

Transportation Impact Analysis

KOCH CORPORATE CENTER (PHASE II)

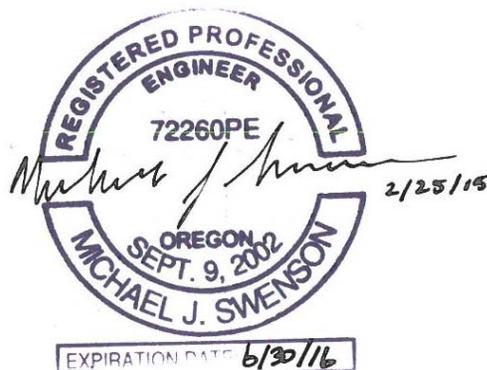
Prepared for:
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February 2015

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Chapter 1. Frequently Asked Questions

This section provides an executive summary of the Transportation Impact Analysis through a set of frequently asked questions (FAQs).

Where is the project located?

The site is located along the southeast quadrant of SW Tualatin Sherwood Road / 115th Avenue SW intersection in Tualatin, Oregon.

What is the project land use and trip generation?

The project includes the construction of three light industrial buildings totaling approximately 307,000 gsf. The project is estimated to generate 282 trips during the weekday AM peak hour and 298 trips during the weekday PM peak hour utilizing ITE land use 110.

What are the existing and future without-project conditions in the study area?

The study area was defined through coordination with Washington County and the City of Tualatin and includes the intersections of SW 115th Avenue / SW Tualatin Sherwood Road and SW Avery St / SW Tualatin Sherwood Road. Under existing conditions, during both the weekday AM and PM peak hours, both intersections are anticipated to operate within the County standards. After the addition of forecast background growth and pipeline project traffic, the SW 115th Avenue / SW Tualatin Road intersection is anticipated to operate at a volume-to-capacity ratios of 1.06 during the weekday AM peak hour, which exceeds the County standards.

Would the project have any transportation impacts?

With the addition of project related traffic, the intersection volume-to-capacity ratio is anticipated to exceed the 0.99 volume-to-capacity ratio operational standard at both intersections during the weekday AM and PM peak hours.

What mitigation measures are recommended?

A second westbound left-turn lane at the SW 115th Avenue / SW Tualatin Sherwood Road intersection is proposed to mitigate the project impact at the off-site study intersections.

Chapter 2. Introduction

This Transportation Impact Analysis (TIA) summarizes the potential transportation-related impacts associated with the proposed Koch Corporate Center (Phase II) located in the City of Tualatin. The analysis was conducted to evaluate the project's impacts on roadways and intersections within the vicinity of the site and to recommend, if necessary, mitigation measures that would reduce or otherwise offset these impacts. This scope of this analysis has been prepared in coordination with both the City of Tualatin and Washington County staff.

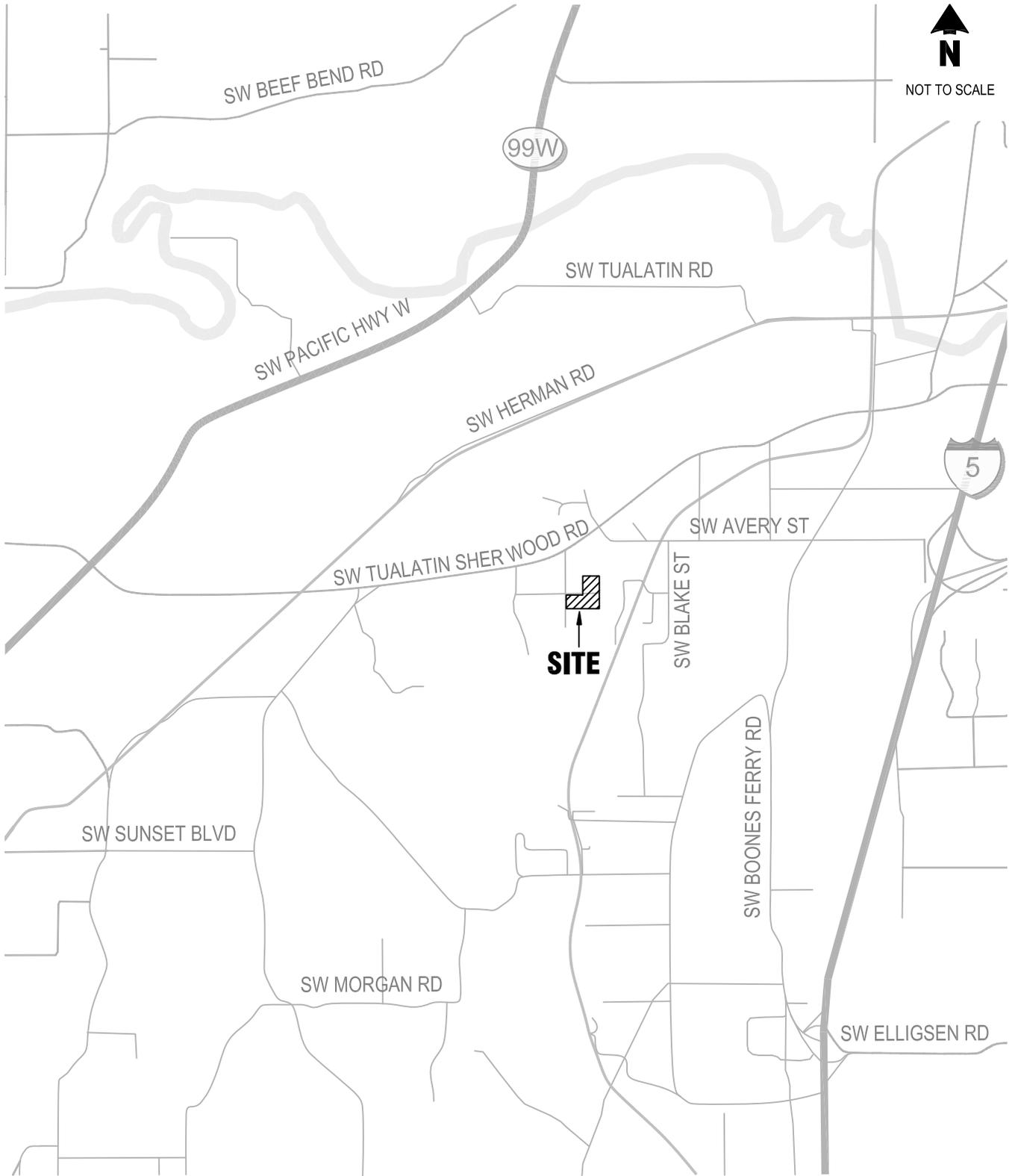
Project Description

The project site is located along the southeast quadrant of the SW 115th / SW Tualatin Sherwood Road intersection in Tualatin, Oregon. The project's site vicinity is shown in Figure 1. The primary access to the project will be via the SW 115th Avenue / SW Tualatin Sherwood Road intersection. The project includes the construction of three industrial buildings totaling 306,875 gross square feet (gsf). Currently, two buildings associated with the first phase of the Koch Corporate Center are being constructed and are anticipated to be completed and occupied by the project horizon year. A preliminary site plan showing the subject project and access points are included in Figure 2. The project is anticipated to be built and fully occupied by 2018.

Analysis Approach and Study Area

The scope of this analysis was coordinated with City of Tualatin and Washington County staff and is consistent with the City's and Washington County's road standard requirements. The study area includes two intersections, SW 115th Street / SW Tualatin Sherwood Road and SW Avery Street / SW Tualatin Sherwood Road. Since SW Tualatin Sherwood Road is maintained by the County, the potential "Impact Area" of the project was reviewed based on the projected average daily traffic (ADT). The intersection is operated by Washington County; therefore Washington County standards were used for analysis.

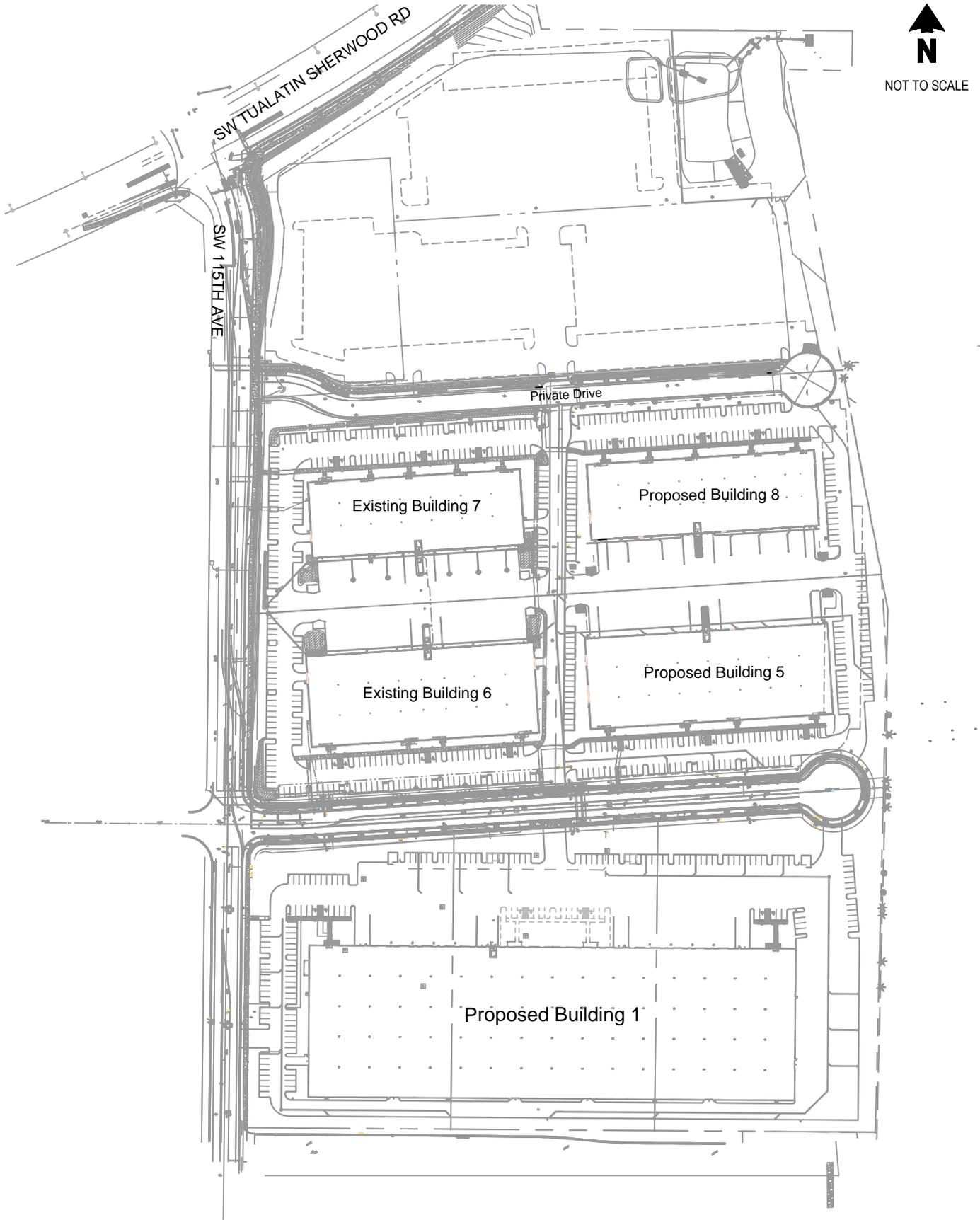
Intersection operations are evaluated for the existing, without-project and with-project weekday AM and PM peak hour conditions. Site-generated impacts are determined by comparing without- and with-project traffic conditions.



Site Vicinity

Koch Corporate Center (Phase II)

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Preliminary Site Plan

Koch Corporate Center (Phase II)

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FIGURE

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Chapter 3. Existing and Baseline Conditions

This section describes both existing conditions and 2018 without-project conditions within the identified study area. Study area characteristics are provided for the roadway network, planned improvements, existing and forecasted without-project volumes, traffic operations, and non-motorized facilities.

Roadway Network

The primary roadways within the vicinity of the site include the following:

SW Tualatin Sherwood Road is a two-lane major arterial with a posted speed limit of 45 miles per hour (mph). Traffic signals exist at major intersections near the site including SW 115th Street / SW Tualatin Sherwood Road and SW Avery Road / SW Tualatin Sherwood Road. Bike lanes are provided near the project site. Sidewalks are provided where development has occurred.

SW 115th Avenue is a two-lane local commercial industrial roadway with a posted speed limit of 25 mph. Sidewalks are located where development has occurred.

SW Avery Street is a two-lane local commercial industrial roadway with a posted speed limit of 25 mph. Sidewalks are located where development has occurred. Bike lanes exist on both sides of the roadway.

Planned Improvements

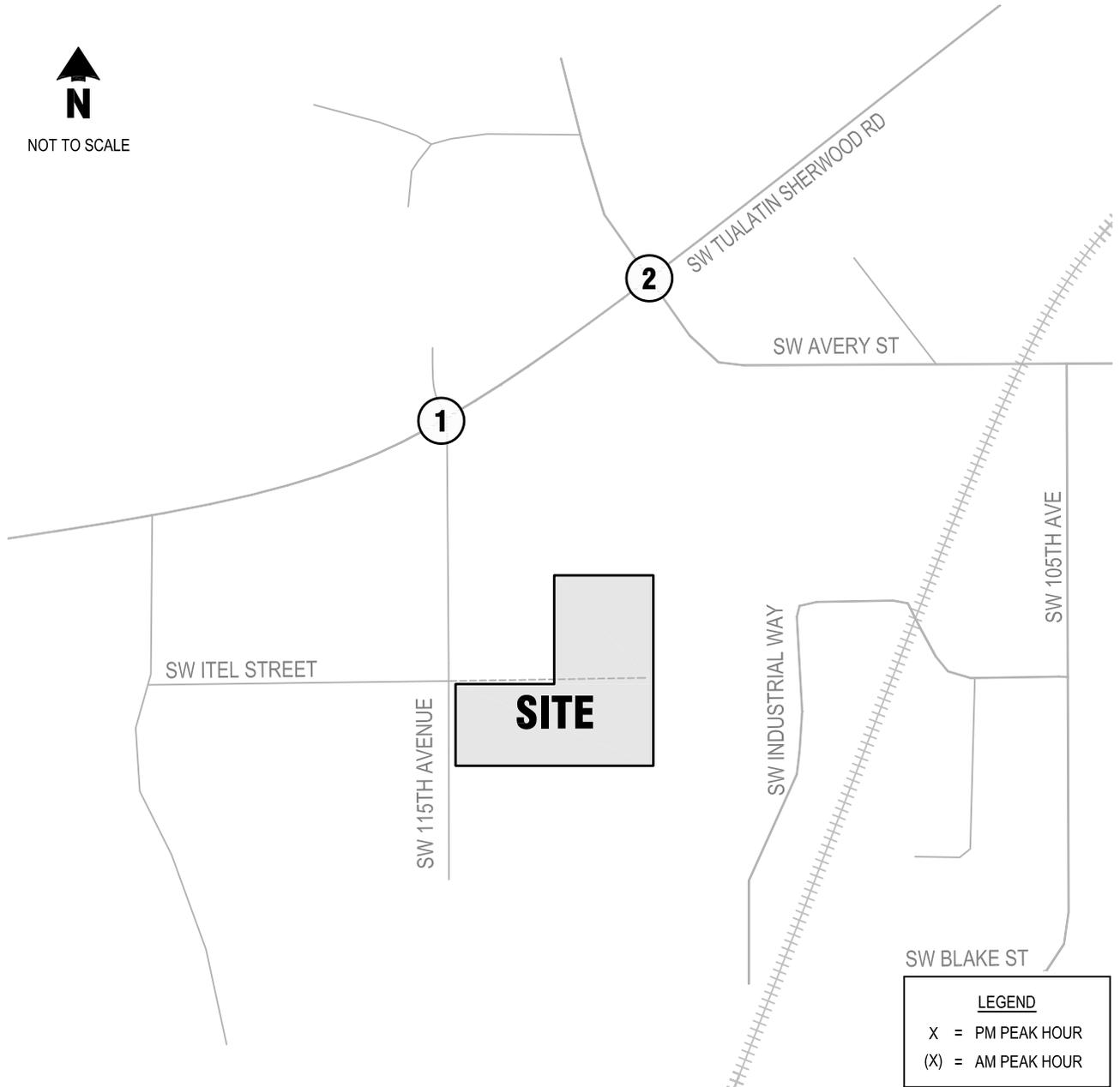
The City of Tualatin *Transportation System Plan* (February 2014) was reviewed to identify any planned improvements within the 2018 horizon year. No improvements were identified in the study area that would be constructed by the project horizon year.

