EXHIBIT
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Prepared for

TML Holdings, LCC

Aurora Airport Rezone
Transportation Impact Study

Prepared by

DKS

February 2019

REGISTERED PROFESSIONAL ENGINEER
85448
OREGON
MAY 23, 2013
LACY SUE VOSTI BROWN
EXPIRES: 12/31/19

DKS

117 Commercial St NE
#310
Salem, OR 97301
503.391.8773
dksassociates.com

February 1, 2019

Ted Millar
TLM Holdings, LLC
Southend Corporate Airpark
14335 Keil Road NE, Suite 11
Aurora, OR 97002

Subject: Aurora Airport Rezone Transportation Impact Study

Dear Ted Millar,

DKS Associates is pleased to submit this transportation impact study for the proposed rezone and development of the 20-acre parcel on the east edge of the Aurora State Airport. Please feel free to call if you have any questions or comments regarding this study.

Sincerely,
DKS Associates

Lacy Brown, Ph.D., P.E.
Transportation Engineer

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1.0 PROJECT SUMMARY

This report documents a preliminary traffic assessment related to the impacts of a proposed rezone and development of the 20-acre parcel on the east edge of the Aurora State Airport. The planned rezone would change the zoning from an Exclusive Farm Use (EFU) to a Public, which will include airport related commercial and warehouse or hanger uses. Table 1 provides more details regarding the study area and characteristics of the proposed project.

Table 1: Study Area and Proposed Project Characteristics

Study Area	
Number of Study Intersections	Six
Analysis Period(s)	Weekday AM peak hour (peak hour between 7-9 AM) and PM peak hour (peak hour between 4-6 PM)
Proposed Development	
Size and Land Use	20-acre Airport Related Commercial and Hanger/Warehouse use.
Project Trips	961 net new average daily trips and 151 (135 in, 16 out) AM peak hour trips and 145 (17 in, 128 out) PM peak hour trips.
Vehicle Access Points	Three access points along Airport Road, one of which is the existing Stenbock Way intersection.
Other Transportation Facilities	
Pedestrian Facilities	No existing facilities
Bicycle Facilities	Bicycle lanes along Arndt Road
Transit Facilities	Route 3 SMART Transit stops at the Airport Road/Arndt Road intersection.

The following chapters of this report document the existing conditions of the study area, including roadway classification, bicycle and pedestrian facilities, existing traffic operations, existing safety conditions, and observations made during a field visit. The report then discussed the impact the proposed rezone and site plan will impact the surrounding transportation network and provides recommendation to mitigate the impact.

The proposed rezone and development of the 20-acre parcel on the east edge of the Aurora State Airport is anticipated to result in the following short-term and long-term impacts:

Project Summary

Trip Generation

- The proposed Aurora Airport Rezone net trip generation estimates were calculated by adding the Warehousing (150) and General Office Building (710) trip generation estimates

and then subtracting the existing Church (560) trip generation estimates. All trip generation estimates were provided by the ITE Trip Generation Manual.[1]

- The proposed Aurora Airport zone change is expected to generate 961 net new average daily trips and 151 (135 in, 16 out) AM peak hour trips and 145 (17 in, 128 out) PM peak hour trips.

Intersection Operations

- In the 2017 Existing Conditions, the Airport Road/Arndt Road intersection fails to meet the Marion County operating standard in the AM and PM peak hours, the OR-551/Arndt Road and OR-551/Ehlen Road intersections fail to meet ODOT's mobility targets for the AM and PM peak hours, and Airport Road/Ehlen Road intersection fails to meet the Marion County operating standard in the PM peak hour.
- In the Short-term (2022) scenario and the Long-term (2037) scenario, the same intersections fail to meet mobility targets or operating standards.

Mitigations

The following mitigations are necessary to mitigate the impact on the transportation system of the proposed rezone and development.

Airport Road/Arndt Road

- Install a westbound right turn lane.
- Construct necessary traffic signal modifications

OR-551/Arndt Road

- Install an eastbound and westbound left turn lane.
- Construct necessary traffic signal modifications.

Airport Road/Ehlen Road

- Install an eastbound left turn lane and two way left turn lane on the east approach for the two-stage left turns.

ODOT maintains jurisdiction of OR-551 and ODOT approval shall be required for all proposed mitigations along this facility. At the time any official request is submitted, the request shall include an operational and queuing analysis, preliminary design layout, and a preliminary signal operations design (PSOD).

Site Plan Review

- The site plan provided shows approximately 362 proposed parking spaces located primarily along Airport Road. The site plan shows sufficient aisle width for parking maneuvers.
- There are two proposed site access points along Airport Road. It is recommended that these two access points are aligned with the two existing private driveways on east side of Airport

[1] *Trip Generation, 9th Edition*, Institute of Transportation Engineers, 2012.

Road to avoid off-set intersections. The Airport should coordinate with County staff and property owners at these locations.

Transportation Planning Rule

- With the mitigation strategies identified in this report, the proposed zone change will not significantly affect the transportation system.

2.0 EXISTING CONDITIONS

This chapter details the existing study area conditions including the proposed site development, existing bicycle and pedestrian facilities, existing transit facilities, roadway network, future planned projects, existing traffic volumes and operations, crash analysis, and field observations. Supporting details are provided in the appendix.

STUDY AREA

The proposed rezone and development of the 20-acre parcel on the east edge of the Aurora State Airport, shown in Figure 1, would change the zoning from an Exclusive Farm Use (EFU) to Public, which will include airport related office and light industrial uses. There will be two access points to Airport Road. The following sections present a summary of the roadway network including the existing characteristics of the bicycle and pedestrian facilities, public transportation services, and any future planned projects in the study area.

ROAD NETWORK

All of the roadways within the study area are rural roads because they are outside of the Aurora urban growth boundary.

The transportation characteristics of the roadways within the study area are shown in Table 2 on the following page. The table includes the functional classification, the number of travel lanes, posted speed, and the facilities for bicyclists, pedestrians, and public transit.

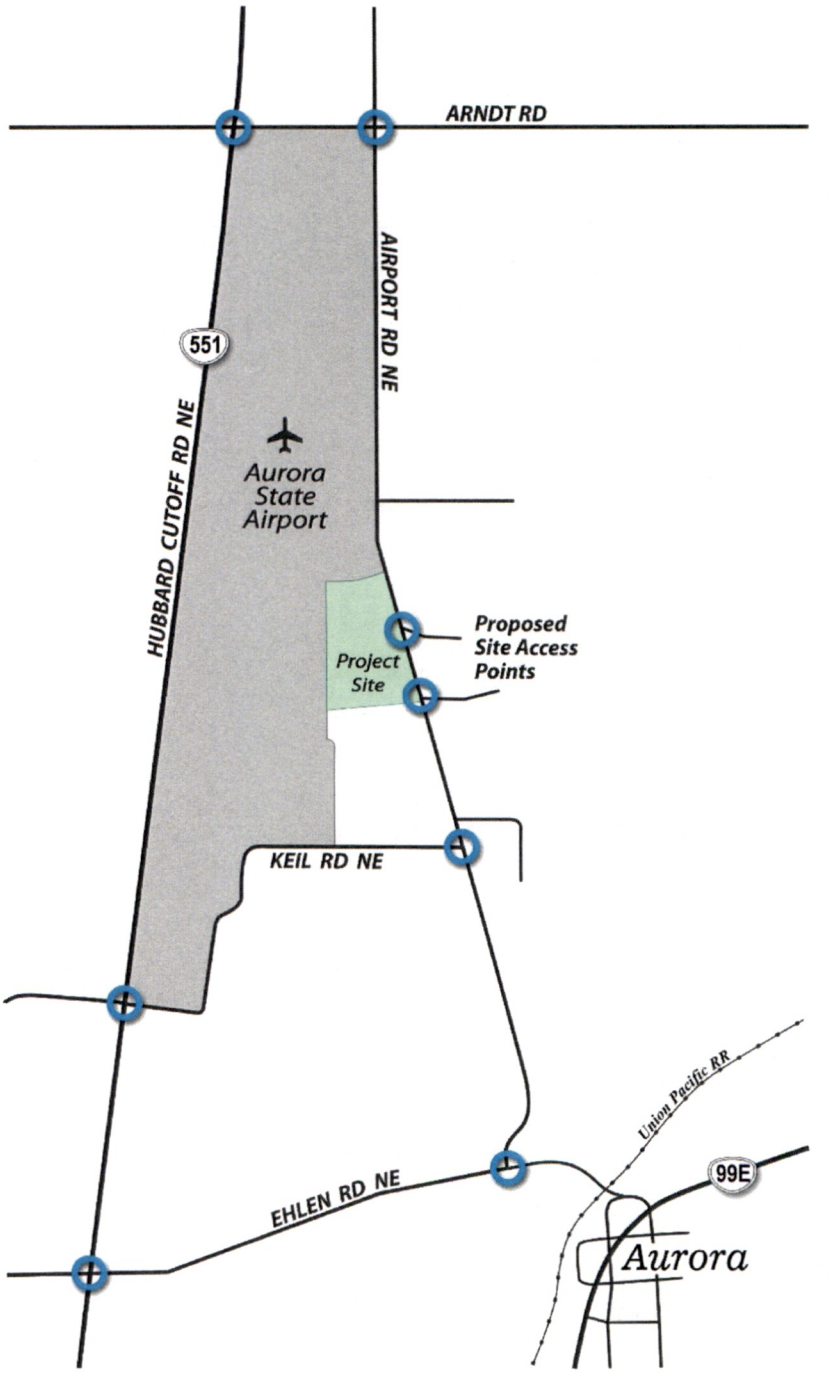

Figure 1: Study Area

Table 2: Existing Study Area Roadway Characteristics

Roadway	ODOT Functional Classification	Lanes	Posted Speed	Sidewalk	Bike Lanes	Transit Facilities
OR 551	State Road - Rural Minor Arterial	2	55 mph	No	No[1]	None
Arndt Road	Rural Minor Arterial	2	45 mph	No	Yes	SMART Route Stops
Airport Road	Rural Major Collector	2	35/55 mph[2]	No	No	None
Keil Road	Rural Minor Collector	2	35 mph	No	No	None
Ehlen Road	Rural Minor Arterial	2	35/45 mph[3]	No	No	None

[1]OR 551 has shoulders, approximately six feet, that are wide enough for bicycles.
[2]Airport Road is 55 mph from Arndt Road to just north of Smith Lane and 35 mph from just north of Smith Lane to Ehlen Road.
[3]Ehlen Road is 45 mph from OR 551 to Kahle Lane NE and 35 mph from Kahle Lane NE to just east of Airport Road NE.

The existing bicycle and pedestrian facilities near the proposed site include six foot bicycle lanes on Arndt Road from OR 551 and continuing east along Arndt Road. There is a short segment of sidewalk on each corner of the Arndt Road/Airport Road intersection. There are two transit stops that facilitate Route 3 of the South Metro Area Regional Transit (SMART), which provides service to Wilsonville and surrounding area. The functional classification specifies the purpose of the facility and is a determining factor of applicable cross-section, access spacing, and intersection performance standards.

EXISTING TRAFFIC VOLUMES AND OPERATIONS

An analysis of the 2017 existing intersection operations was performed for the study intersections to ensure the transportation network meets Marion County's performance standards. Intersections are the focus of the analysis because they are the controlling bottlenecks of traffic flow and the ability of a roadway system to carry traffic efficiently is nearly always diminished in their vicinity.

Intersection operations were analyzed for the AM and PM peak hours. Turning movement counts were collected on June 6th and 7th, 2017 during the AM and PM peak periods at each of the following study intersections.

- Airport Road /Arndt Road
- Airport Road /Keil Road
- Airport Road /Ehlen Road
- OR-551/Arndt Road
- OR-551/Keil Road
- OR-551/Ehlen Road

Seasonal Adjustment Factor

The traffic count data collected in June 2017 represents a period where traffic volumes are lower than the average weekday conditions. Adjustments to ODOT facilities are required to reach the desired conditions using methodology from the ODOT Analysis Procedural Manual. To determine when the average weekday conditions occur, data is examined from Automatic Traffic Recorder (ATR) stations that record traffic highway volumes year-round. The Hubbard ATR #24-016 on OR-551 just south of Ehlen Road was deemed appropriate to utilize. The June traffic counts were adjusted to the peak month of August by a seasonal factor of 1.01. The supporting ATR data and calculation is included in the appendix. The adjusted 2017 traffic volumes are shown in Figure 2 below.

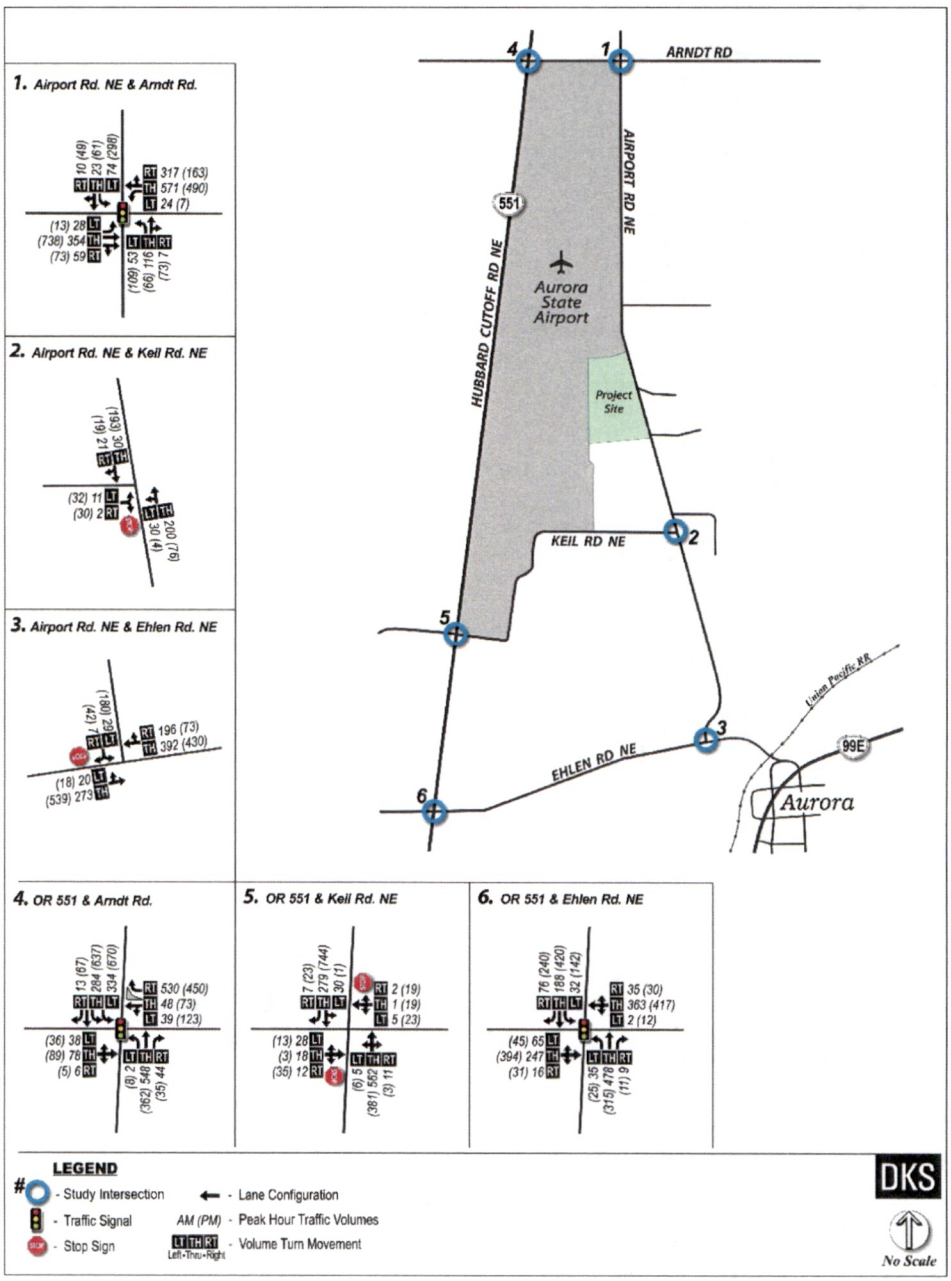

Figure 2: 2017 Existing Conditions Traffic Volumes

Intersection Performance Measures

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

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

All study intersections under Marion County jurisdiction require that unsignalized intersections maintain a Level of Service (LOS) of E or better. Signalized intersections under Marion County jurisdiction are required to maintain a LOS of D or better (all individual movements to maintain a LOS E or better) with a v/c ratio of 0.85 or less.[2] Signalized intersections under ODOT jurisdiction require a 0.70 or better v/c ratio for a regional highway in a rural area.[3]

[2] TIA Requirements Policy and Procedures - Methodologies and Analysis Parameters. Marion County. 2015.
[3] Oregon Highway Plan Table 5. Oregon Department of Transportation. 2015.

Table 3: 2017 Existing Peak Hour Study Intersection Operations

Intersection	Jurisdiction	Mobility Targets/ Operating Standard	AM Peak			PM Peak		
			v/c	*Delay*	*LOS*	*v/c*	*Delay*	*LOS*
Signalized								
Airport Road/Arndt Road	Marion County	0.85 v/c and LOS D	**0.84**	**25.8**	**C**	**0.89**	**32.8**	**C**
OR-551/Arndt Road	ODOT	0.70 v/c	**0.75**	**22.6**	**C**	**0.79**	**26.4**	**C**
OR-551/Ehlen Road	ODOT	0.70 v/c	**0.77**	**27.6**	**C**	**0.79**	**30.6**	**C**
Two-way Stop								
Airport Road/Keil Road	Marion County	LOS E	0.02 EB	10.7	A/B	0.11 EB	10.8	A/B
Airport Road/Ehlen Road	Marion County	LOS E	0.12 SB	17.1	A/C	**0.88 SB**	**70.0**	**A/F**
OR-551/Keil Road	ODOT	0.75 v/c	0.29 EB	26.8	A/D	0.35 WB	34.0	A/D

Signalized intersections:
v/c = Volume-to-Capacity Ratio of Intersection
Delay = Average Stopped Delay per Vehicle (sec)
LOS = Level of Service of Intersection

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

Bold/Highlighted: Intersection fails to meet operating standards/mobility targets.

Existing study intersection operations were evaluated based on the Highway Capacity Manual (HCM) 2000 methodology for signalized intersections[4] and HCM 6th Edition for unsignalized intersections.[5]

[4] *Highway Capacity Manual*, Transportation Research Board, Washington D.C., 2000. Methodology approved by Keith Blair, ODOT Region 2 Senior Analyst, November 6, 2018.
[5] *Highway Capacity Manual 6th Edition*, Transportation Research Board, Washington D.C., 2016. Methodology approved by Keith Blair, ODOT Region 2 Senior Analyst, November 6, 2018.

Table 3 lists the study intersection's existing volume to capacity (v/c) ratio, delay, and LOS. As shown, the Airport Road/Arndt Road intersection fails to meet the Marion County operating standard in the AM and PM peak hours, the OR-551/Arndt Road and OR-551/Ehlen Road intersections fail to meet ODOT's mobility targets for the AM and PM peak hours, and Airport Road/Ehlen Road intersection fails to meet the Marion County operating standard in the PM peak hour.

CRASH HISTORY

The most recent five years (2011-2015) of available crash data for the study area was obtained from the Oregon Department of Transportation (ODOT) and was used to evaluate the safety performance of the study intersections. As shown in Figure 3, there were a total of 144 collisions, 118 collisions at the study intersections and 26 collisions along the study segments. Three of the total collisions at the study intersections resulted in severe injuries and three collisions involved a bicycle and resulted in an injury. There were no fatalities at any of the study intersections.

The two primary types of collisions were rear-end (55 crashes) and turning (51 crashes) and many were attributed to failure to yield (46 crashes) or following too closely (32 crashes).

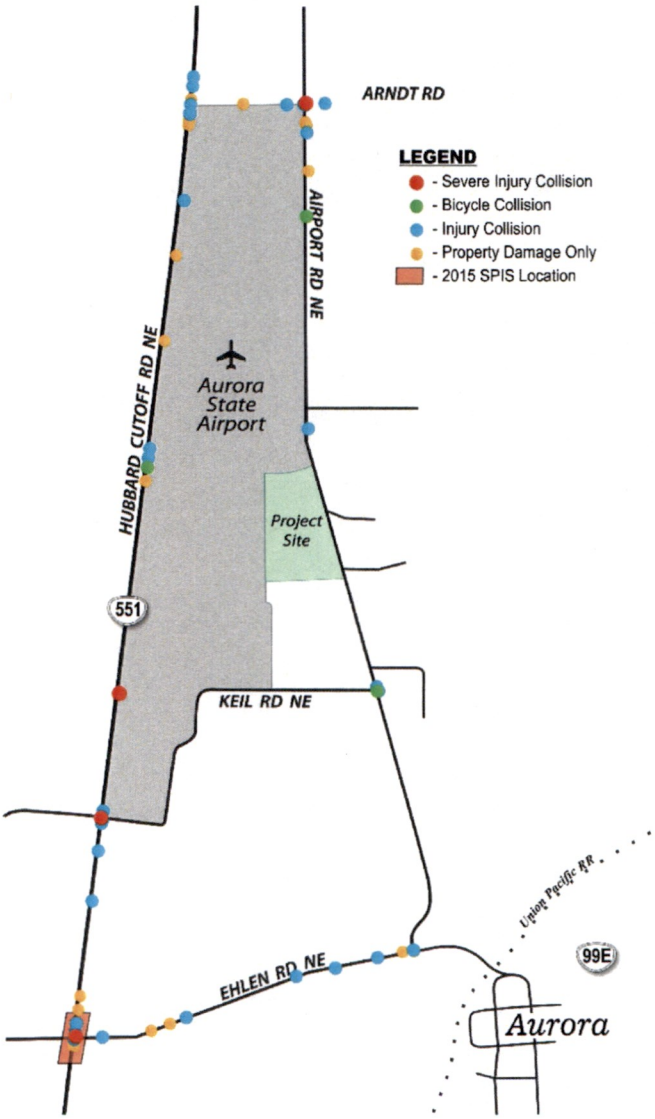

Figure 3: 2011 to 2015 Collisions

Safety Priority Index System (SPIS)

The Safety Priority Index System (SPIS) is a ranking system developed by ODOT to identify potential safety problems on state highways. SPIS scores are developed based upon crash frequency, severity, and rate for a 0.10 mile or variable length segment along the state highway over a rolling three-year window (i.e., every year it is updated with the most recent three years).

A prioritized list of the top 15% of statewide SPIS sites is created for each region, and the top 5% are investigated by the five Region Traffic managers' offices. Based on crash data from 2012 to 2014 there was one SPIS location at the OR-551/Ehlen Road intersection, as shown in Figure 3.

Collision Rate

The total number of crashes observed at an intersection is typically related to the volume of traffic traveling through said intersection. Because of this relationship, a commonly used measure to evaluate the safety performance of an intersection is the intersection crash rate, which is the number of crashes per year per million entering vehicles (MEV). ODOT has developed a list of critical crash rates which represent the expected crash rate for different types of intersections across the state. If the calculated crash rate is higher than the corresponding ODOT critical crash rate, this would indicate a potential safety concern and would warrant additional safety investigations.

As shown in Table 4, there were no fatal crashes in the study area between 2011 and 2015. The three signalized intersections, Airport Road/Arndt Road, OR-551/Arndt Road, and OR-551/Ehlen Road, and the two-way stop controlled intersection at Airport Road/Keil Road had a high crash rate that exceeds the ODOT Critical Crash Rate. At the Airport Road/Keil Road intersection, the total number of crashes is relatively low, however the volume of traffic is also low and the overall crash rate is higher than expected.

Table 4: Study Intersection Crashes (2009-2013)

Intersection	Crash Frequency (by Severity)				Approximate ADT	ODOT Critical Crash Rate[2]	Observed Crash Rate[3]
	Severe	*Injury*	*PDO[1]*	***Total***			
Airport Road/Arndt Road	1	21	13	35	21,540	0.58	**0.89**
Airport Road/Keil Road	0	4	1	5	3,580	0.48	**0.77**
Airport Road/Ehlen Road	0	2	5	7	12,930	0.48	0.30
OR-551/Arndt Road	0	12	16	28	25,740	0.58	**0.60**
OR-551/Keil Road	1	10	6	17	12,800	1.08	0.73
OR-551/Ehlen Road	1	13	12	26	21,020	0.58	**0.68**

[1] PDO = Property damage only
[2] Critical crash rate according to 90th Percentile rate from ODOT APM Exhibit 4-1
[3] Crash rate = average annual crashes per million entering vehicles (MEV); MEV estimates based on PM peak-hour traffic count

Bold/Highlighted: Intersection is over the critical crash rate.

Safety Improvements

The severe injury at the Airport Road/Arndt Road intersection occurred at night when a vehicle traveling northbound collided with a southbound left turning vehicle. The severe injury at the Airport Road/Ehlen Road intersection occurred during the day when a vehicle failed to stop at the stop sign and collided with a vehicle traveling westbound. The severe injury at the OR-551/Keil Road intersection occurred during the day when a vehicle turning left from Keil Road onto OR-551 failed to yield to a motorcyclists traveling westbound through the intersection.

It is recommended that safety improvements such as improved signal visibility and advance warning signs be installed at the Airport Road/Arndt Road, OR-551/Arndt Road, and OR-551/Ehlen Road intersections. There is a planned project to install roadway departure safety countermeasures along Ehlen Road, including centerline rumble strips and profiled fog lines (see Chapter 3 for more details).

FIELD OBSERVATIONS

DKS performed field observations at the study area intersections for the Aurora Airport project area on August 2nd, 2017 during the AM and PM peak hours. These observations were performed on a typical weekday to verify that actual intersection operations were consistent with the analysis results. Notable observations at the proposed project driveways and study intersections included:

- No sight distance issues were observed at the proposed project site driveways.
- Queues at the OR-551/Ehlen Road intersection reached up to 18 vehicles in the westbound direction in the AM peak hour and 19 vehicles in the eastbound direction in the PM peak hour.
- Eastbound and westbound permissive left turns off Ehlen Road often blocked through movements in the AM and PM peak hour.
- At the OR-551/Arndt Road intersection, the longest queue in the AM peak hour that was observed was 21 combined vehicles in the dual southbound left turn lanes in the PM peak hour.
- Queues at Airport Road/Arndt Road intersection reached 25 vehicles in the westbound direction in the AM peak hour and up to 24 vehicles in the eastbound direction in the PM peak hour.
- Study intersections and roadway segments are rural in nature; however they connect I-5 to the Canby urban area resulting in high traffic volumes.

Northbound traffic at OR-551/Arndt Road intersection (left) and westbound traffic at Airport Road/Arndt Road intersection (right)

Westbound traffic at OR-551/Ehlen Road intersection

3.0 SHORT–TERM (2022) PROJECT IMPACTS

The proposed development of the 20-acre parcel on the east edge of the Aurora State Airport includes changing the existing zoning from Exclusive Farm Use (EFU) to Public and using the space as additional warehouse or hanger space with attached offices. Based on TPR requirements, the worst-case Public zone land use assumptions would be 158,000 square feet of warehouse or hanger space and 123,000 square feet of office space.

It was assumed that for the No Build scenarios, the existing EFU zoning would remain unchanged with the existing church building being the primary trip generation site and no new trips were added to the roadway network. To accurately determine how many projects trips the proposed Public zoning with warehouse or hanger space with attached offices would generate, the trips generated by the church building were subtracted from the trips generated by the proposed warehouse or hanger space with attached offices. This resulted in the estimated net new trips that were then distributed and added to the roadway network.

The following sections present the anticipated number of trips generated by the proposed development compared to the existing EFU zoning, the distribution of trips within the study area, the future traffic volumes and operating conditions, the recommended mitigations, and a review of the preliminary site plan. Supporting information can be found in the appendix.

TRIP GENERATION

Trip generation is the method used to estimate the number of vehicles a development adds to site driveways and the adjacent roadway network during a specified period (i.e., such as the PM peak hour). Trip generation estimates are performed using trip rates surveyed at similar land uses, as provided by the Institute of Transportation Engineers (ITE).[6]

The existing zoning of Exclusive Farm Use (EFU) with the existing church building was assumed to remain for the future No Build scenarios. Based on the ITE manual, the existing church is estimated to generate 631 average daily trips, 35 (21 in, 14 out) AM peak hour trips and 41 (18 in, 23 out) PM peak hour trips. These trips were subtracted from the expected trips generated by the worst-case land use assumed for the Public zone.

The worst-case land use assumed for the Public zone is estimated to generate 1,592 average daily trips and 186 (156 in, 30 out) AM peak hour trips and 186 (35 in, 151 out) PM peak hour trips. The future Build scenario (proposed Public zoning minus existing church trips) is estimated to generate 961 net new average daily trips and 151 (135 in, 16 out) AM peak hour trips and 145 (17 in, 128 out) PM peak hour trips. The peak hour trips were distributed and added to the roadway network for the future Build operations analysis.

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[6] *Trip Generation Manual, 10th Edition*, Institute of Transportation Engineers, 2017.

Table 5 lists the AM and PM peak hour vehicle trip generation estimates, which were used for both the short-term (2022) and long-term (2037).[7]

Table 5: Trip Generation Summary for Existing Zoning and Proposed Public Zone

Land Use (ITE Code)	Trip Generation Rate[1]		Units	AM Peak Hour			PM Peak Hour			Daily Trips
	AM Peak	*PM Peak*		*In*	*Out*	*Total*	*In*	*Out*	*Total*	
Existing EFU Zone										
Church (560)	0.35	0.41	100 KSF[2]	21	14	35	18	23	41	631
Worst Case Public Zone Land Use										
Warehousing (150)	0.28	0.30	158 KSF[2]	34	10	44	13	34	47	295
General Office Building (710)	1.15	1.13	123 KSF[2]	122	20	142	22	117	139	1,297
New Trips from Proposed Public Zoning				*156*	*30*	*186*	*35*	*151*	*186*	*1,592*
Net New Trips for Future Build Scenarios				**135**	**16**	**151**	**17**	**128**	**145**	**961**

[1] The project trip generation estimates were based on ITE equation for the existing church and proposed warehouse and office buildings. The peak hour trip generation rates for the church, warehouse, and office buildings were back calculated.
[2] KSF = 1,000 Square Feet

TRIP DISTRIBUTION

Trip distribution provides an estimation of where project-related trips would be coming from and going to. It is given as percentages at key gateways to the study area and is used to route project trips through the study intersections. The trip distribution, estimated using the existing traffic counts, is shown in Figure 4 on the following page.

[7] Based on the types of approved uses for Exclusive Farm Use (EFU) Zone, Chapter 17.136 and for Public (P) Zone, Chapter 17.171 in the Marion County Code, it was determined that the existing current conditional use of the church facilities and the proposed airport development would be the worst case scenario

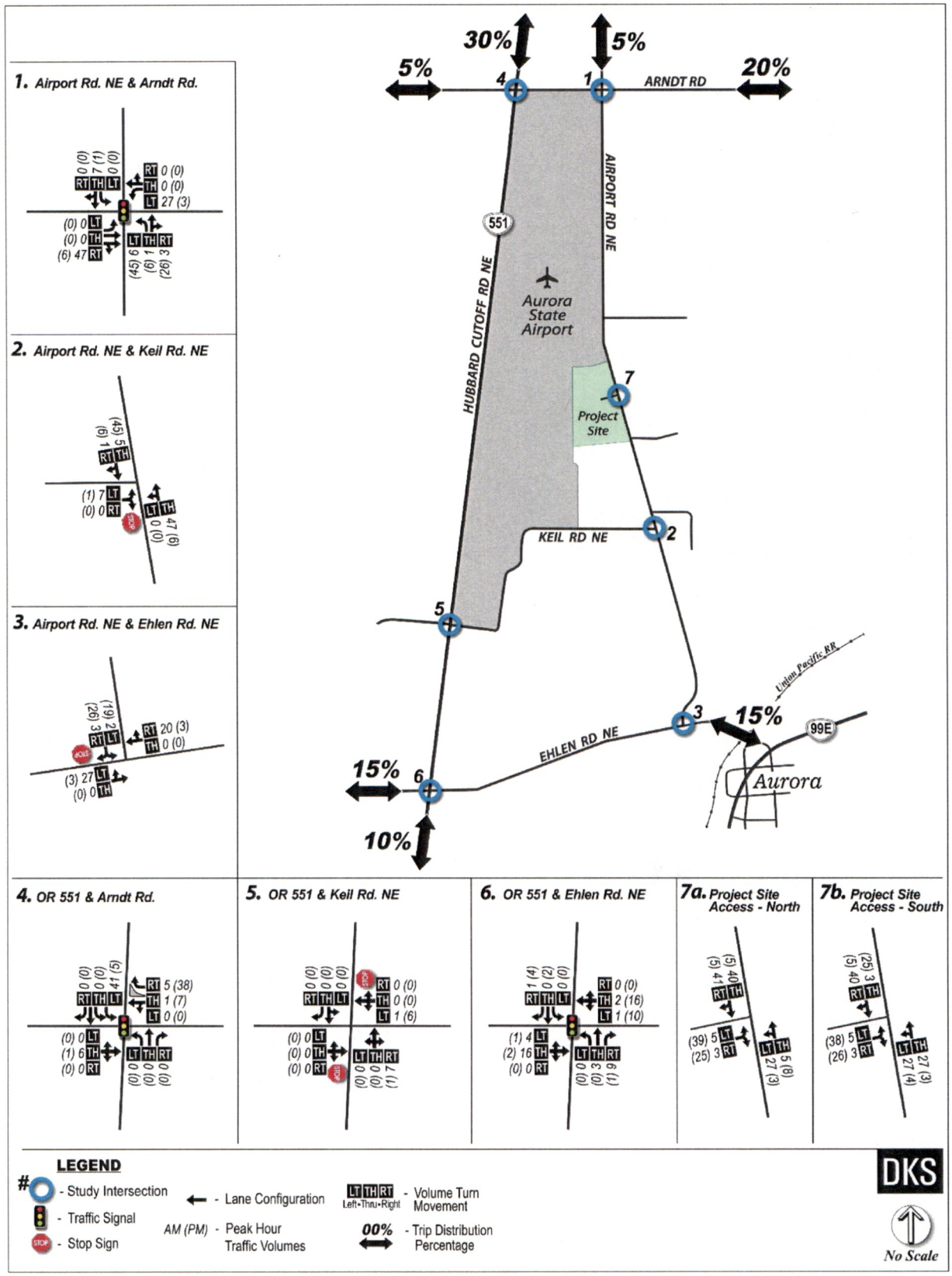

Figure 4: Project Trip Distribution

SHORT-TERM (2022) IMPACT ANALYSIS

Future Traffic Volumes

Future traffic volumes were estimated and used to analyze future intersection operations at the study intersection for the 2022 No Build and 2022 Build scenarios. The future traffic volumes include various combinations of three types of traffic: existing, background, and project. The background traffic includes the traffic that is expected to be added to the transportation system based on an anticipated growth rate.

A growth rate was calculated based on methodology stated in ODOT's Analysis Procedure Manual.[8] OR-551 is located outside of Aurora's urban growth boundary and using historical trends to estimate a growth rate was deemed applicable. Current and future traffic volumes on OR-551 near the site (mile posts 1.49 and 3.46) were gathered from ODOT's Future Volumes Table and an annual growth rate of 2.0% on OR-551 between Arndt Road and Ehlen Road was calculated. Supporting data is included in the appendix.

This growth rate was applied to the OR-551/Arndt Road and OR-551/Ehlen Road intersections, the north-south through movements at the OR-551/Keil Road intersection, and the east-west movements at the Arndt Road/Airport Road intersection. The growth rate was selectively applied to the study intersections to accurately model the expected background growth in traffic. It is anticipated that any growth on Airport Road in the future will be due to the expansion of the Aurora Airport facilities.

Short-term (2022) Traffic Operations

The following sections present the results of the future traffic operations at each of the study intersections. All future traffic operations assumed completion of the following planned projects.

- **Marion County Local Road Roadway Departure:** Install roadway departure countermeasures along Ehlen Road to include centerline rumble strips and profiled fog lines. Construction is expected to begin in 2018 per the 2018-2021 ODOT STIP draft project list. (Project Key 19753)
- **Marion County Flashing Yellow Arrows:** Install flashing yellow arrows for all left turn movements at the Airport Road/Arndt Road intersection to allow for protective and permissive left turns. Optimized signal timing was assumed as part of this project.

ODOT's 2018-2021 STIP draft project list also includes plans to install left turn lanes on Ehlen Road at the OR-551 signalized intersection (Project Key 18664). Per direction from ODOT, it was decided to not assume this planned project for the analysis due to the uncertainty of funding.[9]

Figure 5 and Figure 6 on the following pages show the expected traffic volumes for the study area for the 2022 No Build with Existing EFU Zoning and the 2022 Build with Proposed Public Zoning.

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[8] *Analysis Procedure Manual, Version 2,* Chapter 6: Future Year Forecasting, ODOT, Last updated November 2018.
[9] TIA Review Comments from ODOT, Dated January 4, 2019

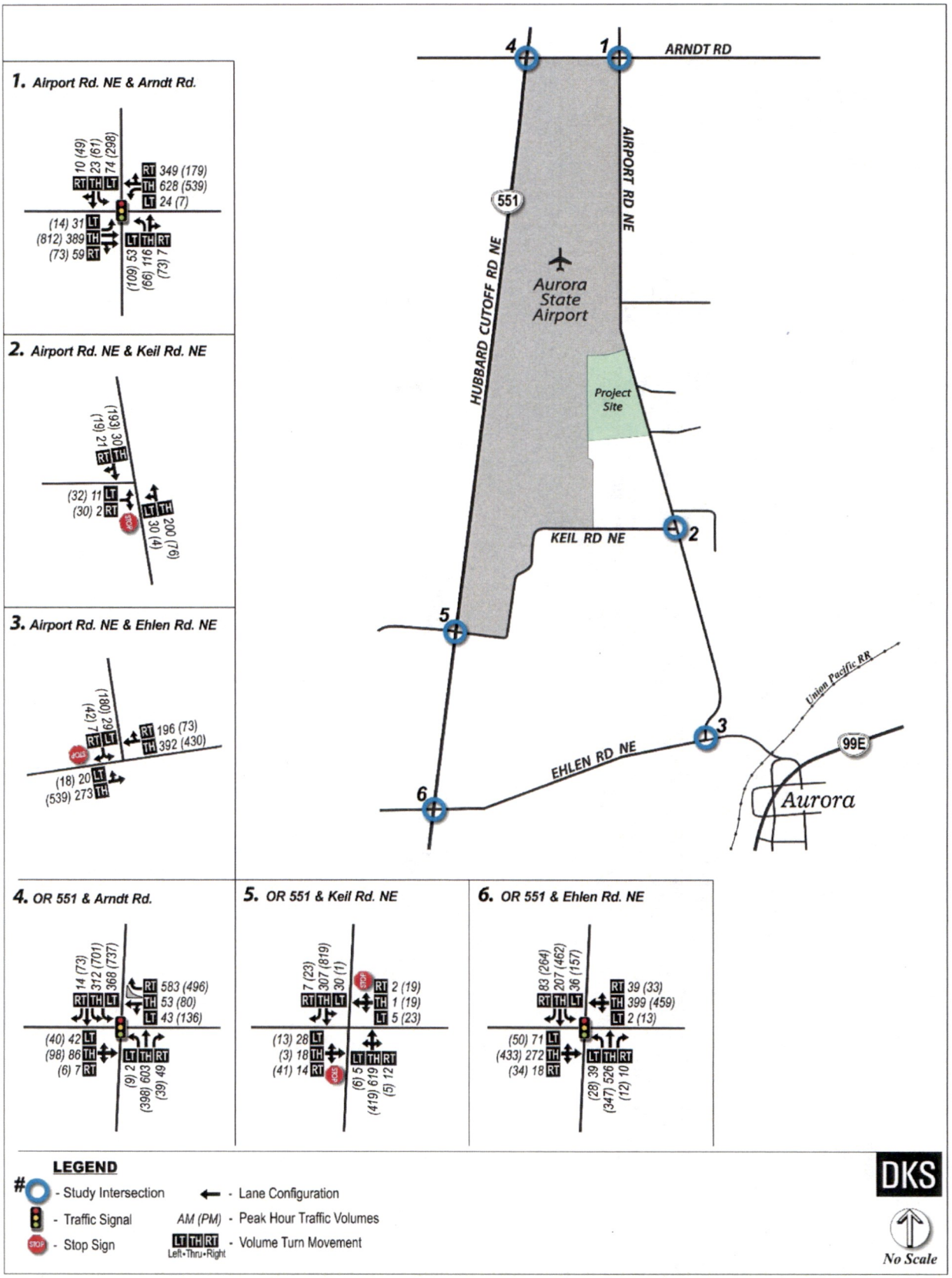

Figure 5: 2022 No Build (Existing EFU Zoning) Traffic Volumes

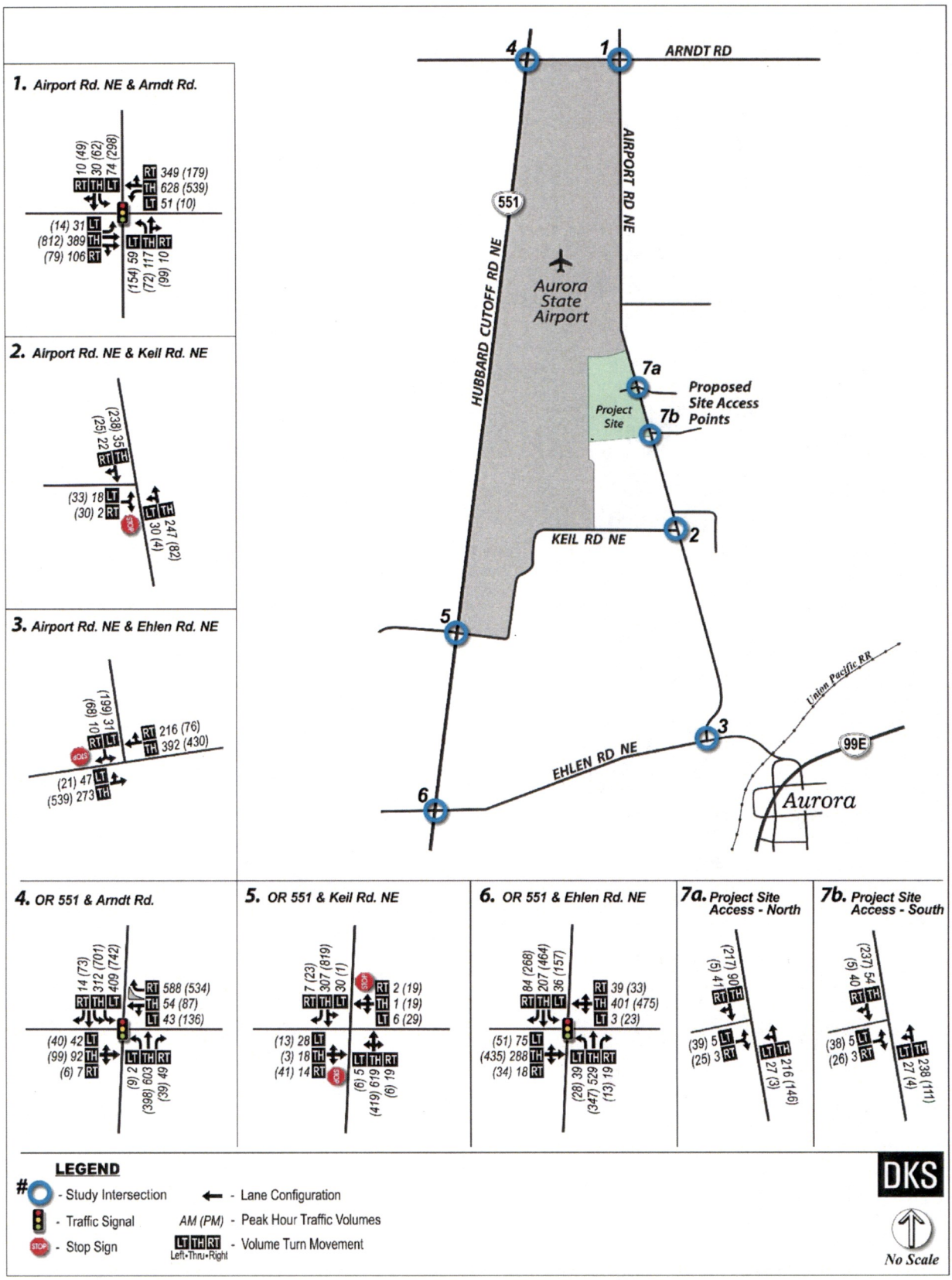

Figure 6: 2022 Build (Proposed Public Zoning) Traffic Volumes

It is anticipated that the proposed rezone and development will be completed in 2022. Table 6 lists the 2022 No Build intersection operations and Table 7 lists the study intersections' 2022 Build (assumes worst case Public zone land use) intersection operations.

Table 6: Short-term (2022) No Build Intersection Operations

Intersection	Jurisdiction	Mobility Targets/ Operating Standard	AM Peak			PM Peak		
			v/c	*Delay*	*LOS*	*v/c*	*Delay*	*LOS*
Signalized								
Airport Road/Arndt Road	Marion County	0.85 v/c and LOS D	**0.89**	**41.7**	**D**	**1.04**	**40.9**	**D**
OR-551/Arndt Road	ODOT	0.70	**0.78**	**23.1**	**C**	**0.88**	**39.6**	**D**
OR-551/Ehlen Road	ODOT	0.70	**0.83**	**32.9**	**C**	**0.88**	**37.6**	**D**
Two-way Stop								
Airport Road/Keil Road	Marion County	LOS E	0.02 EB	10.7	A/B	0.10 EB	10.6	A/B
Airport Road/Ehlen Road	Marion County	LOS E	0.12 SB	17.1	A/C	**0.88 SB**	**70.0**	**A/F**
OR-551/Keil Road	ODOT	0.75	0.33 EB	30.2	A/D	0.43 WB	44.1	A/E

Signalized intersections:
v/c = Volume-to-Capacity Ratio of Intersection
Delay = Average Stopped Delay per Vehicle (sec)
LOS = Level of Service of Intersection

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

Bold/Highlighted: Intersection fails to meet operating standards/mobility targets.

Table 7: Short-term (2022) Build Intersection Operations

Intersection	Jurisdiction	Mobility Targets/ Operating Standard	AM Peak			PM Peak		
			v/c	*Delay*	*LOS*	*v/c*	*Delay*	*LOS*
Signalized								
Airport Road/Arndt Road	Marion County	0.85 v/c and LOS D	**0.89**	**41.3**	**D**	**1.00**	**46.5**	**D**
OR-551/Arndt Road	ODOT	0.70	**0.80**	**24.7**	**C**	**0.88**	**41.9**	**D**
OR-551/Ehlen Road	ODOT	0.70	**0.83**	**34.0**	**C**	**0.88**	**38.4**	**D**
Two-way Stop								
Airport Road/Keil Road	Marion County	LOS E	0.04 EB	11.4	A/B	0.11 EB	11.1	A/B
Airport Road/Ehlen Road	Marion County	LOS E	0.15 SB	18.7	A/C	**1.03 SB**	**104.0**	**A/F**
OR-551/Keil Road	ODOT	0.75	0.33 EB	30.5	A/D	0.49 WB	50.9	A/F

Short-term (2022) Mitigation Strategies

As was discussed in the existing conditions section, Airport Road/Arndt Road, OR-551/Arndt Road, OR-551/Ehlen Road, and Airport Road/Ehlen Road currently do not meet Marion County or ODOT mobility targets/standards. The intersections OR-551/Arndt Road and Airport Road/Ehlen Road will further degrade operations as compared to pre-project conditions. The following improvements would be necessary to mitigate the anticipated impact of project trips at these two intersections.

OR-551/Arndt Road

- Install left-turn lanes on the eastbound and westbound approaches.
- Construct necessary traffic signal modifications.

Airport Road/Ehlen Road

- Install a left-turn lane on the eastbound approach
- Install a two-way left-turn lane on the east leg to allow for two-stage left turns.

ODOT maintains jurisdiction of OR-551 and ODOT approval shall be required for all proposed mitigations along this facility. At the time any official request is submitted, the request shall include an operational and queuing analysis, preliminary design layout, and a preliminary signal operations design (PSOD).

Table 8 below shows the operational results with the recommended mitigations and how they compare to the mitigation standard. The mitigation standard is based on the Short-term (2022) No Build operations. The recommended mitigations improve operations to the point at which they are at or better than the pre-project conditions. Additionally, the mitigations improve traffic operations for the Airport Road/Ehlen Road intersection to the required operating standard.

Table 8: 2022 Mitigated Traffic Operations

Intersection	Mitigation	Mitigation Standard[1]	AM Peak			Mitigation Standard[1]	PM Peak		
			v/c	*Delay*	*LOS*		*v/c*	*Delay*	*LOS*
Signalized									
OR-551/Arndt Road	EBLT, WBLT	0.78 v/c	0.77	20.7	C				
Two-way Stop									
Airport Road/Ehlen Road	EBLT, TWLT					LOS E	0.69 SB	31.4	A/D

Signalized intersections:
v/c = Volume-to-Capacity Ratio of Intersection
Delay = Average Stopped Delay per Vehicle (sec)
LOS = Level of Service of Intersection

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

[1]Since the intersection fails to meet current mobility targets/standards, the mitigation standard is equal to the operating condition without project trips added.

SITE PLAN REVIEW

The site plan includes approximately 158,000 square feet of proposed warehouse or hanger space and 123,000 square feet of proposed office space. The site plan also shows a taxi-lane easement that connects to the existing taxiway and runway and approximately 362 proposed parking spaces located primarily along Airport Road. The site plan shows sufficient aisle width for parking maneuvers.

Site Access

The access points are located at existing driveways along Airport Road, one of which is Stenbock Way NE. The spacing between the access points is approximately 575 feet and 630 feet. The access points along Airport Road are located near existing driveways that lead to properties on the east side of Airport Way. It is recommended that the proposed access points are aligned with these driveways to avoid off-set intersections. The Airport should coordinate with County staff and property owners at these locations. Based on preliminary observations, there are no existing sight distance concerns at the existing driveway or study intersections.[10] However, prior to occupancy, sight distance at any existing access points will need to be verified, documented, and stamped by a registered professional Civil or Traffic Engineer licensed in the State of Oregon.

[10] Preliminary sight distance evaluations were completed on August 2, 2017.

Table 9 on the following page shows the traffic operations at the two proposed project driveways for the Short-term (2022) Build scenario. It was assumed that project trips would be evenly split between the two proposed driveways and therefore the expected operations would be similar. As shown, both the proposed driveways meet the Marion County operating standard.

Table 9: Short-term (2022) Build Driveway Operations

Location	Jurisdiction	Operating Standard	AM Peak			PM Peak		
			v/c	*Delay*	*LOS*	*v/c*	*Delay*	*LOS*
Airport Road/North Access Point	Marion County	LOS E	0.02 NBL	10.6	A/B	0.12 EB	11.3	A/B
Airport Road/South Access Point			0.02 NBL	10.4	A/B	0.12 EB	11.3	A/B

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

Bold/Highlighted: Intersection fails to meet operating standards.

Turn Lane Warrant Analysis

Turn warrant analyses were performed for the proposed site access points along Airport Road using the Highway Review Board (HRB) left turn lane warrant analysis methodology for the northbound approaches and the National Cooperative Highway Research Program (NCHRP) Report 279 right turn lane warrant analysis methodology for the southbound approaches. It was assumed that the vehicles turning into the project site would be split between the two proposed access points.

Northbound left turn lanes were not warranted at the proposed site accesses under HRB methodology, however were warranted by ODOT criteria. Right turn lanes were not warranted at either of the proposed site accesses. Since left-turn lane warrants are only met by ODOT criteria during the AM peak hour for the worst-case land use assumption, left-turn lanes are not deemed necessary at this time. All approaches would also continue to meet Marion County standards without the addition of left-turn lanes. The results and supporting documentation can be found in the appendix.

4.0 TRANSPORTATION PLANNING RULE ANALYSIS (2037)

Transportation system planning in Oregon is guided and enforced by Statewide Planning Goal 12: Transportation.[11] The Transportation Planning Rule (TPR), OAR 660-012, describes how to implement Planning Goal 12 in all communities throughout the State.[12] By implementing Planning Goal 12, the TPR promotes the development of safe, convenient, and economic transportation systems that are designed to reduce reliance on the automobile.

OAR 660-012-0060 of the TPR addresses amendments to plans and land use regulations and includes measures to be taken to ensure allowed land uses are consistent with the identified function and capacity of existing and planned transportation facilities. This rule includes criteria for identifying significant effects of plan or land use regulation amendments on transportation facilities, actions to be taken when a significant effect would occur, identification of planned facilities, and coordination with transportation facility providers.

The foregoing transportation impact analysis does indicate that several facilities in the surrounding transportation network will be significantly impacted by a proposed change in zoning. Additional intersections were identified with significant impacts. For those cases, the TPR requires that measures be taken consistent with the rule.

LONG-TERM (2037) TRAFFIC VOLUMES

As previously completed for the 2022 short-term analysis, the future traffic volumes include various combinations of three types of traffic: existing, background, and project. The background traffic includes the traffic that is expected to be added to the transportation system based on an anticipated growth rate of 2.0% per year.

This growth rate was applied to the OR-551/Arndt Road and OR-551/Ehlen Road intersections, the north-south through movements at the OR-551/Keil Road intersection, and the east-west movements at the Arndt Road/Airport Road intersection. The growth rate was selectively applied to the study intersections to accurately model the expected background growth in traffic. It is anticipated that any growth on Airport Road in the future will be due to the expansion of the Aurora Airport facilities.

All future traffic operations assumed completion of the planned projects previously discussed including the flashing yellow arrows to allow for protected and permissive left turns on the Airport Road/Arndt Road intersection.

The estimated traffic volumes were used to analyze future intersection operations at the study intersection for the 2037 No Build and 2037 Build scenarios. Figure 7 and Figure 8 on the following pages show the expected traffic volumes for the study area for the 2037 No Build with Existing EFU Zoning and 2037 Build with the Worst Case Public Zone Land Use.

