

EXHIBIT 7
CUP16-02

SECTION 7 – TRAFFIC STUDY

TRAFFIC ANALYSIS REPORT

FOR

LACAMAS HEIGHTS ELEMENTARY SCHOOL

NE 232nd Avenue

CAMAS SCHOOL DISTRICT, CITY OF CAMAS

SUBMITTED BY



May 2016

Project 15-46

TRAFFIC ANALYSIS REPORT

FOR

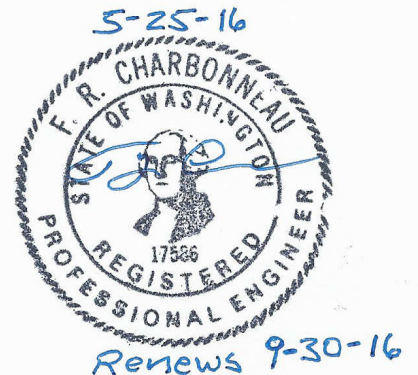
LACAMAS HEIGHTS ELEMENTARY SCHOOL

NE 232nd Avenue

CAMAS SCHOOL DISTRICT, CITY OF CAMAS

Prepared By

CHARBONNEAU Engineering LLC



May 2016

Project 15-46

TABLE OF CONTENTS

INTRODUCTION.....	1
SITE DESCRIPTION, STREETS, AND CRITICAL INTERSECTIONS	1
TRAFFIC OPERATIONAL ANALYSIS	2
VEHICLE TRIP GENERATION	3
TRAFFIC FLOW AND CAPACITY ANALYSIS RESULTS	3
LEFT TURN LANE REQUIREMENTS	5
TRAFFIC SIGNAL WARRANTS.....	6
PEDESTRIANS, BICYCLE, & BUSSING.....	6
INTERSECTION SIGHT DISTANCE.....	6
TRAFFIC SAFETY	6
SUMMARY AND RECOMMENDATIONS	7
APPENDIX.....	9

Vicinity Map	Figure 'a'
Site Plan	Figure 'b'
Lane Configuration & Traffic Control	Figure 'c'
Traffic Flow Diagrams	
Existing Traffic Year 2015 (AM, Mid, & PM Peak Hours)	Figure 1
In-Process Traffic	Figure 2
Background Traffic Year 2018	Figure 3
Bus Trip Assignment	Figure 4
Non-Bus Trip Distribution	Figure 5
Non-Bus Trip Assignment, (AM, Mid, & PM Peak Hours)	Figure 6
Total Traffic Year 2018 (AM, Mid, & PM Peak Hours)	Figure 7
Traffic Count Data	
In-Process Traffic Data	
Left Turn Lane Warrants	
Peak Hour Signal Warrants	
Intersection Capacity Analysis Printouts – Synchro v9 output	
WSDOT Furnished Crash History Report	
City TIF Projects Location Map	

INTRODUCTION

This traffic study was performed to determine the impacts associated with the development of the new Lacamas Heights Elementary School in the Camas School District in the City of Camas. The impact area as defined based on input received from the City staff included the school's frontage area on NE 232nd Avenue and several key intersections occurring along NE 232nd Avenue, NE 28th Street, and 267th Avenue. The school property is situated on the north side of 9th Street east of 232nd Avenue. The site location is highlighted on the vicinity map (Figure 'a') in the appendix. Site layout including placement on the school building, parking lot, sports fields, and driveway locations on 232nd Avenue Street are shown on Figure 'b'.

The project proposes to construct a new elementary school to replace the existing Lacamas Heights Elementary School now located adjacent to the high school campus along SE 15th Street. The new elementary school will serve 600 students. The school will operate on a standard 180 day school year during the hours of 9:00 AM to 3:30 PM. Traffic access to the site is being planned for two accesses on the east side of 232nd Avenue as illustrated on the site plan. The north access will serve all non-bus traffic and the south access will be reserved for school busses.

In the project scope established with the City of Camas a number of important elements were identified and considered in the study.

- Projecting site generated traffic relative for 600 students. Trip rates were applied from the ITE Trip Generation Manual (9th Edition, year 2012).
- Distribution of site generated trips was based on the District's service area and boundary information, traffic volume counts, circulation patterns, and engineering judgment.
- Background traffic was established from several in-process traffic projects identified by the City. Application of annual traffic growth was not necessary in the analysis as confirmed by staff.
- Documentation of pedestrian, bicycle, and transit facilities in the study area.
- Evaluation of sight distance at the site access point on 9th Street.
- Determination of left turn lane requirements and peak hour signal warrants.
- Capacity analysis of four study intersections including 232nd Avenue at 9th Street, 232nd at 28th Street, 242nd Avenue at 28th Street, 267th Avenue at 19th Street, and the site accesses on 232nd Avenue. The peak hour periods during the weekday AM, mid-afternoon, and PM were analyzed for the existing, background year 2018, and total traffic year 2018 scenarios.
- Review of the existing travel lane and traffic control conditions.
- Level of service analysis of the study intersections to confirm the locations not meeting the City's mobility standards and the required mitigation.
- Documentation of the study area streets and intersections included in the City's TIF Update (May 2012).
- Review of WSDOT furnished crash history data to assess if there have been safety issues that must be mitigated.

The Appendix to the report contains technical data including a vicinity map, site plan, traffic flow mapping, left turn lane & signal warrants, lane and traffic control plan, and the capacity analysis outputs.

SITE DESCRIPTION, STREETS, AND CRITICAL INTERSECTIONS

The project site is located in north Camas approximately a quarter-mile north of Lacamas Lake on the east side of 232nd Avenue. The surrounding land is sparsely developed and consists mainly of forested and farm property. The site is situated close to the District's west boundary with most of the service area extending to the east, south, and north.

Intersection sight distance at the future access points on 232nd Avenue (final location still to be determined) will need to meet AASHTO's standard based on the street's 40 MPH speed. For 40 MPH the required intersection sight distance is 445 feet.

Northeast 232nd Avenue is classified as an arterial and currently provides one lane in each direction. There are minimal shoulders with approximately one to two feet of width and the travel speed is posted at 40 MPH. There is a moderate uphill grade to the north from the 9th Street intersection. Appropriate school zone signing will need to be posted including school symbol signs in advance of the site access points.

The intersection of **9th Street at 232nd Avenue** is configured as a tee-shaped design with stop control on the 9th Street approach. A dead-end sign is present on 9th Street. There are no separate turn lanes at this location.

Northeast 232nd Avenue at 28th Street (classified as an arterial) is a four-way configuration controlled by stop signing on the northbound approach. The north leg is a private road serving several residences and is not signed for stop control. There are no separate turn lanes at the intersection. A large two-way arrow-board sign is posted on the north side of the intersection for northbound traffic.

Northeast 28th Street at 242nd Avenue is configured as a tee-shaped design with stop sign control established for southbound traffic. There is a private driveway approach on the south leg. There are no separate turn lanes at the intersection.

Northeast 19th Street at 267nd Avenue is configured as a tee-shaped design with stop sign control established for eastbound traffic. There is a private driveway approach on the west side of the intersection. There are no separate turn lanes at the intersection.

The existing lane configuration and traffic control elements are shown on Figure 'c'.

TRAFFIC OPERATIONAL ANALYSIS

Four intersections were analyzed for level of service (LOS) conditions as stipulated in the project scoping established with the City of Camas. LOS analyses were completed for the study intersections during the peak hour periods under several scenarios:

- Existing traffic year 2015
- Background traffic year 2018
- Total traffic year 2018

In order to perform the LOS analysis at the critical intersections video traffic counts were recorded during the AM peak (7:15-9:15 AM), mid-afternoon (1:45-3:45 PM), and PM peak (4:00-6:00 PM) traffic hours. The existing traffic volumes are shown on Figure 1 in the report's appendix.

Background traffic is comprised of the existing and the in-process traffic that was specified by the City. The in-process traffic is shown on Figure 2 and the year 2018 background traffic volumes are shown on Figure 3.

Figure 4 illustrates the trip assignments for the school bus routes in the study area.

Figure 5 exhibits the distribution for the non-bus traffic associated with the new school. The distribution was based on the service and boundary vicinity, traffic volume counts, circulation patterns, and engineering judgment. Figure 6 illustrates the site generated trip assignments covering the AM, mid-afternoon, and PM peak hours. Generated traffic was developed from the number of trips associated with 600 students.

The total traffic scenario was derived from the summation of the background and the school's site generated traffic. The total traffic scenario is depicted on Figure No. 7.

VEHICLE TRIP GENERATION

Vehicle trip generation rates were calculated based on historical data contained in the ITE Trip Generation manual (9th Edition, 2012). Trip rates for the elementary school were applied from the manual using ITE code #520.

Over a 24-hour weekday period a total of 774 trip ends are projected to occur when the school begins operation. During the AM, mid-afternoon, and PM peak hours a total of 270, 168, and 90 trips, respectively will be generated in the peak hours.

Table 1 Trip Generation Summary

ITE Land Use	Units (Students)	Weekday									
		ADT	AM Peak Hour			Mid-Afternoon Peak Hour			PM Peak Hour		
			Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
Elementary School (#520)	600										
Generation Rate ¹		1.29	0.45	55%	45%	0.28	45%	55%	0.15	49%	51%
Site Trips		774	270	149	121	168	76	92	90	44	46

¹ Source: *Trip Generation*, 9th Edition, ITE, 2012, average rates.

TRAFFIC FLOW AND CAPACITY ANALYSIS RESULTS

The traffic flow maps included in the appendix showing the traffic volume data and turning movements for the weekday peak hour conditions were used in the capacity analysis. The study intersections were evaluated for the existing, year 2018 background, and year 2018 total traffic scenarios during the AM, mid-afternoon, and PM peak hours. Synchro version #9 software employing the year 2010 Highway Capacity Manual methodology was applied in performing the intersection capacity analyses.

The City's mobility standards require that a LOS 'D' and a volume to capacity (v/c) ratio of 0.90 or better be maintained for all intersections. The standards are documented in the City of Camas Comprehensive Plan, Transportation Element, Policy TR-20 dated March 2004.

Table 2 presents a summary of the capacity analysis results determined in the study.

Table 2 Capacity Analysis Summary

Intersection	Type of Control	Peak Hour	Traffic Scenario											
			2015 Existing				2018 Background				2018 Total			
			Crit. Mov't	LOS	Delay	v/c	Crit. Mov't	LOS	Delay	v/c	Crit. Mov't	LOS	Delay	v/c
NE 28th Street and NE 232nd Avenue	Two-way Stop	AM	NB	B	12.3	-	NB	C	21.5	-	NB	F	93.6	-
		Mid-Afternoon	NB	B	12.5	-	NB	C	17.2	-	NB	D	25.1	-
		PM	NB	B	13.2	-	NB	E	45.6	-	NB	F	90.1	-
	Mitigation ¹	AM	-	-	-	-	-	-	-	-	NB	E	45.9	-
		Mid-Afternoon	-	-	-	-	-	-	-	-	-	-	-	-
		PM	-	-	-	-	NB	E	43.1	-	NB	F	61.3	-
	Mitigation ²	AM	-	-	-	-	-	-	-	-	-	B	14.6	0.44
		Mid-Afternoon	-	-	-	-	-	-	-	-	-	-	-	-
		PM	-	-	-	-	-	B	12.8	0.38	-	B	14.2	0.42
Non-Bus Access and NE 232nd Avenue	Two-way Stop	AM	-	-	-	-	-	-	-	-	WB	B	10.1	-
		Mid-Afternoon	-	-	-	-	-	-	-	-	WB	A	9.4	-
		PM	-	-	-	-	-	-	-	-	WB	A	9.5	-
NE 9th Street and NE 232nd Avenue	Two-way Stop	AM	WB	A	9.1	-	WB	B	10.1	-	WB	B	10.2	-
		Mid-Afternoon	WB	A	0.0	-	WB	A	0.0	-	WB	A	0.0	-
		PM	WB	A	8.5	-	WB	A	8.8	-	WB	A	8.8	-
NE 242nd Avenue/ driveway and NE 28th Street/ Dresser Road	Two-way Stop	AM	SB	B	12.3	-	SB	C	15.2	-	SB	D	25.6	-
		Mid-Afternoon	SB	B	13.2	-	SB	C	15.0	-	SB	C	18.7	-
		PM	SB	B	13.2	-	SB	C	16.9	-	SB	C	18.6	-
NE 267th Avenue and NE 19th Street	Two-way Stop	AM	WB	C	16.4	-	WB	C	19.3	-	WB	D	27.5	-
		Mid-Afternoon	WB	B	12.3	-	WB	B	12.8	-	WB	B	13.4	-
		PM	WB	B	13.1	-	WB	B	14.7	-	WB	C	15.2	-

Notes: 2010 Highway Capacity Manual methodology used in analysis, Synchro v9. NB - Northbound, SB - Southbound, WB - Westbound, Crit. Mov't - Critical movement or critical approach.

¹ Mitigation: Construct a northbound left turn lane on NE 232nd Avenue at NE 28th Street.

² Mitigation: Not Recommended - Traffic Signal.

With the exception of the intersection at 28th Street and 232nd Avenue the study intersections will operate at acceptable LOS 'D' or better during the peak hours for the existing, year 2018 background, and year 2018 total traffic scenarios.

The proposed non-bus traffic access (major access, worst case) on 232nd Avenue will operate at LOS 'B' or better through the year 2018 total traffic scenario.

The northbound stop controlled movement at 28th Street and 232nd Avenue is currently operating at LOS 'B'. In the year 2018 background scenario the intersection will experience LOS 'E' in the PM peak hour. For the year 2018 total traffic scenario the intersection is projected to operate at LOS 'F' in the AM and PM peak hours. Potential mitigation includes signalization or adding a second northbound lane to create separate left and combination through/right lanes. Although the peak hour signal warrant is met in the year 2018 background and total traffic scenarios installation is not recommended because a future east-west collector street extending Ingle Road from 28th Street to 232nd Avenue includes a roundabout at the 232nd Avenue intersection (City of Camas TIF Project Locations, May 2012). When the future collector is constructed (no defined schedule in place) it is anticipated that the traffic volumes at 28th Street and 232nd Avenue will significantly decrease negating the need for a signal as confirmed in the City's TIF Update report (May 2012, DKS) for the year 2035 scenario. As an interim step it is recommended that a second northbound lane be added on the south intersection leg. With this improvement the northbound left turn lane will still operate at LOS 'F' until the roundabout is constructed in conjunction with the Ingle Road extension to 232nd Avenue.

Generally, LOS 'A', 'B', 'C', and 'D' are desirable service levels ranging from no vehicle delays to average or longer than average delays in the peak hours. Level 'E' represents long delays indicating signalization warrants need to be reviewed and signals considered only if warrants are met. Level 'F' indicates that intersection improvements, such as widening and signalization, may be required. By definition, and according to the Highway Capacity Manual (HCM), the following delay times are associated with the LOS at stop controlled (unsignalized) and signalized intersections.

Level of Service criteria defined in *Highway Capacity Manual*.

Level of Service (LOS)	Unsignalized Control Stopped Delay (sec/veh)	Signalized Control Stopped Delay (sec/veh)
A	≤ 10	≤ 10
B	> 10 and ≤ 15	> 10 and ≤ 20
C	> 15 and ≤ 25	> 20 and ≤ 35
D	> 25 and ≤ 35	> 35 and ≤ 55
E	> 35 and ≤ 50	> 55 and ≤ 80
F	> 50	> 80

LEFT TURN LANE REQUIREMENTS

A series of left turn lane warrant analyses were performed for the study intersections and the site access intersections. The study revealed that a westbound left turn lane is warranted for the year 2018 total traffic scenario at the intersection of 28th Street at 232nd Avenue. Installation of the westbound left turn lane is not recommended considering the peak hour LOS and queuing results (WB approach LOS 'A', 95th percentile queue of one vehicle). It is also noted that with the future Ingle Road extension between 28th Street and 232nd Avenue eastbound (opposing) traffic at 232nd Avenue/28th Street will decrease benefiting the westbound to southbound movement.

Based on the street's functional classification as an arterial, 40 MPH speed, and for safety reasons it is recommended that southbound left turn lanes be installed on 232nd Avenue at the site access intersections. For the non-bus (north) access the storage length will need to accommodate sufficient stacking distance for eight vehicles or 200 feet. At the south site access (bus entrance) the stacking distance should accommodate a minimum of three busses in the AM peak hour (worst case peak period) for a recommended storage length of 200 feet.

The left turn lane data and warrants are contained in the appendix.

TRAFFIC SIGNAL WARRANTS

The study intersections were reviewed for signalization needs based on the peak hour signal warrant contained in the Manual on Uniform Traffic Control Devices (MUTCD). The peak hour warrant was met at the following locations.

- 28th Street/232nd Avenue for the year 2018 background and total traffic scenarios (signal not recommended, instead mitigate by adding second northbound lane)
- 28th Street/242nd Avenue for the year 2018 total traffic scenario (future signal planned as TIF project, signal not recommended in conjunction with new elementary school development as the current stop controlled intersection will experience LOS 'D' or better through the year 2018 total traffic periods and no crashes were reported within the last five years)
- 19th Street/267th Avenue for the year 2018 total traffic scenario (signal not recommended as the current stop controlled intersection will experience LOS 'D' or better through the year 2018 total traffic periods and no reported crashes were reported within the last five years)

PEDESTRIANS, BICYCLE, & BUSES

The project site is situated within a sparsely developed area that does not currently provide facilities for pedestrians, bicyclists, or transit. With the project development sidewalk will be provided on site and along the street frontage adjacent to the school. Appropriate school zone signing including advance symbol will be placed on 232nd Avenue in conjunction with the project.

No bicycle lanes are present within the general area.

C-Tran does not provide transit service in this area of Camas.

INTERSECTION SIGHT DISTANCE

Intersection sight distance was reviewed on 232nd Avenue along the project frontage. The current vertical grade is moderate resulting in favorable sight distance near the preliminary site access locations. When the site locations are finalized it is recommended that sight distances be reassessed in conformance with the AASHTO standards based on a travel speed of 40 MPH. For 40 MPH the required intersection sight distance is 445 feet.

TRAFFIC SAFETY

Accident data for the study intersections was provided by WSDOT and reviewed to help identify any traffic safety problems. The data covered a five-year study period in the years 2010 through 2014 (reference appendix).

The crash rates are presented in Table 3 and are based on the number of accidents per million entering vehicles (MEV) per year. Typically, an intersection is not considered unsafe unless the accident rate exceeds the threshold of 1.0 accident per MEV.

None of the study intersections have experienced a crash rate of greater than 0.46 MEV and as a result no safety mitigation is necessary.

Table 3 Intersection Crash Rate Summary

Intersection	Accident History (Years)	Number of Accidents	Accidents per year	Annual Traffic Entering (veh/yr)	Accident rate per M.E.V.*
NE 28th Street & NE 232nd Avenue	5	1	0.2	1654537	0.12
NE 9th Street & NE 232nd Avenue	5	1	0.2	430983	0.46
NE 242nd Avenue & NE 28th St/Dresser Rd	5	0	0.0	1614361	0.00
NE 19th Street and NE 267th Avenue	5	0	0.0	2038039	0.00

* M.E.V. - million entering vehicles.