One capacity improvement was identified City of Tualatin *Transportation System Plan* and includes the widening of SW Avery Street to a three lane cross-section between SW Teton Avenue and SW Tualatin Sherwood Road. The existing intersection at SW Tualatin Sherwood / SW Avery Street already reflects this planned improvement with left turn lanes on SW Avery Street. This improvement is anticipated to be constructed in 2019, after the project horizon year. An additional transit improvement was identified in the study area which would fund a fixed-route bus service on SW Avery Street and SW Tualatin Sherwood Road within the next 5 to 10 years.

Traffic Volumes

Weekday AM and PM peak hour traffic volumes at the study intersection were collected in January 2015. The existing weekday AM and PM peak hour traffic volumes are illustrated in Figure 3. The detailed traffic count worksheets are provided in Appendix A.

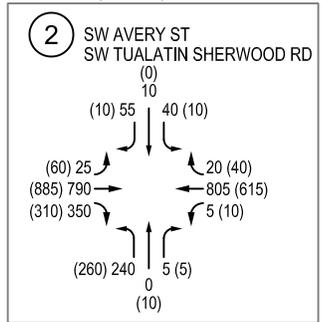
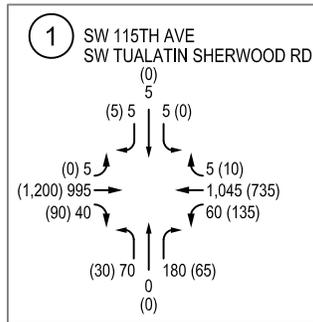
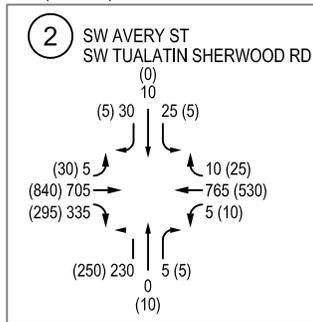
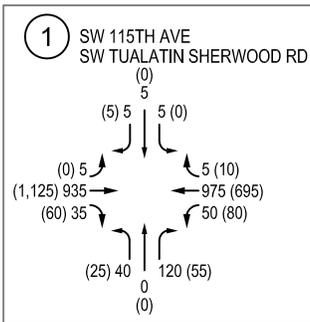
Consistent with other studies in the area, and approved by the City and County, an annual growth rate of 1.5 percent was utilized for estimating future without-project traffic volumes. In addition to an annual growth rate, two pipeline projects were included in the 2018 without-project weekday AM and PM peak hour traffic volumes. The pipeline projects include: Hedges Business Park and Koch Corporate Center – Buildings 5 & 6. Figure 3 illustrates the resulting 2018 without-project weekday AM and PM peak hour traffic volumes.



LEGEND	
X	= PM PEAK HOUR
(X)	= AM PEAK HOUR

EXISTING (2015)

WITHOUT PROJECT (2018)



Existing and 2018 Without-Project Weekday AM and PM Peak Hour Traffic Volumes

FIGURE

Traffic Operations

A level of service (LOS) analysis was conducted for the study area intersections for the weekday AM and PM peak hour. The signalized intersections were analyzed using *Synchro 8*. This software program provides an analysis based on methodologies presented in the *Highway Capacity Manual* (HCM) (Transportation Research Board, 2000 Edition).

LOS values range from LOS A, which indicates good operating conditions with little or no delay, to LOS F, which indicates extreme congestion and long vehicle delays. LOS is measured in terms of total average intersection delay for signalized and all-way stop-controlled intersections. A more detailed explanation of LOS criteria is provided in Appendix B.

Existing and without-project (2018) LOS results are summarized in Table 1 and LOS worksheets are provided in Appendix C. The signal timing splits and offsets were optimized during the without-project weekday AM and PM peak hour.

The study intersections are under Washington County jurisdiction. Washington County has identified their operational standard as a volume-to-capacity (V/C) ratio equal to or less than 0.98 for the overall intersection. Since SW Tualatin Sherwood Road is a County facility, the Washington County standard is being considered in the operations analysis. Based on discussions with County staff, the use of the peak hour volumes satisfies the first and second hour operational standards defined by the County.

Table 1. Existing and Without-Project AM and PM Peak Hour LOS Summary

Intersection	2015 Existing			2018 Without-Project		
	LOS ¹	Delay ²	V/C ³	LOS	Delay	V/C
Weekday AM Peak Hour						
1. SW 115th Ave / SW Tualatin Sherwood Rd	B	18.9	0.88	D	44.4	1.06
2. SW Avery St / SW Tualatin Sherwood Rd	C	23.4	0.84	C	21.3	0.94
Weekday PM Peak Hour						
1. SW 115th Ave / SW Tualatin Sherwood Rd	B	17.2	0.75	C	21.7	0.85
2. SW Avery St / SW Tualatin Sherwood Rd	C	22.7	0.76	C	20.5	0.88
1. Level of Service 2. Average vehicle delay in seconds per vehicle. 3. Volume-to-capacity ratio reported for the worst movement at signalized intersections						

As shown in Table 1, all intersections currently operate with a volume-to-capacity ratio less than 0.98 during both the weekday AM and PM peak hours. With the addition of background traffic growth and traffic anticipated from the pipeline projects, the eastbound through movement at the SW 115th Ave / SW Tualatin Sherwood Road intersection is anticipated to operate with a volume-to-capacity of 1.06 during the weekday AM peak hour. This does not meet the County's operational standard.

Non-Motorized Facilities

Non-motorized facilities exist within the study area in the form of sidewalks and bike lanes. Bike lanes are provided along SW Tualatin Sherwood Road and SW Avery Street.

Traffic Safety

Collision data was reviewed and summarized at SW 115th Avenue / SW Tualatin Sherwood Road and SW Avery Street / SW Tualatin Sherwood Road. This includes complete data between 2011 and 2013 and is shown in Table 2. Accident data received from the Oregon Department of Transportation is shown in Appendix D.

Table 2. Collision Data Summary

Location	2011	2012	2013	Total Collisions	Collisions/ Year ¹
1. SW 115th Ave / SW Tualatin Sherwood Rd	1	2	3	6	2
2. SW Avery St / SW Tualatin Sherwood Rd	6	6	3	15	5

1. Collisions per year based on average between 2011 and 2013.

As shown in Table 2, collisions at the intersection of SW 115th Avenue / SW Tualatin Sherwood Road and SW Avery Street / SW Tualatin Sherwood Road total approximately two and five collisions per year respectively. For both intersections, the collision types consisted of rear-ends or turning movements.

Chapter 4. Project Impacts

This section of the report documents the site-generated impacts of the proposed project on the surrounding roadway network, including impacts to traffic volumes and intersection operations. Project-generated weekday AM and PM peak hour traffic volumes are estimated, distributed, and assigned to the surrounding roadway network. Future with-project traffic volumes are projected and intersection peak hour operations are evaluated. 2018 without- and with-project conditions are compared in order to identify transportation impacts associated with the project.

Trip Generation

The following trip generation estimates were developed using rates identified in the ITE *Trip Generation Manual*, 9th Edition. The trip generation rates used for the proposed site are based on ITE Land Use #110 (General Light Industrial). Trip generation estimates for the weekday AM and PM peak hour and average daily conditions are noted in Table 3.

Table 3. Trip Generation

Land Use	Size	Rate ¹	Project Trips		
			Total	In	Out
Light Industrial (LU # 110)	306,875 gsf				
Weekday AM Peak Hour		0.92	282	248	34
Weekday PM Peak Hour		0.97	298	36	262
Weekday Daily		6.97	2140	1070	1070

1. Trips rates from ITE Trip Generation Manual, 9th Edition.

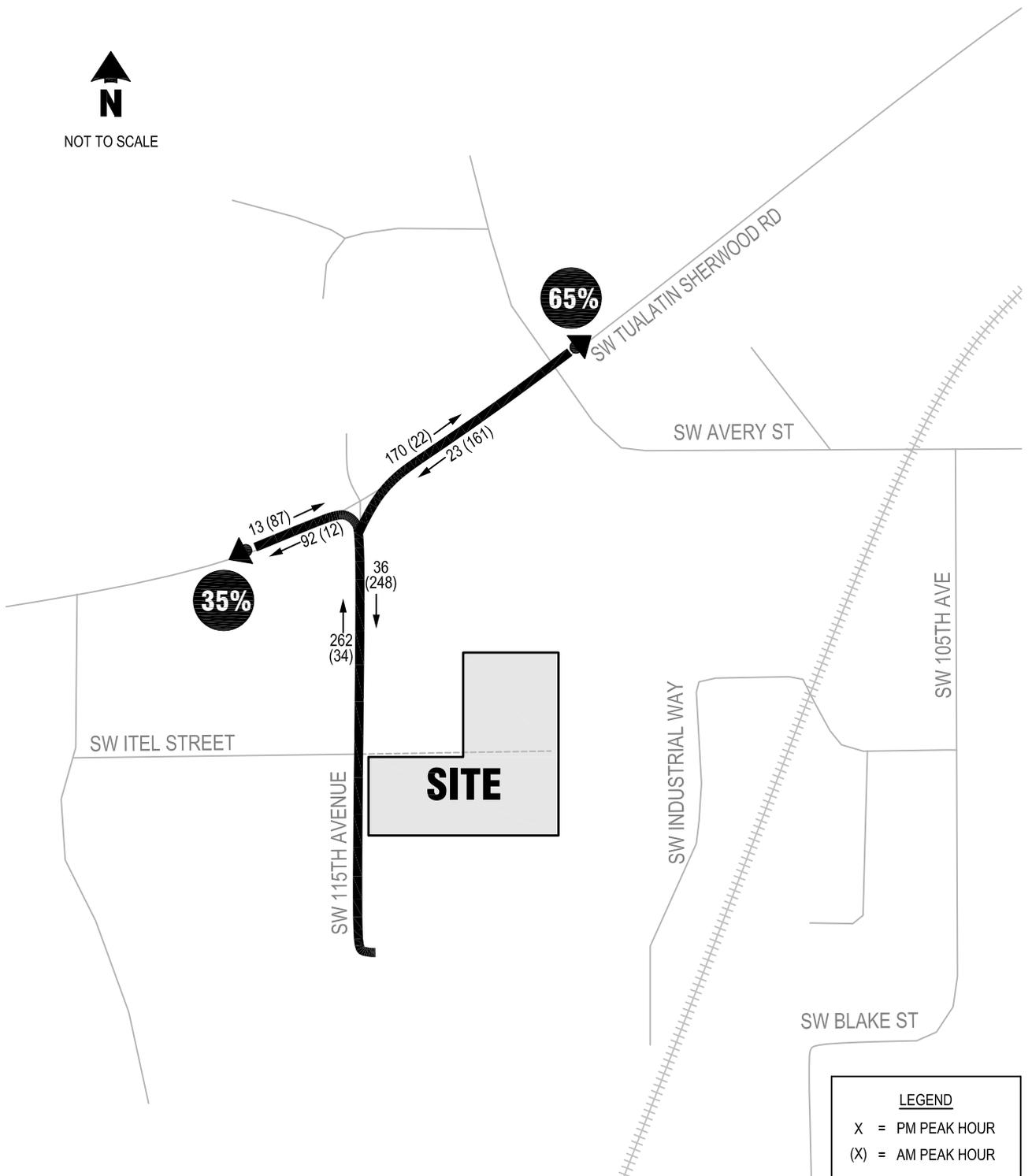
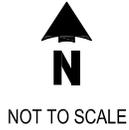
As shown in Table 3, based on ITE rates the weekday AM and PM peak hour trip generation totals 282 and 298 net new trips, respectively.

Trip Distribution

A review of the existing turning movement counts and the trip distribution from the first phase of the Koch Corporate Center was conducted to estimate the anticipated travel patterns to/from the site. In general, 35 percent of the trips are oriented to/from the west and 65 percent of the trips are oriented to/from the east. Figure 4 illustrates the trip distribution and assignment of project trips within the study area and at the study intersections for both the weekday AM and PM peak hours.

Traffic Volumes

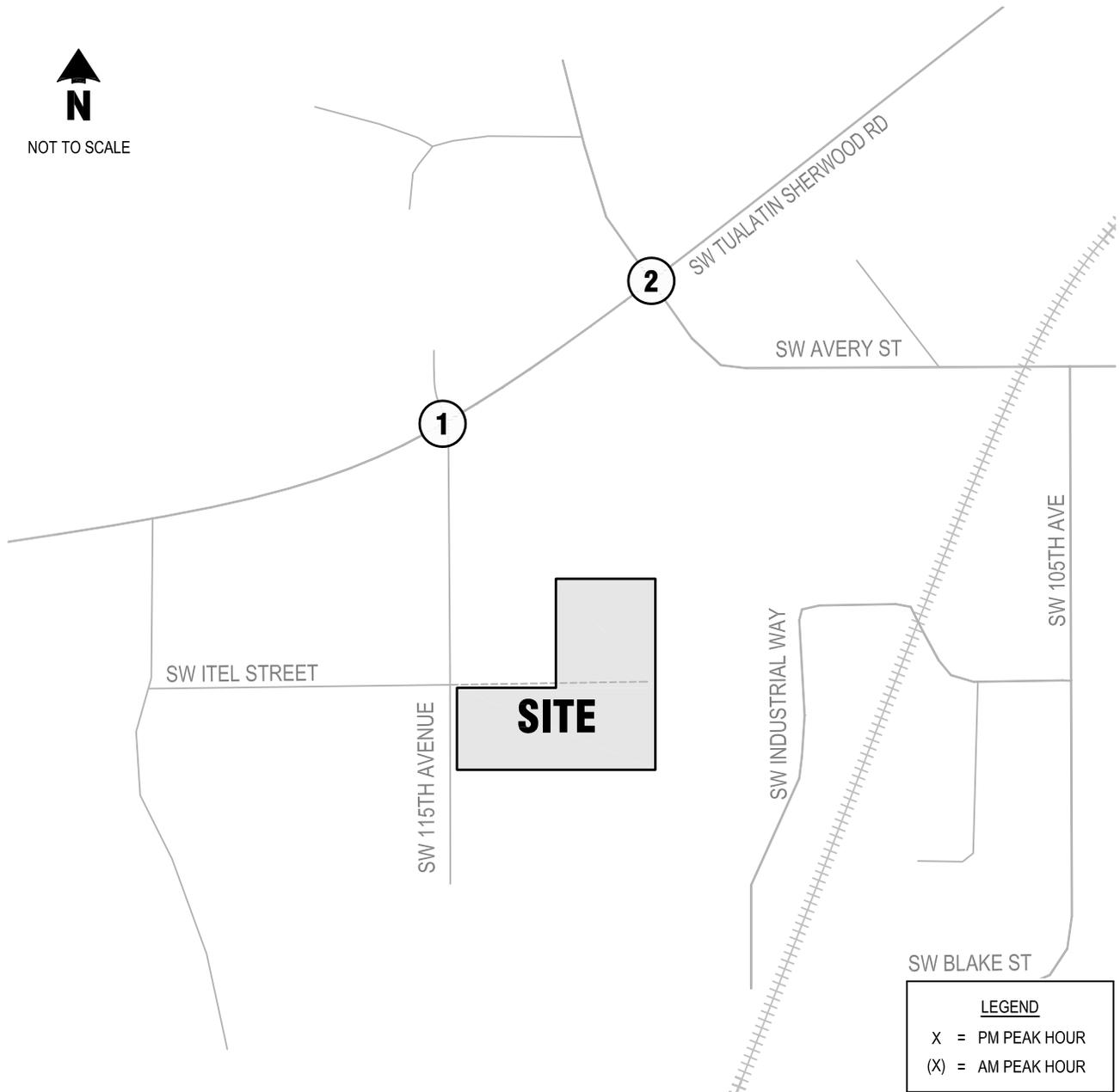
Future (2018) with-project traffic volumes were estimated by adding site-generated traffic volumes and future without-project traffic volumes. The resulting weekday AM and PM peak hour future with-project traffic volumes are illustrated in Figure 5.