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[11] Statewide Planning Goals: http://www.oregon.gov/LCD/goals.shtml
[12] Transportation Planning Rule: http://arcweb.sos.state.or.us/rules/OARS_600/OAR_660/660_012.html

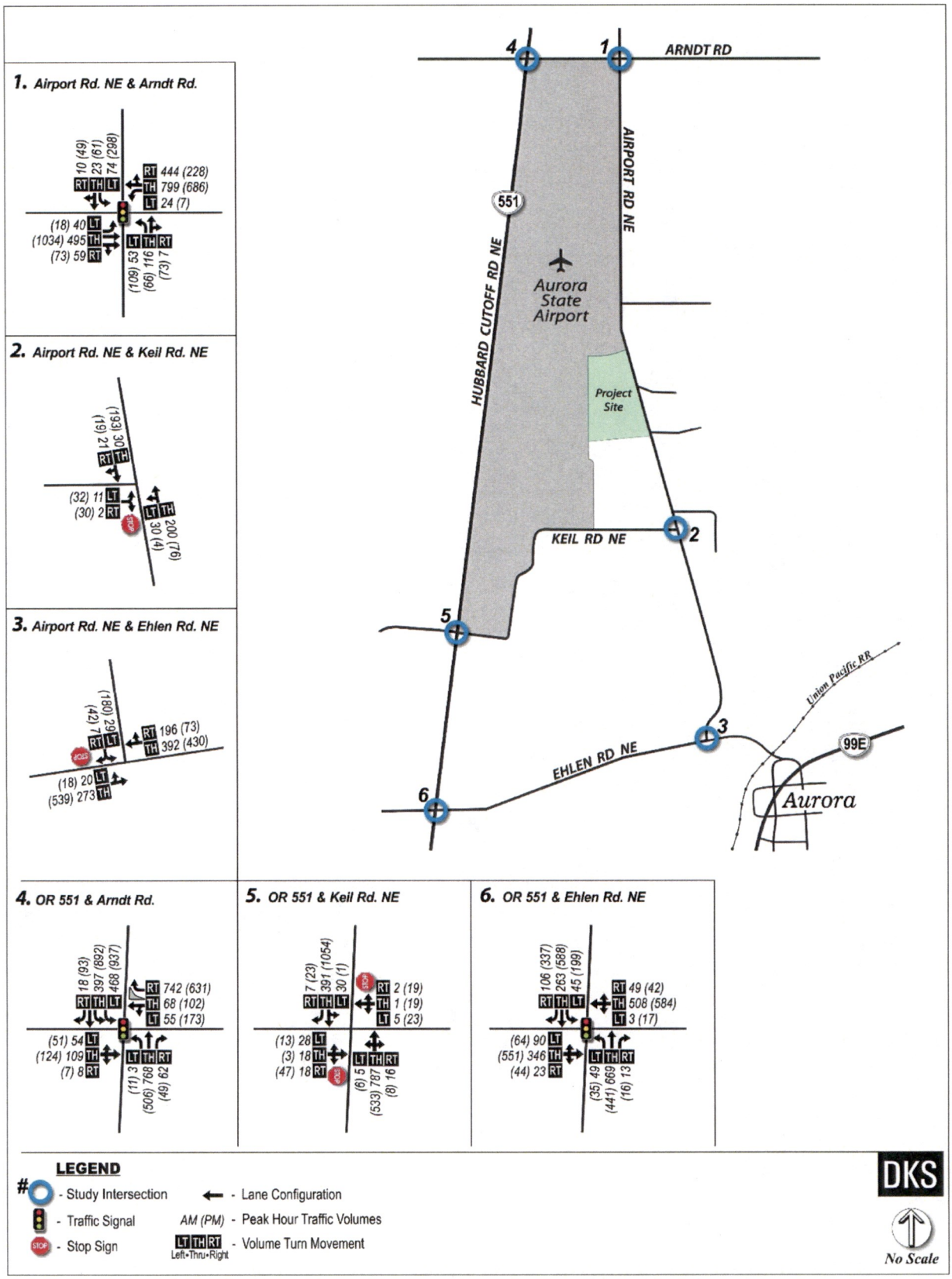

Figure 7: 2037 No Build (Existing EFU Zoning) Traffic Volumes

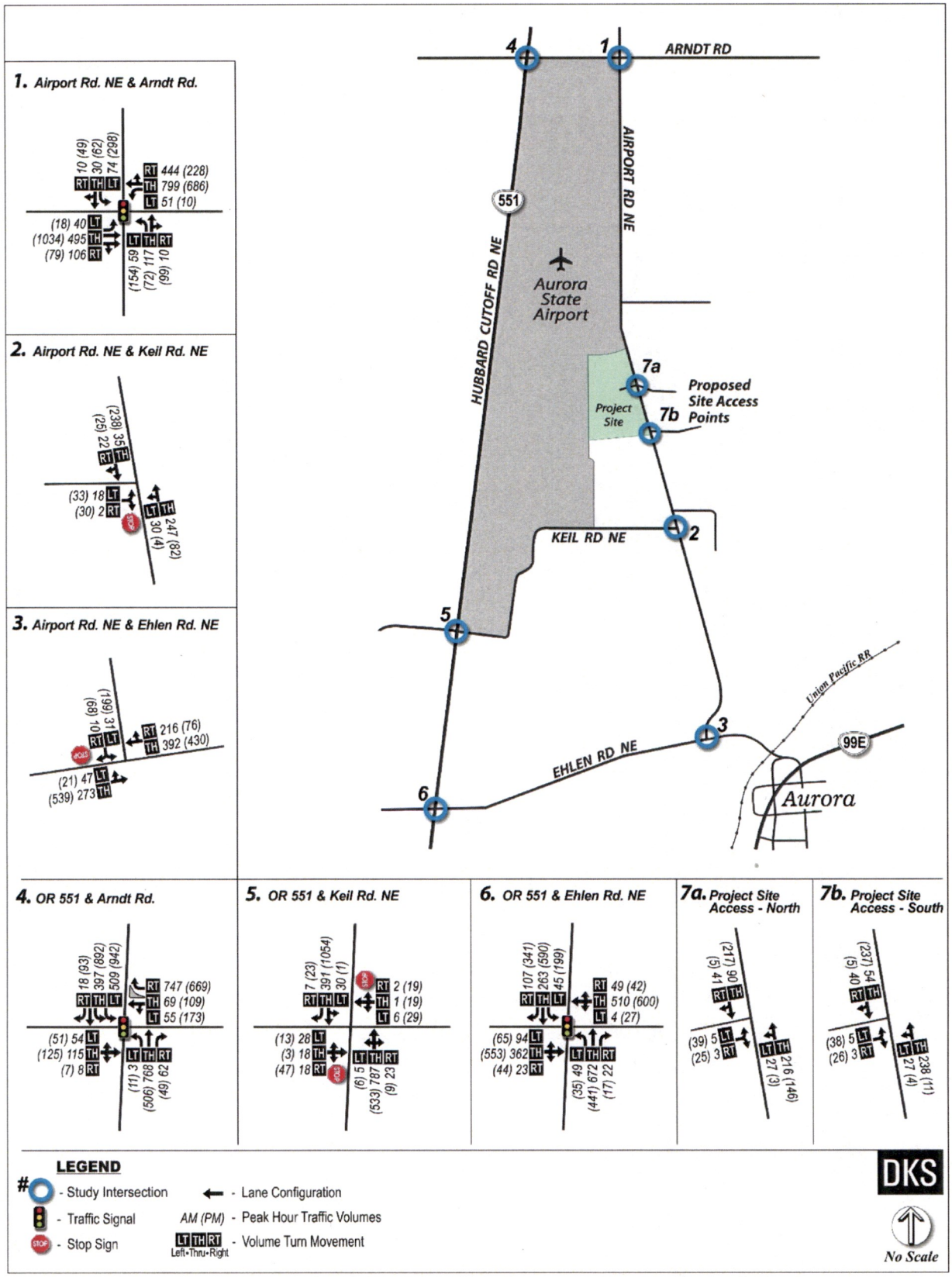

Figure 8: 2037 Build (Proposed Public Zoning) Traffic Volumes

LONG-TERM (2037) INTERSECTION OPERATIONS

Table 10 lists the 2037 No Build (Existing EFU Zoning) intersection operations and

Table 11 on the following page lists the study intersections' 2037 Build (Worst Case Public Zone Land Use) intersection operations. As shown, in both scenarios the Airport Road/Arndt Road intersection fails to meet the Marion County operating standard in the AM and PM peak hours, the OR-551/Arndt Road and OR-551/Ehlen Road intersections fail to meet ODOT's mobility targets for the AM and PM peak hours, and the Airport Road/Ehlen Road intersection fails to meet the Marion County operating standard in the PM peak hour.

Table 10: 2037 No Build (Existing EFU Zoning) Intersection Operations

Intersection	Jurisdiction	Mobility Targets/ Operating Standard	AM Peak			PM Peak		
			v/c	*Delay*	*LOS*	*v/c*	*Delay*	*LOS*
Signalized								
Airport Road/Arndt Road	Marion County	0.85 v/c and LOS D	**1.10**	**106.9**	**F**	**1.21**	**79.9**	**E**
OR-551/Arndt Road	ODOT	0.70	**0.89**	**32.2**	**C**	**1.06**	**79.5**	**E**
OR-551/Ehlen Road	ODOT	0.70	**0.93**	**49.7**	**D**	**1.07**	**76.6**	**E**
Two-way Stop								
Airport Road/Keil Road	Marion County	LOS E	0.02 EB	10.7	A/B	0.10 EB	10.5	A/B
Airport Road/Ehlen Road	Marion County	LOS E	0.12 SB	17.1	A/C	**0.88 SB**	**70.0**	**A/F**
OR-551/Keil Road	ODOT	0.75	0.36 EB	35.3	A/E	0.60 WB	82.1	B/F

Signalized intersections:
v/c = Volume-to-Capacity Ratio of Intersection
Delay = Average Stopped Delay per Vehicle (sec)
LOS = Level of Service of Intersection

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

Bold/Highlighted: Intersection fails to meet operating standards/mobility targets.

Table 11: 2037 Build (Worst Case Public Zone Land Use) Intersection Operations

Intersection	Jurisdiction	Mobility Targets/ Operating Standard	AM Peak			PM Peak		
			v/c	*Delay*	*LOS*	*v/c*	*Delay*	*LOS*
Signalized								
Airport Road/Arndt Road	Marion County	0.85 v/c and LOS D	**1.11**	**103.1**	**F**	**1.17**	**85.9**	**F**
OR-551/Arndt Road	ODOT	0.70	**0.91**	**35.0**	**C**	**1.07**	**80.2**	**F**
OR-551/Ehlen Road	ODOT	0.70	**0.93**	**52.1**	**D**	**1.07**	**80.2**	**F**
Two-way Stop								
Airport Road/Keil Road	Marion County	LOS E	0.04 EB	11.4	A/B	0.11 EB	11.1	A/B
Airport Road/Ehlen Road	Marion County	LOS E	0.15 SB	18.7	A/C	**1.03 SB**	**104.0**	**A/F**
OR-551/Keil Road	ODOT	0.75	0.36 EB	35.5	A/E	0.69 WB	99.6	B/F

MITIGATION STRATEGIES

As was discussed in the existing conditions section, Airport Road/Arndt Road, OR-551/Arndt Road, OR-551/Ehlen Road, and Airport Road/Ehlen Road currently do not meet Marion County or ODOT mobility targets/standards. The intersections Airport Road/Arndt Road, and OR-551/Arndt Road, and Airport Road/Ehlen Road will further degrade operations as compared to pre-project conditions. The following improvements would be necessary to mitigate the anticipated impact of project trips at these two intersections. The mitigation strategies for the OR-551/Arndt Road and Airport Road/Ehlen Road intersections are the same as previously recommended for the short-term (2022) scenarios and are summarized below.

Airport Road/Arndt Road

- Install a dedicated right turn lane on the westbound approach.
- Construct necessary traffic signal modifications.

OR-551/Arndt Road

- Install a dedicated left turn lane on the eastbound and westbound approaches.
- Construct necessary traffic signal modifications.

Airport Road/Ehlen Road

- Install a left turn lane on the eastbound approach
- Install a two-way left-turn lane on the east leg to allow for two-stage left turns.

ODOT maintains jurisdiction of OR-551 and ODOT approval shall be required for all proposed mitigations along this facility. At the time any official request is submitted, the request shall include an operational and queuing analysis, preliminary design layout, and a preliminary signal operations design (PSOD).

Table 12 shows the operational results with the mitigation strategies and how they compare to the mitigation standard. The mitigation standard is based on the Long-term (2037) No Build operations. The recommended mitigations improve operations to the point at which they are at or better than the pre-project conditions. Additionally, the mitigations improve traffic operations for the Airport Road/Ehlen Road intersection to the required operating standard. With the recommended mitigation strategies as identified in this report, the proposed zone change will not significantly affect the transportation system.

Table 12: Long-term (2037) Mitigated Traffic Operations

Intersection	Mitigation	Mitigation Standard[1]	AM Peak			Mitigation Standard[1]	PM Peak		
			v/c	*Delay*	*LOS*		*v/c*	*Delay*	*LOS*
Signalized									
Airport Road/Arndt Road	WBRT	1.10 v/c	0.85	43.7	D				
OR-551/Arndt Road	EBLT, WBLT	0.89 v/c	0.86	27.6	C	1.06 v/c	0.90	34.4	C
Two-way Stop									
Airport Road/Ehlen Road	EBLT, TWLT					LOS E	0.69 SB	31.4	A/D

Signalized intersections:
v/c = Volume-to-Capacity Ratio of Intersection
Delay = Average Stopped Delay per Vehicle (sec)
LOS = Level of Service of Intersection

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

[1]Since the intersection fails to meet current mobility targets/standards, the mitigation standard is equal to the operating condition without project trips added

PROJECT SUMMARY

The proposed rezone and development of the 20-acre parcel on the east edge of the Aurora State Airport is anticipated to result in the following short-term impacts:

Trip Generation

- The proposed Aurora Airport Rezone net trip generation estimates were calculated by adding the Warehousing (150) and General Office Building (710) trip generation estimates and then subtracting the existing Church (560) trip generation estimates. All trip generation estimates were provided by the ITE Trip Generation Manual.[13]
- The proposed Aurora Airport zone change is expected to generate 961 net new average daily trips and 151 (135 in, 16 out) AM peak hour trips and 145 (17 in, 128 out) PM peak hour trips.

Intersection Operations

- Under 2017 Existing Conditions, the Airport Road/Arndt Road intersection fails to meet the Marion County operating standard in the AM and PM peak hours, the OR-551/Arndt Road and OR-551/Ehlen Road intersections fail to meet ODOT's mobility targets for the AM and PM peak hours, and Airport Road/Ehlen Road intersection fails to meet the Marion County operating standard in the PM peak hour.
- In the Short-term (2022) scenario and the Long-term (2037) scenario, the same intersections fail to meet mobility targets or operating standards.

Mitigations

The following mitigations are necessary to mitigate the impact on the transportation system of the proposed rezone and development.

Airport Road/Arndt Road

- Install a dedicated right turn lane on the westbound approach.
- Construct necessary traffic signal modifications.

OR-551/Arndt Road

- Install a dedicated left turn lane on the eastbound and westbound approaches.
- Construct necessary traffic signal modifications.

Airport Road/Ehlen Road

- Install a left turn lane on the eastbound approach
- Install a two-way left-turn lane on the east leg to allow for two-stage left turns.

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[13] *Trip Generation Manual, 10th Edition*, Institute of Transportation Engineers, 2017.

ODOT maintains jurisdiction of OR-551 and ODOT approval shall be required for all proposed mitigations along this facility. At the time any official request is submitted, the request shall include an operational and queuing analysis, preliminary design layout, and a preliminary signal operations design (PSOD).

The applicant should work with ODOT and Marion County to determine the proportionate share of each of the above improvements.

Site Plan Review

- The site plan provided shows approximately 362 proposed parking spaces located primarily along Airport Road. The site plan shows sufficient aisle width for parking maneuvers.
- There are two proposed site access points along Airport Road. It is recommended that these two access points are aligned with the two existing private driveways on east side of Airport Road to avoid off-set intersections. The Airport should coordinate with County staff and property owners at these locations.

5.0 TPR REVIEW AND REQUIRED MITIGATIONS

This chapter covers the requirements of the Transportation Planning Rule (TPR) and the necessary mitigation strategies for each of the study intersections.

TRANSPORTATION PLANNING RULE REVIEW

To preserve the function of the study area roadways and to provide safe access to the proposed development, it is recommended that a series of transportation mitigation measures be performed. These measures should also significantly reduce the expected transportation impacts resulting from the proposed zone change to Public Zone and reasonable worst-case 158,000 square-feet of warehousing and 123,000 square-feet of general office.

Transportation Planning Rule (TPR) Mitigation Requirements

Transportation system planning in Oregon is guided and enforced by Statewide Planning Goal 12: Transportation.[14] The Transportation Planning Rule (TPR), OAR 660-012, describes how to implement Planning Goal 12 in all communities throughout the State.[15] By implementing Planning Goal 12, the TPR promotes the development of safe, convenient, and economic transportation systems that are designed to reduce reliance on the automobile. OAR 660-012-0060 of the TPR addresses amendments to plans and land use regulations and includes measures to be taken to ensure allowed land uses are consistent with the identified function and capacity of existing and planned transportation facilities. This rule includes criteria for identifying significant effects of plan or land use regulation amendments on transportation facilities, actions to be taken when a significant effect would occur, identification of planned facilities, and coordination with transportation facility providers.

The foregoing transportation impact analysis indicates that several facilities in the surrounding transportation network will be significantly impacted by a proposed change in zoning.

MITIGATION STRATEGIES

The transportation impact analysis documented in this report indicates that the following study intersections will be significantly impacted by the proposed development as defined by the TPR Guidelines. The improvements identified to address significant impacts to the local transportation system are described below, based on the findings from the previous Recommended Mitigation sections. The funding and implementation of these improvements will need to be coordinated with ODOT and Marion County.

- **Airport Road/Arndt Road:** Install a dedicated right turn lane on the westbound approach. Construct necessary traffic signal modifications.
- **OR-551/Arndt Road:** Install a dedicated left turn lane on the eastbound and westbound approaches. Construct necessary traffic signal modifications.

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[14] Statewide Planning Goals: http://www.oregon.gov/LCD/goals.shtml
[15] Transportation Planning Rule: http://arcweb.sos.state.or.us/rules/OARS_600/OAR_660/660_012.html

- **Airport Road/Ehlen Road:** Install a left turn lane on the eastbound approach. Install a two-way left-turn lane on the east leg to allow for two-stage left turns.

The mitigation strategies must mitigate project impacts to meet either the greater of the operating standard/mobility target or the v/c ratio of the equivalent no-build condition. Table 13 shows the required mitigations for the zone change for Public Zone and reasonable worst-case 158,000 square-feet of warehousing and 123,000 square-feet of general office. These mitigation strategies will not significantly affect the transportation system per the TPR mitigation requirements.

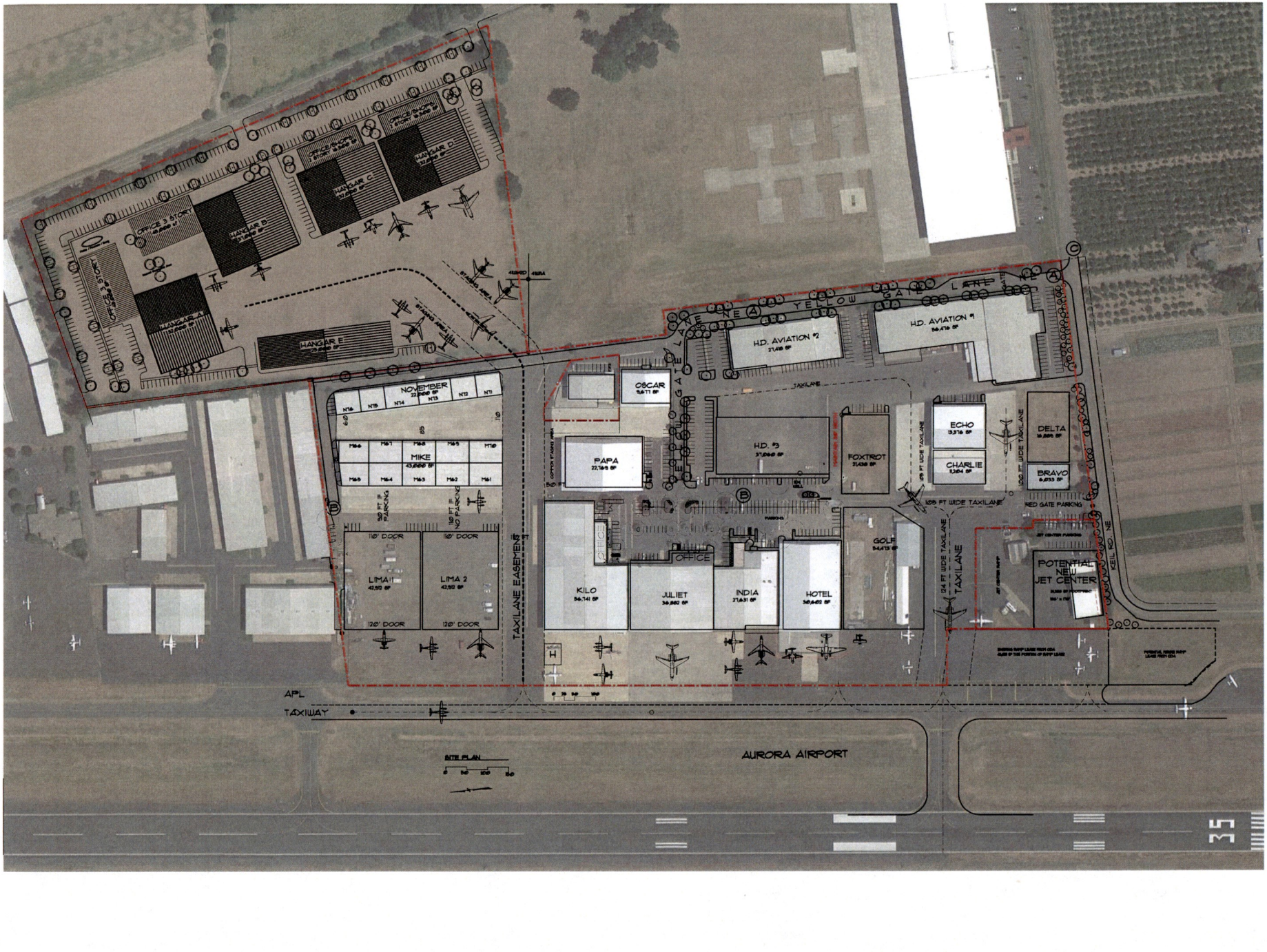
Table 13: Horizon Year Study Intersection Operations with Mitigations (2037)

Intersection	Mitigation	Mitigation Standard[1]	AM Peak			Mitigation Standard[1]	PM Peak		
			v/c	*Delay*	*LOS*		*v/c*	*Delay*	*LOS*
Signalized									
Airport Road/Arndt Road	Westbound Right-turn	1.10 v/c	0.85	43.7	D				
OR-551/Arndt Road	Eastbound Left Turn, Westbound Left-turn	0.89 v/c	0.86	27.6	C	1.06 v/c	0.90	34.4	C
Two-way Stop									
Airport Road/Ehlen Road	Eastbound Left-turn, Two-Way Left-turn					LOS E	0.69 SB	31.4	A/D

Signalized intersections:
v/c = Volume-to-Capacity Ratio of Intersection
Delay = Average Stopped Delay per Vehicle (sec)
LOS = Level of Service of Intersection

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

Appendix A – Site Plan



ARON FAEGRE ARCHITECT
520 S.W. YAMHILL
PORTLAND
OREGON
97204
503-222-2546

AURORA AIRPORT BUSINESS CENTER

MASTER PLAN

AURORA AIRPORT - AURORA, OREGON

MASTER SITE PLAN

DATE: 5/7/2017

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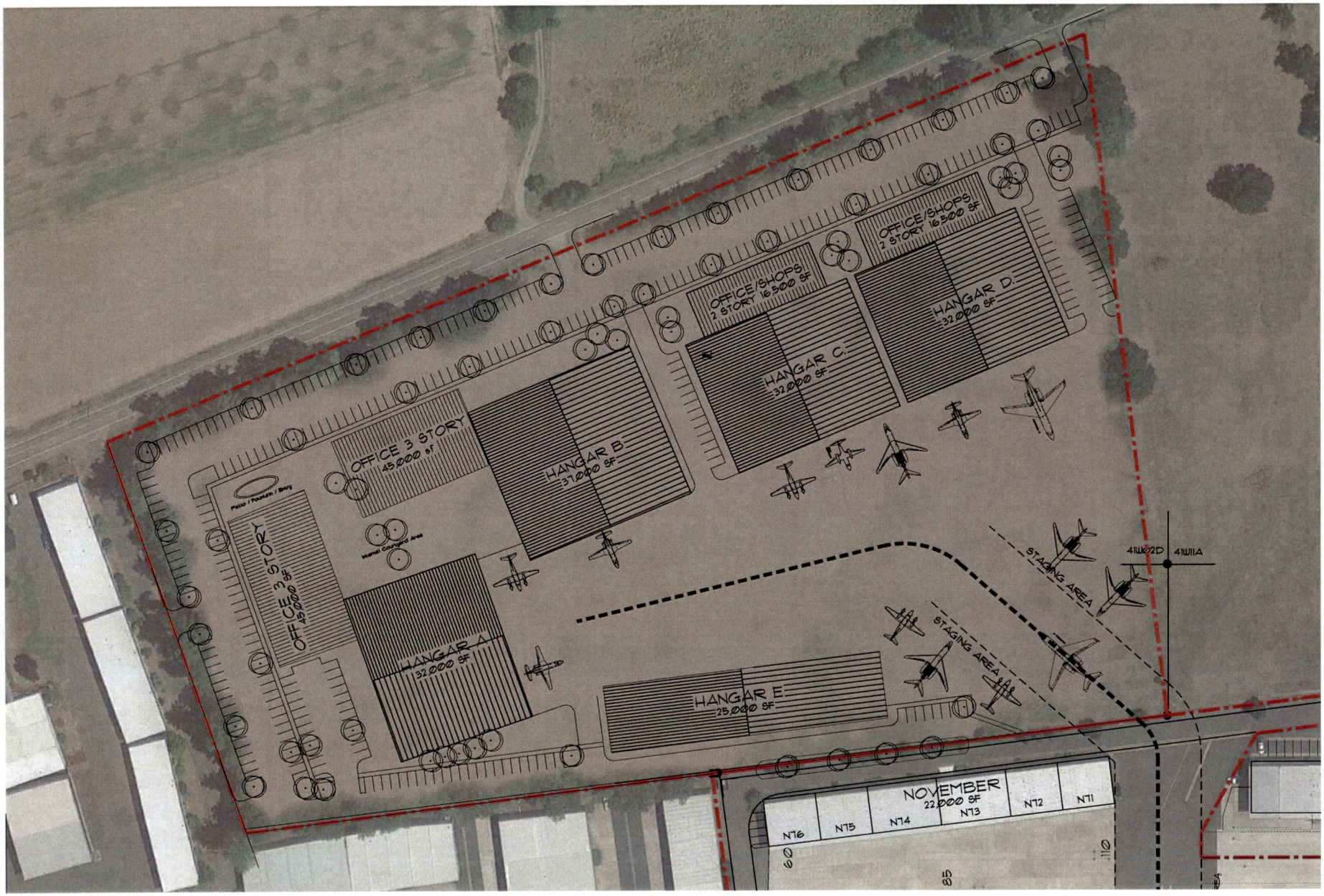

ARON
FAEGRE
ARCHITECT

520 S.W. YAMHILL
PORTLAND
OREGON
97204

503-222-2546

AURORA AIRPORT BUSINESS CENTER

MASTER
PLAN

AURORA AIRPORT - AURORA, OREGON

MASTER
SITE PLAN

DATE: 5/7/2017

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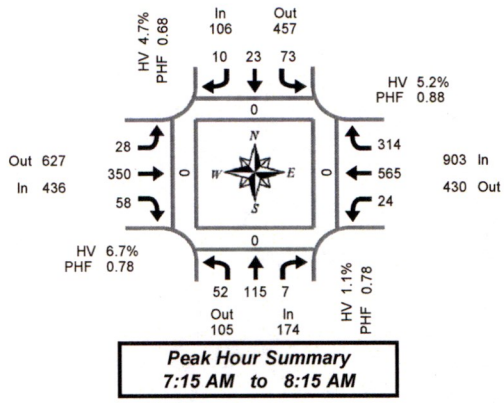
Appendix B – Existing Peak Hour Traffic Counts

Total Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
7:15 AM to 8:15 AM

Airport Rd NE & Arndt Rd NE

Wednesday, June 07, 2017
7:00 AM to 9:00 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	4	18	0	0	2	4	3	0	4	22	1	0	2	34	24	0	118	0	0	0	0
7:05 AM	1	12	2	0	9	1	1	0	1	31	3	0	4	39	38	0	142	0	0	0	0
7:10 AM	7	6	0	0	3	2	4	0	3	22	1	0	1	30	19	0	98	0	0	0	0
7:15 AM	0	7	0	0	5	1	1	0	0	25	4	0	3	40	48	0	134	0	0	0	0
7:20 AM	6	12	3	0	5	0	0	0	2	29	4	0	0	47	31	0	139	0	0	0	0
7:25 AM	4	12	1	0	4	1	0	0	1	25	4	0	1	53	26	0	132	0	0	0	0
7:30 AM	8	10	0	0	9	3	2	0	4	35	0	0	1	51	26	0	149	0	0	0	0
7:35 AM	2	10	0	0	1	1	0	0	2	30	3	0	3	61	35	0	148	0	0	0	0
7:40 AM	5	11	0	0	5	3	2	0	5	25	7	0	0	52	26	0	141	0	0	0	0
7:45 AM	4	8	0	0	8	2	0	0	1	26	7	0	4	45	23	0	128	0	0	0	0
7:50 AM	4	10	2	0	7	0	0	0	4	53	12	0	6	43	21	0	162	0	0	0	0
7:55 AM	4	6	1	0	6	5	0	0	4	17	4	0	2	38	23	0	110	0	0	0	0
8:00 AM	4	12	0	0	11	2	3	0	1	23	6	0	2	37	13	0	114	0	0	0	0
8:05 AM	2	9	0	0	6	4	2	0	3	28	3	0	0	46	23	1	126	0	0	0	0
8:10 AM	9	8	0	0	6	1	0	0	1	34	4	0	2	52	19	1	136	0	0	0	0
8:15 AM	1	6	0	0	10	2	1	0	1	28	4	0	0	34	10	0	97	0	0	0	0
8:20 AM	4	4	0	0	4	2	0	0	3	32	7	0	1	43	14	0	114	0	0	0	0
8:25 AM	2	3	0	0	4	0	2	0	1	24	0	0	2	37	21	0	96	0	0	0	0
8:30 AM	1	4	0	0	5	0	0	0	4	28	6	0	0	38	18	0	104	0	0	0	0
8:35 AM	4	3	0	1	4	2	0	0	1	27	4	0	2	45	16	0	108	0	0	0	0
8:40 AM	3	10	1	0	7	1	1	0	0	27	3	0	0	40	14	0	107	0	0	0	0
8:45 AM	1	10	0	0	5	3	1	0	1	25	2	0	0	34	10	0	92	0	0	0	0
8:50 AM	4	5	1	0	6	0	2	0	0	19	7	0	0	45	20	0	109	0	0	0	0
8:55 AM	2	3	0	0	7	3	1	0	2	18	4	0	3	35	9	0	87	0	0	0	0
Total Survey	86	199	11	1	139	43	26	0	49	653	100	0	39	1,019	527	2	2,891	0	0	0	0

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	12	36	2	0	14	7	8	0	8	75	5	0	7	103	81	0	358	0	0	0	0
7:15 AM	10	31	4	0	14	2	1	0	3	79	12	0	4	140	105	0	405	0	0	0	0
7:30 AM	15	31	0	0	15	7	4	0	11	90	10	0	4	164	87	0	438	0	0	0	0
7:45 AM	12	24	3	0	21	7	0	0	9	96	23	0	12	126	67	0	400	0	0	0	0
8:00 AM	15	29	0	0	23	7	5	0	5	85	13	0	4	135	55	2	376	0	0	0	0
8:15 AM	7	13	0	0	18	4	3	0	5	84	11	0	3	114	45	0	307	0	0	0	0
8:30 AM	8	17	1	1	16	3	1	0	5	82	13	0	2	123	48	0	319	0	0	0	0
8:45 AM	7	18	1	0	18	6	4	0	3	62	13	0	3	114	39	0	288	0	0	0	0
Total Survey	86	199	11	1	139	43	26	0	49	653	100	0	39	1,019	527	2	2,891	0	0	0	0

Peak Hour Summary
7:15 AM to 8:15 AM

By Approach	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	174	105	279	0	106	457	563	0	436	627	1,063	0	903	430	1,333	2	1,619	0	0	0	0
%HV	1.1%				4.7%				6.7%				5.2%				5.1%				
PHF	0.78				0.68				0.78				0.88				0.92				

By Movement	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	52	115	7	174	73	23	10	106	28	350	58	436	24	565	314	903	1,619
%HV	0.0%	1.7%	0.0%	1.1%	5.5%	0.0%	10.0%	4.7%	7.1%	7.4%	1.7%	6.7%	4.2%	6.7%	2.5%	5.2%	5.1%
PHF	0.72	0.85	0.44	0.78	0.76	0.52	0.50	0.68	0.64	0.84	0.56	0.78	0.50	0.86	0.75	0.88	0.92

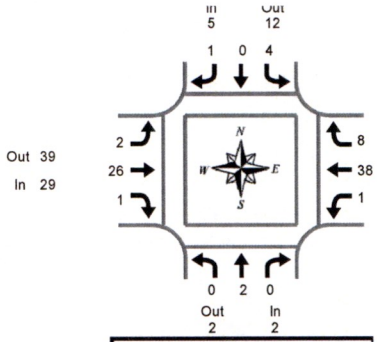
Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	49	122	9	0	64	23	13	0	31	340	50	0	27	533	340	0	1,601	0	0	0	0
7:15 AM	52	115	7	0	73	23	10	0	28	350	58	0	24	565	314	2	1,619	0	0	0	0
7:30 AM	49	97	3	0	77	25	12	0	30	355	57	0	23	539	254	2	1,521	0	0	0	0
7:45 AM	42	83	4	1	78	21	9	0	24	347	60	0	21	498	215	2	1,402	0	0	0	0
8:00 AM	37	77	2	1	75	20	13	0	18	313	50	0	12	486	187	2	1,290	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
7:15 AM to 8:15 AM

Airport Rd NE & Arndt Rd NE

Wednesday, June 07, 2017
7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	0	0	0	1	0	0	1	0	1	0	1	0	1	0	1	3
7:05 AM	0	0	0	0	0	0	0	0	0	5	0	5	0	3	1	4	9
7:10 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	2	3
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	3
7:20 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	7	1	8	9
7:25 AM	0	0	0	0	0	0	0	0	0	2	0	2	0	7	0	7	9
7:30 AM	0	0	0	0	0	0	0	0	0	6	0	6	0	6	1	7	13
7:35 AM	0	1	0	1	0	0	0	0	0	2	0	2	0	3	0	3	6
7:40 AM	0	0	0	0	1	0	0	1	1	4	0	5	0	2	1	3	9
7:45 AM	0	1	0	1	0	0	0	0	0	2	1	3	0	3	1	4	8
7:50 AM	0	0	0	0	0	0	0	0	0	5	0	5	0	0	1	1	6
7:55 AM	0	0	0	0	1	0	0	1	0	1	0	1	0	1	0	1	3
8:00 AM	0	0	0	0	0	0	1	1	0	1	0	1	0	2	0	2	4
8:05 AM	0	0	0	0	2	0	0	2	1	1	0	2	0	0	2	2	6
8:10 AM	0	0	0	0	0	0	0	0	0	1	0	1	1	4	1	6	7
8:15 AM	0	0	0	0	2	0	0	2	0	6	0	6	0	3	0	3	11
8:20 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2
8:25 AM	0	0	0	0	1	0	0	1	1	3	0	4	0	3	1	4	9
8:30 AM	0	0	0	0	0	0	0	0	1	5	0	6	0	2	0	2	8
8:35 AM	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	2	4
8:40 AM	0	0	0	0	1	0	0	1	0	3	0	3	0	5	0	5	9
8:45 AM	0	1	0	1	0	0	1	1	0	1	0	1	0	2	1	3	6
8:50 AM	0	0	0	0	0	0	0	0	0	3	1	4	0	1	0	1	5
8:55 AM	0	0	0	0	0	0	0	0	1	6	0	7	0	3	0	3	10
Total Survey	0	3	0	3	9	0	2	11	5	63	2	70	1	66	11	78	162

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	0	0	0	1	0	0	1	0	7	0	7	0	6	1	7	15
7:15 AM	0	0	0	0	0	0	0	0	0	3	0	3	0	17	1	18	21
7:30 AM	0	1	0	1	1	0	0	1	1	12	0	13	0	11	2	13	28
7:45 AM	0	1	0	1	1	0	0	1	0	8	1	9	0	4	2	6	17
8:00 AM	0	0	0	0	2	0	1	3	1	3	0	4	1	6	3	10	17
8:15 AM	0	0	0	0	3	0	0	3	1	10	0	11	0	7	1	8	22
8:30 AM	0	0	0	0	1	0	0	1	1	10	0	11	0	9	0	9	21
8:45 AM	0	1	0	1	0	0	1	1	1	10	1	12	0	6	1	7	21
Total Survey	0	3	0	3	9	0	2	11	5	63	2	70	1	66	11	78	162

Heavy Vehicle Peak Hour Summary
7:15 AM to 8:15 AM

By Approach	Northbound Airport Rd NE			Southbound Airport Rd NE			Eastbound Arndt Rd NE			Westbound Arndt Rd NE			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	2	2	4	5	12	17	29	39	68	47	30	77	83
PHF	0.25			0.31			0.56			0.53			0.67

By Movement	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	2	0	2	4	0	1	5	2	26	1	29	1	38	8	47	83
PHF	0.00	0.25	0.00	0.25	0.33	0.00	0.25	0.31	0.50	0.54	0.25	0.56	0.25	0.48	0.67	0.53	0.67

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	2	0	2	3	0	0	3	1	30	1	32	0	38	6	44	81
7:15 AM	0	2	0	2	4	0	1	5	2	26	1	29	1	38	8	47	83
7:30 AM	0	2	0	2	7	0	1	8	3	33	1	37	1	28	8	37	84
7:45 AM	0	1	0	1	7	0	1	8	3	31	1	35	1	26	6	33	77
8:00 AM	0	1	0	1	6	0	2	8	4	33	1	38	1	28	5	34	81

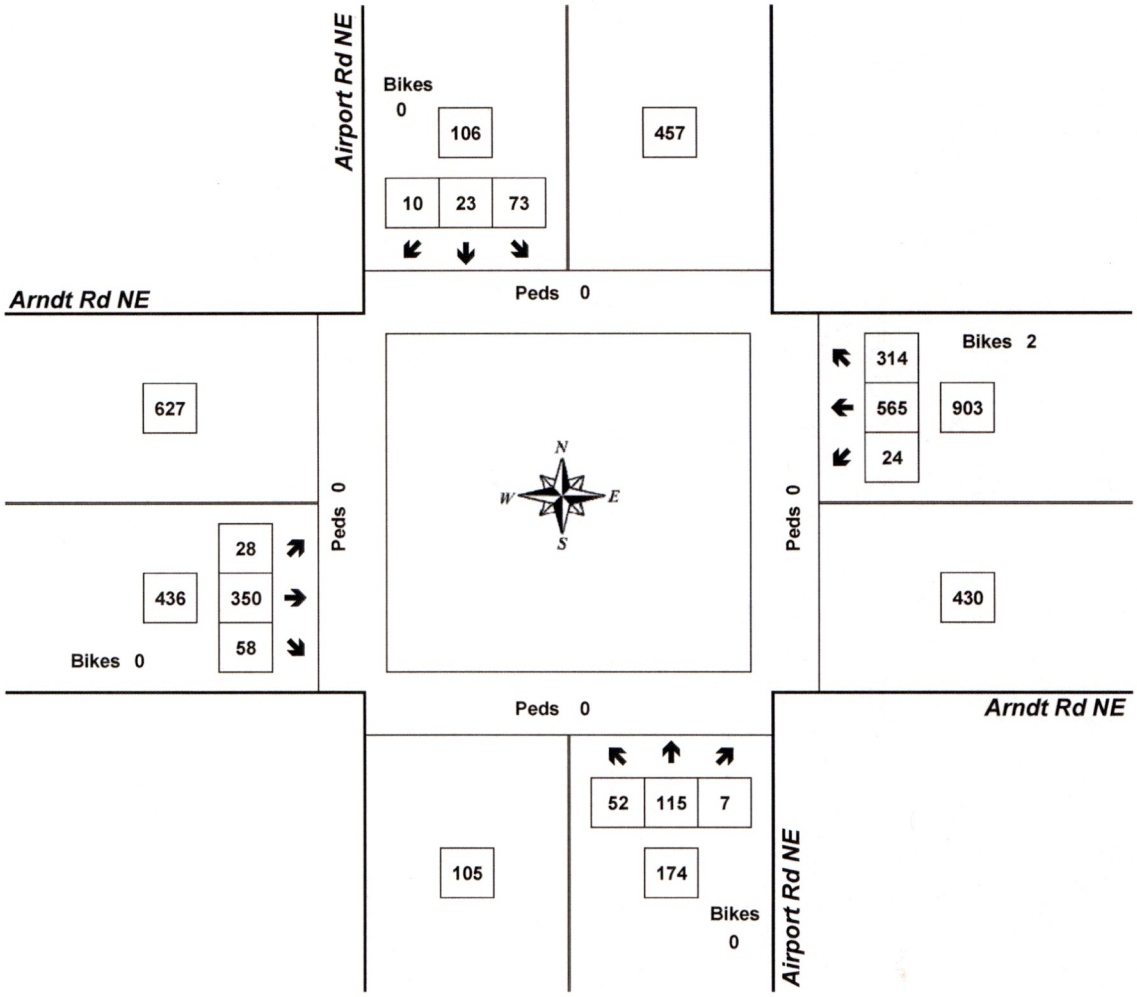
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Airport Rd NE & Arndt Rd NE

7:15 AM to 8:15 AM
Wednesday, June 07, 2017

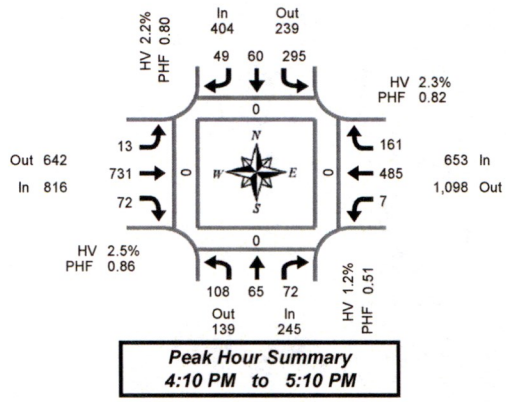


Approach	PHF	HV%	Volume
EB	0.78	6.7%	436
WB	0.88	5.2%	903
NB	0.78	1.1%	174
SB	0.68	4.7%	106
Intersection	0.92	5.1%	1,619

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Airport Rd NE & Arndt Rd NE

Tuesday, June 06, 2017
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	3	7	3	0	21	8	2	0	3	61	9	0	0	39	8	0	164	0	0	0	0
4:05 PM	2	1	3	0	23	4	1	0	3	54	2	0	0	28	11	0	132	0	0	0	0
4:10 PM	5	3	3	0	28	6	3	0	0	62	6	0	0	54	17	0	187	0	0	0	0
4:15 PM	1	4	2	0	23	2	2	0	1	67	7	0	0	49	18	0	176	0	0	0	0
4:20 PM	6	2	4	0	23	5	5	0	1	46	5	0	0	50	10	0	157	0	0	0	0
4:25 PM	6	4	2	0	20	5	8	1	1	73	7	0	1	40	6	0	173	0	0	0	0
4:30 PM	14	4	8	0	26	1	4	0	2	75	5	0	1	33	16	0	189	0	0	0	0
4:35 PM	33	14	18	0	29	9	6	0	1	70	3	0	0	27	10	0	220	0	0	0	0
4:40 PM	11	8	9	0	21	8	7	0	0	57	6	0	0	47	9	0	183	0	0	0	0
4:45 PM	4	2	5	0	36	7	3	0	0	65	8	0	2	38	15	0	185	0	0	0	0
4:50 PM	10	5	9	0	25	3	1	0	4	51	6	0	1	25	19	0	159	0	0	0	0
4:55 PM	4	6	3	0	34	5	4	0	0	35	2	0	0	51	10	0	154	0	0	0	0
5:00 PM	5	3	3	0	7	4	4	0	3	72	5	0	1	37	18	0	162	0	0	0	0
5:05 PM	9	10	6	0	23	5	2	0	0	58	12	0	1	34	13	0	173	0	0	0	0
5:10 PM	8	5	3	0	23	9	1	0	0	55	5	0	0	35	9	0	153	0	0	0	0
5:15 PM	4	4	5	0	20	12	1	0	3	58	3	0	2	49	17	0	178	0	0	0	0
5:20 PM	4	3	4	0	81	1	0	0	0	0	6	0	1	32	14	0	146	0	0	0	0
5:25 PM	0	5	3	0	25	6	0	0	4	72	4	0	0	33	15	0	167	0	0	0	0
5:30 PM	6	5	1	0	19	8	0	1	1	56	5	0	1	28	12	1	142	0	0	0	0
5:35 PM	2	7	5	0	18	4	1	0	0	68	6	0	0	33	9	0	153	0	0	0	0
5:40 PM	1	6	1	0	40	5	2	0	2	39	4	0	0	32	11	0	143	0	0	0	0
5:45 PM	3	1	0	0	21	3	4	0	1	57	6	0	0	32	9	0	137	0	0	0	0
5:50 PM	3	2	1	0	19	6	1	0	1	62	7	0	1	30	9	0	142	0	0	0	0
5:55 PM	3	2	3	0	28	5	0	0	1	56	5	0	0	23	5	0	131	0	0	0	0
Total Survey	147	113	104	0	633	131	62	2	32	1,369	134	0	12	879	290	1	3,906	0	0	0	0

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	10	11	9	0	72	18	6	0	6	177	17	0	0	121	36	0	483	0	0	0	0
4:15 PM	13	10	8	0	66	12	15	1	3	186	19	0	1	139	34	0	506	0	0	0	0
4:30 PM	58	26	35	0	76	18	17	0	3	202	14	0	1	107	35	0	592	0	0	0	0
4:45 PM	18	13	17	0	95	15	8	0	4	151	16	0	3	114	44	0	498	0	0	0	0
5:00 PM	22	18	12	0	53	18	7	0	3	185	22	0	2	106	40	0	488	0	0	0	0
5:15 PM	8	12	12	0	126	19	1	0	7	130	13	0	3	114	46	0	491	0	0	0	0
5:30 PM	9	18	7	0	77	17	3	1	3	163	15	0	1	93	32	1	438	0	0	0	0
5:45 PM	9	5	4	0	68	14	5	0	3	175	18	0	1	85	23	0	410	0	0	0	0
Total Survey	147	113	104	0	633	131	62	2	32	1,369	134	0	12	879	290	1	3,906	0	0	0	0

Peak Hour Summary
4:10 PM to 5:10 PM

By Approach	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	245	139	384	0	404	239	643	1	816	642	1,458	0	653	1,098	1,751	0	2,118	0	0	0	0
%HV	1.2%				2.2%				2.5%				2.3%				2.2%				
PHF	0.51				0.80				0.86				0.82				0.89				

By Movement	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	108	65	72	245	295	60	49	404	13	731	72	816	7	485	161	653	2,118
%HV	0.9%	1.5%	1.4%	1.2%	1.7%	3.3%	4.1%	2.2%	15.4%	2.2%	2.8%	2.5%	0.0%	2.1%	3.1%	2.3%	2.2%
PHF	0.47	0.63	0.51	0.51	0.78	0.63	0.68	0.80	0.46	0.84	0.90	0.86	0.58	0.79	0.86	0.82	0.89

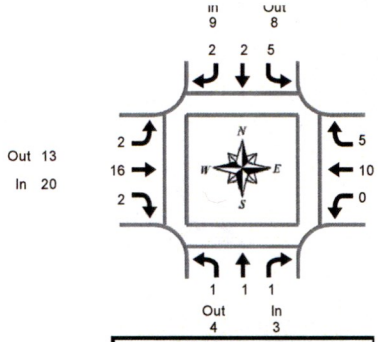
Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	99	60	69	0	309	63	46	1	16	716	66	0	5	481	149	0	2,079	0	0	0	0
4:15 PM	111	67	72	0	290	63	47	1	13	724	71	0	7	466	153	0	2,084	0	0	0	0
4:30 PM	106	69	76	0	350	70	33	0	17	668	65	0	9	441	165	0	2,069	0	0	0	0
4:45 PM	57	61	48	0	351	69	19	1	17	629	66	0	9	427	162	1	1,915	0	0	0	0
5:00 PM	48	53	35	0	324	68	16	1	16	653	68	0	7	398	141	1	1,827	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
4:10 PM to 5:10 PM

Airport Rd NE & Arndt Rd NE

Tuesday, June 06, 2017
4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	0	0	0	0	0	1	1	2	0	1	0	1	3
4:05 PM	0	0	0	0	0	0	0	0	1	3	0	4	0	0	0	0	4
4:10 PM	0	0	0	0	1	0	0	1	0	2	0	2	0	2	1	3	6
4:15 PM	0	0	0	0	1	1	1	3	0	2	0	2	0	0	3	3	8
4:20 PM	1	0	1	2	0	0	0	0	1	1	0	2	0	1	0	1	5
4:25 PM	0	1	0	1	0	0	1	1	0	3	0	3	0	1	0	1	6
4:30 PM	0	0	0	0	1	0	0	1	1	0	0	1	0	0	0	0	2
4:35 PM	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0	0	2
4:40 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	2	4
4:45 PM	0	0	0	0	0	0	0	0	0	2	1	3	0	0	1	1	4
4:50 PM	0	0	0	0	1	0	0	1	0	1	0	1	0	1	0	1	3
4:55 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	1	2
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:05 PM	0	0	0	0	0	0	0	0	0	2	1	3	0	2	0	2	5
5:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	2
5:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
5:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
5:35 PM	1	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	2
5:40 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
5:45 PM	0	0	0	0	1	0	1	2	0	1	0	1	0	1	0	1	4
5:50 PM	0	0	0	0	1	0	0	1	0	1	1	2	0	1	1	2	5
5:55 PM	0	0	0	0	1	0	0	1	0	1	0	1	0	1	0	1	3
Total Survey	2	1	1	4	8	2	3	13	3	25	5	33	0	20	7	27	77

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	1	0	0	1	1	6	1	8	0	3	1	4	13
4:15 PM	1	1	1	3	1	1	2	4	1	6	0	7	0	2	3	5	19
4:30 PM	0	0	0	0	1	1	0	2	1	3	0	4	0	2	0	2	8
4:45 PM	0	0	0	0	2	0	0	2	0	3	1	4	0	2	1	3	9
5:00 PM	0	0	0	0	0	0	0	0	0	2	1	3	0	3	0	3	6
5:15 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	3	1	4	5
5:30 PM	1	0	0	1	0	0	0	0	0	2	0	2	0	2	0	2	5
5:45 PM	0	0	0	0	3	0	1	4	0	3	1	4	0	3	1	4	12
Total Survey	2	1	1	4	8	2	3	13	3	25	5	33	0	20	7	27	77

Heavy Vehicle Peak Hour Summary
4:10 PM to 5:10 PM

By Approach	Northbound Airport Rd NE			Southbound Airport Rd NE			Eastbound Arndt Rd NE			Westbound Arndt Rd NE			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	3	4	7	9	8	17	20	13	33	15	22	37	47
PHF	0.25			0.56			0.71			0.54			0.62

By Movement	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	1	1	1	3	5	2	2	9	2	16	2	20	0	10	5	15	47
PHF	0.25	0.25	0.25	0.25	0.63	0.50	0.25	0.56	0.25	0.67	0.50	0.71	0.00	0.83	0.31	0.54	0.62

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	1	1	1	3	5	2	2	9	3	18	2	23	0	9	5	14	49
4:15 PM	1	1	1	3	4	2	2	8	2	14	2	18	0	9	4	13	42
4:30 PM	0	0	0	0	3	1	0	4	1	8	3	12	0	10	2	12	28
4:45 PM	1	0	0	1	2	0	0	2	0	7	3	10	0	10	2	12	25
5:00 PM	1	0	0	1	3	0	1	4	0	7	3	10	0	11	2	13	28

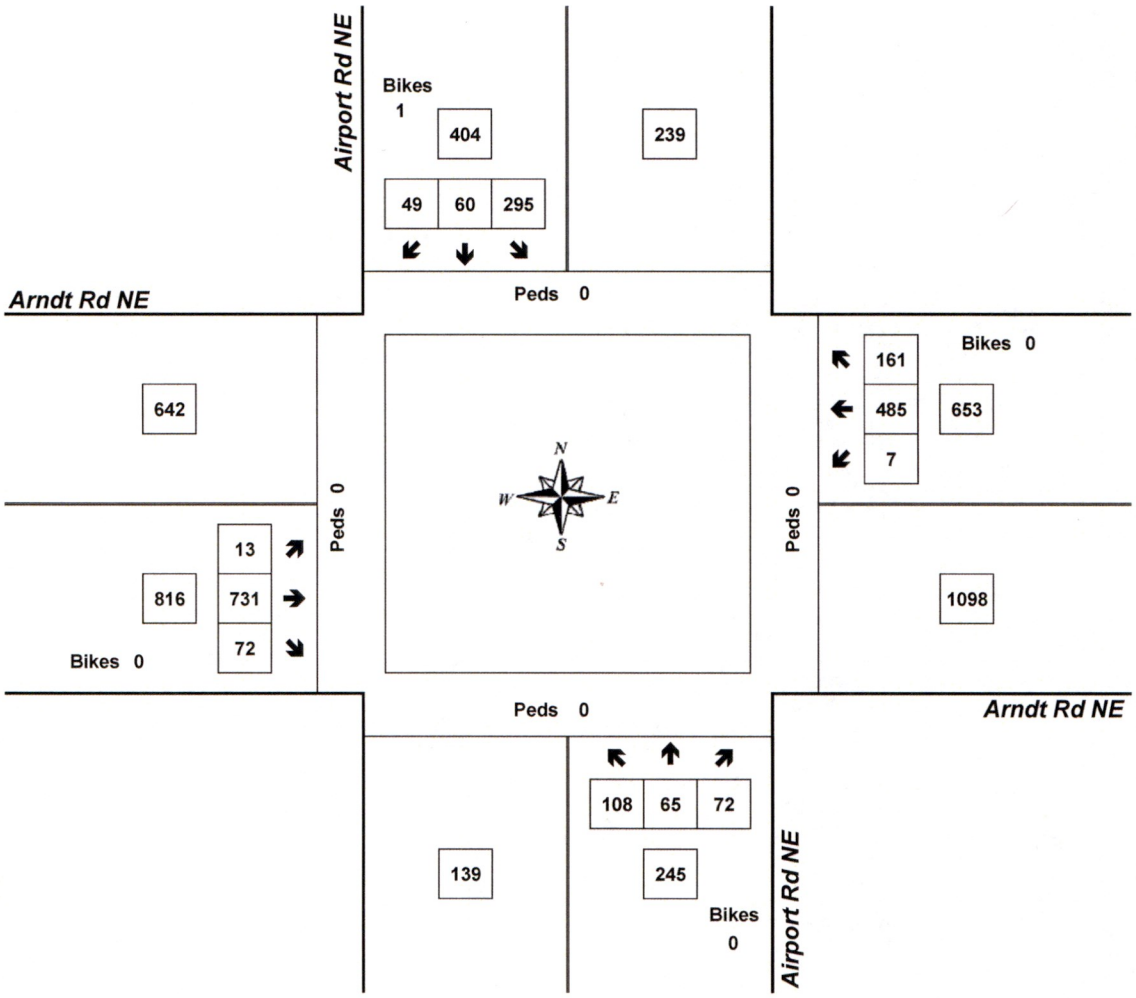
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Airport Rd NE & Arndt Rd NE

4:10 PM to 5:10 PM
Tuesday, June 06, 2017

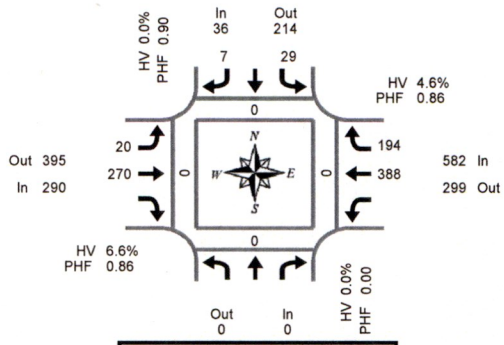


Approach	PHF	HV%	Volume
EB	0.86	2.5%	816
WB	0.82	2.3%	653
NB	0.51	1.2%	245
SB	0.80	2.2%	404
Intersection	0.89	2.2%	2,118

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
7:00 AM to 8:00 AM

Airport Rd NE & Ehlen Rd NE

Wednesday, June 07, 2017
7:00 AM to 9:00 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE			Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE			Interval Total	Pedestrians Crosswalk			
				Bikes	L	R	Bikes	L	T		Bikes	T	R	Bikes		North	South	East	West
7:00 AM				0	2	2	0	2	28		0	35	21	0	90	0	0	0	0
7:05 AM				0	2	2	0	3	21		0	31	10	0	69	0	0	0	0
7:10 AM				0	0	0	0	1	23		0	35	6	0	65	0	0	0	0
7:15 AM				0	5	1	0	1	20		0	34	12	0	73	0	0	0	0
7:20 AM				0	0	1	0	1	26		0	22	21	0	71	0	0	0	0
7:25 AM				0	3	0	0	2	21		0	43	18	0	87	0	0	0	0
7:30 AM				0	4	0	0	0	24		0	34	21	0	83	0	0	0	0
7:35 AM				0	2	0	0	0	24		0	38	15	0	79	0	0	0	0
7:40 AM				0	2	0	0	3	31		0	25	19	0	80	0	0	0	0
7:45 AM				0	3	0	0	1	25		0	32	18	0	79	0	0	0	0
7:50 AM				0	2	0	0	2	12		0	27	13	0	56	0	0	0	0
7:55 AM				0	4	1	0	4	15		0	32	20	0	76	0	0	0	0
8:00 AM				0	6	0	0	2	15		0	34	17	0	74	0	0	0	0
8:05 AM				0	2	0	0	0	29		0	21	17	0	69	0	0	0	0
8:10 AM				0	5	0	0	0	18		0	38	11	0	72	0	0	0	0
8:15 AM				0	0	0	0	0	21		0	23	6	0	50	0	0	0	0
8:20 AM				0	4	1	0	0	27		0	30	9	0	71	0	0	0	0
8:25 AM				0	7	0	0	0	18		0	29	4	1	58	0	0	0	0
8:30 AM				0	3	0	0	0	21		0	23	8	0	55	0	0	0	0
8:35 AM				0	2	0	0	1	20		0	25	9	0	57	0	0	0	0
8:40 AM				0	2	1	0	1	20		0	32	12	0	68	0	0	0	0
8:45 AM				0	2	0	0	0	19		0	22	9	0	52	0	0	0	0
8:50 AM				0	5	1	0	1	26		0	23	9	0	65	0	0	0	0
8:55 AM				0	6	0	0	0	16		0	26	8	0	56	0	0	0	0
Total Survey				0	73	10	0	25	520		0	714	313	1	1,655	0	0	0	0

