40 AM	10	5	6	0	0	4	1	0	1	72	3	0	1	102	0	0	205	
11:45 AM	9	2	0	0	3	4	0	0	2	82	1	1	3	91	1	0	199	
11:50 AM	4	1	7	0	1	2	2	0	0	77	6	0	5	88	2	0	195	
11:55 AM	3	5	5	0	2	6	2	0	0	98	10	0	4	78	1	0	214	2344
12:00 PM	6	1	5	0	2	4	2	0	0	69	4	0	5	70	0	0	168	2331
12:05 PM	3	1	10	0	2	1	1	0	0	95	8	1	5	98	0	0	225	2385
12:10 PM	5	2	2	0	1	6	1	0	0	82	3	0	7	88	0	0	197	2409
12:15 PM	5	1	2	0	2	6	2	0	2	103	1	0	8	78	3	0	213	2401
12:20 PM	2	1	6	0	0	2	0	0	1	93	6	0	7	85	1	0	204	2421
12:25 PM	1	2	5	0	1	4	2	0	2	82	11	0	7	74	2	0	193	2407
12:30 PM	4	3	6	0	2	5	0	0	0	81	3	0	3	91	3	0	201	2418
12:35 PM	1	5	7	0	0	7	1	0	1	89	6	0	7	69	0	1	194	2408
12:40 PM	3	6	9	0	3	4	0	0	2	97	8	0	3	97	1	0	233	2436
12:45 PM	7	2	5	0	0	3	2	0	1	84	3	0	7	85	1	0	200	2437
12:50 PM	3	4	2	0	3	3	1	0	0	68	5	0	2	114	1	0	206	2448
12:55 PM	5	2	12	0	1	4	0	0	0	93	5	0	6	78	0	0	206	2440
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	52	48	64	0	24	40	12	0	12	996	64	0	48	1184	12	0	2556	
Heavy Trucks	0	0	4		0	0	0		0	108	8		0	108	0		228	
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																	0	
Stopped Buses																	0	

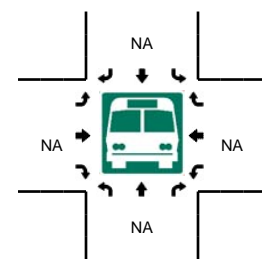
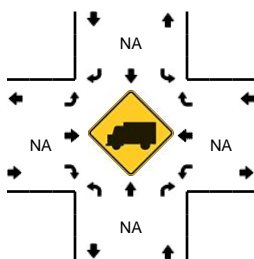
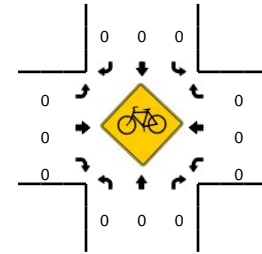
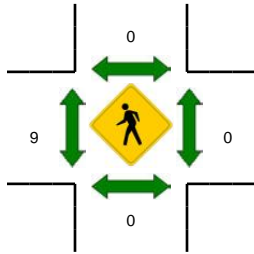
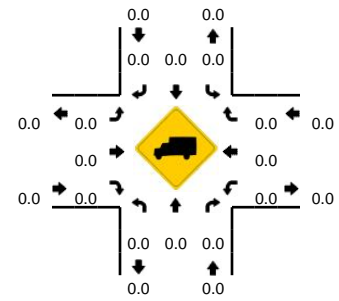
Comments:

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

**QC JOB #:** 13929518  
**DATE:** Wed, Nov 02 2016



**Peak-Hour: 11:55 AM -- 12:55 PM**  
**Peak 15-Min: 11:55 AM -- 12:10 PM**

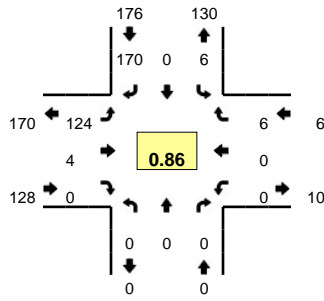


5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				Church Driveway (Eastbound)				Church Driveway (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:05 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:10 AM	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
11:15 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	
11:20 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	
11:25 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:35 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	
11:50 AM	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2	
11:55 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	
12:05 PM	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	9	
12:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	
12:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	
12:25 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	6	
12:30 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	7	
12:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	
12:40 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	8	
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	
12:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	
12:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	
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	4	0	4	0	0	0	0	0	0	0	8	
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	4	0	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																		

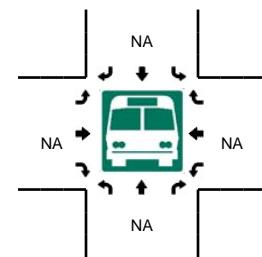
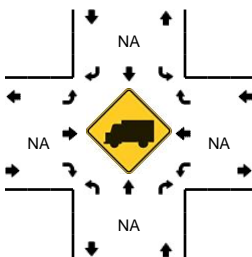
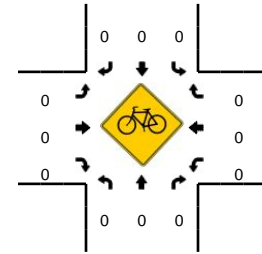
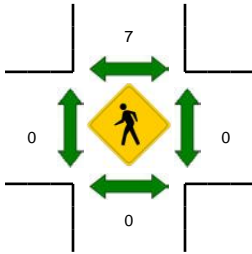
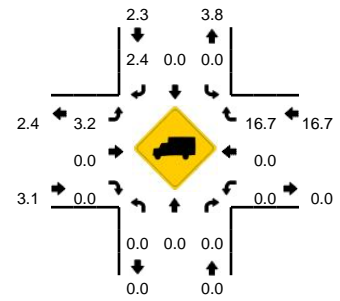
Comments:

**LOCATION:** SE Ruscliffe Ln -- SE Rusk Rd  
**CITY/STATE:** Milwaukie, OR

**QC JOB #:** 13929514  
**DATE:** Wed, Nov 02 2016



**Peak-Hour: 11:55 AM -- 12:55 PM**  
**Peak 15-Min: 12:35 PM -- 12:50 PM**

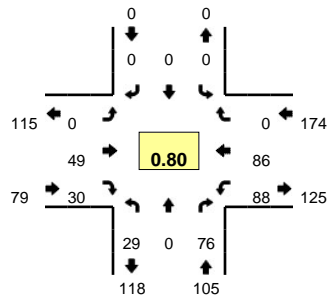


5-Min Count Period Beginning At	SE Ruscliffe Ln (Northbound)				SE Ruscliffe Ln (Southbound)				SE Rusk Rd (Eastbound)				SE Rusk Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:00 AM	0	0	0	0	0	0	10	0	14	0	0	0	0	0	0	0	24	
11:05 AM	0	0	0	0	0	0	7	0	18	0	0	0	0	0	0	0	25	
11:10 AM	0	0	0	0	0	0	12	0	9	0	0	0	0	0	0	0	21	
11:15 AM	0	0	0	0	0	0	12	0	13	0	0	0	0	0	0	0	25	
11:20 AM	0	0	0	0	0	0	5	0	14	0	0	0	0	0	0	0	19	
11:25 AM	0	0	0	0	2	0	6	0	20	0	0	0	0	0	2	0	30	
11:30 AM	0	0	0	0	0	0	15	0	5	0	0	0	0	0	0	0	20	
11:35 AM	0	0	0	0	0	0	8	0	16	0	0	0	0	0	0	0	24	
11:40 AM	0	0	0	0	2	0	6	0	18	0	0	0	0	0	2	0	28	
11:45 AM	0	0	0	0	0	0	7	0	10	0	0	0	0	0	0	0	17	
11:50 AM	0	0	0	0	0	0	13	0	10	0	0	0	0	0	2	0	25	
11:55 AM	0	0	0	0	0	0	18	0	12	0	0	0	0	0	0	0	30	288
12:00 PM	0	0	0	0	1	0	9	0	12	0	0	0	0	0	1	0	23	287
12:05 PM	0	0	0	0	0	0	11	0	10	0	0	0	0	0	0	0	21	283
12:10 PM	0	0	0	0	0	0	12	0	9	1	0	0	0	0	0	0	22	284
12:15 PM	0	0	0	0	1	0	18	0	7	1	0	0	0	0	0	0	27	286
12:20 PM	0	0	0	0	0	0	16	0	9	0	0	0	0	0	0	0	25	292
12:25 PM	0	0	0	0	2	0	20	0	7	0	0	0	0	0	2	0	31	293
12:30 PM	0	0	0	0	1	0	11	0	11	0	0	0	0	0	0	0	23	296
12:35 PM	0	0	0	0	0	0	16	0	11	1	0	0	0	0	2	0	30	302
12:40 PM	0	0	0	0	0	0	18	0	15	0	0	0	0	0	1	0	34	308
12:45 PM	0	0	0	0	0	0	12	0	14	0	0	0	0	0	0	0	26	317
12:50 PM	0	0	0	0	1	0	9	0	7	1	0	0	0	0	0	0	18	310
12:55 PM	0	0	0	0	0	0	14	0	16	1	0	0	0	0	1	0	32	312
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	184	0	160	4	0	0	0	0	0	12	0	360
Heavy Trucks	0	0	0	0	0	0	8	0	4	0	0	0	0	0	0	0	0	12
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																		

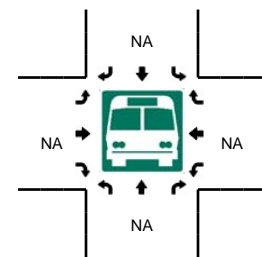
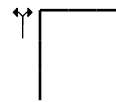
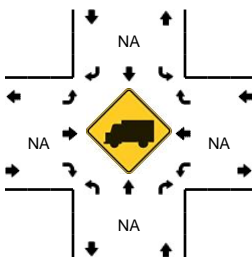
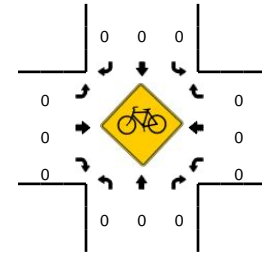
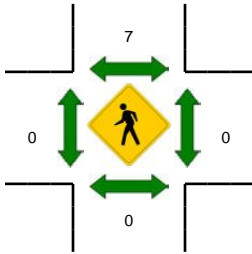
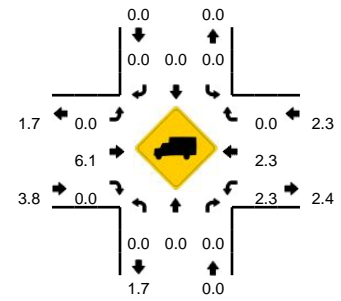
Comments:

**LOCATION:** SE Rusk Rd -- SE Kellog Creek Dr  
**CITY/STATE:** Milwaukie, OR

**QC JOB #:** 13929515  
**DATE:** Wed, Nov 02 2016



**Peak-Hour: 11:55 AM -- 12:55 PM**  
**Peak 15-Min: 12:30 PM -- 12:45 PM**

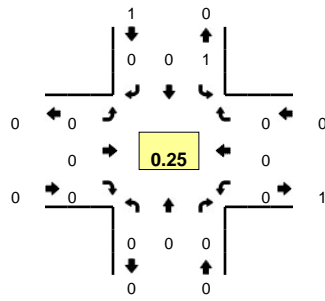


5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				SE Kellog Creek Dr (Eastbound)				SE Kellog Creek Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:00 AM	2	0	1	0	0	0	0	0	0	13	2	0	7	4	0	0	29	
11:05 AM	0	0	5	0	0	0	0	0	0	13	2	0	2	4	0	0	26	
11:10 AM	0	0	8	0	0	0	0	0	0	3	2	0	8	4	0	0	25	
11:15 AM	3	0	5	0	0	0	0	0	0	7	3	0	7	5	0	0	30	
11:20 AM	0	0	9	0	0	0	0	0	0	6	3	0	3	4	0	0	25	
11:25 AM	1	0	8	0	0	0	0	0	0	11	4	0	5	1	0	0	30	
11:30 AM	1	0	4	0	0	0	0	0	0	2	1	0	9	6	0	0	23	
11:35 AM	0	0	12	0	0	0	0	0	0	4	4	0	7	1	0	0	28	
11:40 AM	0	0	11	0	0	0	0	0	0	8	1	0	4	2	0	0	26	
11:45 AM	4	0	8	0	0	0	0	0	0	1	1	0	4	2	0	0	20	
11:50 AM	1	0	7	0	0	0	0	0	0	4	0	0	8	4	0	0	24	
11:55 AM	2	0	3	0	0	0	0	0	0	7	2	0	10	9	0	0	33	319
12:00 PM	2	0	8	0	0	0	0	0	0	3	3	0	6	5	0	0	27	317
12:05 PM	1	0	8	0	0	0	0	0	0	2	7	0	9	3	0	0	30	321
12:10 PM	1	0	7	0	0	0	0	0	0	3	1	0	6	6	0	0	24	320
12:15 PM	3	0	8	0	0	0	0	0	0	2	2	0	8	10	0	0	33	323
12:20 PM	1	0	3	0	0	0	0	0	0	4	2	0	3	10	0	0	23	321
12:25 PM	3	0	4	0	0	0	0	0	0	3	2	0	8	10	0	0	30	321
12:30 PM	3	0	4	0	0	0	0	0	0	6	8	0	8	8	0	0	37	335
12:35 PM	5	0	10	0	0	0	0	0	0	3	1	0	8	7	0	0	34	341
12:40 PM	6	0	12	0	0	0	0	0	0	4	0	0	10	9	0	0	41	356
12:45 PM	1	0	4	0	0	0	0	0	0	9	2	0	3	8	0	0	27	363
12:50 PM	1	0	5	0	0	0	0	0	0	3	0	0	9	1	0	0	19	358
12:55 PM	2	0	11	0	0	0	0	0	0	5	0	0	7	3	0	0	28	353
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	56	0	104	0	0	0	0	0	0	52	36	0	104	96	0	0	448	
Heavy Trucks	0	0	0	0	0	0	0	0	0	4	0	0	0	4	0	0	8	
Pedestrians					12					0				0			12	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

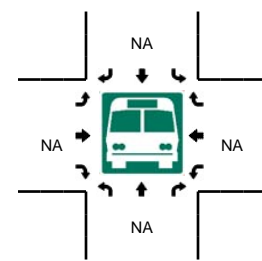
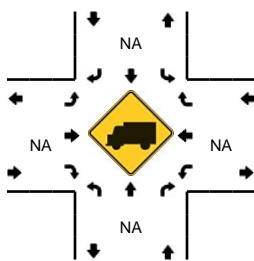
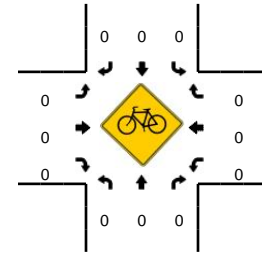
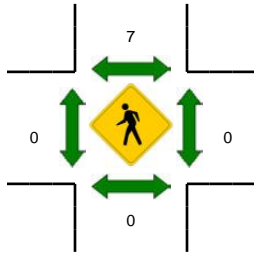
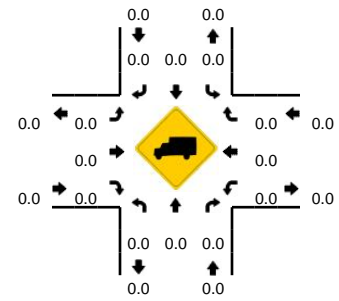
Comments:

**LOCATION:** Church Driveway -- SE Kellog Creek Dr  
**CITY/STATE:** Milwaukie, OR

**QC JOB #:** 13929517  
**DATE:** Wed, Nov 02 2016



**Peak-Hour: 11:55 AM -- 12:55 PM**  
**Peak 15-Min: 11:55 AM -- 12:10 PM**

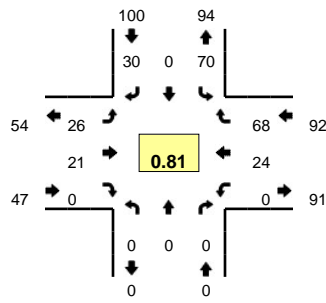


5-Min Count Period Beginning At	Church Driveway (Northbound)				Church Driveway (Southbound)				SE Kellog Creek Dr (Eastbound)				SE Kellog Creek Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	
11:05 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
11:10 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
11:20 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:25 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:35 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
11:50 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
11:55 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	6
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
12:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
12:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
12:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
12:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
12:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
12:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
12:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	0	0	0	0	0	0	0	0	0	0	4	
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																		

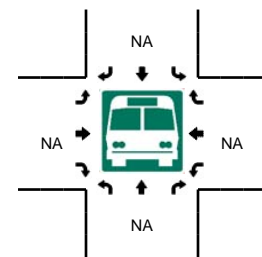
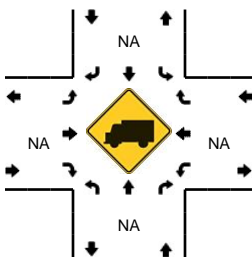
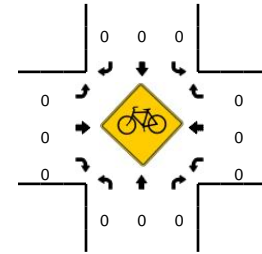
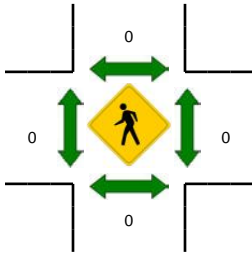
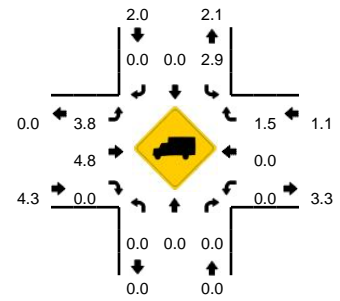
Comments:

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

**QC JOB #:** 13929516  
**DATE:** Wed, Nov 02 2016



**Peak-Hour: 11:55 AM -- 12:55 PM**  
**Peak 15-Min: 12:05 PM -- 12:20 PM**



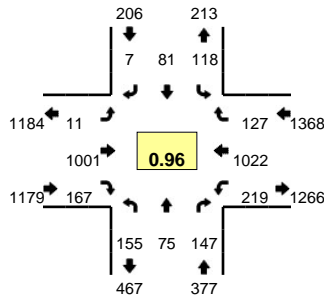
5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				SE Aldercrest Rd (Eastbound)				SE Aldercrest Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:00 AM	0	0	0	0	8	0	2	0	0	0	0	0	0	3	0	0	13	
11:05 AM	0	0	0	0	3	0	1	0	0	1	0	0	0	1	9	0	15	
11:10 AM	0	0	0	0	6	0	0	0	1	1	0	0	0	2	4	0	14	
11:15 AM	0	0	0	0	4	0	5	0	1	2	0	0	0	0	9	0	21	
11:20 AM	0	0	0	0	3	0	2	0	1	0	0	0	0	3	7	0	16	
11:25 AM	0	0	0	0	6	0	1	0	4	0	0	0	0	4	3	0	18	
11:30 AM	0	0	0	0	8	0	3	0	1	4	0	0	0	2	5	0	23	
11:35 AM	0	0	0	0	6	0	3	0	2	2	0	0	0	1	9	0	23	
11:40 AM	0	0	0	0	5	0	1	0	1	1	0	0	0	1	6	0	15	
11:45 AM	0	0	0	0	4	0	2	0	2	1	0	0	0	1	11	0	21	
11:50 AM	0	0	0	0	2	0	3	0	1	1	0	0	0	2	4	0	13	
11:55 AM	0	0	0	0	8	0	0	0	0	1	0	0	0	2	6	0	17	209
12:00 PM	0	0	0	0	2	0	3	0	4	1	0	0	0	2	4	0	16	212
12:05 PM	0	0	0	0	10	0	6	0	3	5	0	0	0	2	4	0	30	227
12:10 PM	0	0	0	0	4	0	2	0	1	0	0	0	0	6	6	0	19	232
12:15 PM	0	0	0	0	5	0	3	0	3	2	0	0	0	3	9	0	25	236
12:20 PM	0	0	0	0	6	0	0	0	2	0	0	0	0	3	1	0	12	232
12:25 PM	0	0	0	0	9	0	1	0	3	3	0	0	0	2	4	0	22	236
12:30 PM	0	0	0	0	7	0	4	0	3	0	0	0	0	0	6	0	20	233
12:35 PM	0	0	0	0	4	0	3	0	1	3	0	0	0	0	8	0	19	229
12:40 PM	0	0	0	0	6	0	4	0	2	2	0	0	0	1	13	0	28	242
12:45 PM	0	0	0	0	6	0	0	0	1	2	0	0	0	1	2	0	12	233
12:50 PM	0	0	0	0	3	0	4	0	3	2	0	0	0	2	5	0	19	239
12:55 PM	0	0	0	0	1	0	8	0	6	1	0	0	0	2	4	0	22	244
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	76	0	44	0	28	28	0	0	0	44	76	0	296	
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	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	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:

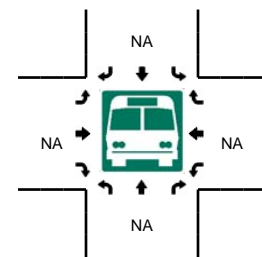
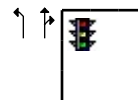
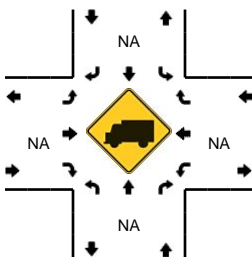
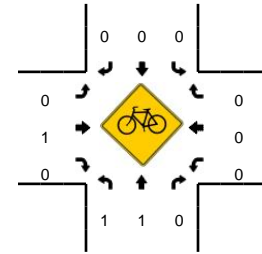
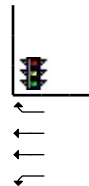
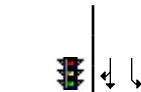
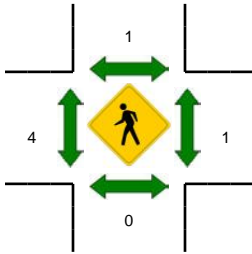
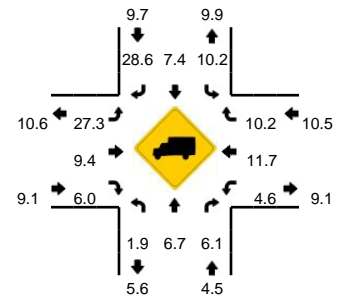


**LOCATION:** SE Lake Rd/SE Webster Rd -- Milwaukie Expy  
**CITY/STATE:** Portland, OR

**QC JOB #:** 13929520  
**DATE:** Thu, Nov 17 2016



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



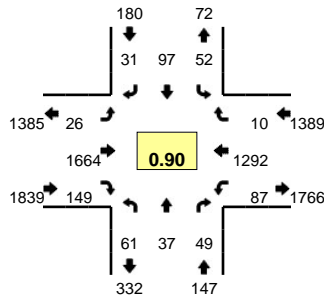
5-Min Count Period Beginning At	SE Lake Rd/SE Webster Rd (Northbound)				SE Lake Rd/SE Webster Rd (Southbound)				Milwaukie Expy (Eastbound)				Milwaukie Expy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:00 AM	11	3	12	0	8	7	0	0	0	53	9	0	16	63	8	0	190	
11:05 AM	19	5	18	0	8	7	1	0	0	82	13	0	22	74	4	0	253	
11:10 AM	12	6	12	0	10	8	0	0	0	70	10	0	10	78	6	0	222	
11:15 AM	8	4	12	0	14	6	1	0	1	88	15	0	12	68	5	0	234	
11:20 AM	12	8	13	0	6	4	2	0	1	85	15	0	12	96	6	0	260	
11:25 AM	9	6	15	0	13	10	2	0	3	71	14	0	19	73	7	0	242	
11:30 AM	11	2	10	0	3	7	2	0	0	53	13	0	18	91	22	0	232	
11:35 AM	14	7	19	0	9	8	0	0	0	70	17	0	16	66	2	0	228	
11:40 AM	20	7	14	0	11	10	0	0	1	76	7	0	12	67	9	0	234	
11:45 AM	17	2	19	0	11	12	0	0	2	81	11	0	18	90	3	0	266	
11:50 AM	14	1	19	0	12	11	0	0	0	87	17	0	8	60	5	0	234	
11:55 AM	14	7	9	0	7	7	1	0	0	75	11	0	15	108	5	0	259	2854
12:00 PM	19	7	11	0	6	2	0	0	1	75	14	0	15	87	6	0	243	2907
12:05 PM	14	9	13	0	15	6	1	0	4	86	16	0	16	68	7	0	255	2909
12:10 PM	9	5	17	0	12	9	0	0	2	82	12	0	14	65	3	0	230	2917
12:15 PM	17	5	12	0	5	7	0	0	1	93	25	0	21	86	9	0	281	2964
12:20 PM	11	7	12	0	14	7	1	0	0	86	15	0	12	81	21	0	267	2971
12:25 PM	9	6	8	0	9	7	0	0	0	97	16	0	23	83	10	0	268	2997
12:30 PM	10	5	20	0	9	8	1	0	2	69	8	0	21	86	13	0	252	3017
12:35 PM	18	8	10	0	13	9	1	0	1	104	2	0	14	88	10	0	278	3067
12:40 PM	7	7	10	0	8	5	1	0	0	82	16	0	21	93	15	0	265	3098
12:45 PM	14	5	16	0	10	6	0	0	0	81	17	0	19	84	15	0	267	3099
12:50 PM	13	4	9	0	10	8	1	0	0	71	15	0	28	93	13	0	265	3130
12:55 PM	14	4	13	0	8	11	0	0	3	59	10	0	20	92	7	0	241	3112
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	148	72	128	0	112	84	4	0	4	1104	224	0	224	1000	160	0	3264	
Heavy Trucks	4	8	8		24	4	0		0	120	8		12	124	24		336	
Pedestrians		0				0				4				0			4	
Bicycles	1	0	0		0	0	0		0	0	0		0	0	0		1	
Railroad																		
Stopped Buses																		

Comments:

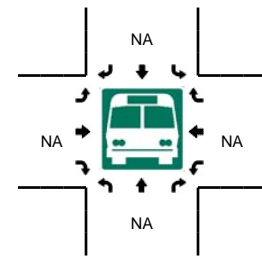
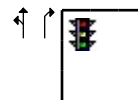
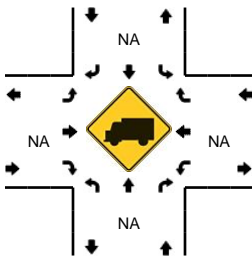
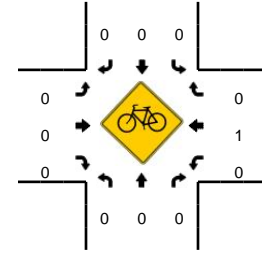
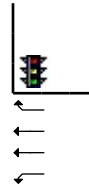
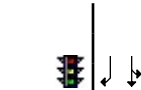
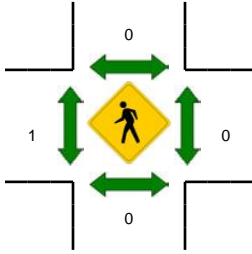
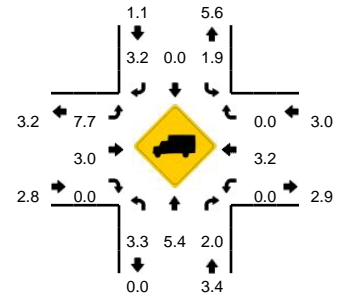


**LOCATION:** SE Rusk Rd -- Milwaukie Expy  
**CITY/STATE:** Milwaukie, OR

**QC JOB #:** 13929502  
**DATE:** Wed, Nov 02 2016



**Peak-Hour: 4:25 PM -- 5:25 PM**  
**Peak 15-Min: 5:05 PM -- 5:20 PM**

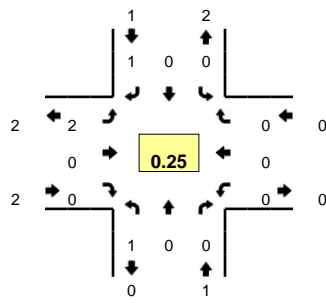


5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				Milwaukie Expy (Eastbound)				Milwaukie Expy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	7	3	3	0	4	3	3	0	3	118	3	0	0	82	1	0	230	
4:05 PM	10	3	3	0	8	6	4	0	2	136	14	0	3	92	0	0	281	
4:10 PM	7	2	2	0	7	16	1	0	2	141	11	0	11	79	1	0	280	
4:15 PM	3	3	2	0	1	3	2	0	1	149	11	0	4	117	1	0	297	
4:20 PM	9	4	3	0	0	6	3	0	0	114	14	0	7	98	1	0	259	
4:25 PM	4	4	0	0	5	10	2	0	0	162	14	0	9	122	1	0	333	
4:30 PM	2	5	10	0	4	8	3	0	9	111	14	0	5	72	1	0	244	
4:35 PM	2	3	2	0	4	7	1	0	2	142	16	1	7	127	0	0	314	
4:40 PM	7	3	0	0	2	10	2	0	2	116	11	0	9	96	2	0	260	
4:45 PM	2	2	3	0	1	4	0	0	2	154	16	0	6	117	0	0	307	
4:50 PM	4	3	5	0	2	9	0	0	2	128	13	0	3	99	2	0	270	
4:55 PM	3	1	2	0	3	5	1	0	1	150	11	0	9	100	1	0	287	3362
5:00 PM	9	5	6	0	4	6	4	0	2	120	2	0	3	89	0	0	250	3382
5:05 PM	6	6	4	0	9	7	6	0	0	166	9	0	9	132	0	0	354	3455
5:10 PM	5	0	6	0	9	9	7	0	4	133	13	0	8	110	1	1	306	3481
5:15 PM	8	2	3	0	4	11	1	0	0	143	14	0	8	131	0	0	325	3509
5:20 PM	9	3	8	0	5	11	4	0	1	139	16	0	10	97	2	0	305	3555
5:25 PM	4	2	4	0	4	4	1	0	0	160	16	0	5	105	1	0	306	3528
5:30 PM	4	6	2	0	2	4	4	0	4	137	12	0	10	98	1	0	284	3568
5:35 PM	4	1	2	0	3	2	1	0	4	125	7	0	4	87	0	0	240	3494
5:40 PM	5	0	8	0	3	4	2	0	2	126	5	0	3	111	2	0	271	3505
5:45 PM	2	2	4	0	0	2	1	0	0	140	16	0	5	113	2	0	287	3485
5:50 PM	1	1	3	0	5	7	1	0	2	130	10	0	8	64	0	0	232	3447
5:55 PM	3	2	2	0	1	5	0	0	1	136	9	0	1	93	2	0	255	3415
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	32	52	0	88	108	56	0	16	1768	144	0	100	1492	4	4	3940	
Heavy Trucks	0	8	0		4	0	0		4	56	0		0	36	0		108	
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

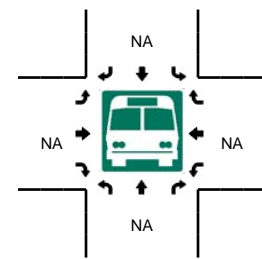
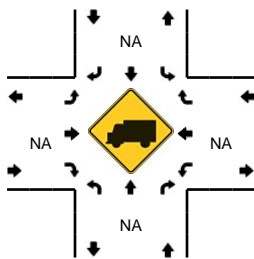
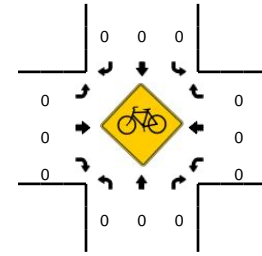
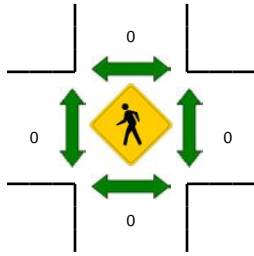
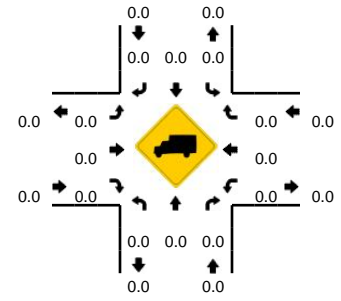
Comments:

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

**QC JOB #:** 13929512  
**DATE:** Wed, Nov 02 2016



**Peak-Hour: 4:25 PM -- 5:25 PM**  
**Peak 15-Min: 4:25 PM -- 4:40 PM**

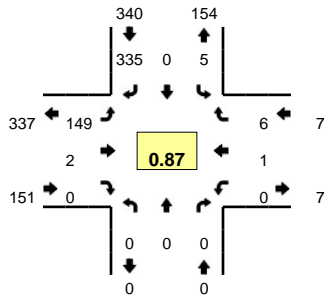


5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				Church Driveway (Eastbound)				Church Driveway (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:20 PM	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2	
4:25 PM	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2	
4:30 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
4:35 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	
4:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	
5:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	
5:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	
5:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
5:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
5:30 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	2	
5:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
5:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
5:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
5:55 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	2	
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	0	0	0	0	0	4	0	8	0	0	0	0	0	0	0	16	
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																		

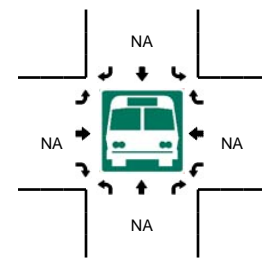
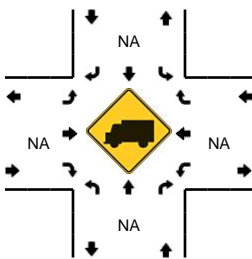
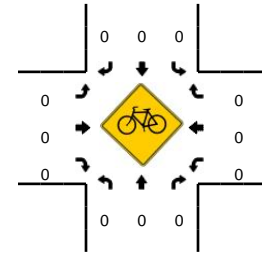
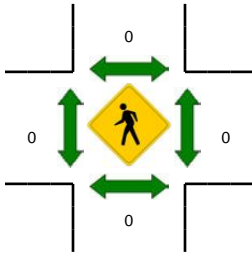
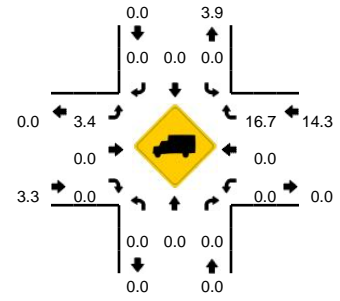
Comments:

**LOCATION:** SE Ruscliffe Ln -- SE Rusk Rd  
**CITY/STATE:** Milwaukie, OR

**QC JOB #:** 13929504  
**DATE:** Wed, Nov 02 2016



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

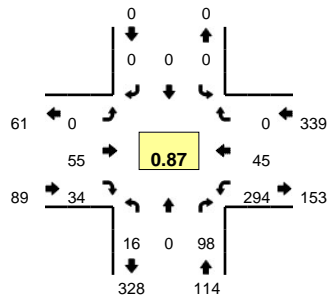


5-Min Count Period Beginning At	SE Ruscliffe Ln (Northbound)				SE Ruscliffe Ln (Southbound)				SE Rusk Rd (Eastbound)				SE Rusk Rd (Westbound)				Total	Hourly Totals	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
4:00 PM	0	0	0	0	1	0	6	0	9	0	0	0	0	0	0	1	0	17	
4:05 PM	0	0	0	0	0	0	23	0	18	0	0	0	0	0	0	0	0	41	
4:10 PM	0	0	0	0	2	0	31	0	8	0	0	0	0	0	0	1	0	42	
4:15 PM	0	0	0	0	0	0	28	0	8	0	0	0	0	0	0	0	0	36	
4:20 PM	0	0	0	0	0	0	24	0	13	0	0	0	0	0	0	0	0	37	
4:25 PM	0	0	0	0	1	0	36	0	12	0	0	1	0	0	0	0	0	50	
4:30 PM	0	0	0	0	0	0	24	0	11	2	0	0	0	0	0	1	0	38	
4:35 PM	0	0	0	0	1	0	35	0	8	0	0	0	0	0	0	0	0	44	
4:40 PM	0	0	0	0	0	0	24	0	10	0	0	0	0	0	1	0	0	35	
4:45 PM	0	0	0	0	0	0	27	0	9	0	0	0	0	0	0	0	0	36	
4:50 PM	0	0	0	0	0	0	27	0	11	0	0	0	0	0	0	0	0	38	
4:55 PM	0	0	0	0	0	0	28	0	10	0	0	0	0	0	0	0	0	38	452
5:00 PM	0	0	0	0	0	0	11	0	17	0	0	0	0	0	2	0	0	30	465
5:05 PM	0	0	0	0	1	0	25	0	20	0	0	0	0	0	0	0	0	46	470
5:10 PM	0	0	0	0	0	0	32	0	6	0	0	0	0	0	1	0	0	39	467
5:15 PM	0	0	0	0	1	0	30	0	22	0	0	0	0	0	1	0	0	54	485
5:20 PM	0	0	0	0	1	0	36	0	12	0	0	0	0	0	1	0	0	50	498
5:25 PM	0	0	0	0	1	0	29	0	13	0	0	0	0	0	0	0	0	43	491
5:30 PM	0	0	0	0	0	0	19	0	8	0	0	0	0	0	1	0	0	28	481
5:35 PM	0	0	0	0	0	0	18	0	6	0	0	0	0	0	1	0	0	25	462
5:40 PM	0	0	0	0	0	0	11	0	10	0	0	0	0	0	1	0	0	22	449
5:45 PM	0	0	0	0	1	0	26	0	8	0	0	0	0	0	0	0	0	35	448
5:50 PM	0	0	0	0	0	0	22	0	4	0	0	0	0	0	0	0	0	26	436
5:55 PM	0	0	0	0	0	0	18	0	10	1	0	0	0	0	0	0	0	29	427
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	8	0	392	0	160	0	0	0	0	0	0	12	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																			