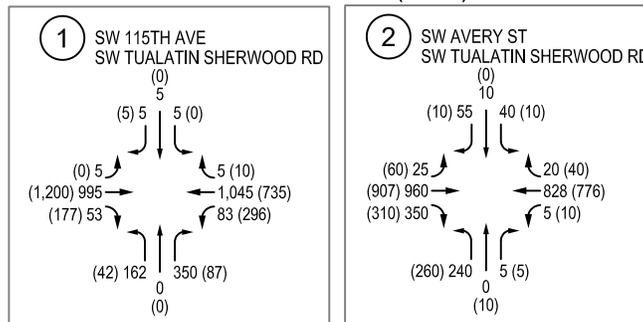
Trip Distribution & Assignment

Koch Corporate Center (Phase II)

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WITH PROJECT (2018)



2018 With-Project Weekday AM and PM Peak Hour Traffic Volumes

Traffic Operations

The with-project analysis reflects the project impacts of the additional project related trips at the study intersections. The results of the LOS analysis are summarized in Table 4. The results of the 2018 without-project analyses have also been included for comparison. Due to the actuated operations of the two signals, the signal phase splits were optimized for the without- and with-project weekday AM and PM peak hour. Levels of service worksheets for 2018 with-project traffic conditions are included in Appendix C of this report.

Table 4. Without-Project and With-Project LOS Summary

Intersection	2018 Without-Project			2018 With-Project		
	LOS ¹	Delay ²	V/C ³	LOS	Delay	V/C
Weekday AM Peak Hour						
1. SW 115th Ave / SW Tualatin Sherwood Rd	D	44.4	1.06	F	123.4	1.44
2. SW Avery St / SW Tualatin Sherwood Rd	C	21.3	0.94	C	22.8	0.94
Weekday PM Peak Hour						
1. SW 115th Ave / SW Tualatin Sherwood Rd	C	21.7	0.85	D	35.8	1.00
2. SW Avery St / SW Tualatin Sherwood Rd	C	20.5	0.88	C	24.9	0.87

1. Level of Service
2. Average vehicle delay in seconds per vehicle.
3. Volume-to-capacity ratio for worst movement at signalized intersections

As shown in Table 4, with the addition of project related traffic, the intersection V/C ratio is anticipated to exceed the County's operational standard at both the SW 115th Avenue / Tualatin Sherwood Road intersection as well as the SW Avery Street / SW Tualatin Sherwood Road intersection. The maximum V/C at the SW 115th Avenue / SW Tualatin Sherwood Road intersection is 1.44 during the weekday AM peak hour on the eastbound through approach. At the SW Avery Street / SW Tualatin Sherwood Road intersection, the maximum V/C is anticipated to be 0.94 on the northbound left-turn movement during the weekday PM peak hour.

Chapter 5. Project Mitigation

As the project does not meet the jurisdictional volume-to-capacity standard during future with-project conditions, potential mitigation measures were evaluated. Intersections that operated at a volume-to-capacity ratio below 0.99 during future without-project conditions are required to operate below a 0.99 volume-to-capacity ratio with the proposed project. Similarly, intersections that operated at 0.99 or above during future without-project conditions are required to be returned to volume-to-capacity ratios that are less than or equal to the without-project conditions.

Mitigation

Potential mitigations were evaluated at the study intersections. At the SW 115th Avenue / SW Tualatin Sherwood Road intersection, the operational impact of adding a second westbound to southbound left-turn lane was evaluated. By constructing the improvement, the phase timing for westbound left-turn movement can be reduced with more green time given to the eastbound through and westbound through movements. The traffic signal phase timing and signal offsets were optimized at both intersections during both weekday AM peak hour and weekday PM peak hour to account for the increase in capacity at the SW 115th Avenue / SW Tualatin Sherwood Road intersection.

By constructing the second westbound left-turn lane, the volume-to-capacity ratio at the SW 115th Avenue / SW Tualatin Sherwood Road intersection is anticipated to 1.05 on the eastbound through movement decrease during the weekday AM peak hour, which is below the volume-to-capacity ratio of 1.06 anticipated during future without-project conditions. During the weekday PM peak hour, the intersection is anticipated to operate with a maximum volume-to-capacity ratio of 0.84.

Results of the operations analyses for the proposed mitigations are shown in Table 5 with the unmitigated with-project operations shown for comparison. Detailed level of service worksheets are included in Appendix C of this report.

Table 5. Without-Project and Mitigation LOS Summary

Intersection	2018 With-Project			2018 Mitigated		
	LOS ¹	Delay ²	V/C ³	LOS	Delay	V/C
Weekday AM Peak Hour						
1. SW 115th Ave / SW Tualatin Sherwood Rd	D	44.4	1.06	D	38.4	1.05
2. SW Avery St / SW Tualatin Sherwood Rd	C	21.3	0.94	C	22.0	0.94
Weekday PM Peak Hour						
1. SW 115th Ave / SW Tualatin Sherwood Rd	C	21.7	0.85	C	28.0	0.84
2. SW Avery St / SW Tualatin Sherwood Rd	C	20.5	0.88	C	24.5	0.93

1. Level of Service
2. Average vehicle delay in seconds per vehicle.
3. Volume-to-capacity ratio for worst movement at signalized intersections

Queuing Analysis

A queuing analysis focusing on the dual westbound left-turn lanes was performed at the SW 115th Avenue / SW Tualatin Sherwood Road intersection for the weekday AM and PM peak hour with-project mitigation conditions using Poisson queuing methodology. Since the volume to capacity ratio for the westbound left-turn lane is less than 1.0, the use of the Poisson methodology is appropriate and meets Washington County standards. An average vehicle length of 25 feet was assumed in the calculations. This vehicle length is representative of the mix of cars and trucks anticipated during the weekday AM and PM peak hours.

The existing turn pocket length for the westbound left-turning movements is approximately 290 feet and it was assumed the second left-turn lane would be the same length. Table 6 shows the results of the queuing analysis for the westbound-left turning movement at 115th Avenue SW / SW Tualatin Sherwood Road under the mitigation scenario. Detailed worksheets are shown in Appendix E.

Table 6. Poisson Queuing Analysis (Mitigation Scenario)

SW 115th Avenue / SW Tualatin Sherwood Road	Approach Volume	Length of Red Interval (sec)	Average Arrival Rate	95th Percentile Queue (feet) ¹
AM Peak Hour	296	105	4.80	190'
PM Peak Hour	83	110	1.41	75'

1. Queues rounded to five feet.

As shown in Table 6, the 95th percentile queues at the SW 115th Avenue / SW Tualatin Road intersection are anticipated to be shorter than the provided 290 foot storage pockets at the intersection. The 95th percentile queue is anticipated to be 190 feet during the weekday AM peak hour and 75 feet during the weekday PM peak hour. Based on this information, the queuing for the westbound left-turn pockets are not anticipated to spill out of the turn pocket and block the westbound through movement.

Safety Analysis

The capacity improvement considered for SW 115th Avenue / SW Tualatin Sherwood Road was an additional westbound left. The benefit to cost ratio was calculated using the following formula:

$$B/C = (Annual\ Benefits) * (Series\ Present\ Worth\ Factor\ (20\ yrs\ @\ 10\%)) / Estimated\ Improvement\ Cost$$

Of the 6 collisions reported at the SW 115th Ave SW / SW Tualatin Sherwood Rd intersection over the 3 year period, 2 were reported as property-damage only while the remaining 4 collisions resulted in 6 injuries. This results in an annual benefit average cost of \$20,186.67 during the analysis period.

An additional westbound left-turn lane at the intersection has been identified as a possible capacity improvement for consideration. Preliminary design work for the second left-turn lane was previously conducted with the *Koch Corporate Center (Building 5 and 6)* TIA which estimated the cost of construction to be approximately \$200,000. This value is used in the calculation of the benefit to cost analysis.

$$B/C = (Annual\ Benefits) * (Series\ Present\ Worth\ Factor\ (20\ yrs\ @\ 10\%)) / Estimated\ Improvement\ Cost$$

$$B/C = (\$20,186.67) * (8.5136) / \$200,000$$

$$B/C = 0.86$$

Based on the benefit to cost ratio of less than 1.0, no improvement is triggered at the SW 115th Avenue / SW Tualatin Sherwood Road intersection through a review of the safety analysis.

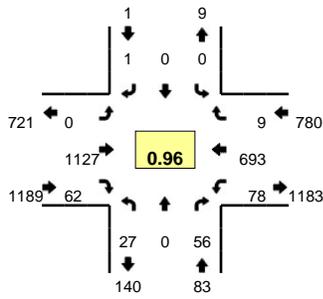
Chapter 6. Findings and Recommendations

This transportation impact study summarizes the project traffic impacts of the proposed Koch Corporate Center development. The following outlines the general findings of the study.

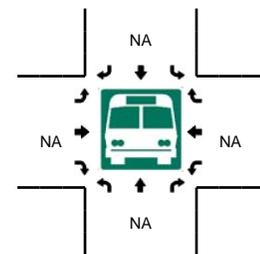
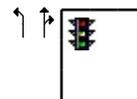
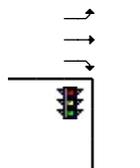
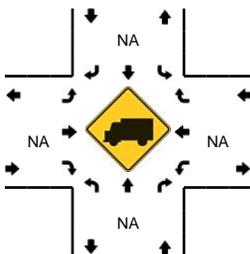
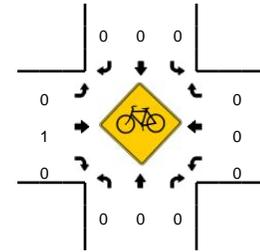
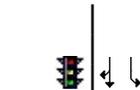
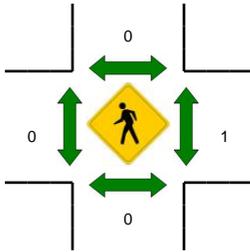
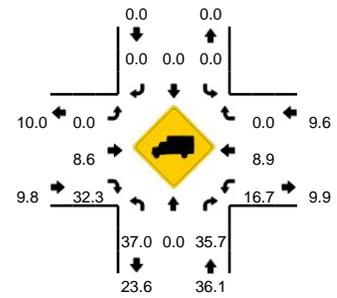
- The project includes the construction of three industrial buildings totaling approximately 306,875 gsf.
- The project is estimated to generate 282 weekday AM peak hour trips and 298 weekday PM peak hour trips.
- Under existing roadway channelization, both study intersections are anticipated to exceed the Washington County operational standard.
- Off-site mitigation, in the form of adding a second westbound left-turn pocket at SW 115th Avenue / SW Tualatin Sherwood Road is recommended. With the proposed mitigation, both intersections would meet jurisdictional operational requirements in the weekday AM and PM peak hours.
- The 95th percentile queue for the westbound left-turn lane at SW 115th Avenue / SW Tualatin Sherwood Road is anticipated to be accommodated in the available turn pocket storage during both the weekday AM and PM peak hours.

LOCATION: SW 115th Ave -- SW Tualatin-Sherwood Rd
CITY/STATE: Tualatin, OR

QC JOB #: 13177003
DATE: Thu, Jan 08 2015



Peak-Hour: 7:05 AM -- 8:05 AM
Peak 15-Min: 7:40 AM -- 7:55 AM

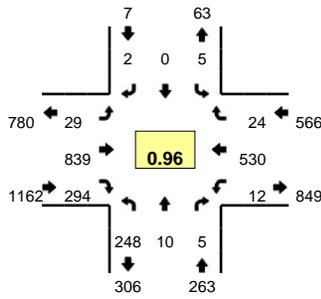


5-Min Count Period Beginning At	SW 115th Ave (Northbound)				SW 115th Ave (Southbound)				SW Tualatin-Sherwood Rd (Eastbound)				SW Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	7	0	1	0	0	0	0	97	7	0	5	49	0	0	166	
7:05 AM	2	0	2	0	0	0	0	0	0	90	6	0	7	53	0	0	160	
7:10 AM	4	0	9	0	0	0	0	0	0	90	6	0	9	52	0	0	170	
7:15 AM	1	0	3	0	0	0	0	0	0	105	6	0	3	51	0	0	169	
7:20 AM	1	0	6	0	0	0	0	0	0	92	3	0	9	62	0	0	173	
7:25 AM	2	0	4	0	0	0	0	0	0	105	3	0	2	64	1	0	181	
7:30 AM	5	0	4	0	0	0	0	0	0	88	7	0	9	49	0	0	162	
7:35 AM	3	0	5	0	0	0	0	0	0	96	5	0	6	50	0	0	165	
7:40 AM	1	0	5	0	0	0	0	0	0	108	1	0	4	55	1	0	175	
7:45 AM	2	0	3	0	0	0	0	0	0	97	4	0	8	65	2	0	181	
7:50 AM	3	0	5	0	0	0	0	0	0	84	8	0	4	72	2	0	178	
7:55 AM	1	0	4	0	0	0	0	0	0	83	12	0	10	61	1	0	172	2052
8:00 AM	2	0	6	0	0	0	1	0	0	89	1	0	7	59	2	0	167	2053
8:05 AM	2	0	10	0	0	0	0	0	0	73	8	0	4	51	0	0	148	2041
8:10 AM	2	0	2	0	0	0	0	0	1	92	5	0	11	49	2	0	164	2035
8:15 AM	8	0	13	0	0	0	0	0	1	70	6	0	7	55	0	0	160	2026
8:20 AM	7	0	7	0	0	0	0	0	0	68	6	0	7	54	1	0	150	2003
8:25 AM	1	0	3	0	0	0	0	0	0	68	3	0	5	62	2	0	144	1966
8:30 AM	2	0	7	0	0	0	0	0	0	80	5	0	6	56	0	0	156	1960
8:35 AM	4	0	7	0	1	0	0	0	0	70	4	0	3	54	0	0	143	1938
8:40 AM	1	1	3	0	0	0	0	0	0	72	5	0	2	49	0	0	133	1896
8:45 AM	2	0	6	0	0	0	0	0	1	69	8	0	5	55	0	0	146	1861
8:50 AM	2	0	4	0	0	0	0	0	2	70	3	0	5	78	1	0	165	1848
8:55 AM	3	0	6	0	1	0	0	0	0	66	6	0	2	51	2	0	137	1813
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	52	0	0	0	0	0	0	1156	52	0	64	768	20	0	2136	
Heavy Trucks	4	0	16		0	0	0		0	84	12		12	84	0		212	
Pedestrians																	0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																	0	
Stopped Buses																	0	

