DKS *Associates*
TRANSPORTATION SOLUTIONS

MEMORANDUM

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FROM: Peter Coffey, P.E., P.T.O.E.
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Brad Coy, E.I.T.

DATE: January 29, 2010

SUBJECT: **Warner Milne Road Restriping Analysis** P09155-000-000

This memorandum documents traffic analysis performed for the section of Warner Milne Road in Oregon City that is currently being repaved and restriped to determine whether the existing cross section should include either bike lanes or a center two-way left-turn lane (TWLTL). The City would like to make the final striping modifications as part of the improvement project that is currently under construction.

First, background information is documented and safety research findings relating to TWLTLs are presented. Then, the existing traffic volumes along Warner Milne Road are documented and analysis results are presented relating to intersection operations, left-turn lane warrants, and collision history. Following the analysis, a summary of findings relating to the two striping alternatives is provided.

Background Information

Warner Milne Road runs between Linn Avenue and Molalla Avenue in Oregon City (through a mixed use commercial/high density residential area[1]), is classified as a minor arterial, and has a speed limit of 30 miles per hour (mph). In the past, it has included a travel lane in either direction plus a center TWLTL. However, the Oregon City Transportation System Plan (TSP) identifies a high priority bicycle system improvement (Project B-6) on this section of Warner Milne Road that includes the striping of 5- to 6-foot wide bike lanes in both directions.[2] Because the curb-to-curb distance on Warner Milne Road is not sufficiently wide to include both bike lanes and a TWLTL, a decision must be made regarding which should be provided.

Currently, there is roadwork being performed on the eastern end of Warner Milne Road between Beavercreek Road (also referred to as Kaen Avenue) and Molalla Avenue. The roadwork includes

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[1] Adjacent zoning includes Mixed Use Corridor 1 (MUC-1), Mixed Use Employment (MUE), General Commercial (C), and Multi-Family Dwelling (R-2).
[2] *Oregon City Transportation System Plan*, Ordinance No. 01-1009, Adopted April 2001, Table 5-11, page 5-51; Project B-6 has an estimated cost of $10,150.

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the relocation of the Warner Milne Road approach to Molalla Avenue in order to align opposite Fox Lane. In addition, the curb-to-curb distance is being widened to accommodate three travel lanes (one in either direction plus an eastbound turn lane) as well as bike lanes in either direction. This widened cross section will extend approximately 350 feet from the intersection, at which point the bike lanes will end and Warner Milne Road will narrow to the existing curb-to-curb distance. The construction design plans show restriping a travel lane in either direction plus a center TWLTL along the rest of Warner Milne Road up until approximately 190 feet from Beavercreek Road. The TWLTL striping will then end and a westbound left turn lane for the signalized Warner Milne Road/Beavercreek Road intersection will be provided. This plan is consistent with the previous Warner Milne Road striping.

Due to the current roadwork on Warner Milne Road, now is an opportune moment to decide whether bike lanes should be provided instead of a TWLTL. One key reference for the city is the Oregon City TSP, which indicates that bike lanes are required on minor arterials while center turn lanes are optional.[3] Therefore, because Warner Milne Road is classified as a minor arterial, bike lanes would typically be a higher priority than a TWLTL.

A review of other minor arterials throughout the city also indicates that bike lanes are almost always provided instead of TWLTLs.[4] The following roadways are some examples (though in some instances there are unimproved roadway sections where there are neither bike lanes nor TWLTLs):

- Warner Parrot Road (which becomes Warner Milne Road at Linn Avenue)
- South End Road
- Linn Avenue
- Holmes Lane
- Meyers Road
- Redland Road
- Washington Street

As mentioned previously, land uses along this section of Warner Milne Road are mixed use employment, commercial, and high density residential. These land uses often attract bike trips as residents travel between their homes and retail/employment centers. Therefore, bike lanes would facilitate bike trips in the area. In addition, providing bike lanes adjacent to these land uses is consistent with the Oregon City TSP objective to "provide a well-defined and accessible bicycle network that links residential areas, major bicycle generators, employment centers, and the arterial and collector roadway network with one another."[5]

In addition, as Oregon City continues to improve the connectivity of its bike lane network, it will encourage residents to use alternative transportation modes and contribute to a reduction in vehicle-miles traveled (VMT). The City has a goal identified in its TSP[6] to reduce per capita VMT by 10 percent between the years 2000 and 2020, and additional bike lanes can help the City move towards this goal. Furthermore, providing bike facilities (such as bike lanes) is a proactive and

[3] *Oregon City Transportation System Plan (TSP)*, Ordinance No. 01-1009, Adopted April 2001, Figure 5-2A (Street Design Standards: Typical Sections).
[4] One instance when there is a TWLTL provided on a minor arterial instead of bikes is Abernethy Road. However, there is a wider shoulder along much of this roadway that could provide some service to bicycles.
[5] *Oregon City TSP*, Ordinance No. 01-1009, Adopted April 2001, Goal 1: Objective 4, pg. 5-4.
[6] I.B.I.D., Goal 1: Objective 2, pg. 5-4.

economical approach to reducing greenhouse gas (GHG) emissions, which will help Oregon City to meet another TSP Goal, namely to "ensure the multi-modal transportation system preserves, protects, and supports the environmental integrity of the Oregon City community."[7] Therefore, providing bike lanes instead of a TWLTL is more consistent with multiple objectives of the Oregon City TSP.

There are also regional goals that should be addressed because Oregon City is within Metro's metropolitan planning boundaries. Metro is the federally mandated metropolitan planning organization designated by the governor to develop an overall transportation plan and to allocate federal funds for the region. In their *2035 Regional Transportation Plan*,[8] Metro has also identified various objectives that are associated with providing an increased number of bike lanes:

- **Objective 3.1: Travel Choices –** Achieve modal targets for increased walking, bicycling, use of transit and shared ride and reduced reliance on the automobile and drive alone trips.
- **Objective 3.2: Vehicle Miles of Travel –** Reduce vehicle miles traveled per capita.
- **Objective 6.2: Clean Air –** Reduce transportation-related vehicle emissions to improve air quality so that as growth occurs, the view of the Cascades and the Coast Range from within the region are maintained.
- **Objective 7.1: Active Living –** Provide safe, comfortable and convenient transportation options that support active living and physical activity to meet daily needs and access services.

If bike lanes were provided on Warner Milne Road instead of a TWLTL and no widening was performed, the bike lanes would be required to end approximately 190 feet east of Beavercreek Road to allow for the westbound left turn lane at the Warner Milne Road/Beavercreek Road intersection. This would leave a gap in the bicycle lane network starting at this location and extending west to Linn Avenue (where Warner Milne Road becomes Warner Parrot Road).

The main consideration for including a TWLTL instead of bike lanes is that this is what was previously provided and current construction plans include the restriping of a TWLTL instead of bike lanes. In addition, because certain operational and safety considerations (e.g., left-turn volumes, capacity needs, and recent collisions) can increase the importance of having a TWLTL, these were analyzed and are documented in this memorandum in order to assist City Staff in determining whether a TWLTL on Warner Milne Road is more important than bike lanes.

[7] I.B.I.D., Goal 1: Objective 9, pg. 5-4.
[8] *2035 Regional Transportation Plan: Public Review Draft*, Metro, September 15, 2009; pgs.9 to 11

Safety Research

Research was performed to document when bike lanes and/or a center two-way left-turn lane (TWLTL) are appropriate and how they can benefit roadway users. How these considerations relate to this segment of Warner Milne Road is discussed throughout this memorandum and overall findings are provided in the final summary section.

Bike Lanes

Cyclists are important roadway users, and all roadways should be designed under the assumption that they will be used by cyclists.[9] In addition, because there are various methods that can be used to accommodate bicyclists, community goals (typically developed and documented in conjunction with transportation plans) are important in shaping how a bicycle network is developed.[10] Therefore, the Oregon City TSP is an important document to provide guidance for this decision.

Bicyclist safety is another important consideration when determining whether to install bike lanes. One emphasis area that has been identified for reducing the number and of severity of bicycle-related collisions is to provide safe roadway facilities for parallel travel. The most common method of doing so is to provide bicycle lanes.[11]

In recent years, bicycle travel has also become a more important alternative mode of transportation in the United States. A primary method that has been used to improve bicycle travel is to provide bike lanes. In fact, it has been recommended that "special efforts . . . be made to assure that a high quality network is provided with these lanes."[12] While there are no definite rules for determining when a striped bike lane should be provided to accommodate bicycle traffic, two of the main considerations that are typically used across the world are roadway traffic volumes and travel speed. The most common thresholds are when there are more than 3,000 daily vehicles and/or vehicular travel speeds are in excess of 25 mph.[13] These thresholds are also documented in the Oregon City TSP.[14]

Center Two-Way Left-Turn Lanes (TWLTLs)

Though it is best to remove left-turning traffic from through lanes whenever practical, the degree of importance of providing a turn lane is based on whether one is warranted. The two main warrant considerations are high traffic volumes and identified safety concerns.[15]

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[9] *Guide for the Development of Bicycle Facilities (1999),* American Association of State Highway Transportation Officials (AASHTO), pg. 1.
[10] I.B.I.D., pg. 5.
[11] *Guidance for Implementation of the AASHTO Strategic Highway Safety Plan – Volume 18: A Guide for Reducing Collisions Involving Bicycles,* National Cooperative Highway Research Program (NCHRP) Report 500, 2008, pgs. V-49 to V-50.
[12] I.B.I.D., pg. 8.
[13] *Bicycle Facility Selection: A Comparison of Approaches*, prepared by Michael King for the Pedestrian and Bicycle Information Center Highway Safety Research Center, University of North Carolina – Chapel Hill
[14] *Oregon City Transportation System Plan*, Ordinance No. 01-1009, Adopted April 2001, pg. 5-48.
[15] *A Policy on Geometric Design of Highways and Streets (Fifth Edition, 2004),* AASHTO, pg. 682.

Research data[16] also support the finding that having a TWLTL has been shown to be advantageous for the following reasons:

- There are less collisions, especially rear-ends; though, the greatest collision reduction benefits are experienced in rural rather than urban locations.[17]
- Travel times through a corridor are reduced because of less delay caused by turning vehicles.
- The roadway has improved capacity and can serve higher traffic volumes.
- Surveys of both drivers and owners of abutting properties have indicated that they typically prefer having TWLTLs in order to improve driveway access.

Not all roadways are good candidates for striping TWLTLs. The typical preferred use of a TWLTL is when the roadway has the following characteristics[18]:

- It is an arterial road with closely spaced, low-volume commercial driveways (i.e., no heavy concentrations of left-turning traffic).
- Travel speeds are relatively low (25 to 45 mph).
- Total roadway volumes are below about 24,000 daily vehicles (i.e., a lower-volume road).[19]

Traffic Volumes

Because they are the basis of operational and warrant analysis, traffic volumes along Warner Milne Road were collected during the a.m. (7:00 to 9:00 a.m.) and p.m. (4:00 to 6:00 p.m.) peak periods at the following five driveways:

- Warner Milne Rd./Danielson's West Driveway
- Warner Milne Rd./City Hall Driveways
- Warner Milne Rd./Barclay Apartments Driveway
- Warner Milne Rd./Clackamas Credit Union Driveway
- Warner Milne Rd./Clackamas County Sheriff's Driveway

Only the vehicles entering and exiting the driveways were counted because the current construction allows for local access traffic but is a deterrent to through traffic. To estimate through traffic volumes on Warner Milne Road, recent traffic volumes counted prior to construction at the nearby Warner Milne Road/Molalla Avenue intersection were used, and balancing was performed. The resulting intersection volumes assumed for this analysis are shown in Figure 1 and detailed count information is provided in the appendix. A review of the left-turn volumes into the driveways shows there are no heavy concentrations of left-turning traffic at any of these driveways. For this fact and because of the close spacing of driveways, a TWLTL would be the preferred option for removing left turns from the through lanes.

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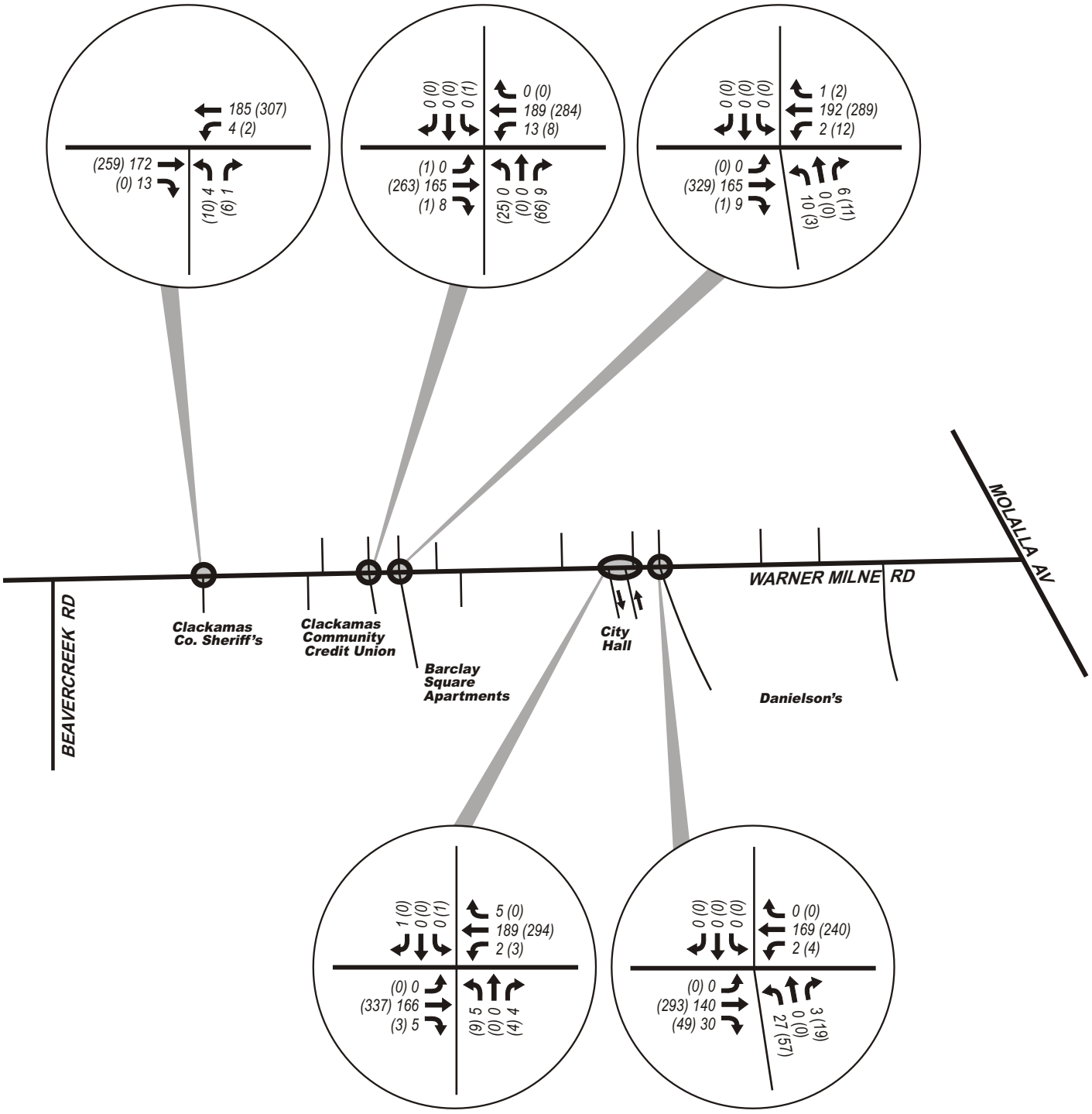
[16] I.B.I.D., pg. 338.
[17] *Safety Evaluation of Center Two-Way Left-Turn Lanes on Two-Lane Roads*, Federal Highway Administration Tech Brief (FHWA-HRT-08-046), March 2008.
[18] *A Policy on Geometric Design of Highways and Streets (Fifth Edition, 2004)*, AASHTO, pgs. 338, 475.
[19] *Traffic Engineering Handbook (Sixth Edition, 2009)*, Institute of Traffic Engineers (ITE), pg. 465.