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE			Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE			Interval Total	Pedestrians Crosswalk			
				Bikes	L	R	Bikes	L	T		Bikes	T	R	Bikes		North	South	East	West
7:00 AM				0	4	4	0	6	72		0	101	37	0	224	0	0	0	0
7:15 AM				0	8	2	0	4	67		0	99	51	0	231	0	0	0	0
7:30 AM				0	8	0	0	3	79		0	97	55	0	242	0	0	0	0
7:45 AM				0	9	1	0	7	52		0	91	51	0	211	0	0	0	0
8:00 AM				0	13	0	0	2	62		0	93	45	0	215	0	0	0	0
8:15 AM				0	11	1	0	0	66		0	82	19	1	179	0	0	0	0
8:30 AM				0	7	1	0	2	61		0	80	29	0	180	0	0	0	0
8:45 AM				0	13	1	0	1	61		0	71	26	0	173	0	0	0	0
Total Survey				0	73	10	0	25	520		0	714	313	1	1,655	0	0	0	0

Peak Hour Summary
7:00 AM to 8:00 AM

By Approach	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE				Total
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	
Volume	0	0	0	0	36	214	250	0	290	395	685	0	582	299	881	0	908
%HV	0.0%				0.0%				6.6%				4.6%				5.1%
PHF	0.00				0.90				0.86				0.86				0.91

Pedestrians Crosswalk			
North	South	East	West
0	0	0	0

By Movement	Northbound Airport Rd NE				Southbound Airport Rd NE			Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE			Total
				Total	L	R	Total	L	T		Total	T	R	Total	
Volume				0	29	7	36	20	270		290	388	194	582	908
%HV	NA	NA	NA	0.0%	0.0%	0.0%	0.0%	0.0%	7.0%	NA	6.6%	6.4%	1.0%	4.6%	5.1%
PHF				0.00	0.81	0.44	0.90	0.71	0.84		0.86	0.84	0.81	0.86	0.91

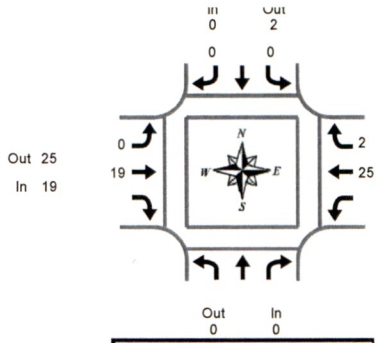
Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE			Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE			Interval Total	Pedestrians Crosswalk			
				Bikes	L	R	Bikes	L	T		Bikes	T	R	Bikes		North	South	East	West
7:00 AM				0	29	7	0	20	270		0	388	194	0	908	0	0	0	0
7:15 AM				0	38	3	0	16	260		0	380	202	0	899	0	0	0	0
7:30 AM				0	41	2	0	12	259		0	363	170	1	847	0	0	0	0
7:45 AM				0	40	3	0	11	241		0	346	144	1	785	0	0	0	0
8:00 AM				0	44	3	0	5	250		0	326	119	1	747	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Airport Rd NE & Ehlen Rd NE

Wednesday, June 07, 2017
7:00 AM to 9:00 AM

Peak Hour Summary
7:00 AM to 8:00 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE			Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE			Interval Total
				Total	L	R	Total	L	T		Total	T	R	Total	
7:00 AM				0	0	0	0	0	0		0	1	0	1	1
7:05 AM				0	0	0	0	0	2		2	1	0	1	3
7:10 AM				0	0	0	0	0	1		1	0	0	0	1
7:15 AM				0	0	0	0	0	0		0	5	0	5	5
7:20 AM				0	0	0	0	0	1		1	4	0	4	5
7:25 AM				0	0	0	0	0	2		2	4	0	4	6
7:30 AM				0	0	0	0	0	4		4	2	1	3	7
7:35 AM				0	0	0	0	0	2		2	0	0	0	2
7:40 AM				0	0	0	0	0	2		2	1	1	2	4
7:45 AM				0	0	0	0	0	2		2	3	0	3	5
7:50 AM				0	0	0	0	0	2		2	1	0	1	3
7:55 AM				0	0	0	0	0	1		1	3	0	3	4
8:00 AM				0	0	0	0	0	4		4	5	0	5	9
8:05 AM				0	0	0	0	0	4		4	1	0	1	5
8:10 AM				0	0	0	0	0	1		1	4	0	4	5
8:15 AM				0	0	0	0	0	2		2	2	0	2	4
8:20 AM				0	1	0	1	0	2		2	2	0	2	5
8:25 AM				0	0	0	0	0	2		2	3	0	3	5
8:30 AM				0	0	0	0	0	3		3	2	0	2	5
8:35 AM				0	0	0	0	0	0		0	4	0	4	4
8:40 AM				0	1	1	2	0	2		2	4	0	4	8
8:45 AM				0	0	0	0	0	1		1	1	0	1	2
8:50 AM				0	1	0	1	0	2		2	1	0	1	4
8:55 AM				0	0	0	0	0	0		0	3	0	3	3
Total Survey				0	3	1	4	0	42		42	57	2	59	105

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE			Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE			Interval Total
				Total	L	R	Total	L	T		Total	T	R	Total	
7:00 AM				0	0	0	0	0	3		3	2	0	2	5
7:15 AM				0	0	0	0	0	3		3	13	0	13	16
7:30 AM				0	0	0	0	0	8		8	3	2	5	13
7:45 AM				0	0	0	0	0	5		5	7	0	7	12
8:00 AM				0	0	0	0	0	9		9	10	0	10	19
8:15 AM				0	1	0	1	0	6		6	7	0	7	14
8:30 AM				0	1	1	2	0	5		5	10	0	10	17
8:45 AM				0	1	0	1	0	3		3	5	0	5	9
Total Survey				0	3	1	4	0	42		42	57	2	59	105

Heavy Vehicle Peak Hour Summary
7:00 AM to 8:00 AM

By Approach	Northbound Airport Rd NE			Southbound Airport Rd NE			Eastbound Ehlen Rd NE			Westbound Ehlen Rd NE			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	0	2	2	19	25	44	27	19	46	46
PHF	0.00			0.00			0.59			0.52			0.64

By Movement	Northbound Airport Rd NE				Southbound Airport Rd NE			Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE			Total
				Total	L	R	Total	L	T		Total	T	R	Total	
Volume				0	0	0	0	0	19		19	25	2	27	46
PHF				0.00	0.00	0.00	0.00	0.00	0.59		0.59	0.48	0.25	0.52	0.64

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE			Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE			Interval Total
				Total	L	R	Total	L	T		Total	T	R	Total	
7:00 AM				0	0	0	0	0	19		19	25	2	27	46
7:15 AM				0	0	0	0	0	25		25	33	2	35	60
7:30 AM				0	1	0	1	0	28		28	27	2	29	58
7:45 AM				0	2	1	3	0	25		25	34	0	34	62
8:00 AM				0	3	1	4	0	23		23	32	0	32	59

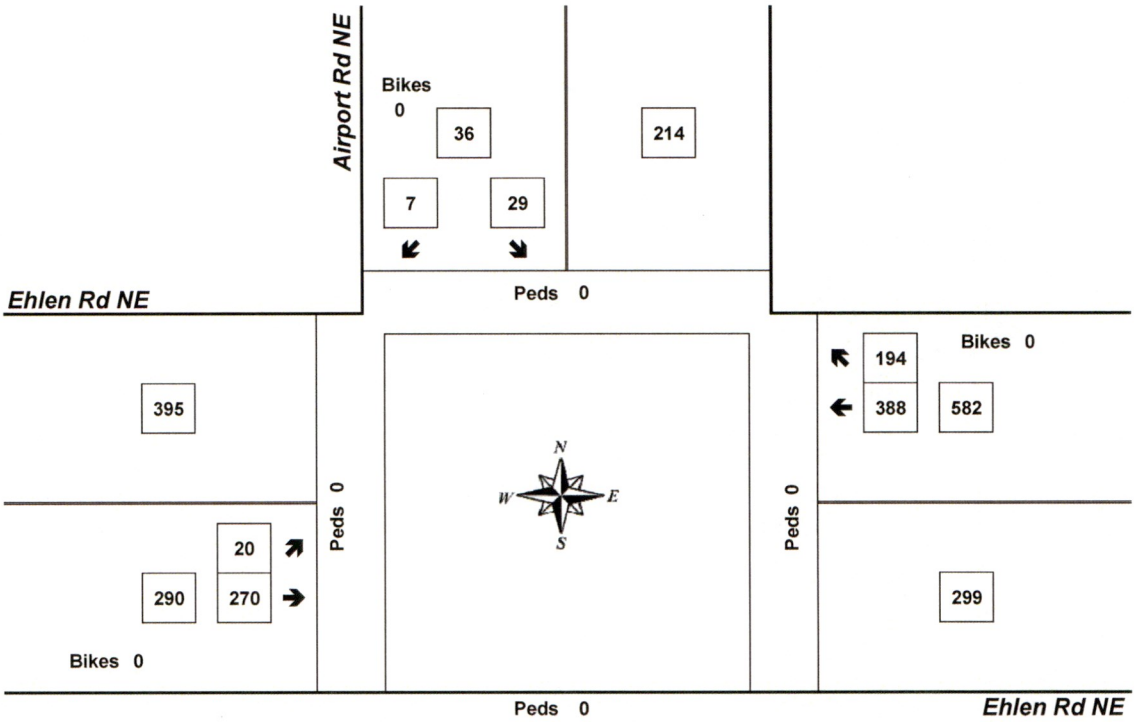
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Airport Rd NE & Ehlen Rd NE

7:00 AM to 8:00 AM
Wednesday, June 07, 2017



Bikes
0

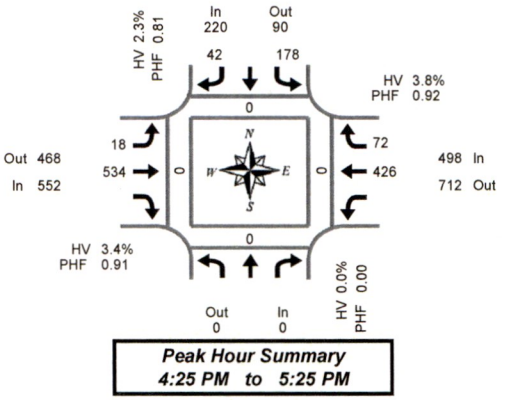
Approach	PHF	HV%	Volume
EB	0.86	6.6%	290
WB	0.86	4.6%	582
NB	0.00	0.0%	0
SB	0.90	0.0%	36
Intersection	0.91	5.1%	908

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Airport Rd NE & Ehlen Rd NE

Tuesday, June 06, 2017
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Airport Rd NE			Bikes	Southbound Airport Rd NE			Bikes	Eastbound Ehlen Rd NE			Bikes	Westbound Ehlen Rd NE			Bikes	Interval Total	Pedestrians Crosswalk			
					L		R		L	T			T	R				North	South	East	West
4:00 PM				0	9		3	0	3	47		0	33	8	0		103	0	0	0	0
4:05 PM				0	15		4	0	2	47		0	33	8	0		109	0	0	0	0
4:10 PM				0	10		2	0	1	42		0	21	4	0		80	0	0	0	0
4:15 PM				0	7		1	0	0	48		0	37	3	0		96	0	0	0	0
4:20 PM				0	10		2	0	2	44		0	35	5	0		98	0	0	0	0
4:25 PM				0	12		2	0	0	41		0	34	7	0		96	0	0	0	0
4:30 PM				0	15		5	0	1	47		0	45	8	0		121	0	0	0	0
4:35 PM				0	15		9	0	3	44		0	34	8	0		113	0	0	0	0
4:40 PM				0	16		5	0	3	39		0	33	2	0		98	0	0	0	0
4:45 PM				0	18		5	0	0	40		0	37	5	0		105	0	0	0	0
4:50 PM				0	18		2	0	1	58		0	37	4	0		120	0	0	0	0
4:55 PM				0	6		2	0	4	49		0	26	7	0		94	0	0	0	0
5:00 PM				0	11		4	0	0	30		0	37	4	0		86	0	0	0	0
5:05 PM				0	19		1	0	2	44		0	38	11	0		115	0	0	0	0
5:10 PM				0	17		2	0	1	53		0	31	7	0		111	0	0	0	0
5:15 PM				0	15		3	0	2	38		0	37	4	0		99	0	0	0	0
5:20 PM				0	16		2	0	1	51		0	37	5	0		112	0	0	0	0
5:25 PM				0	6		1	0	0	32		0	29	1	0		69	0	0	0	0
5:30 PM				0	8		0	0	3	64		0	31	4	1		110	0	0	0	0
5:35 PM				0	14		3	0	2	44		0	31	3	0		97	0	0	0	0
5:40 PM				0	12		1	0	0	33		0	23	3	0		72	0	0	0	0
5:45 PM				0	7		1	0	3	52		0	17	2	0		82	0	0	0	0
5:50 PM				0	9		1	0	3	54		0	32	9	0		108	0	0	0	0
5:55 PM				0	10		1	0	1	36		0	25	4	0		77	0	0	0	0
Total Survey				0	295		62	0	38	1,077		0	773	126	1		2,371	0	0	0	0

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Airport Rd NE			Bikes	Southbound Airport Rd NE			Bikes	Eastbound Ehlen Rd NE			Bikes	Westbound Ehlen Rd NE			Bikes	Interval Total	Pedestrians Crosswalk			
					L		R		L	T			T	R				North	South	East	West
4:00 PM				0	34		9	0	6	136		0	87	20	0		292	0	0	0	0
4:15 PM				0	29		5	0	2	133		0	106	15	0		290	0	0	0	0
4:30 PM				0	46		19	0	7	130		0	112	18	0		332	0	0	0	0
4:45 PM				0	42		9	0	5	147		0	100	16	0		319	0	0	0	0
5:00 PM				0	47		7	0	3	127		0	106	22	0		312	0	0	0	0
5:15 PM				0	37		6	0	3	121		0	103	10	0		280	0	0	0	0
5:30 PM				0	34		4	0	5	141		0	85	10	1		279	0	0	0	0
5:45 PM				0	26		3	0	7	142		0	74	15	0		267	0	0	0	0
Total Survey				0	295		62	0	38	1,077		0	773	126	1		2,371	0	0	0	0

Peak Hour Summary
4:25 PM to 5:25 PM

By Approach	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	0	0	0	0	220	90	310	0	552	468	1,020	0	498	712	1,210	0	1,270	0	0	0	0
%HV	0.0%				2.3%				3.4%				3.8%				3.4%				
PHF	0.00				0.81				0.91				0.92				0.96				

By Movement	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE			Total
				Total	L		R	Total	L	T		Total	T	R	Total	
Volume				0	178		42	220	18	534		552	426	72	498	1,270
%HV	NA	NA	NA	0.0%	1.7%	NA	4.8%	2.3%	11.1%	3.2%	NA	3.4%	4.2%	1.4%	3.8%	3.4%
PHF				0.00	0.86		0.55	0.81	0.64	0.91		0.91	0.94	0.78	0.92	0.96

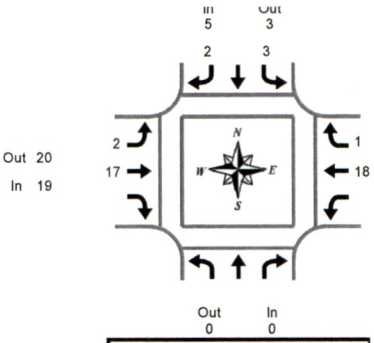
Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Airport Rd NE			Bikes	Southbound Airport Rd NE			Bikes	Eastbound Ehlen Rd NE			Bikes	Westbound Ehlen Rd NE			Bikes	Interval Total	Pedestrians Crosswalk			
					L		R		L	T			T	R				North	South	East	West
4:00 PM				0	151		42	0	20	546		0	405	69	0		1,233	0	0	0	0
4:15 PM				0	164		40	0	17	537		0	424	71	0		1,253	0	0	0	0
4:30 PM				0	172		41	0	18	525		0	421	66	0		1,243	0	0	0	0
4:45 PM				0	160		26	0	16	536		0	394	58	1		1,190	0	0	0	0
5:00 PM				0	144		20	0	18	531		0	368	57	1		1,138	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Airport Rd NE & Ehlen Rd NE

Tuesday, June 06, 2017
4:00 PM to 6:00 PM

Peak Hour Summary
4:25 PM to 5:25 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE			Interval Total
				Total	L		R	Total	L	T		Total	T	R	Total	
4:00 PM				0	0		1	1	0	3		3	3	0	3	7
4:05 PM				0	0		0	0	0	4		4	0	0	0	4
4:10 PM				0	0		0	0	0	3		3	0	0	0	3
4:15 PM				0	0		0	0	0	8		8	3	0	3	11
4:20 PM				0	1		0	1	1	3		4	2	0	2	7
4:25 PM				0	0		0	0	0	4		4	1	0	1	5
4:30 PM				0	0		0	0	0	1		1	1	0	1	2
4:35 PM				0	0		1	1	1	3		4	2	0	2	7
4:40 PM				0	0		0	0	0	1		1	2	0	2	3
4:45 PM				0	1		0	1	0	0		0	1	0	1	2
4:50 PM				0	0		0	0	0	0		0	3	0	3	3
4:55 PM				0	0		0	0	0	1		1	1	0	1	2
5:00 PM				0	0		0	0	0	1		1	1	0	1	2
5:05 PM				0	1		0	1	0	1		1	2	1	3	5
5:10 PM				0	0		0	0	1	2		3	2	0	2	5
5:15 PM				0	0		1	1	0	0		0	1	0	1	2
5:20 PM				0	1		0	1	0	3		3	1	0	1	5
5:25 PM				0	0		0	0	0	0		0	1	0	1	1
5:30 PM				0	0		0	0	0	5		5	0	0	0	5
5:35 PM				0	0		1	1	0	2		2	0	0	0	3
5:40 PM				0	0		0	0	0	3		3	1	0	1	4
5:45 PM				0	0		0	0	0	2		2	0	0	0	2
5:50 PM				0	0		0	0	0	2		2	1	0	1	3
5:55 PM				0	1		0	1	0	1		1	0	0	0	2
Total Survey				0	5		4	9	3	53		56	29	1	30	95

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE			Interval Total
				Total	L		R	Total	L	T		Total	T	R	Total	
4:00 PM				0	0		1	1	0	10		10	3	0	3	14
4:15 PM				0	1		0	1	1	15		16	6	0	6	23
4:30 PM				0	0		1	1	1	5		6	5	0	5	12
4:45 PM				0	1		0	1	0	1		1	5	0	5	7
5:00 PM				0	1		0	1	1	4		5	5	1	6	12
5:15 PM				0	1		1	2	0	3		3	3	0	3	8
5:30 PM				0	0		1	1	0	10		10	1	0	1	12
5:45 PM				0	1		0	1	0	5		5	1	0	1	7
Total Survey				0	5		4	9	3	53		56	29	1	30	95

Heavy Vehicle Peak Hour Summary
4:25 PM to 5:25 PM

By Approach	Northbound Airport Rd NE			Southbound Airport Rd NE			Eastbound Ehlen Rd NE			Westbound Ehlen Rd NE			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	5	3	8	19	20	39	19	20	39	43
PHF	0.00			0.63			0.53			0.79			0.77

By Movement	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE			Total
				Total	L		R	Total	L	T		Total	T	R	Total	
Volume				0	3		2	5	2	17		19	18	1	19	43
PHF				0.00	0.75		0.50	0.63	0.50	0.53		0.53	0.75	0.25	0.79	0.77

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE			Interval Total
				Total	L		R	Total	L	T		Total	T	R	Total	
4:00 PM				0	2		2	4	2	31		33	19	0	19	56
4:15 PM				0	3		1	4	3	25		28	21	1	22	54
4:30 PM				0	3		2	5	2	13		15	18	1	19	39
4:45 PM				0	3		2	5	1	18		19	14	1	15	39
5:00 PM				0	3		2	5	1	22		23	10	1	11	39

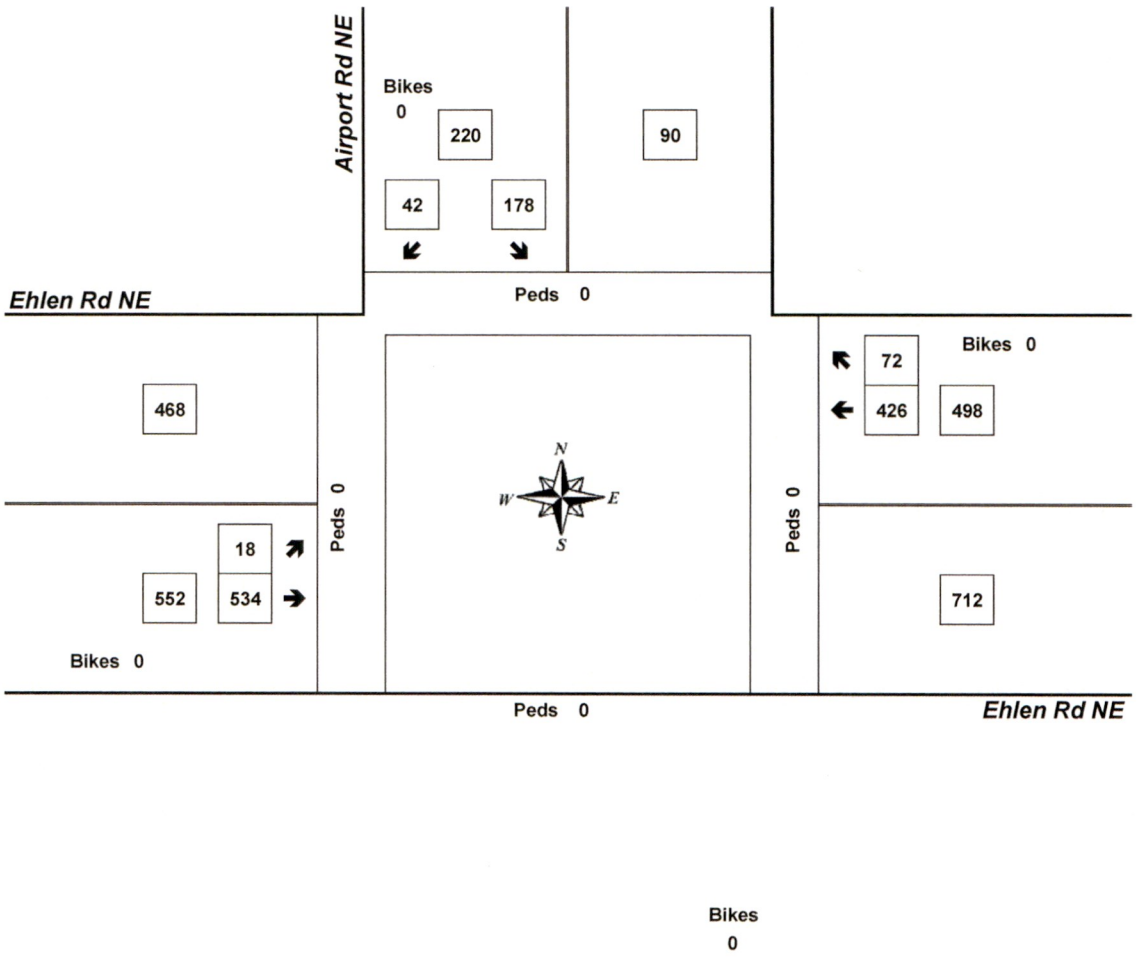
Peak Hour Summary

All Traffic Data Services Inc

Clay Carney
(503) 833-2740

Airport Rd NE & Ehlen Rd NE

4:25 PM to 5:25 PM
Tuesday, June 06, 2017



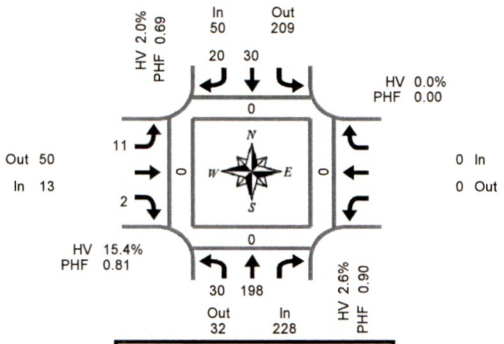
Approach	PHF	HV%	Volume
EB	0.91	3.4%	552
WB	0.92	3.8%	498
NB	0.00	0.0%	0
SB	0.81	2.3%	220
Intersection	0.96	3.4%	1,270

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Airport Rd NE & Keil Rd NE

Wednesday, June 07, 2017
7:00 AM to 9:00 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE			Eastbound Keil Rd NE			Westbound Keil Rd NE			Interval Total	Pedestrians Crosswalk			
	L	T		Bikes	T	R	Bikes	L		R	Bikes		Bikes		North	South	East	West
7:00 AM	2	21		0	0	1	0	2		0	0		0	26	0	0	0	0
7:05 AM	0	13		0	4	2	0	0		0	0		0	19	0	0	0	0
7:10 AM	0	10		0	2	1	0	0		0	0		0	13	0	0	0	0
7:15 AM	2	15		0	3	0	0	2		0	0		0	22	0	0	0	0
7:20 AM	0	19		0	1	1	0	1		1	0		0	23	0	0	0	0
7:25 AM	4	18		0	1	3	0	0		0	0		0	26	0	0	0	0
7:30 AM	3	16		0	1	1	0	1		0	0		0	22	0	0	0	0
7:35 AM	0	18		0	2	2	0	2		0	0		0	24	0	0	0	0
7:40 AM	2	22		0	3	2	0	0		0	0		0	29	0	0	0	0
7:45 AM	2	19		0	2	2	0	2		0	0		0	27	0	0	0	0
7:50 AM	3	13		0	4	0	0	0		0	0		0	20	0	0	0	0
7:55 AM	6	18		0	3	4	0	0		0	0		0	31	0	0	0	0
8:00 AM	5	14		0	4	2	0	1		1	0		0	27	0	0	0	0
8:05 AM	2	16		0	3	2	0	2		0	0		0	25	0	0	0	0
8:10 AM	1	10		0	3	1	0	0		0	0		0	15	0	0	0	0
8:15 AM	0	6		0	2	1	0	0		2	0		0	11	0	0	0	0
8:20 AM	1	8		0	4	0	0	0		0	0		0	13	0	0	0	0
8:25 AM	1	5		0	3	0	0	0		1	0		0	10	0	0	0	0
8:30 AM	0	6		0	2	0	0	1		0	0		0	9	0	0	0	0
8:35 AM	1	12		0	2	0	0	1		2	0		0	18	0	0	0	0
8:40 AM	1	15		0	2	2	0	1		0	0		0	21	0	0	0	0
8:45 AM	1	7		0	1	0	0	0		0	0		0	9	0	0	0	0
8:50 AM	2	8		0	2	1	0	0		2	0		0	15	0	0	0	0
8:55 AM	0	6		0	6	0	0	1		0	0		0	13	0	0	0	0
Total Survey	39	315		0	60	28	0	17		9	0		0	468	0	0	0	0

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE			Eastbound Keil Rd NE			Westbound Keil Rd NE			Interval Total	Pedestrians Crosswalk			
	L	T		Bikes	T	R	Bikes	L		R	Bikes		Bikes		North	South	East	West
7:00 AM	2	44		0	6	4	0	2		0	0		0	58	0	0	0	0
7:15 AM	6	52		0	5	4	0	3		1	0		0	71	0	0	0	0
7:30 AM	5	56		0	6	5	0	3		0	0		0	75	0	0	0	0
7:45 AM	11	50		0	9	6	0	2		0	0		0	78	0	0	0	0
8:00 AM	8	40		0	10	5	0	3		1	0		0	67	0	0	0	0
8:15 AM	2	19		0	9	1	0	0		3	0		0	34	0	0	0	0
8:30 AM	2	33		0	6	2	0	3		2	0		0	48	0	0	0	0
8:45 AM	3	21		0	9	1	0	1		2	0		0	37	0	0	0	0
Total Survey	39	315		0	60	28	0	17		9	0		0	468	0	0	0	0

Peak Hour Summary
7:15 AM to 8:15 AM

By Approach	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Keil Rd NE				Westbound Keil Rd NE				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	228	32	260	0	50	209	259	0	13	50	63	0	0	0	0	0	291	0	0	0	0
%HV	2.6%				2.0%				15.4%				0.0%				3.1%				
PHF	0.90				0.69				0.81				0.00				0.88				

By Movement	Northbound Airport Rd NE				Southbound Airport Rd NE			Eastbound Keil Rd NE			Westbound Keil Rd NE			Total
	L	T		Total	T	R	Total	L		R	Total			Total	
Volume	30	198		228	30	20	50	11		2	13			0	291
%HV	0.0%	3.0%	NA	2.6%	NA	0.0%	5.0%	2.0%	18.2%	NA	0.0%	15.4%	NA	NA	NA	0.0%	3.1%
PHF	0.54	0.84		0.90		0.68	0.63	0.69	0.69		0.50	0.81				0.00	0.88

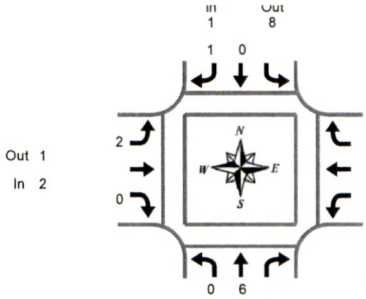
Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE			Eastbound Keil Rd NE			Westbound Keil Rd NE			Interval Total	Pedestrians Crosswalk			
	L	T		Bikes	T	R	Bikes	L		R	Bikes		Bikes		North	South	East	West
7:00 AM	24	202		0	26	19	0	10		1	0		0	282	0	0	0	0
7:15 AM	30	198		0	30	20	0	11		2	0		0	291	0	0	0	0
7:30 AM	26	165		0	34	17	0	8		4	0		0	254	0	0	0	0
7:45 AM	23	142		0	34	14	0	8		6	0		0	227	0	0	0	0
8:00 AM	15	113		0	34	9	0	7		8	0		0	186	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
7:15 AM to 8:15 AM

Airport Rd NE & Keil Rd NE

Wednesday, June 07, 2017
7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Keil Rd NE				Westbound Keil Rd NE				Interval Total
	L	T		Total	T	R	Total		L	R	Total				Total		
7:00 AM	0	0		0	0	0	0		0	0	0				0		0
7:05 AM	0	0		0	0	0	0		0	0	0				0		0
7:10 AM	0	0		0	0	0	0		0	0	0				0		0
7:15 AM	0	1		1	0	0	0		0	0	0				0		1
7:20 AM	0	0		0	0	0	0		0	0	0				0		0
7:25 AM	0	0		0	0	0	0		0	0	0				0		0
7:30 AM	0	1		1	0	0	0		0	0	0				0		1
7:35 AM	0	0		0	0	0	0		0	0	0				0		0
7:40 AM	0	1		1	0	0	0		0	0	0				0		1
7:45 AM	0	0		0	0	0	0		2	0	2				0		2
7:50 AM	0	2		2	0	0	0		0	0	0				0		2
7:55 AM	0	0		0	0	1	1		0	0	0				0		1
8:00 AM	0	0		0	0	0	0		0	0	0				0		0
8:05 AM	0	1		1	0	0	0		0	0	0				0		1
8:10 AM	0	0		0	0	0	0		0	0	0				0		0
8:15 AM	0	0		0	0	0	0		0	1	1				0		1
8:20 AM	0	0		0	0	0	0		0	0	0				0		0
8:25 AM	0	0		0	0	0	0		0	0	0				0		0
8:30 AM	0	0		0	0	0	0		1	0	1				0		1
8:35 AM	0	1		1	1	0	1		0	1	1				0		3
8:40 AM	0	0		0	0	0	0		0	0	0				0		0
8:45 AM	0	0		0	0	0	0		0	0	0				0		0
8:50 AM	0	0		0	1	0	1		0	0	0				0		1
8:55 AM	0	0		0	0	0	0		0	0	0				0		0
Total Survey	0	7		7	2	1	3		3	2	5				0		15

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Keil Rd NE				Westbound Keil Rd NE				Interval Total
	L	T		Total	T	R	Total		L	R	Total				Total		
7:00 AM	0	0		0	0	0	0		0	0	0				0		0
7:15 AM	0	1		1	0	0	0		0	0	0				0		1
7:30 AM	0	2		2	0	0	0		0	0	0				0		2
7:45 AM	0	2		2	0	1	1		2	0	2				0		5
8:00 AM	0	1		1	0	0	0		0	0	0				0		1
8:15 AM	0	0		0	0	0	0		0	1	1				0		1
8:30 AM	0	1		1	1	0	1		1	1	2				0		4
8:45 AM	0	0		0	1	0	1		0	0	0				0		1
Total Survey	0	7		7	2	1	3		3	2	5				0		15

Heavy Vehicle Peak Hour Summary
7:15 AM to 8:15 AM

By Approach	Northbound Airport Rd NE			Southbound Airport Rd NE			Eastbound Keil Rd NE			Westbound Keil Rd NE			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	6	0	6	1	8	9	2	1	3	0	0	0	9
PHF	0.50			0.25			0.25			0.00			0.45

By Movement	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Keil Rd NE				Westbound Keil Rd NE				Total
	L	T		Total	T	R	Total		L	R	Total				Total		
Volume	0	6		6	0	1	1		2	0	2				0		9
PHF	0.00	0.50		0.50	0.00	0.25	0.25		0.25	0.00	0.25				0.00		0.45

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Keil Rd NE				Westbound Keil Rd NE				Interval Total
	L	T		Total	T	R	Total		L	R	Total				Total		
7:00 AM	0	5		5	0	1	1		2	0	2				0		8
7:15 AM	0	6		6	0	1	1		2	0	2				0		9
7:30 AM	0	5		5	0	1	1		2	1	3				0		9
7:45 AM	0	4		4	1	1	2		3	2	5				0		11
8:00 AM	0	2		2	2	0	2		1	2	3				0		7

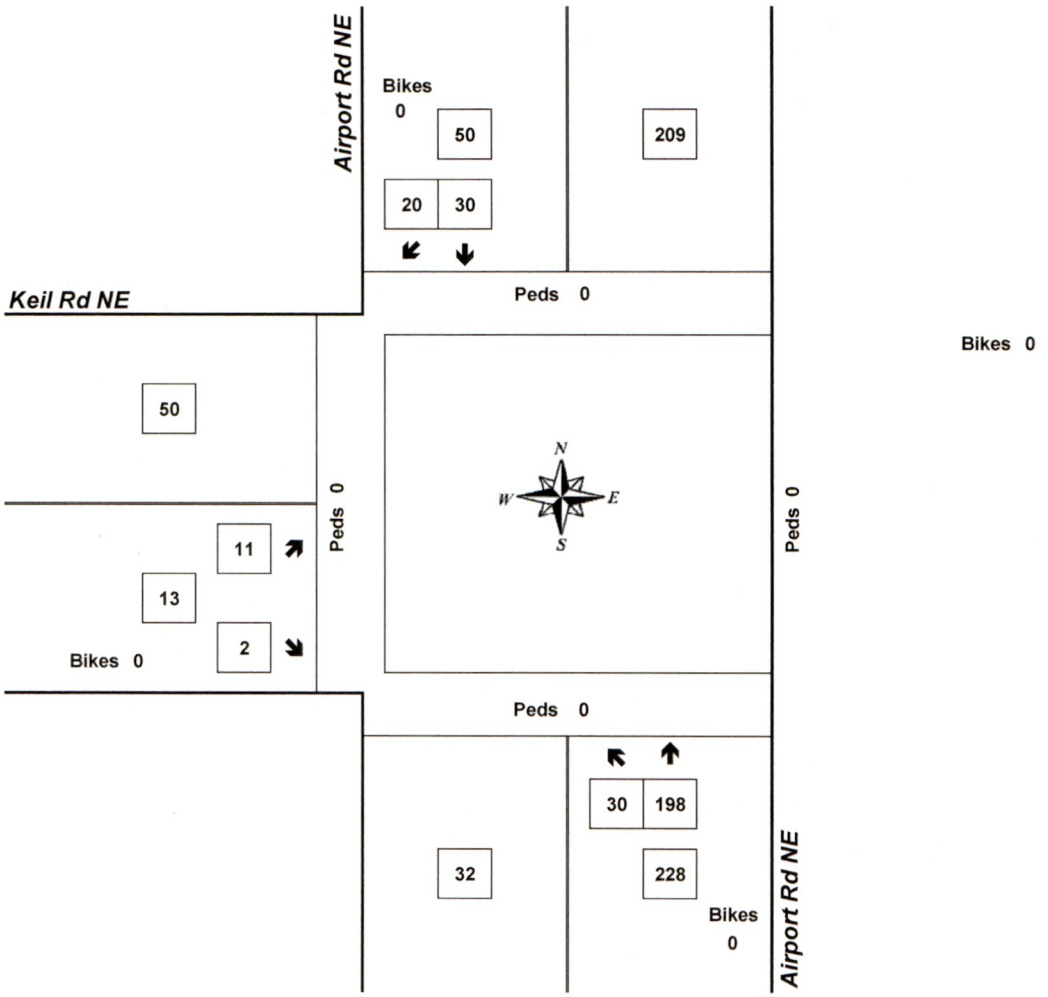
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Airport Rd NE & Keil Rd NE

7:15 AM to 8:15 AM
Wednesday, June 07, 2017



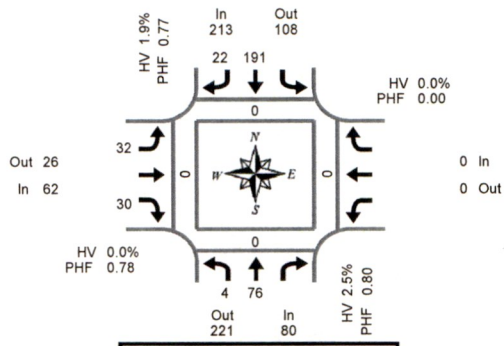
Approach	PHF	HV%	Volume
EB	0.81	15.4%	13
WB	0.00	0.0%	0
NB	0.90	2.6%	228
SB	0.69	2.0%	50
Intersection	0.88	3.1%	291

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Airport Rd NE & Keil Rd NE

Tuesday, June 06, 2017
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Keil Rd NE				Westbound Keil Rd NE				Interval	Pedestrians Crosswalk			
Time	L	T		Bikes	T	R		Bikes	L		R	Bikes				Bikes	Total	North	South	East	West
4:00 PM	1	6		0	20	0		0	4		2	0				0	33	0	0	0	0
4:05 PM	1	8		0	6	0		0	2		2	0				0	19	0	0	0	0
4:10 PM	0	3		0	12	1		0	2		1	0				0	19	0	0	0	0
4:15 PM	0	5		0	7	1		0	2		1	0				0	16	0	0	0	0
4:20 PM	0	8		0	9	0		0	0		1	0				0	18	0	0	0	0
4:25 PM	0	6		0	15	4		0	2		2	0				0	29	0	0	0	0
4:30 PM	0	9		0	20	2		0	4		2	0				0	37	0	0	0	0
4:35 PM	0	9		0	22	6		0	2		7	0				0	46	0	0	0	0
4:40 PM	0	4		0	13	5		0	1		1	0				0	24	0	0	0	0
4:45 PM	0	4		0	21	1		0	3		3	0				0	32	0	0	0	0
4:50 PM	0	6		0	13	0		0	1		2	0				0	22	0	0	0	0
4:55 PM	1	9		0	12	1		0	2		2	0				0	27	0	0	0	0
5:00 PM	2	4		0	14	0		0	7		1	0				0	28	0	0	0	0
5:05 PM	1	8		0	17	3		0	2		4	0				0	35	0	0	0	0
5:10 PM	0	6		0	16	0		0	4		2	0				0	28	0	0	0	0
5:15 PM	0	3		0	19	0		0	4		3	0				0	29	0	0	0	0
5:20 PM	0	4		0	10	0		0	3		0	0				0	17	0	0	0	0
5:25 PM	0	3		0	7	0		0	3		4	0				0	17	0	0	0	0
5:30 PM	0	7		0	15	2		0	1		1	0				0	26	0	0	0	0
5:35 PM	0	4		0	10	2		0	4		0	0				0	20	0	0	0	0
5:40 PM	1	1		0	11	1		0	0		1	0				0	15	0	0	0	0
5:45 PM	1	4		0	9	0		0	0		0	0				0	14	0	0	0	0
5:50 PM	0	6		0	12	0		0	2		2	0				0	22	0	0	0	0
5:55 PM	0	6		0	8	0		0	1		1	0				0	16	0	0	0	0
Total Survey	8	133		0	318	29		0	56		45	0				0	589	0	0	0	0

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Keil Rd NE				Westbound Keil Rd NE				Interval	Pedestrians Crosswalk			
Time	L	T		Bikes	T	R		Bikes	L		R	Bikes				Bikes	Total	North	South	East	West
4:00 PM	2	17		0	38	1		0	8		5	0				0	71	0	0	0	0
4:15 PM	0	19		0	31	5		0	4		4	0				0	63	0	0	0	0
4:30 PM	0	22		0	55	13		0	7		10	0				0	107	0	0	0	0
4:45 PM	1	19		0	46	2		0	6		7	0				0	81	0	0	0	0
5:00 PM	3	18		0	47	3		0	13		7	0				0	91	0	0	0	0
5:15 PM	0	10		0	36	0		0	10		7	0				0	63	0	0	0	0
5:30 PM	1	12		0	36	5		0	5		2	0				0	61	0	0	0	0
5:45 PM	1	16		0	29	0		0	3		3	0				0	52	0	0	0	0
Total Survey	8	133		0	318	29		0	56		45	0				0	589	0	0	0	0

Peak Hour Summary
4:20 PM to 5:20 PM

By Approach	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Keil Rd NE				Westbound Keil Rd NE				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	80	221	301	0	213	108	321	0	62	26	88	0	0	0	0	0	355	0	0	0	0
%HV	2.5%				1.9%				0.0%				0.0%				1.7%				
PHF	0.80				0.77				0.78				0.00				0.79				

By Movement	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Keil Rd NE				Westbound Keil Rd NE				Total
	L	T		Total		T	R	Total	L		R	Total				Total	
Volume	4	76		80		191	22	213	32		30	62				0	355
%HV	25.0%	1.3%	NA	2.5%	NA	2.1%	0.0%	1.9%	0.0%	NA	0.0%	0.0%	NA	NA	NA	0.0%	1.7%
PHF	0.25	0.79		0.80		0.84	0.42	0.77	0.62		0.68	0.78				0.00	0.79

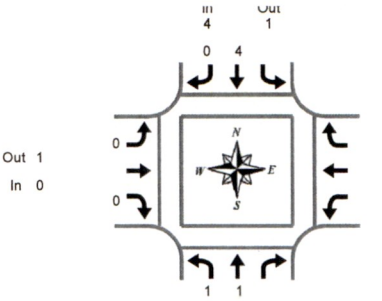
Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Keil Rd NE				Westbound Keil Rd NE				Interval	Pedestrians Crosswalk			
Time	L	T		Bikes	T	R		Bikes	L		R	Bikes				Bikes	Total	North	South	East	West
4:00 PM	3	77		0	170	21		0	25		26	0				0	322	0	0	0	0
4:15 PM	4	78		0	179	23		0	30		28	0				0	342	0	0	0	0
4:30 PM	4	69		0	184	18		0	36		31	0				0	342	0	0	0	0
4:45 PM	5	59		0	165	10		0	34		23	0				0	296	0	0	0	0
5:00 PM	5	56		0	148	8		0	31		19	0				0	267	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Airport Rd NE & Keil Rd NE

Tuesday, June 06, 2017
4:00 PM to 6:00 PM

Peak Hour Summary
4:20 PM to 5:20 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Keil Rd NE				Westbound Keil Rd NE				Interval Total
	L	T		Total	T	R	Total		L	R	Total				Total		
4:00 PM	0	0		0	1	0	1		0	1	1				0		2
4:05 PM	0	1		1	0	0	0		0	0	0				0		1
4:10 PM	0	0		0	0	0	0		0	0	0				0		0
4:15 PM	0	1		1	1	0	1		0	0	0				0		2
4:20 PM	0	1		1	0	0	0		0	0	0				0		1
4:25 PM	0	0		0	0	0	0		0	0	0				0		0
4:30 PM	0	0		0	1	0	1		0	0	0				0		1
4:35 PM	0	0		0	0	0	0		0	0	0				0		0
4:40 PM	0	0		0	0	0	0		0	0	0				0		0
4:45 PM	0	0		0	1	0	1		0	0	0				0		1
4:50 PM	0	0		0	0	0	0		0	0	0				0		0
4:55 PM	0	0		0	0	0	0		0	0	0				0		0
5:00 PM	0	0		0	0	0	0		0	0	0				0		0
5:05 PM	1	0		1	1	0	1		0	0	0				0		2
5:10 PM	0	0		0	0	0	0		0	0	0				0		0
5:15 PM	0	0		0	1	0	1		0	0	0				0		1
5:20 PM	0	0		0	0	0	0		1	0	1				0		1
5:25 PM	0	0		0	0	0	0		0	0	0				0		0
5:30 PM	0	0		0	0	0	0		0	0	0				0		0
5:35 PM	0	0		0	1	0	1		0	0	0				0		1
5:40 PM	0	0		0	0	0	0		0	0	0				0		0
5:45 PM	0	0		0	0	0	0		0	0	0				0		0
5:50 PM	0	0		0	1	0	1		0	0	0				0		1
5:55 PM	0	0		0	0	0	0		0	0	0				0		0
Total Survey	1	3		4	8	0	8		1	1	2				0		14

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Keil Rd NE				Westbound Keil Rd NE				Interval Total
	L	T		Total	T	R	Total		L	R	Total				Total		
4:00 PM	0	1		1	1	0	1		0	1	1				0		3
4:15 PM	0	2		2	1	0	1		0	0	0				0		3
4:30 PM	0	0		0	1	0	1		0	0	0				0		1
4:45 PM	0	0		0	1	0	1		0	0	0				0		1
5:00 PM	1	0		1	1	0	1		0	0	0				0		2
5:15 PM	0	0		0	1	0	1		1	0	1				0		2
5:30 PM	0	0		0	1	0	1		0	0	0				0		1
5:45 PM	0	0		0	1	0	1		0	0	0				0		1
Total Survey	1	3		4	8	0	8		1	1	2				0		14

Heavy Vehicle Peak Hour Summary
4:20 PM to 5:20 PM

By Approach	Northbound Airport Rd NE			Southbound Airport Rd NE			Eastbound Keil Rd NE			Westbound Keil Rd NE			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	2	4	6	4	1	5	0	1	1	0	0	0	6
PHF	0.50			0.50			0.00			0.00			0.50

By Movement	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Keil Rd NE				Westbound Keil Rd NE				Total
	L	T		Total	T	R	Total		L	R	Total				Total		
Volume	1	1		2	4	0	4		0	0	0				0		6
PHF	0.25	0.25		0.50	0.50	0.00	0.50		0.00	0.00	0.00				0.00		0.50

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Airport Rd NE				Southbound Airport Rd NE				Eastbound Keil Rd NE				Westbound Keil Rd NE				Interval Total
	L	T		Total	T	R	Total		L	R	Total				Total		
4:00 PM	0	3		3	4	0	4		0	1	1				0		8
4:15 PM	1	2		3	4	0	4		0	0	0				0		7
4:30 PM	1	0		1	4	0	4		1	0	1				0		6
4:45 PM	1	0		1	4	0	4		1	0	1				0		6
5:00 PM	1	0		1	4	0	4		1	0	1				0		6

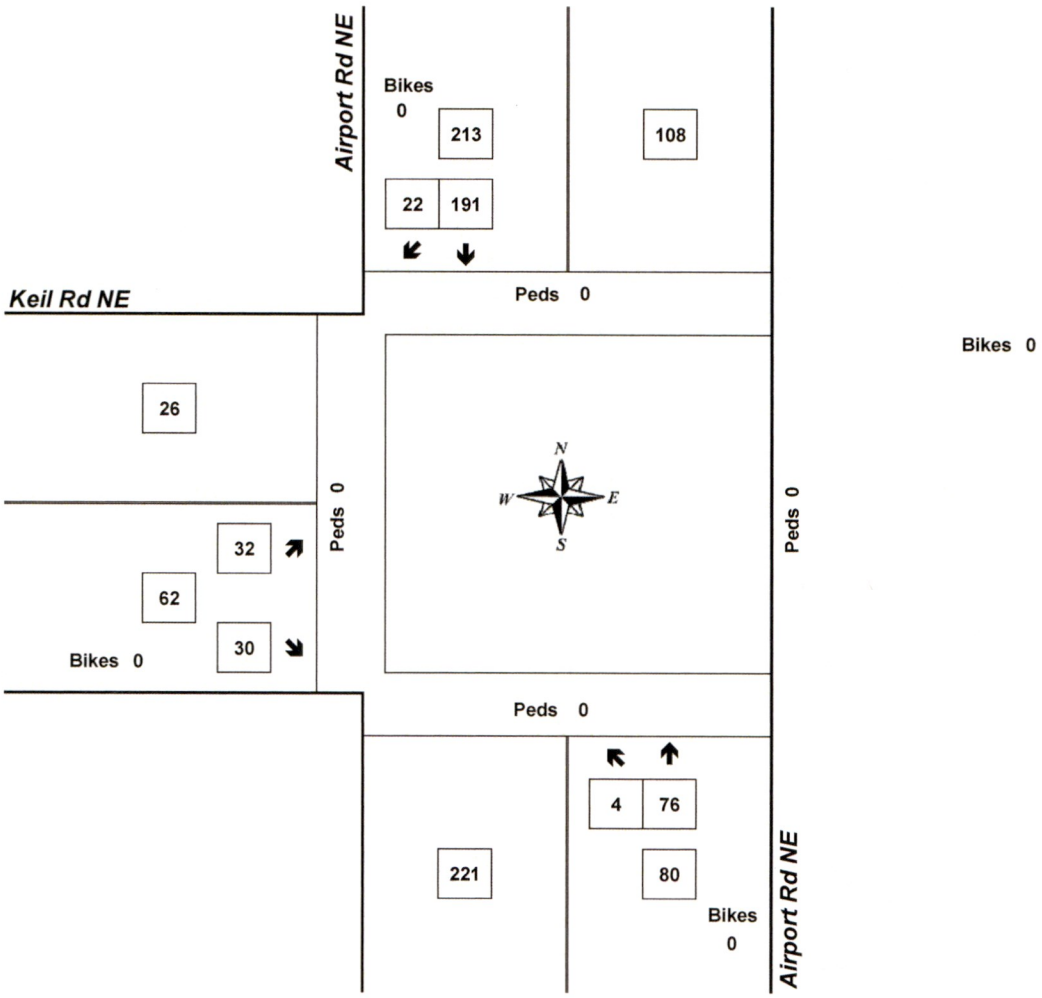
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Airport Rd NE & Keil Rd NE

4:20 PM to 5:20 PM
Tuesday, June 06, 2017



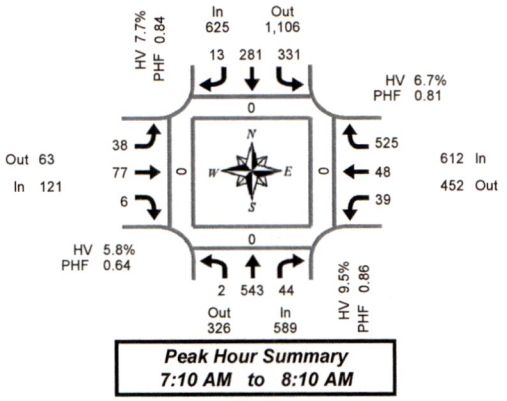
Approach	PHF	HV%	Volume
EB	0.78	0.0%	62
WB	0.00	0.0%	0
NB	0.80	2.5%	80
SB	0.77	1.9%	213
Intersection	0.79	1.7%	355

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Hwy 551 & Arndt Rd NE

Wednesday, June 07, 2017
7:00 AM to 9:00 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	0	35	3	0	19	18	2	0	0	15	0	0	6	6	24	0	128	0	0	0	0
7:05 AM	0	31	4	0	22	21	2	0	3	6	1	0	4	6	26	0	126	0	0	0	0
7:10 AM	0	51	2	0	12	25	1	0	3	5	0	0	6	6	33	0	144	0	0	0	0
7:15 AM	0	47	7	0	27	22	1	0	1	6	0	0	5	5	29	0	150	0	0	0	0
7:20 AM	0	56	3	0	20	25	1	0	4	3	2	0	5	1	47	0	167	0	0	0	0
7:25 AM	0	48	5	0	21	14	0	0	1	13	0	0	2	5	44	0	153	0	0	0	0
7:30 AM	0	51	2	0	26	34	1	0	5	15	1	0	6	3	63	0	207	0	0	0	0
7:35 AM	1	55	3	0	21	28	1	1	3	9	0	0	4	6	45	0	176	0	0	0	0
7:40 AM	0	49	5	0	38	24	1	0	3	3	1	0	3	3	57	0	187	0	0	0	0
7:45 AM	1	54	4	0	43	20	1	0	4	5	0	0	2	2	42	0	178	0	0	0	0
7:50 AM	0	29	5	0	35	21	2	0	8	9	1	0	0	3	38	0	151	0	0	0	0
7:55 AM	0	39	2	0	16	18	2	0	2	5	1	0	1	3	38	0	127	0	0	0	0
8:00 AM	0	38	2	0	34	30	2	0	4	0	0	0	2	6	41	0	159	0	0	0	0
8:05 AM	0	26	4	0	38	20	0	0	0	4	0	0	3	5	48	0	148	0	0	0	0
8:10 AM	0	38	1	0	27	16	1	0	6	1	0	0	1	2	48	0	141	0	0	0	0
8:15 AM	0	52	3	0	33	18	0	0	5	8	1	0	2	1	30	0	153	0	0	0	0
8:20 AM	0	27	3	0	28	21	0	0	3	1	1	0	2	0	53	0	139	0	0	0	0
8:25 AM	0	31	3	0	26	12	2	0	5	6	0	0	3	2	29	0	119	0	0	0	0
8:30 AM	1	33	1	0	28	21	0	0	1	6	1	0	2	4	40	0	138	0	0	0	0
8:35 AM	1	37	4	0	17	13	3	0	2	3	0	0	3	5	42	0	130	0	0	0	0
8:40 AM	1	32	2	0	29	14	3	0	3	2	4	0	4	3	31	0	128	0	0	0	0
8:45 AM	0	31	4	0	21	22	2	0	4	3	0	0	3	1	32	0	123	0	0	0	0
8:50 AM	1	29	3	0	19	11	2	0	5	3	1	0	4	5	38	0	121	0	0	0	0
8:55 AM	0	22	2	0	9	14	1	0	4	6	0	0	1	2	34	0	95	0	0	0	0
Total Survey	6	941	77	0	609	482	31	1	79	137	15	0	74	85	952	0	3,488	0	0	0	0

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	0	117	9	0	53	64	5	0	6	26	1	0	16	18	83	0	398	0	0	0	0
7:15 AM	0	151	15	0	68	61	2	0	6	22	2	0	12	11	120	0	470	0	0	0	0
7:30 AM	1	155	10	0	85	86	3	1	11	27	2	0	13	12	165	0	570	0	0	0	0
7:45 AM	1	122	11	0	94	59	5	0	14	19	2	0	3	8	118	0	456	0	0	0	0
8:00 AM	0	102	7	0	99	66	3	0	10	5	0	0	6	13	137	0	448	0	0	0	0
8:15 AM	0	110	9	0	87	51	2	0	13	15	2	0	7	3	112	0	411	0	0	0	0
8:30 AM	3	102	7	0	74	48	6	0	6	11	5	0	9	12	113	0	396	0	0	0	0
8:45 AM	1	82	9	0	49	47	5	0	13	12	1	0	8	8	104	0	339	0	0	0	0
Total Survey	6	941	77	0	609	482	31	1	79	137	15	0	74	85	952	0	3,488	0	0	0	0

Peak Hour Summary
7:10 AM to 8:10 AM

By Approach	Northbound Hwy 551				Southbound Hwy 551				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Total
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	
Volume	589	326	915	0	625	1,106	1,731	1	121	63	184	0	612	452	1,064	0	1,947
%HV	9.5%				7.7%				5.8%				6.7%				7.8%
PHF	0.86				0.84				0.64				0.81				0.85

Pedestrians Crosswalk			
North	South	East	West
0	0	0	0

By Movement	Northbound Hwy 551				Southbound Hwy 551				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	2	543	44	589	331	281	13	625	38	77	6	121	39	48	525	612	1,947
%HV	0.0%	9.2%	13.6%	9.5%	6.6%	9.3%	0.0%	7.7%	5.3%	6.5%	0.0%	5.8%	10.3%	6.3%	6.5%	6.7%	7.8%
PHF	0.25	0.86	0.73	0.86	0.71	0.82	0.54	0.84	0.63	0.52	0.50	0.64	0.61	0.86	0.80	0.81	0.85

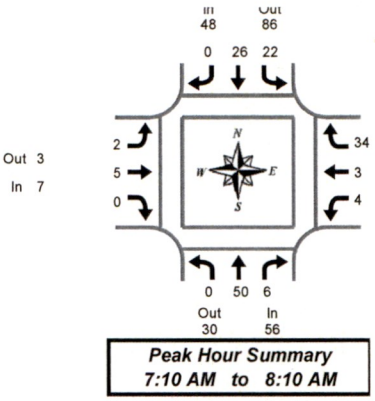
Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	2	545	45	0	300	270	15	1	37	94	7	0	44	49	486	0	1,894	0	0	0	0
7:15 AM	2	530	43	0	346	272	13	1	41	73	6	0	34	44	540	0	1,944	0	0	0	0
7:30 AM	2	489	37	0	365	262	13	1	48	66	6	0	29	36	532	0	1,885	0	0	0	0
7:45 AM	4	436	34	0	354	224	16	0	43	50	9	0	25	36	480	0	1,711	0	0	0	0
8:00 AM	4	396	32	0	309	212	16	0	42	43	8	0	30	36	466	0	1,594	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Hwy 551 & Arndt Rd NE