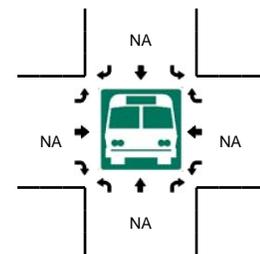
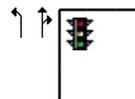
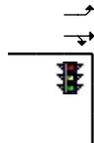
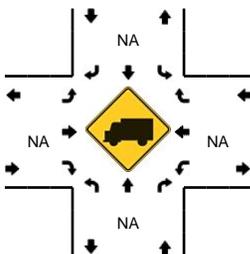
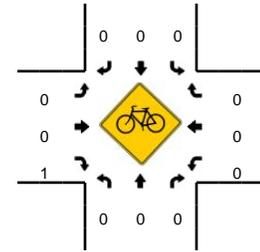
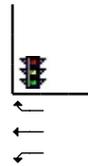
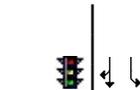
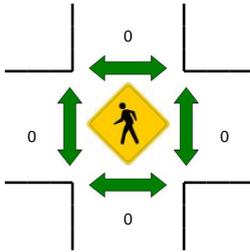
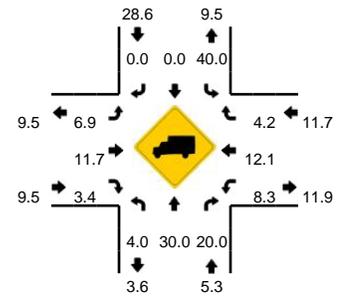
Comments:

LOCATION: SW 112th Ave -- SW Tualatin-Sherwood Rd
CITY/STATE: Tualatin, OR

QC JOB #: 13177001
DATE: Thu, Jan 08 2015



Peak-Hour: 7:05 AM -- 8:05 AM
Peak 15-Min: 7:40 AM -- 7:55 AM

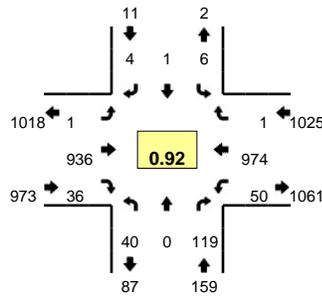


5-Min Count Period Beginning At	SW 112th Ave (Northbound)				SW 112th Ave (Southbound)				SW Tualatin-Sherwood Rd (Eastbound)				SW Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	9	1	0	0	0	0	0	0	1	86	18	0	1	45	1	0	162	
7:05 AM	14	0	1	0	0	0	0	0	4	68	13	0	0	46	3	0	149	
7:10 AM	18	1	0	0	1	0	0	0	2	77	22	0	0	45	0	0	166	
7:15 AM	22	0	1	0	0	0	0	0	1	73	29	0	0	33	0	0	159	
7:20 AM	22	0	0	0	0	0	0	0	2	68	23	0	1	46	1	0	163	
7:25 AM	17	2	0	0	0	0	0	0	2	86	23	0	1	52	2	0	185	
7:30 AM	20	0	0	0	0	0	0	0	1	63	28	0	1	39	3	0	155	
7:35 AM	13	1	0	0	0	0	0	0	1	70	30	0	2	45	1	0	163	
7:40 AM	26	0	2	0	0	0	0	0	3	72	33	0	0	31	4	0	171	
7:45 AM	31	2	0	0	2	0	0	0	3	71	27	0	0	48	5	0	189	
7:50 AM	27	2	0	0	1	0	1	0	2	56	25	0	1	47	0	0	162	
7:55 AM	13	0	1	0	1	0	1	0	4	68	17	0	5	54	2	0	166	1990
8:00 AM	25	2	0	0	0	0	0	0	4	67	24	0	1	44	3	0	170	1998
8:05 AM	19	0	0	0	4	0	0	0	0	68	14	0	2	51	1	0	159	2008
8:10 AM	7	0	0	0	1	0	1	0	1	71	24	0	2	39	1	0	147	1989
8:15 AM	20	0	0	0	0	2	1	0	2	65	16	0	0	43	0	0	149	1979
8:20 AM	13	0	0	0	0	0	1	0	0	59	17	0	1	51	6	0	148	1964
8:25 AM	12	1	1	0	2	0	2	0	0	56	15	0	0	56	1	0	146	1925
8:30 AM	14	0	0	0	1	0	1	0	2	57	26	0	1	42	1	0	145	1915
8:35 AM	7	0	1	0	0	0	0	0	0	62	15	0	1	49	2	0	137	1889
8:40 AM	13	0	1	0	0	0	1	0	3	61	14	0	1	39	1	0	134	1852
8:45 AM	9	0	1	0	1	0	0	0	0	63	9	0	0	54	1	0	138	1801
8:50 AM	19	1	1	0	0	0	2	0	1	62	14	0	0	58	1	0	159	1798
8:55 AM	12	0	0	0	1	0	0	0	4	50	19	0	0	45	5	0	136	1768
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	336	16	8	0	12	0	4	0	32	796	340	0	4	504	36	0	2088	
Heavy Trucks	16	4	4		4	0	0		0	76	16		0	76	4		200	
Pedestrians		0				0				0				0			0	
Bicycles		0	0			0	0			0	0			0	0		0	
Railroad																	0	
Stopped Buses																	0	

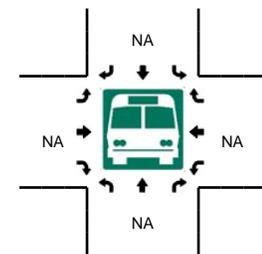
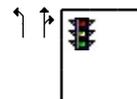
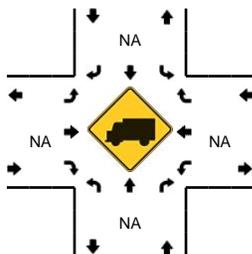
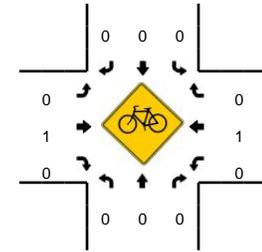
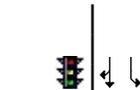
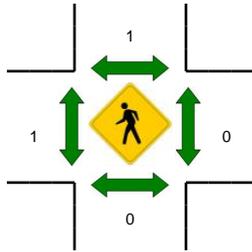
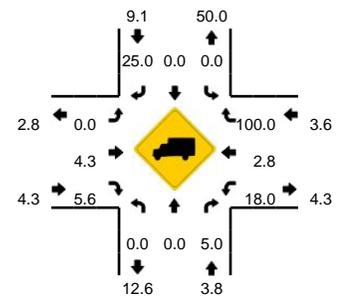
Comments:

LOCATION: SW 115th Ave -- SW Tualatin-Sherwood Rd
CITY/STATE: Tualatin, OR

QC JOB #: 13177004
DATE: Thu, Jan 08 2015



Peak-Hour: 4:55 PM -- 5:55 PM
Peak 15-Min: 5:05 PM -- 5:20 PM

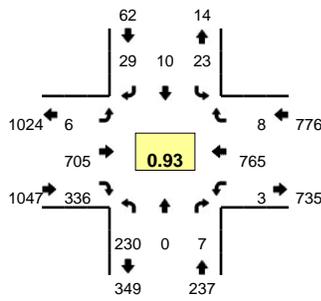


5-Min Count Period Beginning At	SW 115th Ave (Northbound)				SW 115th Ave (Southbound)				SW Tualatin-Sherwood Rd (Eastbound)				SW Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	0	5	0	1	1	0	0	0	58	1	0	0	74	1	0	143	
4:05 PM	0	0	8	0	2	0	0	0	0	92	1	0	0	98	1	0	202	
4:10 PM	0	0	9	0	1	0	0	0	0	62	4	0	0	62	0	0	140	
4:15 PM	0	0	4	0	0	0	0	0	0	68	5	0	0	76	0	0	153	
4:20 PM	3	0	7	0	0	0	0	0	0	64	7	0	0	74	0	0	162	
4:25 PM	7	0	3	0	0	0	0	0	0	71	3	0	0	75	0	0	160	
4:30 PM	1	0	12	0	0	0	0	0	0	71	3	0	0	82	0	0	170	
4:35 PM	7	0	7	0	0	0	0	0	0	81	7	0	0	92	0	0	201	
4:40 PM	3	0	7	0	1	0	0	0	0	68	2	0	0	73	1	0	159	
4:45 PM	2	0	9	0	0	0	0	0	0	65	5	0	0	85	0	0	169	
4:50 PM	5	0	13	0	0	0	0	0	0	50	3	0	0	58	0	0	132	
4:55 PM	3	0	9	0	0	0	0	0	0	90	2	0	0	72	0	0	182	1973
5:00 PM	5	0	15	0	0	0	0	0	0	71	4	0	0	56	0	0	153	1983
5:05 PM	3	0	16	0	1	0	0	0	0	87	2	0	0	99	0	0	213	1994
5:10 PM	6	0	9	0	0	0	0	0	0	83	6	0	0	76	0	0	183	2037
5:15 PM	4	0	10	0	2	0	1	0	0	75	1	0	0	94	1	0	192	2076
5:20 PM	2	0	8	0	1	0	0	0	0	68	4	0	0	75	0	0	163	2077
5:25 PM	3	0	9	0	0	1	0	0	0	79	1	0	0	86	0	0	183	2100
5:30 PM	3	0	12	0	1	0	0	0	0	79	4	0	0	90	0	0	194	2124
5:35 PM	7	0	5	0	0	0	0	0	0	78	4	0	0	83	0	0	179	2102
5:40 PM	2	0	12	0	1	0	0	0	0	66	1	0	0	71	0	0	158	2101
5:45 PM	2	0	10	0	0	0	1	0	1	86	4	0	0	98	0	0	206	2138
5:50 PM	0	0	4	0	0	0	2	0	0	74	3	0	0	74	0	0	162	2168
5:55 PM	5	0	9	0	0	0	0	0	0	76	3	0	0	71	0	0	170	2156
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	52	0	140	0	12	0	4	0	0	980	36	0	48	1076	4	0	2352	
Heavy Trucks	0	0	8	0	0	0	4	0	0	48	4	0	8	32	4	0	108	
Pedestrians	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

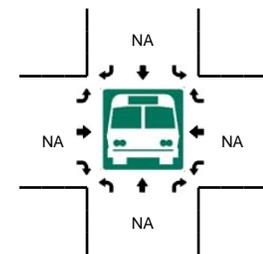
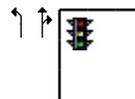
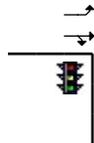
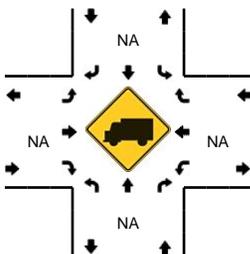
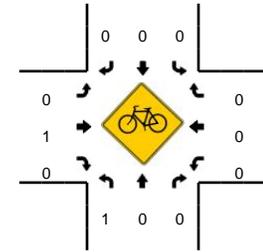
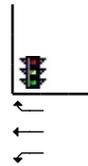
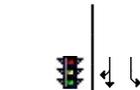
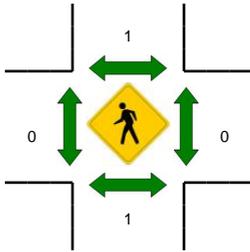
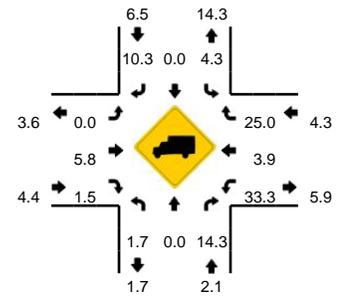
Comments:

LOCATION: SW 112th Ave -- SW Tualatin-Sherwood Rd
CITY/STATE: Tualatin, OR

QC JOB #: 13177002
DATE: Thu, Jan 08 2015



Peak-Hour: 4:55 PM -- 5:55 PM
Peak 15-Min: 5:05 PM -- 5:20 PM



5-Min Count Period Beginning At	SW 112th Ave (Northbound)				SW 112th Ave (Southbound)				SW Tualatin-Sherwood Rd (Eastbound)				SW Tualatin-Sherwood Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	17	0	2	0	1	1	4	0	0	38	24	0	0	58	1	0	146	
4:05 PM	14	0	1	0	1	2	6	0	0	65	32	0	1	70	1	0	193	
4:10 PM	18	2	1	0	6	2	4	0	0	41	25	0	2	40	2	0	143	
4:15 PM	21	0	2	0	3	0	2	0	1	60	22	0	0	55	1	0	167	
4:20 PM	20	0	2	0	6	3	0	0	0	51	17	0	0	62	0	0	161	
4:25 PM	8	1	0	0	1	1	0	0	0	50	21	0	0	66	0	0	148	
4:30 PM	24	0	2	0	1	0	1	0	0	46	29	0	0	63	0	0	166	
4:35 PM	22	0	0	0	3	2	1	0	0	64	36	0	0	77	0	0	205	
4:40 PM	20	0	0	0	1	3	1	0	0	47	27	0	0	52	1	0	152	
4:45 PM	15	0	1	0	0	0	0	0	0	50	25	0	0	69	1	0	161	
4:50 PM	14	0	0	0	4	0	5	0	1	43	20	0	0	53	0	0	140	
4:55 PM	13	0	1	0	3	1	0	0	1	56	37	0	0	60	0	0	172	1954
5:00 PM	25	0	1	0	1	1	4	0	0	52	32	0	0	42	0	0	158	1966
5:05 PM	15	0	0	0	3	1	6	0	0	67	34	0	2	67	0	0	195	1968
5:10 PM	29	0	3	0	7	1	2	0	0	56	39	0	0	50	1	0	188	2013
5:15 PM	17	0	0	0	1	1	3	0	0	63	22	0	0	79	2	0	188	2034
5:20 PM	26	0	0	0	3	2	1	0	1	53	26	0	0	68	0	0	180	2053
5:25 PM	19	0	1	0	0	1	0	0	0	58	20	0	0	61	1	0	161	2066
5:30 PM	19	0	1	0	0	0	4	0	0	64	27	0	1	76	0	0	192	2092
5:35 PM	17	0	0	0	2	0	1	0	0	69	23	0	0	59	1	0	172	2059
5:40 PM	26	0	0	0	1	1	2	0	0	52	26	0	0	55	1	0	164	2071
5:45 PM	12	0	0	0	0	1	3	0	1	71	23	0	0	85	1	0	197	2107
5:50 PM	12	0	0	0	2	0	3	0	3	44	27	0	0	63	1	0	155	2122
5:55 PM	10	0	0	0	1	0	2	0	0	73	18	0	0	64	0	0	168	2118
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	244	0	12	0	44	12	44	0	0	744	380	0	8	784	12	0	2284	
Heavy Trucks	0	0	0		0	0	8		0	44	12		4	32	4		104	
Pedestrians	0	0	0		0	0	0		0	0	0		0	0	0		0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

Comments:

Highway Capacity Manual, 2000

Signalized intersection level of service (LOS) is defined in terms of the average total vehicle delay of all movements through an intersection. Vehicle delay is a method of quantifying several intangible factors, including driver discomfort, frustration, and lost travel time. Specifically, LOS criteria are stated in terms of average delay per vehicle during a specified time period (for example, the PM peak hour). Vehicle delay is a complex measure based on many variables, including signal phasing (i.e., progression of movements through the intersection), signal cycle length, and traffic volumes with respect to intersection capacity. Table 1 shows LOS criteria for signalized intersections, as described in the *Highway Capacity Manual* (Transportation Research Board, Special Report 209, 2000).