SUMMARY AND RECOMMENDATIONS

The development plan for Lacamas Heights Elementary School will construct a new 70,000 square foot building providing for a total of 600 students. The traffic impact area as defined based on input received from City of Camas transportation staff included the school's immediate frontage area and analysis of several off-site intersections including NE 232nd Avenue at the future site access points and at 28th Street, and 242nd Avenue at 28th Street, and 267th Avenue at 19th Street. The site location is shown on Figure 'a' in the report's appendix. Traffic access to the school will be provided on 232nd Avenue and is illustrated on the site plan (Figures 'b').

The new elementary school is projected to generate 774 trips per day. A total of 270 trips will be generated in the AM peak hour, 168 trips generated in the mid-afternoon peak hour, and 90 trips generated in the PM peak hour. Table 1 in the report exhibits the project trip generation.

The traffic analysis documented the impacts to the existing street system. Traffic scenarios included the weekday peak traffic hours occurring during the AM, mid-afternoon, and PM periods. Year 2015 existing traffic, year 2018 background traffic, and year 2018 total traffic scenarios were evaluated in the study.

The proposed site access on 232nd Avenue for non-bus traffic (north access) will operate at LOS 'B' or better through the year 2018 total traffic scenario. It will be necessary to install a stop sign on the proposed site access approaches to 232nd Avenue for traffic control and safety purposes. A stop bar pavement marking shall also be installed at each location.

With exception of the intersection at 28th Street and 232nd Avenue the other study intersections will operate at acceptable LOS 'D' or better during the peak hours for the existing, year 2018 background, and year 2018 total traffic scenarios. At these locations no mitigation is proposed.

For the intersection at 28th Street and 232nd Avenue the northbound stop controlled movement currently operates at LOS 'B'. In the year 2018 background scenario it will experience LOS 'E' due to

the addition of in-process traffic. For the year 2018 total traffic scenario the intersection is projected to operate at LOS 'F' in the AM and PM peak hours. The recommended mitigation includes adding a second northbound lane to create separate left and combination through/right lanes. Although the improvement will still result in LOS 'F' for the left turn movement the v/c ratio will equate to 0.88 on the stop controlled approach in the PM peak hour (year 2018 total traffic scenario, worst case). The v/c ratio combining both northbound lanes equates to a value of 0.34 at buildout. Additional improvements are not recommended because a future east-west collector street extending Ingle Road from 28th Street to 232nd Avenue includes a roundabout at the 232nd Avenue intersection (City of Camas TIF Project Locations, May 2012). When the future collector is constructed it is anticipated that the traffic volumes at 28th Street and 232nd Avenue will significantly decrease negating the need to make significant improvements as confirmed in the City's TIF Update report (May 2012, DKS) for the year 2035 scenario

The analyses determined that a westbound left turn lane is warranted for the year 2018 total traffic scenario at the intersection of 28th Street at 232nd Avenue. Installation of the westbound left turn lane is not recommended considering the LOS and queuing results (WB approach LOS 'A', 95th percentile queue of one vehicle). It is also noted that with the future Ingle Road extension between 28th Street and 232nd Avenue eastbound traffic at 232nd Avenue/28th Street will decrease benefiting the westbound to southbound movement.

Southbound left turn lanes are recommended on 232nd Avenue at the two site access locations based on the street's functional classification as an arterial, travel speed (posted 40 MPH), and safety reasons. For the non-bus (north) access the storage length will need to accommodate sufficient stacking distance for eight vehicles or 200 feet. At the south site access (bus entrance) the stacking distance should accommodate a minimum of three busses in the AM peak hour (worst case peak period) with the recommended storage length of 200 feet.

Peak hour signal warrants were determined for the study intersections.

At 28th Street and 232nd Avenue the warrant is met for the year 2018 background and total traffic scenarios. A signal installation is not recommended as the intersection will be mitigated by adding a separate northbound left turn lane.

At 28th Street and 242nd Avenue the signal warrant is met for the year 2018 total traffic scenario. The signal need has also been identified by the City as a future TIF project. However, signalization is not recommended in conjunction with new elementary school development as the intersection will experience LOS 'D' or better through the year 2018 total traffic periods and no reported crashes have been reported within the last five years.

At 19th Street and 267nd Avenue the signal warrant is met for the year 2018 total traffic scenario. However, signalization is not recommended in conjunction with new elementary school development as the intersection will experience LOS 'D' or better through the year 2018 total traffic periods and no reported crashes have been reported within the last five years.

APPENDIX

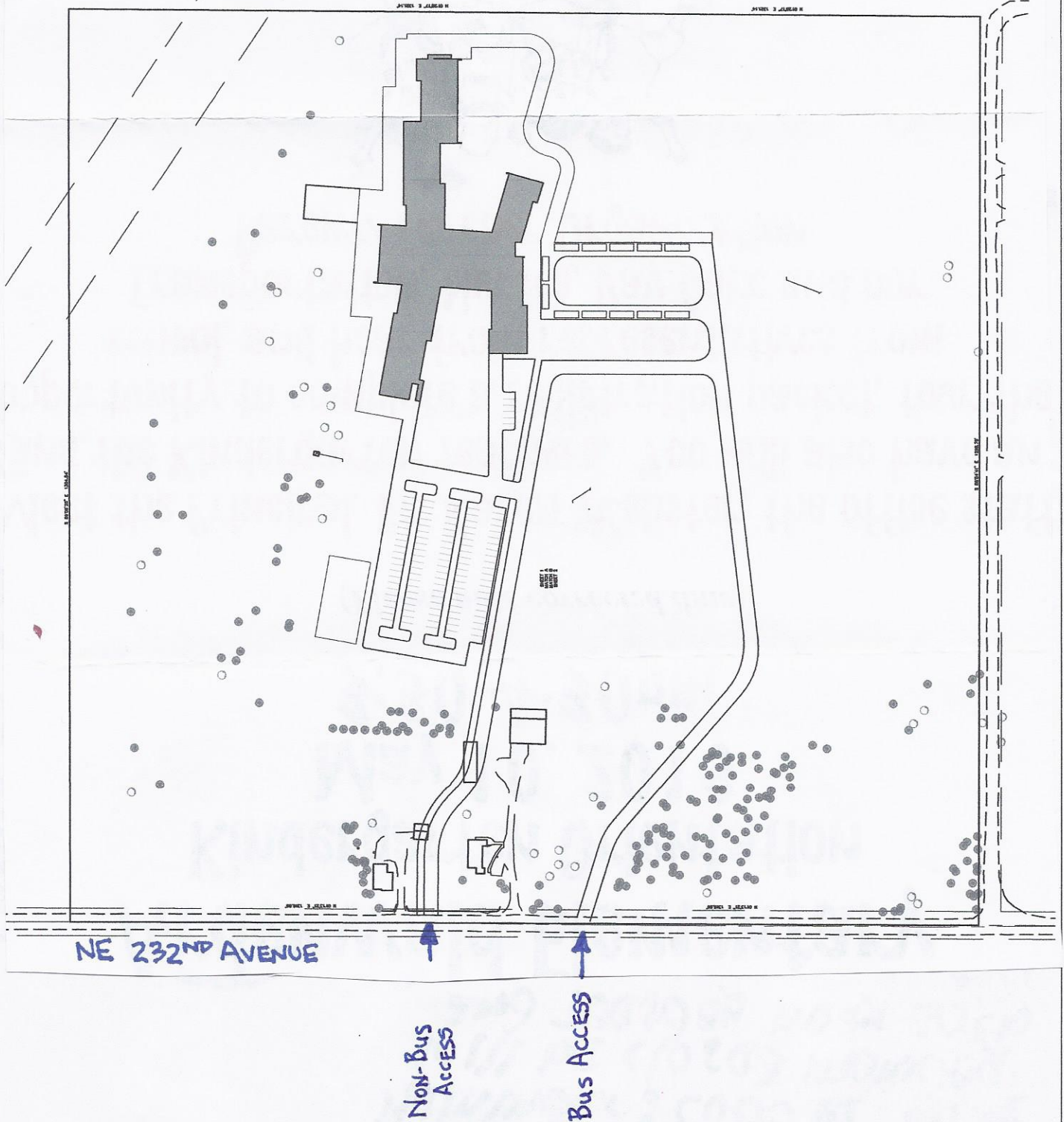
Vicinity Map	Figure 'a'
Site Plan	Figure 'b'
Lane Configuration & Traffic Control	Figure 'c'
Traffic Flow Diagrams	
Existing Traffic Year 2015 (AM, Mid, & PM Peak Hours)	Figure 1
In-Process Traffic	Figure 2
Background Traffic Year 2018	Figure 3
Bus Trip Assignment	Figure 4
Non-Bus Trip Distribution	Figure 5
Non-Bus Trip Assignment, (AM, Mid, & PM Peak Hours)	Figure 6
Total Traffic Year 2018 (AM, Mid, & PM Peak Hours)	Figure 7
Traffic Count Data	
In-Process Traffic Data	
Left Turn Lane Warrants	
Peak Hour Signal Warrants	
Intersection Capacity Analysis Printouts – Synchro v9 output	
WSDOT Furnished Crash History Report	
City TIF Projects Location Map	