Wednesday, June 07, 2017
7:00 AM to 9:00 AM

Peak Hour Summary
7:10 AM to 8:10 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start	Northbound Hwy 551				Southbound Hwy 551				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval
Time	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	Total
7:00 AM	0	2	0	2	3	3	0	6	0	0	0	0	0	0	3	3	11
7:05 AM	0	4	0	4	3	2	0	5	0	0	1	1	0	0	3	3	13
7:10 AM	0	1	0	1	1	2	0	3	0	0	0	0	0	0	2	2	6
7:15 AM	0	5	0	5	2	2	0	4	0	0	0	0	2	0	4	6	15
7:20 AM	0	7	0	7	0	4	0	4	0	0	0	0	0	0	5	5	16
7:25 AM	0	5	1	6	2	2	0	4	0	0	0	0	1	0	4	5	15
7:30 AM	0	4	0	4	4	2	0	6	0	4	0	4	1	1	4	6	20
7:35 AM	0	5	1	6	0	2	0	2	1	0	0	1	0	0	4	4	13
7:40 AM	0	7	2	9	3	2	0	5	0	0	0	0	0	0	0	0	14
7:45 AM	0	3	0	3	4	1	0	5	0	0	0	0	0	0	4	4	12
7:50 AM	0	5	1	6	4	0	0	4	0	1	0	1	0	0	0	0	11
7:55 AM	0	4	0	4	0	2	0	2	0	0	0	0	0	0	1	1	7
8:00 AM	0	1	0	1	2	4	0	6	1	0	0	1	0	2	3	5	13
8:05 AM	0	3	1	4	0	3	0	3	0	0	0	0	0	0	3	3	10
8:10 AM	0	4	0	4	5	2	0	7	1	0	0	1	0	0	1	1	13
8:15 AM	0	7	0	7	3	4	0	7	0	0	1	1	0	0	3	3	18
8:20 AM	0	0	0	0	1	2	0	3	0	0	0	0	0	0	1	1	4
8:25 AM	0	5	1	6	2	1	1	4	0	0	0	0	1	1	3	5	15
8:30 AM	0	2	1	3	2	5	0	7	0	0	0	0	0	0	0	0	10
8:35 AM	0	7	0	7	3	2	1	6	0	0	0	0	0	2	2	4	17
8:40 AM	1	6	0	7	2	1	0	3	0	0	0	0	0	1	2	3	13
8:45 AM	0	3	0	3	4	6	0	10	1	0	0	1	1	0	2	3	17
8:50 AM	0	3	2	5	2	1	0	3	0	1	1	2	1	0	0	1	11
8:55 AM	0	4	0	4	4	1	0	5	0	0	0	0	0	1	3	4	13
Total Survey	1	97	10	108	56	56	2	114	4	6	3	13	7	8	57	72	307

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start	Northbound Hwy 551				Southbound Hwy 551				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval
Time	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	Total
7:00 AM	0	7	0	7	7	7	0	14	0	0	1	1	0	0	8	8	30
7:15 AM	0	17	1	18	4	8	0	12	0	0	0	0	3	0	13	16	46
7:30 AM	0	16	3	19	7	6	0	13	1	4	0	5	1	1	8	10	47
7:45 AM	0	12	1	13	8	3	0	11	0	1	0	1	0	0	5	5	30
8:00 AM	0	8	1	9	7	9	0	16	2	0	0	2	0	2	7	9	36
8:15 AM	0	12	1	13	6	7	1	14	0	0	1	1	1	1	7	9	37
8:30 AM	1	15	1	17	7	8	1	16	0	0	0	0	0	3	4	7	40
8:45 AM	0	10	2	12	10	8	0	18	1	1	1	3	2	1	5	8	41
Total Survey	1	97	10	108	56	56	2	114	4	6	3	13	7	8	57	72	307

Heavy Vehicle Peak Hour Summary
7:10 AM to 8:10 AM

By Approach	Northbound Hwy 551			Southbound Hwy 551			Eastbound Arndt Rd NE			Westbound Arndt Rd NE			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	56	30	86	48	86	134	7	3	10	41	33	74	152
PHF	0.74			0.86			0.35			0.64			0.75

By Movement	Northbound Hwy 551				Southbound Hwy 551				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	50	6	56	22	26	0	48	2	5	0	7	4	3	34	41	152
PHF	0.00	0.74	0.50	0.74	0.50	0.72	0.00	0.86	0.50	0.31	0.00	0.35	0.33	0.38	0.65	0.64	0.75

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start	Northbound Hwy 551				Southbound Hwy 551				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval
Time	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	Total
7:00 AM	0	52	5	57	26	24	0	50	1	5	1	7	4	1	34	39	153
7:15 AM	0	53	6	59	26	26	0	52	3	5	0	8	4	3	33	40	159
7:30 AM	0	48	6	54	28	25	1	54	3	5	1	9	2	4	27	33	150
7:45 AM	1	47	4	52	28	27	2	57	2	1	1	4	1	6	23	30	143
8:00 AM	1	45	5	51	30	32	2	64	3	1	2	6	3	7	23	33	154

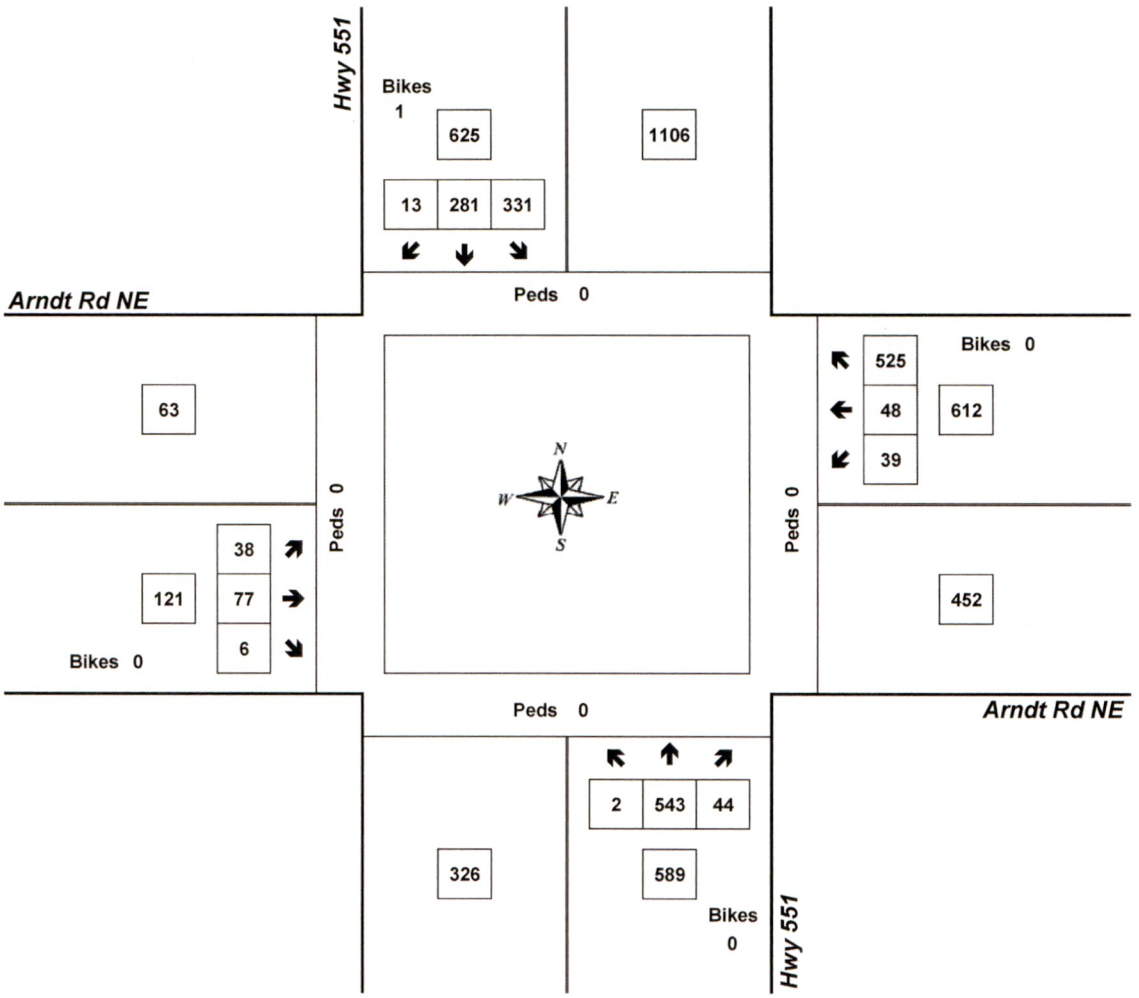
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Hwy 551 & Arndt Rd NE

7:10 AM to 8:10 AM
Wednesday, June 07, 2017



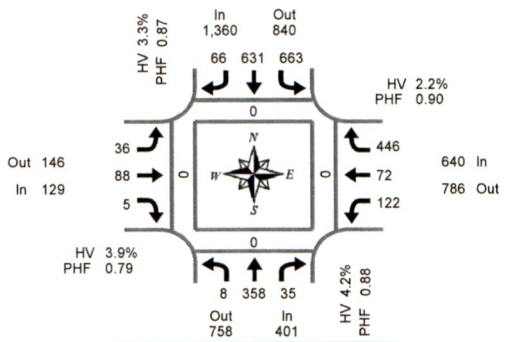
Approach	PHF	HV%	Volume
EB	0.64	5.8%	121
WB	0.81	6.7%	612
NB	0.86	9.5%	589
SB	0.84	7.7%	625
Intersection	0.85	7.8%	1,947

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
4:15 PM to 5:15 PM

Hwy 551 & Arndt Rd NE

Tuesday, June 06, 2017
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	28	3	0	34	60	5	0	5	15	0	0	7	7	26	0	190	0	0	0	0
4:05 PM	1	24	1	0	44	52	2	0	2	11	3	0	4	4	33	0	181	0	0	0	0
4:10 PM	0	21	7	0	52	63	7	0	2	4	2	0	4	5	43	0	210	0	0	0	0
4:15 PM	1	36	2	0	73	70	6	0	2	5	0	0	12	6	36	0	249	0	0	0	0
4:20 PM	2	28	0	0	56	50	6	0	1	8	0	0	10	5	35	0	201	0	0	0	0
4:25 PM	0	42	3	0	63	62	4	0	3	8	0	0	11	3	39	0	238	0	0	0	0
4:30 PM	2	24	3	0	63	44	3	0	8	12	1	0	12	10	36	0	218	0	0	0	0
4:35 PM	0	29	3	0	55	54	3	0	4	3	1	0	14	9	33	0	208	0	0	0	0
4:40 PM	1	43	3	0	42	48	8	0	3	8	1	0	10	6	48	0	221	0	0	0	0
4:45 PM	0	24	6	0	65	44	5	0	0	5	0	0	11	10	29	0	199	0	0	0	0
4:50 PM	1	13	6	0	37	47	7	0	2	8	0	0	5	5	36	0	167	0	0	0	0
4:55 PM	0	34	1	0	57	46	10	0	4	3	1	0	13	5	32	0	206	0	0	0	0
5:00 PM	0	25	4	0	61	49	6	0	3	8	0	0	9	6	38	0	209	0	0	0	0
5:05 PM	1	31	3	0	34	50	6	0	1	10	0	0	10	5	38	0	189	0	0	0	0
5:10 PM	0	29	1	0	57	67	2	0	5	10	1	0	5	2	46	0	225	0	0	0	0
5:15 PM	0	33	2	0	54	47	5	0	1	14	2	0	3	7	37	0	205	0	0	0	0
5:20 PM	0	24	4	0	55	78	2	0	2	10	0	0	0	5	28	0	208	0	0	0	0
5:25 PM	1	34	4	0	48	54	4	0	3	7	1	0	3	2	30	0	191	0	0	0	0
5:30 PM	0	31	4	0	67	52	4	0	4	7	6	0	2	7	29	0	213	0	0	0	0
5:35 PM	0	24	3	0	68	53	2	0	7	7	1	0	3	7	23	0	198	0	0	0	0
5:40 PM	1	31	9	0	49	57	4	0	1	7	0	0	5	4	30	0	198	0	0	0	0
5:45 PM	1	23	5	0	35	60	5	0	3	8	2	0	3	7	26	0	178	0	0	0	0
5:50 PM	2	19	5	0	61	47	4	0	6	4	0	0	2	5	29	0	184	0	0	0	0
5:55 PM	0	25	5	0	50	57	3	0	1	10	0	0	3	1	25	0	180	0	0	0	0
Total Survey	14	675	87	0	1,280	1,311	113	0	73	192	22	0	161	133	805	0	4,866	0	0	0	0

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	1	73	11	0	130	175	14	0	9	30	5	0	15	16	102	0	581	0	0	0	0
4:15 PM	3	106	5	0	192	182	16	0	6	21	0	0	33	14	110	0	688	0	0	0	0
4:30 PM	3	96	9	0	160	146	14	0	15	23	3	0	36	25	117	0	647	0	0	0	0
4:45 PM	1	71	13	0	159	137	22	0	6	16	1	0	29	20	97	0	572	0	0	0	0
5:00 PM	1	85	8	0	152	166	14	0	9	28	1	0	24	13	122	0	623	0	0	0	0
5:15 PM	1	91	10	0	157	179	11	0	6	31	3	0	6	14	95	0	604	0	0	0	0
5:30 PM	1	86	16	0	184	162	10	0	12	21	7	0	10	18	82	0	609	0	0	0	0
5:45 PM	3	67	15	0	146	164	12	0	10	22	2	0	8	13	80	0	542	0	0	0	0
Total Survey	14	675	87	0	1,280	1,311	113	0	73	192	22	0	161	133	805	0	4,866	0	0	0	0

Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound Hwy 551				Southbound Hwy 551				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Total
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	
Volume	401	758	1,159	0	1,360	840	2,200	0	129	146	275	0	640	786	1,426	0	2,530
%HV	4.2%				3.3%				3.9%				2.2%				3.2%
PHF	0.88				0.87				0.79				0.90				0.92

Pedestrians Crosswalk			
North	South	East	West
0	0	0	0

By Movement	Northbound Hwy 551				Southbound Hwy 551				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	8	358	35	401	663	631	66	1,360	36	88	5	129	122	72	446	640	2,530
%HV	0.0%	4.5%	2.9%	4.2%	2.3%	4.0%	7.6%	3.3%	0.0%	5.7%	0.0%	3.9%	4.9%	1.4%	1.6%	2.2%	3.2%
PHF	0.50	0.84	0.58	0.88	0.86	0.87	0.72	0.87	0.60	0.79	0.42	0.79	0.82	0.72	0.91	0.90	0.92

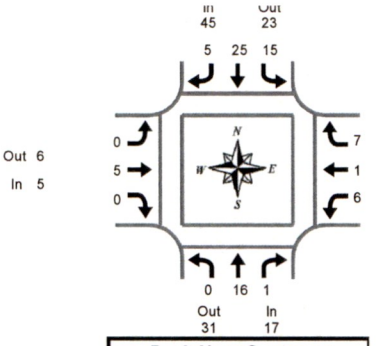
Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	8	346	38	0	641	640	66	0	36	90	9	0	113	75	426	0	2,488	0	0	0	0
4:15 PM	8	358	35	0	663	631	66	0	36	88	5	0	122	72	446	0	2,530	0	0	0	0
4:30 PM	6	343	40	0	628	628	61	0	36	98	8	0	95	72	431	0	2,446	0	0	0	0
4:45 PM	4	333	47	0	652	644	57	0	33	96	12	0	69	65	396	0	2,408	0	0	0	0
5:00 PM	6	329	49	0	639	671	47	0	37	102	13	0	48	58	379	0	2,378	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Hwy 551 & Arndt Rd NE

Tuesday, June 06, 2017
4:00 PM to 6:00 PM

Peak Hour Summary
4:15 PM to 5:15 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	3	0	3	2	6	0	8	1	0	0	1	0	0	1	1	13
4:05 PM	0	0	0	0	3	3	0	6	0	1	0	1	1	0	0	1	8
4:10 PM	0	1	0	1	1	2	1	4	0	0	0	0	0	0	1	1	6
4:15 PM	0	3	0	3	2	2	1	5	0	0	0	0	1	0	0	1	9
4:20 PM	0	2	0	2	3	6	1	10	0	2	0	2	1	0	0	1	15
4:25 PM	0	1	1	2	1	3	0	4	0	1	0	1	3	1	0	4	11
4:30 PM	0	1	0	1	1	2	0	3	0	0	0	0	0	0	0	0	4
4:35 PM	0	0	0	0	1	2	0	3	0	1	0	1	0	0	0	0	4
4:40 PM	0	1	0	1	1	1	1	3	0	0	0	0	0	0	2	2	6
4:45 PM	0	1	0	1	3	1	0	4	0	1	0	1	1	0	0	1	7
4:50 PM	0	1	0	1	0	2	1	3	0	0	0	0	0	0	2	2	6
4:55 PM	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
5:00 PM	0	1	0	1	1	2	1	4	0	0	0	0	0	0	1	1	6
5:05 PM	0	1	0	1	2	0	0	2	0	0	0	0	0	0	1	1	4
5:10 PM	0	2	0	2	0	4	0	4	0	0	0	0	0	0	1	1	7
5:15 PM	0	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	2
5:20 PM	0	1	0	1	0	4	1	5	0	0	0	0	0	2	0	2	8
5:25 PM	0	1	0	1	0	3	0	3	0	0	0	0	0	0	1	1	5
5:30 PM	0	0	0	0	0	3	0	3	0	0	0	0	0	0	4	4	7
5:35 PM	0	2	0	2	2	1	0	3	0	0	0	0	0	1	0	1	6
5:40 PM	0	0	0	0	2	1	0	3	0	0	0	0	0	0	0	0	3
5:45 PM	0	0	0	0	0	2	0	2	0	1	0	1	0	2	0	2	5
5:50 PM	0	2	0	2	4	2	0	6	0	0	0	0	0	0	1	1	9
5:55 PM	0	0	0	0	0	4	0	4	0	0	0	0	0	0	2	2	6
Total Survey	0	27	1	28	30	56	7	93	1	7	0	8	7	6	17	30	159

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	4	0	4	6	11	1	18	1	1	0	2	1	0	2	3	27
4:15 PM	0	6	1	7	6	11	2	19	0	3	0	3	5	1	0	6	35
4:30 PM	0	2	0	2	3	5	1	9	0	1	0	1	0	0	2	2	14
4:45 PM	0	4	0	4	3	3	1	7	0	1	0	1	1	0	2	3	15
5:00 PM	0	4	0	4	3	6	1	10	0	0	0	0	0	0	3	3	17
5:15 PM	0	3	0	3	1	7	1	9	0	0	0	0	0	2	1	3	15
5:30 PM	0	2	0	2	4	5	0	9	0	0	0	0	0	1	4	5	16
5:45 PM	0	2	0	2	4	8	0	12	0	1	0	1	0	2	3	5	20
Total Survey	0	27	1	28	30	56	7	93	1	7	0	8	7	6	17	30	159

Heavy Vehicle Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound Hwy 551			Southbound Hwy 551			Eastbound Arndt Rd NE			Westbound Arndt Rd NE			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	17	31	48	45	23	68	5	6	11	14	21	35	81
PHF	0.61			0.59			0.42			0.58			0.58

By Movement	Northbound Hwy 551				Southbound Hwy 551				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	16	1	17	15	25	5	45	0	5	0	5	6	1	7	14	81
PHF	0.00	0.67	0.25	0.61	0.63	0.57	0.63	0.59	0.00	0.42	0.00	0.42	0.30	0.25	0.44	0.58	0.58

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Arndt Rd NE				Westbound Arndt Rd NE				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	16	1	17	18	30	5	53	1	6	0	7	7	1	6	14	91
4:15 PM	0	16	1	17	15	25	5	45	0	5	0	5	6	1	7	14	81
4:30 PM	0	13	0	13	10	21	4	35	0	2	0	2	1	2	8	11	61
4:45 PM	0	13	0	13	11	21	3	35	0	1	0	1	1	3	10	14	63
5:00 PM	0	11	0	11	12	26	2	40	0	1	0	1	0	5	11	16	68

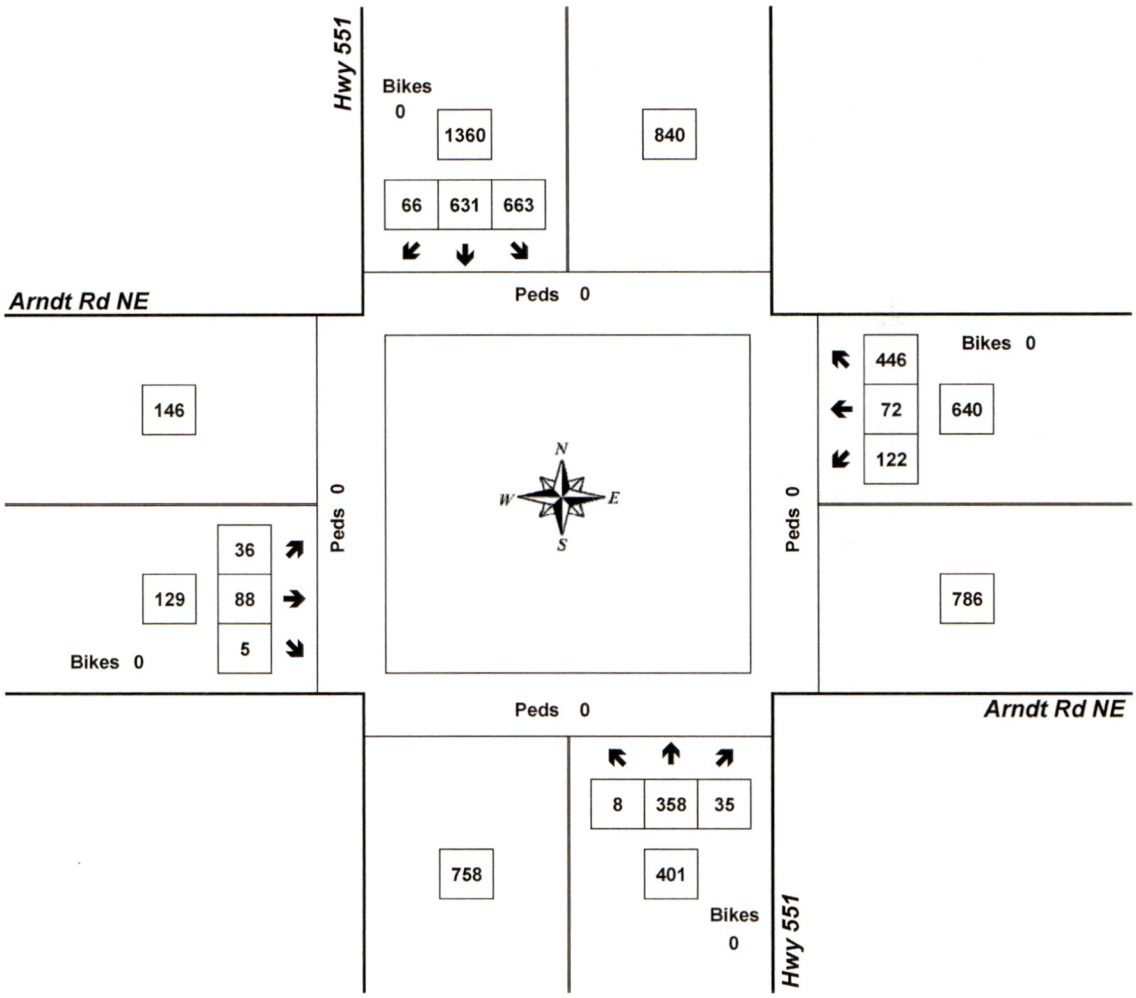
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Hwy 551 & Arndt Rd NE

4:15 PM to 5:15 PM
Tuesday, June 06, 2017

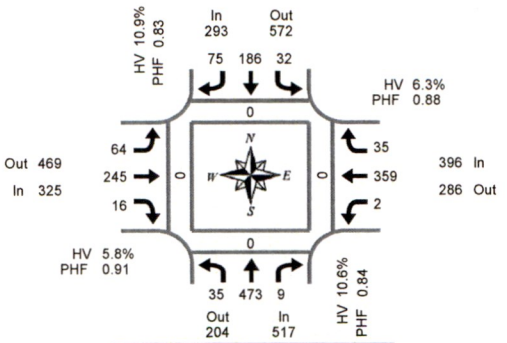


Approach	PHF	HV%	Volume
EB	0.79	3.9%	129
WB	0.90	2.2%	640
NB	0.88	4.2%	401
SB	0.87	3.3%	1,360
Intersection	0.92	3.2%	2,530

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
7:00 AM to 8:00 AM

Hwy 551 & Ehlen Rd NE

Wednesday, June 07, 2017
7:00 AM to 9:00 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	4	35	0	0	1	16	8	0	9	23	2	0	0	26	2	0	126	0	0	0	0
7:05 AM	3	31	1	0	2	11	5	0	4	21	1	0	1	39	2	0	121	0	0	0	0
7:10 AM	4	45	1	0	2	20	4	0	2	25	2	0	0	27	4	0	136	0	0	0	0
7:15 AM	2	38	1	0	2	20	6	0	8	17	0	0	0	35	3	0	132	0	0	0	0
7:20 AM	1	49	0	0	4	17	7	0	7	17	2	0	0	16	2	0	122	0	0	0	0
7:25 AM	3	32	1	0	7	13	5	0	8	17	1	0	0	43	3	0	133	0	0	0	0
7:30 AM	3	52	0	0	0	12	5	0	6	21	0	0	1	32	3	0	135	0	0	0	0
7:35 AM	2	56	0	0	4	32	6	0	2	20	1	0	0	25	5	0	153	0	0	0	0
7:40 AM	4	35	1	0	6	10	4	0	4	35	0	0	0	34	4	0	137	0	0	0	0
7:45 AM	4	43	1	0	1	19	6	0	8	18	1	0	0	29	2	0	132	0	0	0	0
7:50 AM	4	31	1	0	1	8	10	0	3	11	1	0	0	21	4	0	95	0	0	0	0
7:55 AM	1	26	2	0	2	8	9	0	3	20	5	0	0	32	1	0	109	0	0	0	0
8:00 AM	2	26	0	0	4	14	2	0	4	15	0	0	1	24	3	0	95	0	0	0	0
8:05 AM	0	25	0	0	6	18	7	0	5	21	3	0	1	24	4	0	114	0	0	0	0
8:10 AM	2	39	0	0	3	23	4	0	5	18	2	0	0	27	7	0	130	0	0	0	0
8:15 AM	0	19	0	0	1	11	2	0	4	21	1	0	0	27	3	0	89	0	0	0	0
8:20 AM	1	25	0	0	2	16	2	0	2	20	2	0	0	15	3	0	88	0	0	0	0
8:25 AM	5	26	0	0	0	15	6	0	4	17	1	0	1	38	5	0	118	0	0	0	0
8:30 AM	1	21	0	0	2	14	2	0	12	25	2	0	0	17	4	0	100	0	0	0	0
8:35 AM	6	35	0	0	4	7	9	0	4	16	0	0	0	24	2	0	107	0	0	0	0
8:40 AM	3	21	1	0	1	10	6	0	3	19	1	0	2	25	2	0	94	0	0	0	0
8:45 AM	7	31	0	0	4	12	4	0	3	15	3	0	0	20	3	0	102	0	0	0	0
8:50 AM	2	15	0	0	2	10	5	0	9	22	1	0	0	25	3	0	94	0	0	0	0
8:55 AM	1	18	0	0	2	15	1	0	6	15	3	0	0	14	6	0	81	0	0	0	0
Total Survey	65	774	10	0	63	351	125	0	125	469	35	0	7	639	80	0	2,743	0	0	0	0

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	11	111	2	0	5	47	17	0	15	69	5	0	1	92	8	0	383	0	0	0	0
7:15 AM	6	119	2	0	13	50	18	0	23	51	3	0	0	94	8	0	387	0	0	0	0
7:30 AM	9	143	1	0	10	54	15	0	12	76	1	0	1	91	12	0	425	0	0	0	0
7:45 AM	9	100	4	0	4	35	25	0	14	49	7	0	0	82	7	0	336	0	0	0	0
8:00 AM	4	90	0	0	13	55	13	0	14	54	5	0	2	75	14	0	339	0	0	0	0
8:15 AM	6	70	0	0	3	42	10	0	10	58	4	0	1	80	11	0	295	0	0	0	0
8:30 AM	10	77	1	0	7	31	17	0	19	60	3	0	2	66	8	0	301	0	0	0	0
8:45 AM	10	64	0	0	8	37	10	0	18	52	7	0	0	59	12	0	277	0	0	0	0
Total Survey	65	774	10	0	63	351	125	0	125	469	35	0	7	639	80	0	2,743	0	0	0	0

Peak Hour Summary
7:00 AM to 8:00 AM

By Approach	Northbound Hwy 551				Southbound Hwy 551				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	517	204	721	0	293	572	865	0	325	469	794	0	396	286	682	0	1,531	0	0	0	0
%HV	10.6%				10.9%				5.8%				6.3%				8.6%				
PHF	0.84				0.83				0.91				0.88				0.90				

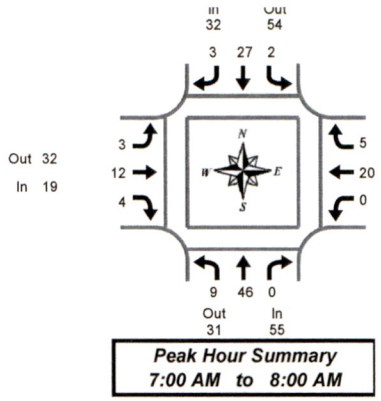
By Movement	Northbound Hwy 551				Southbound Hwy 551				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	35	473	9	517	32	186	75	293	64	245	16	325	2	359	35	396	1,531
%HV	25.7%	9.7%	0.0%	10.6%	6.3%	14.5%	4.0%	10.9%	4.7%	4.9%	25.0%	5.8%	0.0%	5.6%	14.3%	6.3%	8.6%
PHF	0.73	0.83	0.56	0.84	0.62	0.76	0.75	0.83	0.70	0.81	0.57	0.91	0.50	0.89	0.73	0.88	0.90

Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	35	473	9	0	32	186	75	0	64	245	16	0	2	359	35	0	1,531	0	0	0	0
7:15 AM	28	452	7	0	40	194	71	0	63	230	16	0	3	342	41	0	1,487	0	0	0	0
7:30 AM	28	403	5	0	30	186	63	0	50	237	17	0	4	328	44	0	1,395	0	0	0	0
7:45 AM	29	337	5	0	27	163	65	0	57	221	19	0	5	303	40	0	1,271	0	0	0	0
8:00 AM	30	301	1	0	31	165	50	0	61	224	19	0	5	280	45	0	1,212	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
7:00 AM to 8:00 AM

Hwy 551 & Ehlen Rd NE

Wednesday, June 07, 2017
7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	1	0	1	0	3	0	3	0	0	0	0	0	1	0	1	5
7:05 AM	0	2	0	2	0	1	0	1	0	2	0	2	0	1	0	1	6
7:10 AM	2	2	0	4	0	4	0	4	0	0	1	1	0	0	0	0	9
7:15 AM	1	6	0	7	0	2	0	2	0	1	0	1	0	5	0	5	15
7:20 AM	0	5	0	5	1	5	0	6	0	0	2	2	0	1	2	3	16
7:25 AM	1	4	0	5	1	2	0	3	0	1	0	1	0	5	0	5	14
7:30 AM	3	5	0	8	0	1	0	1	1	2	0	3	0	1	0	1	13
7:35 AM	0	5	0	5	0	3	1	4	1	3	0	4	0	0	1	1	14
7:40 AM	2	6	0	8	0	1	0	1	1	0	0	1	0	1	0	1	11
7:45 AM	0	2	0	2	0	3	0	3	0	1	0	1	0	1	0	1	7
7:50 AM	0	5	0	5	0	1	0	1	0	1	0	1	0	0	2	2	9
7:55 AM	0	3	0	3	0	1	2	3	0	1	1	2	0	4	0	4	12
8:00 AM	0	1	0	1	0	3	0	3	1	2	0	3	0	3	0	3	10
8:05 AM	0	2	0	2	2	3	0	5	0	0	1	1	0	2	1	3	11
8:10 AM	0	4	0	4	0	2	1	3	0	3	0	3	0	4	0	4	14
8:15 AM	0	3	0	3	0	0	0	0	1	1	0	2	0	2	1	3	8
8:20 AM	1	2	0	3	0	3	0	3	0	2	0	2	0	1	0	1	9
8:25 AM	1	4	0	5	0	2	0	2	2	2	1	5	0	4	0	4	16
8:30 AM	0	3	0	3	0	2	0	2	0	3	0	3	0	1	0	1	9
8:35 AM	3	7	0	10	0	3	2	5	0	0	0	0	0	6	0	6	21
8:40 AM	1	5	0	6	0	1	1	2	0	6	1	7	1	3	0	4	19
8:45 AM	2	5	0	7	0	1	0	1	0	0	0	0	0	1	0	1	9
8:50 AM	0	1	0	1	1	4	0	5	2	1	0	3	0	0	0	0	9
8:55 AM	0	4	0	4	0	1	0	1	0	0	0	0	0	3	0	3	8
Total Survey	17	87	0	104	5	52	7	64	9	32	7	48	1	50	7	58	274

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	2	5	0	7	0	8	0	8	0	2	1	3	0	2	0	2	20
7:15 AM	2	15	0	17	2	9	0	11	0	2	2	4	0	11	2	13	45
7:30 AM	5	16	0	21	0	5	1	6	3	5	0	8	0	2	1	3	38
7:45 AM	0	10	0	10	0	5	2	7	0	3	1	4	0	5	2	7	28
8:00 AM	0	7	0	7	2	8	1	11	1	5	1	7	0	9	1	10	35
8:15 AM	2	9	0	11	0	5	0	5	3	5	1	9	0	7	1	8	33
8:30 AM	4	15	0	19	0	6	3	9	0	9	1	10	1	10	0	11	49
8:45 AM	2	10	0	12	1	6	0	7	2	1	0	3	0	4	0	4	26
Total Survey	17	87	0	104	5	52	7	64	9	32	7	48	1	50	7	58	274

Heavy Vehicle Peak Hour Summary
7:00 AM to 8:00 AM

By Approach	Northbound Hwy 551			Southbound Hwy 551			Eastbound Ehlen Rd NE			Westbound Ehlen Rd NE			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	55	31	86	32	54	86	19	32	51	25	14	39	131
PHF	0.65			0.67			0.59			0.48			0.73

By Movement	Northbound Hwy 551				Southbound Hwy 551				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	9	46	0	55	2	27	3	32	3	12	4	19	0	20	5	25	131
PHF	0.45	0.72	0.00	0.65	0.25	0.61	0.38	0.67	0.25	0.50	0.33	0.59	0.00	0.45	0.63	0.48	0.73

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	9	46	0	55	2	27	3	32	3	12	4	19	0	20	5	25	131
7:15 AM	7	48	0	55	4	27	4	35	4	15	4	23	0	27	6	33	146
7:30 AM	7	42	0	49	2	23	4	29	7	18	3	28	0	23	5	28	134
7:45 AM	6	41	0	47	2	24	6	32	4	22	4	30	1	31	4	36	145
8:00 AM	8	41	0	49	3	25	4	32	6	20	3	29	1	30	2	33	143

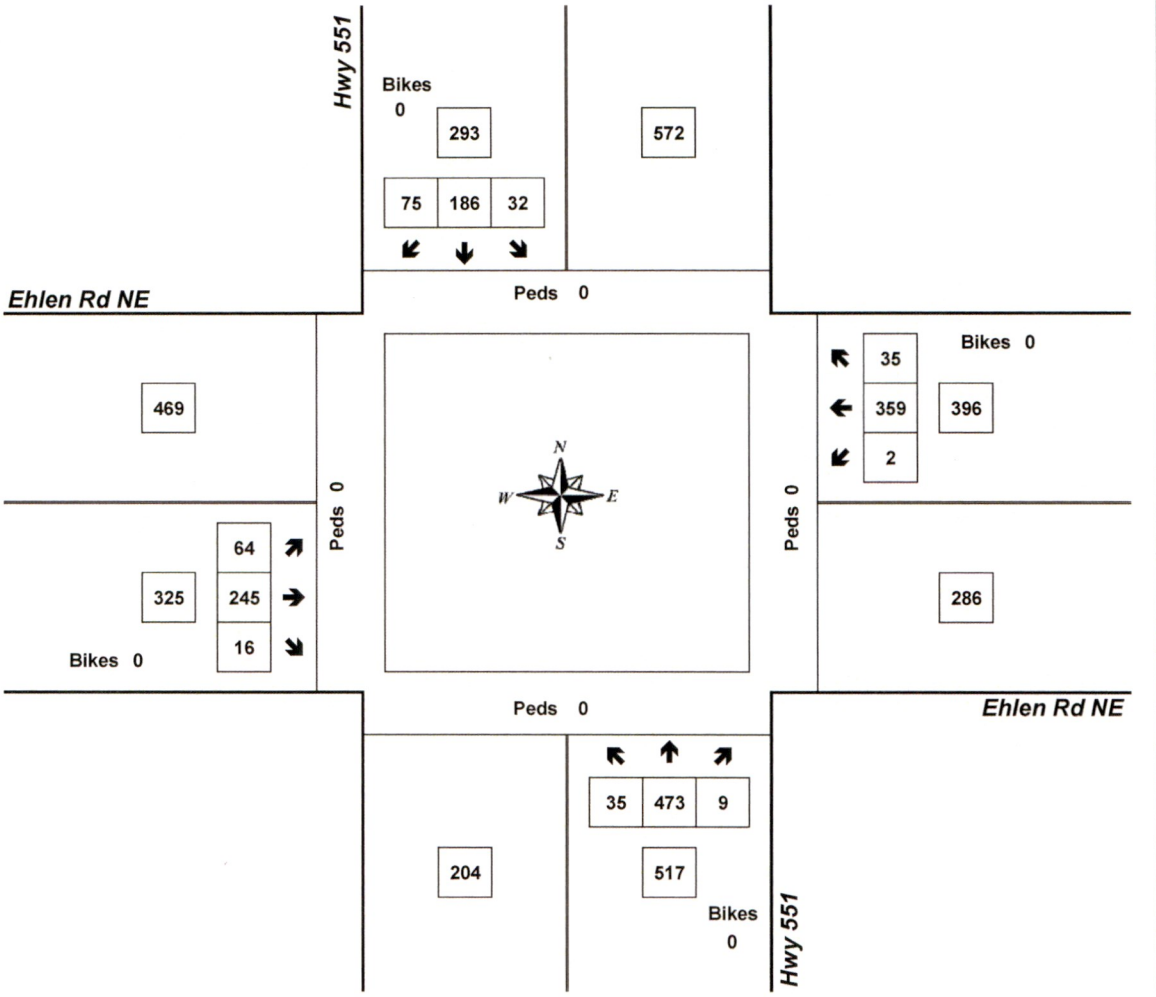
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Hwy 551 & Ehlen Rd NE

7:00 AM to 8:00 AM
Wednesday, June 07, 2017



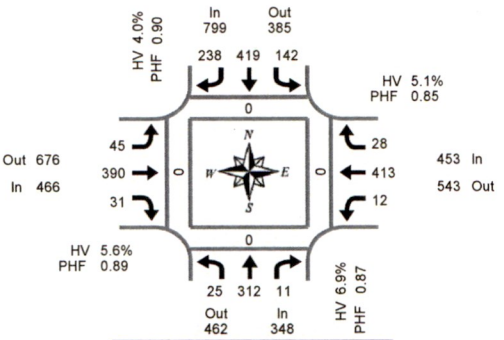
Approach	PHF	HV%	Volume
EB	0.91	5.8%	325
WB	0.88	6.3%	396
NB	0.84	10.6%	517
SB	0.83	10.9%	293
Intersection	0.90	8.6%	1,531

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Hwy 551 & Ehlen Rd NE

Tuesday, June 06, 2017
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	3	36	4	0	10	45	17	0	2	27	1	0	0	22	0	0	167	0	0	0	0
4:05 PM	2	2	0	0	11	32	22	0	2	42	2	0	1	47	0	0	163	0	0	0	0
4:10 PM	5	15	0	0	10	26	18	0	9	36	3	0	0	25	4	0	151	0	0	0	0
4:15 PM	3	45	1	0	8	47	18	0	2	36	2	0	0	27	4	0	193	0	0	0	0
4:20 PM	2	29	1	0	9	36	22	0	3	36	5	0	1	38	1	0	183	0	0	0	0
4:25 PM	1	17	1	0	16	38	11	0	8	38	1	0	0	33	4	0	168	0	0	0	0
4:30 PM	3	22	1	0	16	48	18	0	1	28	5	0	1	31	1	0	175	0	0	0	0
4:35 PM	0	24	1	0	6	29	24	0	6	31	1	0	0	44	3	0	169	0	0	0	0
4:40 PM	4	29	1	0	16	41	24	0	7	25	2	0	1	28	2	0	180	0	0	0	0
4:45 PM	3	19	2	0	17	25	20	0	3	31	1	0	2	52	2	0	177	0	0	0	0
4:50 PM	2	19	0	0	11	41	15	0	4	49	2	0	5	24	0	0	172	0	0	0	0
4:55 PM	2	35	0	0	7	23	15	0	1	32	2	0	2	40	1	0	160	0	0	0	0
5:00 PM	0	27	1	0	14	30	21	0	3	29	5	0	0	33	2	0	165	0	0	0	0
5:05 PM	2	14	1	0	8	33	18	0	4	26	2	0	0	35	6	0	149	0	0	0	0
5:10 PM	3	32	1	0	14	28	32	0	3	29	3	0	0	28	2	0	175	0	0	0	0
5:15 PM	5	19	1	1	11	29	16	0	5	39	3	0	0	42	2	0	172	0	0	0	0
5:20 PM	1	33	0	0	14	40	9	0	3	32	2	0	0	29	3	0	166	0	0	0	0
5:25 PM	3	21	0	0	18	45	9	0	11	26	0	0	0	32	2	0	167	0	0	0	0
5:30 PM	3	24	0	0	18	34	10	0	5	44	0	0	0	33	2	0	173	0	0	0	0
5:35 PM	1	31	2	0	11	31	14	0	3	21	0	0	0	26	3	1	143	0	0	0	0
5:40 PM	2	20	2	0	12	35	7	0	6	36	4	0	1	27	2	0	154	0	0	0	0
5:45 PM	4	12	2	0	7	36	17	0	8	43	2	0	1	18	1	0	151	0	0	0	0
5:50 PM	0	24	0	0	15	37	13	0	7	36	1	0	0	28	4	0	165	0	0	0	0
5:55 PM	2	17	0	0	12	32	12	0	7	27	0	0	2	19	4	0	134	0	0	0	0
Total Survey	56	566	22	1	291	841	402	0	113	799	49	0	17	761	55	1	3,972	0	0	0	0

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	10	53	4	0	31	103	57	0	13	105	6	0	1	94	4	0	481	0	0	0	0
4:15 PM	6	91	3	0	33	121	51	0	13	110	8	0	1	98	9	0	544	0	0	0	0
4:30 PM	7	75	3	0	38	118	66	0	14	84	8	0	2	103	6	0	524	0	0	0	0
4:45 PM	7	73	2	0	35	89	50	0	8	112	5	0	9	116	3	0	509	0	0	0	0
5:00 PM	5	73	3	0	36	91	71	0	10	84	10	0	0	96	10	0	489	0	0	0	0
5:15 PM	9	73	1	1	43	114	34	0	19	97	5	0	0	103	7	0	505	0	0	0	0
5:30 PM	6	75	4	0	41	100	31	0	14	101	4	0	1	86	7	1	470	0	0	0	0
5:45 PM	6	53	2	0	34	105	42	0	22	106	3	0	3	65	9	0	450	0	0	0	0
Total Survey	56	566	22	1	291	841	402	0	113	799	49	0	17	761	55	1	3,972	0	0	0	0

Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound Hwy 551				Southbound Hwy 551				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	348	462	810	0	799	385	1,184	0	466	676	1,142	0	453	543	996	0	2,066	0	0	0	0
%HV	6.9%				4.0%				5.6%				5.1%				5.1%				
PHF	0.87				0.90				0.89				0.85				0.95				

By Movement	Northbound Hwy 551				Southbound Hwy 551				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	25	312	11	348	142	419	238	799	45	390	31	466	12	413	28	453	2,066
%HV	20.0%	6.1%	0.0%	6.9%	2.8%	5.3%	2.5%	4.0%	0.0%	5.6%	12.9%	5.6%	8.3%	5.3%	0.0%	5.1%	5.1%
PHF	0.69	0.86	0.69	0.87	0.81	0.86	0.84	0.90	0.70	0.87	0.70	0.89	0.33	0.83	0.70	0.85	0.95

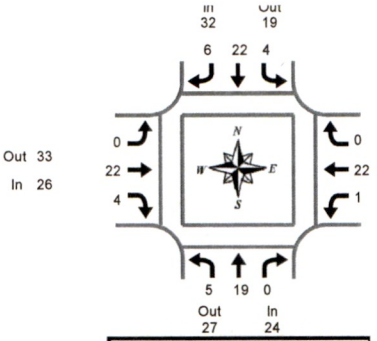
Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	30	292	12	0	137	431	224	0	48	411	27	0	13	411	22	0	2,058	0	0	0	0
4:15 PM	25	312	11	0	142	419	238	0	45	390	31	0	12	413	28	0	2,066	0	0	0	0
4:30 PM	28	294	9	1	152	412	221	0	51	377	28	0	11	418	26	0	2,027	0	0	0	0
4:45 PM	27	294	10	1	155	394	186	0	51	394	24	0	10	401	27	1	1,973	0	0	0	0
5:00 PM	26	274	10	1	154	410	178	0	65	388	22	0	4	350	33	1	1,914	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
4:15 PM to 5:15 PM

Hwy 551 & Ehlen Rd NE

Tuesday, June 06, 2017
4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start	Northbound Hwy 551				Southbound Hwy 551				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE				Interval
Time	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	Total
4:00 PM	0	3	1	4	0	5	0	5	0	1	1	2	0	1	0	1	12
4:05 PM	0	1	0	1	0	6	1	7	0	3	0	3	1	3	0	4	15
4:10 PM	0	0	0	0	0	2	0	2	0	5	1	6	0	0	0	0	8
4:15 PM	1	6	0	7	0	3	0	3	0	5	0	5	0	4	0	4	19
4:20 PM	0	1	0	1	1	1	0	2	0	4	0	4	0	2	0	2	9
4:25 PM	0	0	0	0	1	4	1	6	0	2	0	2	0	2	0	2	10
4:30 PM	0	1	0	1	0	4	0	4	0	3	0	3	0	0	0	0	8
4:35 PM	0	1	0	1	0	1	1	2	0	2	0	2	0	3	0	3	8
4:40 PM	1	1	0	2	0	2	0	2	0	1	1	2	0	2	0	2	8
4:45 PM	2	1	0	3	0	1	2	3	0	0	0	0	0	3	0	3	9
4:50 PM	0	2	0	2	2	0	1	3	0	0	1	1	1	1	0	2	8
4:55 PM	1	1	0	2	0	2	0	2	0	0	0	0	0	2	0	2	6
5:00 PM	0	1	0	1	0	2	0	2	0	1	1	2	0	0	0	0	5
5:05 PM	0	1	0	1	0	1	0	1	0	1	1	2	0	3	0	3	7
5:10 PM	0	3	0	3	0	1	1	2	0	3	0	3	0	0	0	0	8
5:15 PM	0	0	0	0	0	2	0	2	0	1	0	1	0	4	0	4	7
5:20 PM	0	1	0	1	0	2	0	2	0	2	0	2	0	1	0	1	6
5:25 PM	1	0	0	1	0	2	0	2	0	0	0	0	0	1	0	1	4
5:30 PM	0	0	0	0	0	3	1	4	0	3	0	3	0	0	0	0	7
5:35 PM	0	2	0	2	0	1	0	1	0	2	0	2	0	1	0	1	6
5:40 PM	1	0	0	1	0	1	0	1	0	5	0	5	0	1	0	1	8
5:45 PM	0	1	0	1	0	3	0	3	0	1	1	2	0	0	0	0	6
5:50 PM	0	0	0	0	0	2	1	3	0	0	0	0	0	1	0	1	4
5:55 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
Total Survey	7	27	1	35	4	53	9	66	0	45	7	52	2	35	0	37	190

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start	Northbound Hwy 551				Southbound Hwy 551				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE				Interval
Time	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	Total
4:00 PM	0	4	1	5	0	13	1	14	0	9	2	11	1	4	0	5	35
4:15 PM	1	7	0	8	2	8	1	11	0	11	0	11	0	8	0	8	38
4:30 PM	1	3	0	4	0	7	1	8	0	6	1	7	0	5	0	5	24
4:45 PM	3	4	0	7	2	3	3	8	0	0	1	1	1	6	0	7	23
5:00 PM	0	5	0	5	0	4	1	5	0	5	2	7	0	3	0	3	20
5:15 PM	1	1	0	2	0	6	0	6	0	3	0	3	0	6	0	6	17
5:30 PM	1	2	0	3	0	5	1	6	0	10	0	10	0	2	0	2	21
5:45 PM	0	1	0	1	0	7	1	8	0	1	1	2	0	1	0	1	12
Total Survey	7	27	1	35	4	53	9	66	0	45	7	52	2	35	0	37	190

Heavy Vehicle Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound Hwy 551			Southbound Hwy 551			Eastbound Ehlen Rd NE			Westbound Ehlen Rd NE			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	24	27	51	32	19	51	26	33	59	23	26	49	105
PHF	0.75			0.67			0.59			0.72			0.69

By Movement	Northbound Hwy 551				Southbound Hwy 551				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	5	19	0	24	4	22	6	32	0	22	4	26	1	22	0	23	105
PHF	0.42	0.68	0.00	0.75	0.50	0.61	0.50	0.67	0.00	0.50	0.50	0.59	0.25	0.69	0.00	0.72	0.69

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start	Northbound Hwy 551				Southbound Hwy 551				Eastbound Ehlen Rd NE				Westbound Ehlen Rd NE				Interval
Time	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	Total
4:00 PM	5	18	1	24	4	31	6	41	0	26	4	30	2	23	0	25	120
4:15 PM	5	19	0	24	4	22	6	32	0	22	4	26	1	22	0	23	105
4:30 PM	5	13	0	18	2	20	5	27	0	14	4	18	1	20	0	21	84
4:45 PM	5	12	0	17	2	18	5	25	0	18	3	21	1	17	0	18	81
5:00 PM	2	9	0	11	0	22	3	25	0	19	3	22	0	12	0	12	70

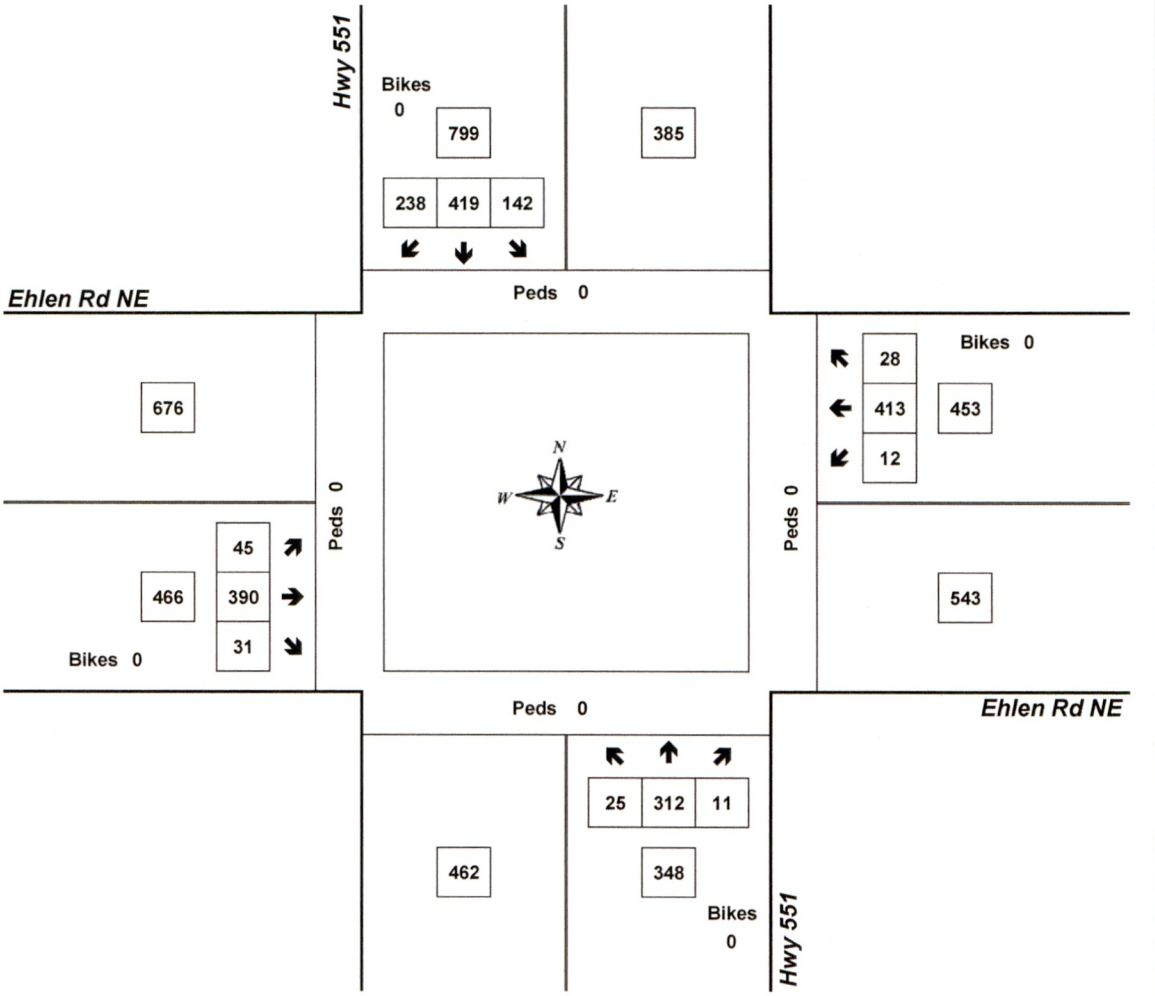
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Hwy 551 & Ehlen Rd NE

4:15 PM to 5:15 PM
Tuesday, June 06, 2017



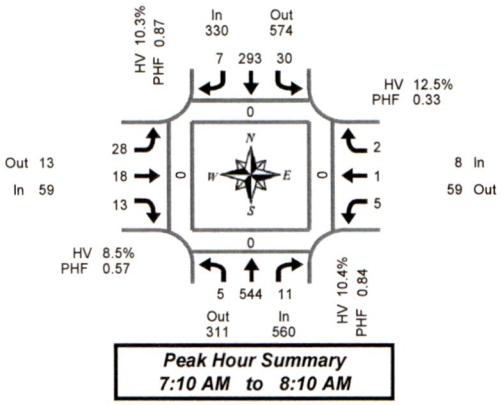
Approach	PHF	HV%	Volume
EB	0.89	5.6%	466
WB	0.85	5.1%	453
NB	0.87	6.9%	348
SB	0.90	4.0%	799
Intersection	0.95	5.1%	2,066