Table 1. Level of Service Criteria for Signalized Intersections

Level of Service	Average Control Delay (sec/veh)	General Description (Signalized Intersections)
A	≤10	Free Flow
B	>10 - 20	Stable Flow (slight delays)
C	>20 - 35	Stable flow (acceptable delays)
D	>35 - 55	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>55 - 80	Unstable flow (intolerable delay)
F	>80	Forced flow (jammed)

Source: *Highway Capacity Manual*, Transportation Research Board, Special Report 209, 2000.

Unsignalized intersection LOS criteria can be further reduced into two intersection types: all-way stop-controlled and two-way stop-controlled. All-way, stop-controlled intersection LOS is expressed in terms of the average vehicle delay of all of the movements, much like that of a signalized intersection. Two-way, stop-controlled intersection LOS is defined in terms of the average vehicle delay of an individual movement(s). This is because the performance of a two-way, stop-controlled intersection is more closely reflected in terms of its individual movements, rather than its performance overall. For this reason, LOS for a two-way, stop-controlled intersection is defined in terms of its individual movements. With this in mind, total average vehicle delay (i.e., average delay of all movements) for a two-way, stop-controlled intersection should be viewed with discretion. Table 2 shows LOS criteria for unsignalized intersections (both all-way and two-way, stop-controlled).

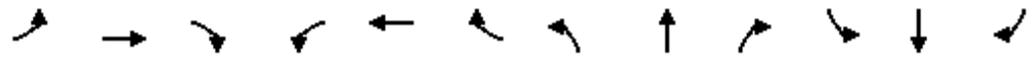
Table 2. Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay (sec/veh)
A	0 - 10
B	>10 - 15
C	>15 - 25
D	>25 - 35
E	>35 - 50
F	>50

Source: *Highway Capacity Manual*, Transportation Research Board, Special Report 209, 2000.

HCM Signalized Intersection Capacity Analysis
 1: SW 115th Ave & SW Tualatin Sherwood Rd

Koch Corporate Center Phase II
 Existing Weekday AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1125	60	80	695	10	25	0	55	0	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5	4.0	5.5		4.0	4.5			4.5	
Lane Util. Factor		1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frbp, ped/bikes		1.00	0.98	1.00	1.00		1.00	0.99			1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt		1.00	0.85	1.00	1.00		1.00	0.85			0.85	
Flt Protected		1.00	1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)		1727	1438	1641	1724		1337	1180			1615	
Flt Permitted		1.00	1.00	0.13	1.00		0.95	1.00			1.00	
Satd. Flow (perm)		1727	1438	216	1724		1337	1180			1615	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1125	60	80	695	10	25	0	55	0	0	5
RTOR Reduction (vph)	0	0	16	0	0	0	0	49	0	0	5	0
Lane Group Flow (vph)	0	1125	44	80	705	0	25	6	0	0	0	0
Confl. Peds. (#/hr)									1	1		
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	35%	35%	35%	0%	0%	0%
Turn Type	D.P+P	NA	Perm	D.P+P	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	6		2	2								
Actuated Green, G (s)		103.6	103.6	110.1	114.1		4.5	15.9			7.4	
Effective Green, g (s)		103.6	103.6	110.1	114.1		4.5	15.9			7.4	
Actuated g/C Ratio		0.74	0.74	0.79	0.81		0.03	0.11			0.05	
Clearance Time (s)		5.5	5.5	4.0	5.5		4.0	4.5			4.5	
Vehicle Extension (s)		3.5	3.5	1.5	3.5		1.5	1.5			1.5	
Lane Grp Cap (vph)		1277	1064	236	1405		42	134			85	
v/s Ratio Prot		c0.65		0.02	c0.41		c0.02	c0.01			0.00	
v/s Ratio Perm			0.03	0.25								
v/c Ratio		0.88	0.04	0.34	0.50		0.60	0.05			0.00	
Uniform Delay, d1		13.6	4.9	31.3	4.1		66.9	55.3			62.8	
Progression Factor		1.00	1.00	1.27	1.38		1.00	1.00			1.00	
Incremental Delay, d2		8.9	0.1	0.3	1.1		14.2	0.1			0.0	
Delay (s)		22.5	5.0	39.9	6.7		81.0	55.3			62.8	
Level of Service		C	A	D	A		F	E			E	
Approach Delay (s)		21.6			10.1			63.4			62.8	
Approach LOS		C			B			E			E	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: SW 112th Ave & SW Tualatin Sherwood Rd

Koch Corporate Center Phase II
Existing Weekday AM Peak Hour

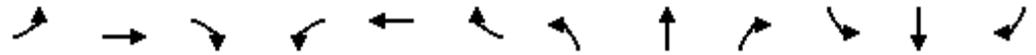


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	840	295	10	530	25	250	10	5	5	0	5
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5	4.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	1727	1438	1612	1696	1442	1719	1719		1399	1252	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1641	1727	1438	1612	1696	1442	1719	1719		1399	1252	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	30	840	295	10	530	25	250	10	5	5	0	5
RTOR Reduction (vph)	0	0	61	0	0	9	0	4	0	0	5	0
Lane Group Flow (vph)	30	840	234	10	530	16	250	11	0	5	0	0
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	10%	10%	10%	12%	12%	12%	5%	5%	5%	29%	29%	29%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	4.8	95.0	95.0	1.3	91.5	91.5	24.2	24.0		1.2	1.0	
Effective Green, g (s)	4.8	95.0	95.0	1.3	91.5	91.5	24.2	24.0		1.2	1.0	
Actuated g/C Ratio	0.03	0.68	0.68	0.01	0.65	0.65	0.17	0.17		0.01	0.01	
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5	4.0	5.0		4.0	5.0	
Vehicle Extension (s)	1.5	3.5	3.5	1.5	3.5	3.5	1.5	1.5		1.5	1.5	
Lane Grp Cap (vph)	56	1171	975	14	1108	942	297	294		11	8	
v/s Ratio Prot	c0.02	c0.49		0.01	0.31		c0.15	c0.01		0.00	0.00	
v/s Ratio Perm			0.16			0.01						
v/c Ratio	0.54	0.72	0.24	0.71	0.48	0.02	0.84	0.04		0.45	0.00	
Uniform Delay, d1	66.5	14.1	8.6	69.2	12.2	8.5	56.0	48.4		69.1	69.0	
Progression Factor	0.94	0.88	1.45	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.7	2.1	0.3	87.8	1.5	0.0	18.3	0.0		10.5	0.1	
Delay (s)	65.0	14.5	12.9	157.0	13.7	8.5	74.3	48.4		79.5	69.1	
Level of Service	E	B	B	F	B	A	E	D		E	E	
Approach Delay (s)		15.4			16.0			72.8			74.3	
Approach LOS		B			B			E			E	

Intersection Summary		
HCM 2000 Control Delay	23.4	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.74	
Actuated Cycle Length (s)	140.0	Sum of lost time (s) 18.5
Intersection Capacity Utilization	73.5%	ICU Level of Service D
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
 1: SW 115th Ave & SW Tualatin Sherwood Rd

Koch Corporate Center Phase II
 Existing Weekday PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	935	35	50	975	5	40	0	120	5	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1827	1521	1736	1825		1736	1553		1656	1595	
Flt Permitted	0.19	1.00	1.00	0.18	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	340	1827	1521	325	1825		1736	1553		1656	1595	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	935	35	50	975	5	40	0	120	5	5	5
RTOR Reduction (vph)	0	0	11	0	0	0	0	107	0	0	5	0
Lane Group Flow (vph)	5	935	24	50	980	0	40	13	0	5	5	0
Confl. Peds. (#/hr)	1					1	1					1
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	9%	9%	9%
Turn Type	D.P+P	NA	Perm	D.P+P	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	6		2	2								
Actuated Green, G (s)	88.1	81.4	81.4	88.1	86.8		5.9	12.8		1.1	8.0	
Effective Green, g (s)	88.1	81.4	81.4	88.1	86.8		5.9	12.8		1.1	8.0	
Actuated g/C Ratio	0.73	0.68	0.68	0.73	0.72		0.05	0.11		0.01	0.07	
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	1.5	3.5	3.5	1.5	3.5		1.5	1.5		1.5	1.5	
Lane Grp Cap (vph)	264	1239	1031	317	1320		85	165		15	106	
v/s Ratio Prot	0.00	0.51		c0.01	c0.54		c0.02	c0.01		0.00	0.00	
v/s Ratio Perm	0.01		0.02	0.11								
v/c Ratio	0.02	0.75	0.02	0.16	0.74		0.47	0.08		0.33	0.05	
Uniform Delay, d1	18.4	12.7	6.3	21.1	9.9		55.5	48.3		59.1	52.4	
Progression Factor	1.00	1.00	1.00	0.92	0.87		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	4.3	0.0	0.1	2.9		1.5	0.1		4.7	0.1	
Delay (s)	18.4	17.0	6.3	19.4	11.5		57.0	48.4		63.8	52.5	
Level of Service	B	B	A	B	B		E	D		E	D	
Approach Delay (s)		16.6			11.9			50.5			56.3	
Approach LOS		B			B			D			E	

Intersection Summary		
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.66	B
Actuated Cycle Length (s)	120.0	Sum of lost time (s)
Intersection Capacity Utilization	68.8%	18.0
Analysis Period (min)	15	ICU Level of Service
		C

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: SW 112th Ave & SW Tualatin Sherwood Rd

Koch Corporate Center Phase II
Existing Weekday PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	705	335	5	765	10	230	0	5	25	10	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5	4.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85		1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1827	1516	1736	1827	1517	1770	1583		1687	1576	
Flt Permitted	0.22	1.00	1.00	0.26	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	409	1827	1516	477	1827	1517	1770	1583		1687	1576	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	705	335	5	765	10	230	0	5	25	10	30
RTOR Reduction (vph)	0	0	111	0	0	4	0	4	0	0	28	0
Lane Group Flow (vph)	5	705	224	5	765	6	230	1	0	25	12	0
Confl. Peds. (#/hr)	1		1	1		1						
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	2%	2%	2%	7%	7%	7%
Turn Type	D.P+P	NA	Perm	D.P+P	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	6		2	2		6						
Actuated Green, G (s)	73.8	72.8	72.8	73.8	72.8	72.8	20.5	19.1		8.6	7.2	
Effective Green, g (s)	73.8	72.8	72.8	73.8	72.8	72.8	20.5	19.1		8.6	7.2	
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.17	0.16		0.07	0.06	
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5	4.0	5.0		4.0	5.0	
Vehicle Extension (s)	1.5	3.5	3.5	1.5	3.5	3.5	1.5	1.5		1.5	1.5	
Lane Grp Cap (vph)	262	1108	919	303	1108	920	302	251		120	94	
v/s Ratio Prot	c0.00	0.39		0.00	c0.42		c0.13	0.00		0.01	c0.01	
v/s Ratio Perm	0.01		0.15	0.01		0.00						
v/c Ratio	0.02	0.64	0.24	0.02	0.69	0.01	0.76	0.00		0.21	0.13	
Uniform Delay, d1	12.5	15.1	10.9	11.5	16.0	9.3	47.4	42.4		52.5	53.4	
Progression Factor	1.34	0.87	1.47	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	2.1	0.5	0.0	3.5	0.0	9.8	0.0		0.3	0.2	
Delay (s)	16.8	15.3	16.5	11.5	19.5	9.3	57.2	42.4		52.8	53.6	
Level of Service	B	B	B	B	B	A	E	D		D	D	
Approach Delay (s)		15.7			19.3			56.9			53.3	
Approach LOS		B			B			E			D	

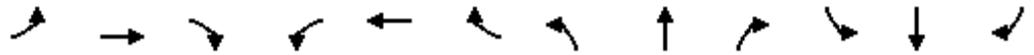
Intersection Summary

HCM 2000 Control Delay	22.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1: SW 115th Ave & SW Tualatin Sherwood Rd

Koch Corporate Center Phase II
2018 Without-Project AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1200	90	135	735	10	30	0	65	0	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5	4.0	5.5		4.0	4.5			4.5	
Lane Util. Factor		1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frbp, ped/bikes		1.00	0.98	1.00	1.00		1.00	0.99			1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt		1.00	0.85	1.00	1.00		1.00	0.85			0.85	
Flt Protected		1.00	1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)		1727	1438	1641	1724		1337	1180			1615	
Flt Permitted		1.00	1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (perm)		1727	1438	1641	1724		1337	1180			1615	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1200	90	135	735	10	30	0	65	0	0	5
RTOR Reduction (vph)	0	0	31	0	0	0	0	57	0	0	5	0
Lane Group Flow (vph)	0	1200	59	135	745	0	30	8	0	0	0	0
Confl. Peds. (#/hr)									1	1		
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	35%	35%	35%	0%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)		78.5	78.5	13.0	95.5		3.1	14.5			7.4	
Effective Green, g (s)		78.5	78.5	13.0	95.5		3.1	14.5			7.4	
Actuated g/C Ratio		0.65	0.65	0.11	0.80		0.03	0.12			0.06	
Clearance Time (s)		5.5	5.5	4.0	5.5		4.0	4.5			4.5	
Vehicle Extension (s)		3.5	3.5	1.5	3.5		1.5	1.5			1.5	
Lane Grp Cap (vph)		1129	940	177	1372		34	142			99	
v/s Ratio Prot		c0.69		c0.08	0.43		c0.02	c0.01			0.00	
v/s Ratio Perm			0.04									
v/c Ratio		1.06	0.06	0.76	0.54		0.88	0.06			0.00	
Uniform Delay, d1		20.8	7.5	52.0	4.4		58.3	46.7			52.8	
Progression Factor		1.00	1.00	0.99	1.03		1.00	1.00			1.00	
Incremental Delay, d2		45.2	0.1	12.3	1.2		104.6	0.1			0.0	
Delay (s)		65.9	7.6	63.6	5.7		162.9	46.7			52.8	
Level of Service		E	A	E	A		F	D			D	
Approach Delay (s)		61.9			14.6			83.4			52.8	
Approach LOS		E			B			F			D	

Intersection Summary		
HCM 2000 Control Delay	44.4	HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio	0.95	
Actuated Cycle Length (s)	120.0	Sum of lost time (s) 18.0
Intersection Capacity Utilization	90.9%	ICU Level of Service E
Analysis Period (min)	15	