PLOT DATE: 01.05.16



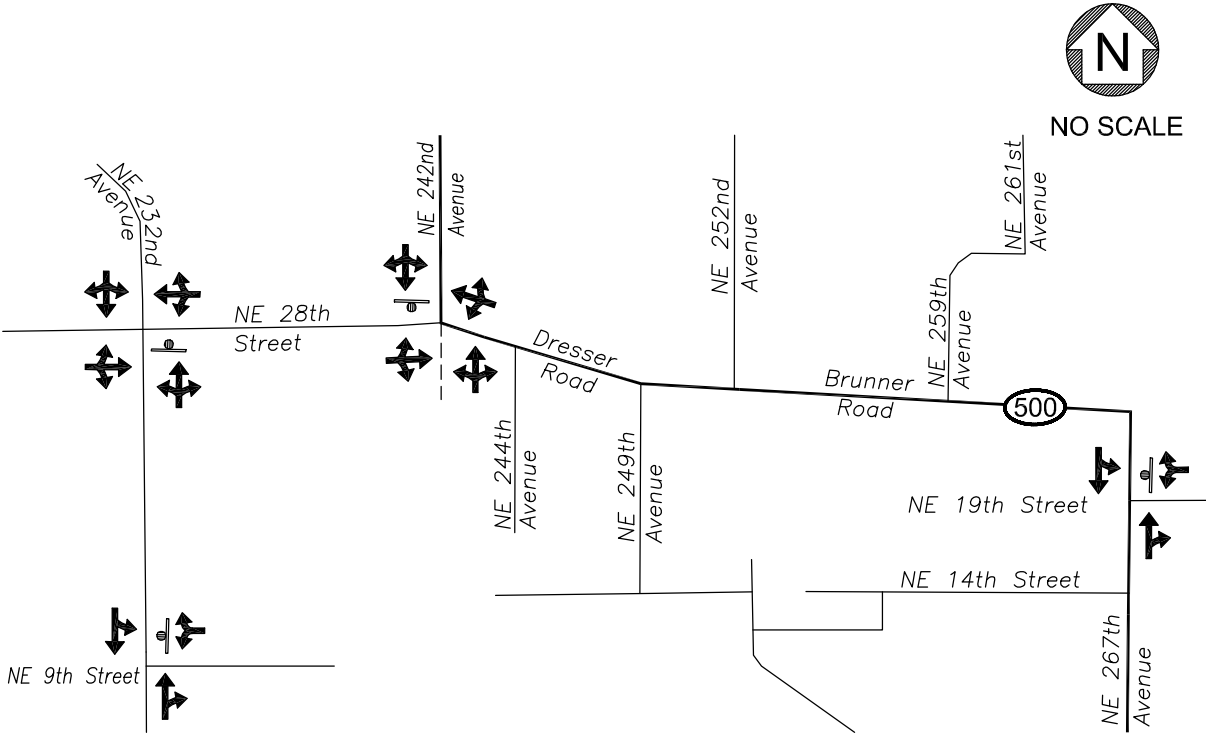
PROJECT: 15-46

a

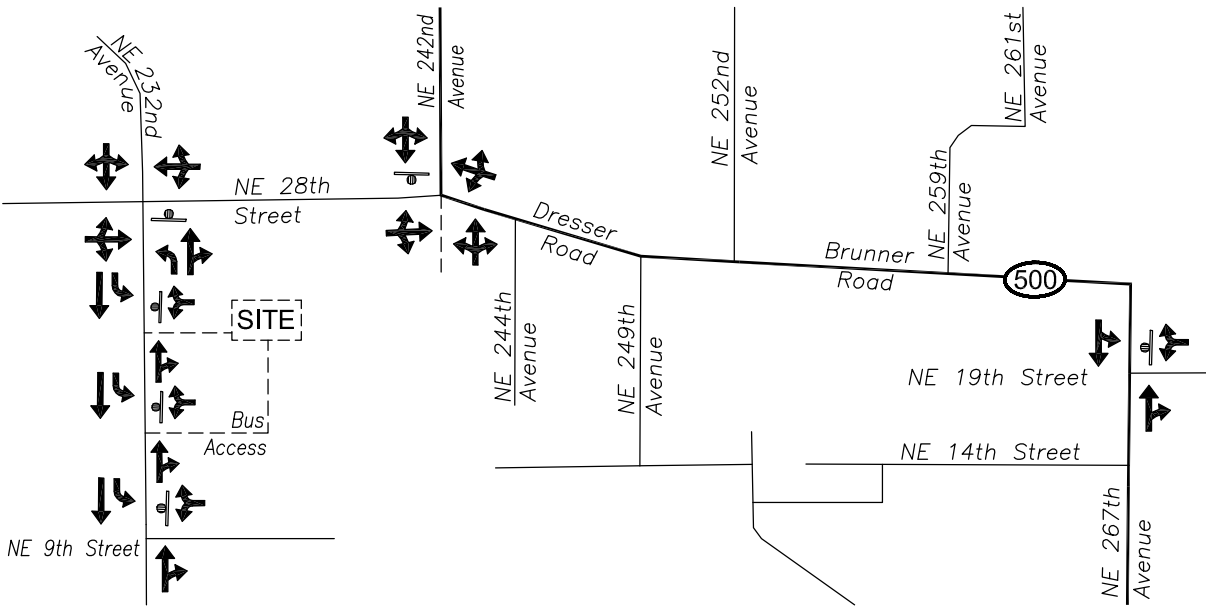


FILE NAME: 1546flow2.dwg

PLOT DATE: 05.24.16



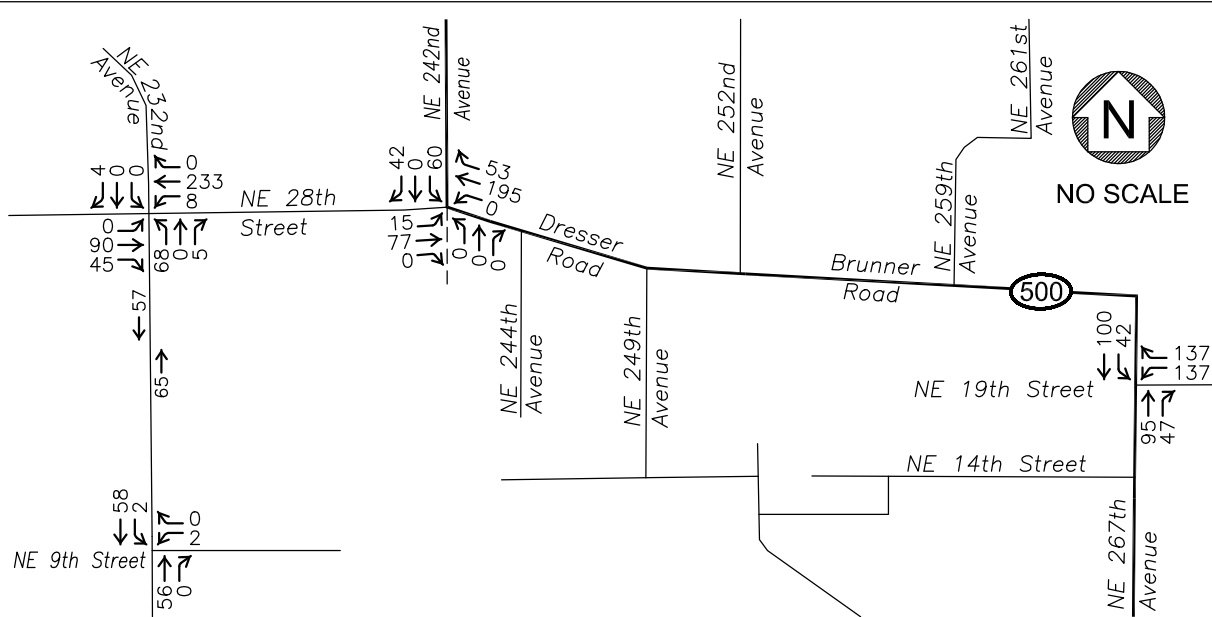
EXISTING



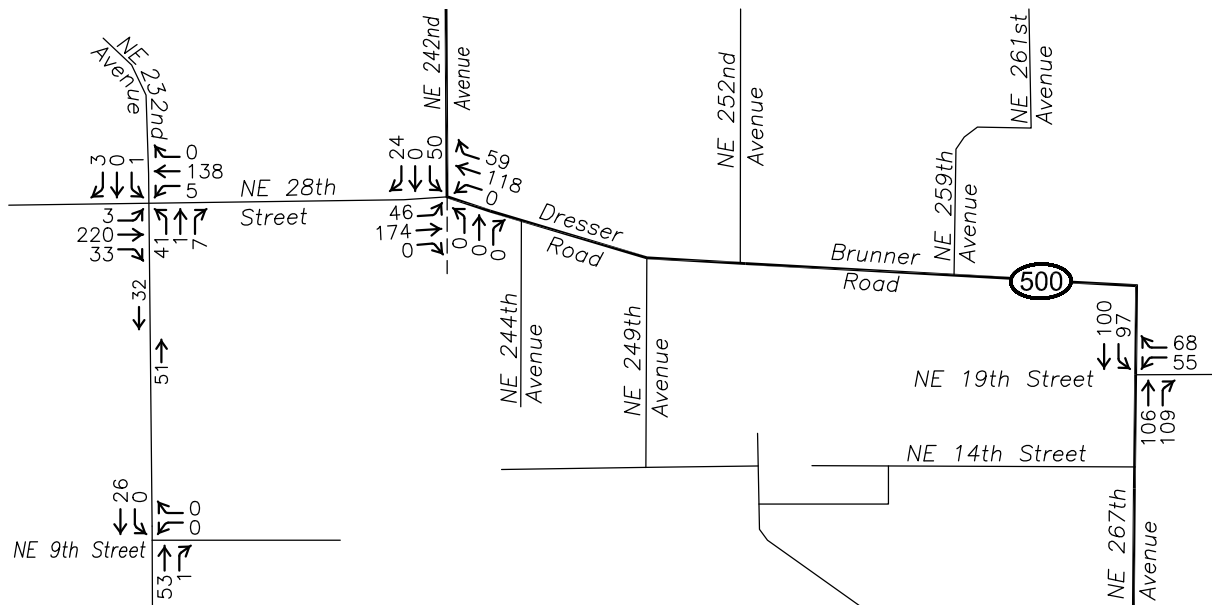
PROPOSED

FILE NAME: 1546flow2.dwg

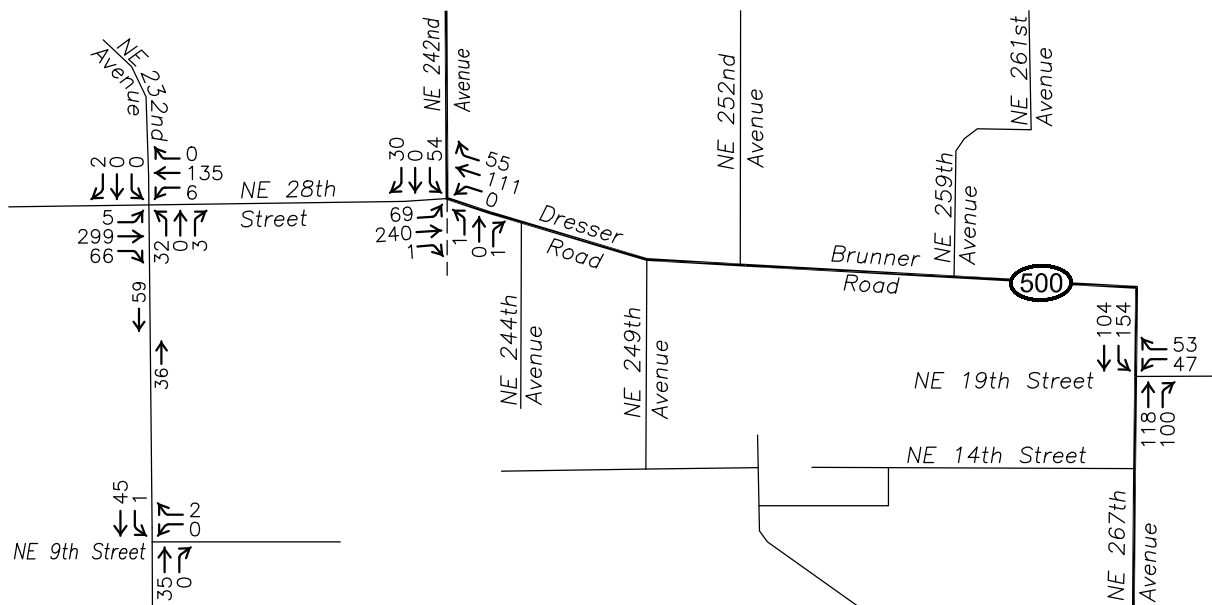
PLOT DATE: 05.12.16



AM
PEAK
HOUR



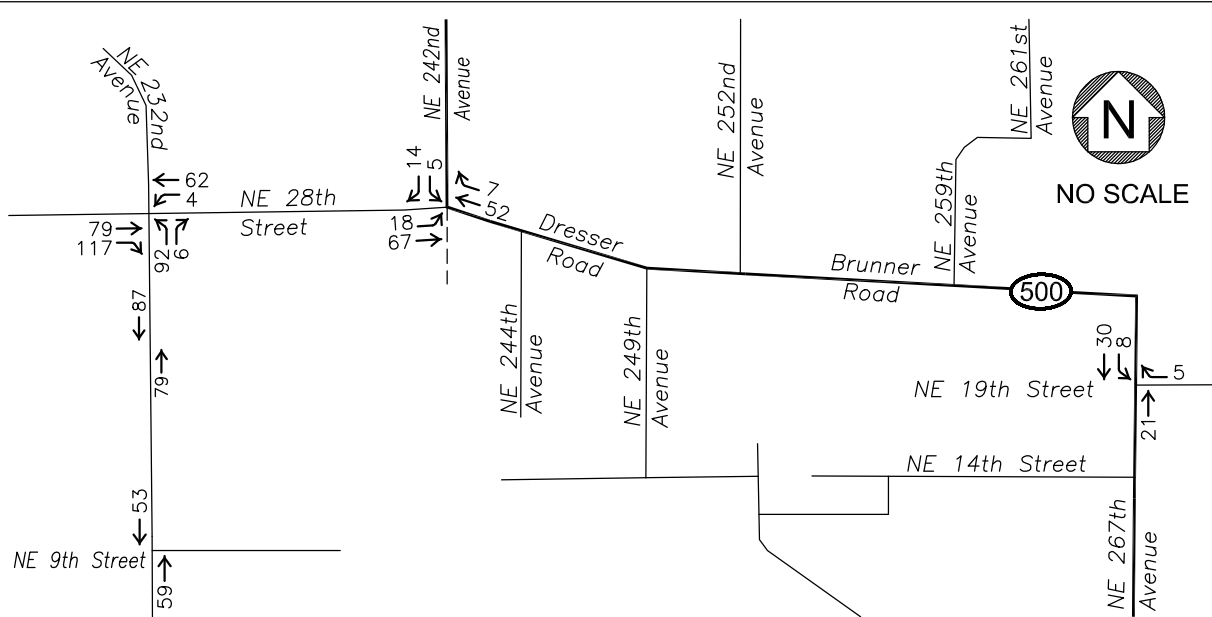
MID-
AFTERNOON
PEAK
HOUR



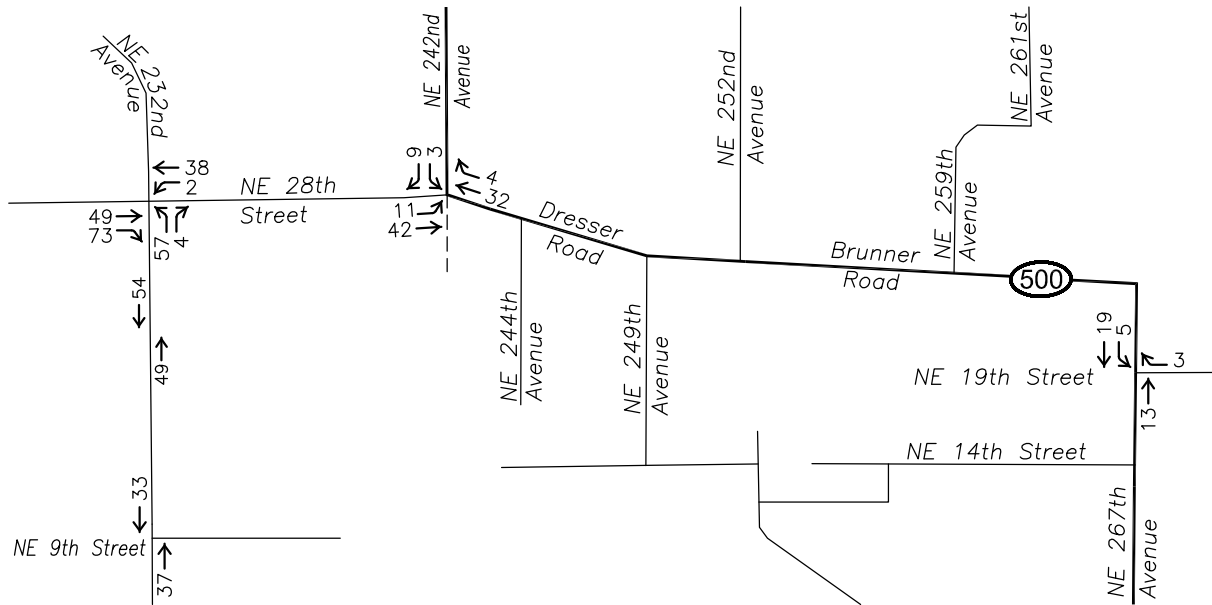
PM
PEAK
HOUR

FILE NAME: 1546flow2.dwg

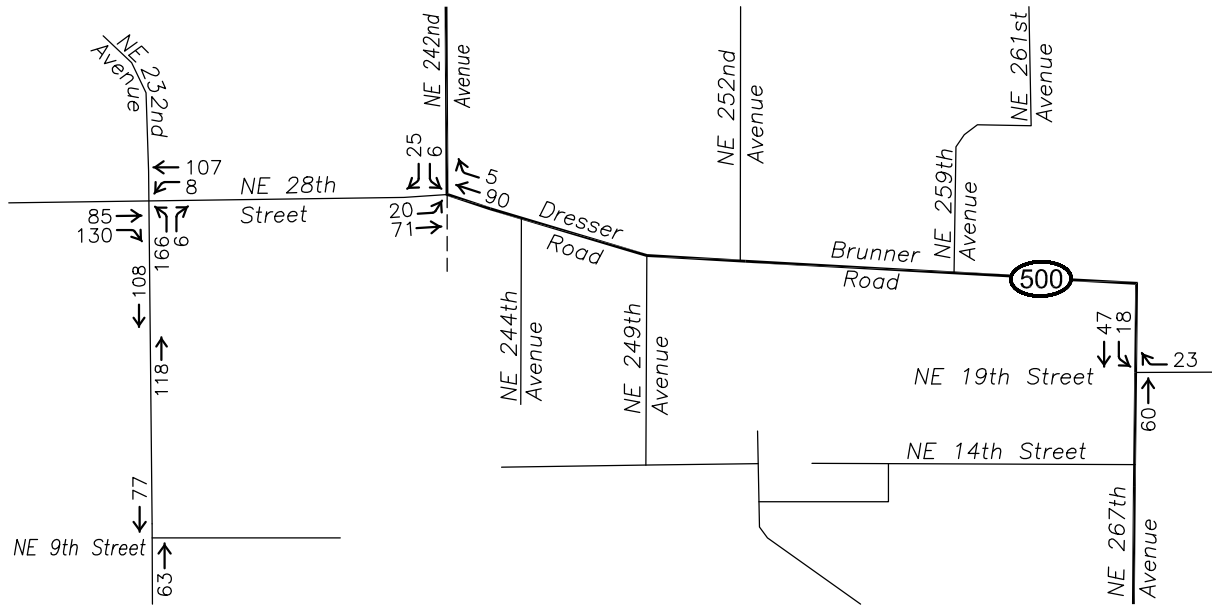
PLOT DATE: 05.12.16



AM
PEAK
HOUR



MID-
AFTERNOON
PEAK
HOUR



PM
PEAK
HOUR

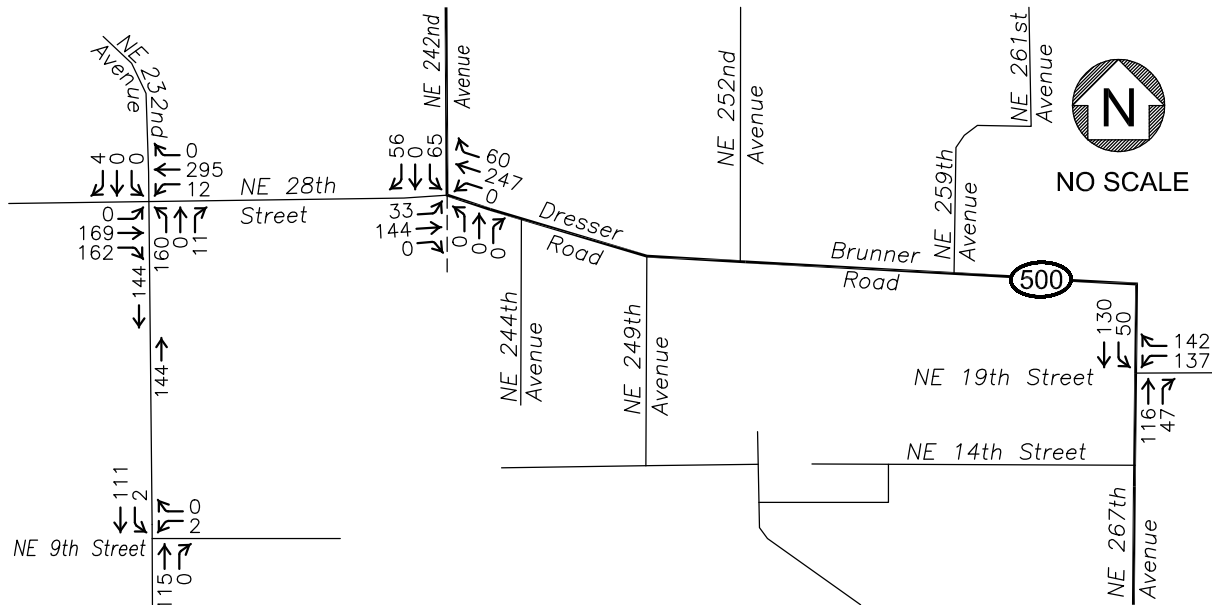
FILE NAME: 1546flow2.dwg

PLOT DATE: 05.16.16

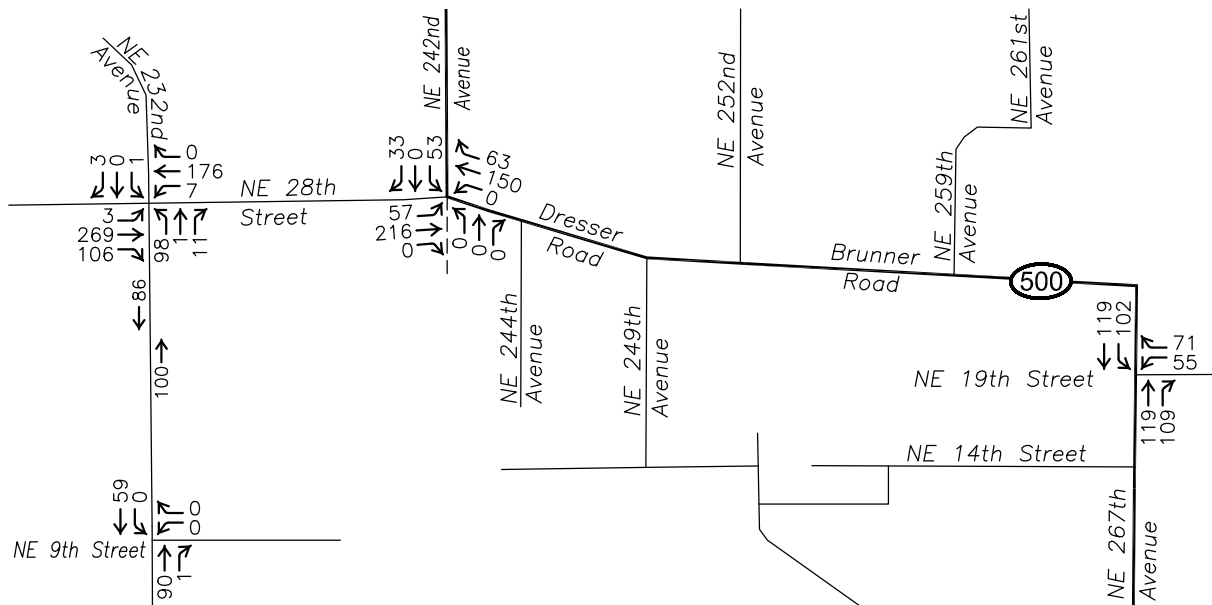
NOTES: 2018 Background
Traffic = 2015 Existing Traffic +
In-Process Traffic.