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Hwy 551 & Keil Rd NE

Wednesday, June 07, 2017
7:00 AM to 9:00 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start	Northbound Hwy 551				Southbound Hwy 551				Eastbound Keil Rd NE				Westbound Keil Rd NE				Interval	Pedestrians Crosswalk			
Time	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	Total	North	South	East	West
7:00 AM	0	33	1	0	2	23	0	0	5	2	0	0	0	0	0	0	66	0	0	0	0
7:05 AM	2	35	3	0	2	16	1	0	2	1	0	0	0	0	1	0	63	0	0	0	0
7:10 AM	1	45	0	0	4	31	0	0	6	1	1	0	0	1	1	0	91	0	0	0	0
7:15 AM	1	51	0	0	2	23	1	0	5	1	1	0	0	0	0	0	85	0	0	0	0
7:20 AM	0	45	3	0	2	25	0	0	5	3	3	0	0	0	0	0	86	0	0	0	0
7:25 AM	0	57	0	0	1	24	1	0	1	3	2	0	0	0	0	0	89	0	0	0	0
7:30 AM	0	61	1	0	3	25	0	0	0	2	1	0	0	0	0	0	93	0	0	0	0
7:35 AM	0	45	1	0	4	33	1	0	3	2	1	0	0	0	0	0	90	0	0	0	0
7:40 AM	1	56	1	0	2	26	1	0	1	3	0	0	0	0	0	0	91	0	0	0	0
7:45 AM	1	54	0	0	1	19	3	0	1	0	1	0	0	0	0	0	80	0	0	0	0
7:50 AM	1	31	1	0	6	18	0	0	0	0	0	0	0	0	0	0	57	0	0	0	0
7:55 AM	0	28	1	0	3	18	0	0	4	1	0	0	3	0	0	0	58	0	0	0	0
8:00 AM	0	39	0	0	1	26	0	0	2	1	0	0	0	0	1	0	70	0	0	0	0
8:05 AM	0	32	3	0	1	25	0	0	0	1	3	0	2	0	0	0	67	0	0	0	0
8:10 AM	0	44	0	0	0	22	0	0	1	0	0	0	0	1	0	0	68	0	0	0	0
8:15 AM	0	42	1	0	1	17	0	0	2	0	0	0	0	0	0	0	63	0	0	0	0
8:20 AM	0	34	0	0	0	16	0	0	1	0	0	0	0	0	0	0	51	0	0	0	0
8:25 AM	0	37	1	0	2	23	0	0	0	2	0	0	0	0	1	0	66	0	0	0	0
8:30 AM	0	32	0	0	2	15	0	0	1	0	3	0	1	0	0	0	54	0	0	0	0
8:35 AM	0	42	2	0	0	19	0	0	1	2	0	0	0	0	1	0	67	0	0	0	0
8:40 AM	0	23	1	0	1	22	0	0	0	0	0	0	0	0	0	0	47	0	0	0	0
8:45 AM	0	39	0	0	0	16	0	0	1	1	1	0	0	0	0	0	58	0	0	0	0
8:50 AM	0	25	0	0	0	15	1	0	2	0	1	0	0	0	0	0	44	0	0	0	0
8:55 AM	0	28	0	0	2	17	0	0	1	1	2	0	0	0	0	0	51	0	0	0	0
Total Survey	7	958	20	0	42	514	9	0	45	27	20	0	6	2	5	0	1,655	0	0	0	0

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start	Northbound Hwy 551				Southbound Hwy 551				Eastbound Keil Rd NE				Westbound Keil Rd NE				Interval	Pedestrians Crosswalk			
Time	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	Total	North	South	East	West
7:00 AM	3	113	4	0	8	70	1	0	13	4	1	0	0	1	2	0	220	0	0	0	0
7:15 AM	1	153	3	0	5	72	2	0	11	7	6	0	0	0	0	0	260	0	0	0	0
7:30 AM	1	162	3	0	9	84	2	0	4	7	2	0	0	0	0	0	274	0	0	0	0
7:45 AM	2	113	2	0	10	55	3	0	5	1	1	0	3	0	0	0	195	0	0	0	0
8:00 AM	0	115	3	0	2	73	0	0	3	2	3	0	2	1	1	0	205	0	0	0	0
8:15 AM	0	113	2	0	3	56	0	0	3	2	0	0	0	0	1	0	180	0	0	0	0
8:30 AM	0	97	3	0	3	56	0	0	2	2	3	0	1	0	1	0	168	0	0	0	0
8:45 AM	0	92	0	0	2	48	1	0	4	2	4	0	0	0	0	0	153	0	0	0	0
Total Survey	7	958	20	0	42	514	9	0	45	27	20	0	6	2	5	0	1,655	0	0	0	0

Peak Hour Summary
7:10 AM to 8:10 AM

By Approach	Northbound Hwy 551				Southbound Hwy 551				Eastbound Keil Rd NE				Westbound Keil Rd NE				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	560	311	871	0	330	574	904	0	59	13	72	0	8	59	67	0	957	0	0	0	0
%HV	10.4%				10.3%				8.5%				12.5%				10.2%				
PHF	0.84				0.87				0.57				0.33				0.87				

By Movement	Northbound Hwy 551				Southbound Hwy 551				Eastbound Keil Rd NE				Westbound Keil Rd NE				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	5	544	11	560	30	293	7	330	28	18	13	59	5	1	2	8	957
%HV	20.0%	10.3%	9.1%	10.4%	0.0%	11.6%	0.0%	10.3%	3.6%	11.1%	15.4%	8.5%	20.0%	0.0%	0.0%	12.5%	10.2%
PHF	0.42	0.83	0.69	0.84	0.75	0.87	0.35	0.87	0.44	0.56	0.54	0.57	0.25	0.25	0.50	0.33	0.87

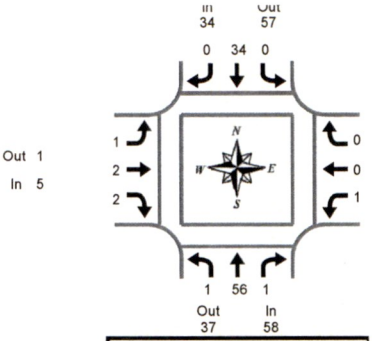
Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start	Northbound Hwy 551				Southbound Hwy 551				Eastbound Keil Rd NE				Westbound Keil Rd NE				Interval	Pedestrians Crosswalk			
Time	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	Total	North	South	East	West
7:00 AM	7	541	12	0	32	281	8	0	33	19	10	0	3	1	2	0	949	0	0	0	0
7:15 AM	4	543	11	0	26	284	7	0	23	17	12	0	5	1	1	0	934	0	0	0	0
7:30 AM	3	503	10	0	24	268	5	0	15	12	6	0	5	1	2	0	854	0	0	0	0
7:45 AM	2	438	10	0	18	240	3	0	13	7	7	0	6	1	3	0	748	0	0	0	0
8:00 AM	0	417	8	0	10	233	1	0	12	8	10	0	3	1	3	0	706	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Peak Hour Summary
7:10 AM to 8:10 AM

Hwy 551 & Keil Rd NE

Wednesday, June 07, 2017
7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Keil Rd NE				Westbound Keil Rd NE				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	1	0	1	0	3	0	3	0	0	0	0	0	0	0	0	4
7:05 AM	0	3	0	3	0	1	0	1	0	0	0	0	0	0	0	0	4
7:10 AM	0	1	0	1	0	3	0	3	0	0	0	0	0	0	0	0	4
7:15 AM	0	7	0	7	0	2	0	2	1	0	0	1	0	0	0	0	10
7:20 AM	0	3	0	3	0	5	0	5	0	0	2	2	0	0	0	0	10
7:25 AM	0	9	0	9	0	3	0	3	0	0	0	0	0	0	0	0	12
7:30 AM	0	7	1	8	0	2	0	2	0	0	0	0	0	0	0	0	10
7:35 AM	0	4	0	4	0	2	0	2	0	0	0	0	0	0	0	0	6
7:40 AM	0	9	0	9	0	3	0	3	0	2	0	2	0	0	0	0	14
7:45 AM	1	2	0	3	0	3	0	3	0	0	0	0	0	0	0	0	6
7:50 AM	0	6	0	6	0	1	0	1	0	0	0	0	0	0	0	0	7
7:55 AM	0	4	0	4	0	2	0	2	0	0	0	0	1	0	0	1	7
8:00 AM	0	1	0	1	0	6	0	6	0	0	0	0	0	0	0	0	7
8:05 AM	0	3	0	3	0	2	0	2	0	0	0	0	0	0	0	0	5
8:10 AM	0	2	0	2	0	4	0	4	0	0	0	0	0	0	0	0	6
8:15 AM	0	7	0	7	0	1	0	1	0	0	0	0	0	0	0	0	8
8:20 AM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
8:25 AM	0	7	0	7	0	2	0	2	0	1	0	1	0	0	0	0	10
8:30 AM	0	2	0	2	0	2	0	2	0	0	0	0	0	0	0	0	4
8:35 AM	0	9	0	9	0	5	0	5	0	1	0	1	0	0	0	0	15
8:40 AM	0	4	0	4	0	1	0	1	0	0	0	0	0	0	0	0	5
8:45 AM	0	6	0	6	0	3	0	3	0	0	0	0	0	0	0	0	9
8:50 AM	0	2	0	2	0	2	0	2	0	0	1	1	0	0	0	0	5
8:55 AM	0	5	0	5	1	1	0	2	0	0	1	1	0	0	0	0	8
Total Survey	1	104	1	106	1	61	0	62	1	4	4	9	1	0	0	1	178

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Keil Rd NE				Westbound Keil Rd NE				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	5	0	5	0	7	0	7	0	0	0	0	0	0	0	0	12
7:15 AM	0	19	0	19	0	10	0	10	1	0	2	3	0	0	0	0	32
7:30 AM	0	20	1	21	0	7	0	7	0	2	0	2	0	0	0	0	30
7:45 AM	1	12	0	13	0	6	0	6	0	0	0	0	1	0	0	1	20
8:00 AM	0	6	0	6	0	12	0	12	0	0	0	0	0	0	0	0	18
8:15 AM	0	14	0	14	0	5	0	5	0	1	0	1	0	0	0	0	20
8:30 AM	0	15	0	15	0	8	0	8	0	1	0	1	0	0	0	0	24
8:45 AM	0	13	0	13	1	6	0	7	0	0	2	2	0	0	0	0	22
Total Survey	1	104	1	106	1	61	0	62	1	4	4	9	1	0	0	1	178

Heavy Vehicle Peak Hour Summary
7:10 AM to 8:10 AM

By Approach	Northbound Hwy 551			Southbound Hwy 551			Eastbound Keil Rd NE			Westbound Keil Rd NE			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	58	37	95	34	57	91	5	1	6	1	3	4	98
PHF	0.69			0.85			0.42			0.25			0.77

By Movement	Northbound Hwy 551				Southbound Hwy 551				Eastbound Keil Rd NE				Westbound Keil Rd NE				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	1	56	1	58	0	34	0	34	1	2	2	5	1	0	0	1	98
PHF	0.25	0.70	0.25	0.69	0.00	0.85	0.00	0.85	0.25	0.25	0.25	0.42	0.25	0.00	0.00	0.25	0.77

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Keil Rd NE				Westbound Keil Rd NE				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	1	56	1	58	0	30	0	30	1	2	2	5	1	0	0	1	94
7:15 AM	1	57	1	59	0	35	0	35	1	2	2	5	1	0	0	1	100
7:30 AM	1	52	1	54	0	30	0	30	0	3	0	3	1	0	0	1	88
7:45 AM	1	47	0	48	0	31	0	31	0	2	0	2	1	0	0	1	82
8:00 AM	0	48	0	48	1	31	0	32	0	2	2	4	0	0	0	0	84

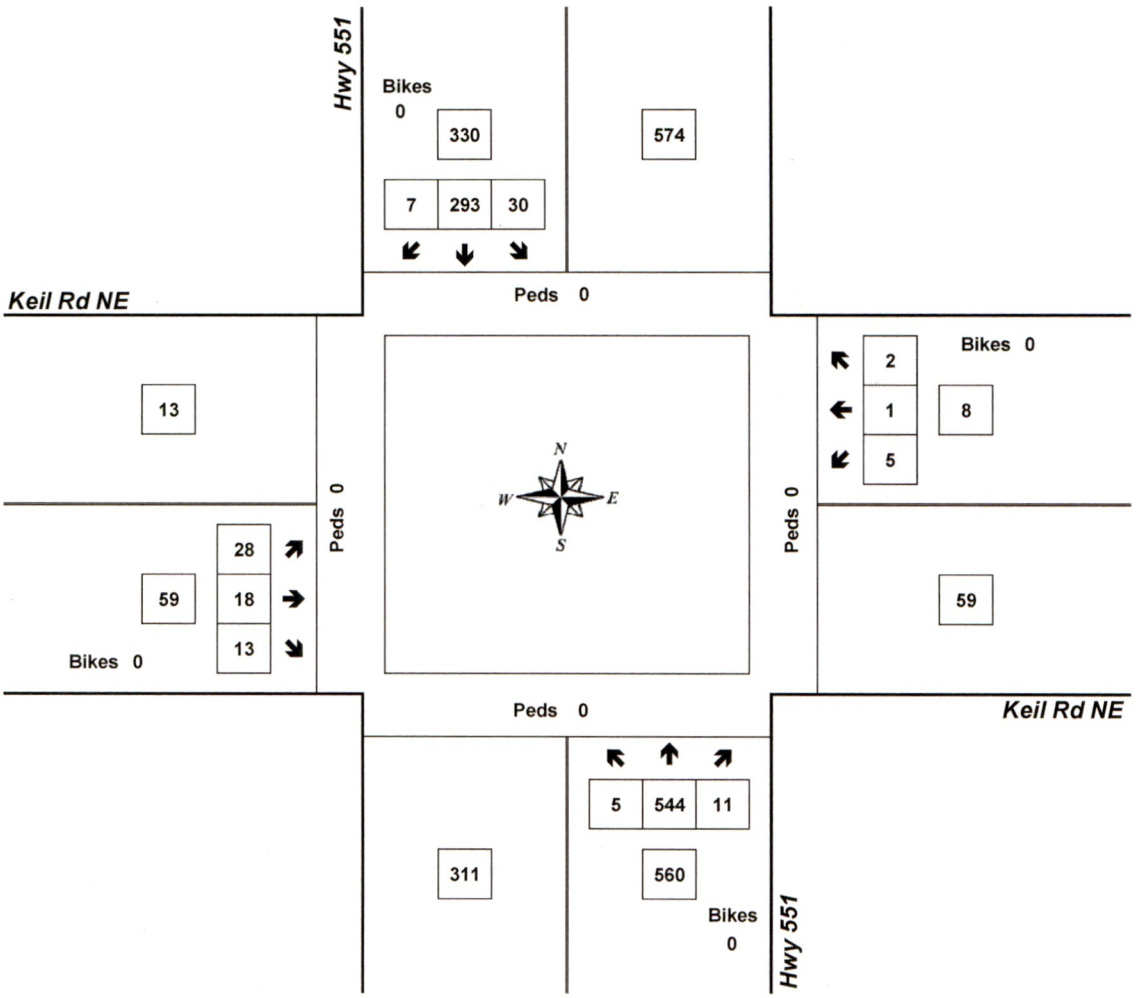
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Hwy 551 & Keil Rd NE

7:10 AM to 8:10 AM
Wednesday, June 07, 2017



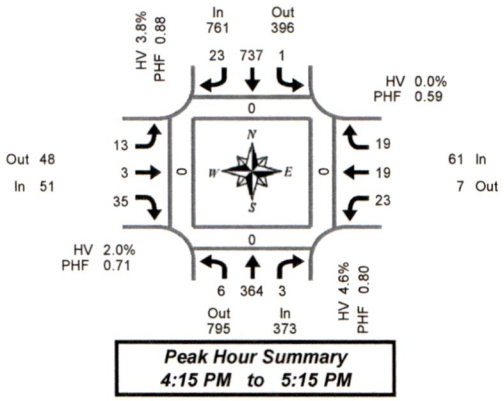
Approach	PHF	HV%	Volume
EB	0.57	8.5%	59
WB	0.33	12.5%	8
NB	0.84	10.4%	560
SB	0.87	10.3%	330
Intersection	0.87	10.2%	957

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Hwy 551 & Keil Rd NE

Tuesday, June 06, 2017
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Keil Rd NE				Westbound Keil Rd NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	29	0	0	0	68	5	0	3	1	3	0	1	0	2	0	112	0	0	0	0
4:05 PM	0	16	0	0	0	52	1	0	0	0	1	0	2	0	7	0	79	0	0	0	0
4:10 PM	0	26	1	0	0	66	2	0	2	1	2	0	0	0	0	0	100	0	0	0	0
4:15 PM	1	47	0	0	0	73	0	0	3	1	2	0	0	1	0	0	128	0	0	0	0
4:20 PM	1	39	0	0	0	71	4	0	1	1	1	0	0	0	1	0	119	0	0	0	0
4:25 PM	1	25	2	0	0	57	1	0	0	1	1	0	0	1	2	0	91	0	0	0	0
4:30 PM	0	22	0	0	0	78	4	0	3	0	1	0	1	1	3	0	113	0	0	0	0
4:35 PM	0	36	1	0	1	58	0	0	2	0	7	0	3	3	2	0	113	0	0	0	0
4:40 PM	0	32	0	0	0	61	1	0	0	0	5	0	5	3	5	0	112	0	0	0	0
4:45 PM	0	29	0	0	0	60	4	0	0	0	3	0	2	2	1	0	101	0	0	0	0
4:50 PM	0	22	0	0	0	54	0	0	1	0	5	0	1	0	0	0	83	0	0	0	0
4:55 PM	2	39	0	0	0	42	2	0	2	0	1	0	0	1	2	0	91	0	0	0	0
5:00 PM	0	10	0	0	0	62	4	0	1	0	2	0	1	2	0	0	82	0	0	0	0
5:05 PM	1	33	0	0	0	60	0	0	0	0	6	0	7	3	2	0	112	0	0	0	0
5:10 PM	0	30	0	0	0	61	3	0	0	0	1	0	3	2	1	0	101	0	0	0	0
5:15 PM	0	31	2	0	1	70	2	0	1	0	3	0	0	0	0	0	110	0	0	0	0
5:20 PM	1	31	1	0	0	49	2	0	0	0	0	0	1	0	2	0	87	0	0	0	0
5:25 PM	1	34	0	0	0	73	2	0	1	0	0	0	1	0	0	0	112	0	0	0	0
5:30 PM	1	32	1	0	0	58	2	0	2	0	2	0	0	1	1	0	100	0	0	0	0
5:35 PM	1	37	0	0	0	53	3	0	4	0	2	0	0	1	1	0	102	0	0	0	0
5:40 PM	0	23	0	0	0	55	0	0	1	0	1	0	0	4	1	0	85	0	0	0	0
5:45 PM	0	24	0	0	0	62	3	0	1	0	1	0	0	0	1	0	92	0	0	0	0
5:50 PM	2	34	1	0	0	60	2	0	0	0	2	0	0	2	0	0	103	0	0	0	0
5:55 PM	0	23	0	0	1	51	1	0	1	0	0	0	0	0	1	0	78	0	0	0	0
Total Survey	12	704	9	0	3	1,454	48	0	29	5	52	0	28	27	35	0	2,406	0	0	0	0

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Keil Rd NE				Westbound Keil Rd NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	71	1	0	0	186	8	0	5	2	6	0	3	0	9	0	291	0	0	0	0
4:15 PM	3	111	2	0	0	201	5	0	4	3	4	0	0	2	3	0	338	0	0	0	0
4:30 PM	0	90	1	0	1	197	5	0	5	0	13	0	9	7	10	0	338	0	0	0	0
4:45 PM	2	90	0	0	0	156	6	0	3	0	9	0	3	3	3	0	275	0	0	0	0
5:00 PM	1	73	0	0	0	183	7	0	1	0	9	0	11	7	3	0	295	0	0	0	0
5:15 PM	2	96	3	0	1	192	6	0	2	0	3	0	2	0	2	0	309	0	0	0	0
5:30 PM	2	92	1	0	0	166	5	0	7	0	5	0	0	6	3	0	287	0	0	0	0
5:45 PM	2	81	1	0	1	173	6	0	2	0	3	0	0	2	2	0	273	0	0	0	0
Total Survey	12	704	9	0	3	1,454	48	0	29	5	52	0	28	27	35	0	2,406	0	0	0	0

Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound Hwy 551				Southbound Hwy 551				Eastbound Keil Rd NE				Westbound Keil Rd NE				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	373	795	1,168	0	761	396	1,157	0	51	48	99	0	61	7	68	0	1,246	0	0	0	0
%HV	4.6%				3.8%				2.0%				0.0%				3.8%				
PHF	0.80				0.88				0.71				0.59				0.92				

By Movement	Northbound Hwy 551				Southbound Hwy 551				Eastbound Keil Rd NE				Westbound Keil Rd NE				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	6	364	3	373	1	737	23	761	13	3	35	51	23	19	19	61	1,246
%HV	0.0%	4.7%	0.0%	4.6%	0.0%	3.9%	0.0%	3.8%	0.0%	0.0%	2.9%	2.0%	0.0%	0.0%	0.0%	0.0%	3.8%
PHF	0.50	0.82	0.25	0.80	0.25	0.89	0.64	0.88	0.65	0.25	0.58	0.71	0.52	0.59	0.48	0.59	0.92

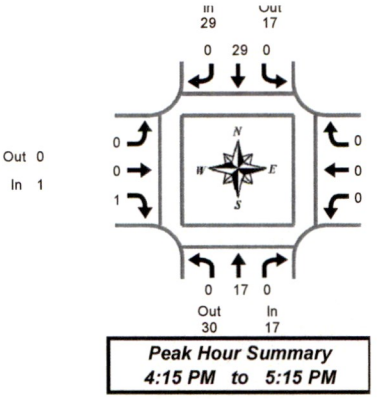
Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Keil Rd NE				Westbound Keil Rd NE				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	5	362	4	0	1	740	24	0	17	5	32	0	15	12	25	0	1,242	0	0	0	0
4:15 PM	6	364	3	0	1	737	23	0	13	3	35	0	23	19	19	0	1,246	0	0	0	0
4:30 PM	5	349	4	0	2	728	24	0	11	0	34	0	25	17	18	0	1,217	0	0	0	0
4:45 PM	7	351	4	0	1	697	24	0	13	0	26	0	16	16	11	0	1,166	0	0	0	0
5:00 PM	7	342	5	0	2	714	24	0	12	0	20	0	13	15	10	0	1,164	0	0	0	0

Heavy Vehicle Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740



Hwy 551 & Keil Rd NE

Tuesday, June 06, 2017
4:00 PM to 6:00 PM

Peak Hour Summary
4:15 PM to 5:15 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Keil Rd NE				Westbound Keil Rd NE				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	3	0	3	0	2	0	2	0	1	0	1	0	0	0	0	6
4:05 PM	0	1	0	1	0	6	0	6	0	0	0	0	0	0	0	0	7
4:10 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
4:15 PM	0	4	0	4	0	4	0	4	0	0	0	0	0	0	0	0	8
4:20 PM	0	2	0	2	0	1	0	1	0	0	0	0	0	0	0	0	3
4:25 PM	0	1	0	1	0	7	0	7	0	0	0	0	0	0	0	0	8
4:30 PM	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	3
4:35 PM	0	1	0	1	0	2	0	2	0	0	0	0	0	0	0	0	3
4:40 PM	0	1	0	1	0	2	0	2	0	0	0	0	0	0	0	0	3
4:45 PM	0	2	0	2	0	2	0	2	0	0	1	1	0	0	0	0	5
4:50 PM	0	1	0	1	0	2	0	2	0	0	0	0	0	0	0	0	3
4:55 PM	0	2	0	2	0	1	0	1	0	0	0	0	0	0	0	0	3
5:00 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
5:05 PM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
5:10 PM	0	2	0	2	0	2	0	2	0	0	0	0	0	0	0	0	4
5:15 PM	0	1	0	1	0	2	0	2	0	0	0	0	0	0	0	0	3
5:20 PM	0	1	0	1	0	4	0	4	0	0	0	0	0	0	0	0	5
5:25 PM	0	0	0	0	0	4	0	4	0	0	0	0	0	0	0	0	4
5:30 PM	0	0	0	0	0	4	0	4	0	0	0	0	0	0	0	0	4
5:35 PM	0	2	0	2	0	1	0	1	0	0	0	0	0	0	0	0	3
5:40 PM	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	3
5:45 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:50 PM	0	1	0	1	0	3	0	3	0	0	0	0	0	0	0	0	4
5:55 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
Total Survey	0	26	0	26	0	63	0	63	0	1	1	2	0	0	0	0	91

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Keil Rd NE				Westbound Keil Rd NE				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	4	0	4	0	10	0	10	0	1	0	1	0	0	0	0	15
4:15 PM	0	7	0	7	0	12	0	12	0	0	0	0	0	0	0	0	19
4:30 PM	0	2	0	2	0	7	0	7	0	0	0	0	0	0	0	0	9
4:45 PM	0	5	0	5	0	5	0	5	0	0	1	1	0	0	0	0	11
5:00 PM	0	3	0	3	0	5	0	5	0	0	0	0	0	0	0	0	8
5:15 PM	0	2	0	2	0	10	0	10	0	0	0	0	0	0	0	0	12
5:30 PM	0	2	0	2	0	8	0	8	0	0	0	0	0	0	0	0	10
5:45 PM	0	1	0	1	0	6	0	6	0	0	0	0	0	0	0	0	7
Total Survey	0	26	0	26	0	63	0	63	0	1	1	2	0	0	0	0	91

Heavy Vehicle Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound Hwy 551			Southbound Hwy 551			Eastbound Keil Rd NE			Westbound Keil Rd NE			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	17	30	47	29	17	46	1	0	1	0	0	0	47
PHF	0.61			0.60			0.25			0.00			0.62

By Movement	Northbound Hwy 551				Southbound Hwy 551				Eastbound Keil Rd NE				Westbound Keil Rd NE				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	17	0	17	0	29	0	29	0	0	1	1	0	0	0	0	47
PHF	0.00	0.61	0.00	0.61	0.00	0.60	0.00	0.60	0.00	0.00	0.25	0.25	0.00	0.00	0.00	0.00	0.62

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Hwy 551				Southbound Hwy 551				Eastbound Keil Rd NE				Westbound Keil Rd NE				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	18	0	18	0	34	0	34	0	1	1	2	0	0	0	0	54
4:15 PM	0	17	0	17	0	29	0	29	0	0	1	1	0	0	0	0	47
4:30 PM	0	12	0	12	0	27	0	27	0	0	1	1	0	0	0	0	40
4:45 PM	0	12	0	12	0	28	0	28	0	0	1	1	0	0	0	0	41
5:00 PM	0	8	0	8	0	29	0	29	0	0	0	0	0	0	0	0	37

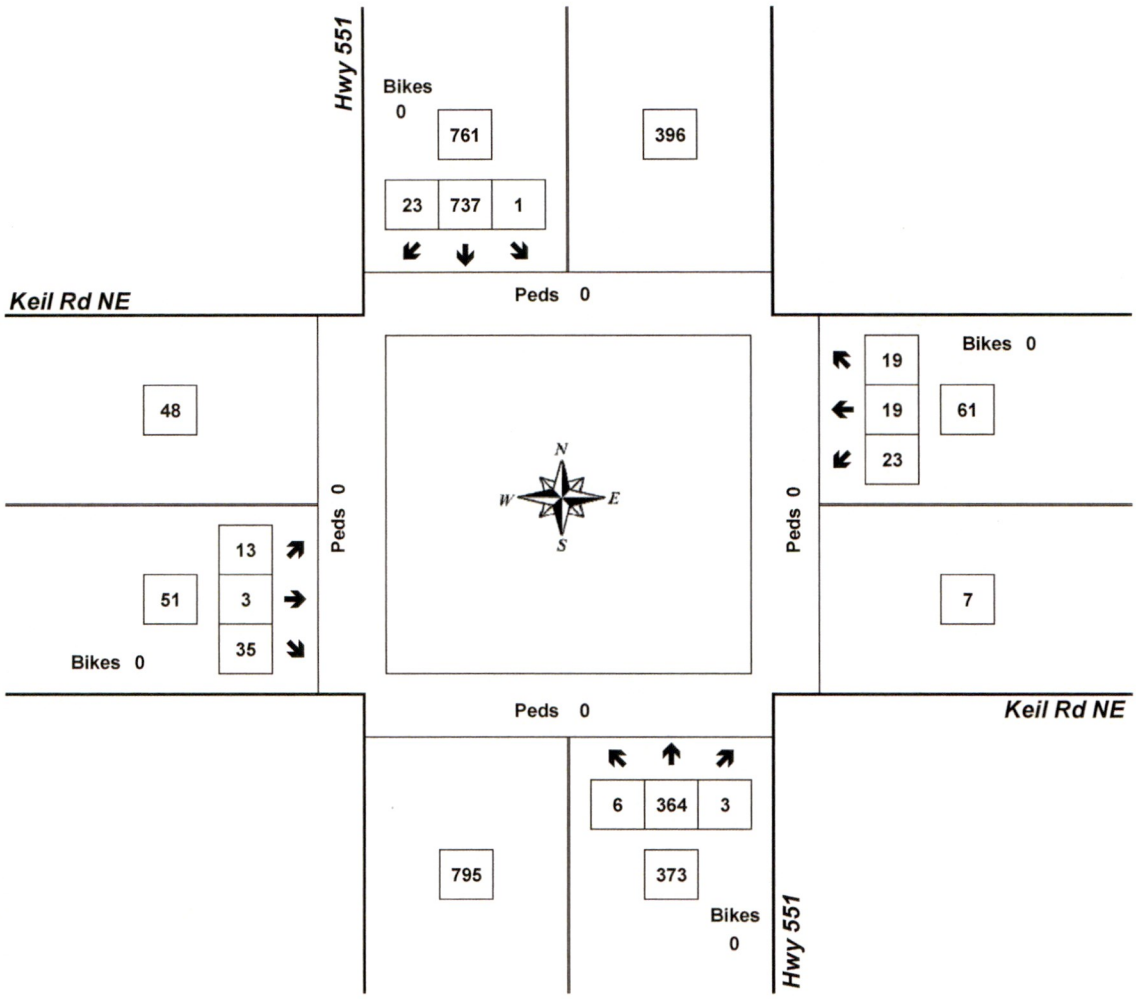
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

Hwy 551 & Keil Rd NE

4:15 PM to 5:15 PM
Tuesday, June 06, 2017



Approach	PHF	HV%	Volume
EB	0.71	2.0%	51
WB	0.59	0.0%	61
NB	0.80	4.6%	373
SB	0.88	3.8%	761
Intersection	0.92	3.8%	1,246

Count Period: 4:00 PM to 6:00 PM

Appendix C – Level of Service Description

TRAFFIC LEVELS OF SERVICE

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

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

---

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

UNSIGNALIZED INTERSECTIONS (Two-Way Stop Controlled)

Unsignalized intersection level of service is reported for the major street and minor street (generally, left turn movements). The method assesses available and critical gaps in the traffic stream which make it possible for side street traffic to enter the main street flow. The 2010 Highway Capacity Manual describes the detailed methodology. It is not unusual for an intersection to experience level of service E or F conditions for the minor street left turn movement. It should be understood that, often, a poor level of service is experienced by only a few vehicles and the intersection as a whole operates acceptably.

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

Level-of-Service Criteria: Automobile Mode

Control Delay (s/vehicle)	**LOS by Volume-to-Capacity Ratio**	
	***v/c* ≤ 1.0**	***v/c* > 1.0**
0-10	A	F
>10-15	B	F
>15-25	C	F
>25-35	D	F
>35-50	E	F
>50	F	F

Note: The LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole

SIGNALIZED INTERSECTIONS

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

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

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

Appendix D – Collision Data

Crash ID	Crash Date	1st Street	2nd Street	Collision Type_Full	DKS Severity	Weather	Road Surface	Light	Collision Cause
1406592	1/16/2011	Highway 551	Arndt Rd	Turning	Property Damage Only	Unknown	Unknown	Daylight	Improper Driving
1405542	2/3/2011	Highway 551	Arndt Rd	Turning	Injury	Clear	Dry	Dawn	Failure to Yield
1408525	2/9/2011	Highway 551	Arndt Rd	Turning	Injury	Clear	Dry	Dark; Lights	Disregard Traffic Signal
1403248	2/16/2011	Ehlen Rd NE		Fixed Object	Property Damage Only	Rain	Wet	Dark; Lights	Too Fast for Conditions
1405544	2/27/2011	Highway 551	Ehlen Rd NE	Rear-end	Property Damage Only	Rain	Wet	Daylight	Following Too Close
1403891	3/7/2011	Airport Rd NE	Arndt Rd	Turning	Injury	Clear	Dry	Daylight	Failure to Yield
1407206	3/10/2011	Highway 551		Angle	Injury	Cloudy	Wet	Daylight	Failure to Yield
1408904	4/1/2011	Highway 551	Keil Rd NE	Angle	Injury	Clear	Dry	Daylight	Failure to Yield
1409626	4/11/2011	Highway 551	Keil Rd NE	Angle	Injury	Cloudy	Dry	Daylight	Failure to Yield
1410373	4/25/2011	Ehlen Rd NE	Airport Rd NE	Rear-end	Property Damage Only	Rain	Wet	Daylight	Inattention
1412396	5/4/2011	Highway 551		Turning	Property Damage Only	Clear	Dry	Daylight	Improper Turn
1410978	5/5/2011	Highway 551	Ehlen Rd NE	Turning	Injury	Cloudy	Dry	Daylight	Disregard Traffic Signal
1411591	5/16/2011	Arndt Rd	Airport Rd NE	Angle	Property Damage Only	Clear	Dry	Daylight	Disregard Traffic Signal
1412988	6/25/2011	Highway 551	Ehlen Rd NE	Turning	Severe Injury	Clear	Dry	Daylight	Careless
1416806	7/12/2011	Highway 551	Keil Rd NE	Angle	Severe Injury	Clear	Dry	Daylight	Passed Stop Sign
1426712	7/27/2011	Arndt Rd	Highway 551	Rear-end	Property Damage Only	Clear	Dry	Daylight	Following Too Close
1420972	7/27/2011	Highway 551	Arndt Rd	Rear-end	Property Damage Only	Clear	Dry	Daylight	Following Too Close
1419545	8/1/2011	Ehlen Rd NE		Rear-end	Injury	Clear	Dry	Daylight	Too Fast for Conditions
1419717	8/3/2011	Highway 551	Ehlen Rd NE	Angle	Property Damage Only	Clear	Dry	Daylight	Disregard Traffic Signal
1435944	8/28/2011	Arndt Rd	Airport Rd NE	Angle	Injury	Clear	Dry	Daylight	Disregard Traffic Signal
1422622	9/7/2011	Arndt Rd	Airport Rd NE	Turning	Property Damage Only	Clear	Dry	Daylight	Failure to Yield
1425113	9/26/2011	Highway 551	Keil Rd NE	Rear-end	Injury	Cloudy	Wet	Daylight	Following Too Close
1428713	10/8/2011	Airport Rd NE	Keil Rd NE	Fixed Object	Injury	Cloudy	Dry	Dark; Lights	Other
1429368	10/20/2011	Highway 551		Fixed Object	Property Damage Only	Rain	Wet	Dark; Lights	Improper Driving
1440375	10/21/2011	Arndt Rd	Highway 551	Rear-end	Property Damage Only	Clear	Dry	Dawn	Inattention
1429998	10/27/2011	Highway 551	Ehlen Rd NE	Turning	Property Damage Only	Clear	Dry	Dark; No Lights	Failure to Yield
1433468	12/9/2011	Highway 551		Angle	Injury	Clear	Dry	Dark; Lights	Passed Stop Sign
1434480	12/17/2011	Highway 551	Ehlen Rd NE	Turning	Injury	Fog	Wet	Daylight	Failure to Yield
1450441	1/3/2012	Highway 551	Keil Rd NE	Rear-end	Property Damage Only	Fog	Wet	Dawn	Too Fast for Conditions
1451125	1/15/2012	Ehlen Rd NE	Airport Rd NE	Turning	Property Damage Only	Cloudy	Wet	Daylight	Failure to Yield
1468402	1/15/2012	Ehlen Rd NE	Airport Rd NE	Turning	Property Damage Only	Cloudy	Wet	Daylight	Failure to Yield
1458842	2/21/2012	Arndt Rd	Airport Rd NE	Turning	Injury	Cloudy	Wet	Dusk	Failure to Yield
1456274	3/13/2012	Highway 551	Arndt Rd	Sideswipe	Property Damage Only	Cloudy	Wet	Daylight	Improper Lane Change
1455980	3/21/2012	Airport Rd NE		Head-on	Injury	Snow	Snow	Dark; Lights	Too Fast for Conditions
1460248	5/4/2012	Ehlen Rd NE	Airport Rd NE	Rear-end	Injury	Cloudy	Dry	Daylight	Too Fast for Conditions
1465166	6/21/2012	Highway 551		Rear-end	Property Damage Only	Clear	Dry	Daylight	Following Too Close
1468764	7/26/2012	Ehlen Rd NE		Rear-end	Injury	Clear	Dry	Daylight	Following Too Close
1468699	7/30/2012	Highway 551	Ehlen Rd NE	Rear-end	Injury	Clear	Dry	Daylight	Careless
1469261	8/8/2012	Highway 551	Keil Rd NE	Rear-end	Injury	Clear	Dry	Daylight	Careless
1473516	8/17/2012	Highway 551		Rear-end	Injury	Clear	Dry	Daylight	Following Too Close
1470721	8/24/2012	Arndt Rd	Highway 551	Rear-end	Property Damage Only	Clear	Dry	Daylight	Following Too Close
1473395	9/11/2012	Highway 551	Keil Rd NE	Turning	Injury	Clear	Dry	Daylight	Failure to Yield

Crash ID	Crash Date	1st Street	2nd Street	Collision Type_Full	DKS Severity	Weather	Road Surface	Light	Collision Cause
1488849	10/5/2012	Arndt Rd	Airport Rd NE	Rear-end	Injury	Clear	Dry	Daylight	Following Too Close
1490556	10/17/2012	Arndt Rd	Airport Rd NE	Rear-end	Injury	Clear	Dry	Daylight	Following Too Close
1478959	10/22/2012	Airport Rd NE	Keil Rd NE	Rear-end	Property Damage Only	Rain	Wet	Daylight	Too Fast for Conditions
1479041	10/30/2012	Highway 551	Ehlen Rd NE	Rear-end	Property Damage Only	Rain	Wet	Daylight	Inattention
1479353	11/7/2012	Airport Rd NE	Keil Rd NE	Turning	Injury	Cloudy	Dry	Dark; Lights	Failure to Yield
1499765	11/22/2012	Arndt Rd	Airport Rd NE	Angle	Injury	Clear	Dry	Daylight	Disregard Traffic Signal
1501432	1/8/2013	Arndt Rd	Airport Rd NE	Angle	Injury	Cloudy	Dry	Daylight	Inattention
1487345	1/16/2013	Airport Rd NE	Keil Rd NE	Fixed Object	Injury	Cloudy	Wet	Dark; Lights	Too Fast for Conditions
1502482	1/18/2013	Arndt Rd	Airport Rd NE	Turning	Property Damage Only	Fog	Wet	Dusk	Failure to Yield
1500729	2/11/2013	Arndt Rd	Airport Rd NE	Turning	Property Damage Only	Clear	Dry	Daylight	Failure to Yield
1500744	2/19/2013	Arndt Rd	Airport Rd NE	Turning	Property Damage Only	Unknown	Wet	Daylight	Failure to Yield
1511133	4/5/2013	Highway 551	Arndt Rd	Other	Property Damage Only	Rain	Wet	Daylight	Load Lost of Shifted
1511471	4/7/2013	Arndt Rd	Airport Rd NE	Angle	Property Damage Only	Rain	Wet	Daylight	Disregard Traffic Control
1502166	4/19/2013	Highway 551		Fixed Object	Injury	Clear	Dry	Dark; Lights	Phantom Vehicle
1503956	5/13/2013	Highway 551	Ehlen Rd NE	Angle	Property Damage Only	Cloudy	Dry	Daylight	Disregard Traffic Signal
1504719	5/20/2013	Highway 551	Keil Rd NE	Rear-end	Property Damage Only	Clear	Dry	Dark; Lights	Too Fast for Conditions
1507929	6/28/2013	Highway 551	Keil Rd NE	Fixed Object	Property Damage Only	Clear	Dry	Daylight	Inattention
1509316	7/9/2013	Highway 551	Arndt Rd	Rear-end	Property Damage Only	Clear	Dry	Dusk	Following Too Close
1523536	7/11/2013	Arndt Rd	Airport Rd NE	Turning	Injury	Clear	Dry	Daylight	Failure to Yield
1521331	8/6/2013	Highway 551	Arndt Rd	Rear-end	Injury	Clear	Dry	Daylight	Following Too Close
1512784	8/6/2013	Ehlen Rd NE	Highway 551	Rear-end	Property Damage Only	Clear	Dry	Daylight	Following Too Close
1513417	8/18/2013	Highway 551	Keil Rd NE	Rear-end	Injury	Clear	Dry	Daylight	Following Too Close
1513455	8/20/2013	Highway 551	Arndt Rd	Rear-end	Property Damage Only	Clear	Dry	Daylight	Following Too Close
1513907	8/22/2013	Highway 551	Keil Rd NE	Turning	Property Damage Only	Clear	Dry	Daylight	Failure to Yield
1519649	9/21/2013	Arndt Rd	Airport Rd NE	Rear-end	Injury	Clear	Dry	Daylight	Following Too Close
1520842	9/30/2013	Airport Rd NE	Arndt Rd	Rear-end	Property Damage Only	Cloudy	Wet	Daylight	Following Too Close
1537133	10/25/2013	Arndt Rd	Airport Rd NE	Rear-end	Property Damage Only	Rain	Wet	Dark; No Lights	Following Too Close
1526863	11/7/2013	Airport Rd NE	Keil Rd NE	Bicycle	Injury	Cloudy	Wet	Dark; Lights	Failure to Yield
1528243	11/15/2013	Highway 551	Ehlen Rd NE	Turning	Property Damage Only	Rain	Wet	Dark; Lights	Failure to Yield
1528763	11/23/2013	Highway 551	Ehlen Rd NE	Turning	Injury	Clear	Dry	Daylight	Failure to Yield
1541878	12/17/2013	Highway 551		Rear-end	Injury	Cloudy	Wet	Dark; Lights	Following Too Close
1541476	12/23/2013	Highway 551		Rear-end	Property Damage Only	Clear	Dry	Dark; Lights	Following Too Close
1551950	1/13/2014	Highway 551		Rear-end	Injury	Cloudy	Dry	Dusk	Following Too Close
1551166	1/13/2014	Arndt Rd	Airport Rd NE	Turning	Injury	Cloudy	Dry	Dark; Lights	Failure to Yield
1552475	1/22/2014	Arndt Rd	Airport Rd NE	Turning	Property Damage Only	Unknown	Dry	Dark; No Lights	Failure to Yield
1552445	2/3/2014	Highway 551	Ehlen Rd NE	Rear-end	Property Damage Only	Rain	Wet	Daylight	Following Too Close
1552973	2/17/2014	Highway 551	Ehlen Rd NE	Rear-end	Injury	Rain	Wet	Dark; Lights	Following Too Close
1553320	2/21/2014	Ehlen Rd NE	Highway 551	Rear-end	Injury	Clear	Dry	Daylight	Other
1553899	3/4/2014	Highway 551	Ehlen Rd NE	Turning	Property Damage Only	Clear	Dry	Daylight	Failure to Yield
1554586	3/20/2014	Highway 551	Keil Rd NE	Angle	Injury	Clear	Dry	Daylight	Failure to Yield
1561706	4/1/2014	Airport Rd NE	Arndt Rd	Turning	Injury	Clear	Dry	Daylight	Failure to Yield
1562210	4/5/2014	Highway 551	Arndt Rd	Rear-end	Injury	Rain	Wet	Daylight	Too Fast for Conditions

Crash ID	Crash Date	1st Street	2nd Street	Collision Type_Full	DKS Severity	Weather	Road Surface	Light	Collision Cause
1555464	4/10/2014	Highway 551	Ehlen Rd NE	Rear-end	Injury	Clear	Dry	Daylight	Following Too Close
1564618	4/24/2014	Airport Rd NE	Arndt Rd	Backing	Property Damage Only	Clear	Dry	Daylight	Improper Driving
1567940	5/20/2014	Highway 551	Ehlen Rd NE	Rear-end	Property Damage Only	Clear	Dry	Daylight	Following Too Close
1557651	5/22/2014	Highway 551	Ehlen Rd NE	Turning	Injury	Clear	Dry	Daylight	Failure to Yield
1558728	6/20/2014	Airport Rd NE	Arndt Rd	Rear-end	Injury	Rain	Wet	Daylight	Inattention
1559059	6/26/2014	Highway 551	Ehlen Rd NE	Angle	Injury	Clear	Dry	Daylight	Disregard Traffic Signal
1559471	7/8/2014	Highway 551	Keil Rd NE	Turning	Injury	Clear	Dry	Daylight	Failure to Yield
1560136	7/17/2014	Highway 551	Ehlen Rd NE	Turning	Property Damage Only	Clear	Dry	Daylight	Failure to Yield
1560588	7/23/2014	Ehlen Rd NE	Airport Rd NE	Rear-end	Property Damage Only	Clear	Dry	Daylight	Following Too Close
1560638	7/24/2014	Highway 551		Rear-end	Property Damage Only	Clear	Dry	Daylight	Following Too Close
1561068	7/31/2014	Highway 551	Keil Rd NE	Angle	Injury	Clear	Dry	Daylight	Failure to Yield
1562123	8/7/2014	Highway 551	Arndt Rd	Sideswipe	Property Damage Only	Clear	Dry	Daylight	Improper Lane Change
1579205	8/7/2014	Highway 551		Sideswipe	Property Damage Only	Clear	Dry	Daylight	Improper Lane Change
1580798	8/20/2014	Arndt Rd	Airport Rd NE	Turning	Injury	Clear	Dry	Daylight	Improper Turn
1563650	8/26/2014	Airport Rd NE	Arndt Rd	Turning	Property Damage Only	Clear	Dry	Daylight	Failure to Yield
1580474	8/26/2014	Arndt Rd	Airport Rd NE	Turning	Property Damage Only	Clear	Dry	Daylight	Failure to Yield
1563909	8/28/2014	Highway 551	Keil Rd NE	Angle	Property Damage Only	Clear	Dry	Daylight	Failure to Yield
1582933	9/11/2014	Arndt Rd	Airport Rd NE	Rear-end	Injury	Clear	Dry	Daylight	Inattention
1565400	9/18/2014	Airport Rd NE		Bicycle	Injury	Clear	Dry	Dark; Lights	Improper Driving
1568048	10/15/2014	Highway 551	Keil Rd NE	Turning	Property Damage Only	Rain	Wet	Daylight	Failure to Yield
1581789	11/10/2014			Turning	Severe Injury	Cloudy	Dry	Dark; Lights	Failure to Yield
1571763	11/12/2014	Highway 551	Ehlen Rd NE	Rear-end	Injury	Unknown	Dry	Daylight	Following Too Close
1572619	11/23/2014	Highway 551	Ehlen Rd NE	Angle	Injury	Clear	Dry	Daylight	Disregard Traffic Signal
1595890	12/8/2014	Arndt Rd	Airport Rd NE	Rear-end	Injury	Cloudy	Dry	Dark; No Lights	Inattention
1596558	12/11/2014	Arndt Rd	Airport Rd NE	Rear-end	Injury	Rain	Wet	Daylight	Following Too Close
1630584	1/6/2015	Highway 551	Arndt Rd	Rear-end	Property Damage Only	Clear	Dry	Daylight	Unknown
1632733	1/27/2015	Arndt Rd		Sideswipe	Property Damage Only	Fog	Wet	Dawn	Improper Lane Change
1604588	3/9/2015	Highway 551	Ehlen Rd NE	Angle	Injury	Clear	Dry	Daylight	Inattention
1604944	3/18/2015	Highway 551	Arndt Rd	Turning	Injury	Clear	Dry	Daylight	Improper Driving
1635125	3/20/2015	Ehlen Rd NE		Turning	Property Damage Only	Cloudy	Dry	Daylight	Failure to Yield
1608578	4/4/2015	Highway 551	Arndt Rd	Sideswipe	Injury	Clear	Dry	Daylight	Improper Lane Change
1606149	4/14/2015	Highway 551	Arndt Rd	Sideswipe	Injury	Clear	Dry	Dark; Lights	Improper Overtake
1639499	4/23/2015	Highway 551	Arndt Rd	Turning	Property Damage Only	Rain	Wet	Dark; Lights	Improper Turn
1607180	4/24/2015	Ehlen Rd NE		Turning	Injury	Rain	Wet	Daylight	Careless
1638765	4/29/2015	Arndt Rd	Airport Rd NE	Turning	Property Damage Only	Clear	Dry	Daylight	Failure to Yield
1640566	5/22/2015	Highway 551	Arndt Rd	Sideswipe	Property Damage Only	Cloudy	Dry	Daylight	Improper Lane Change
1609140	5/30/2015	Highway 551	Arndt Rd	Rear-end	Injury	Clear	Dry	Daylight	Following Too Close
1611437	6/17/2015	Highway 551		Head-on	Injury	Clear	Dry	Daylight	Load Lost of Shifted
1611514	6/18/2015	Airport Rd NE	Arndt Rd	Turning	Severe Injury	Clear	Dry	Dark; No Lights	Failure to Yield
1613543	6/22/2015	Arndt Rd	Airport Rd NE	Turning	Injury	Clear	Dry	Daylight	Failure to Yield
1644654	6/29/2015	Highway 551	Arndt Rd	Turning	Property Damage Only	Clear	Dry	Daylight	Improper Turn
1614908	7/14/2015	Arndt Rd	Airport Rd NE	Rear-end	Injury	Clear	Dry	Daylight	Unknown

Crash ID	Crash Date	1st Street	2nd Street	Collision Type_Full	DKS Severity	Weather	Road Surface	Light	Collision Cause
1641844	8/2/2015	Airport Rd NE		Turning	Property Damage Only	Clear	Dry	Daylight	Improper Turn
1619939	8/26/2015	Arndt Rd	Airport Rd NE	Rear-end	Injury	Clear	Dry	Daylight	Following Too Close
1615733	8/28/2015	Highway 551		Bicycle	Injury	Clear	Dry	Dark; Lights	Phantom Vehicle
1620860	9/7/2015	Highway 551	Arndt Rd	Turning	Injury	Clear	Dry	Daylight	Failure to Yield
1620576	9/9/2015	Highway 551	Arndt Rd	Turning	Injury	Cloudy	Dry	Daylight	Failure to Yield
1616853	9/14/2015	Highway 551		Rear-end	Injury	Clear	Dry	Daylight	Careless
1644656	9/23/2015	Highway 551		Rear-end	Property Damage Only	Clear	Dry	Daylight	Unknown
1622231	9/25/2015	Arndt Rd	Airport Rd NE	Rear-end	Injury	Unknown	Unknown	Daylight	Unknown
1644979	10/4/2015	Ehlen Rd NE	Highway 551	Rear-end	Property Damage Only	Clear	Dry	Daylight	Unknown
1626215	11/4/2015	Ehlen Rd NE	Airport Rd NE	Turning	Injury	Clear	Dry	Dusk	Failure to Yield
1646322	11/4/2015	Ehlen Rd NE	Airport Rd NE	Turning	Property Damage Only	Clear	Dry	Daylight	Failure to Yield
1650111	11/16/2015	Highway 551	Arndt Rd	Turning	Property Damage Only	Rain	Wet	Daylight	Improper Turn
1623824	12/2/2015	Highway 551	Keil Rd NE	Rear-end	Injury	Rain	Wet	Dark; Lights	Following Too Close
1624548	12/8/2015	Airport Rd NE	Arndt Rd	Turning	Injury	Cloudy	Wet	Dark; No Lights	Failure to Yield
1628353	12/10/2015	Highway 551	Arndt Rd	Turning	Injury	Cloudy	Wet	Daylight	Failure to Yield
1653785	12/10/2015	Highway 551	Arndt Rd	Turning	Property Damage Only	Unknown	Wet	Daylight	Failure to Yield
1628484	12/20/2015	Highway 551	Ehlen Rd NE	Rear-end	Injury	Rain	Wet	Dark; Lights	Unknown
1625860	12/30/2015	Arndt Rd	Airport Rd NE	Rear-end	Injury	Clear	Dry	Dark; No Lights	Unknown