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: SW 112th Ave & SW Tualatin Sherwood Rd

Koch Corporate Center Phase II
2018 Without-Project AM Peak Hour



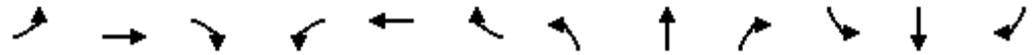
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	885	310	10	615	40	260	10	5	10	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5	4.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	1727	1438	1612	1696	1442	1719	1719		1399	1252	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1641	1727	1438	1612	1696	1442	1719	1719		1399	1252	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	60	885	310	10	615	40	260	10	5	10	0	10
RTOR Reduction (vph)	0	0	69	0	0	16	0	4	0	0	10	0
Lane Group Flow (vph)	60	885	241	10	615	25	260	11	0	10	0	0
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	10%	10%	10%	12%	12%	12%	5%	5%	5%	29%	29%	29%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	7.6	79.8	79.8	1.3	73.5	73.5	19.4	19.1		1.3	1.0	
Effective Green, g (s)	7.6	79.8	79.8	1.3	73.5	73.5	19.4	19.1		1.3	1.0	
Actuated g/C Ratio	0.06	0.66	0.66	0.01	0.61	0.61	0.16	0.16		0.01	0.01	
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5	4.0	5.0		4.0	5.0	
Vehicle Extension (s)	1.5	3.5	3.5	1.5	3.5	3.5	1.5	1.5		1.5	1.5	
Lane Grp Cap (vph)	103	1148	956	17	1038	883	277	273		15	10	
v/s Ratio Prot	c0.04	c0.51		0.01	0.36		c0.15	c0.01		0.01	0.00	
v/s Ratio Perm			0.17			0.02						
v/c Ratio	0.58	0.77	0.25	0.59	0.59	0.03	0.94	0.04		0.67	0.01	
Uniform Delay, d1	54.7	13.8	8.1	59.1	14.1	9.2	49.7	42.7		59.1	59.0	
Progression Factor	1.36	0.38	0.03	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	1.5	0.2	29.3	2.5	0.1	37.1	0.0		62.4	0.1	
Delay (s)	75.9	6.7	0.4	88.3	16.6	9.2	86.8	42.7		121.5	59.1	
Level of Service	E	A	A	F	B	A	F	D		F	E	
Approach Delay (s)		8.5			17.3			84.4			90.3	
Approach LOS		A			B			F			F	

Intersection Summary

HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 1: SW 115th Ave & SW Tualatin Sherwood Rd

Koch Corporate Center Phase II
 2018 Without-Project Weekday PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	995	40	60	1045	5	70	0	180	5	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1827	1521	1736	1825		1736	1553		1656	1595	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	1827	1521	1736	1825		1736	1553		1656	1595	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	995	40	60	1045	5	70	0	180	5	5	5
RTOR Reduction (vph)	0	0	13	0	0	0	0	163	0	0	5	0
Lane Group Flow (vph)	5	995	27	60	1050	0	70	17	0	5	5	0
Confl. Peds. (#/hr)	1					1	1					1
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	9%	9%	9%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)	1.1	81.7	81.7	7.7	88.3		5.7	11.6		1.0	6.9	
Effective Green, g (s)	1.1	81.7	81.7	7.7	88.3		5.7	11.6		1.0	6.9	
Actuated g/C Ratio	0.01	0.68	0.68	0.06	0.74		0.05	0.10		0.01	0.06	
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	1.5	3.5	3.5	1.5	3.5		1.5	1.5		1.5	1.5	
Lane Grp Cap (vph)	15	1243	1035	111	1342		82	150		13	91	
v/s Ratio Prot	0.00	0.54		c0.03	c0.58		c0.04	c0.01		0.00	0.00	
v/s Ratio Perm			0.02									
v/c Ratio	0.33	0.80	0.03	0.54	0.78		0.85	0.12		0.38	0.06	
Uniform Delay, d1	59.1	13.4	6.2	54.4	9.9		56.7	49.5		59.2	53.5	
Progression Factor	1.00	1.00	1.00	0.96	0.87		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.7	5.5	0.0	2.0	3.3		52.2	0.1		6.8	0.1	
Delay (s)	63.8	18.9	6.3	54.5	11.8		108.9	49.6		66.0	53.6	
Level of Service	E	B	A	D	B		F	D		E	D	
Approach Delay (s)		18.6			14.2			66.2			57.7	
Approach LOS		B			B			E			E	

Intersection Summary		
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.75	
Actuated Cycle Length (s)	120.0	Sum of lost time (s) 18.0
Intersection Capacity Utilization	74.8%	ICU Level of Service D
Analysis Period (min)	15	

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: SW 112th Ave & SW Tualatin Sherwood Rd

Koch Corporate Center Phase II
2018 Without-Project Weekday PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	790	350	5	805	20	240	0	5	40	10	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5	4.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1827	1516	1736	1827	1517	1770	1583		1687	1550	
Flt Permitted	0.19	1.00	1.00	0.22	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	355	1827	1516	395	1827	1517	1770	1583		1687	1550	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	25	790	350	5	805	20	240	0	5	40	10	55
RTOR Reduction (vph)	0	0	104	0	0	8	0	4	0	0	51	0
Lane Group Flow (vph)	25	790	246	5	805	12	240	1	0	40	14	0
Confl. Peds. (#/hr)	1		1	1		1				40	14	
Confl. Bikes (#/hr)			1	1		1				40	14	
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	2%	2%	2%	7%	7%	7%
Turn Type	D.P+P	NA	Perm	D.P+P	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	6		2	2		6						
Actuated Green, G (s)	75.1	74.1	74.1	75.1	72.0	72.0	18.6	13.3		13.1	7.8	
Effective Green, g (s)	75.1	74.1	74.1	75.1	72.0	72.0	18.6	13.3		13.1	7.8	
Actuated g/C Ratio	0.63	0.62	0.62	0.63	0.60	0.60	0.16	0.11		0.11	0.06	
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5	4.0	5.0		4.0	5.0	
Vehicle Extension (s)	1.5	3.5	3.5	1.5	3.5	3.5	1.5	1.5		1.5	1.5	
Lane Grp Cap (vph)	257	1128	936	258	1096	910	274	175		184	100	
v/s Ratio Prot	c0.00	0.43		0.00	c0.44		c0.14	0.00		0.02	c0.01	
v/s Ratio Perm	0.06		0.16	0.01		0.01						
v/c Ratio	0.10	0.70	0.26	0.02	0.73	0.01	0.88	0.00		0.22	0.14	
Uniform Delay, d1	13.3	15.5	10.5	12.3	17.2	9.7	49.6	47.5		48.8	52.9	
Progression Factor	0.42	0.36	0.07	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	2.6	0.5	0.0	4.4	0.0	24.6	0.0		0.2	0.2	
Delay (s)	5.7	8.1	1.3	12.3	21.5	9.7	74.2	47.5		49.0	53.1	
Level of Service	A	A	A	B	C	A	E	D		D	D	
Approach Delay (s)		6.0			21.2			73.7			51.6	
Approach LOS		A			C			E			D	

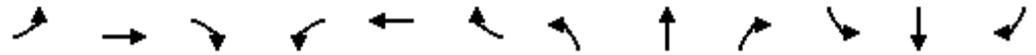
Intersection Summary

HCM 2000 Control Delay	20.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 1: SW 115th Ave & SW Tualatin Sherwood Rd

Koch Corporate Center Phase II
 2018 With-Project AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1200	177	296	735	10	42	0	87	0	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5	4.0	5.5		4.0	4.5			4.5	
Lane Util. Factor		1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frbp, ped/bikes		1.00	0.98	1.00	1.00		1.00	0.99			1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt		1.00	0.85	1.00	1.00		1.00	0.85			0.85	
Flt Protected		1.00	1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)		1727	1438	1641	1724		1337	1180			1615	
Flt Permitted		1.00	1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (perm)		1727	1438	1641	1724		1337	1180			1615	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1200	177	296	735	10	42	0	87	0	0	5
RTOR Reduction (vph)	0	0	64	0	0	0	0	76	0	0	5	0
Lane Group Flow (vph)	0	1200	113	296	745	0	42	11	0	0	0	0
Confl. Peds. (#/hr)									1	1		
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	35%	35%	35%	0%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)		57.8	57.8	32.6	94.4		4.2	15.6			7.4	
Effective Green, g (s)		57.8	57.8	32.6	94.4		4.2	15.6			7.4	
Actuated g/C Ratio		0.48	0.48	0.27	0.79		0.04	0.13			0.06	
Clearance Time (s)		5.5	5.5	4.0	5.5		4.0	4.5			4.5	
Vehicle Extension (s)		3.5	3.5	1.5	3.5		1.5	1.5			1.5	
Lane Grp Cap (vph)		831	692	445	1356		46	153			99	
v/s Ratio Prot		c0.69		c0.18	0.43		c0.03	c0.01			0.00	
v/s Ratio Perm			0.08									
v/c Ratio		1.44	0.16	0.67	0.55		0.91	0.07			0.00	
Uniform Delay, d1		31.1	17.5	38.8	4.8		57.7	45.9			52.8	
Progression Factor		1.00	1.00	0.91	1.07		1.00	1.00			1.00	
Incremental Delay, d2		206.6	0.5	1.8	1.0		98.1	0.1			0.0	
Delay (s)		237.7	18.0	37.2	6.1		155.9	45.9			52.8	
Level of Service		F	B	D	A		F	D			D	
Approach Delay (s)		209.5			15.0			81.7			52.8	
Approach LOS		F			B			F			D	

Intersection Summary		
HCM 2000 Control Delay	123.4	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	1.07	F
Actuated Cycle Length (s)	120.0	Sum of lost time (s)
Intersection Capacity Utilization	100.5%	18.0
Analysis Period (min)	15	ICU Level of Service
		G

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: SW 112th Ave & SW Tualatin Sherwood Rd

Koch Corporate Center Phase II
2018 With-Project AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	907	310	10	776	40	260	10	5	10	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5	4.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	1727	1438	1612	1696	1442	1719	1719		1399	1252	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1641	1727	1438	1612	1696	1442	1719	1719		1399	1252	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	60	907	310	10	776	40	260	10	5	10	0	10
RTOR Reduction (vph)	0	0	67	0	0	16	0	4	0	0	10	0
Lane Group Flow (vph)	60	907	243	10	776	24	260	11	0	10	0	0
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	10%	10%	10%	12%	12%	12%	5%	5%	5%	29%	29%	29%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	9.5	79.8	79.8	1.3	71.6	71.6	19.4	19.1		1.3	1.0	
Effective Green, g (s)	9.5	79.8	79.8	1.3	71.6	71.6	19.4	19.1		1.3	1.0	
Actuated g/C Ratio	0.08	0.66	0.66	0.01	0.60	0.60	0.16	0.16		0.01	0.01	
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5	4.0	5.0		4.0	5.0	
Vehicle Extension (s)	1.5	3.5	3.5	1.5	3.5	3.5	1.5	1.5		1.5	1.5	
Lane Grp Cap (vph)	129	1148	956	17	1011	860	277	273		15	10	
v/s Ratio Prot	c0.04	c0.53		0.01	0.46		c0.15	c0.01		0.01	0.00	
v/s Ratio Perm			0.17			0.02						
v/c Ratio	0.47	0.79	0.25	0.59	0.77	0.03	0.94	0.04		0.67	0.01	
Uniform Delay, d1	52.8	14.2	8.1	59.1	18.0	9.9	49.7	42.7		59.1	59.0	
Progression Factor	1.27	0.43	0.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.5	0.1	29.3	5.6	0.1	37.1	0.0		62.4	0.1	
Delay (s)	67.0	6.6	0.1	88.3	23.6	10.0	86.8	42.7		121.5	59.1	
Level of Service	E	A	A	F	C	A	F	D		F	E	
Approach Delay (s)		7.9			23.7			84.4			90.3	
Approach LOS		A			C			F			F	

Intersection Summary

HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 1: SW 115th Ave & SW Tualatin Sherwood Rd

Koch Corporate Center Phase II
 2018 With-Project Weekday PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	995	53	83	1045	5	162	0	350	5	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1827	1521	1736	1825		1736	1553		1656	1595	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	1827	1521	1736	1825		1736	1553		1656	1595	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	995	53	83	1045	5	162	0	350	5	5	5
RTOR Reduction (vph)	0	0	21	0	0	0	0	180	0	0	5	0
Lane Group Flow (vph)	5	995	32	83	1050	0	162	170	0	5	5	0
Confl. Peds. (#/hr)	1					1	1					1
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	9%	9%	9%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)	1.1	72.2	72.2	11.0	82.1		11.2	17.8		1.0	7.6	
Effective Green, g (s)	1.1	72.2	72.2	11.0	82.1		11.2	17.8		1.0	7.6	
Actuated g/C Ratio	0.01	0.60	0.60	0.09	0.68		0.09	0.15		0.01	0.06	
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	1.5	3.5	3.5	1.5	3.5		1.5	1.5		1.5	1.5	
Lane Grp Cap (vph)	15	1099	915	159	1248		162	230		13	101	
v/s Ratio Prot	0.00	c0.54		c0.05	c0.58		c0.09	c0.11		0.00	0.00	
v/s Ratio Perm			0.02									
v/c Ratio	0.33	0.91	0.03	0.52	0.84		1.00	0.74		0.38	0.05	
Uniform Delay, d1	59.1	20.9	9.7	52.0	14.1		54.4	48.9		59.2	52.8	
Progression Factor	1.00	1.00	1.00	0.93	0.79		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.7	12.2	0.1	1.1	5.4		70.7	10.6		6.8	0.1	
Delay (s)	63.8	33.1	9.8	49.3	16.5		125.1	59.5		66.0	52.9	
Level of Service	E	C	A	D	B		F	E		E	D	
Approach Delay (s)		32.1			18.9			80.3			57.2	
Approach LOS		C			B			F			E	

Intersection Summary		
HCM 2000 Control Delay	35.8	HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio	0.90	
Actuated Cycle Length (s)	120.0	Sum of lost time (s) 18.0
Intersection Capacity Utilization	92.8%	ICU Level of Service F
Analysis Period (min)	15	

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: SW 112th Ave & SW Tualatin Sherwood Rd