LEGEND

- Study Intersection

AM (PM) - Peak Hour Traffic Volumes

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NO SCALE

Figure 1

EXISTING A.M. AND P.M. PEAK HOUR DRIVEWAY VOLUMES

A 24-hour tube count on Warner Milne Road between Beavercreek Road and Molalla Avenue was also available and the measured traffic volumes and speeds are listed in Table 1. This data was collected prior to construction and indicates that bi-directional average daily traffic (ADT) volumes were approximately 7,600 vehicles and the 85th percentile travel speed was 33 mph, which is slightly higher than the 30-mph speed limit. Therefore, Warner Milne Road is a lower speed, lower volume roadway and would be a good candidate for a TWLTL. However, because volumes are greater than 3,000 daily vehicles and travel speeds are greater than 25 mph, it is also important to provide bike lanes on this roadway section.

There were also approximately 135 bikes using the vehicle travel lanes during the day (approximately two percent of total traffic) based on the traffic count data with approximately 20 of these occurring during the p.m. peak hour. Because these bicycles were counted with roadway tubes, it does not include any bicycles that may have been using the sidewalks. Therefore, there is significant existing demand for bicycle facilities on this roadway.

Table 1: 24-Hour Warner Milne Tube Data (Weekday, July 2008, Prior to Construction)

Data	By Direction of Travel		Total
	Eastbound	*Westbound*	
Approximate Daily Traffic Volume (including Bikes)	3,850 vehicles	3,750 vehicles	7,600 vehicles
85th Percentile Speed	33 mph	33 mph	33 mph
Approximate Daily Bicycle Volumes using Vehicular Travel Lane	65 bikes	70 bikes	135 bikes

Intersection Operations

Intersection traffic operations were analyzed for the five study area driveways both with and without a center two-way left-turn lane (TWLTL) in order to compare the operational difference between the two striping alternatives. The operating conditions were estimated for both the a.m. and p.m. peak hours using the traffic volumes discussed previously (see Figure 1).

The average delay, level of service (LOS), and volume to capacity (V/C) ratios were determined using *2000 Highway Capacity Manual* methodology[20] and are listed in Table 2. As shown, all driveways would operate at LOS C or better and meet the Oregon City LOS E operating standard for unsignalized intersections regardless of whether a center TWLTL is provided.[21] Therefore, there are no operating concerns that indicate a center turn lane is needed.

[20] *2000 Highway Capacity Manual*, Transportation Research Board, Washington DC, 2000.
[21] The TWLTL analysis assumes 2-stage gap acceptance where vehicles are able to pull out of the driveways and wait in the TWLTL before merging with traffic. The analysis assumes that TWLTL storage is available for one vehicle.

Table 2: Driveway Operating Conditions (A.M. and P.M. Peak Hours)

Driveway on Warner Milne Road	Operating Standard	With Center Turn Lane			No Center Turn Lane		
		Delay	*LOS*	*V/C*	*Delay*	*LOS*	*V/C*
A.M. Peak Hour							
Danielson's (west)	LOS E	10.4	A/B	0.13	10.9	A/B	0.17
City Hall	LOS E	9.4	A/A	0.13	9.4	A/A	0.15
Barclay Apartments	LOS E	10.6	A/B	0.14	11.2	A/B	0.17
Clackamas Credit Union	LOS E	10.3	A/B	0.14	10.7	A/B	0.17
Clackamas County Sheriff's	LOS E	10.8	A/B	0.12	11.4	A/B	0.15
P.M. Peak Hour							
Danielson's (west)	LOS E	11.0	A/B	0.19	11.8	A/B	0.25
City Hall	LOS E	13.2	A/B	0.18	15.9	A/C	0.22
Barclay Apartments	LOS E	10.8	A/B	0.21	11.4	A/B	0.28
Clackamas Credit Union	LOS E	12.6	A/B	0.21	15.0	A/B	0.29
Clackamas County Sheriff's	LOS E	12.3	A/B	0.21	14.0	A/B	0.28

Delay = Average Stopped Delay per Vehicle (sec) at Worst Movement (typically a minor movement)
LOS = Level of Service of Major Street/Minor Street
V/C = Volume-to-Capacity Ratio of Worst Movement (typically a minor movement)
Bold Underlined values do not meet standards.

Left-Turn Lane Warrants

Left turn lane warrants were analyzed at the five study area driveways and are a good indicator of where left-turn lanes are needed because they take into account roadway characteristics that have been shown to influence both safety and capacity of left-turn movements (e.g., roadway volumes, speeds, expected traffic flow, and number of travel lanes). Table 3 provides the results of the warrant analysis based on methodologies provided by the Highway Research Board (HRB) and ODOT. As shown, no left-turn lane warrants using either method are met. Therefore, there are no turn lane volume concerns that indicate a center turn lane is needed.

Table 3: Turn Lane Warrants (A.M. and P.M. Peak Hours)

Driveway on Warner Milne Road	Movement	Turn Lane Warrants Met?	
		HRB (A.M./P.M.)[a]	*ODOT (A.M./P.M.)*
Danielson's (west)	Eastbound	No/No	No/No
	Westbound	No/No	No/No
City Hall	Eastbound	No/No	No/No
	Westbound	No/No	No/No
Barclay Apartments	Eastbound	No/No	No/No
	Westbound	No/No	No/No
Clackamas Credit Union	Eastbound	No/No	No/No
	Westbound	No/No	No/No
Clackamas County Sheriff's	Westbound	No/No	No/No

[a] HRB = Highway Research Board

Collision Analysis

Collision analysis was performed for the segment of Warner Milne Road between Beavercreek Road (also referred to as Kaen Avenue) and Molalla Avenue. Only those collisions not related to the Warner Milne Road/Beavercreek Road and Warner Milne Road/Molalla Avenue intersections and their associated intersection approaches and turn lanes were considered. Therefore, the specific segment starts 190 feet east of Beavercreek Road and ends 350 feet west of Molalla Avenue.

The collision history for this segment of road was obtained for the most recent three years (i.e., 2006 through 2008) from the ODOT Crash Analysis and Reporting Unit. The data indicate that there were no reported collisions involving pedestrians or bicyclists during these three years. Instead, this section of Warner Milne only had the following two reported collisions, though both incidents did result in injuries (the details were deducted from distance and error code information provided by ODOT):

- On April 28, 2006, an eastbound vehicle improperly turned left into the Oregon City Church of Christ back alley and was hit by a westbound through vehicle.
- On August 12, 2008, a vehicle exiting the Randji Denture Center did not yield to a westbound vehicle turning right into the driveway.

The average yearly collision rate for this segment of Warner Milne Road was calculated based on these two collisions (0.67 collisions per year), the daily traffic tube count reported previously in this memorandum (7,600 daily vehicles), and the estimated roadway length (1,360 feet or approximately one-quarter mile). The resulting collision rate is 0.94 collisions per million vehicle-miles traveled (VMT). This is lower than the statewide average of 2.49 collisions per million VMT for urban city minor arterial roadways for the same years (i.e., 2006 to 2008).[22] However, because this roadway section is less than one mile, small changes in assumptions can significantly change the results. Therefore, ODOT has indicated that a warning should accompany the estimated collision rate.[23]

The low collision rate for this segment of Warner Milne Road supports the conclusion that there were no significant safety concerns when a TWLTL was provided. Because TWLTLs improve safety, it is possible that if the TWLTL is removed, then safety may decrease and there may be an increase in collisions in the future. Therefore, if City Staff decide to stripe bike lanes instead of a TWLTL, it is recommended that a before-and-after safety study be performed as data is available in order to verify the safety effects.

Summary of Findings

Warner Milne Road is currently being repaved and restriped between Beavercreek Road (Kaen Avenue) and Molalla Avenue. Because the curb-to-curb distance is not wide enough to include both bike lanes and a center two-way left-turn lane (TWLTL), City Staff must make a decision regarding which should be provided.

[22] *2008 State Highway Crash Rate Tables*, ODOT Crash Analysis and Reporting Unit, August 2009; Table II, pg. 7.
[23] *Analysis Procedures Manual (APM)*, ODOT Transportation and Analysis Unit (TPAU), July 2009, pg. 5-2.

Below is a summary list of findings for the two alternatives based on the previously documented analysis to assist City Staff in their determination:

Why a TWLTL may be helpful

- This section of Warner Milne Road is a good candidate for a TWLTL because it has the desired characteristics (i.e., minor arterial classification, no heavy concentrations of left-turning traffic, close spacing of driveways, lower travel speeds, and lower traffic volumes).
- There were no identified safety concerns when a TWLTL was previously provided.

Why a TWLTL is not necessary

- There are no operating concerns that indicate a center turn lane is necessary (i.e., all intersections meet operating standards).
- There are no turn lane volume concerns that indicate a center turn lane is necessary (i.e., no turn lane warrants are met).
- Striping a TWLTL prevents the inclusion of bike lanes. This is inconsistent with the Oregon City TSP, which indicates that bike lanes are required on minor arterials while a center turn lane is optional.
- Other minor arterials throughout Oregon City provide bike lanes instead of TWLTLs.

Why bike lanes are important

- The Oregon City TSP indicates that bike lanes are required on minor arterials and that TWLTLs are optional. Providing bike lanes instead of a TWLTL is also consistent with Goal #1 (Multi-Modal Travel Options) of the Oregon City TSP. In particular, Objectives 2, 4, and 9 are better met by striping bike lanes.[24] Because the Oregon City TSP reflects community goals, it is an important document to provide guidance for this decision.
- The Oregon City TSP identifies the striping of 5- to 6-foot wide bike lanes in both directions as a high priority bicycle system improvement (Project B-6).
- There is existing demand for bicycle facilities. Tube counts prior to construction indicate that 135 daily bicyclists use the vehicle travel lanes on this section of Warner Milne Road.
- Safety research indicates that bike lanes should be provided because traffic volumes are greater than 3,000 daily vehicles and travel speeds are greater than 25 mph.

Potential considerations should a TWLTL not be provided

- Striping bike lanes prevents the inclusion of a TWLTL. Therefore, if a TWLTL is not provided, it is recommended that a before-and-after safety study be performed as data is available in order to verify the safety effects.

Let us know if you have any questions or comments.

[24] *Oregon City TSP*, Ordinance No. 01-1009, Adopted April 2001, Goal 1: Objectives 2, 4, & 9, pg. 5-4.

Appendix

Traffic Counts – AM Peak Hour

Traffic Counts – PM Peak Hour

Traffic Counts – 24-Hour Tube Data

Level of Service Descriptions

HCM Analysis – With Turn Lanes

HCM Analysis – Without Turn Lanes

Turn Lane Warrants

ODOT Collision Data

Traffic Counts – AM Peak Hour

Type of peak hour being reported: Intersection Peak

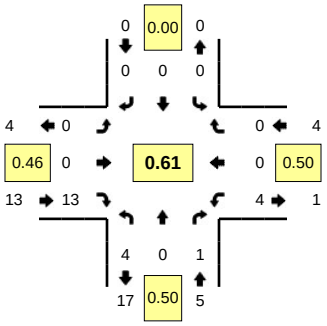
Method for determining peak hour: Total Entering Volume

LOCATION: Clackamas County Sheriff's Dwy -- Warner Milne Rd

QC JOB #: 10470309

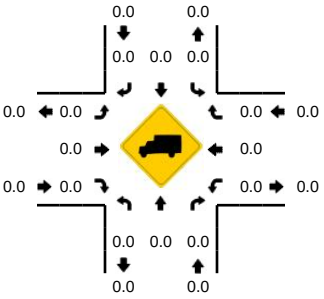
CITY/STATE: Oregon CIty, OR

DATE: 12/16/2009

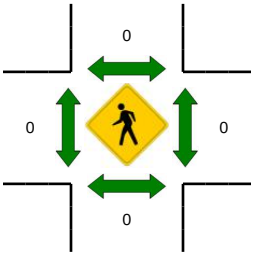


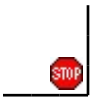
Peak-Hour: 7:15 AM -- 8:15 AM

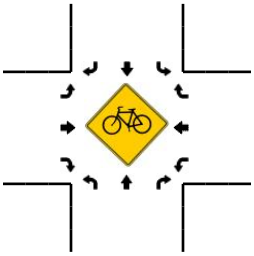
Peak 15-Min: 7:15 AM -- 7:30 AM

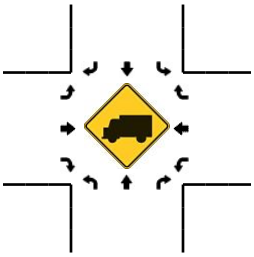


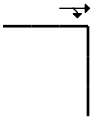
Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

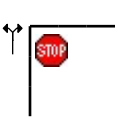


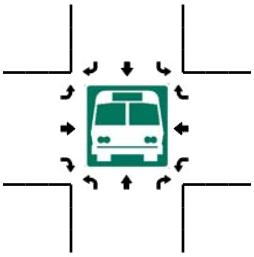












5-Min Count Period Beginning At	Clackamas County Sheriff's Dwy (Northbound)				Clackamas County Sheriff's Dwy (Southbound)				Warner Milne Rd (Eastbound)				Warner Milne Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:05 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	
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	3	0	0	0	0	0	3	
7:20 AM	0	0	1	0	0	0	0	0	0	0	3	0	1	0	0	0	5	
7:25 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	
7:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2	
7:35 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2	
7:40 AM	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
7:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	
7:50 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
7:55 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	19
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	20
8:05 AM	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	21
8:10 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	22
8:15 AM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	21
8:20 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
8:25 AM	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	3	18
8:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	17
8:35 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	16
8:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
8:45 AM	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	2	15
8:50 AM	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	3	17
8:55 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16

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	4	0	0	0	0	0	0	0	28	0	4	0	0	0	36
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Comments: Need to be able to get traffic from both sides