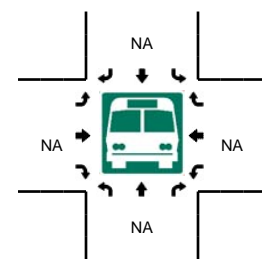
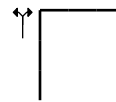
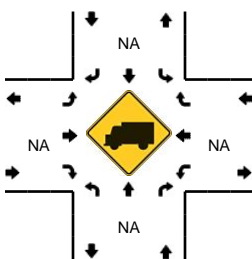
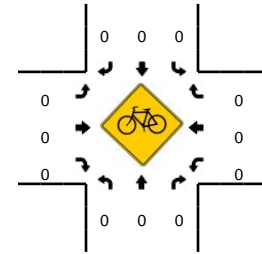
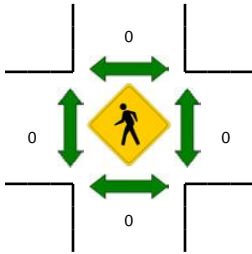
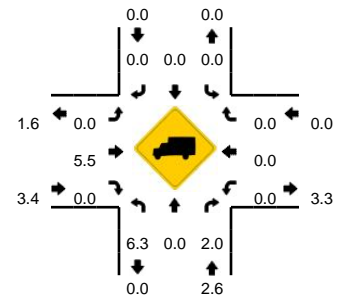
Comments:

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

**QC JOB #:** 13929506  
**DATE:** Wed, Nov 02 2016



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

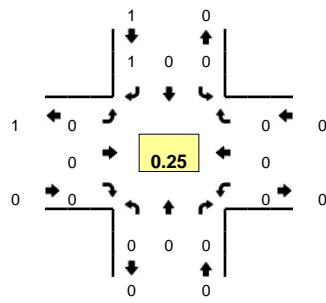


5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				SE Kellogg Creek Dr (Eastbound)				SE Kellogg Creek Dr (Westbound)				Total	Hourly Totals	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
4:00 PM	3	0	4	0	0	0	0	0	0	0	5	3	0	4	1	0	0	20	
4:05 PM	0	0	10	0	0	0	0	0	0	0	9	3	0	22	1	0	0	45	
4:10 PM	1	0	7	0	0	0	0	0	0	0	1	2	0	23	5	0	0	39	
4:15 PM	2	0	6	0	0	0	0	0	0	0	2	2	0	30	2	0	0	44	
4:20 PM	0	0	12	0	0	0	0	0	0	0	1	1	0	17	2	0	0	33	
4:25 PM	0	0	8	0	0	0	0	0	0	0	5	1	0	34	7	0	0	55	
4:30 PM	0	0	10	0	0	0	0	0	0	0	3	1	0	20	4	0	0	38	
4:35 PM	3	0	5	0	0	0	0	0	0	0	3	2	0	28	7	0	0	48	
4:40 PM	1	0	7	0	0	0	0	0	0	0	3	2	0	20	4	0	0	37	
4:45 PM	3	0	6	0	0	0	0	0	0	0	3	1	0	23	5	0	0	41	
4:50 PM	0	0	11	0	0	0	0	0	0	0	1	1	0	20	3	0	0	36	
4:55 PM	1	0	7	0	0	0	0	0	0	0	3	3	0	31	1	0	0	46	482
5:00 PM	2	0	6	0	0	0	0	0	0	0	12	5	0	9	1	0	0	35	497
5:05 PM	1	0	11	0	0	0	0	0	0	0	9	3	0	24	2	0	0	50	502
5:10 PM	3	0	4	0	0	0	0	0	0	0	2	0	0	27	3	0	0	39	502
5:15 PM	1	0	13	0	0	0	0	0	0	0	7	6	0	28	3	0	0	58	516
5:20 PM	1	0	10	0	0	0	0	0	0	0	4	9	0	30	5	0	0	59	542
5:25 PM	1	0	11	0	0	0	0	0	0	0	2	1	0	25	4	0	0	44	531
5:30 PM	3	0	6	0	0	0	0	0	0	0	2	1	0	19	1	0	0	32	525
5:35 PM	0	0	2	0	0	0	0	0	0	0	2	3	0	14	3	0	0	24	501
5:40 PM	2	0	9	0	0	0	0	0	0	0	1	2	0	6	2	0	0	22	486
5:45 PM	1	0	8	0	0	0	0	0	0	0	0	1	0	24	5	0	0	39	484
5:50 PM	1	0	1	0	0	0	0	0	0	0	3	2	0	14	5	0	0	26	474
5:55 PM	0	0	8	0	0	0	0	0	0	0	2	0	0	19	2	0	0	31	459
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	108	0	0	0	0	0	0	0	52	60	0	340	44	0	0	624	
Heavy Trucks	0	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	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																			
Stopped Buses																			

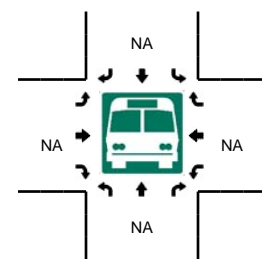
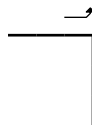
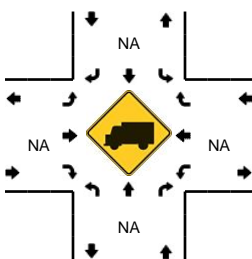
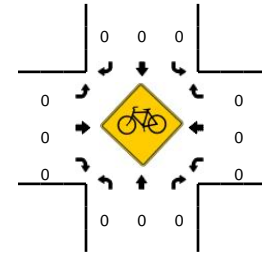
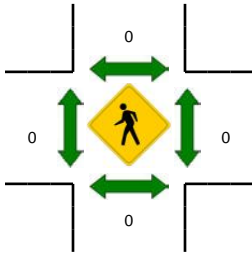
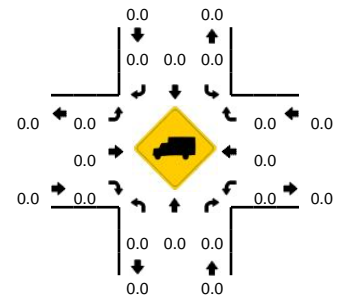
Comments:

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

**QC JOB #:** 13929510  
**DATE:** Wed, Nov 02 2016



**Peak-Hour: 4:25 PM -- 5:25 PM**  
**Peak 15-Min: 4:55 PM -- 5:10 PM**

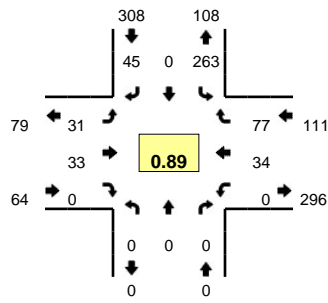


5-Min Count Period Beginning At	Church Driveway (Northbound)				Church Driveway (Southbound)				SE Kellogg Creek Dr (Eastbound)				SE Kellogg Creek Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	
4:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:05 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
5:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
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	4	0	0	0	0	0	0	0	0	0	4	
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																		

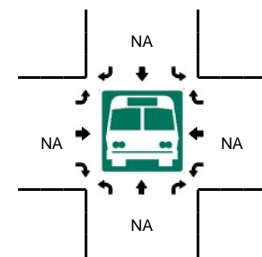
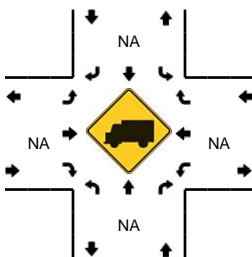
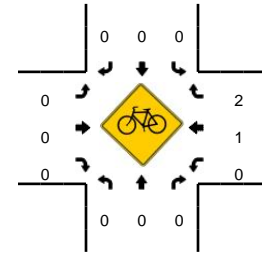
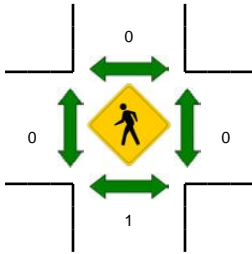
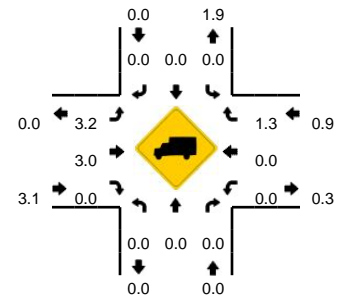
Comments:

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

**QC JOB #:** 13929508  
**DATE:** Wed, Nov 02 2016



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

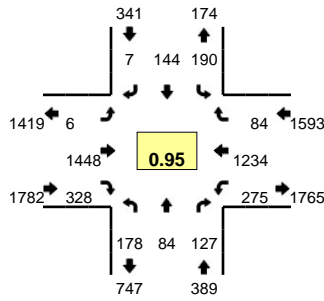


5-Min Count Period Beginning At	SE Rusk Rd (Northbound)				SE Rusk Rd (Southbound)				SE Aldercrest Rd (Eastbound)				SE Aldercrest Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	8	0	3	0	1	1	0	0	0	0	8	0	21	
4:05 PM	0	0	0	0	21	0	3	0	2	3	0	0	0	0	3	8	40	
4:10 PM	0	0	0	0	17	0	3	0	5	4	0	0	0	0	4	7	40	
4:15 PM	0	0	0	0	32	0	4	0	1	3	0	0	0	0	2	4	46	
4:20 PM	0	0	0	0	16	0	2	0	3	4	0	0	0	0	2	11	38	
4:25 PM	0	0	0	0	26	0	1	0	0	2	0	0	0	0	3	8	40	
4:30 PM	0	0	0	0	21	0	4	0	3	3	0	0	0	0	3	7	41	
4:35 PM	0	0	0	0	26	0	3	0	2	3	0	0	0	0	4	5	43	
4:40 PM	0	0	0	0	16	0	7	0	2	3	0	0	0	0	4	8	40	
4:45 PM	0	0	0	0	20	0	0	0	3	3	0	0	0	0	3	6	35	
4:50 PM	0	0	0	0	21	0	1	0	3	5	0	0	0	0	3	3	36	
4:55 PM	0	0	0	0	22	0	4	0	5	1	0	0	0	0	2	7	41	461
5:00 PM	0	0	0	0	12	0	8	0	2	4	0	0	0	0	3	6	35	475
5:05 PM	0	0	0	0	15	0	5	0	1	3	0	0	0	0	3	10	37	472
5:10 PM	0	0	0	0	23	0	6	0	1	2	0	0	0	0	2	4	38	470
5:15 PM	0	0	0	0	29	0	3	0	5	3	0	0	0	0	1	10	51	475
5:20 PM	0	0	0	0	32	0	3	0	4	1	0	0	0	0	3	3	46	483
5:25 PM	0	0	0	0	22	0	1	0	1	5	0	0	0	0	0	9	38	481
5:30 PM	0	0	0	0	15	0	2	0	2	5	0	0	0	0	3	3	30	470
5:35 PM	0	0	0	0	17	0	1	0	0	2	0	0	0	0	3	3	26	453
5:40 PM	0	0	0	0	4	0	3	0	3	1	0	0	0	0	3	10	24	437
5:45 PM	0	0	0	0	15	0	5	0	2	2	0	0	0	0	2	6	32	434
5:50 PM	0	0	0	0	13	0	3	0	2	5	0	0	0	0	4	2	29	427
5:55 PM	0	0	0	0	17	0	2	0	1	1	0	0	0	0	0	7	28	414
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	336	0	48	0	40	24	0	0	0	24	68	0	540	
Heavy Trucks	0	0	0	0	0	0	0	0	4	4	0	0	0	0	0	0	8	
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																		

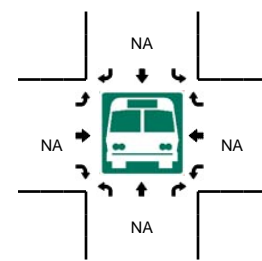
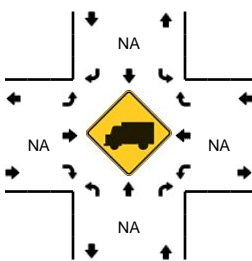
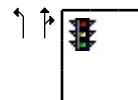
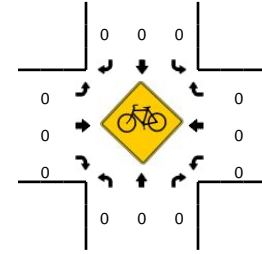
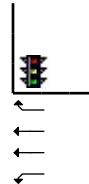
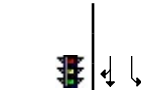
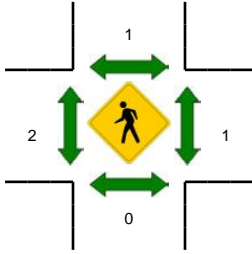
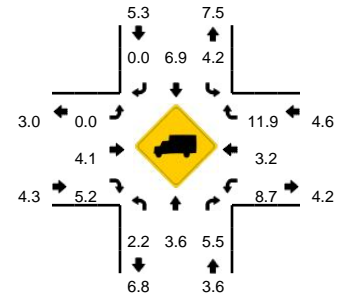
Comments:

**LOCATION:** SE Lake Rd/SE Webster Rd -- Milwaukie Expy  
**CITY/STATE:** Portland, OR

**QC JOB #:** 13929521  
**DATE:** Thu, Nov 17 2016



**Peak-Hour: 4:25 PM -- 5:25 PM**  
**Peak 15-Min: 4:40 PM -- 4:55 PM**



5-Min Count Period Beginning At	SE Lake Rd/SE Webster Rd (Northbound)				SE Lake Rd/SE Webster Rd (Southbound)				Milwaukie Expy (Eastbound)				Milwaukie Expy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	16	8	9	0	9	7	0	0	0	142	25	0	12	120	8	0	356	
4:05 PM	15	7	17	0	18	15	1	0	0	109	21	0	26	81	4	0	314	
4:10 PM	12	4	15	0	11	13	0	0	1	152	25	0	20	105	8	0	366	
4:15 PM	24	5	21	0	17	19	0	0	1	104	30	0	24	102	6	0	353	
4:20 PM	11	5	9	0	15	11	1	0	0	152	37	0	21	131	7	0	400	
4:25 PM	20	6	13	0	20	13	2	0	0	103	17	0	30	77	10	0	311	
4:30 PM	10	3	8	0	13	8	1	0	3	150	23	0	14	128	10	0	371	
4:35 PM	26	4	11	0	31	22	1	0	0	99	21	0	17	76	6	0	314	
4:40 PM	13	6	8	0	14	9	0	0	0	148	32	0	22	116	6	0	374	
4:45 PM	16	12	9	0	19	13	0	0	1	96	40	0	27	91	8	0	332	
4:50 PM	13	4	10	0	10	8	0	0	1	132	47	0	13	127	12	0	377	
4:55 PM	14	5	12	0	13	12	0	0	0	98	26	0	34	90	8	0	312	4180
5:00 PM	8	5	8	0	11	10	1	0	0	152	26	0	15	117	3	0	356	4180
5:05 PM	21	11	14	0	16	11	1	0	0	101	17	0	32	82	5	0	311	4177
5:10 PM	6	7	11	0	22	19	1	0	0	126	28	0	20	109	7	0	356	4167
5:15 PM	18	11	15	0	10	7	0	0	0	101	31	0	27	92	4	0	316	4130
5:20 PM	13	10	8	0	11	12	0	0	1	142	20	0	24	129	5	0	375	4105
5:25 PM	16	7	13	0	19	11	1	0	0	97	31	0	32	92	6	0	325	4119
5:30 PM	9	2	7	0	11	10	1	0	1	153	26	0	22	119	3	0	364	4112
5:35 PM	16	8	15	0	12	14	3	0	1	106	36	0	35	90	3	0	339	4137
5:40 PM	7	5	5	0	6	6	0	0	0	141	41	0	20	107	5	0	343	4106
5:45 PM	16	9	16	0	11	12	1	0	1	75	25	0	33	89	4	0	292	4066
5:50 PM	14	8	6	0	5	9	0	0	0	114	38	0	24	108	4	0	330	4019
5:55 PM	11	9	14	0	9	14	0	0	0	98	20	0	34	73	7	0	289	3996
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	168	88	108	0	172	120	0	0	8	1504	476	0	248	1336	104	0	4332	
Heavy Trucks	8	0	0		8	8	0		0	64	32		32	36	12		200	
Pedestrians		0				0				4				0			4	
Bicycles		0	0			0	0	0		0	0	0		0	0	0	0	
Railroad																		
Stopped Buses																		

Comments:











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



# Queues

## 1: SE Rusk Rd & Milwaukie Expy

12/6/2016

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	6	828	66	45	2073	6	176	33	71	5
v/c Ratio	0.07	0.37	0.06	0.36	0.83	0.00	0.80	0.10	0.27	0.01
Control Delay	55.5	10.3	1.5	51.1	11.3	0.0	74.6	0.6	45.9	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	10.3	1.5	51.1	11.3	0.0	74.6	0.6	45.9	0.0
Queue Length 50th (ft)	5	148	0	36	264	0	131	0	48	0
Queue Length 95th (ft)	19	210	13	m40	m#482	m0	#222	0	91	0
Internal Link Dist (ft)		263			2471		389		744	
Turn Bay Length (ft)	470		110	455		100		50		75
Base Capacity (vph)	165	2225	1112	315	2501	1209	255	369	311	377
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	0.04	0.37	0.06	0.14	0.83	0.00	0.69	0.09	0.23	0.01

### Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.

























Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 1: SE Rusk Rd & Milwaukie Expy

12/6/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Volume (vph)	6	778	62	42	1949	6	117	49	31	9	57	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
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)	1805	3312	1615	1805	3374	1615		1823	1568		1771	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.74	1.00		0.95	1.00
Satd. Flow (perm)	1805	3312	1615	1805	3374	1615		1396	1568		1699	1615
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	6	828	66	45	2073	6	124	52	33	10	61	5
RTOR Reduction (vph)	0	0	22	0	0	2	0	0	28	0	0	4
Lane Group Flow (vph)	6	828	44	45	2073	4	0	176	5	0	71	1
Heavy Vehicles (%)	0%	9%	0%	0%	7%	0%	1%	0%	3%	22%	4%	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)	1.4	79.8	79.8	7.3	85.7	85.7		18.9	18.9		18.9	18.9
Effective Green, g (s)	1.4	79.8	79.8	7.3	85.7	85.7		18.9	18.9		18.9	18.9
Actuated g/C Ratio	0.01	0.66	0.66	0.06	0.71	0.71		0.16	0.16		0.16	0.16
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)	21	2202	1073	109	2409	1153		219	246		267	254
v/s Ratio Prot	0.00	0.25		c0.02	c0.61							
v/s Ratio Perm			0.03			0.00		c0.13	0.00		0.04	0.00
v/c Ratio	0.29	0.38	0.04	0.41	0.86	0.00		0.80	0.02		0.27	0.00
Uniform Delay, d1	58.8	9.0	6.9	54.3	12.7	4.9		48.8	42.7		44.5	42.6
Progression Factor	1.00	1.00	1.00	0.91	0.76	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	7.4	0.5	0.1	1.2	2.0	0.0		18.9	0.0		0.5	0.0
Delay (s)	66.2	9.5	7.0	50.3	11.6	4.9		67.6	42.8		45.0	42.6
Level of Service	E	A	A	D	B	A		E	D		D	D
Approach Delay (s)		9.7			12.4			63.7			44.8	
Approach LOS		A			B			E			D	

### Intersection Summary

HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	79.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 2: SE Rusk Rd & Church Driveway

12/6/2016

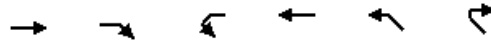


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑	↑	
Volume (veh/h)	1	0	0	196	160	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	2	0	0	302	246	2
Pedestrians	1					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					469	
pX, platoon unblocked	0.99	0.99	0.99			
vC, conflicting volume	549	248	249			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	544	241	242			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	500	798	1328			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	2	302	248			
Volume Left	2	0	0			
Volume Right	0	0	2			
cSH	500	1328	1700			
Volume to Capacity	0.00	0.00	0.15			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	12.2	0.0	0.0			
Lane LOS	B					
Approach Delay (s)	12.2	0.0	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization		20.3%		ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 3: SE Ruscliffe Rd & SE Rusk Rd

12/6/2016



Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations	↻			↻	↻	
Volume (veh/h)	189	1	3	157	3	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	291	2	5	242	5	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)	553					
pX, platoon unblocked						
vC, conflicting volume			292		542	292
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			292		542	292
tC, single (s)			4.1		6.7	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.8	3.4
p0 queue free %			100		99	99
cM capacity (veh/h)			1281		450	720

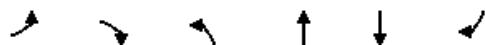
Direction, Lane #	EB 1	WB 1	NW 1
Volume Total	292	246	15
Volume Left	0	5	5
Volume Right	2	0	11
cSH	1700	1281	610
Volume to Capacity	0.17	0.00	0.03
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.2	11.1
Lane LOS		A	B
Approach Delay (s)	0.0	0.2	11.1
Approach LOS			B

Intersection Summary			
Average Delay		0.4	
Intersection Capacity Utilization	20.7%	ICU Level of Service	A
Analysis Period (min)	15		

# HCM Unsignalized Intersection Capacity Analysis

## 4: SE Ruscliffe Rd/SE Rusk Rd

12/6/2016

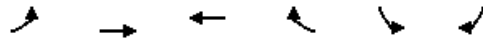


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	26	12	26	161	89	71
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.61	0.61	0.61	0.61	0.61	0.61
Hourly flow rate (vph)	43	20	43	264	146	116
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					923	
pX, platoon unblocked						
vC, conflicting volume	553	204	262			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	553	204	262			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	98	97			
cM capacity (veh/h)	481	842	1314			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	62	307	262			
Volume Left	43	43	0			
Volume Right	20	0	116			
cSH	556	1314	1700			
Volume to Capacity	0.11	0.03	0.15			
Queue Length 95th (ft)	9	3	0			
Control Delay (s)	12.3	1.3	0.0			
Lane LOS	B	A				
Approach Delay (s)	12.3	1.3	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			1.9			
Intersection Capacity Utilization		32.3%		ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 5: SE Kellogg Creek Dr & Church Driveway

12/6/2016



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Volume (veh/h)	0	38	95	2	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.61	0.61	0.61	0.61	0.61	0.61
Hourly flow rate (vph)	0	62	156	3	0	0
Pedestrians					2	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	161				222	159
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	161				222	159
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1428				770	890
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	62	159	0			
Volume Left	0	0	0			
Volume Right	0	3	0			
cSH	1428	1700	1700			
Volume to Capacity	0.00	0.09	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			9.0%	ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 6: SE Aldercrest Rd & SE Rusk Rd

12/6/2016



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	
Sign Control		Stop	Stop		Stop	
Volume (vph)	30	14	17	135	63	20
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	34	16	20	155	72	23











Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	51	175	95
Volume Left (vph)	34	0	72
Volume Right (vph)	0	155	23
Hadj (s)	0.17	-0.51	0.05
Departure Headway (s)	4.5	3.7	4.4
Degree Utilization, x	0.06	0.18	0.12
Capacity (veh/h)	781	953	774
Control Delay (s)	7.7	7.5	8.0
Approach Delay (s)	7.7	7.5	8.0
Approach LOS	A	A	A

Intersection Summary			
Delay		7.7	
Level of Service		A	
Intersection Capacity Utilization	27.3%		ICU Level of Service A
Analysis Period (min)		15	

Queues

7: SE Lake Rd/SE Webster Rd & Milwaukie Expy

12/6/2016

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	8	742	130	146	1902	216	240	253	63	83
v/c Ratio	0.09	0.43	0.15	0.67	0.87	0.23	0.98	0.84	0.58	0.66
Control Delay	50.4	16.2	1.0	63.8	22.9	4.7	105.8	61.3	75.1	77.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.4	16.2	1.0	63.8	22.9	4.7	105.8	61.3	75.1	77.5
Queue Length 50th (ft)	6	118	0	109	542	23	188	148	48	62
Queue Length 95th (ft)	m0	143	12	171	#933	70	#354	#309	#101	#132
Internal Link Dist (ft)		2471			585			201		465
Turn Bay Length (ft)	500		360	295		150			330	
Base Capacity (vph)	180	1710	882	323	2198	954	244	302	118	132
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	0.04	0.43	0.15	0.45	0.87	0.23	0.98	0.84	0.53	0.63

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.



























m Volume for 95th percentile queue is metered by upstream signal.



# HCM Signalized Intersection Capacity Analysis

## 7: SE Lake Rd/SE Webster Rd & Milwaukie Expy

12/6/2016











													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 			 								
Volume (vph)	7	690	121	136	1769	201	223	82	153	59	73	5	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	2000	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	3.8	4.8		4.0	4.8		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00		
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	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	0.90		1.00	0.99		
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1805	3374	1583	1687	3374	1397	1810	1609		1583	1706		
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (perm)	1805	3374	1583	1687	3374	1397	1810	1609		1583	1706		
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
Adj. Flow (vph)	8	742	130	146	1902	216	240	88	165	63	78	5	
RTOR Reduction (vph)	0	0	65	0	0	48	0	55	0	0	2	0	
Lane Group Flow (vph)	8	742	65	146	1902	168	240	198	0	63	81	0	
Confl. Peds. (#/hr)	1					1			1	1			
Confl. Bikes (#/hr)									3				
Heavy Vehicles (%)	0%	7%	2%	7%	7%	13%	5%	6%	5%	14%	11%	0%	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA		
Protected Phases	5	2		1	6		3	8		7	4		
Permitted Phases			2			6							
Actuated Green, G (s)	1.5	60.0	60.0	15.6	74.1	74.1	16.0	18.5		7.1	9.6		
Effective Green, g (s)	1.5	60.0	60.0	15.6	74.1	74.1	16.2	18.5		7.1	9.6		
Actuated g/C Ratio	0.01	0.50	0.50	0.13	0.62	0.62	0.13	0.15		0.06	0.08		
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.8		4.0	4.8		
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)	22	1687	791	219	2083	862	244	248		93	136		
v/s Ratio Prot	0.00	0.22		c0.09	c0.56		c0.13	c0.12		0.04	0.05		
v/s Ratio Perm			0.04			0.12							
v/c Ratio	0.36	0.44	0.08	0.67	0.91	0.20	0.98	0.80		0.68	0.60		
Uniform Delay, d1	58.8	19.2	15.6	49.7	20.1	10.0	51.8	49.0		55.3	53.3		
Progression Factor	0.90	0.78	0.49	1.00	1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	9.5	0.8	0.2	7.5	7.6	0.5	52.7	16.2		17.8	6.9		
Delay (s)	62.5	15.9	7.9	57.2	27.7	10.5	104.4	65.2		73.1	60.2		
Level of Service	E	B	A	E	C	B	F	E		E	E		
Approach Delay (s)		15.1			28.0			84.3			65.8		
Approach LOS		B			C			F			E		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			33.8		HCM 2000 Level of Service					C			
HCM 2000 Volume to Capacity ratio			0.94										
Actuated Cycle Length (s)			120.0		Sum of lost time (s)					18.8			
Intersection Capacity Utilization			85.5%		ICU Level of Service					E			
Analysis Period (min)			15										

c Critical Lane Group

# Queues

## 1: SE Rusk Rd & Milwaukie Expy

12/6/2016

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	10	1143	71	69	1151	14	79	67	72	15
v/c Ratio	0.09	0.48	0.06	0.42	0.43	0.01	0.52	0.29	0.42	0.06
Control Delay	45.6	9.8	3.3	53.4	2.7	0.0	53.5	11.2	48.0	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.6	9.8	3.3	53.4	2.7	0.0	53.5	11.2	48.0	0.5
Queue Length 50th (ft)	6	177	3	42	56	0	48	0	44	0
Queue Length 95th (ft)	23	290	22	m85	69	m0	92	32	84	0
Internal Link Dist (ft)		263			2471		389		741	
Turn Bay Length (ft)	470		110	455		100		50		75
Base Capacity (vph)	198	2363	1134	200	2687	1212	259	339	294	348
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	0.05	0.48	0.06	0.34	0.43	0.01	0.31	0.20	0.24	0.04

### Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 1: SE Rusk Rd & Milwaukie Expy

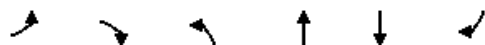
12/6/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	10	1097	68	66	1105	13	43	33	64	18	51	14	
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	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	0.98	
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)	1805	3312	1568	1770	3343	1495		1792	1538		1797	1588	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.78	1.00		0.90	1.00	
Satd. Flow (perm)	1805	3312	1568	1770	3343	1495		1444	1538		1638	1588	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	10	1143	71	69	1151	14	45	34	67	19	53	15	
RTOR Reduction (vph)	0	0	17	0	0	3	0	0	61	0	0	14	
Lane Group Flow (vph)	10	1143	54	69	1151	11	0	79	6	0	72	1	
Confl. Peds. (#/hr)							7					7	
Heavy Vehicles (%)	0%	9%	3%	2%	8%	8%	5%	0%	5%	11%	2%	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)	1.5	68.5	68.5	8.1	75.1	75.1		9.4	9.4		9.4	9.4	
Effective Green, g (s)	1.5	68.5	68.5	8.1	75.1	75.1		9.4	9.4		9.4	9.4	
Actuated g/C Ratio	0.02	0.68	0.68	0.08	0.75	0.75		0.09	0.09		0.09	0.09	
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)	27	2268	1074	143	2510	1122		135	144		153	149	
v/s Ratio Prot	0.01	c0.35		c0.04	0.34								
v/s Ratio Perm			0.03			0.01		c0.05	0.00		0.04	0.00	
v/c Ratio	0.37	0.50	0.05	0.48	0.46	0.01		0.59	0.04		0.47	0.01	
Uniform Delay, d1	48.8	7.6	5.1	43.9	4.7	3.1		43.4	41.2		42.9	41.1	
Progression Factor	1.00	1.00	1.00	1.11	0.48	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.4	0.8	0.1	2.1	0.5	0.0		6.3	0.1		2.3	0.0	
Delay (s)	57.2	8.4	5.2	51.0	2.8	3.1		49.8	41.3		45.2	41.1	
Level of Service	E	A	A	D	A	A		D	D		D	D	
Approach Delay (s)		8.6			5.5			45.9			44.5		
Approach LOS		A			A			D			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			10.3									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.51										
Actuated Cycle Length (s)			100.0									Sum of lost time (s)	14.0
Intersection Capacity Utilization			61.8%									ICU Level of Service	B
Analysis Period (min)			15										
c Critical Lane Group													

# HCM Unsignalized Intersection Capacity Analysis

## 2: SE Rusk Rd & Church Driveway

12/6/2016












Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑	↑	
Volume (veh/h)	3	0	0	137	183	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	3	0	0	159	213	2
Pedestrians	9					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					469	
pX, platoon unblocked						
vC, conflicting volume	382	223	224			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	382	223	224			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	619	815	1346			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	3	159	215			
Volume Left	3	0	0			
Volume Right	0	0	2			
cSH	619	1346	1700			
Volume to Capacity	0.01	0.00	0.13			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	10.8	0.0	0.0			
Lane LOS	B					
Approach Delay (s)	10.8	0.0	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.1			
Intersection Capacity Utilization		20.7%		ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 3: SE Rusk Rd & SE Ruscliffe Ln

12/6/2016

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	6	131	4	6	177
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	0	7	152	5	7	206
Pedestrians						7
Lane Width (ft)						12.0
Walking Speed (ft/s)						4.0
Percent Blockage						1
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						553
pX, platoon unblocked						
vC, conflicting volume	374	162			157	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	374	162			157	
tC, single (s)	6.4	6.4			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	628	841			1435	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	7	157	213			
Volume Left	0	0	7			
Volume Right	7	5	0			
cSH	841	1700	1435			
Volume to Capacity	0.01	0.09	0.00			
Queue Length 95th (ft)	1	0	0			
Control Delay (s)	9.3	0.0	0.3			
Lane LOS	A		A			
Approach Delay (s)	9.3	0.0	0.3			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			0.3			
Intersection Capacity Utilization			26.2%		ICU Level of Service	A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 4: SE Rusk Rd & SE Kellog Creek Dr

12/6/2016

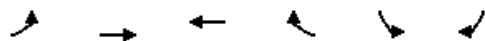


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	50	30	29	85	91	86
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	62	38	36	106	114	108
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						922
pX, platoon unblocked						
vC, conflicting volume	346	168	221			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	346	168	221			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	90	96	97			
cM capacity (veh/h)	625	882	1360			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	100	142	221			
Volume Left	62	36	0			
Volume Right	38	0	108			
cSH	702	1360	1700			
Volume to Capacity	0.14	0.03	0.13			
Queue Length 95th (ft)	12	2	0			
Control Delay (s)	11.0	2.1	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.0	2.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization			30.7%	ICU Level of Service	A	
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 5: SE Kellog Creek Dr & Church Driveway

12/6/2016

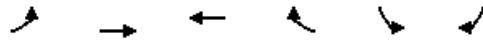


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Volume (veh/h)	0	79	115	0	1	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	0	99	144	0	1	0
Pedestrians					7	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	151				250	151
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	151				250	151
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1434				739	896
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	99	144	1			
Volume Left	0	0	1			
Volume Right	0	0	0			
cSH	1434	1700	739			
Volume to Capacity	0.00	0.08	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	9.9			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	9.9			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.1			
Intersection Capacity Utilization			17.6%		ICU Level of Service	A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 6: SE Aldercrest Rd & SE Rusk Rd

12/6/2016



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	
Sign Control		Stop	Stop		Stop	
Volume (vph)	26	21	24	68	70	30
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	32	26	30	84	86	37

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	58	114	123
Volume Left (vph)	32	0	86
Volume Right (vph)	0	84	37
Hadj (s)	0.19	-0.43	0.00
Departure Headway (s)	4.5	3.8	4.3
Degree Utilization, x	0.07	0.12	0.15
Capacity (veh/h)	775	911	810
Control Delay (s)	7.8	7.3	8.0
Approach Delay (s)	7.8	7.3	8.0
Approach LOS	A	A	A











Intersection Summary			
Delay		7.7	
Level of Service		A	
Intersection Capacity Utilization	21.6%		ICU Level of Service A
Analysis Period (min)		15	



# Queues

## 7: SE Lake Rd/SE Webster Rd & Milwaukie Expy

12/6/2016

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	11	1043	174	228	1065	132	161	231	123	91
v/c Ratio	0.12	0.78	0.24	0.77	0.56	0.15	0.59	0.87	0.68	0.51
Control Delay	36.0	38.1	13.1	57.1	14.5	3.3	51.5	59.8	61.4	51.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.0	38.1	13.1	57.1	14.5	3.3	51.5	59.8	61.4	51.3
Queue Length 50th (ft)	7	253	0	138	186	5	99	99	75	54
Queue Length 95th (ft)	m13	446	115	217	320	35	#201	#256	#147	106
Internal Link Dist (ft)		2471			585			201		465
Turn Bay Length (ft)	500		360	295		150			330	
Base Capacity (vph)	170	1345	714	343	1908	896	274	267	199	193
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	0.06	0.78	0.24	0.66	0.56	0.15	0.59	0.87	0.62	0.47

### Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis  
 7: SE Lake Rd/SE Webster Rd & Milwaukie Expy

12/6/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	1001	167	219	1022	127	155	75	147	118	81	7
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	4.8		4.0	4.8	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	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	0.90		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1421	3312	1504	1719	3223	1436	1770	1594		1641	1726	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1421	3312	1504	1719	3223	1436	1770	1594		1641	1726	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	11	1043	174	228	1065	132	161	78	153	123	84	7
RTOR Reduction (vph)	0	0	105	0	0	50	0	68	0	0	3	0
Lane Group Flow (vph)	11	1043	69	228	1065	82	161	163	0	123	88	0
Confl. Peds. (#/hr)	1					1	4		1	1		4
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	27%	9%	6%	5%	12%	10%	2%	7%	6%	10%	7%	29%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	1.6	39.5	39.5	17.2	55.1	55.1	15.5	13.4		11.1	9.0	
Effective Green, g (s)	1.6	39.5	39.5	17.2	55.1	55.1	15.5	13.4		11.1	9.0	
Actuated g/C Ratio	0.02	0.40	0.40	0.17	0.55	0.55	0.16	0.13		0.11	0.09	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.8		4.0	4.8	
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)	22	1308	594	295	1775	791	274	213		182	155	
v/s Ratio Prot	0.01	c0.31		c0.13	0.33		c0.09	c0.10		c0.07	0.05	
v/s Ratio Perm			0.05			0.06						
v/c Ratio	0.50	0.80	0.12	0.77	0.60	0.10	0.59	0.76		0.68	0.57	
Uniform Delay, d1	48.8	26.7	19.2	39.5	15.1	10.7	39.3	41.8		42.7	43.6	
Progression Factor	0.77	1.27	3.77	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.2	4.6	0.4	11.9	1.5	0.3	3.2	14.9		9.5	4.7	
Delay (s)	52.6	38.5	72.7	51.4	16.6	11.0	42.5	56.7		52.2	48.4	
Level of Service	D	D	E	D	B	B	D	E		D	D	
Approach Delay (s)		43.5			21.6			50.9			50.6	
Approach LOS		D			C			D			D	











Intersection Summary		
HCM 2000 Control Delay	35.3	HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio	0.77	
Actuated Cycle Length (s)	100.0	Sum of lost time (s) 18.8
Intersection Capacity Utilization	75.6%	ICU Level of Service D
Analysis Period (min)	15	

c Critical Lane Group

# Queues

## 1: SE Rusk Rd & Milwaukie Expy

12/6/2016

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	29	1864	171	97	1469	11	117	58	172	34
v/c Ratio	0.28	0.83	0.16	0.58	0.60	0.01	0.95	0.20	0.81	0.12
Control Delay	59.4	22.3	6.8	64.9	10.7	0.5	119.4	10.1	75.9	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.4	22.3	6.8	64.9	10.7	0.5	119.4	10.1	75.9	3.2
Queue Length 50th (ft)	22	551	30	61	406	0	91	0	131	0
Queue Length 95th (ft)	53	#877	71	m113	m570	m0	#173	32	198	9
Internal Link Dist (ft)		263			2471		389		767	
Turn Bay Length (ft)	470		110	455		100		50		75
Base Capacity (vph)	153	2244	1057	181	2462	1125	184	405	318	397
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	0.19	0.83	0.16	0.54	0.60	0.01	0.64	0.14	0.54	0.09

### Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.

























Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 1: SE Rusk Rd & Milwaukie Expy

12/6/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Volume (vph)	26	1678	154	87	1322	10	66	40	52	52	103	31
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	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		0.98	1.00
Satd. Flow (prot)	1671	3505	1615	1805	3505	1582		1775	1583		1856	1548
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.45	1.00		0.75	1.00
Satd. Flow (perm)	1671	3505	1615	1805	3505	1582		818	1583		1414	1548
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	29	1864	171	97	1469	11	73	44	58	58	114	34
RTOR Reduction (vph)	0	0	23	0	0	3	0	0	49	0	0	29
Lane Group Flow (vph)	29	1864	148	97	1469	8	0	117	9	0	172	5
Confl. Peds. (#/hr)							1					1
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	8%	3%	0%	0%	3%	0%	3%	5%	2%	2%	0%	3%
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)	5.2	76.8	76.8	11.1	82.7	82.7		18.1	18.1		18.1	18.1
Effective Green, g (s)	5.2	76.8	76.8	11.1	82.7	82.7		18.1	18.1		18.1	18.1
Actuated g/C Ratio	0.04	0.64	0.64	0.09	0.69	0.69		0.15	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	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)	72	2243	1033	166	2415	1090		123	238		213	233
v/s Ratio Prot	0.02	c0.53		c0.05	0.42							
v/s Ratio Perm			0.09			0.00		c0.14	0.01		0.12	0.00
v/c Ratio	0.40	0.83	0.14	0.58	0.61	0.01		0.95	0.04		0.81	0.02
Uniform Delay, d1	55.9	16.6	8.6	52.2	10.0	5.8		50.5	43.5		49.3	43.4
Progression Factor	1.00	1.00	1.00	1.03	0.87	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	3.7	3.8	0.3	4.2	0.9	0.0		65.7	0.1		19.6	0.0
Delay (s)	59.5	20.4	8.8	57.8	9.7	5.8		116.2	43.6		68.9	43.4
Level of Service	E	C	A	E	A	A		F	D		E	D
Approach Delay (s)		20.0			12.6			92.2			64.7	
Approach LOS		B			B			F			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			22.5									C
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			120.0								14.0	
Intersection Capacity Utilization			78.6%									D
Analysis Period (min)			15									

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 2: SE Rusk Rd & Church Driveway

12/6/2016



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑	↑	
Volume (veh/h)	2	0	1	156	343	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	0	1	179	394	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					469	
pX, platoon unblocked	0.96	0.96	0.96			
vC, conflicting volume	576	395	395			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	536	346	347			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	487	672	1172			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	2	180	395			
Volume Left	2	1	0			
Volume Right	0	0	1			
cSH	487	1172	1700			
Volume to Capacity	0.00	0.00	0.23			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	12.4	0.1	0.0			
Lane LOS	B	A				
Approach Delay (s)	12.4	0.1	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.1			
Intersection Capacity Utilization		28.1%		ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 3: SE Ruscliffe Rd & SE Rusk Rd

12/6/2016



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		T			T
Volume (veh/h)	1	6	151	2	5	338
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	1	7	174	2	6	389
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						553
pX, platoon unblocked	0.97					
vC, conflicting volume	575	175			176	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	542	175			176	
tC, single (s)	6.4	6.4			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	486	831			1413	










Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	8	176	394
Volume Left	1	0	6
Volume Right	7	2	0
cSH	755	1700	1413
Volume to Capacity	0.01	0.10	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	9.8	0.0	0.1
Lane LOS	A		A
Approach Delay (s)	9.8	0.0	0.1
Approach LOS	A		

Intersection Summary			
Average Delay		0.2	
Intersection Capacity Utilization	31.8%	ICU Level of Service	A
Analysis Period (min)	15		

# HCM Unsignalized Intersection Capacity Analysis

## 4: SE Rusk Rd & SE Kellogg Creek Dr/SE Rusk Rd

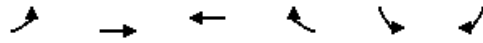
12/6/2016

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	55	34	16	98	294	45
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	63	39	18	113	338	52
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					920	
pX, platoon unblocked						
vC, conflicting volume	513	364	390			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	513	364	390			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	88	94	98			
cM capacity (veh/h)	508	686	1147			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	102	131	390			
Volume Left	63	18	0			
Volume Right	39	0	52			
cSH	563	1147	1700			
Volume to Capacity	0.18	0.02	0.23			
Queue Length 95th (ft)	16	1	0			
Control Delay (s)	12.8	1.3	0.0			
Lane LOS	B	A				
Approach Delay (s)	12.8	1.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization		30.5%		ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 5: SE Kellogg Creek Dr & Church Driveway

12/6/2016



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	89	61	0	0	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	102	70	0	0	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	70				172	70
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	70				172	70
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1543				822	998
<b>Direction, Lane #</b>						
	EB 1	WB 1	SB 1			
Volume Total	102	70	1			
Volume Left	0	0	0			
Volume Right	0	0	1			
cSH	1543	1700	998			
Volume to Capacity	0.00	0.04	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	8.6			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	8.6			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.1			
Intersection Capacity Utilization			14.7%		ICU Level of Service	A
Analysis Period (min)			15			



# HCM Unsignalized Intersection Capacity Analysis

## 6: SE Aldercrest Rd & SE Rusk Rd

12/6/2016



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↷	
Sign Control		Stop	Stop		Stop	
Volume (vph)	31	33	34	77	263	45
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	35	37	38	87	296	51











Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	72	125	346
Volume Left (vph)	35	0	296
Volume Right (vph)	0	87	51
Hadj (s)	0.15	-0.40	0.08
Departure Headway (s)	5.0	4.4	4.5
Degree Utilization, x	0.10	0.15	0.43
Capacity (veh/h)	657	748	782
Control Delay (s)	8.6	8.2	10.8
Approach Delay (s)	8.6	8.2	10.8
Approach LOS	A	A	B

Intersection Summary			
Delay		9.9	
Level of Service		A	
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		

Queues

7: SE Lake Rd/SE Webster Rd & Milwaukie Expy

12/6/2016

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	6	1524	345	289	1299	88	187	222	200	159
v/c Ratio	0.07	0.98	0.39	0.99	0.58	0.09	0.91	0.84	0.99	0.88
Control Delay	64.3	52.2	10.0	99.3	14.2	2.4	95.4	65.1	114.5	94.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.3	52.2	10.0	99.3	14.2	2.4	95.4	65.1	114.5	94.7
Queue Length 50th (ft)	4	666	104	226	264	0	145	130	157	122
Queue Length 95th (ft)	m5	#792	m140	#406	421	22	#283	#265	#311	#251
Internal Link Dist (ft)		2471			585			201		465
Turn Bay Length (ft)	500		360	295		150			330	
Base Capacity (vph)	180	1561	881	293	2245	934	206	265	202	181
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	0.98	0.39	0.99	0.58	0.09	0.91	0.84	0.99	0.88

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.



























Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 7: SE Lake Rd/SE Webster Rd & Milwaukie Expy

12/6/2016











												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 				
Volume (vph)	6	1448	328	275	1234	84	178	84	127	190	144	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	2000	1900	1900
Total Lost time (s)	4.0	6.0	6.0	3.8	6.0	6.0	4.0	4.8		0.7	4.8	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	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	0.91		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3471	1538	1656	3505	1410	1770	1630		1827	1768	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	3471	1538	1656	3505	1410	1770	1630		1827	1768	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	1524	345	289	1299	88	187	88	134	200	152	7
RTOR Reduction (vph)	0	0	190	0	0	34	0	46	0	0	2	0
Lane Group Flow (vph)	6	1524	155	289	1299	54	187	176	0	200	157	0
Confl. Peds. (#/hr)	1					1	2		1	1		2
Heavy Vehicles (%)	0%	4%	5%	9%	3%	12%	2%	4%	6%	4%	7%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	1.4	54.0	54.0	21.0	73.6	73.6	14.0	16.2		10.0	12.2	
Effective Green, g (s)	1.4	54.0	54.0	21.2	73.6	73.6	14.0	16.2		13.3	12.2	
Actuated g/C Ratio	0.01	0.45	0.45	0.18	0.61	0.61	0.12	0.13		0.11	0.10	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.8		4.0	4.8	
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)	21	1561	692	292	2149	864	206	220		202	179	
v/s Ratio Prot	0.00	c0.44		c0.17	0.37		0.11	c0.11		c0.11	0.09	
v/s Ratio Perm			0.10			0.04						
v/c Ratio	0.29	0.98	0.22	0.99	0.60	0.06	0.91	0.80		0.99	0.88	
Uniform Delay, d1	58.8	32.4	20.2	49.3	14.3	9.3	52.4	50.3		53.3	53.2	
Progression Factor	1.17	1.23	4.39	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.2	12.5	0.4	49.3	1.3	0.1	37.8	18.5		60.3	35.0	
Delay (s)	73.3	52.2	89.1	98.6	15.5	9.5	90.2	68.9		113.6	88.2	
Level of Service	E	D	F	F	B	A	F	E		F	F	
Approach Delay (s)		59.1			29.5			78.6			102.4	
Approach LOS		E			C			E			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			53.1				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			18.8		
Intersection Capacity Utilization			93.8%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

**Attachment E – 2018 Background  
Traffic Level-of-Service Worksheets**

# Queues

## 1: SE Rusk Rd & Milwaukie Expy

12/6/2016

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	6	837	67	46	2099	6	179	33	72	5
v/c Ratio	0.07	0.38	0.06	0.36	0.84	0.00	0.81	0.10	0.27	0.01
Control Delay	55.5	10.5	1.6	51.1	11.7	0.0	75.1	0.6	45.8	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	10.5	1.6	51.1	11.7	0.0	75.1	0.6	45.8	0.0
Queue Length 50th (ft)	5	152	0	37	286	0	133	0	49	0
Queue Length 95th (ft)	19	214	13	m40	m#966	m0	#230	0	92	0
Internal Link Dist (ft)		263			2471		389		744	
Turn Bay Length (ft)	470		110	500		100		50		75
Base Capacity (vph)	165	2218	1108	315	2495	1206	255	369	311	377
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	0.04	0.38	0.06	0.15	0.84	0.00	0.70	0.09	0.23	0.01

### Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.























Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 1: SE Rusk Rd & Milwaukie Expy

12/6/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	787	63	43	1973	6	118	50	31	9	58	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
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)	1805	3312	1615	1805	3374	1615		1823	1568		1772	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.74	1.00		0.95	1.00
Satd. Flow (perm)	1805	3312	1615	1805	3374	1615		1391	1568		1700	1615
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	6	837	67	46	2099	6	126	53	33	10	62	5
RTOR Reduction (vph)	0	0	23	0	0	2	0	0	28	0	0	4
Lane Group Flow (vph)	6	837	44	46	2099	4	0	179	5	0	72	1
Heavy Vehicles (%)	0%	9%	0%	0%	7%	0%	1%	0%	3%	22%	4%	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)	1.4	79.5	79.5	7.4	85.5	85.5		19.1	19.1		19.1	19.1
Effective Green, g (s)	1.4	79.5	79.5	7.4	85.5	85.5		19.1	19.1		19.1	19.1
Actuated g/C Ratio	0.01	0.66	0.66	0.06	0.71	0.71		0.16	0.16		0.16	0.16
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)	21	2194	1069	111	2403	1150		221	249		270	257
v/s Ratio Prot	0.00	0.25		c0.03	c0.62							
v/s Ratio Perm			0.03			0.00		c0.13	0.00		0.04	0.00
v/c Ratio	0.29	0.38	0.04	0.41	0.87	0.00		0.81	0.02		0.27	0.00
Uniform Delay, d1	58.8	9.1	7.0	54.2	13.1	5.0		48.7	42.6		44.3	42.4
Progression Factor	1.00	1.00	1.00	0.91	0.76	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	7.4	0.5	0.1	1.1	2.2	0.0		19.3	0.0		0.5	0.0
Delay (s)	66.2	9.7	7.1	50.3	12.1	5.0		68.0	42.6		44.8	42.4
Level of Service	E	A	A	D	B	A		E	D		D	D
Approach Delay (s)		9.8			12.9			64.0			44.7	
Approach LOS		A			B			E			D	

### Intersection Summary

HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 2: SE Rusk Rd & Church Driveway

12/6/2016












Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	1	0	0	198	163	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	2	0	0	305	251	2
Pedestrians	1					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					469	
pX, platoon unblocked	0.99	0.99	0.99			
vC, conflicting volume	557	253	253			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	551	245	245			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	495	793	1323			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	2	305	252			
Volume Left	2	0	0			
Volume Right	0	0	2			
cSH	495	1323	1700			
Volume to Capacity	0.00	0.00	0.15			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	12.3	0.0	0.0			
Lane LOS	B					
Approach Delay (s)	12.3	0.0	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			20.4%	ICU Level of Service	A	
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 3: SE Ruscliffe Rd & SE Rusk Rd

12/6/2016

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	3	7	191	1	3	160
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	5	11	294	2	5	246
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						553
pX, platoon unblocked						
vC, conflicting volume	550	295			295	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	550	295			295	
tC, single (s)	6.7	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.8	3.4			2.2	
p0 queue free %	99	98			100	
cM capacity (veh/h)	445	717			1278	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	15	295	251			
Volume Left	5	0	5			
Volume Right	11	2	0			
cSH	606	1700	1278			
Volume to Capacity	0.03	0.17	0.00			
Queue Length 95th (ft)	2	0	0			
Control Delay (s)	11.1	0.0	0.2			
Lane LOS	B		A			
Approach Delay (s)	11.1	0.0	0.2			
Approach LOS	B					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			20.8%	ICU Level of Service	A	
Analysis Period (min)			15			



HCM Unsignalized Intersection Capacity Analysis  
 4: SE Rusk Rd & SE Kellogg Creek Dr/SE Rusk Rd

12/6/2016

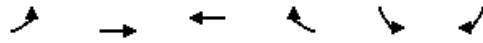


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	26	12	26	166	91	72
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.61	0.61	0.61	0.61	0.61	0.61
Hourly flow rate (vph)	43	20	43	272	149	118
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					920	
pX, platoon unblocked						
vC, conflicting volume	566	208	267			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	566	208	267			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	98	97			
cM capacity (veh/h)	473	837	1308			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	62	315	267			
Volume Left	43	43	0			
Volume Right	20	0	118			
cSH	549	1308	1700			
Volume to Capacity	0.11	0.03	0.16			
Queue Length 95th (ft)	10	3	0			
Control Delay (s)	12.4	1.3	0.0			
Lane LOS	B	A				
Approach Delay (s)	12.4	1.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			32.7%	ICU Level of Service	A	
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 5: SE Kellogg Creek Dr & Church Driveway

12/6/2016

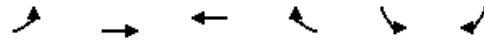


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Volume (veh/h)	0	38	96	2	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.61	0.61	0.61	0.61	0.61	0.61
Hourly flow rate (vph)	0	62	157	3	0	0
Pedestrians					2	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	163				223	161
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	163				223	161
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1426				768	888
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	62	161	0			
Volume Left	0	0	0			
Volume Right	0	3	0			
cSH	1426	1700	1700			
Volume to Capacity	0.00	0.09	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			9.0%		ICU Level of Service	A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 6: SE Aldercrest Rd & SE Rusk Rd

12/6/2016



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	
Sign Control		Stop	Stop		Stop	
Volume (vph)	30	14	17	137	64	20
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	34	16	20	157	74	23











Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	51	177	97
Volume Left (vph)	34	0	74
Volume Right (vph)	0	157	23
Hadj (s)	0.17	-0.51	0.06
Departure Headway (s)	4.5	3.7	4.4
Degree Utilization, x	0.06	0.18	0.12
Capacity (veh/h)	780	952	772
Control Delay (s)	7.8	7.5	8.0
Approach Delay (s)	7.8	7.5	8.0
Approach LOS	A	A	A

Intersection Summary			
Delay		7.7	
Level of Service		A	
Intersection Capacity Utilization	27.5%		ICU Level of Service A
Analysis Period (min)		15	

Queues

7: SE Lake Rd/SE Webster Rd & Milwaukie Expy

12/6/2016

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	8	751	131	148	1926	218	243	255	65	85
v/c Ratio	0.09	0.44	0.15	0.67	0.88	0.23	1.00	0.84	0.60	0.67
Control Delay	50.1	16.3	1.0	63.8	23.6	4.8	108.8	62.3	76.0	78.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.1	16.3	1.0	63.8	23.6	4.8	108.8	62.3	76.0	78.7
Queue Length 50th (ft)	6	120	0	111	558	24	191	150	50	64
Queue Length 95th (ft)	m0	144	12	173	#952	71	#359	#314	#104	#135
Internal Link Dist (ft)		2471			585			201		465
Turn Bay Length (ft)	500		360	295		150			330	
Base Capacity (vph)	180	1706	880	323	2198	954	244	302	118	132
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	0.04	0.44	0.15	0.46	0.88	0.23	1.00	0.84	0.55	0.64

Intersection Summary





























# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis  
 7: SE Lake Rd/SE Webster Rd & Milwaukie Expy