Appendix E – Existing HCM Analysis Results

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	354	59	24	571	317	53	116	7	74	23	10
Future Volume (vph)	28	354	59	24	571	317	53	116	7	74	23	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		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	
Frt	1.00	0.98		1.00	0.95		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1554	3061		1599	1710		1662	1702		1583	1620	
Flt Permitted	0.95	1.00		0.95	1.00		0.73	1.00		0.67	1.00	
Satd. Flow (perm)	1554	3061		1599	1710		1284	1702		1119	1620	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	385	64	26	621	345	58	126	8	80	25	11
RTOR Reduction (vph)	0	8	0	0	11	0	0	3	0	0	9	0
Lane Group Flow (vph)	30	441	0	26	955	0	58	131	0	80	27	0
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	7%	7%	2%	4%	7%	3%	0%	2%	0%	5%	0%	10%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	3.0	47.6		2.9	47.5		11.5	11.5		11.5	11.5	
Effective Green, g (s)	3.0	47.6		2.9	47.5		11.5	11.5		11.5	11.5	
Actuated g/C Ratio	0.04	0.60		0.04	0.59		0.14	0.14		0.14	0.14	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	58	1821		57	1015		184	244		160	232	
v/s Ratio Prot	c0.02	0.14		0.02	c0.56			c0.08			0.02	
v/s Ratio Perm							0.05			0.07		
v/c Ratio	0.52	0.24		0.46	0.94		0.32	0.54		0.50	0.11	
Uniform Delay, d1	37.8	7.7		37.8	15.0		30.7	31.8		31.6	29.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.6	0.1		5.7	15.9		1.0	2.3		2.4	0.2	
Delay (s)	45.4	7.7		43.5	30.9		31.7	34.1		34.0	30.0	
Level of Service	D	A		D	C		C	C		C	C	
Approach Delay (s)		10.1			31.2			33.4			32.8	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	2	30	200	30	21
Future Vol, veh/h	11	2	30	200	30	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	18	0	0	3	0	5
Mvmt Flow	13	2	34	227	34	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	341	46	58	0	-	0
Stage 1	46	-	-	-	-	-
Stage 2	295	-	-	-	-	-
Critical Hdwy	6.58	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.58	-	-	-	-	-
Critical Hdwy Stg 2	5.58	-	-	-	-	-
Follow-up Hdwy	3.662	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	624	1029	1559	-	-	-
Stage 1	937	-	-	-	-	-
Stage 2	720	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	608	1029	1559	-	-	-
Mov Cap-2 Maneuver	608	-	-	-	-	-
Stage 1	914	-	-	-	-	-
Stage 2	720	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.7	1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1559	-	649	-	-
HCM Lane V/C Ratio	0.022	-	0.023	-	-
HCM Control Delay (s)	7.4	0	10.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	273	392	196	29	7
Future Vol, veh/h	20	273	392	196	29	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	7	6	1	0	0
Mvmt Flow	22	300	431	215	32	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	646	0	-	0	883	539
Stage 1	-	-	-	-	539	-
Stage 2	-	-	-	-	344	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	949	-	-	-	319	546
Stage 1	-	-	-	-	589	-
Stage 2	-	-	-	-	722	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	949	-	-	-	310	546
Mov Cap-2 Maneuver	-	-	-	-	310	-
Stage 1	-	-	-	-	573	-
Stage 2	-	-	-	-	722	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	17.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	949	-	-	-	338
HCM Lane V/C Ratio	0.023	-	-	-	0.117
HCM Control Delay (s)	8.9	0	-	-	17.1
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	78	6	39	48	530	2	548	44	334	284	13
Future Volume (vph)	38	78	6	39	48	530	2	548	44	334	284	13
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.7			5.7	4.0	4.5	6.0	6.0	4.5	6.0	6.0
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.99			1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1624			1588	1403	1662	1606	1305	3014	1606	1457
Flt Permitted		0.87			0.77	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1428			1245	1403	1662	1606	1305	3014	1606	1457
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	45	92	7	46	56	624	2	645	52	393	334	15
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	27	0	0	5
Lane Group Flow (vph)	0	142	0	0	102	624	2	645	25	393	334	10
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	5%	6%	0%	10%	6%	6%	0%	9%	14%	7%	9%	0%
Turn Type	Perm	NA		Perm	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4		Free			6			2
Actuated Green, G (s)		19.1			19.1	107.1	1.0	52.2	52.2	19.6	70.8	70.8
Effective Green, g (s)		19.1			19.1	107.1	1.0	52.2	52.2	19.6	70.8	70.8
Actuated g/C Ratio		0.18			0.18	1.00	0.01	0.49	0.49	0.18	0.66	0.66
Clearance Time (s)		5.7			5.7		4.5	6.0	6.0	4.5	6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		254			222	1403	15	782	636	551	1061	963
v/s Ratio Prot							0.00	c0.40		c0.13	0.21	
v/s Ratio Perm		0.10			0.08	c0.44			0.02			0.01
v/c Ratio		0.56			0.46	0.44	0.13	0.82	0.04	0.71	0.31	0.01
Uniform Delay, d1		40.2			39.4	0.0	52.6	23.5	14.3	41.1	7.8	6.2
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		2.8			1.5	1.0	4.0	7.1	0.0	4.4	0.2	0.0
Delay (s)		43.0			40.9	1.0	56.6	30.6	14.4	45.5	7.9	6.2
Level of Service		D			D	A	E	C	B	D	A	A
Approach Delay (s)		43.0			6.6			29.5			27.8	
Approach LOS		D			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	107.1	Sum of lost time (s)	16.2
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	18	12	5	1	2	5	562	11	30	279	7
Future Vol, veh/h	28	18	12	5	1	2	5	562	11	30	279	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	250	-	-	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	4	11	15	20	0	0	20	10	9	0	12	0
Mvmt Flow	32	21	14	6	1	2	6	646	13	34	321	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1059	1064	325	1076	1062	653	329	0	0	659	0	0
Stage 1	393	393	-	665	665	-	-	-	-	-	-	-
Stage 2	666	671	-	411	397	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.61	6.35	7.3	6.5	6.2	4.3	-	-	4.1	-	-
Critical Hdwy Stg 1	6.14	5.61	-	6.3	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.61	-	6.3	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.099	3.435	3.68	4	3.3	2.38	-	-	2.2	-	-
Pot Cap-1 Maneuver	200	215	687	182	225	471	1136	-	-	939	-	-
Stage 1	628	590	-	421	461	-	-	-	-	-	-	-
Stage 2	445	441	-	584	607	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	192	206	687	160	216	471	1136	-	-	939	-	-
Mov Cap-2 Maneuver	192	206	-	160	216	-	-	-	-	-	-	-
Stage 1	625	569	-	419	459	-	-	-	-	-	-	-
Stage 2	439	439	-	531	585	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	26.8	24	0.1	0.9
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1136	-	-	231	199	939	-	-
HCM Lane V/C Ratio	0.005	-	-	0.289	0.046	0.037	-	-
HCM Control Delay (s)	8.2	-	-	26.8	24	9	-	-
HCM Lane LOS	A	-	-	D	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.2	0.1	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	247	16	2	363	35	35	478	9	32	188	76
Future Volume (vph)	65	247	16	2	363	35	35	478	9	32	188	76
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.4			5.4		4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.99			0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1624			1621		1319	1591	1488	1568	1522	1430
Flt Permitted		0.75			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1438			1663		1319	1858	1858	1568	1522	1430
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	72	274	18	2	403	39	39	531	10	36	209	84
RTOR Reduction (vph)	0	1	0	0	3	0	0	0	6	0	0	49
Lane Group Flow (vph)	0	363	0	0	441	0	39	531	4	36	209	35
Heavy Vehicles (%)	5%	5%	25%	0%	6%	14%	26%	10%	0%	6%	15%	4%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4					6			2
Actuated Green, G (s)		29.0			29.0		4.6	35.2	35.2	4.4	35.0	35.0
Effective Green, g (s)		29.0			29.0		4.6	35.2	35.2	4.4	35.0	35.0
Actuated g/C Ratio		0.35			0.35		0.05	0.42	0.42	0.05	0.42	0.42
Clearance Time (s)		5.4			5.4		4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		496			574		72	666	778	82	634	595
v/s Ratio Prot							c0.03	c0.33		0.02	0.14	
v/s Ratio Perm		0.25			c0.27				0.00			0.02
v/c Ratio		0.73			0.77		0.54	0.80	0.01	0.44	0.33	0.06
Uniform Delay, d1		24.1			24.5		38.7	21.3	14.2	38.6	16.6	14.7
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		5.5			6.1		8.1	6.6	0.0	3.7	0.3	0.0
Delay (s)		29.6			30.7		46.7	27.9	14.2	42.3	16.9	14.7
Level of Service		C			C		D	C	B	D	B	B
Approach Delay (s)		29.6			30.7			28.9			19.1	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	27.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	84.0	Sum of lost time (s)	15.4
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	211	50	0
Future Vol, veh/h	0	0	0	211	50	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	10	15	0
Mvmt Flow	0	0	0	248	59	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	307	59	59	0	-	0
Stage 1	59	-	-	-	-	-
Stage 2	248	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	689	1012	1558	-	-	-
Stage 1	969	-	-	-	-	-
Stage 2	798	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	689	1012	1558	-	-	-
Mov Cap-2 Maneuver	689	-	-	-	-	-
Stage 1	969	-	-	-	-	-
Stage 2	798	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1558	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	211	50	0
Future Vol, veh/h	0	0	0	211	50	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	10	15	0
Mvmt Flow	0	0	0	248	59	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	307	59	59	0	-	0
Stage 1	59	-	-	-	-	-
Stage 2	248	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	689	1012	1558	-	-	-
Stage 1	969	-	-	-	-	-
Stage 2	798	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	689	1012	1558	-	-	-
Mov Cap-2 Maneuver	689	-	-	-	-	-
Stage 1	969	-	-	-	-	-
Stage 2	798	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1558	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	738	73	7	490	163	109	66	73	298	61	49
Future Volume (vph)	13	738	73	7	490	163	109	66	73	298	61	49
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.92		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1446	3213		1662	1710		1646	1589		1630	1564	
Flt Permitted	0.95	1.00		0.95	1.00		0.68	1.00		0.65	1.00	
Satd. Flow (perm)	1446	3213		1662	1710		1174	1589		1118	1564	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	15	829	82	8	551	183	122	74	82	335	69	55
RTOR Reduction (vph)	0	5	0	0	9	0	0	34	0	0	25	0
Lane Group Flow (vph)	15	906	0	8	725	0	122	122	0	335	99	0
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	15%	2%	3%	0%	2%	3%	1%	2%	1%	2%	3%	4%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	2.8	47.3		1.3	45.8		33.8	33.8		33.8	33.8	
Effective Green, g (s)	2.8	47.3		1.3	45.8		33.8	33.8		33.8	33.8	
Actuated g/C Ratio	0.03	0.47		0.01	0.46		0.34	0.34		0.34	0.34	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	40	1513		21	780		395	534		376	526	
v/s Ratio Prot	c0.01	0.28		0.00	c0.42			0.08			0.06	
v/s Ratio Perm							0.10			c0.30		
v/c Ratio	0.38	0.60		0.38	0.93		0.31	0.23		0.89	0.19	
Uniform Delay, d1	47.9	19.6		49.2	25.8		24.7	23.9		31.6	23.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.8	0.6		11.2	17.2		0.4	0.2		22.2	0.2	
Delay (s)	53.8	20.2		60.3	42.9		25.1	24.1		53.7	23.8	
Level of Service	D	C		E	D		C	C		D	C	
Approach Delay (s)		20.7			43.1			24.6			45.6	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	32.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	100.4	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	32	30	4	76	193	19
Future Vol, veh/h	32	30	4	76	193	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	0	0	25	1	2	0
Mvmt Flow	41	38	5	96	244	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	362	256	268	0	-	0
Stage 1	256	-	-	-	-	-
Stage 2	106	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.35	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.425	-	-	-
Pot Cap-1 Maneuver	641	788	1174	-	-	-
Stage 1	791	-	-	-	-	-
Stage 2	923	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	638	788	1174	-	-	-
Mov Cap-2 Maneuver	638	-	-	-	-	-
Stage 1	788	-	-	-	-	-
Stage 2	923	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.8	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1174	-	703	-	-
HCM Lane V/C Ratio	0.004	-	0.112	-	-
HCM Control Delay (s)	8.1	0	10.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	12.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	18	539	430	73	180	42
Future Vol, veh/h	18	539	430	73	180	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	11	3	4	1	2	5
Mvmt Flow	19	561	448	76	188	44

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	524	0	-	0	1085	486
Stage 1	-	-	-	-	486	-
Stage 2	-	-	-	-	599	-
Critical Hdwy	4.21	-	-	-	6.42	6.25
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.299	-	-	-	3.518	3.345
Pot Cap-1 Maneuver	998	-	-	-	240	575
Stage 1	-	-	-	-	618	-
Stage 2	-	-	-	-	549	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	998	-	-	-	233	575
Mov Cap-2 Maneuver	-	-	-	-	233	-
Stage 1	-	-	-	-	601	-
Stage 2	-	-	-	-	549	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	70
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	998	-	-	-	263
HCM Lane V/C Ratio	0.019	-	-	-	0.879
HCM Control Delay (s)	8.7	0	-	-	70
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	7.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	89	5	123	73	450	8	362	35	670	637	67
Future Volume (vph)	36	89	5	123	73	450	8	362	35	670	637	67
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.7			5.7	4.0	4.5	6.0	6.0	4.5	6.0	6.0
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt		1.00			1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1650			1639	1458	1662	1683	1444	3162	1683	1377
Flt Permitted		0.85			0.71	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1419			1198	1458	1662	1683	1444	3162	1683	1377
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	97	5	134	79	489	9	393	38	728	692	73
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	25	0	0	30
Lane Group Flow (vph)	0	140	0	0	213	489	9	393	13	728	692	43
Heavy Vehicles (%)	0%	6%	0%	5%	1%	2%	0%	4%	3%	2%	4%	8%
Turn Type	Perm	NA		Perm	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4		Free			6			2
Actuated Green, G (s)		23.8			23.8	98.9	1.2	32.7	32.7	26.2	57.7	57.7
Effective Green, g (s)		23.8			23.8	98.9	1.2	32.7	32.7	26.2	57.7	57.7
Actuated g/C Ratio		0.24			0.24	1.00	0.01	0.33	0.33	0.26	0.58	0.58
Clearance Time (s)		5.7			5.7		4.5	6.0	6.0	4.5	6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		341			288	1458	20	556	477	837	981	803
v/s Ratio Prot							0.01	0.23		c0.23	c0.41	
v/s Ratio Perm		0.10			c0.18	0.34			0.01			0.03
v/c Ratio		0.41			0.74	0.34	0.45	0.71	0.03	0.87	0.71	0.05
Uniform Delay, d1		31.6			34.7	0.0	48.5	28.9	22.4	34.7	14.6	8.9
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.8			9.6	0.6	15.3	4.1	0.0	9.6	2.3	0.0
Delay (s)		32.5			44.2	0.6	63.8	33.0	22.4	44.3	16.9	8.9
Level of Service		C			D	A	E	C	C	D	B	A
Approach Delay (s)		32.5			13.9			32.7			29.9	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	98.9	Sum of lost time (s)	16.2
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	3	35	23	19	19	6	381	3	1	744	23
Future Vol, veh/h	13	3	35	23	19	19	6	381	3	1	744	23
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	250	-	-	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	3	0	0	0	0	5	0	0	4	0
Mvmt Flow	14	3	38	25	21	21	7	414	3	1	809	25

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1275	1255	822	1274	1266	416	834	0	0	417	0	0
Stage 1	824	824	-	430	430	-	-	-	-	-	-	-
Stage 2	451	431	-	844	836	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.23	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.327	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	145	173	372	145	171	641	808	-	-	1153	-	-
Stage 1	370	390	-	607	587	-	-	-	-	-	-	-
Stage 2	592	586	-	361	385	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	126	171	372	127	169	641	808	-	-	1153	-	-
Mov Cap-2 Maneuver	126	171	-	127	169	-	-	-	-	-	-	-
Stage 1	367	390	-	602	582	-	-	-	-	-	-	-
Stage 2	548	581	-	321	385	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.8	34	0.1	0
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	808	-	-	237	189	1153	-	-
HCM Lane V/C Ratio	0.008	-	-	0.234	0.351	0.001	-	-
HCM Control Delay (s)	9.5	-	-	24.8	34	8.1	-	-
HCM Lane LOS	A	-	-	C	D	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.9	1.5	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	394	31	12	417	30	25	315	11	142	420	240
Future Volume (vph)	45	394	31	12	417	30	25	315	11	142	420	240
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.4			5.4		4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.99			0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1630			1654		1385	1651	1488	1614	1667	1444
Flt Permitted		0.92			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1438			1663		1385	1858	1858	1614	1667	1444
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	415	33	13	439	32	26	332	12	149	442	253
RTOR Reduction (vph)	0	2	0	0	2	0	0	0	8	0	0	157
Lane Group Flow (vph)	0	493	0	0	482	0	26	332	4	149	442	96
Heavy Vehicles (%)	0%	6%	13%	8%	5%	0%	20%	6%	0%	3%	5%	3%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4					6			2
Actuated Green, G (s)		40.0			40.0		3.3	28.2	28.2	11.1	36.0	36.0
Effective Green, g (s)		40.0			40.0		3.3	28.2	28.2	11.1	36.0	36.0
Actuated g/C Ratio		0.42			0.42		0.03	0.30	0.30	0.12	0.38	0.38
Clearance Time (s)		5.4			5.4		4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		607			702		48	491	553	189	633	548
v/s Ratio Prot							0.02	0.20		c0.09	c0.27	
v/s Ratio Perm		c0.34			0.29				0.00			0.07
v/c Ratio		0.81			0.69		0.54	0.68	0.01	0.79	0.70	0.18
Uniform Delay, d1		24.1			22.3		45.0	29.2	23.4	40.7	24.8	19.5
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		8.2			2.8		11.9	3.7	0.0	19.2	3.4	0.2
Delay (s)		32.2			25.1		56.9	32.9	23.4	59.9	28.1	19.6
Level of Service		C			C		E	C	C	E	C	B
Approach Delay (s)		32.2			25.1			34.3			31.2	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	94.7	Sum of lost time (s)	15.4
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	108	212	0
Future Vol, veh/h	0	0	0	108	212	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	6	5	0
Mvmt Flow	0	0	0	127	249	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	376	249	249	0	-	0
Stage 1	249	-	-	-	-	-
Stage 2	127	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	629	795	1328	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	904	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	629	795	1328	-	-	-
Mov Cap-2 Maneuver	629	-	-	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	904	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1328	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	108	212	0
Future Vol, veh/h	0	0	0	108	212	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	6	5	0
Mvmt Flow	0	0	0	127	249	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	376	249	249	0	-	0
Stage 1	249	-	-	-	-	-
Stage 2	127	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	629	795	1328	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	904	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	629	795	1328	-	-	-
Mov Cap-2 Maneuver	629	-	-	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	904	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1328	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

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Appendix F – 2022 HCM Analysis Results

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	389	59	24	628	349	53	116	7	74	23	10
Future Volume (vph)	31	389	59	24	628	349	53	116	7	74	23	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		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	
Frt	1.00	0.98		1.00	0.95		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1554	3065		1599	1710		1662	1702		1583	1620	
Flt Permitted	0.06	1.00		0.46	1.00		0.55	1.00		0.67	1.00	
Satd. Flow (perm)	93	3065		779	1710		959	1702		1119	1620	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	34	423	64	26	683	379	58	126	8	80	25	11
RTOR Reduction (vph)	0	9	0	0	15	0	0	2	0	0	10	0
Lane Group Flow (vph)	34	478	0	26	1047	0	58	132	0	80	26	0
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	7%	7%	2%	4%	7%	3%	0%	2%	0%	5%	0%	10%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	73.8	70.4		73.8	70.4		24.6	14.6		17.2	10.9	
Effective Green, g (s)	73.8	70.4		73.8	70.4		24.6	14.6		17.2	10.9	
Actuated g/C Ratio	0.63	0.60		0.63	0.60		0.21	0.13		0.15	0.09	
Clearance Time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	101	1848		516	1031		262	212		189	151	
v/s Ratio Prot	c0.01	0.16		0.00	c0.61		0.02	c0.08		c0.02	0.02	
v/s Ratio Perm	0.20			0.03			0.03			0.04		
v/c Ratio	0.34	0.26		0.05	1.02		0.22	0.62		0.42	0.17	
Uniform Delay, d1	24.7	10.9		8.0	23.1		37.7	48.4		44.7	48.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.1		0.0	31.9		0.4	5.6		1.5	0.5	
Delay (s)	26.6	11.0		8.1	55.1		38.1	54.1		46.2	49.3	
Level of Service	C	B		A	E		D	D		D	D	
Approach Delay (s)		12.0			54.0			49.3			47.2	
Approach LOS		B			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	41.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	116.7	Sum of lost time (s)	22.0
Intersection Capacity Utilization	83.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	2	30	200	30	21
Future Vol, veh/h	11	2	30	200	30	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	18	0	0	3	0	5
Mvmt Flow	13	2	34	227	34	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	341	46	58	0	-	0
Stage 1	46	-	-	-	-	-
Stage 2	295	-	-	-	-	-
Critical Hdwy	6.58	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.58	-	-	-	-	-
Critical Hdwy Stg 2	5.58	-	-	-	-	-
Follow-up Hdwy	3.662	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	624	1029	1559	-	-	-
Stage 1	937	-	-	-	-	-
Stage 2	720	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	608	1029	1559	-	-	-
Mov Cap-2 Maneuver	608	-	-	-	-	-
Stage 1	914	-	-	-	-	-
Stage 2	720	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.7	1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1559	-	649	-	-
HCM Lane V/C Ratio	0.022	-	0.023	-	-
HCM Control Delay (s)	7.4	0	10.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	273	392	196	29	7
Future Vol, veh/h	20	273	392	196	29	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	7	6	1	0	0
Mvmt Flow	22	300	431	215	32	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	646	0	-	0	883	539
Stage 1	-	-	-	-	539	-
Stage 2	-	-	-	-	344	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	949	-	-	-	319	546
Stage 1	-	-	-	-	589	-
Stage 2	-	-	-	-	722	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	949	-	-	-	310	546
Mov Cap-2 Maneuver	-	-	-	-	310	-
Stage 1	-	-	-	-	573	-
Stage 2	-	-	-	-	722	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	17.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	949	-	-	-	338
HCM Lane V/C Ratio	0.023	-	-	-	0.117
HCM Control Delay (s)	8.9	0	-	-	17.1
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	86	7	43	53	583	2	603	49	368	312	14
Future Volume (vph)	42	86	7	43	53	583	2	603	49	368	312	14
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.7			5.7	4.0	4.5	6.0	6.0	4.5	6.0	6.0
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.99			1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1624			1588	1403	1662	1606	1305	3014	1606	1457
Flt Permitted		0.86			0.72	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1414			1165	1403	1662	1606	1305	3014	1606	1457
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	47	96	8	48	59	648	2	670	54	409	347	16
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	27	0	0	5
Lane Group Flow (vph)	0	149	0	0	107	648	2	670	27	409	347	11
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	5%	6%	0%	10%	6%	6%	0%	9%	14%	7%	9%	0%
Turn Type	Perm	NA		Perm	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4		Free			6			2
Actuated Green, G (s)		17.2			17.2	107.8	1.0	54.2	54.2	20.2	73.4	73.4
Effective Green, g (s)		17.2			17.2	107.8	1.0	54.2	54.2	20.2	73.4	73.4
Actuated g/C Ratio		0.16			0.16	1.00	0.01	0.50	0.50	0.19	0.68	0.68
Clearance Time (s)		5.7			5.7		4.5	6.0	6.0	4.5	6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		225			185	1403	15	807	656	564	1093	992
v/s Ratio Prot							0.00	c0.42		c0.14	0.22	
v/s Ratio Perm		c0.11			0.09	c0.46			0.02			0.01
v/c Ratio		0.66			0.58	0.46	0.13	0.83	0.04	0.73	0.32	0.01
Uniform Delay, d1		42.6			41.9	0.0	53.0	22.9	13.6	41.2	7.0	5.5
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		7.2			4.3	1.1	4.0	7.3	0.0	4.6	0.2	0.0
Delay (s)		49.8			46.3	1.1	57.0	30.1	13.6	45.8	7.2	5.5
Level of Service		D			D	A	E	C	B	D	A	A
Approach Delay (s)		49.8			7.5			29.0			27.6	
Approach LOS		D			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	107.8	Sum of lost time (s)	16.2
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	18	14	5	1	2	5	619	12	30	307	7
Future Vol, veh/h	28	18	14	5	1	2	5	619	12	30	307	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	250	-	-	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	4	11	15	20	0	0	20	10	9	0	12	0
Mvmt Flow	32	20	16	6	1	2	6	703	14	34	349	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1145	1150	353	1161	1147	710	357	0	0	717	0	0
Stage 1	421	421	-	722	722	-	-	-	-	-	-	-
Stage 2	724	729	-	439	425	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.61	6.35	7.3	6.5	6.2	4.3	-	-	4.1	-	-
Critical Hdwy Stg 1	6.14	5.61	-	6.3	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.61	-	6.3	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.099	3.435	3.68	4	3.3	2.38	-	-	2.2	-	-
Pot Cap-1 Maneuver	175	191	662	159	201	437	1109	-	-	893	-	-
Stage 1	606	574	-	391	434	-	-	-	-	-	-	-
Stage 2	414	415	-	563	590	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	168	183	662	137	192	437	1109	-	-	893	-	-
Mov Cap-2 Maneuver	168	183	-	137	192	-	-	-	-	-	-	-
Stage 1	603	552	-	389	432	-	-	-	-	-	-	-
Stage 2	409	413	-	509	568	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	30.2	27	0.1	0.8
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1109	-	-	210	173	893	-	-
HCM Lane V/C Ratio	0.005	-	-	0.325	0.053	0.038	-	-
HCM Control Delay (s)	8.3	-	-	30.2	27	9.2	-	-
HCM Lane LOS	A	-	-	D	D	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.3	0.2	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	272	18	2	399	39	39	526	10	36	207	83
Future Volume (vph)	71	272	18	2	399	39	39	526	10	36	207	83
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.4			5.4		4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.99			0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1624			1621		1319	1591	1488	1568	1522	1430
Flt Permitted		0.69			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1438			1663		1319	1858	1858	1568	1522	1430
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	79	302	20	2	443	43	43	584	11	40	230	92
RTOR Reduction (vph)	0	1	0	0	3	0	0	0	6	0	0	52
Lane Group Flow (vph)	0	400	0	0	485	0	43	584	5	40	230	40
Heavy Vehicles (%)	5%	5%	25%	0%	6%	14%	26%	10%	0%	6%	15%	4%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4					6			2
Actuated Green, G (s)		33.2			33.2		5.0	40.7	40.7	4.7	40.4	40.4
Effective Green, g (s)		33.2			33.2		5.0	40.7	40.7	4.7	40.4	40.4
Actuated g/C Ratio		0.35			0.35		0.05	0.43	0.43	0.05	0.43	0.43
Clearance Time (s)		5.4			5.4		4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		507			587		70	688	804	78	654	614
v/s Ratio Prot							c0.03	c0.37		0.03	0.15	
v/s Ratio Perm		0.28			c0.29				0.00			0.03
v/c Ratio		0.79			0.83		0.61	0.85	0.01	0.51	0.35	0.06
Uniform Delay, d1		27.3			27.8		43.6	23.9	15.1	43.5	18.0	15.7
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		8.0			9.3		14.9	9.6	0.0	5.6	0.3	0.0
Delay (s)		35.2			37.1		58.5	33.5	15.2	49.1	18.3	15.8
Level of Service		D			D		E	C	B	D	B	B
Approach Delay (s)		35.2			37.1			34.8			21.1	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	32.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	94.0	Sum of lost time (s)	15.4
Intersection Capacity Utilization	95.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	211	50	0
Future Vol, veh/h	0	0	0	211	50	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	10	15	0
Mvmt Flow	0	0	0	248	59	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	307	59	59	0	-	0
Stage 1	59	-	-	-	-	-
Stage 2	248	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	689	1012	1558	-	-	-
Stage 1	969	-	-	-	-	-
Stage 2	798	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	689	1012	1558	-	-	-
Mov Cap-2 Maneuver	689	-	-	-	-	-
Stage 1	969	-	-	-	-	-
Stage 2	798	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1558	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	211	50	0
Future Vol, veh/h	0	0	0	211	50	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	10	15	0
Mvmt Flow	0	0	0	248	59	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	307	59	59	0	-	0
Stage 1	59	-	-	-	-	-
Stage 2	248	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	689	1012	1558	-	-	-
Stage 1	969	-	-	-	-	-
Stage 2	798	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	689	1012	1558	-	-	-
Mov Cap-2 Maneuver	689	-	-	-	-	-
Stage 1	969	-	-	-	-	-
Stage 2	798	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1558	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	812	73	7	539	179	109	66	73	298	61	49
Future Volume (vph)	14	812	73	7	539	179	109	66	73	298	61	49
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.92		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1446	3217		1662	1710		1646	1589		1630	1564	
Flt Permitted	0.11	1.00		0.20	1.00		0.68	1.00		0.55	1.00	
Satd. Flow (perm)	172	3217		344	1710		1174	1589		943	1564	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	16	912	82	8	606	201	122	74	82	335	69	55
RTOR Reduction (vph)	0	7	0	0	12	0	0	48	0	0	33	0
Lane Group Flow (vph)	16	987	0	8	795	0	122	108	0	335	91	0
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	15%	2%	3%	0%	2%	3%	1%	2%	1%	2%	3%	4%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	36.4	35.4		36.4	35.4		17.3	11.0		20.9	12.8	
Effective Green, g (s)	36.4	35.4		36.4	35.4		17.3	11.0		20.9	12.8	
Actuated g/C Ratio	0.47	0.46		0.47	0.46		0.22	0.14		0.27	0.17	
Clearance Time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	97	1469		178	781		300	225		326	258	
v/s Ratio Prot	c0.00	0.31		0.00	c0.46		0.03	0.07		c0.11	0.06	
v/s Ratio Perm	0.08			0.02			0.06			c0.17		
v/c Ratio	0.16	0.67		0.04	1.02		0.41	0.48		1.03	0.35	
Uniform Delay, d1	16.3	16.5		11.8	21.1		25.3	30.6		27.4	28.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	1.2		0.1	36.8		0.9	1.6		57.1	0.8	
Delay (s)	17.1	17.7		11.9	57.8		26.2	32.2		84.5	29.5	
Level of Service	B	B		B	E		C	C		F	C	
Approach Delay (s)		17.7			57.4			29.6			69.7	
Approach LOS		B			E			C			E	

Intersection Summary			
HCM 2000 Control Delay	40.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	77.5	Sum of lost time (s)	22.0
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	32	30	4	76	193	19
Future Vol, veh/h	32	30	4	76	193	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	25	1	2	0
Mvmt Flow	38	35	5	89	227	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	337	238	249	0	-	0
Stage 1	238	-	-	-	-	-
Stage 2	99	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.35	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.425	-	-	-
Pot Cap-1 Maneuver	663	806	1194	-	-	-
Stage 1	806	-	-	-	-	-
Stage 2	930	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	660	806	1194	-	-	-
Mov Cap-2 Maneuver	660	-	-	-	-	-
Stage 1	803	-	-	-	-	-
Stage 2	930	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.5	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1194	-	723	-	-
HCM Lane V/C Ratio	0.004	-	0.101	-	-
HCM Control Delay (s)	8	0	10.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	12.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	18	539	430	73	180	42
Future Vol, veh/h	18	539	430	73	180	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	11	3	4	1	2	5
Mvmt Flow	19	561	448	76	188	44

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	524	0	-	0	1085	486
Stage 1	-	-	-	-	486	-
Stage 2	-	-	-	-	599	-
Critical Hdwy	4.21	-	-	-	6.42	6.25
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.299	-	-	-	3.518	3.345
Pot Cap-1 Maneuver	998	-	-	-	240	575
Stage 1	-	-	-	-	618	-
Stage 2	-	-	-	-	549	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	998	-	-	-	233	575
Mov Cap-2 Maneuver	-	-	-	-	233	-
Stage 1	-	-	-	-	601	-
Stage 2	-	-	-	-	549	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	70
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	998	-	-	-	263
HCM Lane V/C Ratio	0.019	-	-	-	0.879
HCM Control Delay (s)	8.7	0	-	-	70
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	7.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	98	6	136	80	496	9	398	39	737	701	73
Future Volume (vph)	40	98	6	136	80	496	9	398	39	737	701	73
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.7			5.7	4.0	4.5	6.0	6.0	4.5	6.0	6.0
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.99			1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1649			1639	1458	1662	1683	1444	3162	1683	1377
Flt Permitted		0.83			0.69	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1381			1165	1458	1662	1683	1444	3162	1683	1377
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	107	7	148	87	539	10	433	42	801	762	79
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	28	0	0	31
Lane Group Flow (vph)	0	156	0	0	235	539	10	433	14	801	762	48
Heavy Vehicles (%)	0%	6%	0%	5%	1%	2%	0%	4%	3%	2%	4%	8%
Turn Type	Perm	NA		Perm	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4		Free			6			2
Actuated Green, G (s)		28.8			28.8	106.4	1.3	35.6	35.6	25.8	60.1	60.1
Effective Green, g (s)		28.8			28.8	106.4	1.3	35.6	35.6	25.8	60.1	60.1
Actuated g/C Ratio		0.27			0.27	1.00	0.01	0.33	0.33	0.24	0.56	0.56
Clearance Time (s)		5.7			5.7		4.5	6.0	6.0	4.5	6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		373			315	1458	20	563	483	766	950	777
v/s Ratio Prot							0.01	0.26		c0.25	c0.45	
v/s Ratio Perm		0.11			c0.20	0.37			0.01			0.03
v/c Ratio		0.42			0.75	0.37	0.50	0.77	0.03	1.05	0.80	0.06
Uniform Delay, d1		31.9			35.5	0.0	52.2	31.7	23.8	40.3	18.4	10.4
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.8			9.3	0.7	18.3	6.3	0.0	45.1	4.9	0.0
Delay (s)		32.7			44.7	0.7	70.5	38.0	23.8	85.4	23.4	10.5
Level of Service		C			D	A	E	D	C	F	C	B
Approach Delay (s)		32.7			14.1			37.4			53.0	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	39.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	106.4	Sum of lost time (s)	16.2
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	3	41	23	19	19	6	419	5	1	819	23
Future Vol, veh/h	13	3	41	23	19	19	6	419	5	1	819	23
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	250	-	-	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	3	0	0	0	0	5	0	0	4	0
Mvmt Flow	14	3	45	25	21	21	7	455	5	1	890	25

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1398	1379	903	1401	1389	458	915	0	0	460	0	0
Stage 1	905	905	-	472	472	-	-	-	-	-	-	-
Stage 2	493	474	-	929	917	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.23	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.327	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	119	146	334	119	144	607	754	-	-	1112	-	-
Stage 1	334	358	-	576	562	-	-	-	-	-	-	-
Stage 2	562	561	-	324	354	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	101	145	334	101	143	607	754	-	-	1112	-	-
Mov Cap-2 Maneuver	101	145	-	101	143	-	-	-	-	-	-	-
Stage 1	331	358	-	571	557	-	-	-	-	-	-	-
Stage 2	518	556	-	278	354	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	29.3	44.1	0.1	0
HCM LOS	D	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	754	-	-	209	156	1112	-	-
HCM Lane V/C Ratio	0.009	-	-	0.296	0.425	0.001	-	-
HCM Control Delay (s)	9.8	-	-	29.3	44.1	8.2	-	-
HCM Lane LOS	A	-	-	D	E	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.2	1.9	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	433	34	13	459	33	28	347	12	157	462	264
Future Volume (vph)	50	433	34	13	459	33	28	347	12	157	462	264
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.4			5.4		4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.99			0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1630			1654		1385	1651	1488	1614	1667	1444
Flt Permitted		0.89			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1438			1663		1385	1858	1858	1614	1667	1444
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	456	36	14	483	35	29	365	13	165	486	278
RTOR Reduction (vph)	0	2	0	0	2	0	0	0	9	0	0	172
Lane Group Flow (vph)	0	543	0	0	530	0	29	365	4	165	486	106
Heavy Vehicles (%)	0%	6%	13%	8%	5%	0%	20%	6%	0%	3%	5%	3%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4					6			2
Actuated Green, G (s)		40.2			40.2		5.0	31.4	31.4	11.2	37.6	37.6
Effective Green, g (s)		40.2			40.2		5.0	31.4	31.4	11.2	37.6	37.6
Actuated g/C Ratio		0.41			0.41		0.05	0.32	0.32	0.11	0.38	0.38
Clearance Time (s)		5.4			5.4		4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		588			680		70	527	594	184	638	552
v/s Ratio Prot							0.02	0.22		c0.10	c0.29	
v/s Ratio Perm		c0.38			0.32				0.00			0.07
v/c Ratio		0.92			0.78		0.41	0.69	0.01	0.90	0.76	0.19
Uniform Delay, d1		27.5			25.2		45.2	29.2	22.8	42.9	26.4	20.2
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		20.3			5.7		3.9	3.9	0.0	38.4	5.4	0.2
Delay (s)		47.9			30.8		49.1	33.1	22.8	81.3	31.8	20.4
Level of Service		D			C		D	C	C	F	C	C
Approach Delay (s)		47.9			30.8			33.9			37.1	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	37.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	98.2	Sum of lost time (s)	15.4
Intersection Capacity Utilization	96.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	108	212	0
Future Vol, veh/h	0	0	0	108	212	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	6	5	0
Mvmt Flow	0	0	0	127	249	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	376	249	249	0	-	0
Stage 1	249	-	-	-	-	-
Stage 2	127	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	629	795	1328	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	904	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	629	795	1328	-	-	-
Mov Cap-2 Maneuver	629	-	-	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	904	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1328	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	108	212	0
Future Vol, veh/h	0	0	0	108	212	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	6	5	0
Mvmt Flow	0	0	0	127	249	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	376	249	249	0	-	0
Stage 1	249	-	-	-	-	-
Stage 2	127	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	629	795	1328	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	904	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	629	795	1328	-	-	-
Mov Cap-2 Maneuver	629	-	-	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	904	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1328	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	389	106	51	628	349	59	117	10	74	30	10
Future Volume (vph)	31	389	106	51	628	349	59	117	10	74	30	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		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	
Frt	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1554	3038		1599	1710		1662	1698		1583	1643	
Flt Permitted	0.06	1.00		0.42	1.00		0.54	1.00		0.67	1.00	
Satd. Flow (perm)	95	3038		714	1710		947	1698		1115	1643	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	34	423	115	55	683	379	64	127	11	80	33	11
RTOR Reduction (vph)	0	19	0	0	15	0	0	3	0	0	10	0
Lane Group Flow (vph)	34	519	0	55	1047	0	64	135	0	80	34	0
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	7%	7%	2%	4%	7%	3%	0%	2%	0%	5%	0%	10%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	72.0	68.6		74.6	69.9		24.8	14.8		17.2	11.0	
Effective Green, g (s)	72.0	68.6		74.6	69.9		24.8	14.8		17.2	11.0	
Actuated g/C Ratio	0.62	0.59		0.64	0.60		0.21	0.13		0.15	0.09	
Clearance Time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	101	1791		493	1027		263	216		189	155	
v/s Ratio Prot	c0.01	0.17		0.00	c0.61		0.02	c0.08		c0.02	0.02	
v/s Ratio Perm	0.20			0.07			0.03			0.04		
v/c Ratio	0.34	0.29		0.11	1.02		0.24	0.63		0.42	0.22	
Uniform Delay, d1	24.6	11.8		7.8	23.2		37.5	48.1		44.5	48.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.1		0.1	33.0		0.5	5.6		1.5	0.7	
Delay (s)	26.6	11.9		7.9	56.2		38.0	53.7		46.0	49.4	
Level of Service	C	B		A	E		D	D		D	D	
Approach Delay (s)		12.8			53.9			48.7			47.2	
Approach LOS		B			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	41.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	116.3	Sum of lost time (s)	22.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	18	2	30	247	35	22
Future Vol, veh/h	18	2	30	247	35	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	18	0	0	3	0	5
Mvmt Flow	20	2	34	281	40	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	402	53	65	0	-	0
Stage 1	53	-	-	-	-	-
Stage 2	349	-	-	-	-	-
Critical Hdwy	6.58	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.58	-	-	-	-	-
Critical Hdwy Stg 2	5.58	-	-	-	-	-
Follow-up Hdwy	3.662	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	574	1020	1550	-	-	-
Stage 1	930	-	-	-	-	-
Stage 2	680	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	559	1020	1550	-	-	-
Mov Cap-2 Maneuver	559	-	-	-	-	-
Stage 1	906	-	-	-	-	-
Stage 2	680	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.4	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1550	-	585	-	-
HCM Lane V/C Ratio	0.022	-	0.039	-	-
HCM Control Delay (s)	7.4	0	11.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	47	273	392	216	31	10
Future Vol, veh/h	47	273	392	216	31	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	7	6	1	0	0
Mvmt Flow	52	300	431	237	34	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	668	0	-	0	954	550
Stage 1	-	-	-	-	550	-
Stage 2	-	-	-	-	404	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	931	-	-	-	289	539
Stage 1	-	-	-	-	582	-
Stage 2	-	-	-	-	679	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	931	-	-	-	270	539
Mov Cap-2 Maneuver	-	-	-	-	270	-
Stage 1	-	-	-	-	543	-
Stage 2	-	-	-	-	679	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	18.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	931	-	-	-	307
HCM Lane V/C Ratio	0.055	-	-	-	0.147
HCM Control Delay (s)	9.1	0	-	-	18.7
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	92	7	43	54	588	2	603	49	409	312	14
Future Volume (vph)	42	92	7	43	54	588	2	603	49	409	312	14
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.7			5.7	4.0	4.5	6.0	6.0	4.5	6.0	6.0
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.99			1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1625			1588	1403	1662	1606	1305	3014	1606	1457
Flt Permitted		0.86			0.71	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1423			1147	1403	1662	1606	1305	3014	1606	1457
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	47	102	8	48	60	653	2	670	54	454	347	16
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	27	0	0	5
Lane Group Flow (vph)	0	155	0	0	108	653	2	670	27	454	347	11
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	5%	6%	0%	10%	6%	6%	0%	9%	14%	7%	9%	0%
Turn Type	Perm	NA		Perm	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4		Free			6			2
Actuated Green, G (s)		17.8			17.8	110.9	1.0	55.1	55.1	21.8	75.9	75.9
Effective Green, g (s)		17.8			17.8	110.9	1.0	55.1	55.1	21.8	75.9	75.9
Actuated g/C Ratio		0.16			0.16	1.00	0.01	0.50	0.50	0.20	0.68	0.68
Clearance Time (s)		5.7			5.7		4.5	6.0	6.0	4.5	6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		228			184	1403	14	797	648	592	1099	997
v/s Ratio Prot							0.00	c0.42		c0.15	0.22	
v/s Ratio Perm		c0.11			0.09	c0.47			0.02			0.01
v/c Ratio		0.68			0.59	0.47	0.14	0.84	0.04	0.77	0.32	0.01
Uniform Delay, d1		43.9			43.1	0.0	54.5	24.1	14.3	42.1	7.0	5.6
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		8.1			4.7	1.1	4.7	8.0	0.0	5.9	0.2	0.0
Delay (s)		52.0			47.9	1.1	59.2	32.1	14.4	48.1	7.2	5.6
Level of Service		D			D	A	E	C	B	D	A	A
Approach Delay (s)		52.0			7.7			30.8			29.9	
Approach LOS		D			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	110.9	Sum of lost time (s)	16.2
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	18	14	6	1	2	5	619	19	30	307	7
Future Vol, veh/h	28	18	14	6	1	2	5	619	19	30	307	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	250	-	-	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	4	11	15	20	0	0	20	10	9	0	12	0
Mvmt Flow	32	20	16	7	1	2	6	703	22	34	349	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1149	1158	353	1165	1151	714	357	0	0	725	0	0
Stage 1	421	421	-	726	726	-	-	-	-	-	-	-
Stage 2	728	737	-	439	425	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.61	6.35	7.3	6.5	6.2	4.3	-	-	4.1	-	-
Critical Hdwy Stg 1	6.14	5.61	-	6.3	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.61	-	6.3	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.099	3.435	3.68	4	3.3	2.38	-	-	2.2	-	-
Pot Cap-1 Maneuver	174	189	662	158	200	435	1109	-	-	887	-	-
Stage 1	606	574	-	389	433	-	-	-	-	-	-	-
Stage 2	412	412	-	563	590	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	167	181	662	136	191	435	1109	-	-	887	-	-
Mov Cap-2 Maneuver	167	181	-	136	191	-	-	-	-	-	-	-
Stage 1	603	552	-	387	431	-	-	-	-	-	-	-
Stage 2	407	410	-	509	568	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	30.5	28	0.1	0.8
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1109	-	-	208	167	887	-	-
HCM Lane V/C Ratio	0.005	-	-	0.328	0.061	0.038	-	-
HCM Control Delay (s)	8.3	-	-	30.5	28	9.2	-	-
HCM Lane LOS	A	-	-	D	D	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.4	0.2	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	288	18	3	401	39	39	529	19	36	207	84
Future Volume (vph)	75	288	18	3	401	39	39	529	19	36	207	84
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.4			5.4		4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.99			0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1625			1621		1319	1591	1488	1568	1522	1430
Flt Permitted		0.68			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1438			1663		1319	1858	1858	1568	1522	1430
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	83	320	20	3	446	43	43	588	21	40	230	93
RTOR Reduction (vph)	0	1	0	0	3	0	0	0	12	0	0	53
Lane Group Flow (vph)	0	422	0	0	489	0	43	588	9	40	230	40
Heavy Vehicles (%)	5%	5%	25%	0%	6%	14%	26%	10%	0%	6%	15%	4%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4					6			2
Actuated Green, G (s)		33.7			33.7		5.0	41.3	41.3	4.7	41.0	41.0
Effective Green, g (s)		33.7			33.7		5.0	41.3	41.3	4.7	41.0	41.0
Actuated g/C Ratio		0.35			0.35		0.05	0.43	0.43	0.05	0.43	0.43
Clearance Time (s)		5.4			5.4		4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		509			589		69	690	806	77	656	616
v/s Ratio Prot							c0.03	c0.37		0.03	0.15	
v/s Ratio Perm		0.29			c0.29				0.00			0.03
v/c Ratio		0.83			0.83		0.62	0.85	0.01	0.52	0.35	0.07
Uniform Delay, d1		28.1			28.1		44.1	24.2	15.3	44.1	18.1	15.8
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		10.7			9.7		16.2	9.9	0.0	5.8	0.3	0.0
Delay (s)		38.7			37.8		60.4	34.1	15.3	49.9	18.5	15.9
Level of Service		D			D		E	C	B	D	B	B
Approach Delay (s)		38.7			37.8			35.2			21.3	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	34.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	95.1	Sum of lost time (s)	15.4
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	3	27	216	90	41
Future Vol, veh/h	5	3	27	216	90	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	10	15	0
Mvmt Flow	6	4	32	254	106	48

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	448	130	154	0	-	0
Stage 1	130	-	-	-	-	-
Stage 2	318	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	572	925	1439	-	-	-
Stage 1	901	-	-	-	-	-
Stage 2	742	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	557	925	1439	-	-	-
Mov Cap-2 Maneuver	557	-	-	-	-	-
Stage 1	878	-	-	-	-	-
Stage 2	742	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.6	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1439	-	655	-	-
HCM Lane V/C Ratio	0.022	-	0.014	-	-
HCM Control Delay (s)	7.6	0	10.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	3	27	238	54	40
Future Vol, veh/h	5	3	27	238	54	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	10	15	0
Mvmt Flow	6	4	32	280	64	47

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	432	88	111	0	-	0
Stage 1	88	-	-	-	-	-
Stage 2	344	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	584	976	1492	-	-	-
Stage 1	940	-	-	-	-	-
Stage 2	722	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	569	976	1492	-	-	-
Mov Cap-2 Maneuver	569	-	-	-	-	-
Stage 1	917	-	-	-	-	-
Stage 2	722	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.4	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1492	-	674	-	-
HCM Lane V/C Ratio	0.021	-	0.014	-	-
HCM Control Delay (s)	7.5	0	10.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	812	79	10	539	179	154	72	99	298	62	49
Future Volume (vph)	14	812	79	10	539	179	154	72	99	298	62	49
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.91		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1446	3214		1662	1710		1646	1576		1630	1564	
Flt Permitted	0.11	1.00		0.19	1.00		0.53	1.00		0.64	1.00	
Satd. Flow (perm)	171	3214		331	1710		921	1576		1093	1564	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	16	912	89	11	606	201	173	81	111	335	70	55
RTOR Reduction (vph)	0	7	0	0	12	0	0	58	0	0	35	0
Lane Group Flow (vph)	16	994	0	11	795	0	173	134	0	335	90	0
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	15%	2%	3%	0%	2%	3%	1%	2%	1%	2%	3%	4%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	36.5	35.5		36.5	35.5		23.4	12.6		18.0	9.9	
Effective Green, g (s)	36.5	35.5		36.5	35.5		23.4	12.6		18.0	9.9	
Actuated g/C Ratio	0.46	0.45		0.46	0.45		0.30	0.16		0.23	0.12	
Clearance Time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	94	1440		169	766		370	250		303	195	
v/s Ratio Prot	c0.00	0.31		0.00	c0.46		c0.06	0.09		c0.11	0.06	
v/s Ratio Perm	0.08			0.03			0.07			c0.14		
v/c Ratio	0.17	0.69		0.07	1.04		0.47	0.54		1.11	0.46	
Uniform Delay, d1	17.2	17.5		12.5	21.9		22.0	30.6		29.7	32.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	1.4		0.2	42.7		0.9	2.2		83.1	1.7	
Delay (s)	18.1	18.9		12.7	64.5		23.0	32.8		112.8	33.9	
Level of Service	B	B		B	E		C	C		F	C	
Approach Delay (s)		18.9			63.8			28.1			91.4	
Approach LOS		B			E			C			F	

Intersection Summary			
HCM 2000 Control Delay	46.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	79.2	Sum of lost time (s)	22.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	33	30	4	82	238	25
Future Vol, veh/h	33	30	4	82	238	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	25	1	2	0
Mvmt Flow	39	35	5	96	280	29

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	401	295	309	0	-	0
Stage 1	295	-	-	-	-	-
Stage 2	106	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.35	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.425	-	-	-
Pot Cap-1 Maneuver	609	749	1132	-	-	-
Stage 1	760	-	-	-	-	-
Stage 2	923	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	606	749	1132	-	-	-
Mov Cap-2 Maneuver	606	-	-	-	-	-
Stage 1	756	-	-	-	-	-
Stage 2	923	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.1	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1132	-	667	-	-
HCM Lane V/C Ratio	0.004	-	0.111	-	-
HCM Control Delay (s)	8.2	0	11.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	21

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	21	539	430	76	199	68
Future Vol, veh/h	21	539	430	76	199	68
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	11	3	4	1	2	5
Mvmt Flow	22	561	448	79	207	71

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	527	0	-	0	1093	488
Stage 1	-	-	-	-	488	-
Stage 2	-	-	-	-	605	-
Critical Hdwy	4.21	-	-	-	6.42	6.25
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.299	-	-	-	3.518	3.345
Pot Cap-1 Maneuver	996	-	-	-	237	574
Stage 1	-	-	-	-	617	-
Stage 2	-	-	-	-	545	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	996	-	-	-	229	574
Mov Cap-2 Maneuver	-	-	-	-	229	-
Stage 1	-	-	-	-	597	-
Stage 2	-	-	-	-	545	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	104
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	996	-	-	-	270
HCM Lane V/C Ratio	0.022	-	-	-	1.03
HCM Control Delay (s)	8.7	0	-	-	104
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	10.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	99	6	136	87	534	9	398	39	742	701	73
Future Volume (vph)	40	99	6	136	87	534	9	398	39	742	701	73
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.7			5.7	4.0	4.5	6.0	6.0	4.5	6.0	6.0
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.99			1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1649			1642	1458	1662	1683	1444	3162	1683	1377
Flt Permitted		0.82			0.70	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1377			1178	1458	1662	1683	1444	3162	1683	1377
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	108	7	148	95	580	10	433	42	807	762	79
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	28	0	0	31
Lane Group Flow (vph)	0	157	0	0	243	580	10	433	14	807	762	48
Heavy Vehicles (%)	0%	6%	0%	5%	1%	2%	0%	4%	3%	2%	4%	8%
Turn Type	Perm	NA		Perm	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4		Free			6			2
Actuated Green, G (s)		30.0			30.0	107.7	1.3	35.8	35.8	25.7	60.2	60.2
Effective Green, g (s)		30.0			30.0	107.7	1.3	35.8	35.8	25.7	60.2	60.2
Actuated g/C Ratio		0.28			0.28	1.00	0.01	0.33	0.33	0.24	0.56	0.56
Clearance Time (s)		5.7			5.7		4.5	6.0	6.0	4.5	6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		383			328	1458	20	559	479	754	940	769
v/s Ratio Prot							0.01	0.26		c0.26	c0.45	
v/s Ratio Perm		0.11			c0.21	0.40			0.01			0.03
v/c Ratio		0.41			0.74	0.40	0.50	0.77	0.03	1.07	0.81	0.06
Uniform Delay, d1		31.6			35.3	0.0	52.9	32.3	24.2	41.0	19.2	10.9
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.7			8.7	0.8	18.3	6.6	0.0	53.2	5.4	0.0
Delay (s)		32.3			44.0	0.8	71.2	38.9	24.3	94.2	24.5	10.9
Level of Service		C			D	A	E	D	C	F	C	B
Approach Delay (s)		32.3			13.6			38.3			58.0	
Approach LOS		C			B			D			E	

Intersection Summary			
HCM 2000 Control Delay	41.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	107.7	Sum of lost time (s)	16.2
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	3	41	29	19	19	6	419	6	1	819	23
Future Vol, veh/h	13	3	41	29	19	19	6	419	6	1	819	23
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	250	-	-	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	3	0	0	0	0	5	0	0	4	0
Mvmt Flow	14	3	45	32	21	21	7	455	7	1	890	25

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1399	1381	903	1402	1390	459	915	0	0	462	0	0
Stage 1	905	905	-	473	473	-	-	-	-	-	-	-
Stage 2	494	476	-	929	917	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.23	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.327	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	119	145	334	119	144	606	754	-	-	1110	-	-
Stage 1	334	358	-	576	562	-	-	-	-	-	-	-
Stage 2	561	560	-	324	354	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	101	144	334	101	143	606	754	-	-	1110	-	-
Mov Cap-2 Maneuver	101	144	-	101	143	-	-	-	-	-	-	-
Stage 1	331	358	-	571	557	-	-	-	-	-	-	-
Stage 2	517	555	-	278	354	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	29.3	50.9	0.1	0
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	754	-	-	209	148	1110	-	-
HCM Lane V/C Ratio	0.009	-	-	0.296	0.492	0.001	-	-
HCM Control Delay (s)	9.8	-	-	29.3	50.9	8.2	-	-
HCM Lane LOS	A	-	-	D	F	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.2	2.3	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	435	34	23	475	33	28	347	13	157	464	268
Future Volume (vph)	51	435	34	23	475	33	28	347	13	157	464	268
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.4			5.4		4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.99			0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1630			1652		1385	1651	1488	1614	1667	1444
Flt Permitted		0.87			0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1438			1663		1385	1858	1858	1614	1667	1444
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	54	458	36	24	500	35	29	365	14	165	488	282
RTOR Reduction (vph)	0	2	0	0	2	0	0	0	10	0	0	169
Lane Group Flow (vph)	0	546	0	0	557	0	29	365	4	165	488	113
Heavy Vehicles (%)	0%	6%	13%	8%	5%	0%	20%	6%	0%	3%	5%	3%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4					6			2
Actuated Green, G (s)		40.2			40.2		5.0	31.5	31.5	11.2	37.7	37.7
Effective Green, g (s)		40.2			40.2		5.0	31.5	31.5	11.2	37.7	37.7
Actuated g/C Ratio		0.41			0.41		0.05	0.32	0.32	0.11	0.38	0.38
Clearance Time (s)		5.4			5.4		4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		588			680		70	529	595	183	639	553
v/s Ratio Prot							0.02	0.22		c0.10	c0.29	
v/s Ratio Perm		c0.38			0.34				0.00			0.08
v/c Ratio		0.93			0.82		0.41	0.69	0.01	0.90	0.76	0.20
Uniform Delay, d1		27.7			25.8		45.2	29.1	22.8	43.0	26.4	20.3
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		21.0			7.6		3.9	3.7	0.0	39.9	5.4	0.2
Delay (s)		48.7			33.5		49.2	32.9	22.8	82.9	31.8	20.5
Level of Service		D			C		D	C	C	F	C	C
Approach Delay (s)		48.7			33.5			33.7			37.4	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	38.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	98.3	Sum of lost time (s)	15.4
Intersection Capacity Utilization	91.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	39	25	3	146	217	5
Future Vol, veh/h	39	25	3	146	217	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	6	5	0
Mvmt Flow	46	29	4	172	255	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	438	258	261	0	-	0
Stage 1	258	-	-	-	-	-
Stage 2	180	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	580	786	1315	-	-	-
Stage 1	790	-	-	-	-	-
Stage 2	856	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	578	786	1315	-	-	-
Mov Cap-2 Maneuver	578	-	-	-	-	-
Stage 1	788	-	-	-	-	-
Stage 2	856	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.3	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1315	-	645	-	-
HCM Lane V/C Ratio	0.003	-	0.117	-	-
HCM Control Delay (s)	7.7	0	11.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	38	26	4	111	237	5
Future Vol, veh/h	38	26	4	111	237	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	6	5	0
Mvmt Flow	45	31	5	131	279	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	423	282	285	0	-	0
Stage 1	282	-	-	-	-	-
Stage 2	141	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	591	762	1289	-	-	-
Stage 1	770	-	-	-	-	-
Stage 2	891	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	589	762	1289	-	-	-
Mov Cap-2 Maneuver	589	-	-	-	-	-
Stage 1	767	-	-	-	-	-
Stage 2	891	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.3	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1289	-	649	-	-
HCM Lane V/C Ratio	0.004	-	0.116	-	-
HCM Control Delay (s)	7.8	0	11.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Appendix G – 2037 HCM Analysis Results

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	495	59	24	799	444	53	116	7	74	23	10
Future Volume (vph)	40	495	59	24	799	444	53	116	7	74	23	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		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	
Frt	1.00	0.98		1.00	0.95		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1554	3073		1599	1710		1662	1702		1583	1620	
Flt Permitted	0.05	1.00		0.41	1.00		0.56	1.00		0.67	1.00	
Satd. Flow (perm)	90	3073		687	1710		972	1702		1119	1620	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	538	64	26	868	483	58	126	8	80	25	11
RTOR Reduction (vph)	0	7	0	0	15	0	0	2	0	0	10	0
Lane Group Flow (vph)	43	595	0	26	1336	0	58	132	0	80	26	0
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	7%	7%	2%	4%	7%	3%	0%	2%	0%	5%	0%	10%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	77.5	72.8		75.1	71.6		24.6	14.8		17.4	11.2	
Effective Green, g (s)	77.5	72.8		75.1	71.6		24.6	14.8		17.4	11.2	
Actuated g/C Ratio	0.65	0.61		0.63	0.60		0.21	0.12		0.15	0.09	
Clearance Time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	116	1875		459	1026		257	211		187	152	
v/s Ratio Prot	c0.01	0.19		0.00	c0.78		0.02	c0.08		c0.02	0.02	
v/s Ratio Perm	0.23			0.03			0.03			0.04		
v/c Ratio	0.37	0.32		0.06	1.30		0.23	0.63		0.43	0.17	
Uniform Delay, d1	27.9	11.2		8.4	23.9		39.0	49.6		45.8	49.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.1		0.1	143.1		0.4	5.7		1.6	0.5	
Delay (s)	29.9	11.3		8.4	166.9		39.5	55.3		47.4	50.3	
Level of Service	C	B		A	F		D	E		D	D	
Approach Delay (s)		12.6			163.9			50.5			48.3	
Approach LOS		B			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	106.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	119.3	Sum of lost time (s)	22.0
Intersection Capacity Utilization	99.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	2	30	200	30	21
Future Vol, veh/h	11	2	30	200	30	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	18	0	0	3	0	5
Mvmt Flow	13	2	34	227	34	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	341	46	58	0	-	0
Stage 1	46	-	-	-	-	-
Stage 2	295	-	-	-	-	-
Critical Hdwy	6.58	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.58	-	-	-	-	-
Critical Hdwy Stg 2	5.58	-	-	-	-	-
Follow-up Hdwy	3.662	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	624	1029	1559	-	-	-
Stage 1	937	-	-	-	-	-
Stage 2	720	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	608	1029	1559	-	-	-
Mov Cap-2 Maneuver	608	-	-	-	-	-
Stage 1	914	-	-	-	-	-
Stage 2	720	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.7	1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1559	-	649	-	-
HCM Lane V/C Ratio	0.022	-	0.023	-	-
HCM Control Delay (s)	7.4	0	10.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	273	392	196	29	7
Future Vol, veh/h	20	273	392	196	29	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	7	6	1	0	0
Mvmt Flow	22	300	431	215	32	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	646	0	-	0	883	539
Stage 1	-	-	-	-	539	-
Stage 2	-	-	-	-	344	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	949	-	-	-	319	546
Stage 1	-	-	-	-	589	-
Stage 2	-	-	-	-	722	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	949	-	-	-	310	546
Mov Cap-2 Maneuver	-	-	-	-	310	-
Stage 1	-	-	-	-	573	-
Stage 2	-	-	-	-	722	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	17.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	949	-	-	-	338
HCM Lane V/C Ratio	0.023	-	-	-	0.117
HCM Control Delay (s)	8.9	0	-	-	17.1
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	109	8	55	68	742	3	768	62	468	397	18
Future Volume (vph)	54	109	8	55	68	742	3	768	62	468	397	18
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.7			5.7	4.0	4.5	6.0	6.0	4.5	6.0	6.0
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.99			1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1624			1588	1403	1662	1606	1305	3014	1606	1457
Flt Permitted		0.75			0.66	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1236			1074	1403	1662	1606	1305	3014	1606	1457
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	55	110	8	56	69	749	3	776	63	473	401	18
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	29	0	0	5
Lane Group Flow (vph)	0	171	0	0	125	749	3	776	34	473	401	13
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	5%	6%	0%	10%	6%	6%	0%	9%	14%	7%	9%	0%
Turn Type	Perm	NA		Perm	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4		Free			6			2
Actuated Green, G (s)		20.1			20.1	127.4	1.2	68.0	68.0	23.1	89.9	89.9
Effective Green, g (s)		20.1			20.1	127.4	1.2	68.0	68.0	23.1	89.9	89.9
Actuated g/C Ratio		0.16			0.16	1.00	0.01	0.53	0.53	0.18	0.71	0.71
Clearance Time (s)		5.7			5.7		4.5	6.0	6.0	4.5	6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		195			169	1403	15	857	696	546	1133	1028
v/s Ratio Prot							0.00	c0.48		c0.16	0.25	
v/s Ratio Perm		c0.14			0.12	c0.53			0.03			0.01
v/c Ratio		0.88			0.74	0.53	0.20	0.91	0.05	0.87	0.35	0.01
Uniform Delay, d1		52.5			51.2	0.0	62.6	26.8	14.2	50.7	7.4	5.6
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		33.0			15.5	1.5	6.5	13.0	0.0	13.5	0.2	0.0
Delay (s)		85.4			66.7	1.5	69.1	39.8	14.2	64.2	7.5	5.6
Level of Service		F			E	A	E	D	B	E	A	A
Approach Delay (s)		85.4			10.8			38.0			37.5	
Approach LOS		F			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	32.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	127.4	Sum of lost time (s)	16.2
Intersection Capacity Utilization	88.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	18	18	5	1	2	5	787	16	30	391	7
Future Vol, veh/h	28	18	18	5	1	2	5	787	16	30	391	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	250	-	-	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	99	99	99	99	99	99	99	99	99	99	99	99
Heavy Vehicles, %	4	11	15	20	0	0	20	10	9	0	12	0
Mvmt Flow	28	18	18	5	1	2	5	795	16	30	395	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1274	1280	399	1290	1275	803	402	0	0	811	0	0
Stage 1	459	459	-	813	813	-	-	-	-	-	-	-
Stage 2	815	821	-	477	462	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.61	6.35	7.3	6.5	6.2	4.3	-	-	4.1	-	-
Critical Hdwy Stg 1	6.14	5.61	-	6.3	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.61	-	6.3	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.099	3.435	3.68	4	3.3	2.38	-	-	2.2	-	-
Pot Cap-1 Maneuver	143	159	623	129	168	387	1066	-	-	824	-	-
Stage 1	578	551	-	347	395	-	-	-	-	-	-	-
Stage 2	368	376	-	536	568	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	137	152	623	110	161	387	1066	-	-	824	-	-
Mov Cap-2 Maneuver	137	152	-	110	161	-	-	-	-	-	-	-
Stage 1	575	531	-	345	393	-	-	-	-	-	-	-
Stage 2	363	374	-	484	548	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	35.3	32.1	0.1	0.7
HCM LOS	E	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1066	-	-	182	141	824	-	-
HCM Lane V/C Ratio	0.005	-	-	0.355	0.057	0.037	-	-
HCM Control Delay (s)	8.4	-	-	35.3	32.1	9.5	-	-
HCM Lane LOS	A	-	-	E	D	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.5	0.2	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	346	23	3	508	49	49	669	13	45	263	106
Future Volume (vph)	90	346	23	3	508	49	49	669	13	45	263	106
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.4			5.4		4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.99			0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1624			1621		1319	1591	1488	1568	1522	1430
Flt Permitted		0.58			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1438			1663		1319	1858	1858	1568	1522	1430
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	91	349	23	3	513	49	49	676	13	45	266	107
RTOR Reduction (vph)	0	1	0	0	3	0	0	0	7	0	0	60
Lane Group Flow (vph)	0	462	0	0	562	0	49	676	6	45	266	47
Heavy Vehicles (%)	5%	5%	25%	0%	6%	14%	26%	10%	0%	6%	15%	4%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4					6			2
Actuated Green, G (s)		40.2			40.2		7.5	50.4	50.4	7.0	49.9	49.9
Effective Green, g (s)		40.2			40.2		7.5	50.4	50.4	7.0	49.9	49.9
Actuated g/C Ratio		0.36			0.36		0.07	0.45	0.45	0.06	0.44	0.44
Clearance Time (s)		5.4			5.4		4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		511			591		87	709	828	97	672	631
v/s Ratio Prot							c0.04	c0.42		0.03	0.17	
v/s Ratio Perm		0.32			c0.34				0.00			0.03
v/c Ratio		0.90			0.95		0.56	0.95	0.01	0.46	0.40	0.07
Uniform Delay, d1		34.6			35.5		51.2	30.2	17.4	51.2	21.3	18.2
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		19.2			25.4		8.1	22.9	0.0	3.5	0.4	0.1
Delay (s)		53.8			60.9		59.3	53.0	17.4	54.7	21.7	18.3
Level of Service		D			E		E	D	B	D	C	B
Approach Delay (s)		53.8			60.9			52.8			24.4	
Approach LOS		D			E			D			C	