Report generated on 12/29/2009 9:27 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

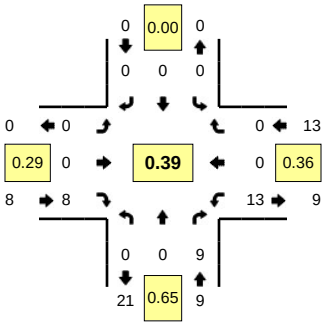
Method for determining peak hour: Total Entering Volume

LOCATION: Clackamas Credit Union Dwy -- Warner Milne Rd

QC JOB #: 10470307

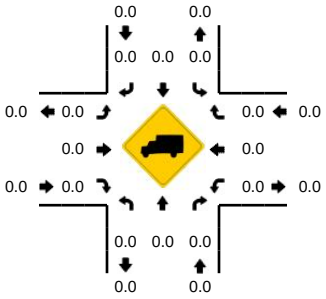
CITY/STATE: Oregon CIty, OR

DATE: 12/16/2009

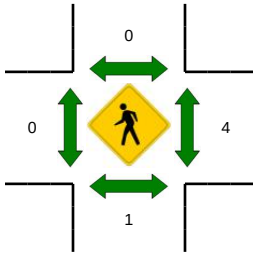


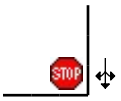
Peak-Hour: 7:55 AM -- 8:55 AM

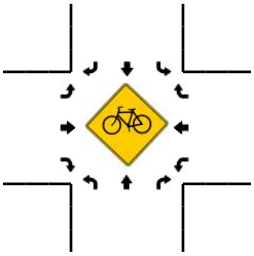
Peak 15-Min: 8:25 AM -- 8:40 AM

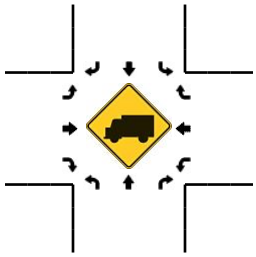


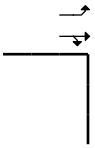
Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

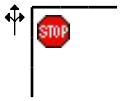


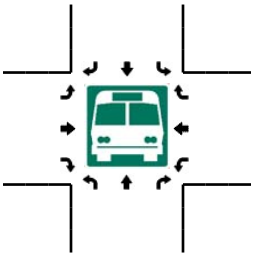












5-Min Count Period Beginning At	Clackamas Credit Union Dwy (Northbound)				Clackamas Credit Union Dwy (Southbound)				Warner Milne Rd (Eastbound)				Warner Milne Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
7:05 AM	1	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	4	
7:10 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
7:15 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
7:20 AM	2	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	4	
7:25 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	
7:30 AM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
7:35 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:40 AM	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	
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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	17
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
8:05 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
8:10 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	12
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
8:20 AM	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	2	9
8:25 AM	0	0	0	0	0	0	0	0	0	0	3	0	5	0	0	0	8	16
8:30 AM	0	0	3	0	0	0	0	0	0	0	2	0	3	0	0	0	8	22
8:35 AM	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	3	25
8:40 AM	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	3	26
8:45 AM	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	3	29
8:50 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	30
8:55 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29

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	16	0	0	0	0	0	0	0	28	0	32	0	0	0	76
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				8			8
Bicycles																	
Railroad																	
Stopped Buses																	

Comments: Need to be able to get traffic from both sides

Report generated on 12/29/2009 9:27 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

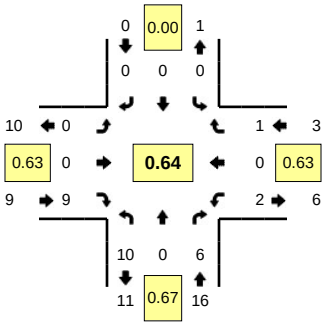
Method for determining peak hour: Total Entering Volume

LOCATION: Barclay Apartments Dwy -- Warner Milne Rd

QC JOB #: 10470305

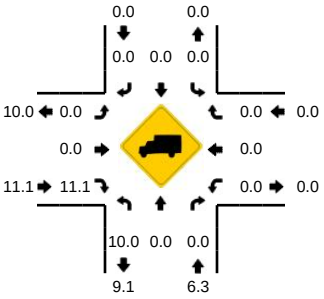
CITY/STATE: Oregon CIty, OR

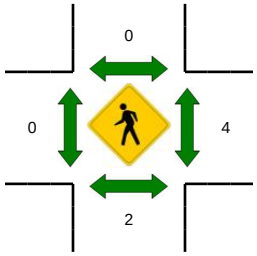
DATE: 12/16/2009

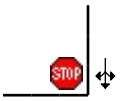


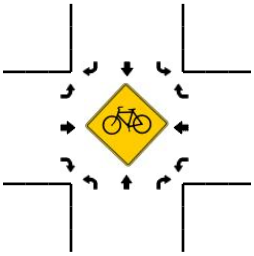
Peak-Hour: 7:40 AM -- 8:40 AM

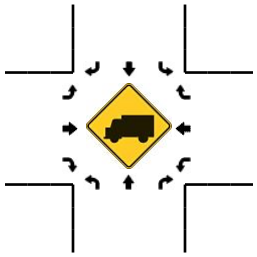
Peak 15-Min: 7:45 AM -- 8:00 AM

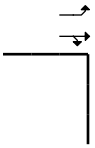


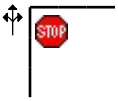


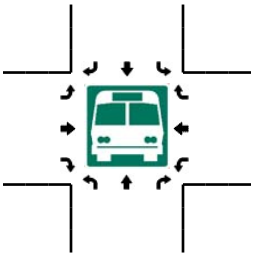












5-Min Count Period Beginning At	Barclay Apartments Dwy (Northbound)				Barclay Apartments Dwy (Southbound)				Warner Milne Rd (Eastbound)				Warner Milne Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	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	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	
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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
7:30 AM	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	3	
7:35 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:40 AM	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	
7:45 AM	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	3	
7:50 AM	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	4	
7:55 AM	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	4	20
8:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2	22
8:05 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	23
8:10 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	22
8:15 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	23
8:20 AM	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	4	27
8:25 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	27
8:30 AM	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	3	27
8:35 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	28
8:40 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2	27
8:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2	26
8:50 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	23
8:55 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19

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	4	0	0	0	0	0	0	0	16	0	0	0	4	0	44
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				4			4
Bicycles																	
Railroad																	
Stopped Buses																	

Comments: Need to be able to get traffic from both sides

Report generated on 12/29/2009 9:27 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

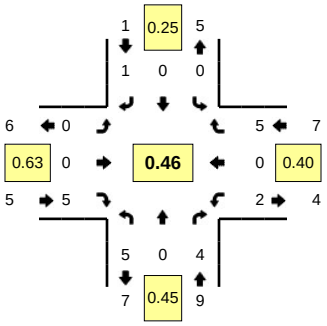
Method for determining peak hour: Total Entering Volume

LOCATION: City Hall Driveway -- Warner Milne Rd

QC JOB #: 10470303

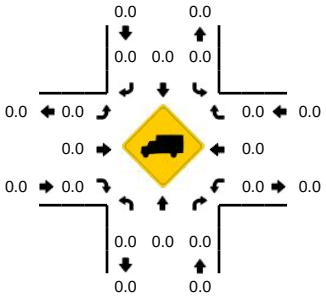
CITY/STATE: Oregon CIty, OR

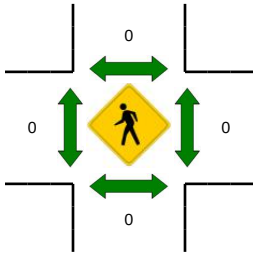
DATE: 12/16/2009

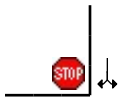


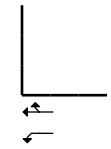
Peak-Hour: 7:10 AM -- 8:10 AM

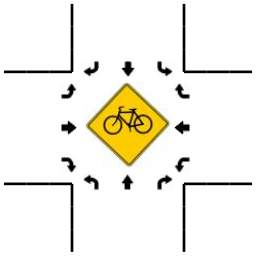
Peak 15-Min: 7:35 AM -- 7:50 AM

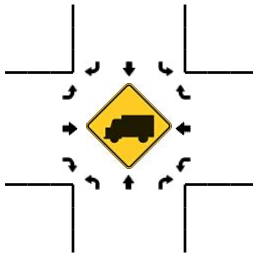


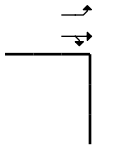


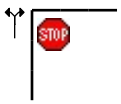


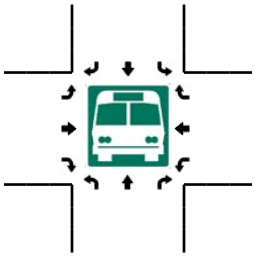












5-Min Count Period Beginning At	City Hall Driveway (Northbound)				City Hall Driveway (Southbound)				Warner Milne Rd (Eastbound)				Warner Milne Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	
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	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
7:15 AM	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	3	
7:20 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:25 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:35 AM	2	0	2	0	0	0	0	0	0	0	1	0	1	0	0	0	6	
7:40 AM	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	
7:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	0	4	
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	1	0	0	0	1	0	2	21
8:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	21
8:05 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	22
8:10 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	21
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
8:20 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
8:25 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17
8:35 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
8:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	6
8:50 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
8:55 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4

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	12	0	8	0	0	0	0	0	0	0	8	0	8	0	12	0	48
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Comments: Need to be able to get traffic from both sides

Report generated on 12/29/2009 9:27 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

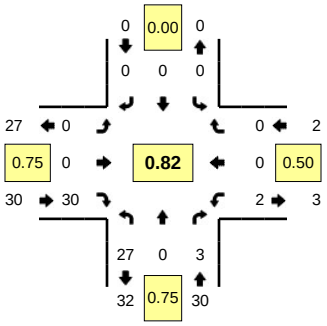
Method for determining peak hour: Total Entering Volume

LOCATION: Danielson's West Dwy -- Warner Milne Rd

QC JOB #: 10470301

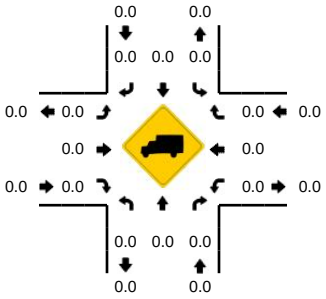
CITY/STATE: Oregon CIty, OR

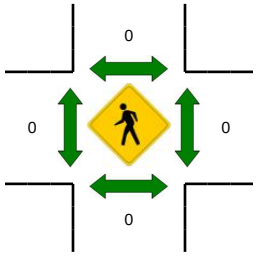
DATE: 12/16/2009

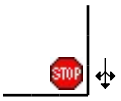


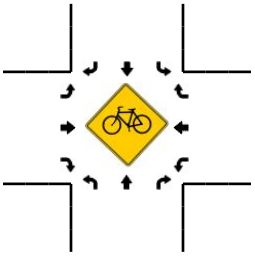
Peak-Hour: 7:50 AM -- 8:50 AM

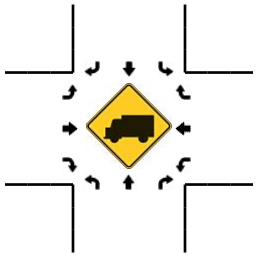
Peak 15-Min: 7:50 AM -- 8:05 AM

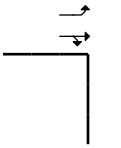


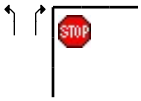


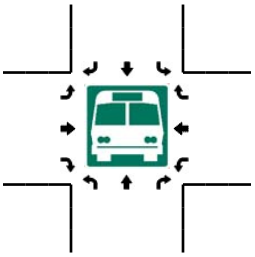












5-Min Count Period Beginning At	Danielson's West Dwy (Northbound)				Danielson's West Dwy (Southbound)				Warner Milne Rd (Eastbound)				Warner Milne Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	3	
7:05 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
7:10 AM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	
7:15 AM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	
7:20 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	
7:25 AM	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	
7:30 AM	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	
7:35 AM	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	3	
7:40 AM	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	2	
7:45 AM	1	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	5	
7:50 AM	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	5	
7:55 AM	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	7	36
8:00 AM	4	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	7	40
8:05 AM	2	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	5	44
8:10 AM	2	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	6	48
8:15 AM	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	48
8:20 AM	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	50
8:25 AM	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	50
8:30 AM	1	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	5	53
8:35 AM	1	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	5	55
8:40 AM	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	4	57
8:45 AM	4	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	10	62
8:50 AM	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	4	61
8:55 AM	2	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	5	59

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	32	0	4	0	0	0	0	0	0	0	36	0	4	0	0	0	76
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Comments: Need to be able to get traffic from both sides

Report generated on 12/29/2009 9:27 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

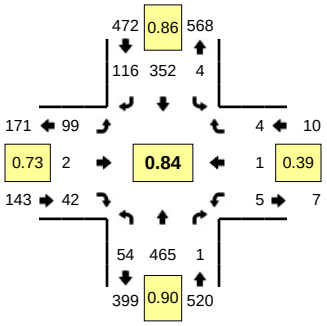
Method for determining peak hour: Total Entering Volume