12/6/2016











													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 			 			 			 		
Volume (vph)	7	698	122	138	1791	203	226	83	154	60	74	5	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	2000	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	3.8	4.8		4.0	4.8		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00		
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	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	0.90		1.00	0.99		
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1805	3374	1583	1687	3374	1397	1810	1609		1583	1707		
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (perm)	1805	3374	1583	1687	3374	1397	1810	1609		1583	1707		
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
Adj. Flow (vph)	8	751	131	148	1926	218	243	89	166	65	80	5	
RTOR Reduction (vph)	0	0	66	0	0	48	0	55	0	0	2	0	
Lane Group Flow (vph)	8	751	65	148	1926	170	243	200	0	65	83	0	
Confl. Peds. (#/hr)	1					1			1	1			
Confl. Bikes (#/hr)									3				
Heavy Vehicles (%)	0%	7%	2%	7%	7%	13%	5%	6%	5%	14%	11%	0%	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA		
Protected Phases	5	2		1	6		3	8		7	4		
Permitted Phases			2			6							
Actuated Green, G (s)	1.5	59.9	59.9	15.8	74.2	74.2	16.0	18.4		7.1	9.5		
Effective Green, g (s)	1.5	59.9	59.9	15.8	74.2	74.2	16.2	18.4		7.1	9.5		
Actuated g/C Ratio	0.01	0.50	0.50	0.13	0.62	0.62	0.13	0.15		0.06	0.08		
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.8		4.0	4.8		
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)	22	1684	790	222	2086	863	244	246		93	135		
v/s Ratio Prot	0.00	0.22		c0.09	c0.57		c0.13	c0.12		0.04	0.05		
v/s Ratio Perm			0.04			0.12							
v/c Ratio	0.36	0.45	0.08	0.67	0.92	0.20	1.00	0.81		0.70	0.62		
Uniform Delay, d1	58.8	19.4	15.7	49.6	20.4	10.0	51.9	49.1		55.4	53.5		
Progression Factor	0.90	0.78	0.49	1.00	1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	9.5	0.8	0.2	7.4	8.4	0.5	56.1	18.2		20.5	8.1		
Delay (s)	62.2	16.0	7.9	57.0	28.7	10.5	108.0	67.3		75.9	61.6		
Level of Service	E	B	A	E	C	B	F	E		E	E		
Approach Delay (s)		15.2			28.8			87.2			67.8		
Approach LOS		B			C			F			E		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			34.8		HCM 2000 Level of Service					C			
HCM 2000 Volume to Capacity ratio			0.95										
Actuated Cycle Length (s)			120.0		Sum of lost time (s)					18.8			
Intersection Capacity Utilization			86.3%		ICU Level of Service					E			
Analysis Period (min)			15										

c Critical Lane Group

# Queues

## 1: SE Rusk Rd & Milwaukie Expy

12/6/2016

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	10	1156	72	70	1165	14	80	68	73	15
v/c Ratio	0.09	0.49	0.06	0.43	0.43	0.01	0.52	0.29	0.42	0.06
Control Delay	45.6	10.0	2.3	54.2	2.7	0.0	53.6	11.3	48.0	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.6	10.0	2.3	54.2	2.7	0.0	53.6	11.3	48.0	0.5
Queue Length 50th (ft)	6	182	0	42	57	0	49	0	44	0
Queue Length 95th (ft)	23	296	18	m86	67	m0	92	33	85	0
Internal Link Dist (ft)		263			2471		389		741	
Turn Bay Length (ft)	470		455	500		100		50		75
Base Capacity (vph)	198	2359	1137	200	2685	1211	259	339	295	348
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	0.05	0.49	0.06	0.35	0.43	0.01	0.31	0.20	0.25	0.04

### Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 1: SE Rusk Rd & Milwaukie Expy

12/6/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	10	1110	69	67	1118	13	44	33	65	18	52	14	
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	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	0.98	
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)	1805	3312	1568	1770	3343	1495		1791	1538		1798	1588	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.78	1.00		0.90	1.00	
Satd. Flow (perm)	1805	3312	1568	1770	3343	1495		1440	1538		1641	1588	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	10	1156	72	70	1165	14	46	34	68	19	54	15	
RTOR Reduction (vph)	0	0	23	0	0	3	0	0	62	0	0	14	
Lane Group Flow (vph)	10	1156	49	70	1165	11	0	80	6	0	73	1	
Confl. Peds. (#/hr)							7					7	
Heavy Vehicles (%)	0%	9%	3%	2%	8%	8%	5%	0%	5%	11%	2%	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)	1.5	68.5	68.5	8.1	75.1	75.1		9.4	9.4		9.4	9.4	
Effective Green, g (s)	1.5	68.5	68.5	8.1	75.1	75.1		9.4	9.4		9.4	9.4	
Actuated g/C Ratio	0.02	0.68	0.68	0.08	0.75	0.75		0.09	0.09		0.09	0.09	
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)	27	2268	1074	143	2510	1122		135	144		154	149	
v/s Ratio Prot	0.01	c0.35		c0.04	0.35								
v/s Ratio Perm			0.03			0.01		c0.06	0.00		0.04	0.00	
v/c Ratio	0.37	0.51	0.05	0.49	0.46	0.01		0.59	0.04		0.47	0.01	
Uniform Delay, d1	48.8	7.6	5.1	44.0	4.8	3.1		43.5	41.2		43.0	41.1	
Progression Factor	1.00	1.00	1.00	1.13	0.47	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.4	0.8	0.1	2.2	0.5	0.0		6.8	0.1		2.3	0.0	
Delay (s)	57.2	8.4	5.2	51.9	2.7	3.1		50.3	41.3		45.3	41.1	
Level of Service	E	A	A	D	A	A		D	D		D	D	
Approach Delay (s)		8.6			5.5			46.2			44.5		
Approach LOS		A			A			D			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			10.4									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			62.3%									ICU Level of Service	B
Analysis Period (min)			15										
c Critical Lane Group													

# HCM Unsignalized Intersection Capacity Analysis

## 2: SE Rusk Rd & Church Driveway

12/6/2016












Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑	↑	
Volume (veh/h)	3	0	0	139	186	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	3	0	0	162	216	2
Pedestrians	9					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						469
pX, platoon unblocked						
vC, conflicting volume	388	226	228			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	388	226	228			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	615	812	1342			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	3	162	219			
Volume Left	3	0	0			
Volume Right	0	0	2			
cSH	615	1342	1700			
Volume to Capacity	0.01	0.00	0.13			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	10.9	0.0	0.0			
Lane LOS	B					
Approach Delay (s)	10.9	0.0	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.1			
Intersection Capacity Utilization	20.8%		ICU Level of Service	A		
Analysis Period (min)	15					



# HCM Unsignalized Intersection Capacity Analysis

## 3: SE Rusk Rd & SE Ruscliffe Ln










12/6/2016

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	6	133	4	6	180
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	0	7	155	5	7	209
Pedestrians						7
Lane Width (ft)						12.0
Walking Speed (ft/s)						4.0
Percent Blockage						1
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						553
pX, platoon unblocked						
vC, conflicting volume	380	164			159	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	380	164			159	
tC, single (s)	6.4	6.4			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	623	838			1432	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	7	159	216			
Volume Left	0	0	7			
Volume Right	7	5	0			
cSH	838	1700	1432			
Volume to Capacity	0.01	0.09	0.00			
Queue Length 95th (ft)	1	0	0			
Control Delay (s)	9.3	0.0	0.3			
Lane LOS	A		A			
Approach Delay (s)	9.3	0.0	0.3			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			0.3			
Intersection Capacity Utilization			26.4%		ICU Level of Service	A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 4: SE Rusk Rd & SE Kellog Creek Dr

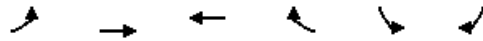
12/6/2016

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	51	30	29	86	93	87
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	64	38	36	108	116	109
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					923	
pX, platoon unblocked						
vC, conflicting volume	351	171	225			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	351	171	225			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	90	96	97			
cM capacity (veh/h)	622	878	1356			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	101	144	225			
Volume Left	64	36	0			
Volume Right	38	0	109			
cSH	697	1356	1700			
Volume to Capacity	0.15	0.03	0.13			
Queue Length 95th (ft)	13	2	0			
Control Delay (s)	11.0	2.1	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.0	2.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization		31.0%		ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 5: SE Kellogg Creek Dr & Church Driveway

12/6/2016

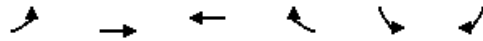


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Volume (veh/h)	0	80	116	0	1	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	0	100	145	0	1	0
Pedestrians					7	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	152				252	152
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	152				252	152
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1433				737	894
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	100	145	1			
Volume Left	0	0	1			
Volume Right	0	0	0			
cSH	1433	1700	737			
Volume to Capacity	0.00	0.09	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	9.9			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	9.9			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.1			
Intersection Capacity Utilization			17.6%		ICU Level of Service	A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 6: SE Aldercrest Rd & SE Rusk Rd

12/6/2016



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	
Sign Control		Stop	Stop		Stop	
Volume (vph)	26	21	24	69	71	30
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	32	26	30	85	88	37

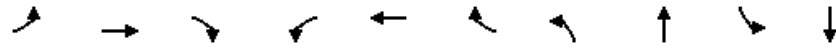
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	58	115	125
Volume Left (vph)	32	0	88
Volume Right (vph)	0	85	37
Hadj (s)	0.19	-0.43	0.00
Departure Headway (s)	4.5	3.8	4.3
Degree Utilization, x	0.07	0.12	0.15
Capacity (veh/h)	774	910	809
Control Delay (s)	7.8	7.3	8.0
Approach Delay (s)	7.8	7.3	8.0
Approach LOS	A	A	A

Intersection Summary			
Delay		7.7	
Level of Service		A	
Intersection Capacity Utilization	21.6%		ICU Level of Service A
Analysis Period (min)		15	

# Queues

## 7: SE Lake Rd/SE Webster Rd & Milwaukee Expy

12/6/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	11	1055	176	231	1077	134	164	234	124	92
v/c Ratio	0.12	0.79	0.25	0.78	0.56	0.15	0.59	0.87	0.69	0.52
Control Delay	35.3	38.8	13.3	57.4	14.5	3.4	51.7	61.3	62.3	52.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.3	38.8	13.3	57.4	14.5	3.4	51.7	61.3	62.3	52.1
Queue Length 50th (ft)	7	257	1	140	186	5	102	~102	76	55
Queue Length 95th (ft)	m13	451	115	220	325	36	#207	#261	#150	106
Internal Link Dist (ft)		2471			585			201		465
Turn Bay Length (ft)	500		360	295		150			330	
Base Capacity (vph)	170	1339	712	343	1909	896	276	268	198	190
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	0.06	0.79	0.25	0.67	0.56	0.15	0.59	0.87	0.63	0.48
























### Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 7: SE Lake Rd/SE Webster Rd & Milwaukie Expy

12/6/2016











												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	1013	169	222	1034	129	157	76	149	119	82	7
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	4.8		4.0	4.8	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	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	0.90		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1421	3312	1504	1719	3223	1436	1770	1594		1641	1726	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1421	3312	1504	1719	3223	1436	1770	1594		1641	1726	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	11	1055	176	231	1077	134	164	79	155	124	85	7
RTOR Reduction (vph)	0	0	107	0	0	50	0	68	0	0	3	0
Lane Group Flow (vph)	11	1055	69	231	1077	84	164	166	0	124	89	0
Confl. Peds. (#/hr)	1					1	4		1	1		4
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	27%	9%	6%	5%	12%	10%	2%	7%	6%	10%	7%	29%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	1.6	39.4	39.4	17.3	55.1	55.1	15.6	13.4		11.1	8.9	
Effective Green, g (s)	1.6	39.4	39.4	17.3	55.1	55.1	15.6	13.4		11.1	8.9	
Actuated g/C Ratio	0.02	0.39	0.39	0.17	0.55	0.55	0.16	0.13		0.11	0.09	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.8		4.0	4.8	
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)	22	1304	592	297	1775	791	276	213		182	153	
v/s Ratio Prot	0.01	c0.32		c0.13	0.33		c0.09	c0.10		c0.08	0.05	
v/s Ratio Perm			0.05			0.06						
v/c Ratio	0.50	0.81	0.12	0.78	0.61	0.11	0.59	0.78		0.68	0.58	
Uniform Delay, d1	48.8	27.0	19.3	39.5	15.1	10.7	39.3	41.9		42.7	43.8	
Progression Factor	0.75	1.28	3.85	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.1	5.0	0.4	12.1	1.6	0.3	3.4	16.2		10.0	5.6	
Delay (s)	51.8	39.4	74.5	51.6	16.7	11.0	42.7	58.1		52.8	49.3	
Level of Service	D	D	E	D	B	B	D	E		D	D	
Approach Delay (s)		44.5			21.8			51.7			51.3	
Approach LOS		D			C			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			35.9				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			18.8		
Intersection Capacity Utilization			76.3%				ICU Level of Service			D		
Analysis Period (min)			15									

c Critical Lane Group

# Queues

## 1: SE Rusk Rd & Milwaukie Expy

12/6/2016

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	29	1887	173	98	1487	11	118	59	175	34
v/c Ratio	0.28	0.84	0.16	0.59	0.61	0.01	0.97	0.20	0.82	0.12
Control Delay	59.4	23.1	6.9	64.8	10.9	0.5	122.7	10.3	76.7	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.4	23.1	6.9	64.8	10.9	0.5	122.7	10.3	76.7	3.2
Queue Length 50th (ft)	22	569	31	62	417	0	92	0	133	0
Queue Length 95th (ft)	53	#896	73	m114	m583	m0	#175	32	201	9
Internal Link Dist (ft)		263			2471		389		767	
Turn Bay Length (ft)	470		110	455		100		50		75
Base Capacity (vph)	153	2238	1055	181	2457	1122	181	405	317	397
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	0.19	0.84	0.16	0.54	0.61	0.01	0.65	0.15	0.55	0.09

### Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 1: SE Rusk Rd & Milwaukie Expy

12/6/2016

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	1698	156	88	1338	10	67	40	53	53	104	31
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	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		0.98	1.00
Satd. Flow (prot)	1671	3505	1615	1805	3505	1582		1775	1583		1856	1548
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.44	1.00		0.75	1.00
Satd. Flow (perm)	1671	3505	1615	1805	3505	1582		806	1583		1410	1548
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	29	1887	173	98	1487	11	74	44	59	59	116	34
RTOR Reduction (vph)	0	0	24	0	0	3	0	0	50	0	0	29
Lane Group Flow (vph)	29	1887	149	98	1487	8	0	118	9	0	175	5
Confl. Peds. (#/hr)							1					1
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	8%	3%	0%	0%	3%	0%	3%	5%	2%	2%	0%	3%
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)	5.2	76.6	76.6	11.1	82.5	82.5		18.3	18.3		18.3	18.3
Effective Green, g (s)	5.2	76.6	76.6	11.1	82.5	82.5		18.3	18.3		18.3	18.3
Actuated g/C Ratio	0.04	0.64	0.64	0.09	0.69	0.69		0.15	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	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)	72	2237	1030	166	2409	1087		122	241		215	236
v/s Ratio Prot	0.02	c0.54		c0.05	0.42							
v/s Ratio Perm			0.09			0.00		c0.15	0.01		0.12	0.00
v/c Ratio	0.40	0.84	0.15	0.59	0.62	0.01		0.97	0.04		0.81	0.02
Uniform Delay, d1	55.9	17.0	8.6	52.3	10.2	5.9		50.6	43.3		49.2	43.2
Progression Factor	1.00	1.00	1.00	1.02	0.87	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	3.7	4.1	0.3	4.5	1.0	0.0		70.5	0.1		20.5	0.0
Delay (s)	59.5	21.1	8.9	57.8	9.8	5.9		121.1	43.4		69.7	43.3
Level of Service	E	C	A	E	A	A		F	D		E	D
Approach Delay (s)		20.6			12.7			95.2			65.4	
Approach LOS		C			B			F			E	

### Intersection Summary

HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		










c Critical Lane Group



# HCM Unsignalized Intersection Capacity Analysis

## 2: SE Rusk Rd & Church Driveway










12/6/2016

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	2	0	1	158	347	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	0	1	182	399	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					469	
pX, platoon unblocked	0.96	0.96	0.96			
vC, conflicting volume	583	399	400			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	541	349	349			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	483	668	1167			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	2	183	400			
Volume Left	2	1	0			
Volume Right	0	0	1			
cSH	483	1167	1700			
Volume to Capacity	0.00	0.00	0.24			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	12.5	0.1	0.0			
Lane LOS	B	A				
Approach Delay (s)	12.5	0.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization		28.3%		ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 3: SE Ruscliffe Rd & SE Rusk Rd

12/6/2016

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	1	6	153	2	5	342
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	1	7	176	2	6	393
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						553
pX, platoon unblocked	0.96					
vC, conflicting volume	582	177	178			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	548	177	178			
tC, single (s)	6.4	6.4	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.5	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	481	829	1410			
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	8	178	399			
Volume Left	1	0	6			
Volume Right	7	2	0			
cSH	751	1700	1410			
Volume to Capacity	0.01	0.10	0.00			
Queue Length 95th (ft)	1	0	0			
Control Delay (s)	9.8	0.0	0.1			
Lane LOS	A		A			
Approach Delay (s)	9.8	0.0	0.1			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			0.2			
Intersection Capacity Utilization			32.0%	ICU Level of Service	A	
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 4: SE Rusk Rd & SE Kellogg Creek Dr/SE Rusk Rd

12/6/2016

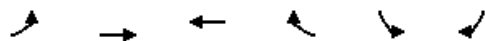


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	56	34	16	99	297	46
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	64	39	18	114	341	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						937
pX, platoon unblocked						
vC, conflicting volume	518	368	394			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	518	368	394			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	87	94	98			
cM capacity (veh/h)	504	682	1143			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	103	132	394			
Volume Left	64	18	0			
Volume Right	39	0	53			
cSH	559	1143	1700			
Volume to Capacity	0.19	0.02	0.23			
Queue Length 95th (ft)	17	1	0			
Control Delay (s)	12.9	1.3	0.0			
Lane LOS	B	A				
Approach Delay (s)	12.9	1.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization	30.6%		ICU Level of Service	A		
Analysis Period (min)	15					

# HCM Unsignalized Intersection Capacity Analysis

## 5: SE Kellogg Creek Dr & Church Driveway

12/6/2016



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Volume (veh/h)	0	90	62	0	0	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	103	71	0	0	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	71				175	71
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	71				175	71
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1542				820	997
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	103	71	1			
Volume Left	0	0	0			
Volume Right	0	0	1			
cSH	1542	1700	997			
Volume to Capacity	0.00	0.04	0.00			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	8.6			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	8.6			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.1			
Intersection Capacity Utilization			14.7%		ICU Level of Service	A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 6: SE Aldercrest Rd & SE Rusk Rd

12/6/2016



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	
Sign Control		Stop	Stop		Stop	
Volume (vph)	31	33	34	78	266	46
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	35	37	38	88	299	52