Intersection Summary			
HCM 2000 Control Delay	49.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	113.0	Sum of lost time (s)	15.4
Intersection Capacity Utilization	117.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	211	50	0
Future Vol, veh/h	0	0	0	211	50	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	0	248	59	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	307	59	59	0	-	0
Stage 1	59	-	-	-	-	-
Stage 2	248	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	689	1012	1558	-	-	-
Stage 1	969	-	-	-	-	-
Stage 2	798	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	689	1012	1558	-	-	-
Mov Cap-2 Maneuver	689	-	-	-	-	-
Stage 1	969	-	-	-	-	-
Stage 2	798	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1558	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	211	50	0
Future Vol, veh/h	0	0	0	211	50	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	0	248	59	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	307	59	59	0	-	0
Stage 1	59	-	-	-	-	-
Stage 2	248	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	689	1012	1558	-	-	-
Stage 1	969	-	-	-	-	-
Stage 2	798	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	689	1012	1558	-	-	-
Mov Cap-2 Maneuver	689	-	-	-	-	-
Stage 1	969	-	-	-	-	-
Stage 2	798	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1558	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	1034	73	7	686	228	109	66	73	298	61	49
Future Volume (vph)	18	1034	73	7	686	228	109	66	73	298	61	49
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.92		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1446	3225		1662	1710		1646	1589		1630	1564	
Flt Permitted	0.11	1.00		0.12	1.00		0.68	1.00		0.54	1.00	
Satd. Flow (perm)	161	3225		209	1710		1174	1589		928	1564	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	20	1162	82	8	771	256	122	74	82	335	69	55
RTOR Reduction (vph)	0	5	0	0	12	0	0	48	0	0	33	0
Lane Group Flow (vph)	20	1239	0	8	1015	0	122	108	0	335	91	0
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	15%	2%	3%	0%	2%	3%	1%	2%	1%	2%	3%	4%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	39.8	37.7		37.6	36.6		17.6	11.3		21.2	13.1	
Effective Green, g (s)	39.8	37.7		37.6	36.6		17.6	11.3		21.2	13.1	
Actuated g/C Ratio	0.50	0.47		0.47	0.46		0.22	0.14		0.26	0.16	
Clearance Time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	113	1517		116	781		295	224		316	255	
v/s Ratio Prot	c0.00	0.38		0.00	c0.59		0.03	0.07		c0.11	0.06	
v/s Ratio Perm	0.08			0.03			0.06			c0.17		
v/c Ratio	0.18	0.82		0.07	1.30		0.41	0.48		1.06	0.36	
Uniform Delay, d1	17.5	18.2		13.2	21.7		26.3	31.7		28.5	29.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	3.5		0.3	144.2		0.9	1.6		67.4	0.9	
Delay (s)	18.2	21.8		13.5	166.0		27.3	33.3		95.9	30.6	
Level of Service	B	C		B	F		C	C		F	C	
Approach Delay (s)		21.7			164.8			30.7			78.3	
Approach LOS		C			F			C			E	

Intersection Summary			
HCM 2000 Control Delay	79.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.21		
Actuated Cycle Length (s)	80.1	Sum of lost time (s)	22.0
Intersection Capacity Utilization	94.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	32	30	4	76	193	19
Future Vol, veh/h	32	30	4	76	193	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	25	1	2	0
Mvmt Flow	38	35	5	89	227	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	337	238	249	0	-	0
Stage 1	238	-	-	-	-	-
Stage 2	99	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.35	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.425	-	-	-
Pot Cap-1 Maneuver	663	806	1194	-	-	-
Stage 1	806	-	-	-	-	-
Stage 2	930	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	660	806	1194	-	-	-
Mov Cap-2 Maneuver	660	-	-	-	-	-
Stage 1	803	-	-	-	-	-
Stage 2	930	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.5	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1194	-	723	-	-
HCM Lane V/C Ratio	0.004	-	0.101	-	-
HCM Control Delay (s)	8	0	10.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	12.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	18	539	430	73	180	42
Future Vol, veh/h	18	539	430	73	180	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	11	3	4	1	2	5
Mvmt Flow	19	561	448	76	188	44

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	524	0	-	0	1085	486
Stage 1	-	-	-	-	486	-
Stage 2	-	-	-	-	599	-
Critical Hdwy	4.21	-	-	-	6.42	6.25
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.299	-	-	-	3.518	3.345
Pot Cap-1 Maneuver	998	-	-	-	240	575
Stage 1	-	-	-	-	618	-
Stage 2	-	-	-	-	549	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	998	-	-	-	233	575
Mov Cap-2 Maneuver	-	-	-	-	233	-
Stage 1	-	-	-	-	601	-
Stage 2	-	-	-	-	549	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	70
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	998	-	-	-	263
HCM Lane V/C Ratio	0.019	-	-	-	0.879
HCM Control Delay (s)	8.7	0	-	-	70
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	7.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	124	7	173	102	631	11	506	49	937	892	93
Future Volume (vph)	51	124	7	173	102	631	11	506	49	937	892	93
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.7			5.7	4.0	4.5	6.0	6.0	4.5	6.0	6.0
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.99			1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1650			1639	1458	1662	1683	1444	3162	1683	1377
Flt Permitted		0.68			0.65	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1133			1099	1458	1662	1683	1444	3162	1683	1377
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	52	125	7	175	103	637	11	511	49	946	901	94
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	31	0	0	30
Lane Group Flow (vph)	0	183	0	0	278	637	11	511	18	946	901	64
Heavy Vehicles (%)	0%	6%	0%	5%	1%	2%	0%	4%	3%	2%	4%	8%
Turn Type	Perm	NA		Perm	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4		Free			6			2
Actuated Green, G (s)		31.2			31.2	115.8	1.4	42.7	42.7	25.7	67.0	67.0
Effective Green, g (s)		31.2			31.2	115.8	1.4	42.7	42.7	25.7	67.0	67.0
Actuated g/C Ratio		0.27			0.27	1.00	0.01	0.37	0.37	0.22	0.58	0.58
Clearance Time (s)		5.7			5.7		4.5	6.0	6.0	4.5	6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		305			296	1458	20	620	532	701	973	796
v/s Ratio Prot							0.01	0.30		c0.30	c0.54	
v/s Ratio Perm		0.16			c0.25	0.44			0.01			0.05
v/c Ratio		0.60			0.94	0.44	0.55	0.82	0.03	1.35	0.93	0.08
Uniform Delay, d1		36.9			41.4	0.0	56.9	33.1	23.4	45.0	22.1	10.8
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		3.3			36.0	1.0	28.9	8.7	0.0	166.6	14.2	0.0
Delay (s)		40.2			77.4	1.0	85.8	41.9	23.4	211.7	36.3	10.8
Level of Service		D			E	A	F	D	C	F	D	B
Approach Delay (s)		40.2			24.2			41.1			120.6	
Approach LOS		D			C			D			F	

Intersection Summary			
HCM 2000 Control Delay	79.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	115.8	Sum of lost time (s)	16.2
Intersection Capacity Utilization	103.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	3	47	23	19	19	6	533	8	1	1054	23
Future Vol, veh/h	13	3	47	23	19	19	6	533	8	1	1054	23
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	250	-	-	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	99	99	99	99	99	99	99	99	99	99	99	99
Heavy Vehicles, %	0	0	3	0	0	0	0	5	0	0	4	0
Mvmt Flow	13	3	47	23	19	19	6	538	8	1	1065	23

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1652	1637	1077	1658	1644	542	1088	0	0	546	0	0
Stage 1	1079	1079	-	554	554	-	-	-	-	-	-	-
Stage 2	573	558	-	1104	1090	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.23	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.327	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	79	102	265	79	101	544	649	-	-	1033	-	-
Stage 1	267	297	-	520	517	-	-	-	-	-	-	-
Stage 2	508	515	-	258	294	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	64	101	265	63	100	544	649	-	-	1033	-	-
Mov Cap-2 Maneuver	64	101	-	63	100	-	-	-	-	-	-	-
Stage 1	265	297	-	515	512	-	-	-	-	-	-	-
Stage 2	467	510	-	209	294	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	43.9	82.1	0.1	0
HCM LOS	E	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	649	-	-	154	103	1033	-	-
HCM Lane V/C Ratio	0.009	-	-	0.413	0.598	0.001	-	-
HCM Control Delay (s)	10.6	-	-	43.9	82.1	8.5	-	-
HCM Lane LOS	B	-	-	E	F	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.8	2.9	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	551	44	17	584	42	35	441	16	199	588	337
Future Volume (vph)	64	551	44	17	584	42	35	441	16	199	588	337
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.4			5.4		4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.99			0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1630			1654		1385	1651	1488	1614	1667	1444
Flt Permitted		0.77			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1438			1663		1385	1858	1858	1614	1667	1444
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	65	557	44	17	590	42	35	445	16	201	594	340
RTOR Reduction (vph)	0	2	0	0	2	0	0	0	10	0	0	129
Lane Group Flow (vph)	0	664	0	0	647	0	35	445	6	201	594	211
Heavy Vehicles (%)	0%	6%	13%	8%	5%	0%	20%	6%	0%	3%	5%	3%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4					6			2
Actuated Green, G (s)		40.3			40.3		5.2	39.0	39.0	11.2	45.0	45.0
Effective Green, g (s)		40.3			40.3		5.2	39.0	39.0	11.2	45.0	45.0
Actuated g/C Ratio		0.38			0.38		0.05	0.37	0.37	0.11	0.42	0.42
Clearance Time (s)		5.4			5.4		4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		547			632		68	608	684	170	708	613
v/s Ratio Prot							0.03	0.27		c0.12	c0.36	
v/s Ratio Perm		c0.46			0.39				0.00			0.15
v/c Ratio		1.21			1.02		0.51	0.73	0.01	1.18	0.84	0.34
Uniform Delay, d1		32.8			32.8		49.1	28.9	21.2	47.4	27.2	20.5
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		112.4			42.0		6.4	4.5	0.0	126.6	8.6	0.3
Delay (s)		145.2			74.8		55.6	33.5	21.2	173.9	35.8	20.8
Level of Service		F			E		E	C	C	F	D	C
Approach Delay (s)		145.2			74.8			34.6			55.8	
Approach LOS		F			E			C			E	

Intersection Summary			
HCM 2000 Control Delay	76.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	105.9	Sum of lost time (s)	15.4
Intersection Capacity Utilization	118.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	108	212	0
Future Vol, veh/h	0	0	0	108	212	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	0	127	249	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	376	249	249	0	-	0
Stage 1	249	-	-	-	-	-
Stage 2	127	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	629	795	1328	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	904	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	629	795	1328	-	-	-
Mov Cap-2 Maneuver	629	-	-	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	904	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1328	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	108	212	0
Future Vol, veh/h	0	0	0	108	212	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	0	127	249	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	376	249	249	0	-	0
Stage 1	249	-	-	-	-	-
Stage 2	127	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	629	795	1328	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	904	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	629	795	1328	-	-	-
Mov Cap-2 Maneuver	629	-	-	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	904	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1328	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	495	106	51	799	444	59	117	10	74	30	10
Future Volume (vph)	40	495	106	51	799	444	59	117	10	74	30	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		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	
Frt	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1554	3050		1599	1710		1662	1698		1583	1643	
Flt Permitted	0.06	1.00		0.37	1.00		0.73	1.00		0.54	1.00	
Satd. Flow (perm)	94	3050		631	1710		1275	1698		903	1643	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	538	115	55	868	483	64	127	11	80	33	11
RTOR Reduction (vph)	0	14	0	0	15	0	0	3	0	0	10	0
Lane Group Flow (vph)	43	639	0	55	1336	0	64	135	0	80	34	0
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	7%	7%	2%	4%	7%	3%	0%	2%	0%	5%	0%	10%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	74.4	69.8		74.4	69.8		19.8	13.7		20.0	13.8	
Effective Green, g (s)	74.4	69.8		74.4	69.8		19.8	13.7		20.0	13.8	
Actuated g/C Ratio	0.64	0.60		0.64	0.60		0.17	0.12		0.17	0.12	
Clearance Time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	117	1830		441	1026		237	200		191	194	
v/s Ratio Prot	c0.01	0.21		0.00	c0.78		0.01	c0.08		c0.02	0.02	
v/s Ratio Perm	0.22			0.07			0.03			0.05		
v/c Ratio	0.37	0.35		0.12	1.30		0.27	0.68		0.42	0.18	
Uniform Delay, d1	26.9	11.8		7.9	23.2		41.6	49.2		42.0	46.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.1		0.1	143.1		0.6	8.7		1.5	0.4	
Delay (s)	28.8	11.9		8.1	166.3		42.3	57.9		43.5	46.6	
Level of Service	C	B		A	F		D	E		D	D	
Approach Delay (s)		12.9			160.1			53.0			44.6	
Approach LOS		B			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	103.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	116.3	Sum of lost time (s)	22.0
Intersection Capacity Utilization	100.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	18	2	30	247	35	22
Future Vol, veh/h	18	2	30	247	35	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	18	0	0	3	0	5
Mvmt Flow	20	2	34	281	40	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	402	53	65	0	-	0
Stage 1	53	-	-	-	-	-
Stage 2	349	-	-	-	-	-
Critical Hdwy	6.58	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.58	-	-	-	-	-
Critical Hdwy Stg 2	5.58	-	-	-	-	-
Follow-up Hdwy	3.662	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	574	1020	1550	-	-	-
Stage 1	930	-	-	-	-	-
Stage 2	680	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	559	1020	1550	-	-	-
Mov Cap-2 Maneuver	559	-	-	-	-	-
Stage 1	906	-	-	-	-	-
Stage 2	680	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.4	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1550	-	585	-	-
HCM Lane V/C Ratio	0.022	-	0.039	-	-
HCM Control Delay (s)	7.4	0	11.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	47	273	392	216	31	10
Future Vol, veh/h	47	273	392	216	31	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	7	6	1	0	0
Mvmt Flow	52	300	431	237	34	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	668	0	-	0	954	550
Stage 1	-	-	-	-	550	-
Stage 2	-	-	-	-	404	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	931	-	-	-	289	539
Stage 1	-	-	-	-	582	-
Stage 2	-	-	-	-	679	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	931	-	-	-	270	539
Mov Cap-2 Maneuver	-	-	-	-	270	-
Stage 1	-	-	-	-	543	-
Stage 2	-	-	-	-	679	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	18.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	931	-	-	-	307
HCM Lane V/C Ratio	0.055	-	-	-	0.147
HCM Control Delay (s)	9.1	0	-	-	18.7
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	115	8	55	69	747	3	768	62	509	397	18
Future Volume (vph)	54	115	8	55	69	747	3	768	62	509	397	18
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.7			5.7	4.0	4.5	6.0	6.0	4.5	6.0	6.0
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.99			1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1625			1588	1403	1662	1606	1305	3014	1606	1457
Flt Permitted		0.75			0.65	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1237			1060	1403	1662	1606	1305	3014	1606	1457
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	55	116	8	56	70	755	3	776	63	514	401	18
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	30	0	0	5
Lane Group Flow (vph)	0	177	0	0	126	755	3	776	33	514	401	13
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	5%	6%	0%	10%	6%	6%	0%	9%	14%	7%	9%	0%
Turn Type	Perm	NA		Perm	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4		Free			6			2
Actuated Green, G (s)		20.9			20.9	129.5	1.2	68.0	68.0	24.4	91.2	91.2
Effective Green, g (s)		20.9			20.9	129.5	1.2	68.0	68.0	24.4	91.2	91.2
Actuated g/C Ratio		0.16			0.16	1.00	0.01	0.53	0.53	0.19	0.70	0.70
Clearance Time (s)		5.7			5.7		4.5	6.0	6.0	4.5	6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		199			171	1403	15	843	685	567	1131	1026
v/s Ratio Prot							0.00	c0.48		c0.17	0.25	
v/s Ratio Perm		c0.14			0.12	c0.54			0.03			0.01
v/c Ratio		0.89			0.74	0.54	0.20	0.92	0.05	0.91	0.35	0.01
Uniform Delay, d1		53.2			51.7	0.0	63.7	28.3	15.0	51.4	7.5	5.7
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		35.4			15.2	1.5	6.5	15.1	0.0	18.1	0.2	0.0
Delay (s)		88.6			66.9	1.5	70.2	43.4	15.0	69.5	7.7	5.7
Level of Service		F			E	A	E	D	B	E	A	A
Approach Delay (s)		88.6			10.8			41.4			41.7	
Approach LOS		F			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	35.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	129.5	Sum of lost time (s)	16.2
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	18	18	6	1	2	5	787	23	30	391	7
Future Vol, veh/h	28	18	18	6	1	2	5	787	23	30	391	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	250	-	-	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	99	99	99	99	99	99	99	99	99	99	99	99
Heavy Vehicles, %	4	11	15	20	0	0	20	10	9	0	12	0
Mvmt Flow	28	18	18	6	1	2	5	795	23	30	395	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1277	1287	399	1294	1279	807	402	0	0	818	0	0
Stage 1	459	459	-	817	817	-	-	-	-	-	-	-
Stage 2	818	828	-	477	462	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.61	6.35	7.3	6.5	6.2	4.3	-	-	4.1	-	-
Critical Hdwy Stg 1	6.14	5.61	-	6.3	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.61	-	6.3	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.099	3.435	3.68	4	3.3	2.38	-	-	2.2	-	-
Pot Cap-1 Maneuver	142	158	623	128	167	385	1066	-	-	819	-	-
Stage 1	578	551	-	345	393	-	-	-	-	-	-	-
Stage 2	367	373	-	536	568	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	136	151	623	109	160	385	1066	-	-	819	-	-
Mov Cap-2 Maneuver	136	151	-	109	160	-	-	-	-	-	-	-
Stage 1	575	531	-	343	391	-	-	-	-	-	-	-
Stage 2	362	371	-	484	547	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	35.5	33.6	0.1	0.7
HCM LOS	E	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1066	-	-	181	135	819	-	-
HCM Lane V/C Ratio	0.005	-	-	0.357	0.067	0.037	-	-
HCM Control Delay (s)	8.4	-	-	35.5	33.6	9.6	-	-
HCM Lane LOS	A	-	-	E	D	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.5	0.2	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	362	23	4	510	49	49	672	22	45	263	107
Future Volume (vph)	94	362	23	4	510	49	49	672	22	45	263	107
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.4			5.4		4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.99			0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1625			1621		1319	1591	1488	1568	1522	1430
Flt Permitted		0.57			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1438			1663		1319	1858	1858	1568	1522	1430
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	95	366	23	4	515	49	49	679	22	45	266	108
RTOR Reduction (vph)	0	1	0	0	3	0	0	0	12	0	0	60
Lane Group Flow (vph)	0	483	0	0	565	0	49	679	10	45	266	48
Heavy Vehicles (%)	5%	5%	25%	0%	6%	14%	26%	10%	0%	6%	15%	4%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4					6			2
Actuated Green, G (s)		40.1			40.1		7.5	50.6	50.6	7.1	50.2	50.2
Effective Green, g (s)		40.1			40.1		7.5	50.6	50.6	7.1	50.2	50.2
Actuated g/C Ratio		0.35			0.35		0.07	0.45	0.45	0.06	0.44	0.44
Clearance Time (s)		5.4			5.4		4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		509			589		87	711	830	98	674	634
v/s Ratio Prot							c0.04	c0.43		0.03	0.17	
v/s Ratio Perm		0.34			c0.34				0.01			0.03
v/c Ratio		0.95			0.96		0.56	0.95	0.01	0.46	0.39	0.08
Uniform Delay, d1		35.5			35.8		51.3	30.2	17.4	51.2	21.3	18.1
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		27.1			27.0		8.1	23.1	0.0	3.4	0.4	0.1
Delay (s)		62.6			62.8		59.4	53.3	17.4	54.6	21.6	18.2
Level of Service		E			E		E	D	B	D	C	B
Approach Delay (s)		62.6			62.8			52.6			24.3	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM 2000 Control Delay	52.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	113.2	Sum of lost time (s)	15.4
Intersection Capacity Utilization	118.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	3	27	216	90	41
Future Vol, veh/h	5	3	27	216	90	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	6	4	32	254	106	48

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	448	130	154	0	-	0
Stage 1	130	-	-	-	-	-
Stage 2	318	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	572	925	1439	-	-	-
Stage 1	901	-	-	-	-	-
Stage 2	742	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	557	925	1439	-	-	-
Mov Cap-2 Maneuver	557	-	-	-	-	-
Stage 1	878	-	-	-	-	-
Stage 2	742	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.6	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1439	-	655	-	-
HCM Lane V/C Ratio	0.022	-	0.014	-	-
HCM Control Delay (s)	7.6	0	10.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	3	27	238	54	40
Future Vol, veh/h	5	3	27	238	54	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	6	4	32	280	64	47

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	432	88	111	0	-	0
Stage 1	88	-	-	-	-	-
Stage 2	344	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	584	976	1492	-	-	-
Stage 1	940	-	-	-	-	-
Stage 2	722	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	569	976	1492	-	-	-
Mov Cap-2 Maneuver	569	-	-	-	-	-
Stage 1	917	-	-	-	-	-
Stage 2	722	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.4	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1492	-	674	-	-
HCM Lane V/C Ratio	0.021	-	0.014	-	-
HCM Control Delay (s)	7.5	0	10.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	1034	79	10	686	228	154	72	99	298	62	49
Future Volume (vph)	18	1034	79	10	686	228	154	72	99	298	62	49
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.91		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1446	3223		1662	1710		1646	1576		1630	1564	
Flt Permitted	0.11	1.00		0.11	1.00		0.53	1.00		0.64	1.00	
Satd. Flow (perm)	161	3223		195	1710		918	1576		1093	1564	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	20	1162	89	11	771	256	173	81	111	335	70	55
RTOR Reduction (vph)	0	5	0	0	12	0	0	58	0	0	35	0
Lane Group Flow (vph)	20	1246	0	11	1015	0	173	134	0	335	90	0
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	15%	2%	3%	0%	2%	3%	1%	2%	1%	2%	3%	4%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	39.8	37.7		37.6	36.6		23.8	12.9		18.2	10.1	
Effective Green, g (s)	39.8	37.7		37.6	36.6		23.8	12.9		18.2	10.1	
Actuated g/C Ratio	0.49	0.46		0.46	0.45		0.29	0.16		0.22	0.12	
Clearance Time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	111	1487		107	766		364	248		296	193	
v/s Ratio Prot	c0.00	0.39		0.00	c0.59		c0.06	0.08		c0.11	0.06	
v/s Ratio Perm	0.08			0.05			0.07			c0.14		
v/c Ratio	0.18	0.84		0.10	1.32		0.48	0.54		1.13	0.47	
Uniform Delay, d1	17.9	19.3		14.1	22.6		23.0	31.7		30.8	33.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	4.3		0.4	155.2		1.0	2.3		92.7	1.8	
Delay (s)	18.7	23.6		14.5	177.8		24.0	33.9		123.5	35.1	
Level of Service	B	C		B	F		C	C		F	D	
Approach Delay (s)		23.5			176.0			29.2			99.5	
Approach LOS		C			F			C			F	

Intersection Summary			
HCM 2000 Control Delay	85.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	81.7	Sum of lost time (s)	22.0
Intersection Capacity Utilization	96.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	33	30	4	82	238	25
Future Vol, veh/h	33	30	4	82	238	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	25	1	2	0
Mvmt Flow	39	35	5	96	280	29

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	401	295	309	0	-	0
Stage 1	295	-	-	-	-	-
Stage 2	106	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.35	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.425	-	-	-
Pot Cap-1 Maneuver	609	749	1132	-	-	-
Stage 1	760	-	-	-	-	-
Stage 2	923	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	606	749	1132	-	-	-
Mov Cap-2 Maneuver	606	-	-	-	-	-
Stage 1	756	-	-	-	-	-
Stage 2	923	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.1	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1132	-	667	-	-
HCM Lane V/C Ratio	0.004	-	0.111	-	-
HCM Control Delay (s)	8.2	0	11.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	21

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	21	539	430	76	199	68
Future Vol, veh/h	21	539	430	76	199	68
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	11	3	4	1	2	5
Mvmt Flow	22	561	448	79	207	71

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	527	0	-	0	1093	488
Stage 1	-	-	-	-	488	-
Stage 2	-	-	-	-	605	-
Critical Hdwy	4.21	-	-	-	6.42	6.25
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.299	-	-	-	3.518	3.345
Pot Cap-1 Maneuver	996	-	-	-	237	574
Stage 1	-	-	-	-	617	-
Stage 2	-	-	-	-	545	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	996	-	-	-	229	574
Mov Cap-2 Maneuver	-	-	-	-	229	-
Stage 1	-	-	-	-	597	-
Stage 2	-	-	-	-	545	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	104
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	996	-	-	-	270
HCM Lane V/C Ratio	0.022	-	-	-	1.03
HCM Control Delay (s)	8.7	0	-	-	104
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	10.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	125	7	173	109	669	11	506	49	942	892	93
Future Volume (vph)	51	125	7	173	109	669	11	506	49	942	892	93
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.7			5.7	4.0	4.5	6.0	6.0	4.5	6.0	6.0
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt		0.99			1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1650			1641	1458	1662	1683	1444	3162	1683	1377
Flt Permitted		0.66			0.65	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1111			1107	1458	1662	1683	1444	3162	1683	1377
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	52	126	7	175	110	676	11	511	49	952	901	94
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	31	0	0	30
Lane Group Flow (vph)	0	184	0	0	285	676	11	511	18	952	901	64
Heavy Vehicles (%)	0%	6%	0%	5%	1%	2%	0%	4%	3%	2%	4%	8%
Turn Type	Perm	NA		Perm	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4		Free			6			2
Actuated Green, G (s)		31.2			31.2	115.8	1.4	42.7	42.7	25.7	67.0	67.0
Effective Green, g (s)		31.2			31.2	115.8	1.4	42.7	42.7	25.7	67.0	67.0
Actuated g/C Ratio		0.27			0.27	1.00	0.01	0.37	0.37	0.22	0.58	0.58
Clearance Time (s)		5.7			5.7		4.5	6.0	6.0	4.5	6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		299			298	1458	20	620	532	701	973	796
v/s Ratio Prot							0.01	0.30		c0.30	c0.54	
v/s Ratio Perm		0.17			c0.26	0.46			0.01			0.05
v/c Ratio		0.62			0.96	0.46	0.55	0.82	0.03	1.36	0.93	0.08
Uniform Delay, d1		37.1			41.6	0.0	56.9	33.1	23.4	45.0	22.1	10.8
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		3.7			40.1	1.1	28.9	8.7	0.0	170.3	14.2	0.0
Delay (s)		40.8			81.7	1.1	85.8	41.9	23.4	215.4	36.3	10.8
Level of Service		D			F	A	F	D	C	F	D	B
Approach Delay (s)		40.8			25.0			41.1			122.6	
Approach LOS		D			C			D			F	

Intersection Summary			
HCM 2000 Control Delay	80.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	115.8	Sum of lost time (s)	16.2
Intersection Capacity Utilization	103.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	3	47	29	19	19	6	533	9	1	1054	23
Future Vol, veh/h	13	3	47	29	19	19	6	533	9	1	1054	23
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	250	-	-	250	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	99	99	99	99	99	99	99	99	99	99	99	99
Heavy Vehicles, %	0	0	3	0	0	0	0	5	0	0	4	0
Mvmt Flow	13	3	47	29	19	19	6	538	9	1	1065	23

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1653	1638	1077	1659	1645	543	1088	0	0	547	0	0
Stage 1	1079	1079	-	555	555	-	-	-	-	-	-	-
Stage 2	574	559	-	1104	1090	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.23	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.327	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	79	102	265	79	101	544	649	-	-	1033	-	-
Stage 1	267	297	-	520	516	-	-	-	-	-	-	-
Stage 2	507	514	-	258	294	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	64	101	265	63	100	544	649	-	-	1033	-	-
Mov Cap-2 Maneuver	64	101	-	63	100	-	-	-	-	-	-	-
Stage 1	265	297	-	515	511	-	-	-	-	-	-	-
Stage 2	466	509	-	209	294	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	43.9	99.6	0.1	0
HCM LOS	E	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	649	-	-	154	98	1033	-	-
HCM Lane V/C Ratio	0.009	-	-	0.413	0.691	0.001	-	-
HCM Control Delay (s)	10.6	-	-	43.9	99.6	8.5	-	-
HCM Lane LOS	B	-	-	E	F	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.8	3.5	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	553	44	27	600	42	35	441	17	199	590	341
Future Volume (vph)	65	553	44	27	600	42	35	441	17	199	590	341
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		5.4			5.4		4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.99			0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1630			1652		1385	1651	1488	1614	1667	1444
Flt Permitted		0.76			0.95		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1438			1663		1385	1858	1858	1614	1667	1444
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	66	559	44	27	606	42	35	445	17	201	596	344
RTOR Reduction (vph)	0	2	0	0	2	0	0	0	11	0	0	126
Lane Group Flow (vph)	0	667	0	0	673	0	35	445	6	201	596	218
Heavy Vehicles (%)	0%	6%	13%	8%	5%	0%	20%	6%	0%	3%	5%	3%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4					6			2
Actuated Green, G (s)		40.3			40.3		5.2	39.1	39.1	11.2	45.1	45.1
Effective Green, g (s)		40.3			40.3		5.2	39.1	39.1	11.2	45.1	45.1
Actuated g/C Ratio		0.38			0.38		0.05	0.37	0.37	0.11	0.43	0.43
Clearance Time (s)		5.4			5.4		4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		546			632		67	609	685	170	709	614
v/s Ratio Prot							0.03	0.27		c0.12	c0.36	
v/s Ratio Perm		c0.46			0.40				0.00			0.15
v/c Ratio		1.22			1.07		0.52	0.73	0.01	1.18	0.84	0.36
Uniform Delay, d1		32.9			32.9		49.2	28.9	21.2	47.4	27.2	20.6
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		115.5			54.4		7.2	4.5	0.0	126.6	8.9	0.4
Delay (s)		148.4			87.2		56.4	33.4	21.2	174.0	36.1	21.0
Level of Service		F			F		E	C	C	F	D	C
Approach Delay (s)		148.4			87.2			34.6			55.8	
Approach LOS		F			F			C			E	

Intersection Summary			
HCM 2000 Control Delay	80.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	15.4
Intersection Capacity Utilization	112.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	39	25	3	146	217	5
Future Vol, veh/h	39	25	3	146	217	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	46	29	4	172	255	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	438	258	261	0	-	0
Stage 1	258	-	-	-	-	-
Stage 2	180	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	580	786	1315	-	-	-
Stage 1	790	-	-	-	-	-
Stage 2	856	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	578	786	1315	-	-	-
Mov Cap-2 Maneuver	578	-	-	-	-	-
Stage 1	788	-	-	-	-	-
Stage 2	856	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.3	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1315	-	645	-	-
HCM Lane V/C Ratio	0.003	-	0.117	-	-
HCM Control Delay (s)	7.7	0	11.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	38	26	4	111	237	5
Future Vol, veh/h	38	26	4	111	237	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	45	31	5	131	279	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	423	282	285	0	-	0
Stage 1	282	-	-	-	-	-
Stage 2	141	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	591	762	1289	-	-	-
Stage 1	770	-	-	-	-	-
Stage 2	891	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	589	762	1289	-	-	-
Mov Cap-2 Maneuver	589	-	-	-	-	-
Stage 1	767	-	-	-	-	-
Stage 2	891	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.3	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1289	-	649	-	-
HCM Lane V/C Ratio	0.004	-	0.116	-	-
HCM Control Delay (s)	7.8	0	11.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Appendix H – HCM Analysis Mitigation Results

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	92	7	43	54	588	2	603	49	409	312	14
Future Volume (vph)	42	92	7	43	54	588	2	603	49	409	312	14
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	5.7	5.7		5.7	5.7	4.0	4.5	6.0	6.0	4.5	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1583	1640		1511	1651	1403	1662	1606	1305	3014	1606	1457
Flt Permitted	0.72	1.00		0.69	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1196	1640		1091	1651	1403	1662	1606	1305	3014	1606	1457
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	47	102	8	48	60	653	2	670	54	454	347	16
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	26	0	0	5
Lane Group Flow (vph)	47	107	0	48	60	653	2	670	28	454	347	11
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	5%	6%	0%	10%	6%	6%	0%	9%	14%	7%	9%	0%
Turn Type	Perm	NA		Perm	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4		Free			6			2
Actuated Green, G (s)	11.6	11.6		11.6	11.6	98.0	1.1	51.0	51.0	19.2	69.1	69.1
Effective Green, g (s)	11.6	11.6		11.6	11.6	98.0	1.1	51.0	51.0	19.2	69.1	69.1
Actuated g/C Ratio	0.12	0.12		0.12	0.12	1.00	0.01	0.52	0.52	0.20	0.71	0.71
Clearance Time (s)	5.7	5.7		5.7	5.7		4.5	6.0	6.0	4.5	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	141	194		129	195	1403	18	835	679	590	1132	1027
v/s Ratio Prot		0.07			0.04		0.00	c0.42		c0.15	0.22	
v/s Ratio Perm	0.04			0.04		c0.47			0.02			0.01
v/c Ratio	0.33	0.55		0.37	0.31	0.47	0.11	0.80	0.04	0.77	0.31	0.01
Uniform Delay, d1	39.7	40.8		39.8	39.5	0.0	48.0	19.4	11.5	37.3	5.4	4.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	3.4		1.8	0.9	1.1	2.7	5.6	0.0	6.0	0.2	0.0
Delay (s)	41.0	44.1		41.6	40.4	1.1	50.7	25.0	11.5	43.3	5.6	4.3
Level of Service	D	D		D	D	A	D	C	B	D	A	A
Approach Delay (s)		43.2			6.8			24.0			26.5	
Approach LOS		D			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	98.0	Sum of lost time (s)	16.2
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	21	539	430	76	199	68
Future Vol, veh/h	21	539	430	76	199	68
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	11	3	4	1	2	5
Mvmt Flow	22	561	448	79	207	71

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	527	0	-	0	1093	488
Stage 1	-	-	-	-	488	-
Stage 2	-	-	-	-	605	-
Critical Hdwy	4.21	-	-	-	6.42	6.25
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.299	-	-	-	3.518	3.345
Pot Cap-1 Maneuver	996	-	-	-	237	574
Stage 1	-	-	-	-	617	-
Stage 2	-	-	-	-	545	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	996	-	-	-	232	574
Mov Cap-2 Maneuver	-	-	-	-	367	-
Stage 1	-	-	-	-	603	-
Stage 2	-	-	-	-	545	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	31.4
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	996	-	-	-	404
HCM Lane V/C Ratio	0.022	-	-	-	0.688
HCM Control Delay (s)	8.7	-	-	-	31.4
HCM Lane LOS	A	-	-	-	D
HCM 95th %tile Q(veh)	0.1	-	-	-	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	495	106	51	799	444	59	117	10	74	30	10
Future Volume (vph)	40	495	106	51	799	444	59	117	10	74	30	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		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	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1554	3050		1599	1710	1413	1662	1698		1583	1643	
Flt Permitted	0.11	1.00		0.36	1.00	1.00	0.73	1.00		0.59	1.00	
Satd. Flow (perm)	178	3050		600	1710	1413	1275	1698		979	1643	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	538	115	55	868	483	64	127	11	80	33	11
RTOR Reduction (vph)	0	17	0	0	0	134	0	4	0	0	9	0
Lane Group Flow (vph)	43	636	0	55	868	349	64	134	0	80	35	0
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	7%	7%	2%	4%	7%	3%	0%	2%	0%	5%	0%	10%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	40.1	36.8		40.1	36.8	36.8	16.7	12.3		20.1	14.0	
Effective Green, g (s)	40.1	36.8		40.1	36.8	36.8	16.7	12.3		20.1	14.0	
Actuated g/C Ratio	0.50	0.46		0.50	0.46	0.46	0.21	0.15		0.25	0.17	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	145	1394		339	781	645	285	259		290	285	
v/s Ratio Prot	c0.01	0.21		0.01	c0.51		0.01	c0.08		c0.02	0.02	
v/s Ratio Perm	0.14			0.07		0.25	0.03			0.05		
v/c Ratio	0.30	0.46		0.16	1.11	0.54	0.22	0.52		0.28	0.12	
Uniform Delay, d1	17.3	15.0		10.6	21.9	15.8	26.3	31.4		23.9	28.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.2		0.2	67.3	0.9	0.4	1.7		0.5	0.2	
Delay (s)	18.4	15.2		10.9	89.1	16.7	26.7	33.1		24.4	28.3	
Level of Service	B	B		B	F	B	C	C		C	C	
Approach Delay (s)		15.4			61.2			31.1			25.8	
Approach LOS		B			E			C			C	

Intersection Summary			
HCM 2000 Control Delay	43.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	80.5	Sum of lost time (s)	22.0
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	115	8	55	69	747	3	768	62	509	397	18
Future Volume (vph)	54	115	8	55	69	747	3	768	62	509	397	18
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	5.7	5.7		5.7	5.7	4.0	4.5	6.0	6.0	4.5	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1583	1641		1511	1651	1403	1662	1606	1305	3014	1606	1457
Flt Permitted	0.71	1.00		0.58	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1186	1641		928	1651	1403	1662	1606	1305	3014	1606	1457
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	55	116	8	56	70	755	3	776	63	514	401	18
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	28	0	0	5
Lane Group Flow (vph)	55	121	0	56	70	755	3	776	35	514	401	13
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	5%	6%	0%	10%	6%	6%	0%	9%	14%	7%	9%	0%
Turn Type	Perm	NA		Perm	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4		Free			6			2
Actuated Green, G (s)	13.5	13.5		13.5	13.5	115.9	1.2	64.7	64.7	21.5	85.0	85.0
Effective Green, g (s)	13.5	13.5		13.5	13.5	115.9	1.2	64.7	64.7	21.5	85.0	85.0
Actuated g/C Ratio	0.12	0.12		0.12	0.12	1.00	0.01	0.56	0.56	0.19	0.73	0.73
Clearance Time (s)	5.7	5.7		5.7	5.7		4.5	6.0	6.0	4.5	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	138	191		108	192	1403	17	896	728	559	1177	1068
v/s Ratio Prot		0.07			0.04		0.00	c0.48		c0.17	0.25	
v/s Ratio Perm	0.05			0.06		c0.54			0.03			0.01
v/c Ratio	0.40	0.64		0.52	0.36	0.54	0.18	0.87	0.05	0.92	0.34	0.01
Uniform Delay, d1	47.4	48.9		48.1	47.2	0.0	56.9	21.9	11.6	46.4	5.5	4.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	6.7		4.2	1.2	1.5	4.9	8.8	0.0	20.2	0.2	0.0
Delay (s)	49.3	55.6		52.3	48.4	1.5	61.8	30.7	11.7	66.6	5.7	4.2
Level of Service	D	E		D	D	A	E	C	B	E	A	A
Approach Delay (s)		53.7			8.4			29.4			39.2	
Approach LOS		D			A			C			D	

Intersection Summary			
HCM 2000 Control Delay	27.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	115.9	Sum of lost time (s)	16.2
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	21	539	430	76	199	68
Future Vol, veh/h	21	539	430	76	199	68
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	11	3	4	1	2	5
Mvmt Flow	22	561	448	79	207	71

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	527	0	-	0	1093	488
Stage 1	-	-	-	-	488	-
Stage 2	-	-	-	-	605	-
Critical Hdwy	4.21	-	-	-	6.42	6.25
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.299	-	-	-	3.518	3.345
Pot Cap-1 Maneuver	996	-	-	-	237	574
Stage 1	-	-	-	-	617	-
Stage 2	-	-	-	-	545	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	996	-	-	-	232	574
Mov Cap-2 Maneuver	-	-	-	-	367	-
Stage 1	-	-	-	-	603	-
Stage 2	-	-	-	-	545	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	31.4
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	996	-	-	-	404
HCM Lane V/C Ratio	0.022	-	-	-	0.688
HCM Control Delay (s)	8.7	-	-	-	31.4
HCM Lane LOS	A	-	-	-	D
HCM 95th %tile Q(veh)	0.1	-	-	-	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	125	7	173	109	669	11	506	49	942	892	93
Future Volume (vph)	51	125	7	173	109	669	11	506	49	942	892	93
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	5.7	5.7		5.7	5.7	4.0	4.5	6.0	6.0	4.5	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1662	1643		1583	1733	1458	1662	1683	1444	3162	1683	1377
Flt Permitted	0.68	1.00		0.62	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1182	1643		1034	1733	1458	1662	1683	1444	3162	1683	1377
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	52	126	7	175	110	676	11	511	49	952	901	94
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	32	0	0	27
Lane Group Flow (vph)	52	131	0	175	110	676	11	511	17	952	901	67
Heavy Vehicles (%)	0%	6%	0%	5%	1%	2%	0%	4%	3%	2%	4%	8%
Turn Type	Perm	NA		Perm	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4		Free			6			2
Actuated Green, G (s)	22.5	22.5		22.5	22.5	115.5	1.4	40.4	40.4	36.4	75.4	75.4
Effective Green, g (s)	22.5	22.5		22.5	22.5	115.5	1.4	40.4	40.4	36.4	75.4	75.4
Actuated g/C Ratio	0.19	0.19		0.19	0.19	1.00	0.01	0.35	0.35	0.32	0.65	0.65
Clearance Time (s)	5.7	5.7		5.7	5.7		4.5	6.0	6.0	4.5	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	230	320		201	337	1458	20	588	505	996	1098	898
v/s Ratio Prot		0.08			0.06		0.01	0.30		c0.30	c0.54	
v/s Ratio Perm	0.04			c0.17		0.46			0.01			0.05
v/c Ratio	0.23	0.41		0.87	0.33	0.46	0.55	0.87	0.03	0.96	0.82	0.07
Uniform Delay, d1	39.2	40.7		45.1	40.0	0.0	56.7	35.1	24.7	38.8	15.0	7.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.9		31.1	0.6	1.1	28.9	12.9	0.0	18.6	5.0	0.0
Delay (s)	39.7	41.6		76.2	40.6	1.1	85.6	48.0	24.7	57.4	20.0	7.4
Level of Service	D	D		E	D	A	F	D	C	E	C	A
Approach Delay (s)		41.0			19.3			46.7			37.7	
Approach LOS		D			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	34.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	115.5	Sum of lost time (s)	16.2
Intersection Capacity Utilization	94.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Appendix I – Turn Lane Warrant Results

Left Turn Lane Warrant Analysis

Project: Aurora Airport Rezoning
Scenario(s): 2022 Build

AM Project Driveway - North

Intersection	Approach (NB,SB, EB,WB)	Number of Advancing Lanes	Number of Opposing Lanes	Volume Advancing (Va)	LT Vol	LT %	Volume Opposing (Vo)	Warrant Factor	5% Warrant Va	Va Warrant Threshold	HRB Warrant Met?	ODOT Volume	ODOT LT Threshold	ODOT Criteria Met?	Max. Est. Queue	Storage Length (ft)
AM Project Driveway - North	NB	1	1	243.09	27	11%	131.5	0.69	490	340	No	375	19	Yes	#N/A	#N/A
AM Project Driveway - South	NB	1	1	265.09	27	10%	93.5	0.72	511	368	No	359	20	Yes	#N/A	#N/A
PM Project Driveway - North	NB	1	1	148.9	3	2%	222.2	1.55	445	690	No	371	19	No	0	
PM Project Driveway - South	NB	1	1	114.9	4	3%	242.2	1.19	435	517	No	357	20	No	0	
#N/A	EB	1	1	64	38	59%	0	0.44	560	249	No	64	48	No	3	

0

Intersection	Approach (NB,SB, EB,WB)	Number of Advancing Lanes	Number of Opposing Lanes	Volume Advancing (Va)	LT Vol	LT %	Volume Opposing (Vo)	Warrant Factor	5% Warrant Va	Va Warrant Threshold	HRB Warrant Met?	ODOT Volume	ODOT LT Threshold	ODOT Criteria Met?	Max. Est. Queue	Storage Length (ft)
0	EB	1	1	0	0	0%	0	N/A	560	N/A	N/A	0	#N/A	#N/A	#DIV/0!	#N/A
0	EB	1	1	0	0	0%	0	N/A	560	N/A	N/A	0	#N/A	#N/A	#DIV/0!	#N/A
0	EB	1	1	0	0	0%	0	N/A	560	N/A	N/A	0	#N/A	#N/A	#DIV/0!	#N/A
#N/A	EB	1	1	0	0	0%	0	N/A	560	N/A	N/A	0	#N/A	#N/A	#DIV/0!	#N/A
#N/A	EB	1	1	0	0	0%	0	N/A	560	N/A	N/A	0	#N/A	#N/A	#DIV/0!	#N/A

*The "Consider" note applies when there are high through volumes but less than 10 left turning vehicles.

ODOT LEFT TURN CRITERIA IS BASED ON THE **8-13-03** LEFT TURN CRITERIA
MAX QUEUE AND STORAGE ESTIMATES BASED ON GARD METHOD

Intersection	Approach (NB,SB, EB,WB)	2-lane or Multi-lane Highway	Volume Advancing (Va)	RT Vol	ODOT RT Lane Warrant	ODOT RT Lane?	NCHRP RT Volume	Taper Warrant	RT Lane Warrant	NCHRP Taper?	NCHRP RT Lane?
AM Project Driveway - North	SB	2-lane	131.5	41	95	No	41	57	102.7	No	No
AM Project Driveway - South	SB	2-lane	93.5	40	100	No	40	61	108.0	No	No
PM Project Driveway - North	SB	2-lane	222.2	5	83	No	5	48	90.7	No	No
PM Project Driveway - South	SB	2-lane	242.2	5	81	No	5	46	88.0	No	No

Turn Lane Warrants: Concepts, Standards, Application in Review

David J. DeBaie P.E., P.T.O.E.
2004 ITE, District 1
Annual Meeting
Burlington, Vermont

Introduction

Turning lanes at intersections reduce accidents (crashes) as crash rate comparisons in the ITE Traffic Engineering Handbook[1] have demonstrated; yet, warrants or guidelines are not clearly established for a sufficiently broad range of conditions. Typically, state transportation departments review crash rates in determining the need for turn lanes and most review roadway volumes. States generally refer to American Association of State Highway Transportation Officials (AASHTO) for guidance on highway design[2]; however, most ITE District 1 states have adopted volume warrants or guidelines at unsignalized intersections that supplement the AASHTO guidance, which is partial for left turn lanes and absent for right turn lanes.

This turn lane warrant review focuses on unsignalized intersections, where there appears to be the greatest need. AASHTO's left turn guideline for left turns is examined in its effectiveness to convey the results of the 1967 research conducted by Harmelink[3]. Harmelink utilized a probabilistic model to establish left turn lane warrants for two-lane and four-lane highways at unsignalized T- intersections. AASHTO presents a summary table of points on Harmelink's graphed curves for two-lane highways. Interpretation of the table is difficult and many states have adopted forms of the graphs for two-lanes and remain consistent with AASHTO by excluding Harmelink's four-lane highway curves.

Volume based right turn lane warrants at unsignalized intersections are included in most state design manuals. The typical form is a graph for use on two-lane highways. Cottrell[4] compiled existing research in 1981 and derived right turn lane design graphs for two-lane and four-lane highways. These graphs delineated warranting thresholds for multiple treatments: full turning lanes, a taper, and a radius. Alternatively, VTrans has developed a right turn lane protocol that is based on the Harmelink probability model.

Several published research efforts and reports exhibit forms of the original Harmelink graphs. These are cited in this review for several reasons: the work is more effective in conveying the warrant information; there is inconsistency with the original graphs (and with AASHTO); or there is contention with the Harmelink model on specific points. Other research (Agent[5], Kikuchi and Chakroborty[6]) exists that proposes turn lane warrants based on accidents, delay, and level of service as alternate basis for warranting turning lanes; however, this review does not report on these concepts.

Standards

AASHTO standards are typically applied by most states where they are available. These standards provide minimal guidance on turning lane warrants. There is repetition of Highway Capacity Manual[7] advice at signalized intersections: at hourly volumes of 100 and 300 for left and right turn lanes respectively, auxiliary lanes should be considered. But different criteria apply to unsignalized intersections and AASHTO guidance is limited to left turn lanes on two-lane highways.

AASHTO Exhibit 9-75 (shown as Figure 1) from the 2001 "Greenbook" summarizes left-turn lane warrant information from 16 of Harmelinks original graphs. AASHTO guidance is thereby provided for two-lane roadways with speeds between 40 and 60 mph, left-turn volume percentages between 5 and 30 percent, and total hourly volume in a single direction of 800 vehicles or less. Maximum advancing volume without a left turn lane can be read from the AASHTO summary table given a known left turn percentage and the opposing volume. At 5 percent left turns opposed by 800 vehicles the maximum advancing volume without a left turn lane can be read from the table for three speeds: 330 vehicles per hour at 40 mph, 280 at 50 mph, and 230 at 60 mph. Minimum warranting left turn volumes within the AASHTO table are derived from the 5 percent left turn column. When opposed by 800 vehicles, the minimum suggested left turn volume requiring a left turn lane is: 17 left turns per hour at 40 mph, 14 at 50 mph, and 12 at 60mph.

Opposing volume (veh/h)	Advancing volume (veh/h) 5% left turns	10% left turns	20% left turns	30% left turns
40-mph operating speed				
800	330	240	180	160
600	410	305	225	200
400	510	380	275	245
200	640	470	350	305
100	720	515	390	340
50-mph operating speed				
800	280	210	165	135
600	350	260	195	170
400	430	320	240	210
200	550	400	300	270
100	615	445	335	295
60-mph operating speed				
800	230	170	125	115
600	290	210	160	140
400	365	270	200	175
200	450	330	250	215
100	505	370	275	240

Figure 1: ASSHTO Guide for Left turn Lanes on Two-Lane Highways

Most states provide this information in a graphical form that summarizes Harmelink warrant thresholds by roadway speed. Curves for specific left turn percentages are shown. Each is like that shown for 40 mph in Figure 2.

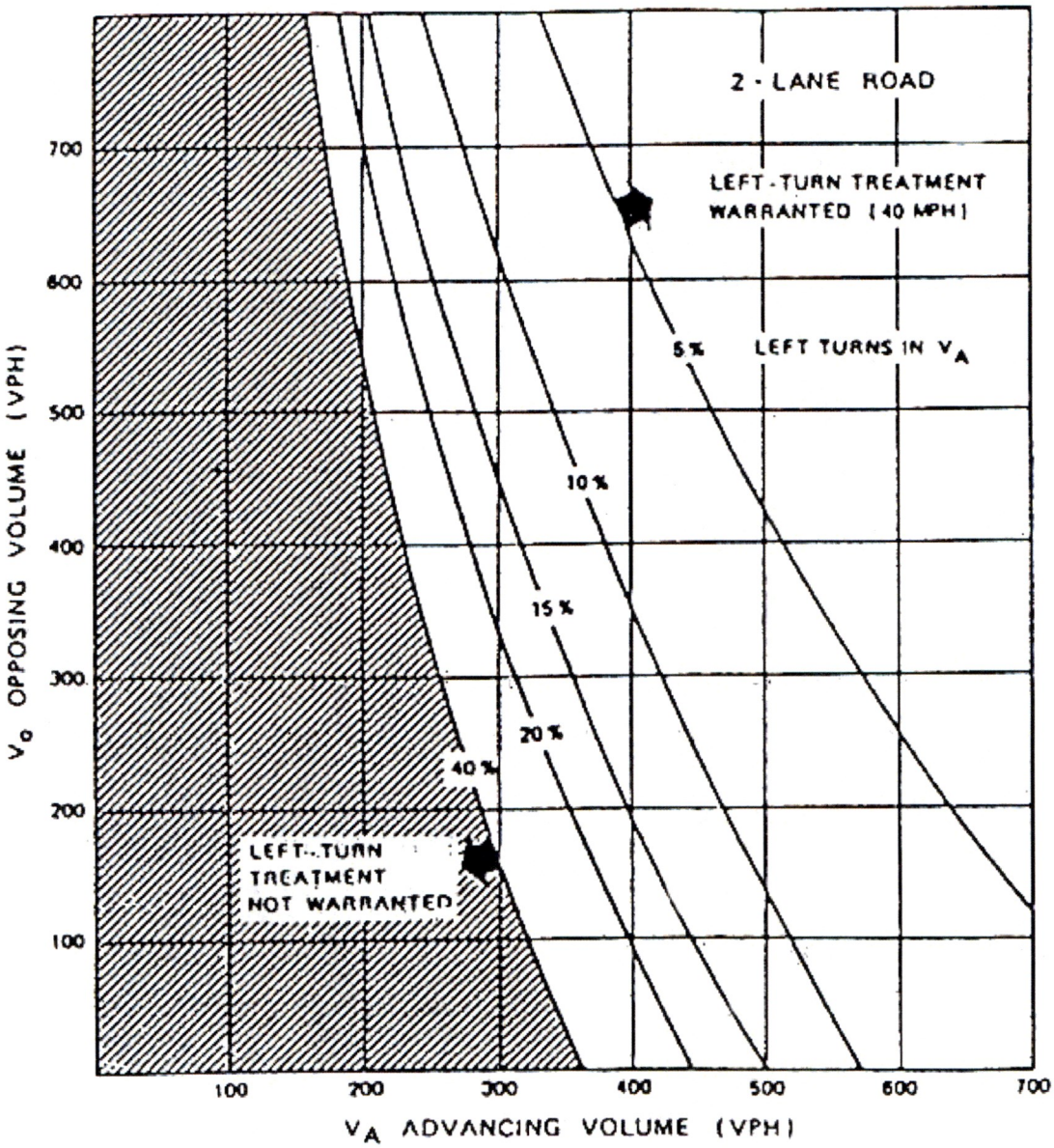

Figure 2: Typical State Design Manual Graph of Left Turn Lane Warrant Conditions on Two-Lane Highways at 40 mph.