LOCATION: Molalla Ave -- Warner Milne Rd

QC JOB #: 10371903

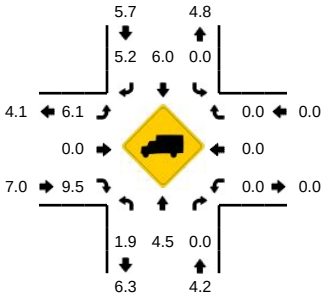
CITY/STATE: Oregon City, OR

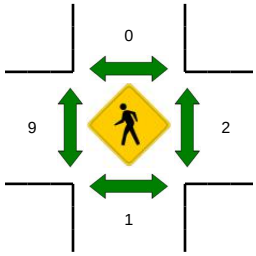
DATE: 7/23/2008

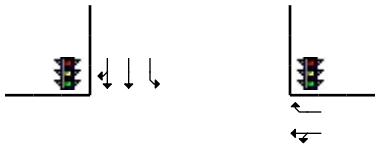


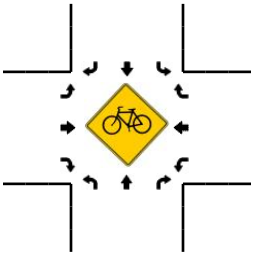
Peak-Hour: 8:00 AM -- 9:00 AM

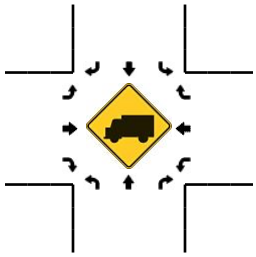
Peak 15-Min: 8:40 AM -- 8:55 AM

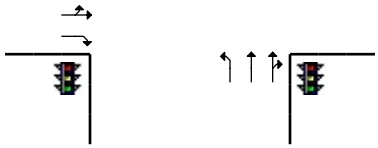


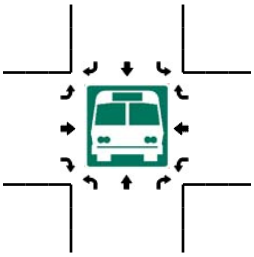












5-Min Count Period Beginning At	Molalla Ave (Northbound)				Molalla Ave (Southbound)				Warner Milne Rd (Eastbound)				Warner Milne Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	4	30	0	0	0	13	3	0	6	0	3	0	0	0	0	0	59	
7:05 AM	3	29	0	0	0	13	2	0	6	0	2	0	0	0	0	0	55	
7:10 AM	4	29	0	0	0	15	2	0	6	0	1	0	0	0	0	0	57	
7:15 AM	1	35	0	0	0	15	3	0	3	0	4	0	0	0	0	0	61	
7:20 AM	2	40	0	0	0	19	5	0	9	0	5	0	0	0	0	0	80	
7:25 AM	5	35	0	0	0	21	4	0	5	1	3	0	2	0	1	0	77	
7:30 AM	2	30	0	0	0	14	2	0	3	0	8	0	0	0	0	0	59	
7:35 AM	3	34	0	0	0	17	5	0	7	0	5	0	0	0	0	0	71	
7:40 AM	2	56	0	0	1	26	8	0	13	0	4	0	0	0	0	0	110	
7:45 AM	1	34	0	0	2	23	4	0	5	1	6	0	0	0	2	0	78	
7:50 AM	4	55	0	0	0	24	9	0	16	0	5	0	1	0	0	0	114	
7:55 AM	4	44	0	0	1	24	10	0	6	0	1	0	0	0	0	0	90	911
8:00 AM	3	34	1	0	0	35	16	0	4	0	1	0	0	0	1	0	95	947
8:05 AM	2	34	0	0	0	28	8	0	6	0	4	0	0	0	0	0	82	974
8:10 AM	4	35	0	0	0	19	10	0	8	0	4	0	0	0	0	0	80	997
8:15 AM	3	44	0	0	0	21	9	0	11	0	4	0	0	0	0	0	92	1028
8:20 AM	3	38	0	0	1	35	15	0	2	0	4	0	0	0	0	0	98	1046
8:25 AM	6	33	0	0	0	22	6	0	9	0	7	0	0	0	0	0	83	1052
8:30 AM	3	31	0	0	0	32	5	0	9	0	1	0	3	1	0	0	85	1078
8:35 AM	3	49	0	0	0	17	8	0	4	0	3	0	1	0	0	0	85	1092
8:40 AM	12	42	0	0	1	35	12	0	9	1	3	0	1	0	1	0	117	1099
8:45 AM	4	36	0	0	0	29	9	0	11	1	3	0	0	0	2	0	95	1116
8:50 AM	3	56	0	0	1	40	11	0	15	0	4	0	0	0	0	0	130	1132
8:55 AM	8	33	0	0	1	39	7	0	11	0	4	0	0	0	0	0	103	1145

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	536	0	0	8	416	128	0	140	8	40	0	4	0	12	0	1368
Heavy Trucks	0	20	0		0	12	8		4	0	0		0	0	0		44
Pedestrians		0				0				28				0			28
Bicycles																	
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/29/2009 9:27 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Traffic Counts – PM Peak Hour

Type of peak hour being reported: Intersection Peak

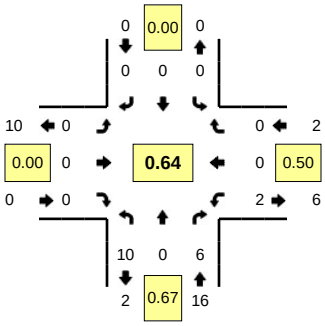
Method for determining peak hour: Total Entering Volume

LOCATION: Clackamas County Sheriff's Dwy -- Warner Milne Rd

QC JOB #: 10470310

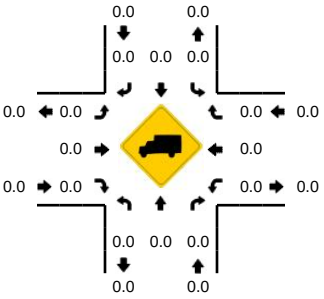
CITY/STATE: Oregon CIty, OR

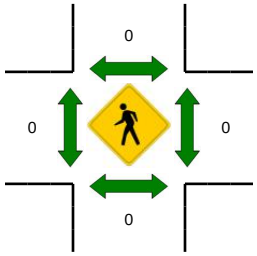
DATE: 12/16/2009

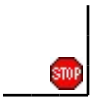


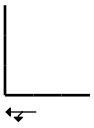
Peak-Hour: 4:05 PM -- 5:05 PM

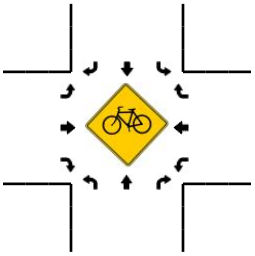
Peak 15-Min: 4:50 PM -- 5:05 PM

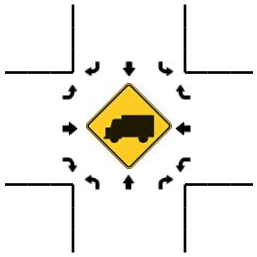


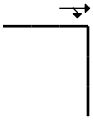


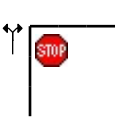


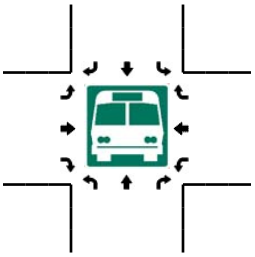












5-Min Count Period Beginning At	Clackamas County Sheriff's Dwy (Northbound)				Clackamas County Sheriff's Dwy (Southbound)				Warner Milne Rd (Eastbound)				Warner Milne Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
4:05 PM	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	2	
4:10 PM	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:20 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
4:25 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
4:30 PM	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
4:35 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
4:40 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:50 PM	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	
4:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15
5:00 PM	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	4	18
5:05 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	17
5:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15
5:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
5:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
5:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
5:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
5:50 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6
5:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6

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	12	0	12	0	0	0	0	0	0	0	0	0	4	0	0	0	28
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Comments: Need to be able to get traffic from both sides

Report generated on 12/29/2009 9:27 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

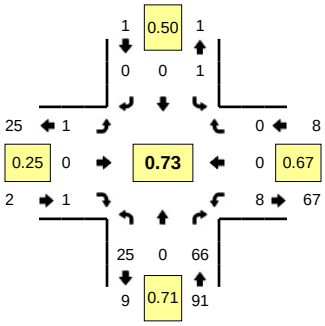
Method for determining peak hour: Total Entering Volume

LOCATION: Clackamas Credit Union Dwy -- Warner Milne Rd

QC JOB #: 10470308

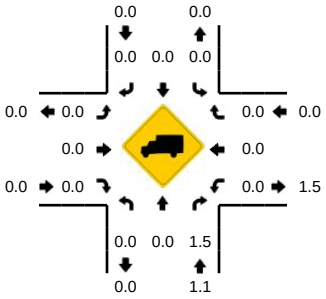
CITY/STATE: Oregon CIty, OR

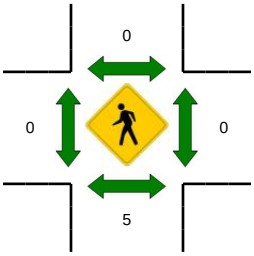
DATE: 12/16/2009

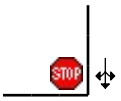


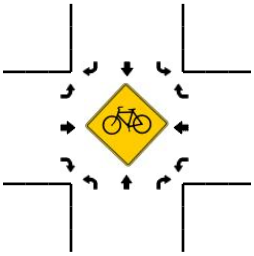
Peak-Hour: 4:00 PM -- 5:00 PM

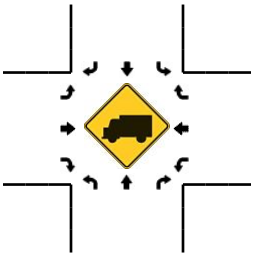
Peak 15-Min: 4:00 PM -- 4:15 PM

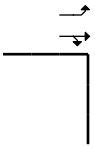


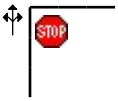


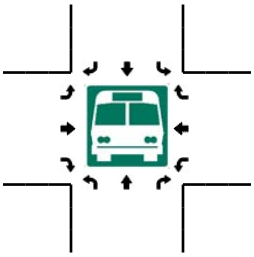












5-Min Count Period Beginning At	Clackamas Credit Union Dwy (Northbound)				Clackamas Credit Union Dwy (Southbound)				Warner Milne Rd (Eastbound)				Warner Milne Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	0	7	0	0	0	0	0	0	0	0	0	1	0	0	0	10	
4:05 PM	2	0	10	0	0	0	0	0	0	0	0	0	1	0	0	0	13	
4:10 PM	2	0	9	0	0	0	0	0	0	0	0	0	1	0	0	0	12	
4:15 PM	2	0	6	0	0	0	0	0	0	0	0	0	1	0	0	0	9	
4:20 PM	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
4:25 PM	1	0	5	0	0	0	0	0	0	0	0	0	1	0	0	0	7	
4:30 PM	2	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	8	
4:35 PM	2	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	6	
4:40 PM	2	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	7	
4:45 PM	4	0	5	0	0	0	0	0	0	0	0	0	2	0	0	0	11	
4:50 PM	3	0	3	0	1	0	0	0	1	0	1	0	1	0	0	0	10	
4:55 PM	2	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	6	102
5:00 PM	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3	95
5:05 PM	1	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0	5	87
5:10 PM	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	78
5:15 PM	1	0	3	0	0	0	0	0	0	0	0	0	2	0	0	0	6	75
5:20 PM	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	3	75
5:25 PM	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	4	72
5:30 PM	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	9	73
5:35 PM	2	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	8	75
5:40 PM	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	4	72
5:45 PM	1	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	4	65
5:50 PM	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	4	59
5:55 PM	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	55

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	24	0	104	0	0	0	0	0	0	0	0	0	12	0	0	0	140
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Comments: Need to be able to get traffic from both sides

Report generated on 12/29/2009 9:27 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

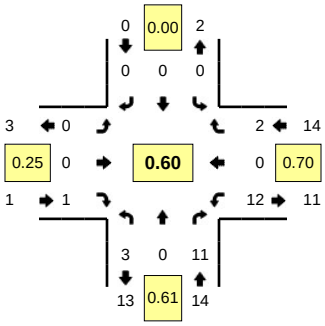
Method for determining peak hour: Total Entering Volume

LOCATION: Barclay Apartments Dwy -- Warner Milne Rd

QC JOB #: 10470306

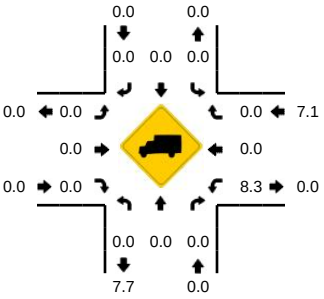
CITY/STATE: Oregon CIty, OR

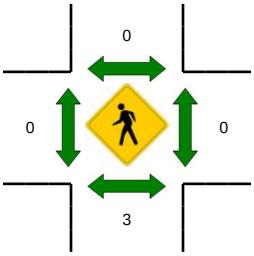
DATE: 12/16/2009

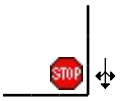


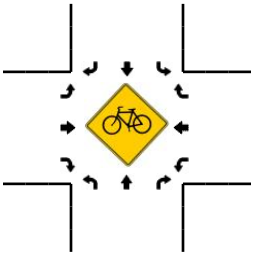
Peak-Hour: 4:10 PM -- 5:10 PM

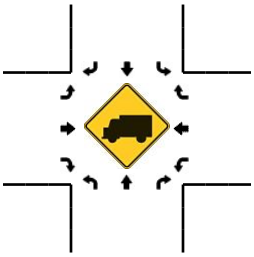
Peak 15-Min: 4:10 PM -- 4:25 PM

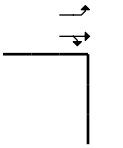


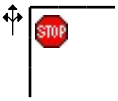


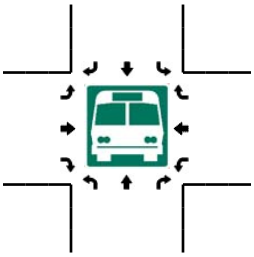












5-Min Count Period Beginning At	Barclay Apartments Dwy (Northbound)				Barclay Apartments Dwy (Southbound)				Warner Milne Rd (Eastbound)				Warner Milne Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	
4:05 PM	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	2	
4:10 PM	0	0	2	0	0	0	0	0	0	0	0	0	3	0	1	0	6	
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:20 PM	1	0	4	0	0	0	0	0	0	0	0	0	1	0	0	0	6	
4:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	
4:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	
4:40 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	
4:45 PM	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	
4:50 PM	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	3	
4:55 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	26
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	27
5:05 PM	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	4	29
5:10 PM	0	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0	4	27
5:15 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	29
5:20 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	24
5:25 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	24
5:30 PM	0	0	2	0	0	0	0	0	0	0	0	0	4	0	0	0	6	29
5:35 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28
5:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25
5:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	24
5:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22

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	24	0	0	0	0	0	0	0	0	0	16	0	4	0	48
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		12				0				0				0			12
Bicycles																	
Railroad																	
Stopped Buses																	

Comments: Need to be able to get traffic from both sides

Report generated on 12/29/2009 9:27 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

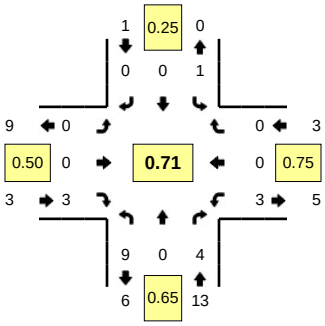
Method for determining peak hour: Total Entering Volume