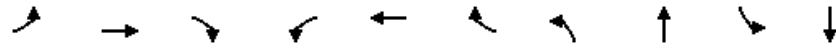
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	72	126	351
Volume Left (vph)	35	0	299
Volume Right (vph)	0	88	52
Hadj (s)	0.15	-0.41	0.08
Departure Headway (s)	5.1	4.4	4.5
Degree Utilization, x	0.10	0.16	0.43
Capacity (veh/h)	655	746	782
Control Delay (s)	8.6	8.3	10.8
Approach Delay (s)	8.6	8.3	10.8
Approach LOS	A	A	B

Intersection Summary		
Delay		10.0
Level of Service		A
Intersection Capacity Utilization	34.3%	ICU Level of Service A
Analysis Period (min)		15

# Queues

## 7: SE Lake Rd/SE Webster Rd & Milwaukee Expy

12/6/2016



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	6	1543	349	293	1315	89	189	225	202	161
v/c Ratio	0.07	0.99	0.39	1.00	0.59	0.10	0.92	0.85	1.00	0.89
Control Delay	63.7	54.0	9.8	103.2	14.3	2.4	97.3	66.5	117.1	96.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.7	54.0	9.8	103.2	14.3	2.4	97.3	66.5	117.1	96.1
Queue Length 50th (ft)	4	675	106	~230	269	0	147	133	159	124
Queue Length 95th (ft)	m5	#807	m137	#412	429	23	#288	#272	#316	#254
Internal Link Dist (ft)		2471			585			201		465
Turn Bay Length (ft)	500		360	295		150			330	
Base Capacity (vph)	180	1561	884	292	2243	934	206	265	202	181
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	0.99	0.39	1.00	0.59	0.10	0.92	0.85	1.00	0.89





























### Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 7: SE Lake Rd/SE Webster Rd & Milwaukie Expy

12/6/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Volume (vph)	6	1466	332	278	1249	85	180	85	129	192	146	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	2000	1900	1900
Total Lost time (s)	4.0	6.0	6.0	3.8	6.0	6.0	4.0	4.8		0.7	4.8	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	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	0.91		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3471	1538	1656	3505	1410	1770	1629		1827	1768	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	3471	1538	1656	3505	1410	1770	1629		1827	1768	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	1543	349	293	1315	89	189	89	136	202	154	7
RTOR Reduction (vph)	0	0	192	0	0	34	0	46	0	0	2	0
Lane Group Flow (vph)	6	1543	157	293	1315	55	189	179	0	202	159	0
Confl. Peds. (#/hr)	1					1	2		1	1		2
Heavy Vehicles (%)	0%	4%	5%	9%	3%	12%	2%	4%	6%	4%	7%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	1.4	54.0	54.0	21.0	73.6	73.6	14.0	16.2		10.0	12.2	
Effective Green, g (s)	1.4	54.0	54.0	21.2	73.6	73.6	14.0	16.2		13.3	12.2	
Actuated g/C Ratio	0.01	0.45	0.45	0.18	0.61	0.61	0.12	0.13		0.11	0.10	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.8		4.0	4.8	
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)	21	1561	692	292	2149	864	206	219		202	179	
v/s Ratio Prot	0.00	c0.44		c0.18	0.38		0.11	c0.11		c0.11	0.09	
v/s Ratio Perm			0.10			0.04						
v/c Ratio	0.29	0.99	0.23	1.00	0.61	0.06	0.92	0.82		1.00	0.89	
Uniform Delay, d1	58.8	32.7	20.2	49.4	14.4	9.3	52.4	50.5		53.4	53.2	
Progression Factor	1.16	1.22	4.29	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.1	14.4	0.4	53.5	1.3	0.1	40.0	20.6		63.3	37.3	
Delay (s)	72.4	54.2	87.2	102.9	15.7	9.5	92.5	71.0		116.7	90.6	
Level of Service	E	D	F	F	B	A	F	E		F	F	
Approach Delay (s)		60.3			30.4			80.8			105.1	
Approach LOS		E			C			F			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			54.4				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			18.8		
Intersection Capacity Utilization			94.7%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												











**Attachment F – 2018 Total Traffic  
Level-of-Service Worksheets**



# Queues

## 1: SE Rusk Rd & Milwaukie Expy

2/3/2017

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	6	837	70	47	2099	6	199	40	74	5
v/c Ratio	0.07	0.38	0.06	0.37	0.85	0.01	0.85	0.12	0.26	0.01
Control Delay	55.5	10.9	1.7	51.1	12.2	0.0	79.5	0.7	45.1	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	10.9	1.7	51.1	12.2	0.0	79.5	0.7	45.1	0.0
Queue Length 50th (ft)	5	157	0	37	298	0	148	0	49	0
Queue Length 95th (ft)	19	214	15	m41	m#966	m0	#267	0	95	0
Internal Link Dist (ft)		263			2471		389		744	
Turn Bay Length (ft)	470		110	455		100		50		75
Base Capacity (vph)	165	2188	1094	315	2466	1192	255	369	311	377
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	0.04	0.38	0.06	0.15	0.85	0.01	0.78	0.11	0.24	0.01

### Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.

























Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 1: SE Rusk Rd & Milwaukie Expy

2/3/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Volume (vph)	6	787	66	44	1973	6	130	57	38	9	60	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
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)	1805	3312	1615	1805	3374	1615		1824	1568		1773	1615
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.74	1.00		0.95	1.00
Satd. Flow (perm)	1805	3312	1615	1805	3374	1615		1390	1568		1701	1615
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	6	837	70	47	2099	6	138	61	40	10	64	5
RTOR Reduction (vph)	0	0	24	0	0	2	0	0	33	0	0	4
Lane Group Flow (vph)	6	837	46	47	2099	4	0	199	7	0	74	1
Heavy Vehicles (%)	0%	9%	0%	0%	7%	0%	1%	0%	3%	22%	4%	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)	1.4	78.5	78.5	7.4	84.5	84.5		20.1	20.1		20.1	20.1
Effective Green, g (s)	1.4	78.5	78.5	7.4	84.5	84.5		20.1	20.1		20.1	20.1
Actuated g/C Ratio	0.01	0.65	0.65	0.06	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)	21	2166	1056	111	2375	1137		232	262		284	270
v/s Ratio Prot	0.00	0.25		c0.03	c0.62							
v/s Ratio Perm			0.03			0.00		c0.14	0.00		0.04	0.00
v/c Ratio	0.29	0.39	0.04	0.42	0.88	0.00		0.86	0.03		0.26	0.00
Uniform Delay, d1	58.8	9.6	7.4	54.2	13.9	5.3		48.6	41.8		43.5	41.6
Progression Factor	1.00	1.00	1.00	0.91	0.75	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	7.4	0.5	0.1	1.1	2.4	0.0		25.4	0.0		0.5	0.0
Delay (s)	66.2	10.1	7.5	50.3	12.8	5.3		74.0	41.8		44.0	41.6
Level of Service	E	B	A	D	B	A		E	D		D	D
Approach Delay (s)		10.3			13.6			68.6			43.8	
Approach LOS		B			B			E			D	

### Intersection Summary

HCM 2000 Control Delay	17.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 2: SE Rusk Rd & Church Driveway

2/3/2017

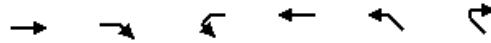


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑	↑	
Volume (veh/h)	0	0	0	225	169	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	0	0	0	346	260	2
Pedestrians	1					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					469	
pX, platoon unblocked	0.99	0.99	0.99			
vC, conflicting volume	608	262	263			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	601	252	253			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	463	785	1313			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	0	346	262			
Volume Left	0	0	0			
Volume Right	0	0	2			
cSH	1700	1313	1700			
Volume to Capacity	0.00	0.00	0.15			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization		15.2%		ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 3: SE Ruscliffe Rd

2/3/2017



Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations	↔			↔	↔	
Volume (veh/h)	218	1	3	166	3	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	335	2	5	255	5	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)	553					
pX, platoon unblocked						
vC, conflicting volume			337		601	336
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			337		601	336
tC, single (s)			4.1		6.7	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.8	3.4
p0 queue free %			100		99	98
cM capacity (veh/h)			1234		415	679
Direction, Lane #	EB 1	WB 1	NW 1			
Volume Total	337	260	15			
Volume Left	0	5	5			
Volume Right	2	0	11			
cSH	1700	1234	570			
Volume to Capacity	0.20	0.00	0.03			
Queue Length 95th (ft)	0	0	2			
Control Delay (s)	0.0	0.2	11.5			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.2	11.5			
Approach LOS			B			
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			21.5%	ICU Level of Service	A	
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 4: SE Rusk Rd & SE Kellogg Creek Dr/SE Rusk Rd

2/3/2017



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	53	19	27	166	91	78
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.61	0.61	0.61	0.61	0.61	0.61
Hourly flow rate (vph)	87	31	44	272	149	128
Pedestrians						1
Lane Width (ft)						12.0
Walking Speed (ft/s)						4.0
Percent Blockage						0
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						923
pX, platoon unblocked						
vC, conflicting volume	575	213	277			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	575	213	277			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	81	96	97			
cM capacity (veh/h)	466	832	1297			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	118	316	277			
Volume Left	87	44	0			
Volume Right	31	0	128			
cSH	528	1297	1700			
Volume to Capacity	0.22	0.03	0.16			
Queue Length 95th (ft)	21	3	0			
Control Delay (s)	13.8	1.4	0.0			
Lane LOS	B	A				
Approach Delay (s)	13.8	1.4	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			2.9			
Intersection Capacity Utilization			33.9%	ICU Level of Service	A	
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 5: SE Kellogg Creek Dr & East Site Driveway

2/3/2017

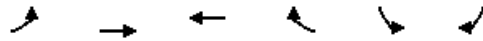


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Volume (veh/h)	0	45	98	7	27	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.61	0.61	0.61	0.61	0.61	0.61
Hourly flow rate (vph)	0	74	161	11	44	0
Pedestrians					2	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	174				242	168
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	174				242	168
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				94	100
cM capacity (veh/h)	1412				749	879
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	74	172	44			
Volume Left	0	0	44			
Volume Right	0	11	0			
cSH	1412	1700	749			
Volume to Capacity	0.00	0.10	0.06			
Queue Length 95th (ft)	0	0	5			
Control Delay (s)	0.0	0.0	10.1			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	10.1			
Approach LOS			B			
<b>Intersection Summary</b>						
Average Delay			1.5			
Intersection Capacity Utilization			16.1%		ICU Level of Service	A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 6: SE Aldercrest Rd & SE Rusk Rd

2/3/2017



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	
Sign Control		Stop	Stop		Stop	
Volume (vph)	30	14	17	138	69	22
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	34	16	20	159	79	25











Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	51	178	105
Volume Left (vph)	34	0	79
Volume Right (vph)	0	159	25
Hadj (s)	0.17	-0.51	0.05
Departure Headway (s)	4.5	3.7	4.4
Degree Utilization, x	0.06	0.18	0.13
Capacity (veh/h)	775	946	772
Control Delay (s)	7.8	7.5	8.1
Approach Delay (s)	7.8	7.5	8.1
Approach LOS	A	A	A

Intersection Summary			
Delay		7.7	
Level of Service		A	
Intersection Capacity Utilization	27.9%		ICU Level of Service A
Analysis Period (min)	15		

Queues

7: SE Lake Rd/SE Webster Rd & Milwaukie Expy

2/3/2017

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	8	754	135	148	1927	218	243	256	65	85
v/c Ratio	0.09	0.44	0.15	0.67	0.88	0.23	1.00	0.85	0.60	0.67
Control Delay	49.6	16.4	1.2	63.8	23.7	4.8	108.8	62.7	76.0	78.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.6	16.4	1.2	63.8	23.7	4.8	108.8	62.7	76.0	78.7
Queue Length 50th (ft)	6	121	0	111	558	24	191	151	50	64
Queue Length 95th (ft)	m0	146	13	173	#954	71	#359	#316	#104	#135
Internal Link Dist (ft)		2471			585			201		465
Turn Bay Length (ft)	500		360	295		150			330	
Base Capacity (vph)	180	1706	880	323	2198	954	244	302	118	132
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	0.04	0.44	0.15	0.46	0.88	0.23	1.00	0.85	0.55	0.64

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.





























Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.



HCM Signalized Intersection Capacity Analysis  
 7: SE Lake Rd/SE Webster Rd & Milwaukie Expy

2/3/2017

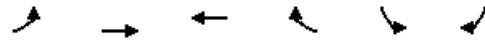
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Volume (vph)	7	701	126	138	1792	203	226	83	155	60	74	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	2000	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	3.8	4.8		4.0	4.8	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	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	0.90		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3374	1583	1687	3374	1397	1810	1609		1583	1707	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	3374	1583	1687	3374	1397	1810	1609		1583	1707	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	8	754	135	148	1927	218	243	89	167	65	80	5
RTOR Reduction (vph)	0	0	68	0	0	48	0	55	0	0	2	0
Lane Group Flow (vph)	8	754	67	148	1927	170	243	201	0	65	83	0
Confl. Peds. (#/hr)	1					1			1	1		
Confl. Bikes (#/hr)									3			
Heavy Vehicles (%)	0%	7%	2%	7%	7%	13%	5%	6%	5%	14%	11%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	1.5	59.9	59.9	15.8	74.2	74.2	16.0	18.4		7.1	9.5	
Effective Green, g (s)	1.5	59.9	59.9	15.8	74.2	74.2	16.2	18.4		7.1	9.5	
Actuated g/C Ratio	0.01	0.50	0.50	0.13	0.62	0.62	0.13	0.15		0.06	0.08	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.8		4.0	4.8	
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)	22	1684	790	222	2086	863	244	246		93	135	
v/s Ratio Prot	0.00	0.22		c0.09	c0.57		c0.13	c0.12		0.04	0.05	
v/s Ratio Perm			0.04			0.12						
v/c Ratio	0.36	0.45	0.09	0.67	0.92	0.20	1.00	0.82		0.70	0.62	
Uniform Delay, d1	58.8	19.4	15.7	49.6	20.4	10.0	51.9	49.2		55.4	53.5	
Progression Factor	0.89	0.78	0.50	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.4	0.8	0.2	7.4	8.4	0.5	56.1	18.5		20.5	8.1	
Delay (s)	61.5	16.0	8.1	57.0	28.8	10.5	108.0	67.7		75.9	61.6	
Level of Service	E	B	A	E	C	B	F	E		E	E	
Approach Delay (s)		15.2			28.9			87.3			67.8	
Approach LOS		B			C			F			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			34.8				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			18.8		
Intersection Capacity Utilization			86.3%				ICU Level of Service			E		
Analysis Period (min)			15									

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 8: SE Kellogg Creek Dr & West Site Driveway

2/3/2017

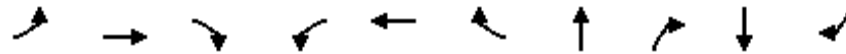


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	38	96	2	7	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	41	104	2	8	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	107				147	105
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	107				147	105
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1484				846	949
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	41	107	8			
Volume Left	0	0	8			
Volume Right	0	2	0			
cSH	1484	1700	846			
Volume to Capacity	0.00	0.06	0.01			
Queue Length 95th (ft)	0	0	1			
Control Delay (s)	0.0	0.0	9.3			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	9.3			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.5			
Intersection Capacity Utilization			15.2%	ICU Level of Service		A
Analysis Period (min)			15			

Queues

1: SE Rusk Rd & Milwaukie Expy

2/6/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	10	1156	85	76	1165	14	91	71	80	15
v/c Ratio	0.09	0.50	0.08	0.45	0.44	0.01	0.57	0.29	0.43	0.06
Control Delay	45.6	10.7	3.6	56.0	2.9	0.0	54.7	11.5	46.9	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.6	10.7	3.6	56.0	2.9	0.0	54.7	11.5	46.9	0.5
Queue Length 50th (ft)	6	188	5	46	55	0	56	0	48	0
Queue Length 95th (ft)	23	311	26	m93	67	m0	102	35	90	0
Internal Link Dist (ft)		263			2471		389		741	
Turn Bay Length (ft)	470		110	455		100		50		75
Base Capacity (vph)	198	2329	1121	203	2660	1201	252	339	298	348
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	0.05	0.50	0.08	0.37	0.44	0.01	0.36	0.21	0.27	0.04

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 1: SE Rusk Rd & Milwaukie Expy

2/6/2017



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	1110	82	73	1118	13	51	36	68	18	59	14
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	1.00		1.00	0.98
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)	1805	3312	1568	1770	3343	1495		1790	1538		1803	1588
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.76	1.00		0.91	1.00
Satd. Flow (perm)	1805	3312	1568	1770	3343	1495		1403	1538		1659	1588
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	10	1156	85	76	1165	14	53	38	71	19	61	15
RTOR Reduction (vph)	0	0	21	0	0	4	0	0	64	0	0	13
Lane Group Flow (vph)	10	1156	64	76	1165	10	0	91	7	0	80	2
Confl. Peds. (#/hr)							7					7
Heavy Vehicles (%)	0%	9%	3%	2%	8%	8%	5%	0%	5%	11%	2%	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)	1.5	67.4	67.4	8.4	74.3	74.3		10.2	10.2		10.2	10.2
Effective Green, g (s)	1.5	67.4	67.4	8.4	74.3	74.3		10.2	10.2		10.2	10.2
Actuated g/C Ratio	0.02	0.67	0.67	0.08	0.74	0.74		0.10	0.10		0.10	0.10
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)	27	2232	1056	148	2483	1110		143	156		169	161
v/s Ratio Prot	0.01	c0.35		c0.04	0.35							
v/s Ratio Perm			0.04			0.01		c0.06	0.00		0.05	0.00
v/c Ratio	0.37	0.52	0.06	0.51	0.47	0.01		0.64	0.05		0.47	0.01
Uniform Delay, d1	48.8	8.2	5.5	43.8	5.1	3.3		43.1	40.5		42.4	40.4
Progression Factor	1.00	1.00	1.00	1.17	0.47	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	8.4	0.9	0.1	2.5	0.5	0.0		8.9	0.1		2.1	0.0
Delay (s)	57.2	9.0	5.7	53.7	2.9	3.3		52.1	40.6		44.5	40.4
Level of Service	E	A	A	D	A	A		D	D		D	D
Approach Delay (s)		9.2			6.0			47.1			43.8	
Approach LOS		A			A			D			D	

### Intersection Summary

HCM 2000 Control Delay	11.1	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	62.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Unsignalized Intersection Capacity Analysis

## 2: SE Rusk Rd & Church Driveway

2/6/2017



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	0	155	212	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	0	0	0	180	247	2
Pedestrians	9					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						469
pX, platoon unblocked						
vC, conflicting volume	437	257	258			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	437	257	258			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	576	781	1309			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	0	180	249			
Volume Left	0	0	0			
Volume Right	0	0	2			
cSH	1700	1309	1700			
Volume to Capacity	0.00	0.00	0.15			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			15.2%	ICU Level of Service	A	
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 3: SE Ruscliffe Ln & SE Rusk Rd