Most states include a graph in their design manuals for determining warranting volumes for right turn lanes at unsignalized intersections (Figure 3). This graph typically relates only to two-lane highways. This graph of right turn volumes and total design hourly volume (DHV) presents a threshold line above which a right turn lane should be considered. The minimum hourly right turn volume where a right turn should be considered is 80 of 300 or 40 of 600 or more approach vehicles. Speed is not a factor except for a correction when posted speeds are below 45 mph (sometimes stated operating speed of 40 mph or design speed of 50 mph), the approach volume is less than 300 and right turns exceed 40. The correction reduces the right turn volume by 20 before entering the chart.

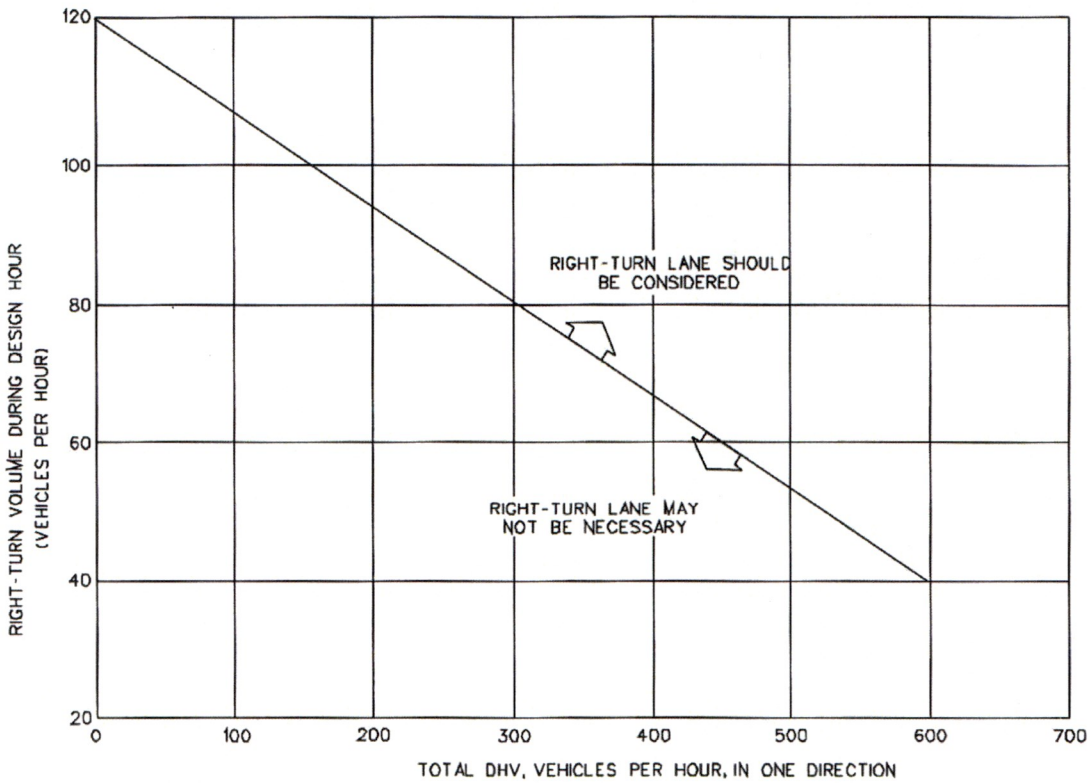

Figure 3: Typical State Design Manual Guideline for Right-Turn Lanes at Unsignalized Intersections on Two-lane Highways

VTrans has adopted an alternate right turn lane volume warrant[8], which is based on the Harmelink left turn warrant (Figure 4). A limited probability of a right turn vehicle delaying a through vehicle is set to derive a design chart with curves for speeds of 30-60 mph on two-lane highways and one curve for four-lane highways. When approach volumes are 800 vehicles per hour, the warranting right turn volumes range from 25 vehicles at 60 mph to 90 at 30 mph for two-lane roadways and 60 right turn vehicles on four-lane roadways.

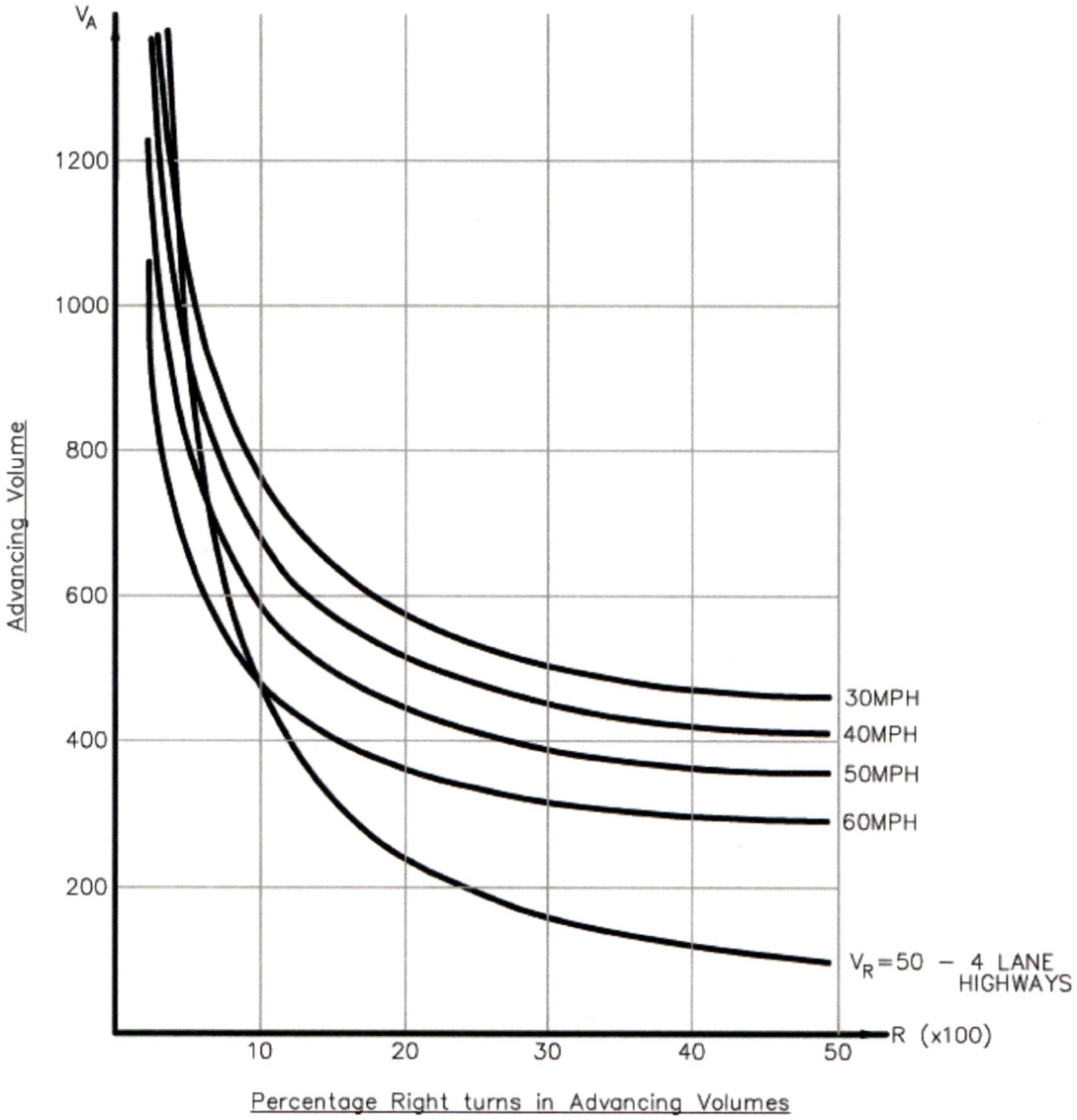

Figure 4: VTrans Right Turn Auxiliary Lanes Traffic Volume Warrants

Concepts

Harmelink's model for left turn warrants at unsignalized intersections is based on probability theory. A description of some of the parameters and an outline of the concept will provide the understanding needed to interpret the ASSHTO table or the original curves. As shown in Figure 5, the concept is based on the arrival of a vehicle on the advancing approach that queues behind a left turning vehicle that is waiting for a gap in the opposing approach flow.

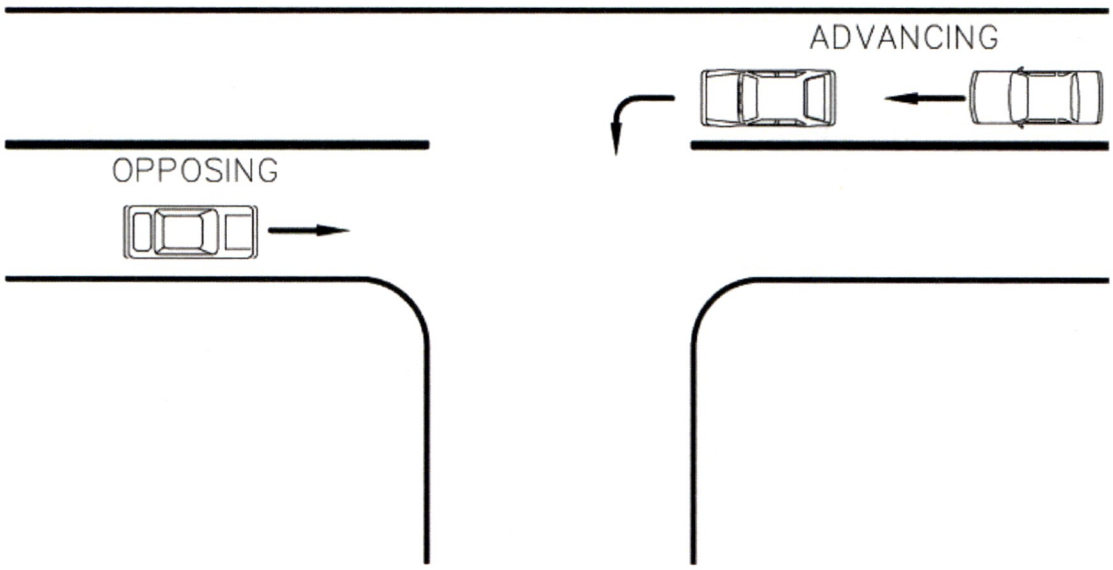

Figure 5: Harmelink's Arrival Event on a Two-lane Highway

The arrival event on a two-lane highway involves a compound probability: first the probability of the presence of a left-turn vehicle, and second, the probability of the arrival of one or more through vehicles. The probability of this dual occurrence should not exceed 0.010 for 40 mph and 0.015, and 0.020 for operating speeds of 50,and 60 mph respectively. On a four-lane divided highway, the design condition is probability of no more than one left turn vehicle stored in the median space (P = 0.030). On four-lane undivided highways, the design condition is the probability of a left turn vehicle waiting in the through lane (P = 0.005).

These limiting probabilities and the application of queuing theory enable the determination of the utilization factor, which is the ratio of the arrival rate to the service rate. The ratio must be less than 1 for the theory to apply. The arrival rate is a function of the advancing approach volume, the percentage of left turns, the average wait time (a function of opposing volume and the critical gap), the time for a left turning vehicle to clear the lane on the advancing approach, and median headway of the advancing traffic. Critical gaps of 5.0 and 6.0 seconds were used for two-lane and four-lane highways.

Time to clear the lane is 1.9 sec. The service rate is equal to "unblocked time," which in general constitutes gaps longer than the critical gap and additional capacity calculated from the remaining unblocked time recognizing the time required to complete a left turn (3.0 seconds for two-lane highways and 4.0 for four-lane highways). It should be noted that Harmelink based his assumptions on field observations and later checked his results with additional field studies.

Harmelink developed 18 graphs for left turn lanes under two-lane conditions and one for four-lane conditions. Each graph related to the same roadway operating and percent left turns and presented a lane-warranting curve and lane storage lengths. The plotted curves reflected a negative exponential form. Harmelink's four-lane highway graph, which is shown below as Figure 6, presents a curve for the undivided left turn lane warrant roughly defined by 13 vehicles turning left across 800 opposing vehicles and 25 turning left across 200 opposing vehicles. The four-lane divided curve contains points associated with 25 left turns into 900 opposing vehicles and 50 left turns into 300 left turns.

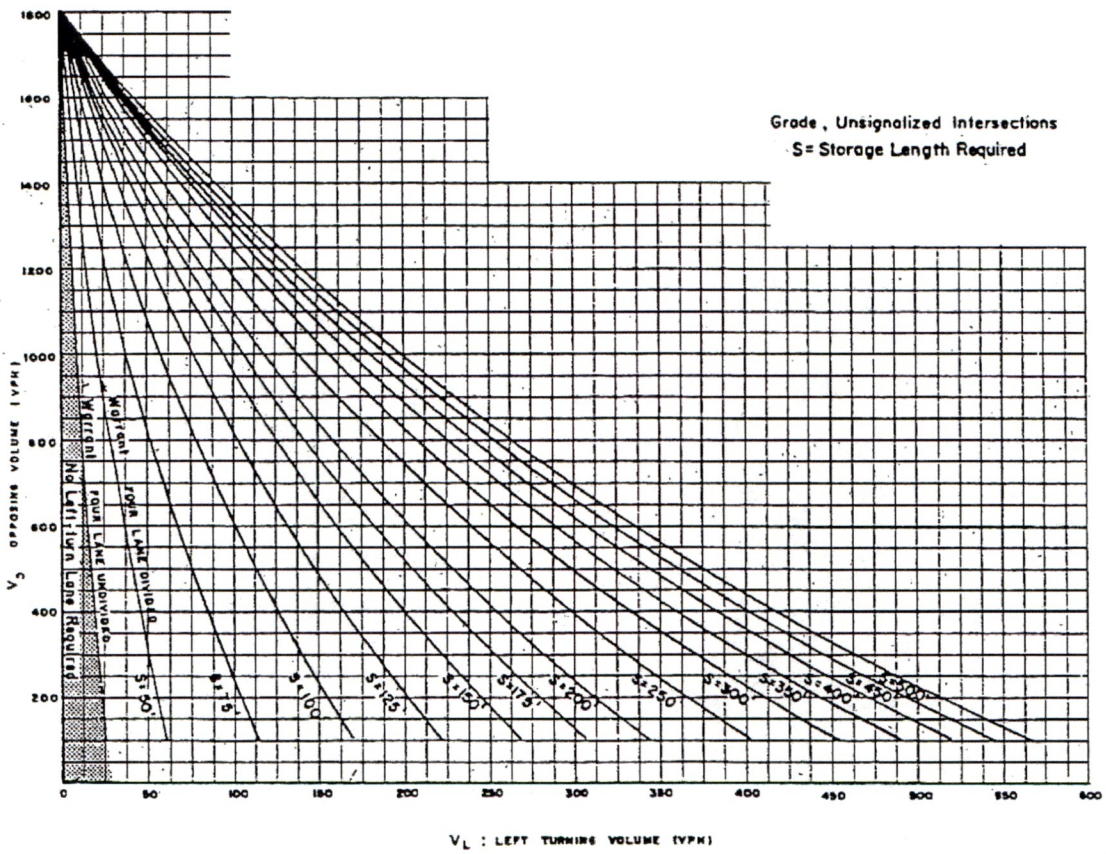

Figure 1. Warrant for left-turn storage lanes on four-lane highways.

Figure 6: Harmelink's Figure 1. Warrant for Left-Turn storage on four-lane highways.

The Cottrell right turn lane warrant model was prepared around 1981 after surveying state DOTs and determining that volume based warrants was used by the greater number of DOTs that used any consistent criteria. His research involved field data collection and previously established state DOT standards. It may be noted that during this same time period, the Virginia Transportation Research Council documented a similar pair of graphs with plots of thresholds for a full width lane and for taper treatment. These are presented in Figures 7 and 8.

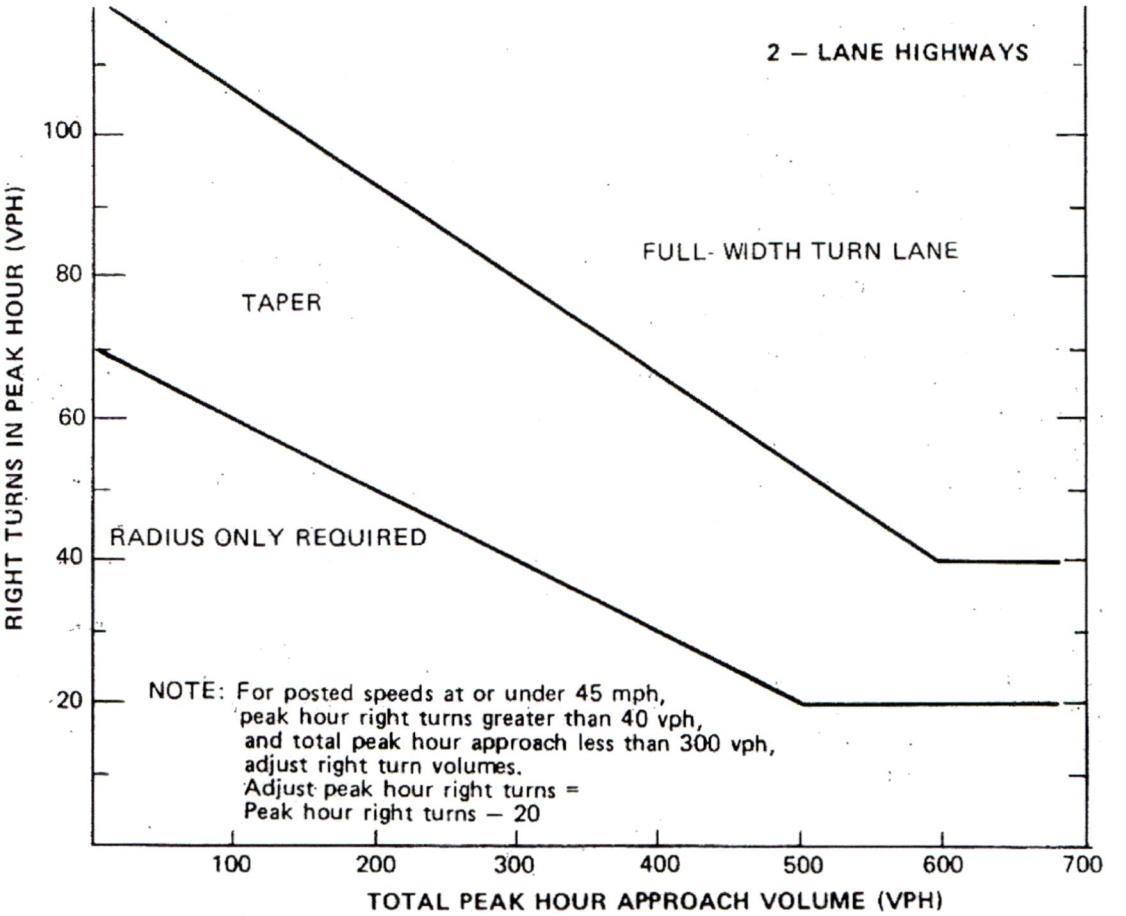

Figure 7: Cottrell's Two Lane Right Turn Treatment

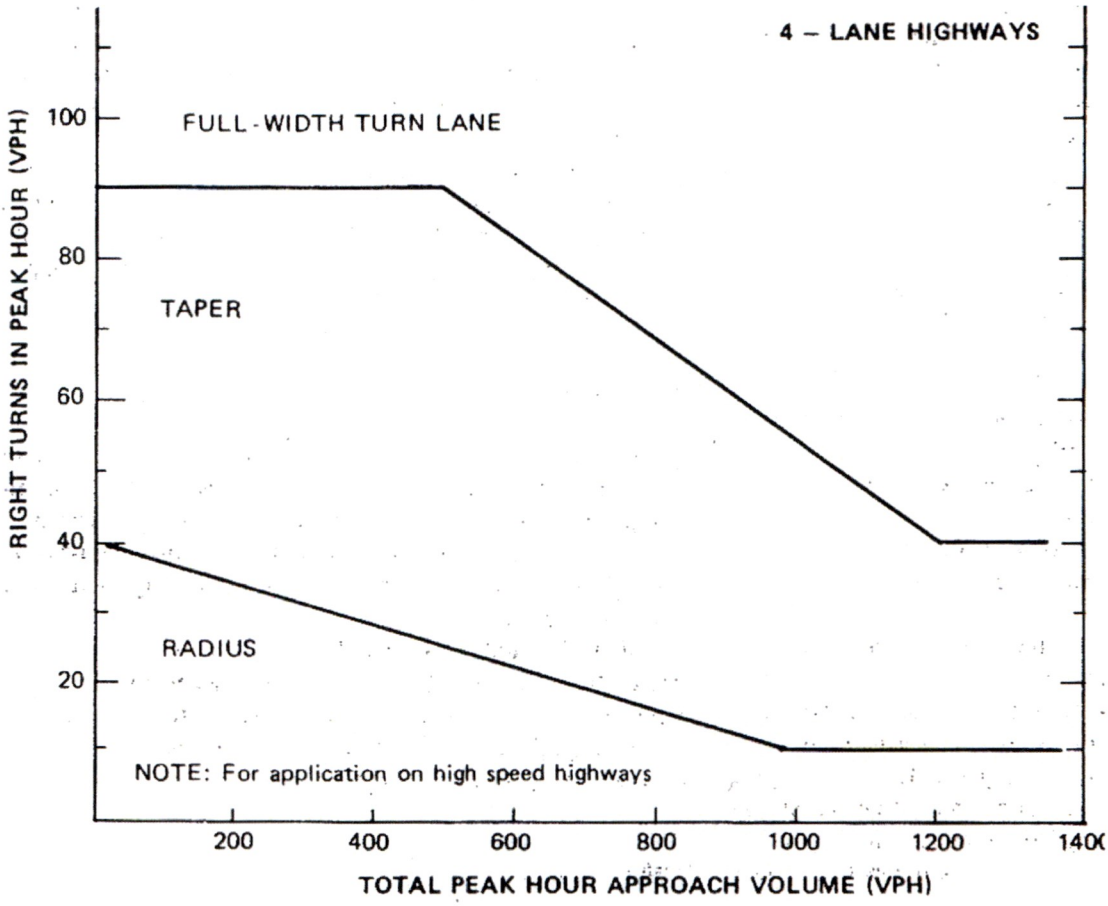

Figure 8: Cottrell's Four-Lane Right Turn Treatment.

VTrans' alternative right turn lane volume warrant is based on the Harmelink left turn warrant. All of Harmelink's speed related probabilities were held for two-lane highways. For four-lane highways, Harmelink's value of 0.03 for undivided highways was used. The time required to make a right turn maneuver was assumed to be 2.1 seconds which compares with Harmelinks left turn times of 3.0 for two-lanes and 4.0 for four-lanes. Under four lane conditions the warrant is met when the volume of right turns is greater than 50 and the two- lane warrant is met.

Application

Interpretation is typically required to use the ASSHTO guide for left turn lanes because volume conditions are often off the chart while not clearly exceeding turn lane thresholds. One caution is provided with the ASSHTO table: " For the volumes shown, left turns and right turns from the minor street can be equal to but not greater than, the left turns from the major street." By the words "for the volumes shown" it can be assumed that a left turn lane could be warranted when lesser volumes are present. This note is not

contained in Harmelink. When all conditions are close to those shown, the AASHTO table is useful.

Several TRB reports including NCHRP Report 279 Intersection Channelization Design Guide[9], and Report 348 Access Management Guidelines for Activity Centers[10], and Synthesis of Highway Practice 225[11], Left-Turn Treatments at Intersections, provide modified versions of the original Harmelink graphs. Two of the three reports also include the AASHTO table derived from Harmelink. It should be noted that only Report 279 provides graphs whose curves present the Harmelink results.

Report 279 provides four graphs, which are similar to those provided in most state design manuals. Three graphs relating to operating speeds of 40, 50 and 60 miles per hour present the left turn lane warrant conditions at unsignalized intersections on two-lane highways. Each graph includes curves for 5, 10, 15, 20 and 40 percent left turns. The Harmelink 30 percent curve is omitted. The fourth graph provided in Report 279 presents the warrant threshold for left turn lanes on four-lane highways. It is presented at a scale, which is significantly easier to read than the original. No distinction is made between four-lane divided and undivided roadways but Harmelink's note is provided stating that for opposing volume of less than 400 vehicles, a turning lane is not normally provided when left turning volumes are less than 27 vehicles per hour and total advancing volume is less than 400 vehicles per hour. These four graphs are shown in Figure 9.

Report 225 includes the AASHTO two-lane unsignalized left turn lane guidance table (Exhibit 9-75 in 2001) and on the next page four Harmelink-like graphs referenced as ITE guidelines for left turn lanes. Two graphs relate to two-lane highways at 30 and 50 mph operating speeds and a graph for four-lane undivided and divided roadways. The graphs differ from Harmelink's for several reasons. First, the axes showing advancing volumes and opposing volumes are switched. Second, the graphs are greatly expanded to account for advancing volume of 1,600-2,400 vehicles per hour and opposing volume of 1,300-1,800 vehicles. Third, a curve is provided for 0.5 percent intervals up to 4 percent and 6, 8 and 50 percent curves have been added to the original 5, 10, 15, 20 and 30 percent curves (40 percent is not included). Lastly, these curves indicate threshold left-turn volumes that are significantly lower for corresponding conditions, than those of the original Harmelink curves and the ASSHTO table on the previous page. These graphs developed by Oppenlander and Bianchi[12] are an extensive effort to expand the range of calculated conditions that would reduce the need for interpretation. No reason is provided for the differences with Harmelink and AASHTO.

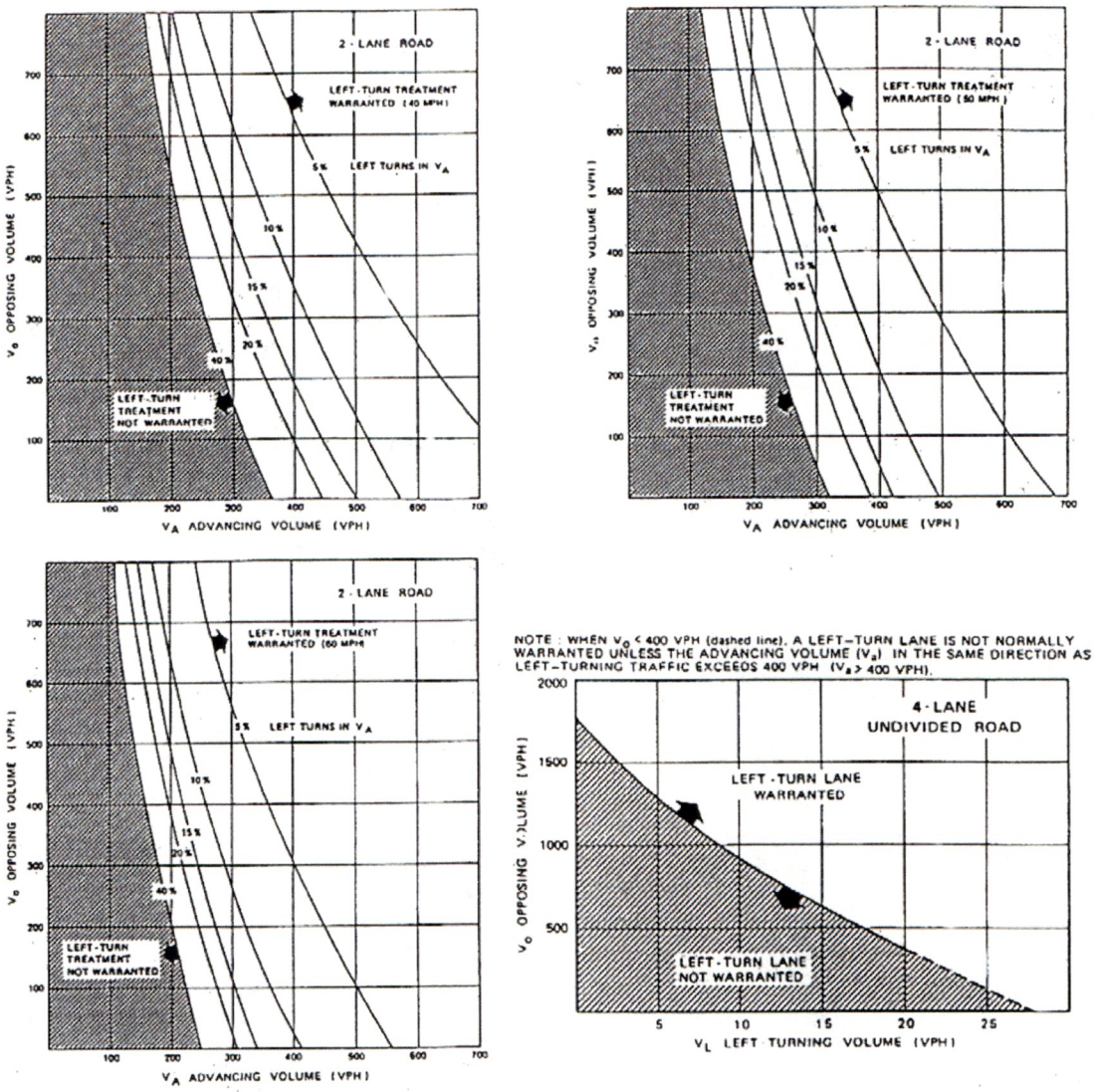

Figure 9: NCHRP 279 Figure 4-12 Volume Warrants for left –turn lanes at unsignalized intersections.

Kikuchi and Charoborty conducted a notable research work containing a review of the Harmelink model. They cited two specific problems with Harmelink and offered modified turn lane volume thresholds. First, Harmelink's definitions of arrival rate and service rate relate to arriving through vehicles and left-turn vehicles respectively. They point out that proper application of queuing theory would have the same type vehicle arriving and serviced but note that the Harmelink model would still hold for conditions that would result in only one through vehicle queuing behind a left turn vehicle. Kikuchi and Charborty's second problem concerned the calculation of the left turn capacity. Harmelink calculated unblocked time and divided that by the time to turn left to determine capacity. In his calculation, gaps greater than the required time to turn are counted. Then, each of these gaps were reduced by one half the critical gap and the time

to turn left; the remaining time in these gaps was aggregated and divided by the time to turn left. Kikuchi and Charoborty's modified volumes are significantly higher than Harmelink's.

Findings

1. At unsignalized intersections, AASHTO provides a volume-based guide on thresholds for left turn lanes on two-lane highways where approach volumes are 800 or less and operating speeds are between 40 and 60 mph; AASHTO provides no volume-based guidance for left turn lanes on four-lane highways or for right turn lanes.

2. The AASHTO left turn guidance is based on graphs developed by M. D. Harmelink and published in Highway Research Record 211 in 1967. Harmelink's model is based on the probability of a through vehicle arriving in a queue behind a waiting left turn vehicle. Harmelink established probability limits for roadway types and roadway speeds and solved for advancing volumes and a specific left turn percentage over a range of opposing vehicles. The graph relating to a specific left turn percentage forms a negative exponential curve.

3. The AASHTO Exhibit 9-75 is a summary table of discrete points from the Harmelink curves. The summary table is more difficult to interpret than the original graphs.

4. ITE District 1 State DOTs typically refer to AASHTO or have adopted graphs that are similar to the Harmelink's for left turn lanes on two-lane highways, been adopted by ASSHTO or these DOTs.

5. NCHRP Report 279 provides a set of graphed curves for two-lane and four-lane highways that are accurate representations of the warrant thresholds derived by Harmelink and consistent with the AASHTO summary table for two-lane highways.

6. NCHRP Report 348 provides a graph without use restrictions (suggesting two-lane and four lane use) but was developed by Harmelink for only four-lane highways.

7. NCHRP Synthesis of Highway Practice 225 provides expanded graphs (that would significantly extend their utility) using the Harmelink model with substituted values for some factors. These graphs yield lower left turn lane warranting volumes than Harmelink and AASHTO.

8. TRR 1327 offers modified left turn lane warranting volumes that are higher than the Harmelink results and therefore not consistent with AASHTO.

9. ITE District 1 State DOTs use a variety of volume based right turn lane warrants and guidelines.

10. The most common right turn volume-based warranting concept is derived from research presented by Cottrell in TRR 855. The Cottrell research includes graphs for two-lane and four-lane conditions that indicate full width lane warranting thresholds and a lane taper treatment. More often, state design manuals contain only two-lane highway graph for only full width lane treatment.

11. VTrans has developed and uses a right turn lane warrant based on Harmelink probability model for left turn lanes.

12. Although field research is cited in Harmelinks 1967 work, the limiting probabilities used to define turn lane volume thresholds are described as the collective judgment of several people. Recent research of the applicability of these probabilities and other assumptions such as acceptable gap time was not found.

13. Turn lane requirements at unsignalized and signalized intersections are based on different criteria. AASHTO guidelines suggest thresholds for turn lanes at unsignalized intersections are significantly less than at signalized intersections.

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DKS

Appendix J – Seasonal Adjustment and Growth Factor

HWY	MP	DIR	HS	Description	2015	2016	2017	2037	RSQ	20 Year Growth Factor	Annual Growth Rate
051	0.50	1		0.44 mile south of Pacific Highway (I-5) overcrossing			22200	26200	MODEL		
051	1.49	1		0.02 mile south of Arndt Road, Clackamas-Marion County Line			12000	16800	0.8889	1.40	2.0%
051	3.46	1		0.02 mile north of Ehlen Road			11600	16200	0.8431	1.40	2.0%
051	3.70	1		Hubbard Automatic Traffic Recorder, Sta. 24-016, 0.22 mile south of Ehlen Road			9100	10700	0.6900		

Seasonal Adjustment Using ATR #24-016

		2017	2016	2015	2014	2013	
Weekday Traffic	Peak Month (August)	11053	9848	10599	10392	9488	
	Count Count (June)	10325	9814	10599	10181	9340	
Percent ADT	Peak Month (August)	121	111	116	117	114	115.0
	Count Count (June)	113	111	116	115	112	114.0

Seasonal Adjustment
1.009

ATR Stations

- Transportation Volume Tables +
- State Highway Traffic Volumes +
- Ramp Interchange Volume Diagrams +
- Permanent Automatic Traffic Recorders: Station Trends +
- Permanent Automatic Traffic Recorders: Station Location Maps +
- Traffic Flow Maps +
- State Highway Vehicle Classification Data +
- Vehicle Miles Travelled +
- Other Jurisdictions Traffic Counting Websites +

Location: OR551; MP 3.70; WILSONVILLE-HUBBARD HIGHWAY N
Ehlen Road

HISTORICAL TR

Year	ADT	Percent of ADT				
		Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2005	8074	133	15.2	11.0	10.7	10.5
2006	8167	136	16.5	10.7	10.4	10.3
2007	8210	126	11.6	10.7	10.5	10.4
2008	7821	125	11.8	11.0	10.9	10.8
2009	7724	127	14.4	10.9	10.7	10.5
2010	7731	121	11.2	10.9	10.7	10.5
2011	7744	125	11.6	10.7	10.5	10.4
2012	8008	132	11.6	10.9	10.6	10.4
2013	8344	127	14.1	10.7	10.5	10.4
2014	8851	128	12.1	10.3	10.1	10.0

2014 TRAFFI

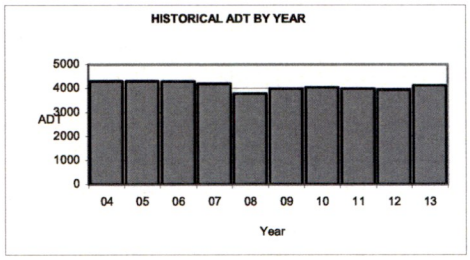
	Average Weekday Traffic	Percent of ADT	Average Daily Traffic	Percent of ADT
January	8692	98	7959	90
February	8896	101	7673	87
March	9301	105	8525	96
April	9953	112	9437	107

Location: OR22; MP 51.30; NORTH SANTIAM HIGHWAY NO. 162; 1.20 miles east of Detroit Avenue

Site Name: Detroit (24-015)
Installed: May, 1997

HISTORICAL TRAFFIC DATA

		Percent of ADT				
Year	ADT	Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2004	4294	240	27.4	24.5	23.3	22.8
2005	4307	250	26.6	24.4	23.6	22.5
2006	4283	240	26.7	24.1	22.8	21.8
2007	4194	242	27.5	25.0	24.2	23.4
2008	3779	263	31.2	27.2	25.7	24.8
2009	3996	***	***	***	***	***
2010	4049	256	29.1	27.3	26.3	24.7
2011	3989	264	29.9	27.6	25.8	24.7
2012	3939	268	30.8	29.1	27.3	25.9
2013	4123	263	29.1	27.2	26.2	25.1



2013 TRAFFIC DATA

	Average Weekday Traffic	Percent of ADT	Average Daily Traffic	Percent of ADT
January	2096	51	2508	61
February	2094	51	2638	64
March	2571	62	3251	79
April	2610	63	3325	81
May	3576	87	4489	109
June	4016	97	5259	128
July	5225	127	6690	162
August	5222	127	6658	161
September	4128	100	4945	120
October	3093	75	3995	97
November	2652	64	3026	73
December	2347	57	2694	65

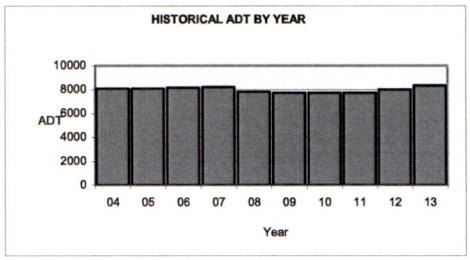
Classification Breakdown	Percent of ADT
Motorcyles	0.59
Passenger cars	59.11
Light Trucks	18.43
Buses	1.41
Single unit trucks (2 axles)	8.18
Single unit trucks (3 axles)	0.44
Single unit trucks (4 or more axles)	0.04
Single trailer trucks (4 or less axles)	6.07
Single trailer trucks (5 axles)	3.20
Single trailer trucks (6 or more axles)	1.03
Multi trailer trucks (5 or less axles)	0.56
Multi trailer trucks (6 axles)	0.31
Multi trailer trucks (7 or more axles)	0.63

Location: OR551; MP 3.70; WILSONVILLE-HUBBARD HIGHWAY NO. 51; 0.22 mile south of Ehlen Road

Site Name: Hubbard (24-016)
Installed: January, 1954

HISTORICAL TRAFFIC DATA

		Percent of ADT				
Year	ADT	Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2004	8095	144	13.9	11.1	10.8	10.6
2005	8074	133	15.2	11.0	10.7	10.5
2006	8167	136	16.5	10.7	10.4	10.3
2007	8210	126	11.6	10.7	10.5	10.4
2008	7821	125	11.8	11.0	10.9	10.8
2009	7724	127	14.4	10.9	10.7	10.5
2010	7731	121	11.2	10.9	10.7	10.5
2011	7744	125	11.6	10.7	10.5	10.4
2012	8008	132	11.6	10.9	10.6	10.4
2013	8344	127	14.1	10.7	10.5	10.4



2013 TRAFFIC DATA

	Average Weekday Traffic	Percent of ADT	Average Daily Traffic	Percent of ADT
January	8139	98	7449	89
February	8798	105	7992	96
March	9109	109	8383	100
April	9488	114	8791	105
May	9152	110	8492	102
June	9340	112	8592	103
July	9366	112	8492	102
August	9453	113	8621	103
September	9186	110	8533	102
October	9305	112	8730	105
November	8992	108	8192	98
December	8530	102	7861	94

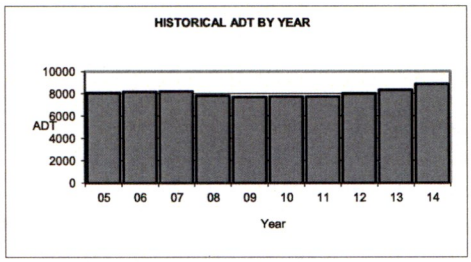
Classification Breakdown	Percent of ADT
Motorcyles	0.07
Passenger cars	56.02
Light Trucks	31.51
Buses	0.26
Single unit trucks (2 axles)	3.53
Single unit trucks (3 axles)	1.11
Single unit trucks (4 or more axles)	0.14
Single trailer trucks (4 or less axles)	0.25
Single trailer trucks (5 axles)	4.77
Single trailer trucks (6 or more axles)	1.39
Multi trailer trucks (5 or less axles)	0.00
Multi trailer trucks (6 axles)	0.04
Multi trailer trucks (7 or more axles)	0.91

Location: OR551; MP 3.70; WILSONVILLE-HUBBARD HIGHWAY NO. 51; 0.22 mile south of Ehlen Road

Site Name: Hubbard (24-016)
Installed: January, 1954

HISTORICAL TRAFFIC DATA

		Percent of ADT				
Year	ADT	Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2005	8074	133	15.2	11.0	10.7	10.5
2006	8167	136	16.5	10.7	10.4	10.3
2007	8210	126	11.6	10.7	10.5	10.4
2008	7821	125	11.8	11.0	10.9	10.8
2009	7724	127	14.4	10.9	10.7	10.5
2010	7731	121	11.2	10.9	10.7	10.5
2011	7744	125	11.6	10.7	10.5	10.4
2012	8008	132	11.6	10.9	10.6	10.4
2013	8344	127	14.1	10.7	10.5	10.4
2014	8851	128	12.1	10.3	10.1	10.0



2014 TRAFFIC DATA

	Average Weekday Traffic	Percent of ADT	Average Daily Traffic	Percent of ADT
January	8692	98	7959	90
February	8896	101	7673	87
March	9301	105	8525	96
April	9953	112	9437	107
May	9815	111	9052	102
June	10181	115	9247	104
July	10391	117	9284	105
August	10392	117	9523	108
September	9903	112	9347	106
October	9872	112	9151	103
November	9420	106	8530	96
December	9231	104	8488	96

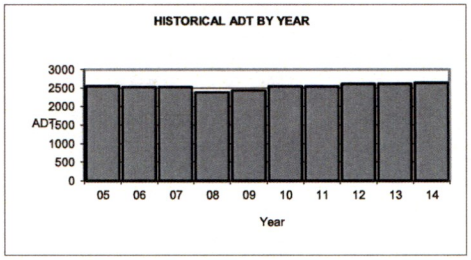
Classification Breakdown	Percent of ADT
Motorcyles	0.1
Passenger cars	56.0
Light Trucks	31.5
Buses	0.3
Single unit trucks (2 axles)	3.5
Single unit trucks (3 axles)	1.1
Single unit trucks (4 or more axles)	0.1
Single trailer trucks (4 or less axles)	0.3
Single trailer trucks (5 axles)	4.8
Single trailer trucks (6 or more axles)	1.4
Multi trailer trucks (5 or less axles)	0.0
Multi trailer trucks (6 axles)	0.0
Multi trailer trucks (7 or more axles)	0.9

Location: OR219; MP 31.88; HILLSBORO-SILVERTON HIGHWAY NO. 140; 1.85 miles south of St. Paul Highway N.E.

Site Name: St. Paul (24-020)
Installed: January, 1958

HISTORICAL TRAFFIC DATA

		Percent of ADT				
Year	ADT	Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2005	2549	280	28.4	20.8	18.2	15.7
2006	2526	263	25.6	18.0	14.8	13.0
2007	2523	276	23.4	16.3	14.5	13.2
2008	2375	293	29.4	17.6	14.2	13.0
2009	2425	279	28.7	18.3	15.4	13.4
2010	2543	282	29.1	18.1	15.9	14.4
2011	2539	260	26.4	19.5	16.4	14.5
2012	2607	315	31.1	20.6	16.2	14.4
2013	2606	260	24.4	16.6	14.8	13.3
2014	2627	259	23.5	17.1	15.0	13.5



2014 TRAFFIC DATA

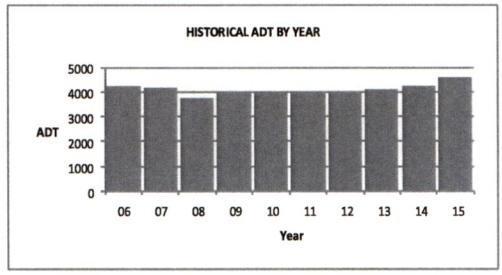
	Average Weekday Traffic	Percent of ADT	Average Daily Traffic	Percent of ADT
January	2226	85	2118	81
February	2303	88	2058	78
March	2526	96	2433	93
April	2753	105	2739	104
May	2772	106	2808	107
June	2901	110	2876	109
July	3307	126	3428	130
August	3085	117	3076	117
September	2799	107	2819	107
October	2651	101	2646	101
November	2400	91	2300	88
December	2354	90	2219	84

Classification Breakdown	Percent of ADT
Motorcyles	0.8
Passenger cars	59.5
Light Trucks	29.9
Buses	0.1
Single unit trucks (2 axles)	5.7
Single unit trucks (3 axles)	1.0
Single unit trucks (4 or more axles)	0.1
Single trailer trucks (4 or less axles)	1.0
Single trailer trucks (5 axles)	0.9
Single trailer trucks (6 or more axles)	0.2
Multi trailer trucks (5 or less axles)	0.0
Multi trailer trucks (6 axles)	0.6
Multi trailer trucks (7 or more axles)	0.4

Location:	OR22; MP 51.30; NORTH SANTIAM HIGHWAY NO. 162; 1.20 miles east of Detroit Avenue	Site Name:	Detroit (24-015)
		Installed:	May, 1997

HISTORICAL TRAFFIC DATA

		Percent of ADT				
Year	ADT	Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2006	4283	240	26.7	24.1	22.8	21.8
2007	4194	242	27.5	25.0	24.2	23.4
2008	3780	263	31.2	27.2	25.7	24.8
2009	3996	***	***	***	***	***
2010	4049	256	29.1	27.3	26.3	24.7
2011	3990	264	29.9	27.6	25.8	24.7
2012	3939	268	30.8	29.1	27.3	25.9
2013	4123	263	29.1	27.2	26.2	25.1
2014	4258	268	30.1	27.7	26.4	25.3
2015	4615	261	32.0	25.4	24.4	23.1



2015 TRAFFIC DATA

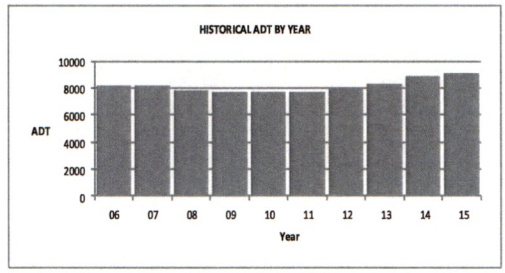
	Average Weekday Traffic	Percent of ADT	Average Daily Traffic	Percent of ADT
January	2266	49	2825	61
February	2579	56	3157	68
March	3084	67	3973	86
April	3126	68	3947	86
May	4184	91	5130	111
June	4656	101	5895	128
July	5547	120	6757	146
August	5425	118	6926	150
September	4553	99	5586	121
October	3763	82	4634	100
November	2905	63	3481	75
December	2783	60	3063	66

For Vehicle Classification data near this ATR, please go to the following web page:
https://gis.odot.state.or.us/TransGIS/

Location:	OR551; MP 3.70; WILSONVILLE-HUBBARD HIGHWAY NO. 51; 0.22 mile south of Ehlen Road	Site Name:	Hubbard (24-016)
		Installed:	January, 1954

HISTORICAL TRAFFIC DATA

		Percent of ADT				
Year	ADT	Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2006	8167	136	16.5	10.7	10.4	10.3
2007	8210	126	11.6	10.7	10.5	10.4
2008	7821	125	11.8	11.0	10.8	10.8
2009	7724	122	11.4	10.7	10.4	10.3
2010	7731	121	11.2	10.9	10.7	10.5
2011	7744	125	11.6	10.7	10.5	10.4
2012	8008	132	11.6	10.9	10.6	10.4
2013	8344	127	14.1	10.7	10.5	10.4
2014	8851	128	12.1	10.3	10.1	10.0
2015	9100	126	11.2	9.9	9.7	9.6



2015 TRAFFIC DATA

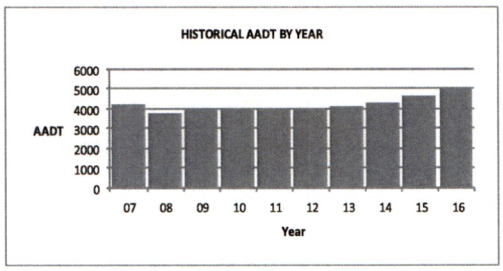
	Average Weekday Traffic	Percent of ADT	Average Daily Traffic	Percent of ADT
January	9186	101	8266	91
February	9690	106	8870	97
March	10116	111	9380	103
April	10351	114	9779	107
May	10073	111	9438	104
June	10599	116	9751	107
July	10217	112	9192	101
August	10185	112	9303	102
September	9759	107	9231	101
October	9871	108	9099	100
November	9404	103	8508	93
December	9250	102	8384	92

For Vehicle Classification data near this ATR, please go to the following web page:
https://gis.odot.state.or.us/TransGIS/

Location:	OR22; MP 51.30; NORTH SANTIAM HIGHWAY NO. 162; 1.20 miles east of Detroit Avenue	Site Name:	Detroit (24-015)
		Installed:	May, 1997

HISTORICAL TRAFFIC DATA

		Percent of AADT				
Year	AADT	Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2007	4194	242	27.5	25.0	24.2	23.4
2008	3780	263	31.2	27.2	25.7	24.8
2009	3996	***	***	***	***	***
2010	4049	256	29.1	27.3	26.3	24.7
2011	3990	264	29.9	27.6	25.8	24.7
2012	3939	268	30.8	29.1	27.3	25.9
2013	4123	263	29.1	27.2	26.2	25.1
2014	4258	268	30.1	27.7	26.4	25.3
2015	4615	261	32.0	25.4	24.4	23.1
2016	4981	254	29.8	26.2	24.8	23.7



2016 TRAFFIC DATA

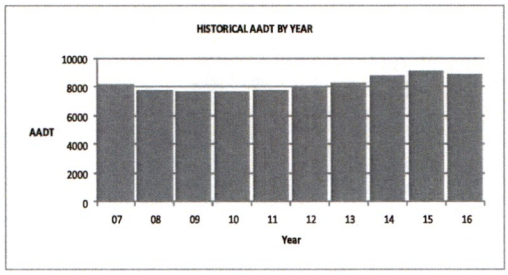
	Average Weekday Traffic	Percent of AADT	Average Daily Traffic	Percent of AADT
January	2311	46	3088	62
February	2722	55	3409	68
March	3055	61	3941	79
April	3289	66	4264	86
May	4424	89	5533	111
June	4873	98	6191	124
July	5999	120	7401	149
August	6361	128	8154	164
September	5373	108	6583	132
October	3595	72	4417	89
November	3099	62	3842	77
December	2760	55	2953	59

For Vehicle Classification data near your project, please go to the following web page:
https://gis.odot.state.or.us/TransGIS/

Location:	OR551; MP 3.70; WILSONVILLE-HUBBARD HIGHWAY NO. 51; 0.22 mile south of Ehlen Road	Site Name:	Hubbard (24-016)
		Installed:	January, 1954

HISTORICAL TRAFFIC DATA

		Percent of AADT				
Year	AADT	Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2007	8210	126	11.6	10.7	10.5	10.4
2008	7821	125	11.8	11.0	10.8	10.8
2009	7724	122	11.4	10.7	10.4	10.3
2010	7731	121	11.2	10.9	10.7	10.5
2011	7744	125	11.6	10.7	10.5	10.4
2012	8008	132	11.6	10.9	10.6	10.4
2013	8344	127	14.1	10.7	10.5	10.4
2014	8851	128	12.1	10.3	10.1	10.0
2015	9100	126	11.2	9.9	9.7	9.6
2016	8867	130	10.2	9.8	9.6	9.6



2016 TRAFFIC DATA

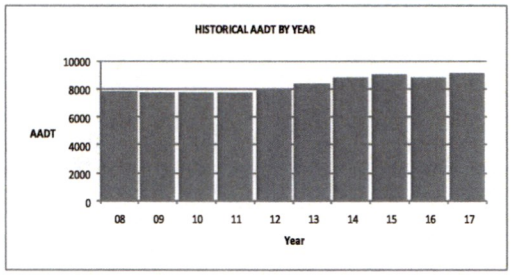
	Average Weekday Traffic	Percent of AADT	Average Daily Traffic	Percent of AADT
January	9216	104	8139	92
February	9697	109	8841	100
March	9948	112	9130	103
April	10342	117	10023	113
May	9984	113	9379	106
June	9814	111	9138	103
July	9378	106	8737	99
August	9848	111	8990	101
September	9472	107	8939	101
October	9468	107	8705	98
November	9274	105	8410	95
December	8674	98	7970	90

For Vehicle Classification data near your project, please go to the following web page:
https://gis.odot.state.or.us/TransGIS/

Location:	OR551; MP 3.70; WILSONVILLE-HUBBARD HIGHWAY NO. 51; 0.22 mile south of Ehlen Road	Site Name:	Hubbard (24-016)
		Installed:	January, 1954

HISTORICAL TRAFFIC DATA

		Percent of AADT				
Year	AADT	Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2008	7821	125	11.8	11.0	10.8	10.8
2009	7724	122	11.4	10.7	10.4	10.3
2010	7731	121	11.2	10.9	10.7	10.5
2011	7744	125	11.6	10.7	10.5	10.4
2012	8008	132	11.6	10.9	10.6	10.4
2013	8344	127	14.1	10.7	10.5	10.4
2014	8851	128	12.1	10.3	10.1	10.0
2015	9100	126	11.2	9.9	9.7	9.6
2016	8867	130	10.2	9.8	9.6	9.6
2017	9132	131	10.2	9.5	9.2	9.2



2017 TRAFFIC DATA

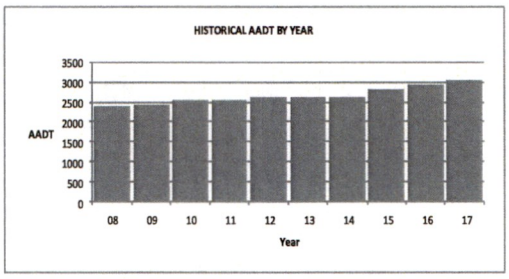
	Average Weekday Traffic	Percent of AADT	Average Daily Traffic	Percent of AADT
January	8251	90	7452	82
February	9392	103	8519	93
March	9818	108	8961	98
April	10156	111	9515	104
May	9987	109	9350	102
June	10325	113	9489	104
July	10340	113	9561	105
August	11053	121	9980	109
September	10232	112	9652	106
October	10243	112	9613	105
November	9632	105	8802	96
December	9332	102	8684	95

For Vehicle Classification data near your project, please go to the following web page: https://www.oregon.gov/ODOT/Data/Documents/TVT_2017.xlsx

Location:	OR219; MP 31.88; HILLSBORO-SILVERTON HIGHWAY NO. 140; 1.85 miles south of St. Paul Highway N.E.	Site Name:	St. Paul (24-020)
		Installed:	January, 1958

HISTORICAL TRAFFIC DATA

		Percent of AADT				
Year	AADT	Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
2008	2376	293	29.4	17.6	14.1	12.8
2009	2425	279	28.7	18.3	15.4	13.4
2010	2543	282	29.1	18.1	15.9	14.4
2011	2539	260	26.4	19.5	16.4	14.5
2012	2607	315	31.1	20.6	16.2	14.4
2013	2606	260	24.4	16.6	14.8	13.3
2014	2627	259	23.5	17.1	15.0	13.5
2015	2800	230	20.2	15.6	14.1	13.1
2016	2942	221	21.1	15.2	14.2	13.5
2017	3048	230	27.7	16.5	15.1	13.9



2017 TRAFFIC DATA

	Average Weekday Traffic	Percent of AADT	Average Daily Traffic	Percent of AADT
January	2327	76	2168	71
February	2745	90	2569	84
March	2878	94	2736	90
April	3083	101	3041	100
May	3330	109	3343	110
June	3312	109	3341	110
July	3859	127	3804	125
August	3719	122	3581	117
September	3391	111	3424	112
October	3245	106	3208	105
November	2911	96	2727	89
December	2763	91	2628	86

For Vehicle Classification data near your project, please go to the following web page: https://www.oregon.gov/ODOT/Data/Documents/TVT_2017.xlsx