**2018 BACKGROUND TRAFFIC
LACAMAS HEIGHTS
ELEMENTARY SCHOOL**

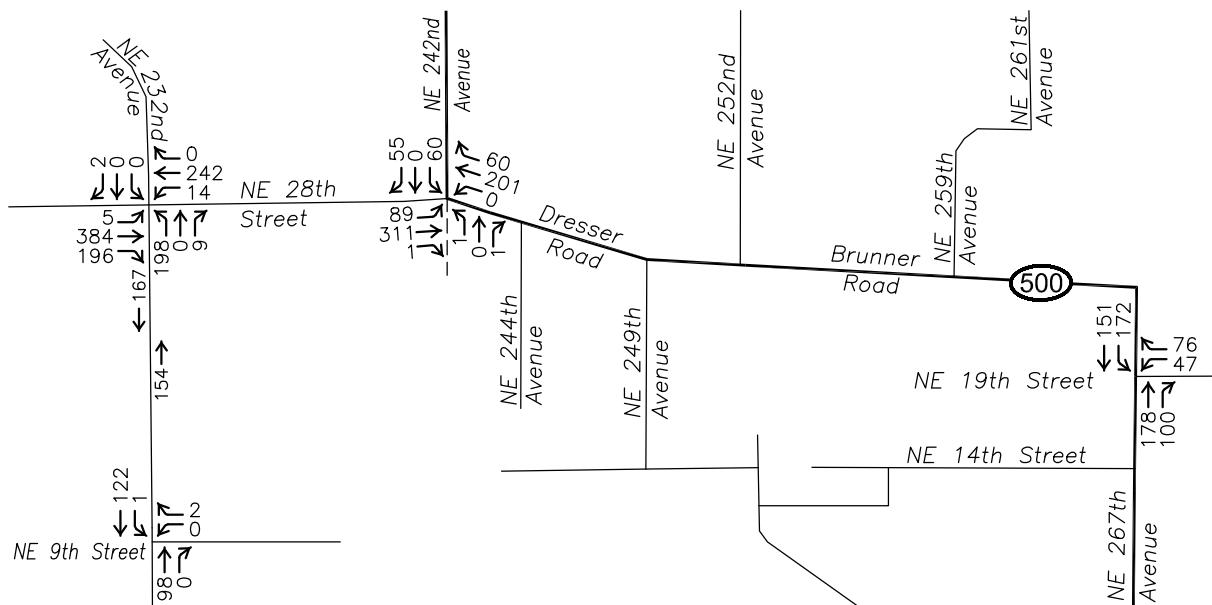
**FIGURE
3**



**AM
PEAK
HOUR**



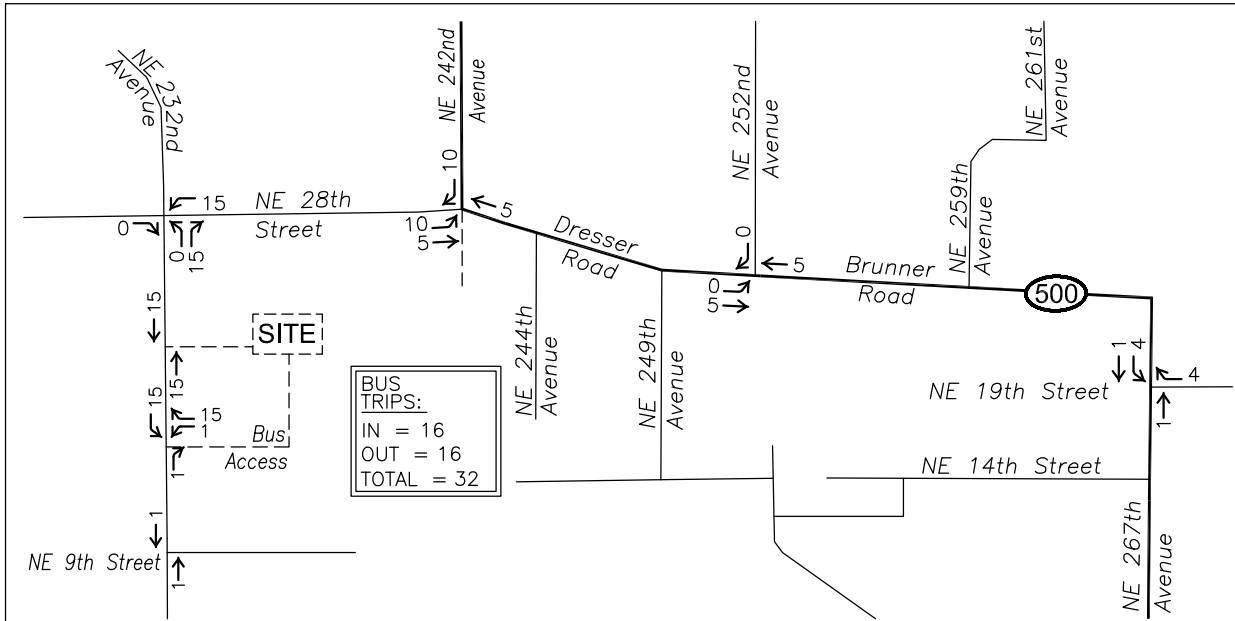
**MID-
AFTERNOON
PEAK
HOUR**



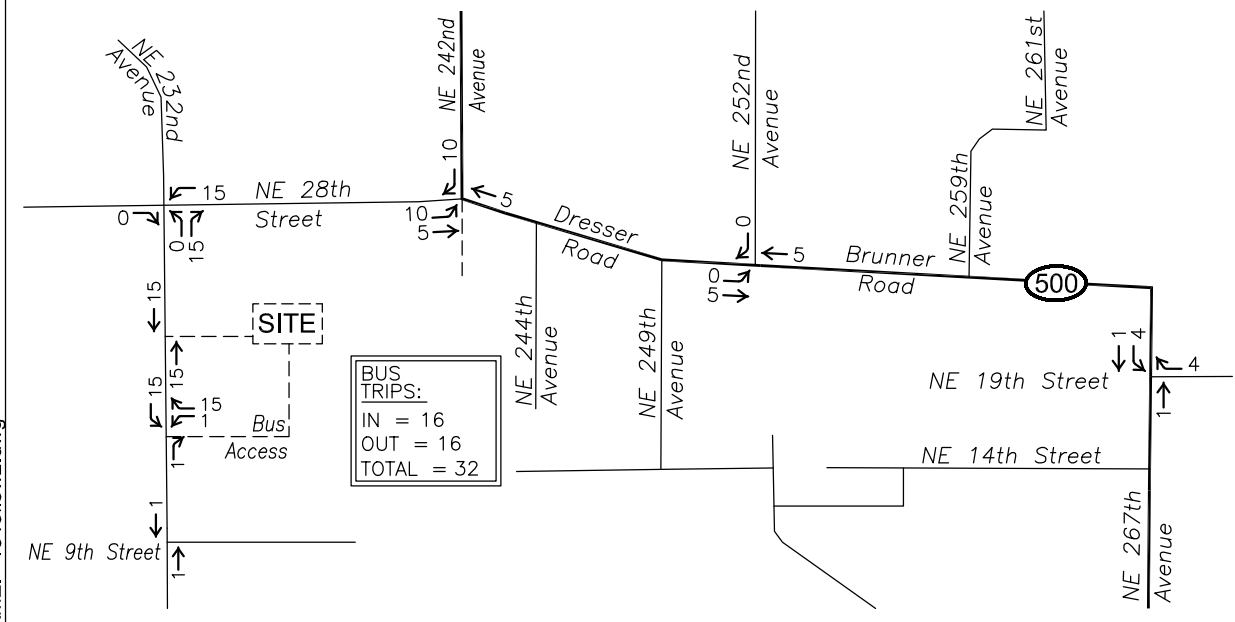
**PM
PEAK
HOUR**

FILE NAME: 1546flow2.dwg

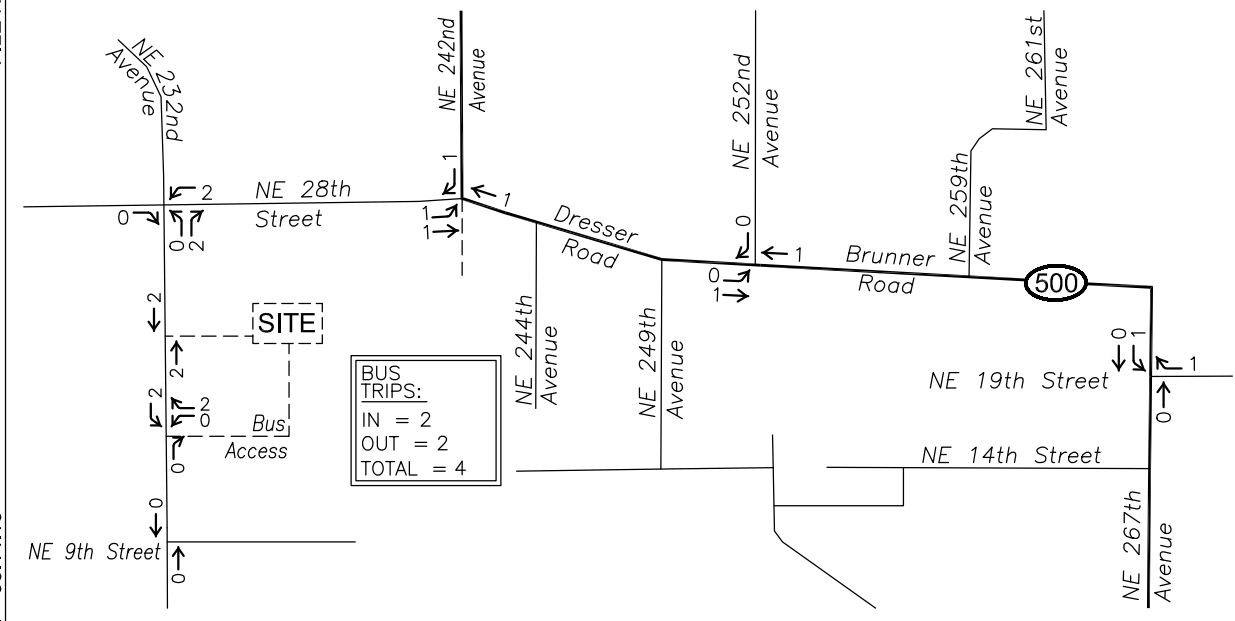
PLOT DATE: 05.14.16



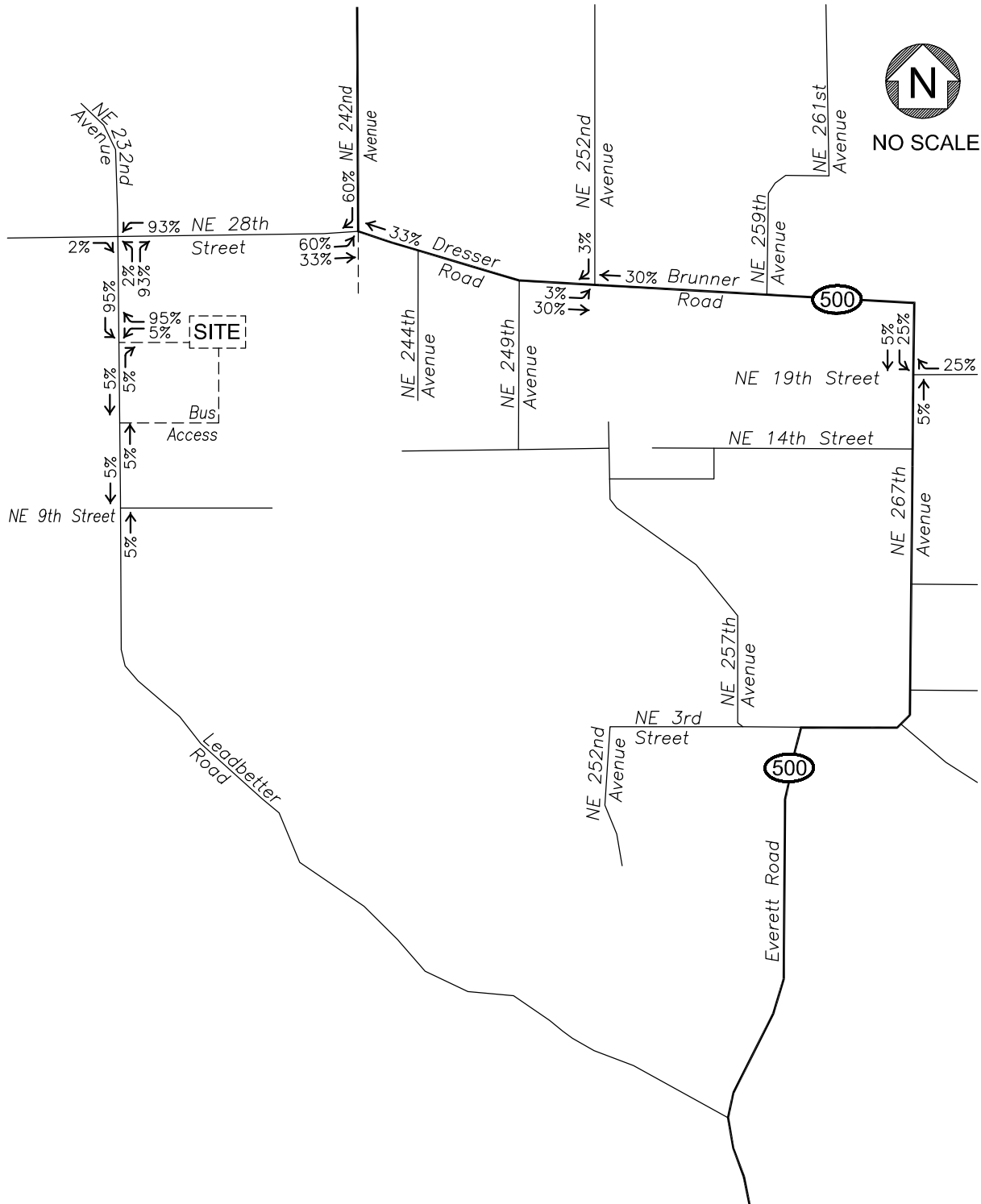
AM
PEAK
HOUR



MID-
AFTERNOON
PEAK
HOUR



PM
PEAK
HOUR



AM PEAK, MID-AFTERNOON PEAK, & PM PEAK



CHARBONNEAU
ENGINEERING LLC

PROJECT: 15-46

NOTES: Trip distribution
based on the school's
boundary and engineering
judgement.