Koch Corporate Center Phase II
2018 With-Project Weekday PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	960	350	5	828	20	240	0	5	40	10	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5	4.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1827	1516	1736	1827	1517	1770	1583		1687	1550	
Flt Permitted	0.17	1.00	1.00	0.10	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	307	1827	1516	184	1827	1517	1770	1583		1687	1550	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	25	960	350	5	828	20	240	0	5	40	10	55
RTOR Reduction (vph)	0	0	74	0	0	8	0	5	0	0	51	0
Lane Group Flow (vph)	25	960	276	5	828	12	240	0	0	40	14	0
Confl. Peds. (#/hr)	1		1	1		1				40	14	
Confl. Bikes (#/hr)			1	1		1				40	14	
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	2%	2%	2%	7%	7%	7%
Turn Type	D.P+P	NA	Perm	D.P+P	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	6		2	2		6						
Actuated Green, G (s)	73.3	72.3	72.3	73.3	70.2	70.2	20.2	7.7		20.5	8.0	
Effective Green, g (s)	73.3	72.3	72.3	73.3	70.2	70.2	20.2	7.7		20.5	8.0	
Actuated g/C Ratio	0.61	0.60	0.60	0.61	0.59	0.59	0.17	0.06		0.17	0.07	
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5	4.0	5.0		4.0	5.0	
Vehicle Extension (s)	1.5	3.5	3.5	1.5	3.5	3.5	1.5	1.5		1.5	1.5	
Lane Grp Cap (vph)	224	1100	913	125	1068	887	297	101		288	103	
v/s Ratio Prot	c0.00	c0.53		0.00	0.45		c0.14	0.00		0.02	c0.01	
v/s Ratio Perm	0.07		0.18	0.02		0.01						
v/c Ratio	0.11	0.87	0.30	0.04	0.78	0.01	0.81	0.00		0.14	0.13	
Uniform Delay, d1	15.1	20.0	11.6	19.2	18.9	10.4	48.0	52.6		42.3	52.7	
Progression Factor	0.96	0.67	0.79	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	5.8	0.5	0.0	5.5	0.0	14.0	0.0		0.1	0.2	
Delay (s)	14.6	19.3	9.7	19.3	24.4	10.4	62.1	52.6		42.3	52.9	
Level of Service	B	B	A	B	C	B	E	D		D	D	
Approach Delay (s)		16.7			24.1			61.9			48.9	
Approach LOS		B			C			E			D	

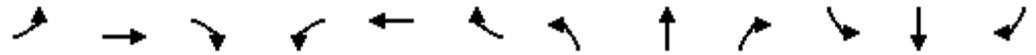
Intersection Summary

HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 1: SW 115th Ave & SW Tualatin Sherwood Rd

Koch Corporate Center Phase II
 2018 With-Project Weekday AM Peak Hour (Mitigated)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1200	177	296	735	10	42	0	87	0	0	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5	4.0	5.5			4.5	4.0		4.5	
Lane Util. Factor		1.00	1.00	0.97	1.00			1.00	1.00		1.00	
Frbp, ped/bikes		1.00	0.99	1.00	1.00			1.00	0.99		1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt		1.00	0.85	1.00	1.00			1.00	0.85		0.85	
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00		1.00	
Satd. Flow (prot)		1727	1450	3183	1724			1337	1190		1615	
Flt Permitted		1.00	1.00	0.95	1.00			0.75	1.00		1.00	
Satd. Flow (perm)		1727	1450	3183	1724			1062	1190		1615	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1200	177	296	735	10	42	0	87	0	0	5
RTOR Reduction (vph)	0	0	29	0	0	0	0	0	50	0	5	0
Lane Group Flow (vph)	0	1200	148	296	745	0	0	42	37	0	0	0
Confl. Peds. (#/hr)									1	1		
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	35%	35%	35%	0%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)		79.7	79.7	15.7	99.4			10.6	26.3		10.6	
Effective Green, g (s)		79.7	79.7	15.7	99.4			10.6	26.3		10.6	
Actuated g/C Ratio		0.66	0.66	0.13	0.83			0.09	0.22		0.09	
Clearance Time (s)		5.5	5.5	4.0	5.5			4.5	4.0		4.5	
Vehicle Extension (s)		3.5	3.5	1.5	3.5			1.5	1.5		1.5	
Lane Grp Cap (vph)		1147	963	416	1428			93	260		142	
v/s Ratio Prot		c0.69		c0.09	0.43				0.02		0.00	
v/s Ratio Perm			0.10					c0.04	0.01			
v/c Ratio		1.05	0.15	0.71	0.52			0.45	0.14		0.00	
Uniform Delay, d1		20.1	7.5	50.0	3.1			51.9	37.8		49.9	
Progression Factor		1.00	1.00	1.02	1.10			1.00	1.00		1.00	
Incremental Delay, d2		39.5	0.3	3.0	0.9			1.3	0.1		0.0	
Delay (s)		59.6	7.9	54.0	4.3			53.2	37.9		49.9	
Level of Service		E	A	D	A			D	D		D	
Approach Delay (s)		53.0			18.4			42.9			49.9	
Approach LOS		D			B			D			D	

Intersection Summary		
HCM 2000 Control Delay	38.4	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.94	D
Actuated Cycle Length (s)	120.0	Sum of lost time (s)
Intersection Capacity Utilization	92.5%	14.0
Analysis Period (min)	15	ICU Level of Service
		F

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: SW 112th Ave & SW Tualatin Sherwood Rd

Koch Corporate Center Phase II
2018 With-Project Weekday AM Peak Hour (Mitigated)

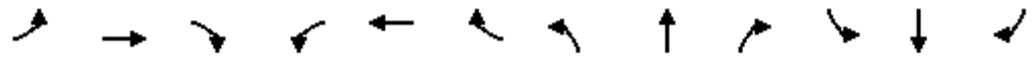


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	907	310	10	776	40	260	10	5	10	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5	4.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	1727	1438	1612	1696	1442	1719	1719		1399	1252	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1641	1727	1438	1612	1696	1442	1719	1719		1399	1252	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	60	907	310	10	776	40	260	10	5	10	0	10
RTOR Reduction (vph)	0	0	67	0	0	16	0	4	0	0	10	0
Lane Group Flow (vph)	60	907	243	10	776	24	260	11	0	10	0	0
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	10%	10%	10%	12%	12%	12%	5%	5%	5%	29%	29%	29%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	9.5	79.8	79.8	1.3	71.6	71.6	19.4	19.1		1.3	1.0	
Effective Green, g (s)	9.5	79.8	79.8	1.3	71.6	71.6	19.4	19.1		1.3	1.0	
Actuated g/C Ratio	0.08	0.66	0.66	0.01	0.60	0.60	0.16	0.16		0.01	0.01	
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5	4.0	5.0		4.0	5.0	
Vehicle Extension (s)	1.5	3.5	3.5	1.5	3.5	3.5	1.5	1.5		1.5	1.5	
Lane Grp Cap (vph)	129	1148	956	17	1011	860	277	273		15	10	
v/s Ratio Prot	c0.04	c0.53		0.01	0.46		c0.15	c0.01		0.01	0.00	
v/s Ratio Perm			0.17			0.02						
v/c Ratio	0.47	0.79	0.25	0.59	0.77	0.03	0.94	0.04		0.67	0.01	
Uniform Delay, d1	52.8	14.2	8.1	59.1	18.0	9.9	49.7	42.7		59.1	59.0	
Progression Factor	1.32	0.20	0.06	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.5	0.2	29.3	5.6	0.1	37.1	0.0		62.4	0.1	
Delay (s)	70.0	4.3	0.6	88.3	23.6	10.0	86.8	42.7		121.5	59.1	
Level of Service	E	A	A	F	C	A	F	D		F	E	
Approach Delay (s)		6.5			23.7			84.4			90.3	
Approach LOS		A			C			F			F	

Intersection Summary		
HCM 2000 Control Delay	22.0	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.81	
Actuated Cycle Length (s)	120.0	Sum of lost time (s) 18.5
Intersection Capacity Utilization	79.7%	ICU Level of Service D
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
 1: SW 115th Ave & SW Tualatin Sherwood Rd

Koch Corporate Center Phase II
 2018 With-Project Weekday PM Peak Hour (Mitigated)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	995	53	83	1045	5	162	0	350	5	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5			4.5	4.0	4.0	4.5	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00			1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.99	1.00	1.00			1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1736	1827	1534	3367	1825			1732	1553	1656	1595	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.75	1.00	0.95	1.00	
Satd. Flow (perm)	1736	1827	1534	3367	1825			1369	1553	1656	1595	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	995	53	83	1045	5	162	0	350	5	5	5
RTOR Reduction (vph)	0	0	19	0	0	0	0	0	135	0	4	0
Lane Group Flow (vph)	5	995	34	83	1050	0	0	162	215	5	6	0
Confl. Peds. (#/hr)	1					1	1					1
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	9%	9%	9%
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6			8	1	7	4	
Permitted Phases			2				8		8			
Actuated Green, G (s)	1.0	77.4	77.4	6.3	82.7			17.3	23.6	1.0	22.3	
Effective Green, g (s)	1.0	77.4	77.4	6.3	82.7			17.3	23.6	1.0	22.3	
Actuated g/C Ratio	0.01	0.65	0.65	0.05	0.69			0.14	0.20	0.01	0.19	
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5			4.5	4.0	4.0	4.5	
Vehicle Extension (s)	1.5	3.5	3.5	1.5	3.5			1.5	1.5	1.5	1.5	
Lane Grp Cap (vph)	14	1178	989	176	1257			197	305	13	296	
v/s Ratio Prot	0.00	0.54		0.02	c0.58				c0.04	c0.00	0.00	
v/s Ratio Perm			0.02					c0.12	0.10			
v/c Ratio	0.36	0.84	0.03	0.47	0.84			0.82	0.71	0.38	0.02	
Uniform Delay, d1	59.2	16.6	7.7	55.2	13.7			49.9	45.0	59.2	39.9	
Progression Factor	1.00	1.00	1.00	0.95	0.82			1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.6	7.5	0.1	0.5	4.7			22.3	5.9	6.8	0.0	
Delay (s)	64.8	24.1	7.8	52.8	15.9			72.2	50.9	66.0	39.9	
Level of Service	E	C	A	D	B			E	D	E	D	
Approach Delay (s)		23.5			18.6			57.6			48.6	
Approach LOS		C			B			E			D	

Intersection Summary		
HCM 2000 Control Delay	28.0	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.84	
Actuated Cycle Length (s)	120.0	Sum of lost time (s) 18.0
Intersection Capacity Utilization	90.5%	ICU Level of Service E
Analysis Period (min)	15	

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: SW 112th Ave & SW Tualatin Sherwood Rd

Koch Corporate Center Phase II
2018 With-Project Weekday PM Peak Hour (Mitigated)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	960	350	5	828	20	240	0	5	40	10	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5	4.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1827	1516	1736	1827	1517	1770	1583		1687	1550	
Flt Permitted	0.19	1.00	1.00	0.12	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	340	1827	1516	221	1827	1517	1770	1583		1687	1550	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	25	960	350	5	828	20	240	0	5	40	10	55
RTOR Reduction (vph)	0	0	83	0	0	8	0	5	0	0	51	0
Lane Group Flow (vph)	25	960	268	5	828	12	240	0	0	40	14	0
Confl. Peds. (#/hr)	1		1	1		1						
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	2%	2%	2%	7%	7%	7%
Turn Type	D.P+P	NA	Perm	D.P+P	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	6		2	2		6						
Actuated Green, G (s)	76.0	75.0	75.0	76.0	72.9	72.9	17.5	6.4		19.1	8.0	
Effective Green, g (s)	76.0	75.0	75.0	76.0	72.9	72.9	17.5	6.4		19.1	8.0	
Actuated g/C Ratio	0.63	0.62	0.62	0.63	0.61	0.61	0.15	0.05		0.16	0.07	
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5	4.0	5.0		4.0	5.0	
Vehicle Extension (s)	1.5	3.5	3.5	1.5	3.5	3.5	1.5	1.5		1.5	1.5	
Lane Grp Cap (vph)	251	1141	947	152	1109	921	258	84		268	103	
v/s Ratio Prot	c0.00	c0.53		0.00	0.45		c0.14	0.00		0.02	c0.01	
v/s Ratio Perm	0.06		0.18	0.02		0.01						
v/c Ratio	0.10	0.84	0.28	0.03	0.75	0.01	0.93	0.00		0.15	0.13	
Uniform Delay, d1	13.4	17.8	10.2	17.0	16.9	9.3	50.6	53.8		43.5	52.7	
Progression Factor	0.63	0.66	0.38	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	4.7	0.4	0.0	4.6	0.0	37.2	0.0		0.1	0.2	
Delay (s)	8.5	16.4	4.4	17.0	21.5	9.3	87.9	53.8		43.5	52.9	
Level of Service	A	B	A	B	C	A	F	D		D	D	
Approach Delay (s)		13.1			21.2			87.2			49.4	
Approach LOS		B			C			F			D	

Intersection Summary

HCM 2000 Control Delay	24.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
 TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
 URBAN NON-SYSTEM CRASH LISTING

CITY OF TUALATIN, WASHINGTON COUNTY

SW Tualatin-Sherwood Road & SW 115th Avenue
 January 1, 2011 through December 31, 2013

SER#	INVEST	S P E D E L D C S L K	D R S W A U C O DATE DAY TIME	CLASS DIST FROM	CITY STREET FIRST STREET SECOND STREET	RD CHAR DIRECT LOCTN	INT-TYP (MEDIAN) LEGS (#LANES)	INT-REL TRAF- CONTL	OFF-RD RDNBT DRVWY	WTHR SURF LIGHT	CRASH TYP COLL TYP SVRTY	SPCL USE		MOVE FROM TO	A G E E X RES	S LICNS RES	PED LOC ERROR	ACTN	EVENT	CAUSE					
												TRLR QTY OWNER V#	QTY VEH TYPE												
06976	NONE	N N N	12/09/2011 Fri 11A	16 0	SW TUALATIN-SHERWOOD SW 115TH AVE	INTER SE 06	CROSS 0	N TRF SIGNAL	N N	CLR DRY DAY	S-1STOP REAR PDO	01 UNKN UNKNOWN	0 0	STRGHT SW NE	01	DRVR	NONE	00	M	OR-Y UNK	026	000 000	07 00 07		
												02	NONE PRVTE PSNGR CAR	0 0	STOP NE SW	01	DRVR	NONE	43	M	OR-Y OR<25	000	000	00 00	
02414	NONE	N N N	05/10/2013 Fri 9A	16 0	SW TUALATIN-SHERWOOD SW 115TH AVE	INTER SW 06	CROSS 0	N TRF SIGNAL	N N	CLR DRY DAY	S-1STOP REAR INJ	01 NONE PSNGR CAR	0 0	STRGHT SW NE	01	DRVR	NONE	31	F	OR-Y OR<25	026	000	07 00 07		
												02	NONE PRVTE PSNGR CAR	0 0	STOP SW NE	01	DRVR	INJC	27	M	OTH-Y OR<25	000	000	00 00	
00809	CITY	N N N N N	02/15/2013 Fri 1P	16 0	SW TUALATIN-SHERWOOD SW 115TH AVE	INTER CN 01	CROSS 0	N TRF SIGNAL	N N	CLR DRY DAY	S-1STOP REAR INJ	01 NONE PSNGR CAR	0 0	STRGHT NE SW	01	DRVR	INJB	32	F	OR-Y OR<25	043,026	022	022	07 00 07	
												02	NONE PRVTE PSNGR CAR	0 0	STRGHT NE SW	01	DRVR	INJC	37	F	OR-Y OR<25	043,026	000	000	00 07
												03	NONE PRVTE PSNGR CAR	0 0	STOP NE SW	01	DRVR	NONE	37	M	OR-Y OR<25	000	022	022	00 00
06202	NO RPT	N N N	11/09/2012 Fri 12P	16 0	SW TUALATIN-SHERWOOD SW 115TH AVE	INTER CN 03	CROSS 0	N TRF SIGNAL	N N	CLR DRY DAY	S-1TURN TURN INJ	01 NONE PSNGR CAR	0 0	TURN-R SW S	01	DRVR	NONE	31	M	OTH-Y N-RES	006	000	08 00 08		
												02	NONE PRVTE PSNGR CAR	0 0	STRGHT SW NE	01	DRVR	INJC	21	M	OR-Y OR<25	000	000	00 00	
04799	CITY	N N N N N	08/29/2013 Thu 6A	16 0	SW TUALATIN-SHERWOOD SW 115TH AVE	INTER CN 03	3-LEG 0	N TRF SIGNAL	N N	RAIN WET DAY	O-1TURN TURN INJ	01 NONE PSNGR CAR	0 0	TURN-L NE S	01	DRVR	INJC	44	M	OR-Y OR<25	020,004	000	000	04 00 04	
												02	NONE PRVTE PSNGR CAR	0 0	STRGHT SW NE	01	DRVR	INJC	50	F	OR-Y OR<25	000	000	00 00	