LOCATION: City Hall Dwy -- Warner Milne Rd

QC JOB #: 10470304

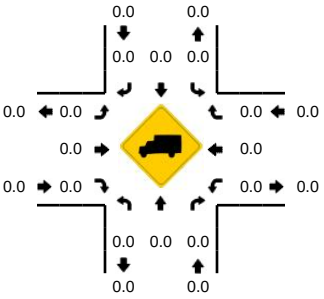
CITY/STATE: Oregon CIty, OR

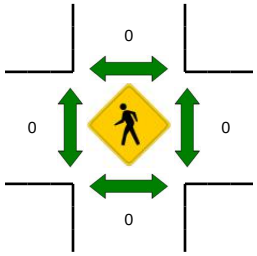
DATE: 12/16/2009

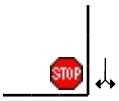


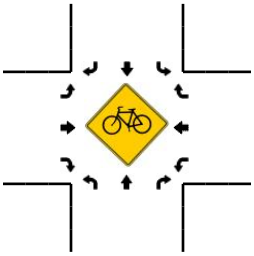
Peak-Hour: 4:30 PM -- 5:30 PM

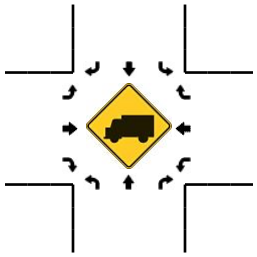
Peak 15-Min: 4:55 PM -- 5:10 PM

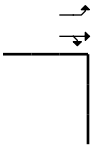


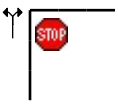


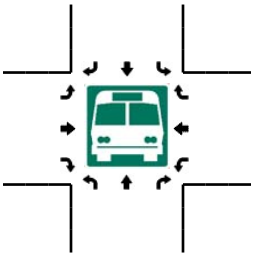












5-Min Count Period Beginning At	City Hall Dwy (Northbound)				City Hall Dwy (Southbound)				Warner Milne Rd (Eastbound)				Warner Milne Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:10 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
4:15 PM	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	
4:20 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
4:25 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:35 PM	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	3	
4:40 PM	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	
4:45 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
4:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:55 PM	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	13
5:00 PM	2	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	4	17
5:05 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	18
5:10 PM	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	19
5:15 PM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	19
5:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
5:25 PM	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	20
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
5:35 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	18
5:40 PM	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	2	18
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	18
5:50 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	19
5:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17

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	12	0	8	0	0	0	0	0	0	0	4	0	4	0	0	0	28
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Comments: Need to be able to get traffic from both sides

Report generated on 12/29/2009 9:27 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

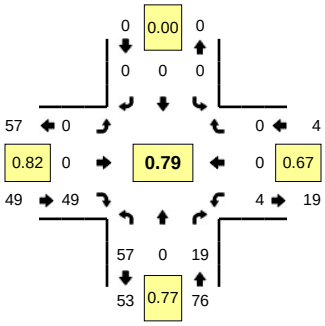
Method for determining peak hour: Total Entering Volume

LOCATION: Danielson's West Dwy -- Warner Milne Rd

QC JOB #: 10470302

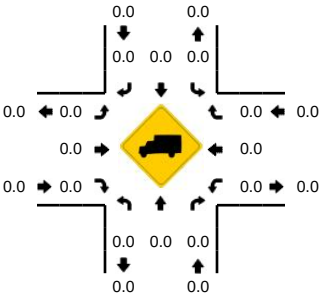
CITY/STATE: Oregon CIty, OR

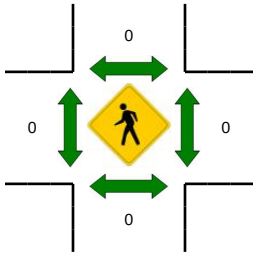
DATE: 12/16/2009

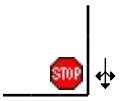


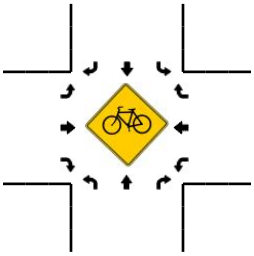
Peak-Hour: 4:00 PM -- 5:00 PM

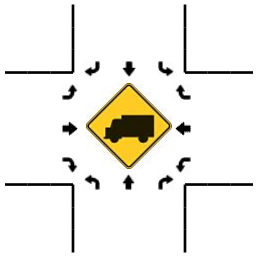
Peak 15-Min: 4:45 PM -- 5:00 PM

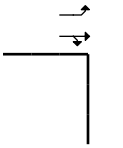


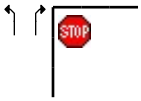


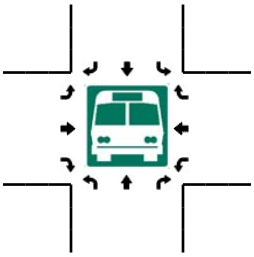












5-Min Count Period Beginning At	Danielson's West Dwy (Northbound)				Danielson's West Dwy (Southbound)				Warner Milne Rd (Eastbound)				Warner Milne Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	4	0	2	0	0	0	0	0	0	0	3	0	0	0	0	0	9	
4:05 PM	6	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	11	
4:10 PM	1	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	7	
4:15 PM	3	0	2	0	0	0	0	0	0	0	4	0	0	0	0	0	9	
4:20 PM	5	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	7	
4:25 PM	5	0	1	0	0	0	0	0	0	0	3	0	1	0	0	0	10	
4:30 PM	6	0	5	0	0	0	0	0	0	0	3	0	1	0	0	0	15	
4:35 PM	5	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	11	
4:40 PM	2	0	2	0	0	0	0	0	0	0	4	0	1	0	0	0	9	
4:45 PM	8	0	1	0	0	0	0	0	0	0	3	0	0	0	0	0	12	
4:50 PM	7	0	1	0	0	0	0	0	0	0	3	0	0	0	0	0	11	
4:55 PM	5	0	3	0	0	0	0	0	0	0	9	0	1	0	0	0	18	129
5:00 PM	4	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	6	126
5:05 PM	2	0	2	0	0	0	0	0	0	0	4	0	1	0	0	0	9	124
5:10 PM	5	0	1	0	0	0	0	0	0	0	3	0	0	0	0	0	9	126
5:15 PM	4	0	1	0	0	0	0	0	0	0	2	0	2	0	0	0	9	126
5:20 PM	4	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	7	126
5:25 PM	4	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	5	121
5:30 PM	5	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	8	114
5:35 PM	5	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	9	112
5:40 PM	1	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	5	108
5:45 PM	5	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	8	104
5:50 PM	5	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	14	107
5:55 PM	5	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	9	98

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	80	0	20	0	0	0	0	0	0	0	60	0	4	0	0	0	164
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Comments: Need to be able to get traffic from both sides

Report generated on 12/29/2009 9:27 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of peak hour being reported: Intersection Peak

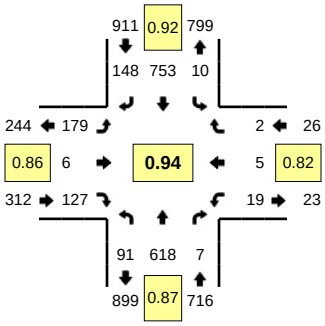
Method for determining peak hour: Total Entering Volume

LOCATION: Molalla Ave -- Warner Milne Rd

QC JOB #: 10371904

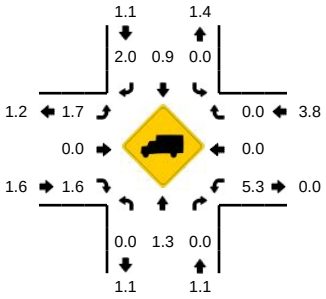
CITY/STATE: Oregon City, OR

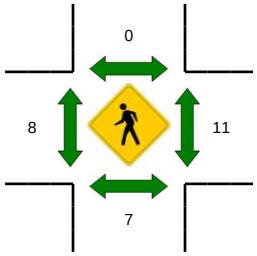
DATE: 7/23/2008

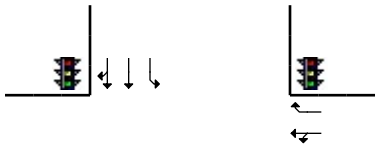


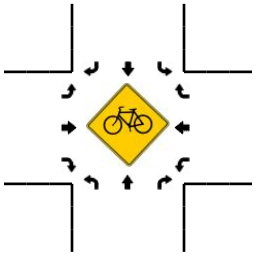
Peak-Hour: 4:55 PM -- 5:55 PM

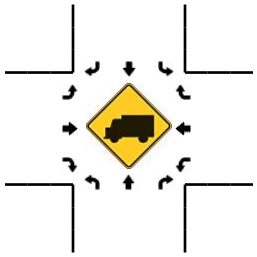
Peak 15-Min: 5:05 PM -- 5:20 PM

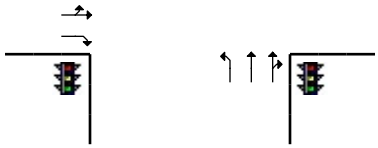


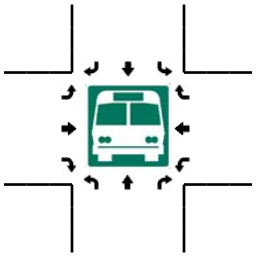












5-Min Count Period Beginning At	Molalla Ave (Northbound)				Molalla Ave (Southbound)				Warner Milne Rd (Eastbound)				Warner Milne Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	11	50	2	0	2	65	16	0	17	0	10	0	2	0	2	0	177	
4:05 PM	4	75	0	0	2	69	13	0	10	1	11	0	1	0	0	0	186	
4:10 PM	6	41	1	0	2	65	13	0	13	0	11	0	2	1	0	0	155	
4:15 PM	13	41	0	0	1	48	14	0	14	2	17	0	2	1	0	0	153	
4:20 PM	8	38	1	0	0	67	18	0	15	0	10	0	0	1	0	0	158	
4:25 PM	6	50	0	0	1	65	18	0	8	2	7	0	2	2	1	0	162	
4:30 PM	14	33	1	0	1	55	12	0	10	2	9	0	1	2	0	0	140	
4:35 PM	9	57	0	0	0	50	12	0	15	1	12	0	2	1	0	0	159	
4:40 PM	17	50	0	0	0	48	7	0	12	2	14	0	4	0	0	0	154	
4:45 PM	5	36	1	0	1	54	11	0	24	1	15	0	2	1	0	0	151	
4:50 PM	9	48	2	0	1	54	22	0	2	1	18	0	2	1	1	0	161	
4:55 PM	8	51	1	0	1	54	19	0	14	0	6	0	2	0	0	0	156	1912
5:00 PM	4	53	0	0	0	63	8	0	8	0	14	0	0	0	0	0	150	1885
5:05 PM	6	46	2	0	0	77	13	0	32	1	11	0	1	1	2	0	192	1891
5:10 PM	17	56	0	0	1	59	13	0	17	1	9	0	3	0	0	0	176	1912
5:15 PM	10	65	0	0	1	47	15	0	12	0	0	0	1	1	0	0	152	1911
5:20 PM	8	52	1	0	1	68	16	0	19	2	14	0	0	0	0	0	181	1934
5:25 PM	6	48	1	0	0	69	8	0	9	0	10	0	2	1	0	0	154	1926
5:30 PM	13	42	0	0	1	47	10	0	17	0	18	0	3	0	0	0	151	1937
5:35 PM	4	58	1	0	1	64	8	0	9	0	8	0	1	1	0	0	155	1933
5:40 PM	3	59	0	0	1	78	15	0	14	1	9	0	1	0	0	0	181	1960
5:45 PM	7	43	0	0	1	56	12	0	8	1	16	0	5	0	0	0	149	1958
5:50 PM	5	45	1	0	2	71	11	0	20	0	12	0	0	1	0	0	168	1965
5:55 PM	7	44	0	0	0	65	3	0	8	0	9	0	1	0	0	0	137	1946

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	132	668	8	0	8	732	164	0	244	8	80	0	20	8	8	0	2080
Heavy Trucks	0	4	0		0	4	4		0	0	0		0	0	0		12
Pedestrians		8				0				8				24			40
Bicycles																	
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/29/2009 9:27 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Traffic Counts – 24-Hour Tube Data

LOCATION: Warner Milne Rd btwn Molalla & Beavercreek

QC JOB #: 10371905

SPECIFIC LOCATION: 0 ft from

DIRECTION: EB

CITY/STATE: Oregon City, OR

DATE: Jul 23 2008 - Jul 23 2008

Start Time	Mon	Tue	Wed 23-Jul-08	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			12			12			12	
1:00 AM			5			5			5	
2:00 AM			10			10			10	
3:00 AM			6			6			6	
4:00 AM			11			11			11	
5:00 AM			33			33			33	
6:00 AM			82			82			82	
7:00 AM			161			161			161	
8:00 AM			163			163			163	
9:00 AM			221			221			221	
10:00 AM			240			240			240	
11:00 AM			**290**			**290**			**290**	
12:00 PM			314			314			314	
1:00 PM			278			278			278	
2:00 PM			290			290			290	
3:00 PM			313			313			313	
4:00 PM			**342**			**342**			**342**	
5:00 PM			332			332			332	
6:00 PM			261			261			261	
7:00 PM			177			177			177	
8:00 PM			144			144			144	
9:00 PM			86			86			86	
10:00 PM			56			56			56	
11:00 PM			31			31			31	
Day Total			3858			3858			3858	
% Weekday Average			100.0%							
% Week Average			100.0%			100.0%				
AM Peak Volume			11:00 AM 290			11:00 AM 290			11:00 AM 290	
PM Peak Volume			4:00 PM 342			4:00 PM 342			4:00 PM 342	

Comments:

LOCATION: Warner Milne Rd btwn Molalla & Beavercreek

QC JOB #: 10371905

SPECIFIC LOCATION: 0 ft from

DIRECTION: WB

CITY/STATE: Oregon City, OR

DATE: Jul 23 2008 - Jul 23 2008

Start Time	Mon	Tue	Wed 23-Jul-08	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			21			21			21	
1:00 AM			8			8			8	
2:00 AM			6			6			6	
3:00 AM			2			2			2	
4:00 AM			8			8			8	
5:00 AM			23			23			23	
6:00 AM			64			64			64	
7:00 AM			88			88			88	
8:00 AM			163			163			163	
9:00 AM			162			162			162	
10:00 AM			211			211			211	
11:00 AM			**263**			**263**			**263**	
12:00 PM			319			319			319	
1:00 PM			274			274			274	
2:00 PM			297			297			297	
3:00 PM			274			274			274	
4:00 PM			**339**			**339**			**339**	
5:00 PM			308			308			308	
6:00 PM			266			266			266	
7:00 PM			214			214			214	
8:00 PM			181			181			181	
9:00 PM			146			146			146	
10:00 PM			63			63			63	
11:00 PM			37			37			37	
Day Total			3737			3737			3737	
% Weekday Average			100.0%							
% Week Average			100.0%			100.0%				
AM Peak Volume			11:00 AM 263			11:00 AM 263			11:00 AM 263	
PM Peak Volume			4:00 PM 339			4:00 PM 339			4:00 PM 339	

Comments:

LOCATION: Warner Milne Rd btwn Molalla & Beavercreek
SPECIFIC LOCATION: 0 ft from
CITY/STATE: Oregon City, OR