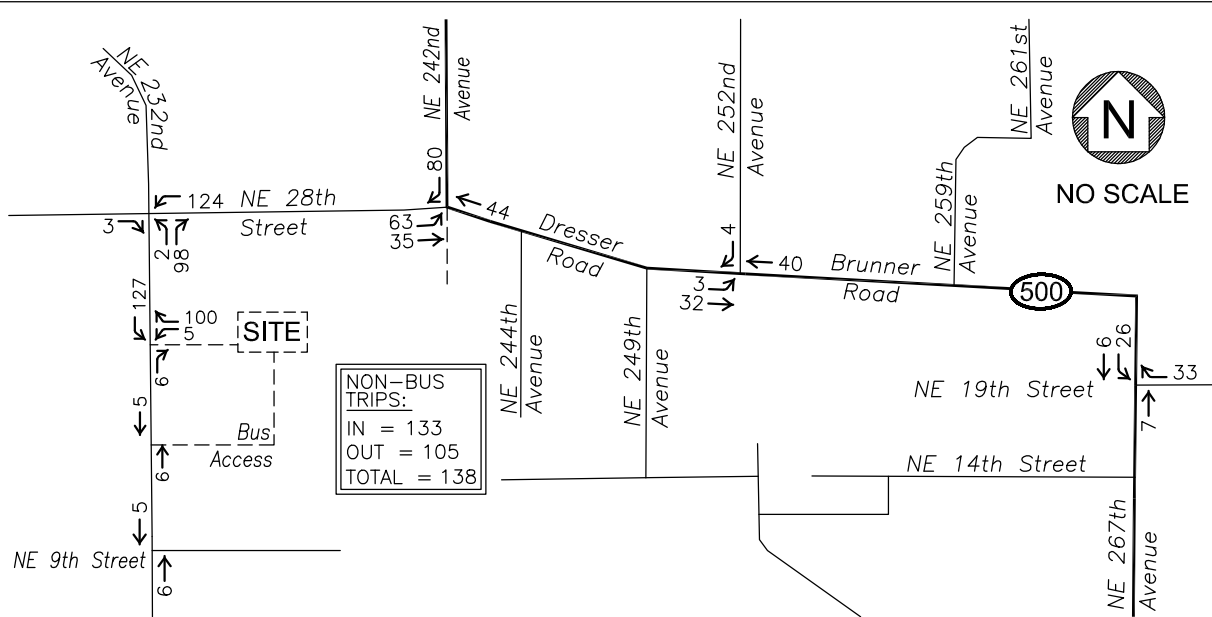
NON-BUS TRIP DISTRIBUTION
LACAMAS HEIGHTS
ELEMENTARY SCHOOL

FIGURE

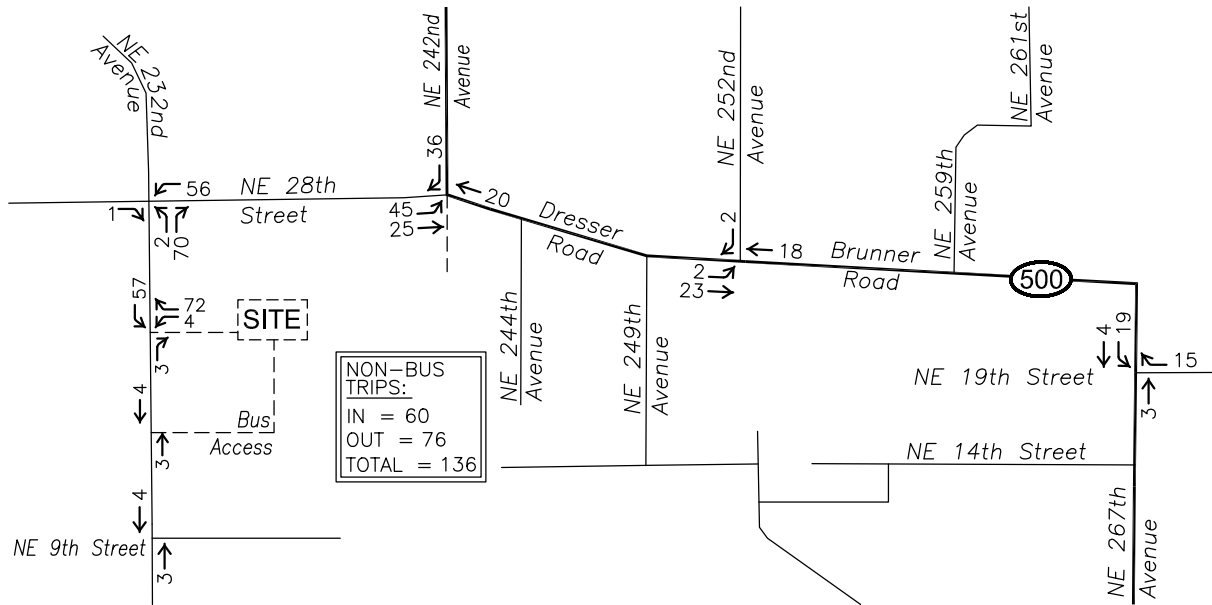
5

FILE NAME: 1546flow2.dwg

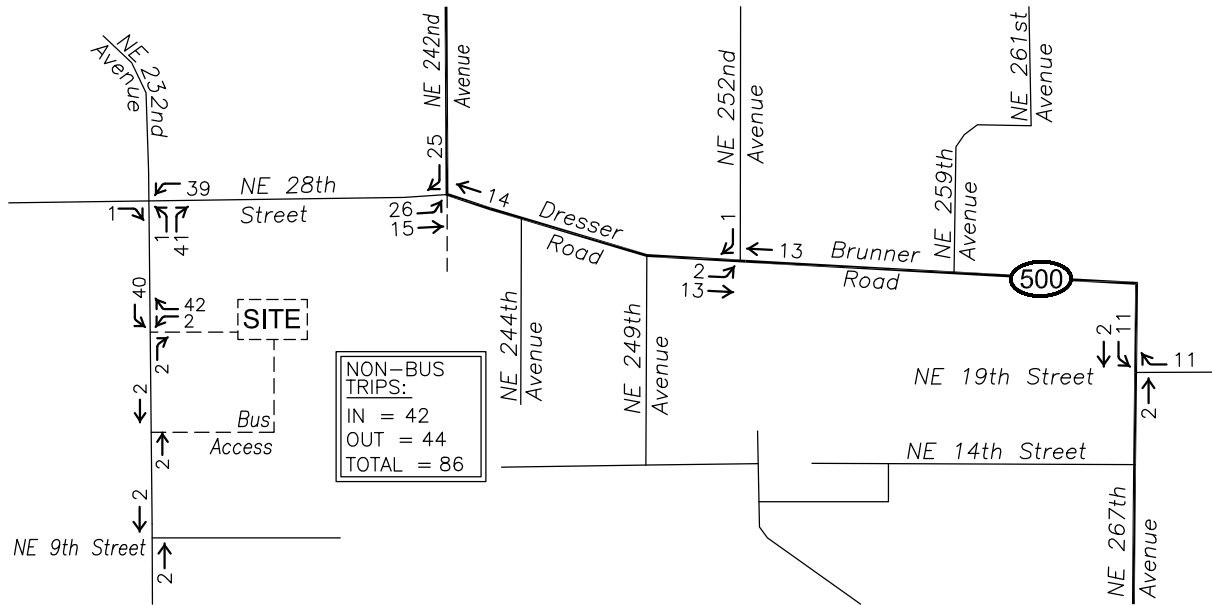
PLOT DATE: 05.14.16



AM
PEAK
HOUR



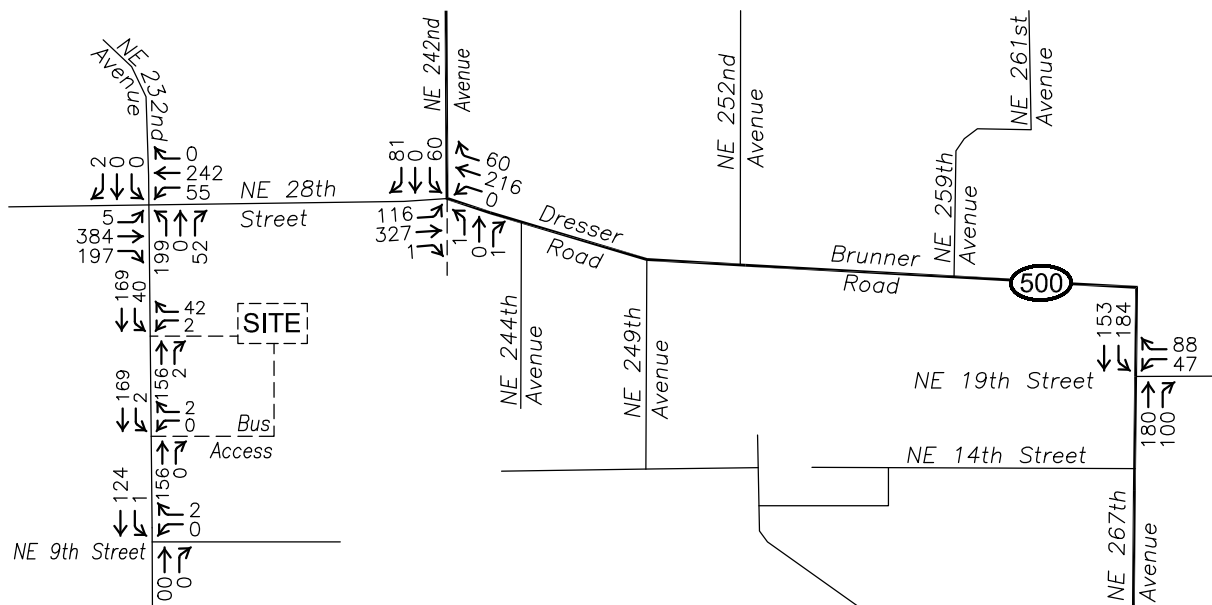
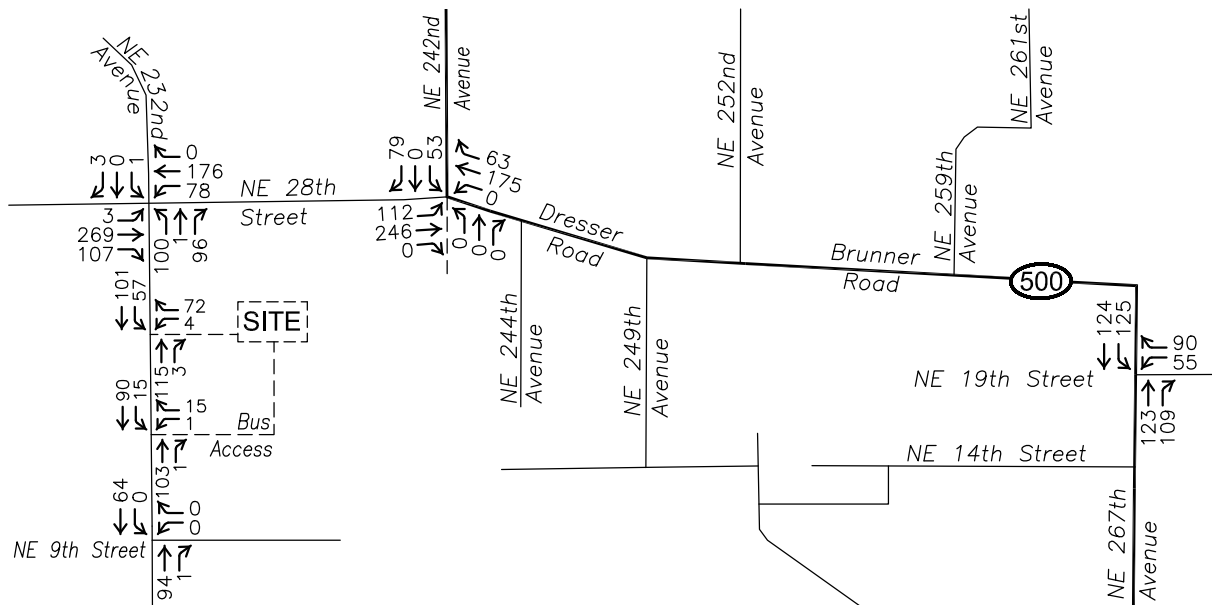
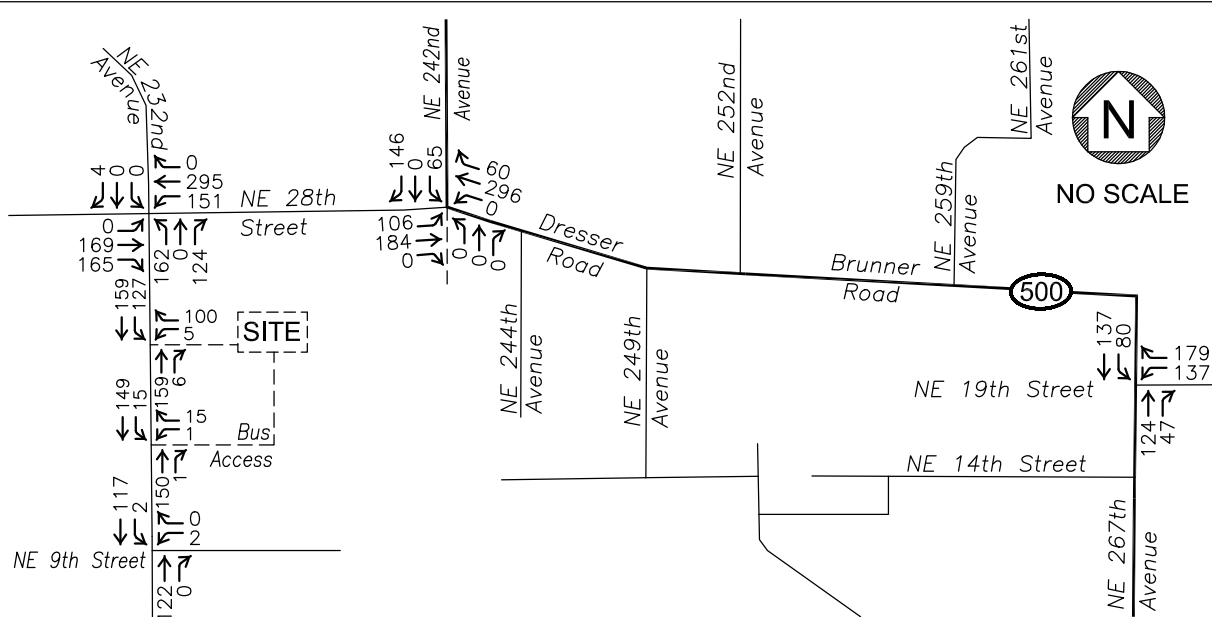
MID-
AFTERNOON
PEAK
HOUR



PM
PEAK
HOUR

FILE NAME: 1546flow2.dwg

PLOT DATE: 05.19.16



Total Vehicle Summary

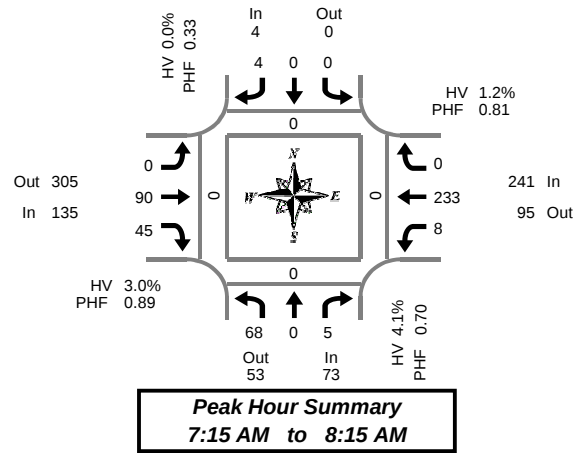


Clay Carney
(503) 833-2740

NE 232nd Ave & NE 28th St

Tuesday, December 15, 2015

7:15 AM to 9:15 AM



15-Minute Interval Summary

7:15 AM to 9:15 AM

Interval Start Time	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:15 AM	11	0	1	0	0	0	1	0	0	20	17	0	5	69	0	0	124	0	0	0	0
7:30 AM	26	0	0	0	0	0	0	0	0	24	10	0	1	58	0	0	119	0	0	0	0
7:45 AM	15	0	1	0	0	0	0	0	0	29	9	0	2	68	0	0	124	0	0	0	0
8:00 AM	16	0	3	0	0	0	3	0	0	17	9	0	0	38	0	0	86	0	0	0	0
8:15 AM	8	0	2	0	0	1	2	0	0	19	8	0	0	58	0	0	98	0	0	0	0
8:30 AM	11	1	0	0	0	0	0	0	1	25	13	0	0	57	0	0	108	0	0	0	0
8:45 AM	9	0	0	0	0	0	2	0	0	22	2	0	1	51	0	0	87	0	0	0	0
9:00 AM	5	1	1	0	0	1	0	0	1	19	1	0	3	54	0	0	86	0	0	0	0
Total Survey	101	2	8	0	0	2	8	0	2	175	69	0	12	453	0	0	832	0	0	0	0

Peak Hour Summary

7:15 AM to 8:15 AM

By Approach	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	73	53	126	0	4	0	4	0	135	305	440	0	241	95	336	0	453	0	0	0	0
%HV	4.1%				0.0%				3.0%				1.2%				2.2%				
PHF	0.70				0.33				0.89				0.81				0.91				

By Movement	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	68	0	5	73	0	0	4	4	0	90	45	135	8	233	0	241	453
%HV	2.9%	0.0%	20.0%	4.1%	0.0%	0.0%	0.0%	0.0%	0.0%	2.2%	4.4%	3.0%	12.5%	0.9%	0.0%	1.2%	2.2%
PHF	0.65	0.00	0.42	0.70	0.00	0.00	0.33	0.33	0.00	0.78	0.66	0.89	0.40	0.84	0.00	0.81	0.91

Rolling Hour Summary

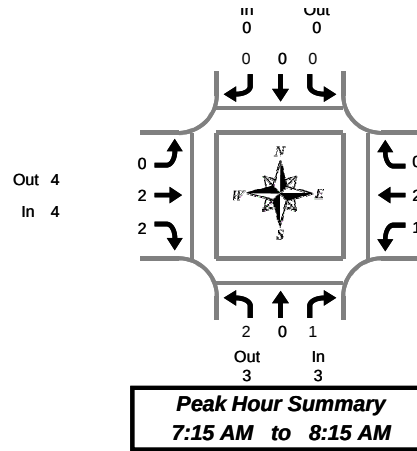
7:15 AM to 9:15 AM

Interval Start Time	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:15 AM	68	0	5	0	0	0	4	0	0	90	45	0	8	233	0	0	453	0	0	0	0
7:30 AM	65	0	6	0	0	1	5	0	0	89	36	0	3	222	0	0	427	0	0	0	0
7:45 AM	50	1	6	0	0	1	5	0	1	90	39	0	2	221	0	0	416	0	0	0	0
8:00 AM	44	1	5	0	0	1	7	0	1	83	32	0	1	204	0	0	379	0	0	0	0
8:15 AM	33	2	3	0	0	2	4	0	2	85	24	0	4	220	0	0	379	0	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



NE 232nd Ave & NE 28th St

Tuesday, December 15, 2015

7:15 AM to 9:15 AM

Heavy Vehicle 15-Minute Interval Summary

7:15 AM to 9:15 AM

Interval Start Time	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:15 AM	0	0	0	0	0	0	0	0	0	0	2	2	1	0	0	1	3
7:30 AM	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	2
7:45 AM	1	0	0	1	0	0	0	0	0	2	0	2	0	1	0	1	4
8:00 AM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8:15 AM	1	0	1	2	0	0	0	0	0	0	0	0	0	3	0	3	5
8:30 AM	0	0	0	0	0	0	0	0	0	4	0	4	0	2	0	2	6
8:45 AM	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
9:00 AM	0	0	0	0	0	0	0	0	1	2	0	3	0	1	0	1	4
Total Survey	3	0	2	5	0	0	0	0	1	10	2	13	1	8	0	9	27

Heavy Vehicle Peak Hour Summary

7:15 AM to 8:15 AM

By Approach	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Total
	In	Out	Total		In	Out	Total		In	Out	Total		In	Out	Total		
Volume	3	3	6		0	0	0		4	4	8		3	3	6		10
PHF	0.19				0.00				0.11				0.15				0.19

By Movement	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	2	0	1	3	0	0	0	0	0	2	2	4	1	2	0	3	10
PHF	0.25	0.00	0.13	0.19	0.00	0.00	0.00	0.00	0.00	0.06	0.25	0.11	0.25	0.10	0.00	0.15	0.19

Heavy Vehicle Rolling Hour Summary

7:15 AM to 9:15 AM

Interval Start Time	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:15 AM	2	0	1	3	0	0	0	0	0	2	2	4	1	2	0	3	10
7:30 AM	3	0	2	5	0	0	0	0	0	2	0	2	0	5	0	5	12
7:45 AM	2	0	2	4	0	0	0	0	0	6	0	6	0	6	0	6	16
8:00 AM	1	0	2	3	0	0	0	0	0	6	0	6	0	5	0	5	14
8:15 AM	1	0	1	2	0	0	0	0	1	8	0	9	0	6	0	6	17

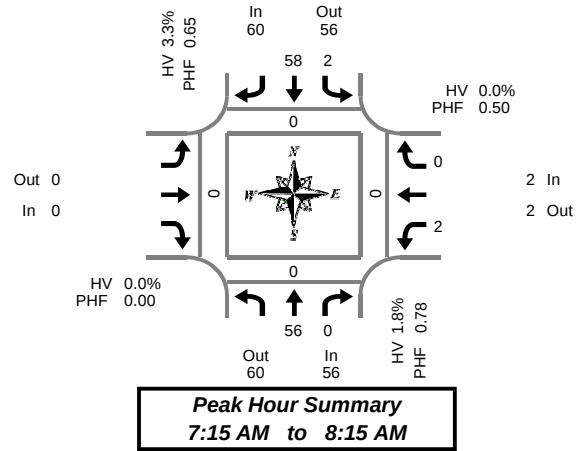
The logo for All Traffic Data Services Inc. is located in the bottom right corner. It features the company name "All Traffic Data" in a large, white, serif font, with "Services Inc." in a smaller, white, sans-serif font below it. The text is set against a black, rounded rectangular background with a yellow border. Below the text is a yellow horizontal bar with a series of black squares, resembling a binary code or a stylized graphic element.

Count Period: 7:15 AM to 9:15 AM

Total Vehicle Summary



Clay Carney
(503) 833-2740



NE 232nd Ave & NE 9th St

Tuesday, December 15, 2015

7:15 AM to 9:15 AM

15-Minute Interval Summary

7:15 AM to 9:15 AM

Interval Start Time	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 9th St				Westbound NE 9th St				Interval Total	Pedestrians Crosswalk			
	T	R	Bikes		L	T		Bikes				Bikes	L		R	Bikes		North	South	East	West
7:15 AM	13	0	0		1	22		0				0	1		0	0	37	0	0	0	0
7:30 AM	18	0	0		1	13		0				0	0		0	0	32	0	0	0	0
7:45 AM	10	0	0		0	14		0				0	0		0	0	24	0	0	0	0
8:00 AM	15	0	0		0	9		0				0	1		0	0	25	0	0	0	0
8:15 AM	7	0	0		0	10		0				0	0		0	0	17	0	0	0	0
8:30 AM	8	0	0		0	13		0				0	0		0	0	21	0	0	0	0
8:45 AM	11	1	0		0	4		0				0	0		0	0	16	0	0	0	0
9:00 AM	9	1	0		0	8		0				0	0		1	0	19	0	0	0	0
Total Survey	91	2	0		2	93		0				0	2		1	0	191	0	0	0	0

Peak Hour Summary

7:15 AM to 8:15 AM

By Approach	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 9th St				Westbound NE 9th St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	56	60	116	0	60	56	116	0	0	0	0	0	2	2	4	0	118	0	0	0	0
%HV	1.8%				3.3%				0.0%				0.0%				2.5%				
PHF	0.78				0.65				0.00				0.50				0.80				

By Movement	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 9th St				Westbound NE 9th St				Total
	T	R	Total		L	T		Total				Total	L		R	Total	
Volume	56	0	56		2	58		60				0	2		0	2	118
%HV	NA	1.8%	0.0%	1.8%	0.0%	3.4%	NA	3.3%	NA	NA	NA	0.0%	0.0%	NA	0.0%	0.0%	2.5%
PHF	0.78	0.00	0.78		0.50	0.66		0.65				0.00	0.50		0.00	0.50	0.80

Rolling Hour Summary

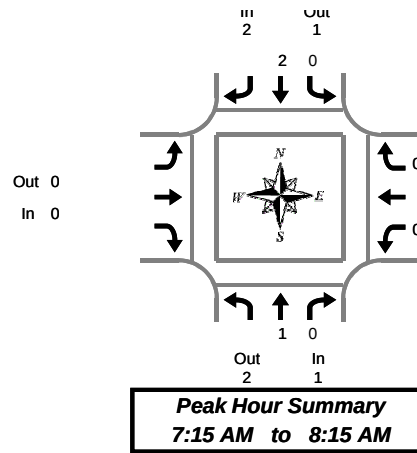
7:15 AM to 9:15 AM

Interval Start Time	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 9th St				Westbound NE 9th St				Interval Total	Pedestrians Crosswalk			
	T	R	Bikes		L	T		Bikes				Bikes	L		R	Bikes		North	South	East	West
7:15 AM	56	0	0		2	58		0				0	2		0	0	118	0	0	0	0
7:30 AM	50	0	0		1	46		0				0	1		0	0	98	0	0	0	0
7:45 AM	40	0	0		0	46		0				0	1		0	0	87	0	0	0	0
8:00 AM	41	1	0		0	36		0				0	1		0	0	79	0	0	0	0
8:15 AM	35	2	0		0	35		0				0	0		1	0	73	0	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



NE 232nd Ave & NE 9th St

Tuesday, December 15, 2015

7:15 AM to 9:15 AM

Heavy Vehicle 15-Minute Interval Summary

7:15 AM to 9:15 AM

Interval Start Time	Northbound NE 232nd Ave			Southbound NE 232nd Ave			Eastbound NE 9th St			Westbound NE 9th St			Interval Total
	T	R	Total	L	T	Total			Total	L	R	Total	
7:15 AM	0	0	0	0	1	1			0	0	0	0	1
7:30 AM	0	0	0	0	1	1			0	0	0	0	1
7:45 AM	0	0	0	0	0	0			0	0	0	0	0
8:00 AM	1	0	1	0	0	0			0	0	0	0	1
8:15 AM	2	0	2	0	0	0			0	0	0	0	2
8:30 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
9:00 AM	0	0	0	0	0	0			0	0	0	0	0
Total Survey	3	0	3	0	2	2			0	0	0	0	5

Heavy Vehicle Peak Hour Summary

7:15 AM to 8:15 AM

By Approach	Northbound NE 232nd Ave			Southbound NE 232nd Ave			Eastbound NE 9th St			Westbound NE 9th St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	1	2	3	2	1	3	0	0	0	0	0	0	3
PHF	0.08			0.25			0.00			0.00			0.25

By Movement	Northbound NE 232nd Ave			Southbound NE 232nd Ave			Eastbound NE 9th St			Westbound NE 9th St			Total
	T	R	Total	L	T	Total			Total	L	R	Total	
Volume	1	0	1	0	2	2			0	0	0	0	3
PHF	0.08	0.00	0.08	0.00	0.25	0.25			0.00	0.00	0.00	0.00	0.25

Heavy Vehicle Rolling Hour Summary

7:15 AM to 9:15 AM

Interval Start Time	Northbound NE 232nd Ave			Southbound NE 232nd Ave			Eastbound NE 9th St			Westbound NE 9th St			Interval Total
	T	R	Total	L	T	Total			Total	L	R	Total	
7:15 AM	1	0	1	0	2	2			0	0	0	0	3
7:30 AM	3	0	3	0	1	1			0	0	0	0	4
7:45 AM	3	0	3	0	0	0			0	0	0	0	3
8:00 AM	3	0	3	0	0	0			0	0	0	0	3
8:15 AM	2	0	2	0	0	0			0	0	0	0	2

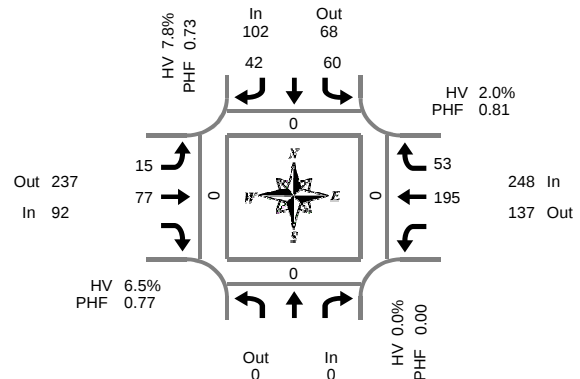
All Traffic Data
Services Inc.