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
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CITY OF TUALATIN, WASHINGTON COUNTY

SW Tualatin-Sherwood Road & SW Avery Street /SW 112th Avenue
 January 1, 2011 through December 31, 2013

SER#	INVEST	S P E E	D R A L	C U G	O H R	DATE DAY TIME	CLASS DIST FROM	CITY STREET FIRST STREET SECOND STREET	RD CHAR DIRECT LOCTN	INT-TYP (MEDIAN) LEGS (#LANES)	INT-REL TRAF- CONTL	OFF-RD RNDBT DRVWY	WTHR SURF LIGHT	CRASH TYP COLL TYP SVRTY	SPCL USE TRLR QTY OWNER V#	MOVE FROM TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E LICNS RES	PED LOC ERROR	ACTN EVENT	CAUSE			
																									VEH TYPE	VEH TYPE	VEH TYPE
05347	CITY	N	N	N	N	10/07/2012 Sun 12P	16 0	SW AVERY ST SW TUALATIN-SHERWOOD	INTER SW 06	UNKNOWN 0	N		N CLR DAY	S-1STOP REAR PDO	01 NONE PSNGR	0 0 CAR	STRGHT SW NE	01	DRVR	NONE	47	M	OR-Y	016,026	038	27,07 00 27,07	
															02	NONE PRVTE PSNGR	0 0 CAR	STOP SW NE	01	DRVR	NONE	40	M	OTH-Y N-RES	000	011 000	00 00
02207	CITY	N	N	N	N	05/01/2013 Wed 12P	16 0	SW AVERY ST SW TUALATIN-SHERWOOD	INTER CN 04	CROSS 0	N		N CLR DAY	ANGL-OTH TURN PDO	01 NONE PSNGR	0 0 CAR	TURN-R SW SE	01	DRVR	NONE	83	F	OR-Y	028	000 000	02 00 02	
															02	NONE PRVTE PSNGR	0 0 CAR	STRGHT NW SE	01	DRVR	NONE	19	M	OR-Y	000	000 000	00 00
02423	NONE	N	N	N		05/11/2011 Wed 4P	16 0	SW TUALATIN-SHERWOOD SW 112TH AVE	INTER NE 06	CROSS 0	N		N RAIN DAY	S-1STOP REAR PDO	01 NONE PSNGR	0 0 CAR	STRGHT NE SW	01	DRVR	NONE	35	M	OR-Y	026	001 000	07 00 07	
															02	NONE PRVTE PSNGR	0 0 CAR	STOP NE SW	01	DRVR	NONE	79	M	OR-Y	000	011 000	00 00
02518	NONE	N	N	N		05/16/2011 Mon 5P	16 0	SW TUALATIN-SHERWOOD SW 112TH AVE	INTER NE 06	CROSS 0	N		N CLR DAY	S-1STOP REAR INJ	01 NONE PSNGR	0 0 CAR	STRGHT NE SW	01	DRVR	NONE	17	F	OR-Y	026	000 000	07 00 07	
															02	NONE PRVTE PSNGR	0 0 CAR	STOP NE SW	01	DRVR	INJC	24	F	OR-Y	000	011 000	00 00
06867	NONE	N	N	N		11/28/2011 Mon 4P	16 0	SW TUALATIN-SHERWOOD SW 112TH AVE	INTER NE 06	CROSS 0	N		N CLR DAY	S-1STOP REAR PDO	01 NONE PSNGR	0 0 CAR	STRGHT NE SW	01	DRVR	NONE	25	M	OR-Y	026	000 000	07 00 07	
															02	NONE PRVTE PSNGR	0 0 CAR	STOP NE SW	01	DRVR	NONE	54	M	OR-Y	000	011 000	00 00
81002	NONE	N	N	N		03/17/2012 Sat 8A	16 0	SW TUALATIN-SHERWOOD SW 112TH AVE	INTER NE 06	CROSS 0	N		N CLR DAY	S-1STOP REAR PDO	01 NONE PSNGR	0 0 CAR	STRGHT NE SW	01	DRVR	NONE	00	F	UNK UNK	026	000 000	07 00 07	

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CITY OF TUALATIN, WASHINGTON COUNTY

SW Tualatin-Sherwood Road & SW Avery Street /SW 112th Avenue
 January 1, 2011 through December 31, 2013

SER#	INVEST	S P E E D	D R S W O C H R L K	DATE	CLASS	CITY STREET	RD CHAR	INT-TYP	INT-REL	OFF-RD	WTHR	CRASH TYP	SPCL USE	MOVE	A	S	PED	ERROR	ACTN	EVENT	CAUSE				
		ELGHR	DAY	DIST	FIRST STREET	DIRECT	(MEDIAN)	LEGS	TRAF-	RNDBT	SURF	COLL TYP	TRLR QTY	OWNER	FROM	PRTC	INJ	G	E	LICNS	LOC				
		DCSLK	TIME	FROM	SECOND STREET	LOCTN	(#LANES)	CONTL	DRVWY	LIGHT	SVRTY	V#	VEH TYPE	TO	P#	TYPE	SVRTY	E	X	RES					
													02	NONE	0	STOP									
													PRVTE			NE	SW						011	00	
													PSNGR CAR									000	000	00	
00663	N N N		02/06/2011	16	SW TUALATIN-SHERWOOD	INTER	CROSS	N		N	CLR	S-1STOP	01	NONE	0	STRGHT							013	27	
NONE			Sun	0	SW 112TH AVE	E			TRF SIGNAL	N	DRY	REAR		PRVTE		E	W					000	000	00	
			4P			06	0			N	DAY	INJ		PSNGR CAR								016,026	038	27	
													02	NONE	0	STOP									
													PRVTE			E	W						011	013	00
													PSNGR CAR									000	000	00	
02935	N N N		06/08/2012	16	SW TUALATIN-SHERWOOD	INTER	CROSS	N		N	CLR	S-1STOP	01	NONE	0	STRGHT								07	
NO RPT			Fri	0	SW 112TH AVE	SW			TRF SIGNAL	N	DRY	REAR		PRVTE		NE	SW					000	000	00	
			5P			05	0			N	DAY	INJ		PSNGR CAR								026	000	07	

ACTION CODE TRANSLATION LIST

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

ACTION CODE TRANSLATION LIST

ACTION CODE	SHORT DESCRIPTION	LONG DESCRIPTION
099	UNK	UNKNOWN ACTION

CAUSE CODE TRANSLATION LIST

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

COLLISION TYPE CODE TRANSLATION LIST

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

CRASH TYPE CODE TRANSLATION LIST

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

DRIVER LICENSE CODE TRANSLATION LIST

LIC CODE	SHORT DESC	LONG DESCRIPTION
0	NONE	NOT LICENSED (HAD NEVER BEEN LICENSED)
1	OR-Y	VALID OREGON LICENSE
2	OTH-Y	VALID LICENSE, OTHER STATE OR COUNTRY
3	SUSP	SUSPENDED/REVOKED

DRIVER RESIDENCE CODE TRANSLATION LIST

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

ERROR CODE TRANSLATION LIST

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

ERROR CODE TRANSLATION LIST

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

EVENT CODE TRANSLATION LIST

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

EVENT CODE TRANSLATION LIST

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

EVENT CODE TRANSLATION LIST

EVENT CODE	SHORT DESCRIPTION	LONG DESCRIPTION
118	EXPNSN JNT	EXPANSION JOINT
119	JERSEY BAR	JERSEY BARRIER
120	WIRE BAR	WIRE OR CABLE MEDIAN BARRIER
121	FENCE	FENCE
123	OBJ IN VEH	LOOSE OBJECT IN VEHICLE STRUCK OCCUPANT
124	SLIPPERY	SLIDING OR SWERVING DUE TO WET, ICY, SLIPPERY OR LOOSE SURFACE (NOT GRAVEL)
125	SHLDR	SHOULDER GAVE WAY
126	BOULDER	ROCK(S), BOULDER (NOT GRAVEL; NOT ROCK SLIDE)
127	LAND SLIDE	ROCK SLIDE OR LAND SLIDE
128	CURVE INV	CURVE PRESENT AT CRASH LOCATION
129	HILL INV	VERTICAL GRADE / HILL PRESENT AT CRASH LOCATION
130	CURVE HID	VIEW OBSCURED BY CURVE
131	HILL HID	VIEW OBSCURED BY VERTICAL GRADE / HILL
132	WINDOW HID	VIEW OBSCURED BY VEHICLE WINDOW CONDITIONS
133	SPRAY HID	VIEW OBSCURED BY WATER SPRAY

FUNCTIONAL CLASSIFICATION TRANSLATION LIST

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

HIGHWAY COMPONENT TRANSLATION LIST

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

INJURY SEVERITY CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
1	KILL	FATAL INJURY
2	INJA	INCAPACITATING INJURY - BLEEDING, BROKEN BONES
3	INJB	NON-INCAPACITATING INJURY
4	INJC	POSSIBLE INJURY - COMPLAINT OF PAIN
5	PRI	DIED PRIOR TO CRASH
7	NO<5	NO INJURY - 0 TO 4 YEARS OF AGE

LIGHT CONDITION CODE TRANSLATION LIST

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

MEDIAN TYPE CODE TRANSLATION LIST

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

MILEAGE TYPE CODE TRANSLATION LIST

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

MOVEMENT TYPE CODE TRANSLATION LIST

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

PARTICIPANT TYPE CODE TRANSLATION LIST

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

PEDESTRIAN LOCATION CODE TRANSLATION LIST

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

TRAFFIC CONTROL DEVICE CODE TRANSLATION LIST

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

ROAD CHARACTER CODE TRANSLATION LIST

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

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

VEHICLE TYPE CODE TRANSLATION LIST

CODE	SHORT DESC	LONG DESCRIPTION
01	PSNGR CAR	PASSENGER CAR, PICKUP, LIGHT DELIVERY, ETC.
02	BOBTAIL	TRUCK TRACTOR WITH NO TRAILERS (BOBTAIL)
03	FARM TRCTR	FARM TRACTOR OR SELF-PROPELLED FARM EQUIPMENT
04	SEMI TOW	TRUCK TRACTOR WITH TRAILER/MOBILE HOME IN TOW
05	TRUCK	TRUCK WITH NON-DETACHABLE BED, PANEL, ETC.
06	MOPED	MOPED, MINIBIKE, SEATED MOTOR SCOOTER, MOTOR BIKE
07	SCHL BUS	SCHOOL BUS (INCLUDES VAN)
08	OTH BUS	OTHER BUS
09	MTRCYCLE	MOTORCYCLE, DIRT BIKE
10	OTHER	OTHER: FORKLIFT, BACKHOE, ETC.
11	MOTRHOME	MOTORHOME
12	TROLLEY	MOTORIZED STREET CAR/TROLLEY (NO RAILS/WIRES)
13	ATV	ATV
14	MTRSCTR	MOTORIZED SCOOTER (STANDING)
15	SNOWMOBILE	SNOWMOBILE
99	UNKNOWN	UNKNOWN VEHICLE TYPE

WEATHER CONDITION CODE TRANSLATION LIST

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

QUEUE LENGTH PROBABILITIES - AM Peak Hour (Mitigated)

Approach volume (vph): 296
 Length of red interval (sec): 105
 Number of turning lanes: 2

Average arrival rate = 4.796296

Number of vehicles arriving during the red interval (N)	Prob. of Arrivals ≥ N	Queue Length (ft)	Factorial	Prob. of N Arrivals
0	1.000	0	1	0.00826
1	0.992	25	1	0.039619
2	0.952	50	2	0.095012
3	0.857	75	6	0.151901
4	0.705	100	24	0.182141
5	0.523	125	120	0.17472
6	0.348	150	720	0.139669
7	0.209	175	5040	0.095699
8	0.113	200	40320	0.057375
9	0.056	225	362880	0.030576
10	0.025	250	3628800	0.014665
11	0.010	275	39916800	0.006394
12	0.004	300	4.79E+08	0.002556
13	0.001	325	6.23E+09	0.000943
14	0.000	350	8.72E+10	0.000323
15	0.000	375	1.31E+12	0.000103
16	0.000	400	2.09E+13	3.1E-05
17	0.000	425	3.56E+14	8.74E-06
18	0.000	450	6.4E+15	2.33E-06
19	0.000	475	1.22E+17	5.88E-07
20	0.000	500	2.43E+18	1.41E-07
21	0.000	525	5.11E+19	3.22E-08
22	0.000	550	1.12E+21	7.02E-09
23	0.000	575	2.59E+22	1.46E-09
24	0.000	600	6.2E+23	2.92E-10
25	0.000	625	1.55E+25	5.61E-11
26	0.000	650	4.03E+26	1.03E-11
27	0.000	675	1.09E+28	1.84E-12
28	0.000	700	3.05E+29	3.15E-13
29	0.000	725	8.84E+30	5.21E-14
30	0.000	750	2.65E+32	8.33E-15

50th Percentile
128.2 feet

95th Percentile
189.9 feet

QUEUE LENGTH PROBABILITIES - PM Peak Hour (Mitigated)

Approach volume (vph): **83**
 Length of red interval (sec): **110**
 Number of turning lanes: **2**

Average arrival rate = 1.408951

Number of vehicles arriving during the red interval (N)	Prob. of Arrivals >= N	Queue Length (ft)	Factorial	Prob. of N Arrivals
0	1.000	0	1	0.2444
1	0.756	25	1	0.344347
2	0.411	50	2	0.242584
3	0.169	75	6	0.11393
4	0.055	100	24	0.04013
5	0.015	125	120	0.011308
6	0.003	150	720	0.002655
7	0.001	175	5040	0.000534
8	0.000	200	40320	9.41E-05
9	0.000	225	362880	1.47E-05
10	0.000	250	3628800	2.08E-06
11	0.000	275	39916800	2.66E-07
12	0.000	300	4.79E+08	3.12E-08
13	0.000	325	6.23E+09	3.38E-09
14	0.000	350	8.72E+10	3.41E-10
15	0.000	375	1.31E+12	3.2E-11
16	0.000	400	2.09E+13	2.82E-12
17	0.000	425	3.56E+14	2.33E-13
18	0.000	450	6.4E+15	1.83E-14
19	0.000	475	1.22E+17	1.36E-15
20	0.000	500	2.43E+18	9.55E-17
21	0.000	525	5.11E+19	6.41E-18
22	0.000	550	1.12E+21	4.1E-19
23	0.000	575	2.59E+22	2.51E-20
24	0.000	600	6.2E+23	1.48E-21
25	0.000	625	1.55E+25	8.31E-23
26	0.000	650	4.03E+26	4.51E-24
27	0.000	675	1.09E+28	2.35E-25
28	0.000	700	3.05E+29	1.18E-26
29	0.000	725	8.84E+30	5.75E-28
30	0.000	750	2.65E+32	2.7E-29

50th Percentile
43.6 feet

95th Percentile
76.2 feet