QC JOB #: 10371905
DIRECTION: EB
DATE: Jul 23 2008

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
12:00 AM	0	0	1	4	6	1	0	0	0	0	0	0	0	0	12	26-35	10
1:00 AM	1	0	1	2	1	0	0	0	0	0	0	0	0	0	5	26-35	3
2:00 AM	0	1	3	6	0	0	0	0	0	0	0	0	0	0	10	21-30	9
3:00 AM	0	0	0	1	3	0	1	0	**1**	0	0	0	0	0	6	26-35	4
4:00 AM	0	0	2	3	4	2	0	0	0	0	0	0	0	0	11	26-35	7
5:00 AM	0	0	7	7	11	6	**2**	0	0	0	0	0	0	0	33	26-35	18
6:00 AM	3	0	8	31	31	8	1	0	0	0	0	0	0	0	82	26-35	61
7:00 AM	11	5	13	63	55	**13**	1	0	0	0	0	0	0	0	161	26-35	118
8:00 AM	3	5	24	59	60	11	1	0	0	0	0	0	0	0	163	26-35	119
9:00 AM	5	6	37	100	65	8	0	0	0	0	0	0	0	0	221	26-35	165
10:00 AM	10	2	52	114	47	13	2	0	0	0	0	0	0	0	240	21-30	165
11:00 AM	**20**	**7**	**53**	**128**	**74**	8	0	0	0	0	0	0	0	0	**290**	26-35	202
12:00 PM	**18**	**7**	**72**	147	61	6	2	**1**	0	0	0	0	0	0	314	21-30	218
1:00 PM	11	3	48	126	77	11	2	0	0	0	0	0	0	0	278	26-35	203
2:00 PM	14	5	44	128	87	9	**3**	0	0	0	0	0	0	0	290	26-35	215
3:00 PM	11	3	53	140	90	15	1	0	0	0	0	0	0	0	313	26-35	230
4:00 PM	17	4	47	**157**	99	17	1	0	0	0	0	0	0	0	**342**	26-35	255
5:00 PM	15	4	45	126	**115**	**26**	1	0	0	0	0	0	0	0	332	26-35	241
6:00 PM	7	3	18	109	99	23	2	0	0	0	0	0	0	0	261	26-35	207
7:00 PM	3	3	6	80	67	16	2	0	0	0	0	0	0	0	177	26-35	146
8:00 PM	4	1	9	55	58	15	2	0	0	0	0	0	0	0	144	26-35	113
9:00 PM	2	2	6	32	35	7	2	0	0	0	0	0	0	0	86	26-35	67
10:00 PM	0	2	4	14	24	9	2	1	0	0	0	0	0	0	56	26-35	38
11:00 PM	0	0	2	9	12	7	0	1	0	0	0	0	0	0	31	26-35	21
Day Total	155	63	555	1641	1181	231	28	3	1	0	0	0	0	0	3858	26-35	2822
Percent	4.0%	1.6%	14.4%	42.5%	30.6%	6.0%	0.7%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

AM Peak	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	7:00 AM	5:00 AM		3:00 AM						11:00 AM		
Volume	20	7	53	128	74	13	2		1						290		
PM Peak	12:00 PM	12:00 PM	12:00 PM	4:00 PM	5:00 PM	5:00 PM	2:00 PM	12:00 PM							4:00 PM		
Volume	18	7	72	157	115	26	3	1							342		

Comments:

SUMMARY - Tube Count - Speed Data

LOCATION: Warner Milne Rd btwn Molalla & Beavercreek
QC JOB #: 10371905
SPECIFIC LOCATION: 0 ft from
DIRECTION: EB
CITY/STATE: Oregon City, OR
DATE: Jul 23 2008 - Jul 23 2008

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
Grand Total	155	63	555	1641	1181	231	28	3	1	0	0	0	0	0	3858	26-35	2822
Percent	4.0%	1.6%	14.4%	42.5%	30.6%	6.0%	0.7%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
Cumulative Percent	4.0%	5.7%	20.0%	62.6%	93.2%	99.2%	99.9%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			

85th Percentile: 33 MPH

Mean Speed(Average): 28 MPH
Median 28 MPH
Mode: 28 MPH

Comments:

Report generated on 12/29/2009 10:08 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

LOCATION: Warner Milne Rd btwn Molalla & Beavercreek
SPECIFIC LOCATION: 0 ft from
CITY/STATE: Oregon City, OR

QC JOB #: 10371905
DIRECTION: WB
DATE: Jul 23 2008

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
12:00 AM	0	0	3	9	8	1	0	0	0	0	0	0	0	0	21	26-35	16
1:00 AM	0	1	2	4	1	0	0	0	0	0	0	0	0	0	8	21-30	6
2:00 AM	0	0	0	2	3	0	1	0	0	0	0	0	0	0	6	26-35	5
3:00 AM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2	26-35	2
4:00 AM	2	1	1	1	3	0	0	0	0	0	0	0	0	0	8	26-35	4
5:00 AM	0	1	1	12	6	3	0	0	0	0	0	0	0	0	23	26-35	18
6:00 AM	2	0	2	21	32	5	**2**	0	0	0	0	0	0	0	64	26-35	52
7:00 AM	5	0	12	30	32	7	2	0	0	0	0	0	0	0	88	26-35	62
8:00 AM	5	4	19	69	54	**11**	1	0	0	0	0	0	0	0	163	26-35	123
9:00 AM	5	**6**	10	84	49	8	0	0	0	0	0	0	0	0	162	26-35	132
10:00 AM	**10**	2	25	97	68	9	0	0	0	0	0	0	0	0	211	26-35	165
11:00 AM	9	2	**39**	**122**	**81**	8	1	**1**	0	0	0	0	0	0	**263**	26-35	203
12:00 PM	**17**	5	**43**	124	110	15	**4**	1	0	0	0	0	0	0	319	26-35	233
1:00 PM	7	**7**	38	116	92	14	0	0	0	0	0	0	0	0	274	26-35	208
2:00 PM	10	4	31	133	102	16	1	0	0	0	0	0	0	0	297	26-35	235
3:00 PM	15	1	13	135	90	20	0	0	0	0	0	0	0	0	274	26-35	225
4:00 PM	14	3	20	**146**	134	21	1	0	0	0	0	0	0	0	**339**	26-35	280
5:00 PM	8	1	12	111	**140**	**33**	3	0	0	0	0	0	0	0	308	26-35	251
6:00 PM	14	2	10	100	122	16	2	0	0	0	0	0	0	0	266	26-35	221
7:00 PM	4	2	11	96	93	7	1	0	0	0	0	0	0	0	214	26-35	189
8:00 PM	7	6	14	83	63	8	0	0	0	0	0	0	0	0	181	26-35	146
9:00 PM	0	0	18	73	44	8	3	0	0	0	0	0	0	0	146	26-35	117
10:00 PM	0	1	10	26	24	0	0	**2**	0	0	0	0	0	0	63	26-35	50
11:00 PM	0	1	6	16	10	2	2	0	0	0	0	0	0	0	37	26-35	26
Day Total	134	50	340	1611	1362	212	24	4	0	0	0	0	0	0	3737	26-35	2973
Percent	3.6%	1.3%	9.1%	43.1%	36.4%	5.7%	0.6%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	10:00 AM	9:00 AM	11:00 AM	11:00 AM	11:00 AM	8:00 AM	6:00 AM	11:00 AM							11:00 AM		
Volume	10	6	39	122	81	11	2	1							263		
PM Peak	12:00 PM	1:00 PM	12:00 PM	4:00 PM	5:00 PM	5:00 PM	12:00 PM	10:00 PM							4:00 PM		
Volume	17	7	43	146	140	33	4	2							339		

Comments:

SUMMARY - Tube Count - Speed Data

LOCATION: Warner Milne Rd btwn Molalla & Beavercreek
QC JOB #: 10371905
SPECIFIC LOCATION: 0 ft from
DIRECTION: WB
CITY/STATE: Oregon City, OR
DATE: Jul 23 2008 - Jul 23 2008

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
Grand Total	134	50	340	1611	1362	212	24	4	0	0	0	0	0	0	3737	26-35	2973
Percent	3.6%	1.3%	9.1%	43.1%	36.4%	5.7%	0.6%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
Cumulative Percent	3.6%	4.9%	14.0%	57.1%	93.6%	99.3%	99.9%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			

85th Percentile: 33 MPH

Mean Speed(Average): 28 MPH
Median 29 MPH
Mode: 28 MPH

Comments:

Report generated on 12/29/2009 10:08 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

LOCATION: Warner Milne Rd btwn Molalla & Beavercreek
QC JOB #: 10371905
SPECIFIC LOCATION: 0 ft from
DIRECTION: EB
CITY/STATE: Oregon City, OR
DATE: Jul 23 2008

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Not Classified	Total
12:00 AM	0	10	1	0	1	0	0	0	0	0	0	0	0	0	12
1:00 AM	0	4	1	0	0	0	0	0	0	0	0	0	0	0	5
2:00 AM	0	9	1	0	0	0	0	0	0	0	0	0	0	0	10
3:00 AM	0	5	1	0	0	0	0	0	0	0	0	0	0	0	6
4:00 AM	0	8	2	0	1	0	0	0	0	0	0	0	0	0	11
5:00 AM	0	23	7	0	2	1	0	0	0	0	0	0	0	0	33
6:00 AM	2	53	21	0	3	0	0	0	0	0	0	0	0	3	82
7:00 AM	1	109	31	0	7	0	0	**3**	0	0	0	**1**	0	9	161
8:00 AM	2	108	37	0	**11**	0	0	3	0	0	0	0	0	2	163
9:00 AM	5	150	51	0	10	0	0	0	0	0	0	0	0	5	221
10:00 AM	6	150	**62**	1	10	0	0	1	0	0	0	0	0	10	240
11:00 AM	**7**	**190**	59	**4**	11	**2**	0	1	0	0	0	0	0	**16**	**290**
12:00 PM	7	218	61	0	10	0	0	0	0	0	0	0	0	**18**	314
1:00 PM	4	188	60	0	12	2	0	0	0	0	0	0	**1**	11	278
2:00 PM	4	205	45	0	**17**	2	0	**2**	0	0	0	0	0	15	290
3:00 PM	6	209	**70**	0	12	2	0	2	0	0	0	0	0	12	313
4:00 PM	2	**246**	62	**1**	11	2	0	1	0	0	0	0	0	17	**342**
5:00 PM	4	243	61	1	6	0	0	1	0	0	0	0	0	16	332
6:00 PM	**8**	193	42	0	7	**3**	0	0	0	0	0	0	0	8	261
7:00 PM	3	126	35	0	8	0	0	0	0	0	0	0	0	5	177
8:00 PM	1	107	19	1	11	0	0	1	0	0	0	0	0	4	144
9:00 PM	1	63	16	0	3	0	0	1	0	0	0	0	0	2	86
10:00 PM	0	46	9	0	1	0	0	0	0	0	0	0	0	0	56
11:00 PM	0	24	7	0	0	0	0	0	0	0	0	0	0	0	31
Day Total	63	2687	761	8	154	14	0	16	0	0	0	1	1	153	3858
Percent	1.6%	69.6%	19.7%	0.2%	4.0%	0.4%	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	4.0%	
AM Peak	11:00 AM	11:00 AM	10:00 AM	11:00 AM	8:00 AM	11:00 AM		7:00 AM				7:00 AM		11:00 AM	11:00 AM
Volume	7	190	62	4	11	2		3				1		16	290
PM Peak	6:00 PM	4:00 PM	3:00 PM	4:00 PM	2:00 PM	6:00 PM		2:00 PM					1:00 PM	12:00 PM	4:00 PM
Volume	8	246	70	1	17	3		2					1	18	342

Comments:

SUMMARY - Tube Count - Vehicle Classification Data

LOCATION: Warner Milne Rd btwn Molalla & Beavercreek
QC JOB #: 10371905
SPECIFIC LOCATION: 0 ft from
DIRECTION: EB
CITY/STATE: Oregon City, OR
DATE: Jul 23 2008 - Jul 23 2008

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Not Classified	Total
Grand Total	63	2687	761	8	154	14	0	16	0	0	0	1	1	153	3858
Percent	1.6%	69.6%	19.7%	0.2%	4.0%	0.4%	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	4.0%	

Comments:

Report generated on 12/29/2009 10:08 AM

LOCATION: Warner Milne Rd btwn Molalla & Beavercreek
QC JOB #: 10371905
SPECIFIC LOCATION: 0 ft from
DIRECTION: WB
CITY/STATE: Oregon City, OR
DATE: Jul 23 2008

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Not Classified	Total
12:00 AM	1	15	4	0	1	0	0	0	0	0	0	0	0	0	21
1:00 AM	0	7	1	0	0	0	0	0	0	0	0	0	0	0	8
2:00 AM	0	5	1	0	0	0	0	0	0	0	0	0	0	0	6
3:00 AM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
4:00 AM	1	4	1	0	0	1	0	0	0	0	0	0	0	1	8
5:00 AM	1	16	2	0	0	**3**	0	0	**1**	0	0	0	0	0	23
6:00 AM	1	41	15	0	3	1	0	1	0	0	0	0	0	2	64
7:00 AM	4	52	18	1	5	0	0	**2**	1	0	0	0	0	5	88
8:00 AM	0	112	36	0	9	1	0	0	0	0	0	0	0	5	163
9:00 AM	2	113	29	1	8	3	0	0	0	0	0	0	0	6	162
10:00 AM	5	145	40	0	8	0	0	1	0	0	0	0	0	**12**	211
11:00 AM	**7**	**174**	**50**	**3**	**13**	3	0	2	0	0	0	0	0	11	**263**
12:00 PM	5	215	**67**	**1**	12	**3**	0	1	0	0	0	0	0	**15**	319
1:00 PM	2	195	60	0	8	2	0	0	0	0	0	0	0	7	274
2:00 PM	6	205	56	0	16	2	0	**2**	0	0	0	0	0	10	297
3:00 PM	7	187	47	0	14	1	0	2	**1**	0	0	0	0	15	274
4:00 PM	7	**236**	63	0	**20**	0	0	1	0	0	0	0	0	12	**339**
5:00 PM	5	231	55	0	6	2	0	0	0	0	0	0	0	9	308
6:00 PM	**11**	189	46	0	6	0	0	0	0	0	0	0	0	14	266
7:00 PM	3	162	37	0	6	1	0	0	0	0	0	0	0	5	214
8:00 PM	2	130	31	0	10	1	0	0	0	0	0	0	0	7	181
9:00 PM	0	117	25	1	3	0	0	0	0	0	0	0	0	0	146
10:00 PM	0	50	12	0	1	0	0	0	0	0	0	0	0	0	63
11:00 PM	0	31	6	0	0	0	0	0	0	0	0	0	0	0	37
Day Total	70	2634	702	7	149	24	0	12	3	0	0	0	0	136	3737
Percent	1.9%	70.5%	18.8%	0.2%	4.0%	0.6%	0.0%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	3.6%	

AM Peak	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	5:00 AM		7:00 AM	5:00 AM					10:00 AM	11:00 AM
Volume	7	174	50	3	13	3		2	1					12	263
PM Peak	6:00 PM	4:00 PM	12:00 PM	12:00 PM	4:00 PM	12:00 PM		2:00 PM	3:00 PM					12:00 PM	4:00 PM
Volume	11	236	67	1	20	3		2	1					15	339

Comments:

SUMMARY - Tube Count - Vehicle Classification Data

LOCATION: Warner Milne Rd btwn Molalla & Beavercreek
QC JOB #: 10371905
SPECIFIC LOCATION: 0 ft from
DIRECTION: WB
CITY/STATE: Oregon City, OR
DATE: Jul 23 2008 - Jul 23 2008

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Not Classified	Total
Grand Total	70	2634	702	7	149	24	0	12	3	0	0	0	0	136	3737
Percent	1.9%	70.5%	18.8%	0.2%	4.0%	0.6%	0.0%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	3.6%	

Comments:

Report generated on 12/29/2009 10:08 AM

Level of Service Descriptions

TRAFFIC LEVELS OF SERVICE

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

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

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

UNSIGNALIZED INTERSECTIONS (Two-Way Stop Controlled)

Unsignalized intersection level of service is reported for the major street and minor street (generally, left turn movements). The method assesses available and critical gaps in the traffic stream which make it possible for side street traffic to enter the main street flow. The *2000 Highway Capacity Manual* describes the detailed methodology. It is not unusual for an intersection to experience level of service E or F conditions for the minor street left turn movement. It should be understood that, often, a poor level of service is experienced by only a few vehicles and the intersection as a whole operates acceptably.