Count Period: 7:15 AM to 9:15 AM

Total Vehicle Summary



Clay Carney
(503) 833-2740



NE 242nd Ave & NE 28th St

Tuesday, December 15, 2015

7:15 AM to 9:15 AM

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

15-Minute Interval Summary

7:15 AM to 9:15 AM

Interval Start Time	Northbound NE 242nd Ave				Southbound NE 242nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes	T	R	Bikes			North	South	East	West
7:15 AM				0	21		14	0	2	19		0	60	17	0	133		0	0	0	0
7:30 AM				0	13		8	0	5	21		0	48	15	0	110		0	0	0	0
7:45 AM				0	17		13	0	4	26		0	57	14	0	131		0	0	0	0
8:00 AM				0	9		7	0	4	11		0	30	7	0	68		0	0	0	0
8:15 AM				0	12		8	0	5	19		0	49	13	0	106		0	0	0	0
8:30 AM				0	19		12	0	9	17		0	48	7	0	112		0	0	0	0
8:45 AM				0	13		14	0	0	22		0	43	14	0	106		0	0	0	0
9:00 AM				0	6		11	0	2	18		0	41	10	0	88		0	0	0	0
Total Survey				0	110		87	0	31	153		0	376	97	0	854		0	0	0	0

Peak Hour Summary

7:15 AM to 8:15 AM

By Approach	Northbound NE 242nd Ave				Southbound NE 242nd Ave				Eastbound NE 28th St				Westbound NE 28th St				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	102	68	170	0	92	237	329	0	248	137	385	0	442	0	0	0	0
%HV	0.0%				7.8%				6.5%				2.0%				4.3%				
PHF	0.00				0.73				0.77				0.81				0.83				

By Movement	Northbound NE 242nd Ave				Southbound NE 242nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	60		42	102	15	77		92		195	53	248	442
%HV	NA	NA	NA	0.0%	13.3%	NA	0.0%	7.8%	20.0%	3.9%	NA	6.5%	NA	1.0%	5.7%	2.0%	4.3%
PHF				0.00	0.71		0.75	0.73	0.75	0.74		0.77		0.81	0.78	0.81	0.83

Rolling Hour Summary

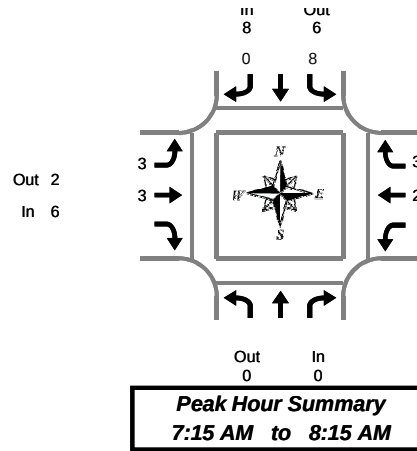
7:15 AM to 9:15 AM

Interval Start Time	Northbound NE 242nd Ave				Southbound NE 242nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Interval Total	Pedestrians Crosswalk			
				Bikes	L		R	Bikes	L	T		Bikes	T	R	Bikes			North	South	East	West
7:15 AM				0	60		42	0	15	77		0	195	53	0	442		0	0	0	0
7:30 AM				0	51		36	0	18	77		0	184	49	0	415		0	0	0	0
7:45 AM				0	57		40	0	22	73		0	184	41	0	417		0	0	0	0
8:00 AM				0	53		41	0	18	69		0	170	41	0	392		0	0	0	0
8:15 AM				0	50		45	0	16	76		0	181	44	0	412		0	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



NE 242nd Ave & NE 28th St

Tuesday, December 15, 2015

7:15 AM to 9:15 AM

Heavy Vehicle 15-Minute Interval Summary

7:15 AM to 9:15 AM

Interval Start Time	Northbound NE 242nd Ave			Southbound NE 242nd Ave			Eastbound NE 28th St			Westbound NE 28th St			Interval Total
			Total	L	R	Total	L	T	Total	T	R	Total	
7:15 AM			0	3	0	3	0	0	0	0	1	1	4
7:30 AM			0	0	0	0	0	1	1	1	0	1	2
7:45 AM			0	2	0	2	2	2	4	1	2	3	9
8:00 AM			0	3	0	3	1	0	1	0	0	0	4
8:15 AM			0	1	1	2	1	0	1	2	0	2	5
8:30 AM			0	3	2	5	2	2	4	0	0	0	9
8:45 AM			0	0	1	1	0	1	1	0	0	0	2
9:00 AM			0	0	0	0	0	2	2	0	1	1	3
Total Survey			0	12	4	16	6	8	14	4	4	8	38

Heavy Vehicle Peak Hour Summary

7:15 AM to 8:15 AM

By Approach	Northbound NE 242nd Ave			Southbound NE 242nd Ave			Eastbound NE 28th St			Westbound NE 28th St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	8	6	14	6	2	8	5	11	16	19
PHF	0.00			0.20			0.21			0.25			0.26

By Movement	Northbound NE 242nd Ave			Southbound NE 242nd Ave			Eastbound NE 28th St			Westbound NE 28th St			Total
			Total	L	R	Total	L	T	Total	T	R	Total	
Volume			0	8	0	8	3	3	6	2	3	5	19
PHF			0.00	0.29	0.00	0.20	0.19	0.15	0.21	0.17	0.25	0.25	0.26

Heavy Vehicle Rolling Hour Summary

7:15 AM to 9:15 AM

Interval Start Time	Northbound NE 242nd Ave			Southbound NE 242nd Ave			Eastbound NE 28th St			Westbound NE 28th St			Interval Total
			Total	L	R	Total	L	T	Total	T	R	Total	
7:15 AM			0	8	0	8	3	3	6	2	3	5	19
7:30 AM			0	6	1	7	4	3	7	4	2	6	20
7:45 AM			0	9	3	12	6	4	10	3	2	5	27
8:00 AM			0	7	4	11	4	3	7	2	0	2	20
8:15 AM			0	4	4	8	3	5	8	2	1	3	19

Peak Hour Summary

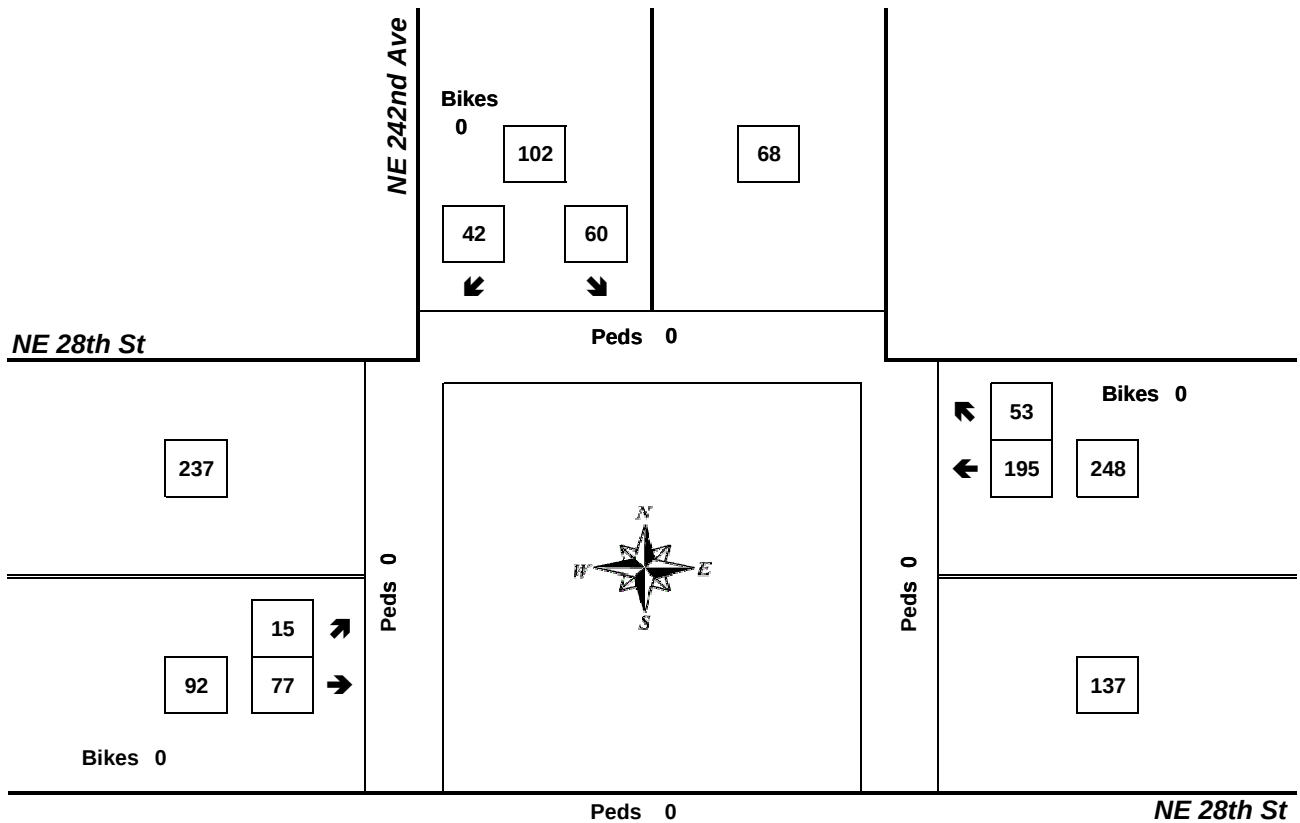


Clay Carney
(503) 833-2740

NE 242nd Ave & NE 28th St

7:15 AM to 8:15 AM

Tuesday, December 15, 2015



Approach	PHF	HV%	Volume
EB	0.77	6.5%	92
WB	0.81	2.0%	248
NB	0.00	0.0%	0
SB	0.73	7.8%	102
Intersection	0.83	4.3%	442

Count Period: 7:15 AM to 9:15 AM

Total Vehicle Summary

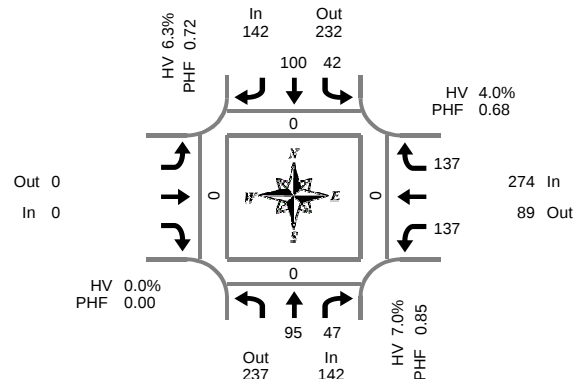


Clay Carney
(503) 833-2740

NE 267th Ave & NE 19th St

Tuesday, December 15, 2015

7:15 AM to 9:15 AM



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

15-Minute Interval Summary

7:15 AM to 9:15 AM

Interval Start Time	Northbound NE 267th Ave				Southbound NE 267th Ave				Eastbound NE 19th St				Westbound NE 19th St				Interval Total	Pedestrians Crosswalk			
	T	R	Bikes		L	T		Bikes				Bikes	L		R	Bikes		North	South	East	West
7:15 AM	36	6	0		13	36		0				0	64		37	0	192	0	0	0	0
7:30 AM	23	12	0		7	27		0				0	26		31	0	126	0	0	0	0
7:45 AM	20	17	0		15	24		0				0	29		41	0	146	0	0	0	0
8:00 AM	16	12	0		7	13		0				0	18		28	0	94	0	0	0	0
8:15 AM	19	9	0		12	17		0				0	24		24	0	105	0	0	0	0
8:30 AM	14	10	0		12	26		0				0	29		32	0	123	0	0	0	0
8:45 AM	32	19	0		4	32		0				0	51		30	0	168	0	0	0	0
9:00 AM	28	16	0		13	17		0				0	15		17	0	106	0	0	0	0
Total Survey	188	101	0		83	192		0				0	256		240	0	1,060	0	0	0	0

Peak Hour Summary

7:15 AM to 8:15 AM

By Approach	Northbound NE 267th Ave				Southbound NE 267th Ave				Eastbound NE 19th St				Westbound NE 19th St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	142	237	379	0	142	232	374	0	0	0	0	0	274	89	363	0	558	0	0	0	0
%HV	7.0%				6.3%				0.0%				4.0%				5.4%				
PHF	0.85				0.72				0.00				0.68				0.73				

By Movement	Northbound NE 267th Ave				Southbound NE 267th Ave				Eastbound NE 19th St				Westbound NE 19th St				Total
	T	R	Total		L	T	Total				Total		L		R	Total	
Volume	95	47	142		42	100	142				0		137		137	274	558
%HV	NA	4.2%	12.8%	7.0%	9.5%	5.0%	NA	6.3%	NA	NA	NA	0.0%	4.4%	NA	3.6%	4.0%	5.4%
PHF	0.66	0.69	0.85		0.70	0.69		0.72			0.00		0.54		0.84	0.68	0.73

Rolling Hour Summary

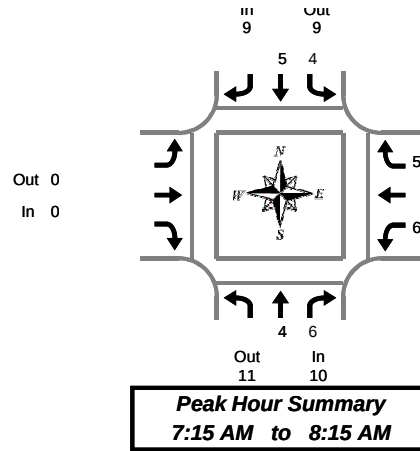
7:15 AM to 9:15 AM

Interval Start Time	Northbound NE 267th Ave				Southbound NE 267th Ave				Eastbound NE 19th St				Westbound NE 19th St				Interval Total	Pedestrians Crosswalk			
	T	R	Bikes		L	T		Bikes				Bikes	L		R	Bikes		North	South	East	West
7:15 AM	95	47	0		42	100		0				0	137		137	0	558	0	0	0	0
7:30 AM	78	50	0		41	81		0				0	97		124	0	471	0	0	0	0
7:45 AM	69	48	0		46	80		0				0	100		125	0	468	0	0	0	0
8:00 AM	81	50	0		35	88		0				0	122		114	0	490	0	0	0	0
8:15 AM	93	54	0		41	92		0				0	119		103	0	502	0	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



NE 267th Ave & NE 19th St

Tuesday, December 15, 2015

7:15 AM to 9:15 AM

Heavy Vehicle 15-Minute Interval Summary

7:15 AM to 9:15 AM

Interval Start Time	Northbound NE 267th Ave			Southbound NE 267th Ave			Eastbound NE 19th St			Westbound NE 19th St			Interval Total
	T	R	Total	L	T	Total			Total	L	R	Total	
7:15 AM	2	0	2	2	1	3			0	5		5	10
7:30 AM	1	1	2	0	2	2			0	0	1	1	5
7:45 AM	0	2	2	1	1	2			0	1	2	3	7
8:00 AM	1	3	4	1	1	2			0	0	2	2	8
8:15 AM	1	1	2	0	1	1			0	0	1	1	4
8:30 AM	0	1	1	3	2	5			0	3	0	3	9
8:45 AM	0	0	0	1	2	3			0	2	0	2	5
9:00 AM	1	1	2	1	1	2			0	0	0	0	4
Total Survey		6	9	15	9	11			0	11	6	17	52

Heavy Vehicle Peak Hour Summary

7:15 AM to 8:15 AM

By Approach	Northbound NE 267th Ave			Southbound NE 267th Ave			Eastbound NE 19th St			Westbound NE 19th St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	10	11	21	9	9	18	0	0	0	11	10	21	30
PHF	0.31			0.23			0.00			0.31			0.34

By Movement	Northbound NE 267th Ave			Southbound NE 267th Ave			Eastbound NE 19th St			Westbound NE 19th St			Total
	T	R	Total	L	T	Total			Total	L	R	Total	
Volume	4	6	10	4	5	9			0	6	5	11	30
PHF	0.33	0.25	0.31	0.20	0.25	0.23			0.00	0.25	0.25	0.31	0.34

Heavy Vehicle Rolling Hour Summary

7:15 AM to 9:15 AM

Interval Start Time	Northbound NE 267th Ave			Southbound NE 267th Ave			Eastbound NE 19th St			Westbound NE 19th St			Interval Total
	T	R	Total	L	T	Total			Total	L	R	Total	
7:15 AM	4	6	10	4	5	9			0	6	5	11	30
7:30 AM	3	7	10	2	5	7			0	1	6	7	24
7:45 AM	2	7	9	5	5	10			0	4	5	9	28
8:00 AM	2	5	7	5	6	11			0	5	3	8	26
8:15 AM	2	3	5	5	6	11			0	5	1	6	22