2/6/2017



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	6	149	4	6	206
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	0	7	173	5	7	240
Pedestrians						7
Lane Width (ft)						12.0
Walking Speed (ft/s)						4.0
Percent Blockage						1
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						553
pX, platoon unblocked						
vC, conflicting volume	429	183			178	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	429	183			178	
tC, single (s)	6.4	6.4			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	584	818			1410	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	7	178	247
Volume Left	0	0	7
Volume Right	7	5	0
cSH	818	1700	1410
Volume to Capacity	0.01	0.10	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	9.4	0.0	0.3
Lane LOS	A		A
Approach Delay (s)	9.4	0.0	0.3
Approach LOS	A		

Intersection Summary			
Average Delay		0.3	
Intersection Capacity Utilization		27.8%	ICU Level of Service A
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 4: SE Rusk Rd & SE Kellog Creek Dr

2/6/2017

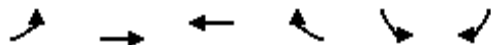


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	67	33	35	86	93	113
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	84	41	44	108	116	141
Pedestrians					7	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					1	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					922	
pX, platoon unblocked						
vC, conflicting volume	389	187	258			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	389	187	258			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	95	97			
cM capacity (veh/h)	595	860	1319			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	125	151	258			
Volume Left	84	44	0			
Volume Right	41	0	141			
cSH	662	1319	1700			
Volume to Capacity	0.19	0.03	0.15			
Queue Length 95th (ft)	17	3	0			
Control Delay (s)	11.7	2.5	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.7	2.5	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			3.4			
Intersection Capacity Utilization			34.0%	ICU Level of Service	A	
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 5: SE Kellog Creek Dr & Church Driveway

2/6/2017



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↶		↶	
Volume (veh/h)	0	84	123	25	16	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	0	105	154	31	20	0
Pedestrians					7	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	192				281	176
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	192				281	176
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				97	100
cM capacity (veh/h)	1385				709	867

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	105	185	20
Volume Left	0	0	20
Volume Right	0	31	0
cSH	1385	1700	709
Volume to Capacity	0.00	0.11	0.03
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.0	10.2
Lane LOS			B
Approach Delay (s)	0.0	0.0	10.2
Approach LOS			B

Intersection Summary			
Average Delay		0.7	
Intersection Capacity Utilization		19.2%	ICU Level of Service
Analysis Period (min)		15	A



# HCM Unsignalized Intersection Capacity Analysis

## 6: SE Aldercrest Rd & SE Rusk Rd

2/6/2017

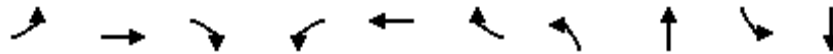


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Sign Control		Stop	Stop		Stop	
Volume (vph)	27	21	24	74	73	31
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	33	26	30	91	90	38
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total (vph)	59	121	128			
Volume Left (vph)	33	0	90			
Volume Right (vph)	0	91	38			
Hadj (s)	0.19	-0.44	0.00			
Departure Headway (s)	4.5	3.8	4.3			
Degree Utilization, x	0.07	0.13	0.15			
Capacity (veh/h)	771	909	805			
Control Delay (s)	7.9	7.4	8.0			
Approach Delay (s)	7.9	7.4	8.0			
Approach LOS	A	A	A			
Intersection Summary						
Delay			7.7			
Level of Service			A			
Intersection Capacity Utilization			21.9%	ICU Level of Service	A	
Analysis Period (min)			15			

Queues

7: SE Lake Rd/SE Webster Rd & Milwaukie Expy

2/6/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	11	1058	176	231	1080	134	167	234	124	92
v/c Ratio	0.12	0.79	0.25	0.78	0.57	0.15	0.60	0.88	0.69	0.52
Control Delay	36.1	39.6	13.7	57.4	14.5	3.4	52.1	61.6	62.5	52.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.1	39.6	13.7	57.4	14.5	3.4	52.1	61.6	62.5	52.3
Queue Length 50th (ft)	7	274	6	140	186	5	105	~102	76	55
Queue Length 95th (ft)	m12	452	116	220	327	36	#213	#261	#150	106
Internal Link Dist (ft)		2471			585			201		465
Turn Bay Length (ft)	500		360	295		150			330	
Base Capacity (vph)	170	1340	713	343	1910	896	277	267	197	189
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	0.06	0.79	0.25	0.67	0.57	0.15	0.60	0.88	0.63	0.49

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 7: SE Lake Rd/SE Webster Rd & Milwaukie Expy

2/6/2017



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Volume (vph)	11	1016	169	222	1037	129	160	76	149	119	82	7
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	4.8		4.0	4.8	
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	0.99	1.00	1.00	0.98	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	0.90		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1421	3312	1504	1719	3223	1436	1770	1594		1641	1726	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1421	3312	1504	1719	3223	1436	1770	1594		1641	1726	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	11	1058	176	231	1080	134	167	79	155	124	85	7
RTOR Reduction (vph)	0	0	107	0	0	50	0	68	0	0	3	0
Lane Group Flow (vph)	11	1058	69	231	1080	84	167	166	0	124	89	0
Confl. Peds. (#/hr)	1					1	4		1	1		4
Confl. Bikes (#/hr)			1						1			
Heavy Vehicles (%)	27%	9%	6%	5%	12%	10%	2%	7%	6%	10%	7%	29%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	1.6	39.4	39.4	17.3	55.1	55.1	15.7	13.5		11.0	8.8	
Effective Green, g (s)	1.6	39.4	39.4	17.3	55.1	55.1	15.7	13.5		11.0	8.8	
Actuated g/C Ratio	0.02	0.39	0.39	0.17	0.55	0.55	0.16	0.14		0.11	0.09	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.8		4.0	4.8	
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)	22	1304	592	297	1775	791	277	215		180	151	
v/s Ratio Prot	0.01	c0.32		c0.13	0.34		c0.09	c0.10		c0.08	0.05	
v/s Ratio Perm			0.05			0.06						
v/c Ratio	0.50	0.81	0.12	0.78	0.61	0.11	0.60	0.77		0.69	0.59	
Uniform Delay, d1	48.8	27.0	19.3	39.5	15.2	10.7	39.2	41.8		42.9	43.9	
Progression Factor	0.77	1.31	3.99	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.1	5.0	0.4	12.1	1.6	0.3	3.7	15.6		10.5	6.1	
Delay (s)	52.7	40.3	77.3	51.6	16.7	11.0	42.9	57.3		53.3	49.9	
Level of Service	D	D	E	D	B	B	D	E		D	D	
Approach Delay (s)		45.6			21.8			51.3			51.9	
Approach LOS		D			C			D			D	

### Intersection Summary

HCM 2000 Control Delay	36.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.8
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 8: SE Kellogg Creek Dr/SE Kellogg Creek Dr

2/6/2017



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Volume (veh/h)	0	80	116	7	4	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	87	126	8	4	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	134				217	130
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	134				217	130
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1451				771	920

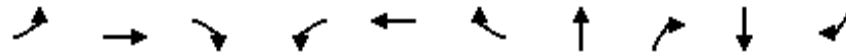
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	87	134	4
Volume Left	0	0	4
Volume Right	0	8	0
cSH	1451	1700	771
Volume to Capacity	0.00	0.08	0.01
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	9.7
Lane LOS			A
Approach Delay (s)	0.0	0.0	9.7
Approach LOS			A

Intersection Summary			
Average Delay		0.2	
Intersection Capacity Utilization		16.5%	ICU Level of Service
Analysis Period (min)		15	A

Queues

1: SE Rusk Rd & Milwaukie Expy

2/6/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	29	1887	188	104	1487	11	130	62	182	34
v/c Ratio	0.28	0.86	0.18	0.62	0.62	0.01	0.98	0.20	0.79	0.11
Control Delay	59.4	24.9	7.3	65.2	12.1	0.6	123.8	10.5	71.4	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.4	24.9	7.3	65.2	12.1	0.6	123.8	10.5	71.4	3.0
Queue Length 50th (ft)	22	600	35	65	429	0	101	0	137	0
Queue Length 95th (ft)	53	#896	78	m#128	m597	m0	#192	35	206	9
Internal Link Dist (ft)		263			2471		389		767	
Turn Bay Length (ft)	470		110	455		100		50		75
Base Capacity (vph)	153	2196	1038	179	2416	1104	182	405	315	397
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	0.19	0.86	0.18	0.58	0.62	0.01	0.71	0.15	0.58	0.09

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 1: SE Rusk Rd & Milwaukie Expy

2/6/2017



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑	↗		↘	↗		↘	↗
Volume (vph)	26	1698	169	94	1338	10	74	43	56	53	111	31
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	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		0.98	1.00
Satd. Flow (prot)	1671	3505	1615	1805	3505	1582		1775	1583		1858	1548
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.44	1.00		0.74	1.00
Satd. Flow (perm)	1671	3505	1615	1805	3505	1582		809	1583		1401	1548
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	29	1887	188	104	1487	11	82	48	62	59	123	34
RTOR Reduction (vph)	0	0	27	0	0	4	0	0	52	0	0	28
Lane Group Flow (vph)	29	1887	161	104	1487	7	0	130	10	0	182	6
Confl. Peds. (#/hr)							1					1
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	8%	3%	0%	0%	3%	0%	3%	5%	2%	2%	0%	3%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8		4		4
Permitted Phases			2			6	8		8			4
Actuated Green, G (s)	5.2	75.2	75.2	11.2	81.2	81.2		19.6	19.6		19.6	19.6
Effective Green, g (s)	5.2	75.2	75.2	11.2	81.2	81.2		19.6	19.6		19.6	19.6
Actuated g/C Ratio	0.04	0.63	0.63	0.09	0.68	0.68		0.16	0.16		0.16	0.16
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)	72	2196	1012	168	2371	1070		132	258		228	252
v/s Ratio Prot	0.02	c0.54		c0.06	0.42							
v/s Ratio Perm			0.10			0.00		c0.16	0.01		0.13	0.00
v/c Ratio	0.40	0.86	0.16	0.62	0.63	0.01		0.98	0.04		0.80	0.02
Uniform Delay, d1	55.9	18.1	9.3	52.3	10.9	6.3		50.1	42.3		48.3	42.2
Progression Factor	1.00	1.00	1.00	0.99	0.89	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	3.7	4.7	0.3	5.4	1.0	0.0		73.2	0.1		17.4	0.0
Delay (s)	59.5	22.8	9.6	57.2	10.8	6.3		123.2	42.3		65.7	42.2
Level of Service	E	C	A	E	B	A		F	D		E	D
Approach Delay (s)		22.1			13.8			97.1			62.0	
Approach LOS		C			B			F			E	

Intersection Summary		
HCM 2000 Control Delay	24.5	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.86	
Actuated Cycle Length (s)	120.0	Sum of lost time (s) 14.0
Intersection Capacity Utilization	80.0%	ICU Level of Service D
Analysis Period (min)	15	

c Critical Lane Group

# HCM Unsignalized Intersection Capacity Analysis

## 2: SE Rusk Rd & Church Driveway

2/6/2017



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	1	173	373	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	0	1	199	429	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					469	
pX, platoon unblocked	0.95	0.95	0.95			
vC, conflicting volume	630	429	430			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	585	373	374			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	453	644	1136			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	0	200	430			
Volume Left	0	1	0			
Volume Right	0	0	1			
cSH	1700	1136	1700			
Volume to Capacity	0.00	0.00	0.25			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.1	0.0			
Lane LOS	A	A				
Approach Delay (s)	0.0	0.1	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			0.0			
Intersection Capacity Utilization			23.0%	ICU Level of Service		A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 3: SE Rusk Rd & SE Ruscliffe Rd

2/6/2017



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	1	6	168	2	5	368
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	1	7	193	2	6	423
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						553
pX, platoon unblocked	0.96					
vC, conflicting volume	629	194			195	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	590	194			195	
tC, single (s)	6.4	6.4			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	451	810			1390	
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	8	195	429			
Volume Left	1	0	6			
Volume Right	7	2	0			
cSH	728	1700	1390			
Volume to Capacity	0.01	0.11	0.00			
Queue Length 95th (ft)	1	0	0			
Control Delay (s)	10.0	0.0	0.1			
Lane LOS	B		A			
Approach Delay (s)	10.0	0.0	0.1			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			0.2			
Intersection Capacity Utilization			33.4%	ICU Level of Service		A
Analysis Period (min)			15			



# HCM Unsignalized Intersection Capacity Analysis

## 4: SE Rusk Rd & SE Kellogg Creek Dr/SE Rusk Rd

2/6/2017



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	71	37	22	99	297	72
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	82	43	25	114	341	83
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					920	
pX, platoon unblocked	1.00	1.00	1.00			
vC, conflicting volume	547	383	424			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	545	380	422			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	83	94	98			
cM capacity (veh/h)	490	670	1114			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>SB 1</b>			
Volume Total	124	139	424			
Volume Left	82	25	0			
Volume Right	43	0	83			
cSH	540	1114	1700			
Volume to Capacity	0.23	0.02	0.25			
Queue Length 95th (ft)	22	2	0			
Control Delay (s)	13.6	1.7	0.0			
Lane LOS	B	A				
Approach Delay (s)	13.6	1.7	0.0			
Approach LOS	B					
<b>Intersection Summary</b>						
Average Delay			2.8			
Intersection Capacity Utilization			37.0%		ICU Level of Service	A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 5: SE Kellogg Creek Dr & Church Driveway

2/6/2017



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	94	69	25	14	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	108	79	29	16	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	108				202	94
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	108				202	94
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	1495				791	969
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>			
Volume Total	108	108	17			
Volume Left	0	0	16			
Volume Right	0	29	1			
cSH	1495	1700	801			
Volume to Capacity	0.00	0.06	0.02			
Queue Length 95th (ft)	0	0	2			
Control Delay (s)	0.0	0.0	9.6			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	9.6			
Approach LOS			A			
<b>Intersection Summary</b>						
Average Delay			0.7			
Intersection Capacity Utilization			15.2%		ICU Level of Service	A
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 6: SE Aldercrest Rd & SE Rusk Rd

2/6/2017

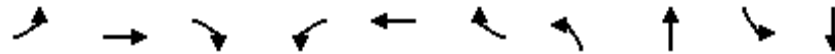


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Sign Control		Stop	Stop		Stop	
Volume (vph)	32	33	34	83	268	47
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	36	37	38	93	301	53
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total (vph)	73	131	354			
Volume Left (vph)	36	0	301			
Volume Right (vph)	0	93	53			
Hadj (s)	0.15	-0.41	0.08			
Departure Headway (s)	5.1	4.4	4.5			
Degree Utilization, x	0.10	0.16	0.44			
Capacity (veh/h)	652	745	779			
Control Delay (s)	8.7	8.3	10.9			
Approach Delay (s)	8.7	8.3	10.9			
Approach LOS	A	A	B			
Intersection Summary						
Delay			10.0			
Level of Service			B			
Intersection Capacity Utilization			34.6%	ICU Level of Service	A	
Analysis Period (min)			15			

Queues

7: SE Lake Rd/SE Webster Rd & Milwaukie Expy

2/6/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	6	1546	349	293	1321	89	189	225	202	161
v/c Ratio	0.07	0.99	0.39	1.00	0.59	0.10	0.92	0.85	1.00	0.89
Control Delay	64.2	53.2	9.4	103.2	14.4	2.4	97.3	66.5	117.1	96.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.2	53.2	9.4	103.2	14.4	2.4	97.3	66.5	117.1	96.1
Queue Length 50th (ft)	4	676	109	~230	271	0	147	133	159	124
Queue Length 95th (ft)	m5	#811	m128	#412	431	23	#288	#272	#316	#254
Internal Link Dist (ft)		2471			585			201		465
Turn Bay Length (ft)	500		360	295		150			330	
Base Capacity (vph)	180	1561	884	292	2243	934	206	265	202	181
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	0.99	0.39	1.00	0.59	0.10	0.92	0.85	1.00	0.89

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

# HCM Signalized Intersection Capacity Analysis

## 7: SE Lake Rd/SE Webster Rd & Milwaukie Expy

2/6/2017



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Volume (vph)	6	1469	332	278	1255	85	180	85	129	192	146	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	2000	1900	1900
Total Lost time (s)	4.0	6.0	6.0	3.8	6.0	6.0	4.0	4.8		0.7	4.8	
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	0.98	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	0.91		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3471	1538	1656	3505	1410	1770	1629		1827	1768	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1805	3471	1538	1656	3505	1410	1770	1629		1827	1768	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	1546	349	293	1321	89	189	89	136	202	154	7
RTOR Reduction (vph)	0	0	192	0	0	34	0	46	0	0	2	0
Lane Group Flow (vph)	6	1546	157	293	1321	55	189	179	0	202	159	0
Confl. Peds. (#/hr)	1					1	2		1	1		2
Heavy Vehicles (%)	0%	4%	5%	9%	3%	12%	2%	4%	6%	4%	7%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	1.4	54.0	54.0	21.0	73.6	73.6	14.0	16.2		10.0	12.2	
Effective Green, g (s)	1.4	54.0	54.0	21.2	73.6	73.6	14.0	16.2		13.3	12.2	
Actuated g/C Ratio	0.01	0.45	0.45	0.18	0.61	0.61	0.12	0.13		0.11	0.10	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	4.8		4.0	4.8	
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)	21	1561	692	292	2149	864	206	219		202	179	
v/s Ratio Prot	0.00	c0.45		c0.18	0.38		0.11	c0.11		c0.11	0.09	
v/s Ratio Perm			0.10			0.04						
v/c Ratio	0.29	0.99	0.23	1.00	0.61	0.06	0.92	0.82		1.00	0.89	
Uniform Delay, d1	58.8	32.7	20.2	49.4	14.4	9.3	52.4	50.5		53.4	53.2	
Progression Factor	1.17	1.19	4.10	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.9	14.5	0.4	53.5	1.3	0.1	40.0	20.6		63.3	37.3	
Delay (s)	72.8	53.3	83.3	102.9	15.7	9.5	92.5	71.0		116.7	90.6	
Level of Service	E	D	F	F	B	A	F	E		F	F	
Approach Delay (s)		58.9			30.4			80.8			105.1	
Approach LOS		E			C			F			F	

### Intersection Summary

HCM 2000 Control Delay	53.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.8
Intersection Capacity Utilization	94.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Unsignalized Intersection Capacity Analysis

## 8: SE Kellogg Creek Dr

2/6/2017



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	90	63	7	4	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	98	68	8	4	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	76				170	72
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	76				170	72
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1523				820	990

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	98	76	4
Volume Left	0	0	4
Volume Right	0	8	0
cSH	1523	1700	820
Volume to Capacity	0.00	0.04	0.01
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	9.4
Lane LOS			A
Approach Delay (s)	0.0	0.0	9.4
Approach LOS			A

Intersection Summary			
Average Delay		0.2	
Intersection Capacity Utilization		14.7%	ICU Level of Service
Analysis Period (min)		15	A