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

Level of Service	Expected Delay	(Sec/Veh)
A	Little or no delay	0-10.0
B	Short traffic delay	>10.1-15.0
C	Average traffic delays	>15.1-25.0
D	Long traffic delays	>25.1-35.0
E	Very long traffic delays	>35.1-50.0
F	Extreme delays potentially affecting other traffic movements in the intersection	> 50

Source: 2000 *Highway Capacity Manual*, Transportation Research Board Washington, D.C.

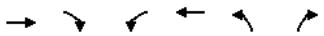
SIGNALIZED INTERSECTIONS

For signalized intersections, level of service is evaluated based upon average vehicle delay experienced by vehicles entering an intersection. Control delay (or signal delay) includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. In previous versions of this chapter of the HCM (1994 and earlier), delay included only stopped delay. As delay increases, the level of service decreases. Calculations for signalized and unsignalized intersections are different due to the variation in traffic control. The *2000 Highway Capacity Manual* provides the basis for these calculations.

Level of Service	Delay (secs.)	Description
A	≤10.00	**Free Flow/Insignificant Delays:** No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication. Most vehicles do not stop at all. Progression is extremely favorable and most vehicles arrive during the green phase.
B	10.1-20.0	**Stable Operation/Minimal Delays:** An occasional approach phase is fully utilized. Many drivers begin to feel somewhat restricted within platoons of vehicles. This level generally occurs with good progression, short cycle lengths, or both.
C	20.1-35.0	**Stable Operation/Acceptable Delays:** Major approach phases fully utilized. Most drivers feel somewhat restricted. Higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level, and the number of vehicles stopping is significant.
D	35.1-55.0	**Approaching Unstable/Tolerable Delays:** The influence of congestion becomes more noticeable. Drivers may have to wait through more than one red signal indication. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. The proportion of vehicles not stopping declines, and individual cycle failures are noticeable.
E	55.1-80.0	**Unstable Operation/Significant Delays:** Volumes at or near capacity. Vehicles may wait though several signal cycles. Long queues form upstream from intersection. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are a frequent occurrence.
F	≥80.0	**Forced Flow/Excessive Delays:** Represents jammed conditions. Queues may block upstream intersections. This level occurs when arrival flow rates exceed intersection capacity, and is considered to be unacceptable to most drivers. Poor progression, long cycle lengths, and v/c ratios approaching 1.0 may contribute to these high delay levels.

Source: *2000 Highway Capacity Manual*, Transportation Research Board, Washington D.C.

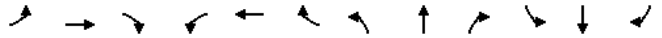
HCM Analysis – With Turn Lanes



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	172	13	4	185	4	1
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	205	15	5	220	5	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			220		442	212
vC1, stage 1 conf vol					212	
vC2, stage 2 conf vol					230	
vCu, unblocked vol			220		442	212
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1361		636	833

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	220	5	220	6
Volume Left	0	5	0	5
Volume Right	15	0	0	1
cSH	1700	1361	1700	667
Volume to Capacity	0.13	0.00	0.13	0.01
Queue Length 95th (ft)	0	0	0	1
Control Delay (s)	0.0	7.7	0.0	10.4
Lane LOS		A		B
Approach Delay (s)	0.0	0.2		10.4
Approach LOS				B

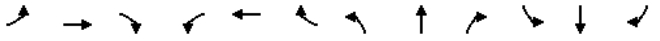
Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	20.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	165	8	13	189	0	0	0	9	0	0	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	0	196	10	15	225	0	0	0	11	0	0	0
Pedestrians					4						1	
Lane Width (ft)					12.0						12.0	
Walking Speed (ft/s)					4.0						4.0	
Percent Blockage					0						0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								1			1	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	226			206			457	458	205	468	463	226
vC1, stage 1 conf vol							201	201		257	257	
vC2, stage 2 conf vol							256	257		211	206	
vCu, unblocked vol	226			206			457	458	205	468	463	226
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	99	100	100	100
cM capacity (veh/h)	1353			1377			586	551	838	570	546	818

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	0	206	15	225	11	0
Volume Left	0	0	15	0	0	0
Volume Right	0	10	0	0	11	0
cSH	1700	1700	1377	1700	838	1700
Volume to Capacity	0.00	0.12	0.01	0.13	0.01	0.00
Queue Length 95th (ft)	0	0	1	0	1	0
Control Delay (s)	0.0	0.0	7.6	0.0	9.4	0.0
Lane LOS			A		A	A
Approach Delay (s)	0.0		0.5		9.4	0.0
Approach LOS					A	A

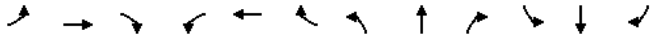
Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	22.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	165	9	2	192	1	10	0	6	0	0	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	0	196	11	2	229	1	12	0	7	0	0	0
Pedestrians					4						2	
Lane Width (ft)					12.0						12.0	
Walking Speed (ft/s)					4.0						4.0	
Percent Blockage					0						0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								1			1	
Upstream signal (ft)					1270							
pX, platoon unblocked												
vC, conflicting volume	232			207			435	438	206	444	443	231
vC1, stage 1 conf vol							202	202		236	236	
vC2, stage 2 conf vol							233	237		208	207	
vCu, unblocked vol	232			207			435	438	206	444	443	231
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.2	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			98	100	99	100	100	100
cM capacity (veh/h)	1346			1376			585	565	837	592	562	812

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	0	207	2	230	19	0
Volume Left	0	0	2	0	12	0
Volume Right	0	11	0	1	7	0
cSH	1700	1700	1376	1700	659	1700
Volume to Capacity	0.00	0.12	0.00	0.14	0.03	0.00
Queue Length 95th (ft)	0	0	0	0	2	0
Control Delay (s)	0.0	0.0	7.6	0.0	10.6	0.0
Lane LOS			A		B	A
Approach Delay (s)	0.0		0.1		10.6	0.0
Approach LOS					B	A

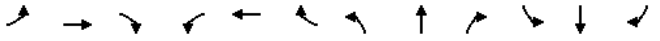
Intersection Summary					
Average Delay	0.5				
Intersection Capacity Utilization	22.1%	ICU Level of Service		A	
Analysis Period (min)	15				



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	166	5	2	189	5	5	0	4	0	0	1
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	0	198	6	2	225	6	6	0	5	0	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								1			1	
Upstream signal (ft)					864							
pX, platoon unblocked												
vC, conflicting volume	231			204			432	436	201	435	436	228
vC1, stage 1 conf vol							201	201		233	233	
vC2, stage 2 conf vol							231	236		202	204	
vCu, unblocked vol	231			204			432	436	201	435	436	228
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	100	99	100	100	100
cM capacity (veh/h)	1349			1380			605	566	845	601	566	816

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	0	204	2	231	11	1
Volume Left	0	0	2	0	6	0
Volume Right	0	6	0	6	5	1
cSH	1700	1700	1380	1700	692	816
Volume to Capacity	0.00	0.12	0.00	0.14	0.02	0.00
Queue Length 95th (ft)	0	0	0	0	1	0
Control Delay (s)	0.0	0.0	7.6	0.0	10.3	9.4
Lane LOS			A		B	A
Approach Delay (s)	0.0		0.1		10.3	9.4
Approach LOS					B	A

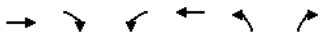
Intersection Summary					
Average Delay	0.3				
Intersection Capacity Utilization	22.8%	ICU Level of Service		A	
Analysis Period (min)	15				



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	140	30	2	169	0	27	0	3	0	0	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	0	167	36	2	201	0	32	0	4	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								1			1	
Upstream signal (ft)					754							
pX, platoon unblocked												
vC, conflicting volume	201			202			390	390	185	376	408	201
vC1, stage 1 conf vol							185	185		206	206	
vC2, stage 2 conf vol							206	206		170	202	
vCu, unblocked vol	201			202			390	390	185	376	408	201
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			95	100	100	100	100	100
cM capacity (veh/h)	1383			1382			631	588	863	637	579	845

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	0	202	2	201	32	4	0
Volume Left	0	0	2	0	32	0	0
Volume Right	0	36	0	0	0	4	0
cSH	1700	1700	1382	1700	631	863	1700
Volume to Capacity	0.00	0.12	0.00	0.12	0.05	0.00	0.00
Queue Length 95th (ft)	0	0	0	0	4	0	0
Control Delay (s)	0.0	0.0	7.6	0.0	11.0	9.2	0.0
Lane LOS			A		B	A	A
Approach Delay (s)	0.0		0.1		10.8		0.0
Approach LOS					B		A

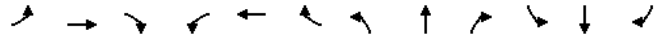
Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	19.7%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	259	0	2	307	10	6
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	276	0	2	327	11	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			276		606	276
vC1, stage 1 conf vol					276	
vC2, stage 2 conf vol					331	
vCu, unblocked vol			276		606	276
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	99
cM capacity (veh/h)			1299		554	768

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	276	2	327	17
Volume Left	0	2	0	11
Volume Right	0	0	0	6
cSH	1700	1299	1700	619
Volume to Capacity	0.16	0.00	0.19	0.03
Queue Length 95th (ft)	0	0	0	2
Control Delay (s)	0.0	7.8	0.0	11.0
Lane LOS		A		B
Approach Delay (s)	0.0	0.1		11.0
Approach LOS				B

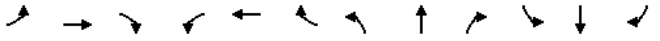
Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	27.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	263	1	8	284	0	25	0	66	1	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	1	280	1	9	302	0	27	0	70	1	0	0
Pedestrians											5	
Lane Width (ft)											12.0	
Walking Speed (ft/s)											4.0	
Percent Blockage											0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								1			1	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	307			281			602	607	280	676	607	307
vC1, stage 1 conf vol							282	282		324	324	
vC2, stage 2 conf vol							319	324		352	283	
vCu, unblocked vol	307			281			602	607	280	676	607	307
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			95	100	91	100	100	100
cM capacity (veh/h)	1260			1293			511	489	759	441	487	734

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	1	281	9	302	97	1
Volume Left	1	0	9	0	27	1
Volume Right	0	1	0	0	70	0
cSH	1260	1700	1293	1700	669	441
Volume to Capacity	0.00	0.17	0.01	0.18	0.14	0.00
Queue Length 95th (ft)	0	0	0	0	13	0
Control Delay (s)	7.9	0.0	7.8	0.0	11.3	13.2
Lane LOS	A		A		B	B
Approach Delay (s)	0.0		0.2		11.3	13.2
Approach LOS					B	B

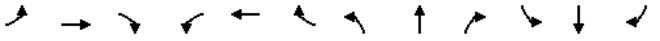
Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	27.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	329	1	12	289	2	3	0	11	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	350	1	13	307	2	3	0	12	0	0	0
Pedestrians											3	
Lane Width (ft)											12.0	
Walking Speed (ft/s)											4.0	
Percent Blockage											0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								1			1	
Upstream signal (ft)					1270							
pX, platoon unblocked												
vC, conflicting volume	313			351			684	689	351	699	688	312
vC1, stage 1 conf vol							351	351		337	337	
vC2, stage 2 conf vol							333	338		362	351	
vCu, unblocked vol	313			351			684	689	351	699	688	312
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	100	98	100	100	100
cM capacity (veh/h)	1256			1175			473	457	697	457	455	732

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	0	351	13	310	15	0
Volume Left	0	0	13	0	3	0
Volume Right	0	1	0	2	12	0
cSH	1700	1700	1175	1700	633	1700
Volume to Capacity	0.00	0.21	0.01	0.18	0.02	0.00
Queue Length 95th (ft)	0	0	1	0	2	0
Control Delay (s)	0.0	0.0	8.1	0.0	10.8	0.0
Lane LOS			A		B	A
Approach Delay (s)	0.0		0.3		10.8	0.0
Approach LOS					B	A

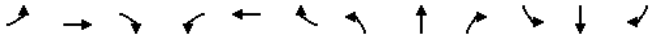
Intersection Summary					
Average Delay	0.4				
Intersection Capacity Utilization	28.3%	ICU Level of Service		A	
Analysis Period (min)	15				



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	337	3	3	294	0	9	0	4	1	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	359	3	3	313	0	10	0	4	1	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								1			1	
Upstream signal (ft)					864							
pX, platoon unblocked												
vC, conflicting volume	313			362			679	679	360	682	681	313
vC1, stage 1 conf vol							360	360		319	319	
vC2, stage 2 conf vol							319	319		363	362	
vCu, unblocked vol	313			362			679	679	360	682	681	313
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			98	100	99	100	100	100
cM capacity (veh/h)	1259			1208			477	464	689	473	463	732

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	0	362	3	313	14	1
Volume Left	0	0	3	0	10	1
Volume Right	0	3	0	0	4	0
cSH	1700	1700	1208	1700	527	473
Volume to Capacity	0.00	0.21	0.00	0.18	0.03	0.00
Queue Length 95th (ft)	0	0	0	0	2	0
Control Delay (s)	0.0	0.0	8.0	0.0	12.0	12.6
Lane LOS			A		B	B
Approach Delay (s)	0.0		0.1		12.0	12.6
Approach LOS					B	B

Intersection Summary					
Average Delay	0.3				
Intersection Capacity Utilization	28.9%	ICU Level of Service		A	
Analysis Period (min)	15				

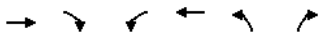


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	293	49	4	240	0	57	0	19	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	312	52	4	255	0	61	0	20	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								1			1	
Upstream signal (ft)					754							
pX, platoon unblocked												
vC, conflicting volume	255			364			602	602	338	596	628	255
vC1, stage 1 conf vol							338	338		264	264	
vC2, stage 2 conf vol							264	264		332	364	
vCu, unblocked vol	255			364			602	602	338	596	628	255
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			88	100	97	100	100	100
cM capacity (veh/h)	1321			1206			512	493	709	503	481	788