Peak Hour Summary

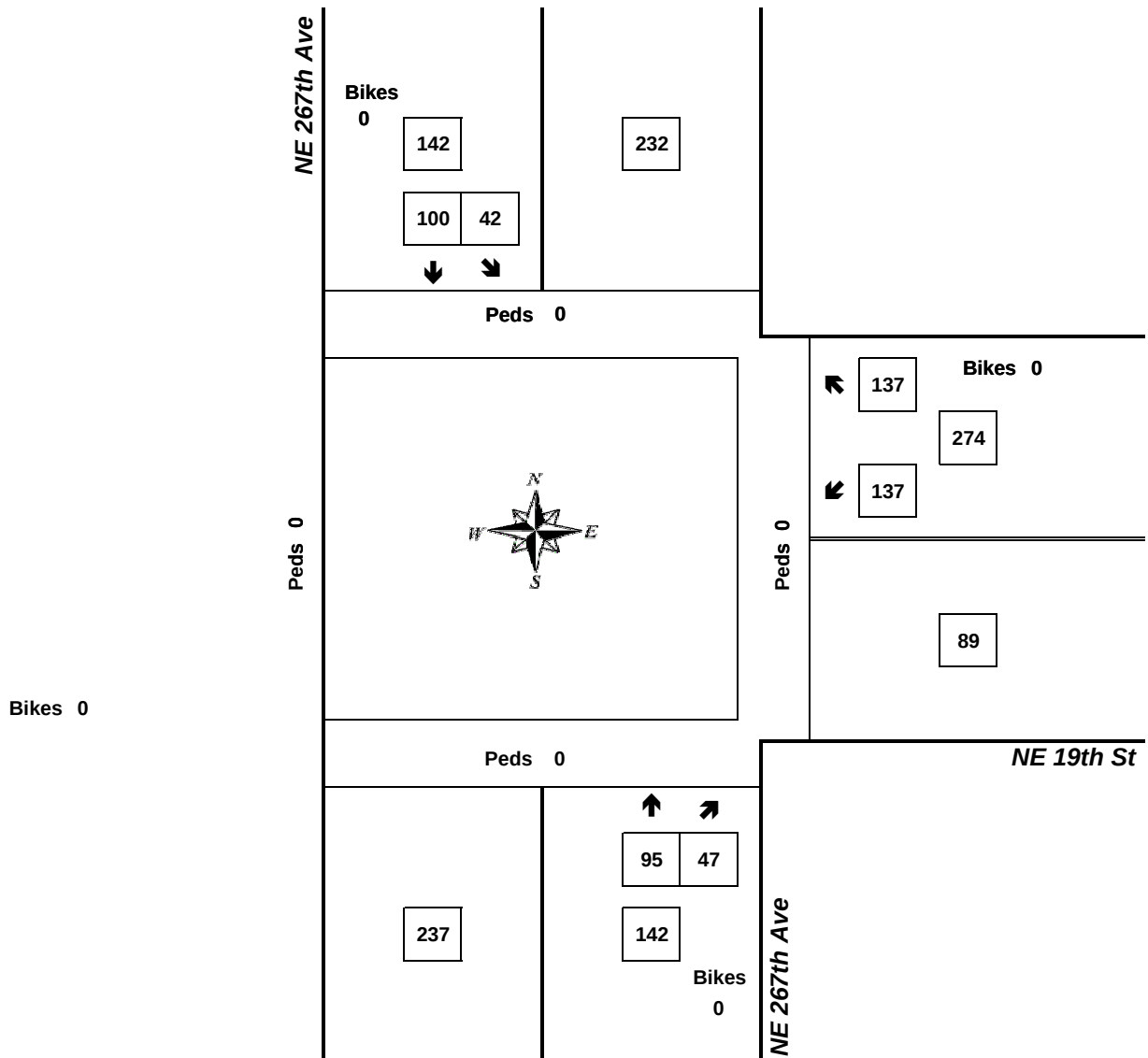


Clay Carney
(503) 833-2740

NE 267th Ave & NE 19th St

7:15 AM to 8:15 AM

Tuesday, December 15, 2015



Approach	PHF	HV%	Volume
EB	0.00	0.0%	0
WB	0.68	4.0%	274
NB	0.85	7.0%	142
SB	0.72	6.3%	142
Intersection	0.73	5.4%	558

Count Period: 7:15 AM to 9:15 AM

Total Vehicle Summary

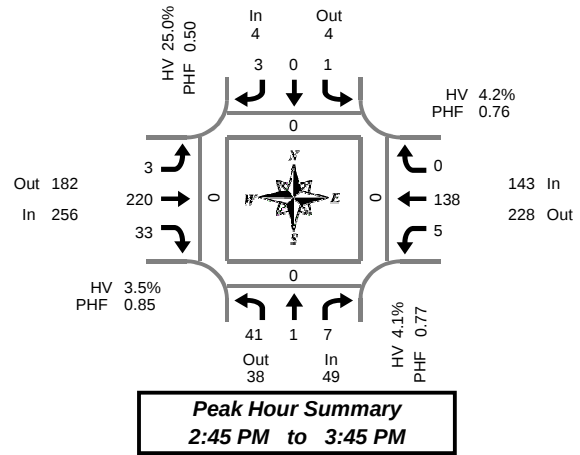


Clay Carney
(503) 833-2740

NE 232nd Ave & NE 28th St

Tuesday, December 08, 2015

1:45 PM to 3:45 PM



15-Minute Interval Summary

1:45 PM to 3:45 PM

Interval Start Time	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
1:45 PM	8	1	3	0	0	1	0	0	2	39	8	0	1	38	0	0	101	0	0	0	0
2:00 PM	6	0	0	0	1	0	1	0	1	51	8	0	1	32	0	0	101	0	0	0	0
2:15 PM	5	0	1	0	0	0	0	0	1	31	12	0	0	38	0	0	88	0	0	0	0
2:30 PM	19	0	0	0	0	0	0	0	1	57	8	0	1	34	0	0	120	0	0	0	0
2:45 PM	9	0	1	0	0	0	0	0	1	48	8	0	0	20	0	0	87	0	0	0	0
3:00 PM	10	0	2	0	0	0	0	0	2	51	6	0	0	32	0	0	103	0	0	0	0
3:15 PM	14	1	1	0	0	0	2	0	0	55	10	0	1	46	0	0	130	0	0	0	0
3:30 PM	8	0	3	0	1	0	1	0	0	66	9	0	4	40	0	0	132	0	0	0	0
Total Survey	79	2	11	0	2	1	4	0	8	398	69	0	8	280	0	0	862	0	0	0	0

Peak Hour Summary

2:45 PM to 3:45 PM

By Approach	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	49	38	87	0	4	4	8	0	256	182	438	0	143	228	371	0	452	0	0	0	0
%HV	4.1%				25.0%				3.5%				4.2%				4.0%				
PHF	0.77				0.50				0.85				0.76				0.86				

By Movement	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	41	1	7	49	1	0	3	4	3	220	33	256	5	138	0	143	452
%HV	4.9%	0.0%	0.0%	4.1%	0.0%	0.0%	33.3%	25.0%	33.3%	3.6%	0.0%	3.5%	20.0%	3.6%	0.0%	4.2%	4.0%
PHF	0.73	0.25	0.58	0.77	0.25	0.00	0.38	0.50	0.38	0.83	0.83	0.85	0.31	0.75	0.00	0.76	0.86

Rolling Hour Summary

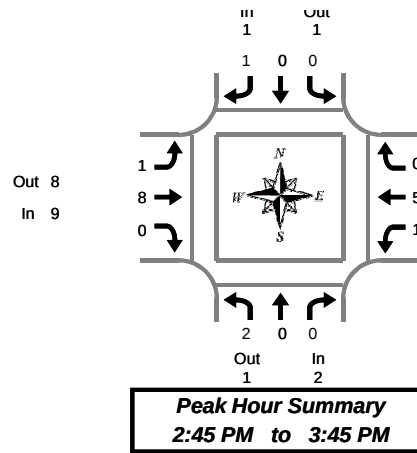
1:45 PM to 3:45 PM

Interval Start Time	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
1:45 PM	38	1	4	0	1	1	1	0	5	178	36	0	3	142	0	0	410	0	0	0	0
2:00 PM	39	0	2	0	1	0	1	0	4	187	36	0	2	124	0	0	396	0	0	0	0
2:15 PM	43	0	4	0	0	0	0	0	5	187	34	0	1	124	0	0	398	0	0	0	0
2:30 PM	52	1	4	0	0	0	2	0	4	211	32	0	2	132	0	0	440	0	0	0	0
2:45 PM	41	1	7	0	1	0	3	0	3	220	33	0	5	138	0	0	452	0	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



NE 232nd Ave & NE 28th St

Tuesday, December 08, 2015

1:45 PM to 3:45 PM

Heavy Vehicle 15-Minute Interval Summary

1:45 PM to 3:45 PM

Interval Start Time	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
1:45 PM	0	0	0	0	0	0	0	0	1	1	1	3	0	1	0	1	4
2:00 PM	0	0	0	0	0	0	1	1	0	1	2	3	0	1	0	1	5
2:15 PM	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	4
2:30 PM	0	0	0	0	0	0	0	0	0	3	0	3	0	1	0	1	4
2:45 PM	0	0	0	0	0	0	0	0	1	3	0	4	0	1	0	1	5
3:00 PM	2	0	0	2	0	0	0	0	0	1	0	1	0	3	0	3	6
3:15 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	3
3:30 PM	0	0	0	0	0	0	1	1	0	2	0	2	1	0	0	1	4
Total Survey	2	0	0	2	0	0	2	2	2	17	3	22	1	8	0	9	35

Heavy Vehicle Peak Hour Summary

2:45 PM to 3:45 PM

By Approach	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Total
	In	Out	Total		In	Out	Total		In	Out	Total		In	Out	Total		
Volume	2	1	3		1	1	2		9	8	17		6	8	14		18
PHF	0.25				0.25				0.20				0.30				0.30

By Movement	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	2	0	0	2	0	0	1	1	1	8	0	9	1	5	0	6	18
PHF	0.25	0.00	0.00	0.25	0.00	0.00	0.25	0.25	0.25	0.20	0.00	0.20	0.25	0.25	0.00	0.30	0.30

Heavy Vehicle Rolling Hour Summary

1:45 PM to 3:45 PM

Interval Start Time	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
1:45 PM	0	0	0	0	0	0	1	1	1	9	3	13	0	3	0	3	17
2:00 PM	0	0	0	0	0	0	1	1	1	11	2	14	0	3	0	3	18
2:15 PM	2	0	0	2	0	0	0	0	1	11	0	12	0	5	0	5	19
2:30 PM	2	0	0	2	0	0	0	0	1	9	0	10	0	6	0	6	18
2:45 PM	2	0	0	2	0	0	1	1	1	8	0	9	1	5	0	6	18

The logo for All Traffic Data Services Inc. is located in the bottom right corner. It features the company name "All Traffic Data" in a large, white, serif font, with "Services Inc." in a smaller, white, sans-serif font below it. The text is set against a black, rounded rectangular background. To the left of the text is a yellow graphic element consisting of a horizontal bar with a series of vertical lines of varying heights, resembling a stylized bar chart or a digital signal.

Count Period: 1:45 PM to 3:45 PM

Total Vehicle Summary

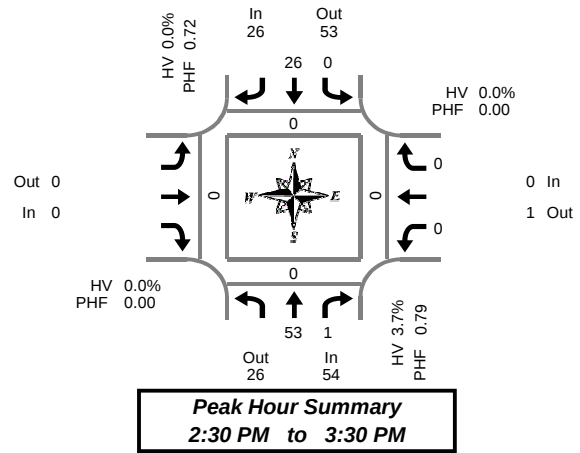


Clay Carney
(503) 833-2740

NE 232nd Ave & NE 9th St

Tuesday, December 08, 2015

1:45 PM to 3:45 PM



15-Minute Interval Summary

1:45 PM to 3:45 PM

Interval Start Time	Northbound NE 232nd Ave			Southbound NE 232nd Ave			Eastbound NE 9th St			Westbound NE 9th St			Interval Total	Pedestrians Crosswalk			
	T	R	Bikes	L	T	Bikes			Bikes	L	R	Bikes		North	South	East	West
1:45 PM	9	0	0	0	2	0			0	0	0	0	11	0	0	0	0
2:00 PM	6	0	0	1	8	0			0	0	0	0	15	0	0	0	0
2:15 PM	6	1	0	0	11	0			0	0	0	0	18	0	0	0	0
2:30 PM	17	0	0	0	8	0			0	0	0	0	25	0	0	0	0
2:45 PM	11	1	0	0	6	0			0	0	0	0	18	0	0	0	0
3:00 PM	11	0	0	0	3	0			0	0	0	0	14	0	0	0	0
3:15 PM	14	0	0	0	9	0			0	0	0	0	23	0	0	0	0
3:30 PM	15	0	0	0	8	0			0	2	0	0	25	0	0	0	0
Total Survey	89	2	0	1	55	0			0	2	0	0	149	0	0	0	0

Peak Hour Summary

2:30 PM to 3:30 PM

By Approach	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 9th St				Westbound NE 9th St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	54	26	80	0	26	53	79	0	0	0	0	0	0	1	1	0	80	0	0	0	0
%HV	3.7%				0.0%				0.0%				0.0%				2.5%				
PHF	0.79				0.72				0.00				0.00				0.80				

By Movement	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 9th St				Westbound NE 9th St				Total
	T	R	Total	L	T	Total			Total	L	R	Total					
Volume	53	1	54	0	26	26			0	0		0	0	80			
%HV	NA	3.8%	0.0%	3.7%	0.0%	0.0%	NA	0.0%	NA	NA	NA	0.0%	0.0%	0.0%	2.5%		
PHF	0.78	0.25	0.79	0.00	0.72	0.72			0.00	0.00		0.00	0.00	0.80			

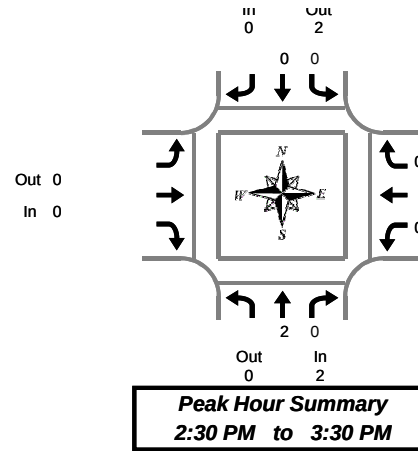
Rolling Hour Summary

1:45 PM to 3:45 PM

Interval Start Time	Northbound NE 232nd Ave			Southbound NE 232nd Ave			Eastbound NE 9th St			Westbound NE 9th St			Interval Total	Pedestrians Crosswalk			
	T	R	Bikes	L	T	Bikes			Bikes	L	R	Bikes		North	South	East	West
1:45 PM	38	1	0	1	29	0			0	0	0	0	69	0	0	0	0
2:00 PM	40	2	0	1	33	0			0	0	0	0	76	0	0	0	0
2:15 PM	45	2	0	0	28	0			0	0	0	0	75	0	0	0	0
2:30 PM	53	1	0	0	26	0			0	0	0	0	80	0	0	0	0
2:45 PM	51	1	0	0	26	0			0	2	0	0	80	0	0	0	0

All Traffic Data
Services Inc.

Interval Start Time	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 9th St				Westbound NE 9th St				Interval Total
	T	R	Total	L	T	Total		Total	L		R	Total					
1:45 PM	0	0	0	0	2	2		0	0		0	0	2				
2:00 PM	0	0	0	0	2	2		0	0		0	0	2				
2:15 PM	2	0	2	0	0	0		0	0		0	0	2				
2:30 PM	2	0	2	0	0	0		0	0		0	0	2				
2:45 PM	2	0	2	0	0	0		0	0		0	0	2				



Peak Hour Summary

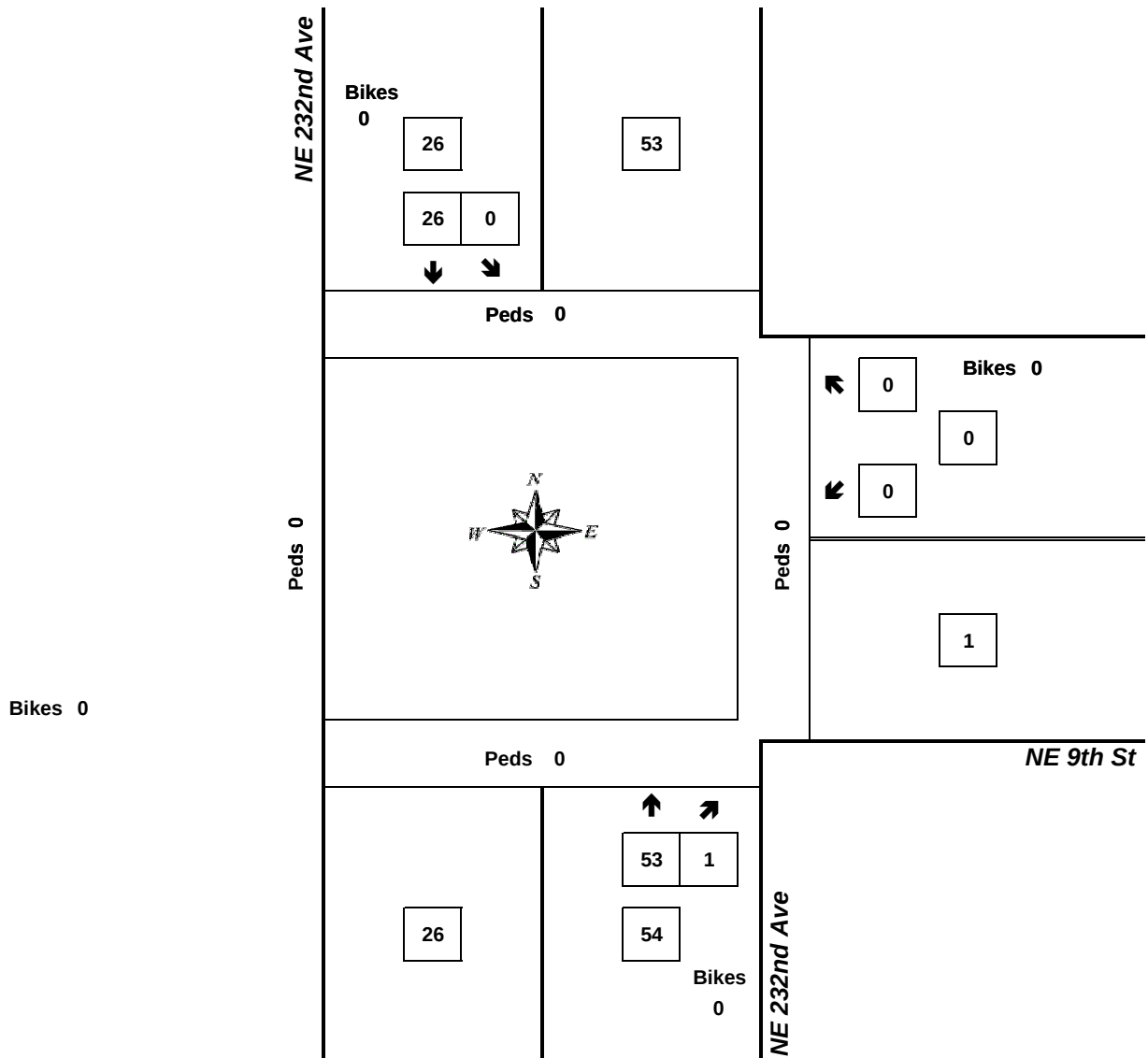


Clay Carney
(503) 833-2740

NE 232nd Ave & NE 9th St

2:30 PM to 3:30 PM

Tuesday, December 08, 2015



Approach	PHF	HV%	Volume
EB	0.00	0.0%	0
WB	0.00	0.0%	0
NB	0.79	3.7%	54
SB	0.72	0.0%	26
Intersection	0.80	2.5%	80