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	0	364	4	255	61	20	0
Volume Left	0	0	4	0	61	0	0
Volume Right	0	52	0	0	0	20	0
cSH	1700	1700	1206	1700	512	709	1700
Volume to Capacity	0.00	0.21	0.00	0.15	0.12	0.03	0.00
Queue Length 95th (ft)	0	0	0	0	10	2	0
Control Delay (s)	0.0	0.0	8.0	0.0	13.0	10.2	0.0
Lane LOS			A		B	B	A
Approach Delay (s)	0.0		0.1		12.3		0.0
Approach LOS					B		A

Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	29.4%	ICU Level of Service		A
Analysis Period (min)	15			

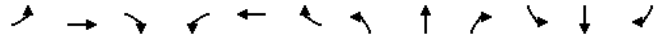
HCM Analysis – Without Turn Lanes



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	172	13	4	185	4	1
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	205	15	5	220	5	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			220		442	212
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			220		442	212
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)			1361		574	833

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	220	225	6
Volume Left	0	5	5
Volume Right	15	0	1
cSH	1700	1361	612
Volume to Capacity	0.13	0.00	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.2	10.9
Lane LOS		A	B
Approach Delay (s)	0.0	0.2	10.9
Approach LOS			B

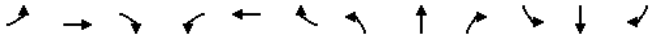
Intersection Summary			
Average Delay		0.2	
Intersection Capacity Utilization		23.7%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	165	8	13	189	0	0	0	9	0	0	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	0	196	10	15	225	0	0	0	11	0	0	0
Pedestrians					4						1	
Lane Width (ft)					12.0						12.0	
Walking Speed (ft/s)					4.0						4.0	
Percent Blockage					0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	226			206			457	458	205	473	463	226
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	226			206			457	458	205	473	463	226
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	99	100	100	100
cM capacity (veh/h)	1353			1377			512	496	838	492	493	818

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	206	240	11	0
Volume Left	0	15	0	0
Volume Right	10	0	11	0
cSH	1353	1377	838	1700
Volume to Capacity	0.00	0.01	0.01	0.00
Queue Length 95th (ft)	0	1	1	0
Control Delay (s)	0.0	0.6	9.4	0.0
Lane LOS		A	A	A
Approach Delay (s)	0.0	0.6	9.4	0.0
Approach LOS			A	A

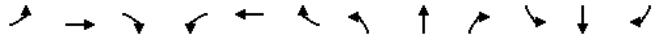
Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		33.0%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	165	9	2	192	1	10	0	6	0	0	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	0	196	11	2	229	1	12	0	7	0	0	0
Pedestrians					4						2	
Lane Width (ft)					12.0						12.0	
Walking Speed (ft/s)					4.0						4.0	
Percent Blockage					0						0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)					1270							
pX, platoon unblocked												
vC, conflicting volume	232			207			436	438	206	449	443	231
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	232			207			436	438	206	449	443	231
tC, single (s)	4.1			4.1			7.2	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			98	100	99	100	100	100
cM capacity (veh/h)	1346			1376			516	513	837	515	510	812

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	207	232	19	0
Volume Left	0	2	12	0
Volume Right	11	1	7	0
cSH	1346	1376	603	1700
Volume to Capacity	0.00	0.00	0.03	0.00
Queue Length 95th (ft)	0	0	2	0
Control Delay (s)	0.0	0.1	11.2	0.0
Lane LOS		A	B	A
Approach Delay (s)	0.0	0.1	11.2	0.0
Approach LOS			B	A

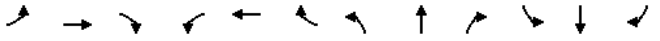
Intersection Summary				
Average Delay			0.5	
Intersection Capacity Utilization			23.7%	ICU Level of Service
Analysis Period (min)			15	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	166	5	2	189	5	5	0	4	0	0	1
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	0	198	6	2	225	6	6	0	5	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)					864							
pX, platoon unblocked												
vC, conflicting volume	231			204			435	436	201	438	436	228
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	231			204			435	436	201	438	436	228
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	100	99	100	100	100
cM capacity (veh/h)	1349			1380			534	516	845	529	516	816

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	204	233	11	1
Volume Left	0	2	6	0
Volume Right	6	6	5	1
cSH	1349	1380	638	816
Volume to Capacity	0.00	0.00	0.02	0.00
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.0	0.1	10.7	9.4
Lane LOS		A	B	A
Approach Delay (s)	0.0	0.1	10.7	9.4
Approach LOS			B	A

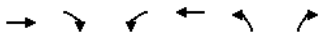
Intersection Summary				
Average Delay			0.3	
Intersection Capacity Utilization			24.4%	ICU Level of Service
Analysis Period (min)			15	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	140	30	2	169	0	27	0	3	0	0	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	0	167	36	2	201	0	32	0	4	0	0	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)					754							
pX, platoon unblocked												
vC, conflicting volume	201			202			390	390	185	394	408	201
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	201			202			390	390	185	394	408	201
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			94	100	100	100	100	100
cM capacity (veh/h)	1383			1382			572	547	863	566	535	845

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	202	204	32	4	0
Volume Left	0	2	32	0	0
Volume Right	36	0	0	4	0
cSH	1383	1382	572	863	1700
Volume to Capacity	0.00	0.00	0.06	0.00	0.00
Queue Length 95th (ft)	0	0	4	0	0
Control Delay (s)	0.0	0.1	11.7	9.2	0.0
Lane LOS		A	B	A	A
Approach Delay (s)	0.0	0.1	11.4		0.0
Approach LOS			B		A

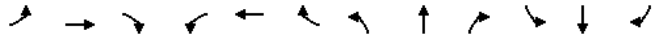
Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	21.1%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	259	0	2	307	10	6
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	276	0	2	327	11	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			276		606	276
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			276		606	276
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	99
cM capacity (veh/h)			1299		462	768

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	276	329	17
Volume Left	0	2	11
Volume Right	0	0	6
cSH	1700	1299	544
Volume to Capacity	0.16	0.00	0.03
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.1	11.8
Lane LOS		A	B
Approach Delay (s)	0.0	0.1	11.8
Approach LOS			B

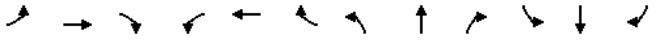
Intersection Summary			
Average Delay		0.4	
Intersection Capacity Utilization		28.7%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	263	1	8	284	0	25	0	66	1	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	1	280	1	9	302	0	27	0	70	1	0	0
Pedestrians											5	
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	307			281			602	607	280	677	607	307
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	307			281			602	607	280	677	607	307
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			94	100	91	100	100	100
cM capacity (veh/h)	1260			1293			411	409	759	331	409	734

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	282	311	97	1
Volume Left	1	9	27	1
Volume Right	1	0	70	0
cSH	1260	1293	616	331
Volume to Capacity	0.00	0.01	0.16	0.00
Queue Length 95th (ft)	0	0	14	0
Control Delay (s)	0.0	0.3	11.9	15.9
Lane LOS	A	A	B	C
Approach Delay (s)	0.0	0.3	11.9	15.9
Approach LOS			B	C

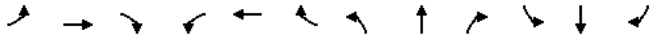
Intersection Summary			
Average Delay		1.8	
Intersection Capacity Utilization		33.8%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	329	1	12	289	2	3	0	11	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	350	1	13	307	2	3	0	12	0	0	0
Pedestrians											3	
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)					1270							
pX, platoon unblocked												
vC, conflicting volume	313			351			685	689	351	699	688	312
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	313			351			685	689	351	699	688	312
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	100	98	100	100	100
cM capacity (veh/h)	1256			1175			361	366	697	347	367	732

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	351	322	15	0
Volume Left	0	13	3	0
Volume Right	1	2	12	0
cSH	1256	1175	582	1700
Volume to Capacity	0.00	0.01	0.03	0.00
Queue Length 95th (ft)	0	1	2	0
Control Delay (s)	0.0	0.4	11.4	0.0
Lane LOS		A	B	A
Approach Delay (s)	0.0	0.4	11.4	0.0
Approach LOS			B	A

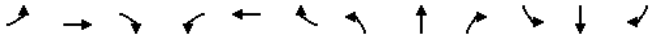
Intersection Summary				
Average Delay			0.4	
Intersection Capacity Utilization		36.5%	ICU Level of Service	A
Analysis Period (min)			15	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	337	3	3	294	0	9	0	4	1	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	359	3	3	313	0	10	0	4	1	0	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)					864							
pX, platoon unblocked												
vC, conflicting volume	313			362			679	679	360	684	681	313
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	313			362			679	679	360	684	681	313
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			97	100	99	100	100	100
cM capacity (veh/h)	1259			1208			367	375	689	363	374	732

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	362	316	14	1
Volume Left	0	3	10	1
Volume Right	3	0	4	0
cSH	1259	1208	429	363
Volume to Capacity	0.00	0.00	0.03	0.00
Queue Length 95th (ft)	0	0	2	0
Control Delay (s)	0.0	0.1	13.7	15.0
Lane LOS		A	B	B
Approach Delay (s)	0.0	0.1	13.7	15.0
Approach LOS			B	B

Intersection Summary				
Average Delay			0.3	
Intersection Capacity Utilization		28.9%	ICU Level of Service	A
Analysis Period (min)			15	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	293	49	4	240	0	57	0	19	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	312	52	4	255	0	61	0	20	0	0	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)					754							
pX, platoon unblocked												
vC, conflicting volume	255			364			602	602	338	622	628	255
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	255			364			602	602	338	622	628	255
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			85	100	97	100	100	100
cM capacity (veh/h)	1321			1206			414	415	709	390	401	788

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	364	260	61	20	0
Volume Left	0	4	61	0	0
Volume Right	52	0	0	20	0
cSH	1321	1206	414	709	1700
Volume to Capacity	0.00	0.00	0.15	0.03	0.00
Queue Length 95th (ft)	0	0	13	2	0
Control Delay (s)	0.0	0.2	15.2	10.2	0.0
Lane LOS		A	C	B	A
Approach Delay (s)	0.0	0.2	14.0		0.0
Approach LOS			B		A

Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	29.4%	ICU Level of Service		A
Analysis Period (min)	15			

Turn Lane Warrants

Left Turn Lane Warrant Analysis

Project: **Oregon City Warner Milne Restriping Study**

A.M. Peak Hour

Intersection	Approach (NB,SB, EB,WB)	Number of Advancing Lanes	Number of Opposing Lanes	Volume Advancing (Va)	LT Vol	LT %	Volume Opposing (Vo)	Warrant Factor	5% Warrant Va	Va Warrant Threshold	HRB Warrant Met?	ODOT Volume	ODOT Criteria Met?	Max. Est. Queue	Storage Length (ft)
Clackamas County Sheriff's Dwy -- Warner Milne Rd	WB	1	1	189	4	2%	185	1.51	646	979	No	374	No	1	
Clackamas Credit Union Dwy -- Warner Milne Rd	EB	1	1	173	0	0%	189	N/A	646	N/A	N/A	362	No	0	
Clackamas Credit Union Dwy -- Warner Milne Rd	WB	1	1	202	13	6%	173	0.89	657	584	No	375	No	2	
Barclay Apartments Dwy -- Warner Milne Rd	EB	1	1	174	0	0%	193	N/A	643	N/A	N/A	367	No	0	
Barclay Apartments Dwy -- Warner Milne Rd	WB	1	1	195	2	1%	174	2.16	657	1422	No	369	No	0	
City Hall Driveway -- Warner Milne Rd	EB	1	1	171	0	0%	194	N/A	643	N/A	N/A	365	No	0	
City Hall Driveway -- Warner Milne Rd	WB	1	1	196	2	1%	171	2.17	657	1425	No	367	No	0	
Danielson's West Dwy -- Warner Milne Rd	EB	1	1	170	0	0%	169	N/A	661	N/A	N/A	339	No	0	
Danielson's West Dwy -- Warner Milne Rd	WB	1	1	171	2	1%	170	2.03	657	1332	No	341	No	0	

P.M. Peak Hour

Intersection	Approach (NB,SB, EB,WB)	Number of Advancing Lanes	Number of Opposing Lanes	Volume Advancing (Va)	LT Vol	LT %	Volume Opposing (Vo)	Warrant Factor	5% Warrant Va	Va Warrant Threshold	HRB Warrant Met?	ODOT Volume	ODOT Criteria Met?	Max. Est. Queue	Storage Length (ft)
Clackamas County Sheriff's Dwy -- Warner Milne Rd	WB	1	1	309	2	1%	259	2.72	598	1625	No	568	No	0	
Clackamas Credit Union Dwy -- Warner Milne Rd	EB	1	1	265	1	0%	284	3.55	581	2066	No	549	No	0	
Clackamas Credit Union Dwy -- Warner Milne Rd	WB	1	1	292	8	3%	264	1.34	595	794	No	556	No	2	
Barclay Apartments Dwy -- Warner Milne Rd	EB	1	1	330	0	0%	291	N/A	575	N/A	N/A	621	No	0	
Barclay Apartments Dwy -- Warner Milne Rd	WB	1	1	303	12	4%	330	1.12	550	614	No	633	No	2	
City Hall Dwy -- Warner Milne Rd	EB	1	1	340	0	0%	294	N/A	575	N/A	N/A	634	No	0	
City Hall Dwy -- Warner Milne Rd	WB	1	1	297	3	1%	340	2.18	543	1184	No	637	No	1	
Danielson's West Dwy -- Warner Milne Rd	EB	2	2	342	0	0%	240	N/A	608	N/A	N/A	291	No	0	
Danielson's West Dwy -- Warner Milne Rd	WB	2	2	244	4	2%	342	1.72	543	933	No	293	No	1	

ODOT LEFT TURN CRITERIA IS BASED ON THE **8-13-03** LEFT TURN CRITERIA

ODOT Collision Data

General Data			Street Names		From Intersection								Vehicle 1				Vehicle 2				
Crash ID	Serial #	Crash Date	1st Street	2nd Street	Distance	Direction	Collision Type	Crash Severity	Weather	Road Surface	Light	Cause 1	Vehicle Type	Vehicle Movement	From - To	Vehicle Action	Vehicle Type	Vehicle Movement	From - To	Vehicle Action	Comment
1295983	3051	8/12/2008	WARNER-MILNE	KAEN RD	500	E	TURN	INJ	CLEAR	DRY	DAYLIGHT	NO YIELD	PSNGR CAR	TURN-R	E to N	EXIT DWY					Entering Randji Denture Center (across from credit union)
1194581	1711	4/28/2006	WARNER-MILNE	MOLALLA AVE	500	W	TURN	INJ	CLEAR	DRY	DAYLIGHT	IMPROPER TURN	PSNGR CAR	STRGHT	E to W	NONE	PSNGR CAR	TURN-L	W to N	ENTR DWY	Just west of Molalla/Warner Milne intersection (EBL into driveway hit by WBT)