Count Period: 1:45 PM to 3:45 PM

Total Vehicle Summary

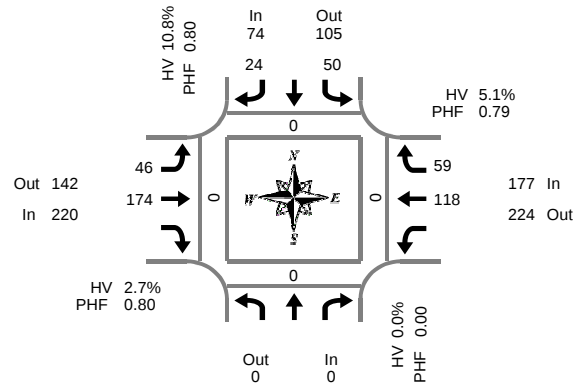


Clay Carney
(503) 833-2740

NE 242nd Ave & NE 28th St

Tuesday, December 08, 2015

1:45 PM to 3:45 PM



Peak Hour Summary
2:45 PM to 3:45 PM

15-Minute Interval Summary

1:45 PM to 3:45 PM

Interval Start Time	Northbound NE 242nd Ave				Southbound NE 242nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Interval Total	Pedestrians Crosswalk			
			Bikes		L		R	Bikes	L	T		Bikes	T	R	Bikes			North	South	East	West
1:45 PM			0		12		4	0	12	33		0	35	5	0		101	0	0	0	0
2:00 PM			0		11		10	0	12	38		0	23	5	0		99	0	0	0	0
2:15 PM			0		15		2	0	8	23		0	34	16	0		98	0	0	0	0
2:30 PM			0		7		12	0	18	39		0	24	10	0		110	0	0	1	0
2:45 PM			0		10		4	0	5	36		0	14	16	0		85	0	0	0	0
3:00 PM			0		11		3	0	16	41		0	28	12	0		111	0	0	0	0
3:15 PM			0		15		8	0	9	44		0	40	16	0		132	0	0	0	0
3:30 PM			0		14		9	0	16	53		0	36	15	0		143	0	0	0	0
Total Survey			0		95		52	0	96	307		0	234	95	0		879	0	0	1	0

Peak Hour Summary

2:45 PM to 3:45 PM

By Approach	Northbound NE 242nd Ave				Southbound NE 242nd Ave				Eastbound NE 28th St				Westbound NE 28th St				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	74	105	179	0	220	142	362	0	177	224	401	0	471	0	0	0	0
%HV	0.0%				10.8%				2.7%				5.1%				4.9%				
PHF	0.00				0.80				0.80				0.79				0.82				

By Movement	Northbound NE 242nd Ave				Southbound NE 242nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Total
				Total	L		R	Total	L	T		Total		T	R	Total	
Volume				0	50		24	74	46	174		220		118	59	177	471
%HV	NA	NA	NA	0.0%	14.0%	NA	4.2%	10.8%	0.0%	3.4%	NA	2.7%	NA	2.5%	10.2%	5.1%	4.9%
PHF				0.00	0.83		0.67	0.80	0.72	0.82		0.80		0.74	0.92	0.79	0.82

Rolling Hour Summary

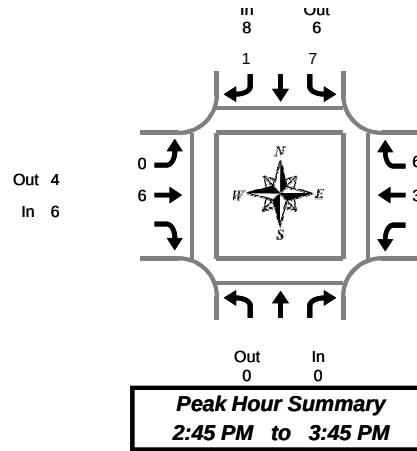
1:45 PM to 3:45 PM

Interval Start Time	Northbound NE 242nd Ave				Southbound NE 242nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Interval Total	Pedestrians Crosswalk			
			Bikes		L		R	Bikes	L	T		Bikes	T	R	Bikes			North	South	East	West
1:45 PM			0		45		28	0	50	133		0	116	36	0		408	0	0	1	0
2:00 PM			0		43		28	0	43	136		0	95	47	0		392	0	0	1	0
2:15 PM			0		43		21	0	47	139		0	100	54	0		404	0	0	1	0
2:30 PM			0		43		27	0	48	160		0	106	54	0		438	0	0	1	0
2:45 PM			0		50		24	0	46	174		0	118	59	0		471	0	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



NE 242nd Ave & NE 28th St

Tuesday, December 08, 2015

1:45 PM to 3:45 PM

Heavy Vehicle 15-Minute Interval Summary

1:45 PM to 3:45 PM

Interval Start Time	Northbound NE 242nd Ave			Southbound NE 242nd Ave			Eastbound NE 28th St			Westbound NE 28th St			Interval Total
			Total	L	R	Total	L	T	Total	T	R	Total	
1:45 PM			0	0	0	0	2	0	2	2	2	4	6
2:00 PM			0	1	0	1	1	0	1	2	2	4	6
2:15 PM			0	0	0	0	2	2	4	1	2	3	7
2:30 PM			0	1	1	2	2	1	3	0	2	2	7
2:45 PM			0	2	0	2	0	2	2	0	1	1	5
3:00 PM			0	1	0	1	0	2	2	3	2	5	8
3:15 PM			0	2	0	2	0	1	1	0	1	1	4
3:30 PM			0	2	1	3	0	1	1	0	2	2	6
Total Survey			0	9	2	11	7	9	16	8	14	22	49

Heavy Vehicle Peak Hour Summary

2:45 PM to 3:45 PM

By Approach	Northbound NE 242nd Ave			Southbound NE 242nd Ave			Eastbound NE 28th St			Westbound NE 28th St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	8	6	14	6	4	10	9	13	22	23
PHF	0.00			0.33			0.17			0.20			0.29

By Movement	Northbound NE 242nd Ave			Southbound NE 242nd Ave			Eastbound NE 28th St			Westbound NE 28th St			Total
			Total	L	R	Total	L	T	Total	T	R	Total	
Volume			0	7	1	8	0	6	6	3	6	9	23
PHF			0.00	0.35	0.25	0.33	0.00	0.30	0.17	0.15	0.25	0.20	0.29

Heavy Vehicle Rolling Hour Summary

1:45 PM to 3:45 PM

Interval Start Time	Northbound NE 242nd Ave			Southbound NE 242nd Ave			Eastbound NE 28th St			Westbound NE 28th St			Interval Total
			Total	L	R	Total	L	T	Total	T	R	Total	
1:45 PM			0	2	1	3	7	3	10	5	8	13	26
2:00 PM			0	4	1	5	5	5	10	3	7	10	25
2:15 PM			0	4	1	5	4	7	11	4	7	11	27
2:30 PM			0	6	1	7	2	6	8	3	6	9	24
2:45 PM			0	7	1	8	0	6	6	3	6	9	23

Jeremy Fick

From: Jardin, David <David.Jardin@clark.wa.gov>
Sent: Tuesday, August 30, 2016 9:52 AM
To: Frank Charbonneau; Curleigh (Jim) Carothers
Cc: Heidi.Rosenberg@Camas.wednet.edu; Chris Robertson; Jeremy Fick
Subject: RE: Lacamas Heights E.S. - 232nd Ave/28th St

Clark County Concurrency

The proposed development is required to meet the standards established in CCC 41.350.020(G) for corridors and intersections of regional significance. Typically, the County's transportation model is used to determine what urban area developments are currently being reviewed, approved, or are under construction and in the vicinity of the proposed development. The traffic these developments generate is referred to as "*in-process traffic*" and will ultimately contribute to the same roadway facilities as the proposed development. This "*in-process traffic*" is used to evaluate and anticipate area growth and its impact on intersection and roadway operating levels with and without the proposed development, helping to determine if roadway mitigation necessary to reduce transportation impacts.

Unsignalized Intersections

The applicant has submitted a traffic study that reports anticipated levels-of-service on the intersection of NE 28th Street/NE 232nd Avenue. This intersection was reported to have a level-of-service "F" on the stop controlled approach in the 2018 evaluation year with the proposed development. The applicant's traffic study also indicates that there are vehicle trips assigned to the failing approach in this intersection.

The applicant has provided an email (below) to supplement the submitted traffic study dated May 25, 2016. The supplemental email has analyzed the impacts of the proposed development on the intersection approaches, listed above, to determine if mitigation requirements would be warranted per CCC 40.350.020 (G)(1)(c).

The applicant's analysis compared the anticipated impacts against the criteria in the code section listed above and found that only one (1) of the three (3) criterion were met. Staff concurs with the applicant's findings.

The County has determined that this development can comply with adopted Concurrency Standards for unsignalized intersections.

SAFETY:

Mitigation for off-site safety deficiencies may only be a condition of approval on development in accordance with CCC 40.350.030(B)(6) The code states that "nothing in this section shall be construed to preclude denial of a proposed development where off-site road conditions are inadequate to provide a minimum level of service as specified in Section 40.350.020 or a *significant* traffic or safety hazard *would be caused or materially aggravated* by the proposed development; provided, that the applicant may voluntarily agree to mitigate such direct impacts in accordance with the provisions of RCW 82.02.020."

Crash History

The applicant's traffic study analyzed the crash history as obtained from Washington State Department of Transportation (WSDOT) for the period 2010 through 2014.

The intersection crash rates, for the study intersection did not exceed thresholds that would warrant additional analysis. However, Staff did review the reported crash at the intersection of NE 28th Street/NE 232nd Avenue to understand the crash type. Staff's review found that the crash was due to an animal in the roadway.

The applicant's study did not recommend any safety mitigations as a part of this development. Staff concurs with the applicant's finding.

Based on Staff's review of the applicant's materials, no further analysis or mitigation is required. Thank you for the opportunity to comment.

David Jardin
Concurrency Engineer
360-397-6118 ext. 4354

From: Frank Charbonneau [mailto:Frank@CharbonneauEngineer.com]
Sent: Friday, August 19, 2016 3:42 PM
To: Jardin, David
Subject: Lacamas Heights E.S. - 232nd Ave/28th St

David – As discussed this morning I am documenting the pertinent code section and the associated requirements for concurrency approval related to the intersection conditions for NE 232nd Avenue and 28th Street in Clark County.

The traffic report dated 5/25/16 prepared for the Lacamas Heights Elementary School recently copied to you determined that the subject intersection would reach LOS 'F' for the year 2018 total traffic scenario unless mitigated by signalization. Code section 40.350.020(G)(1)(c) indicates that proposed developments shall not be required to mitigate their impacts in order to obtain concurrency approval unless meeting all three of the following:

1. The proposed development adds at least five (5) peak period trips to a failing intersection approach;
2. The projected volume to capacity ratio for the worst lane movement on the approach with the highest delay exceeds nine-tenths (0.9) during the peak traffic period; and
3. That same movement is worsened by the proposed development.

Stipulation #2 above pertaining to the volume to capacity (v/c) will not be met as the worst lane movement v/c (northbound left turn) remains below 0.9 in the peak hours. In fact the v/c equates to 0.58 for the year 2018 total traffic AM peak hour and 0.78 for the year 2018 total traffic PM peak hour. The ratios are summarized below using the LOS results contained in the traffic report for the new Lacamas Heights Elementary School.

Year 2018 Total, AM Peak Hour

Left Turn Demand = 178

Approach Capacity = 308

v/c = 0.58

Year 2018 Total, PM Peak Hour

Left Turn Demand = 214

Approach Capacity = 275

v/c = 0.78

Other supporting factors to consider for not mitigating the intersection include.

- Signalization is not warranted
- The proposed school will add only two vehicle trips to the northbound left turn movement in the AM peak hour and one trip in the PM peak hour.
- The City of Camas has identified a future TIF roadway and intersection project to install a roundabout at 232nd Avenue & 22nd Avenue. The future improvement will connecting to Ingle Road and lessen the traffic volume on the northbound approach of 232nd Avenue at 28th Street.
- The School District would have to obtain right-of-way to widen the intersection if the northbound approach were to add another travel lane.

Based on these considerations it is recommended the County not require mitigation at the intersection of NE 232nd Avenue and 28th street in conjunction with the Lacamas Heights Elementary School development project.

We would appreciate receiving your input regarding this recommendation as soon as possible. At that point we would provide the findings to the City of Camas for review.

Please do not hesitate to contact me if you have any questions.

Frank Charbonneau, PE, PTOE
Charbonneau Engineering
503.293.1118

This e-mail and related attachments and any response may be subject to public disclosure under state law.



MEMORANDUM

Date: June 17, 2016

To: Jeremy Fick, PE
Robertson Engineering, PC
610 Esther Street
Vancouver WA 98660

copy: Heidi Rosenberg
Camas School District

From: Frank Charbonneau, PE, PTOE

Subject: **NE 232nd Avenue & 9th Street Intersection Analysis**
City of Camas & Lacamas Heights Elementary School

FL1666

Charbonneau Engineering has completed the traffic analyses for the NE 232nd Avenue and 9th Street intersection proposal being planned in Camas.

The traffic work included a level of service (LOS) analysis for the realignment of 232nd Avenue at 9th Street and the access for the still unbuilt Lacamas Heights Elementary School. The concept plan developed by Robertson Engineering includes a new northbound stop approach that will tee into the 232nd Avenue and 9th Street curved alignment. Figure `a` attached to this memo illustrates the intersection layout and traffic control.

To complete the traffic analyses it was necessary to implement volume data established from the Lacamas Heights Elementary School traffic study completed in May 2016. The total traffic volumes included on Figure 7 in the report were used as the basis for the year 2025 conditions. These numbers included the in-process traffic and the school's trip generation. The data was considered sufficient for this analysis and is supported by City engineering staff, Jim Carothers, PE.

Figures 1-3 represent the year 2025 traffic flow conditions at the study intersection for the AM, mid-afternoon, and PM peak hours. Synchro v9 traffic software applying the year 2010 Highway Capacity Manual methodology was used to determine the LOS results for each of the peak hour periods. Under stop control on the northbound approach the intersection will operate at acceptable LOS `B` or better during the peak hours (City's minimum LOS standard is LOS `D`). The queuing analysis based on the 95th percentile value demonstrated that queues of one to two vehicles will occur on the stop approach. No queuing issues will occur on 232nd Avenue in conjunction with the left turn movement to head south.

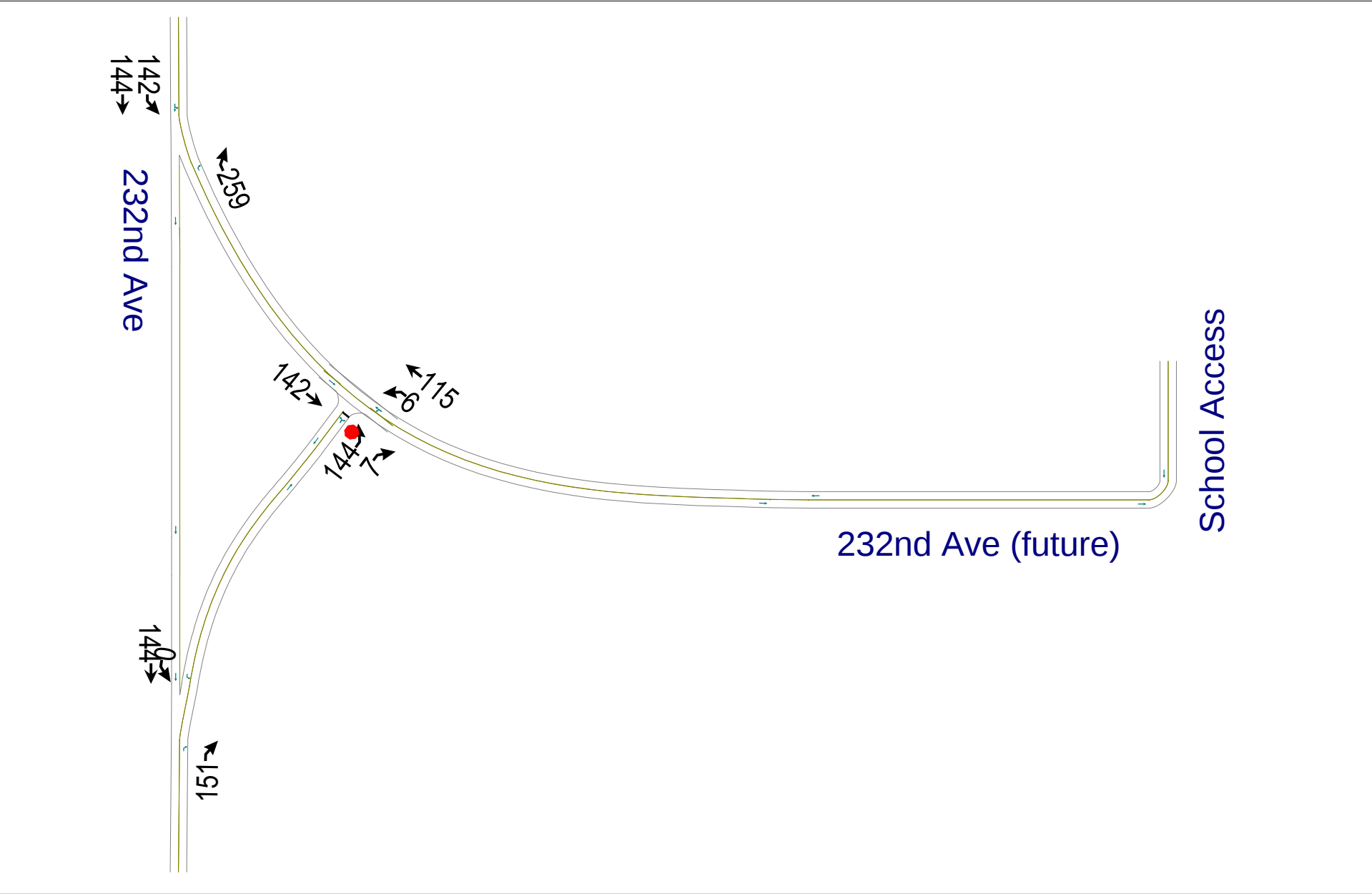
The traffic analysis results documented that the intersection will operate at satisfactory levels well into the future and it is therefore recommended that the City of Camas support the proposed design.

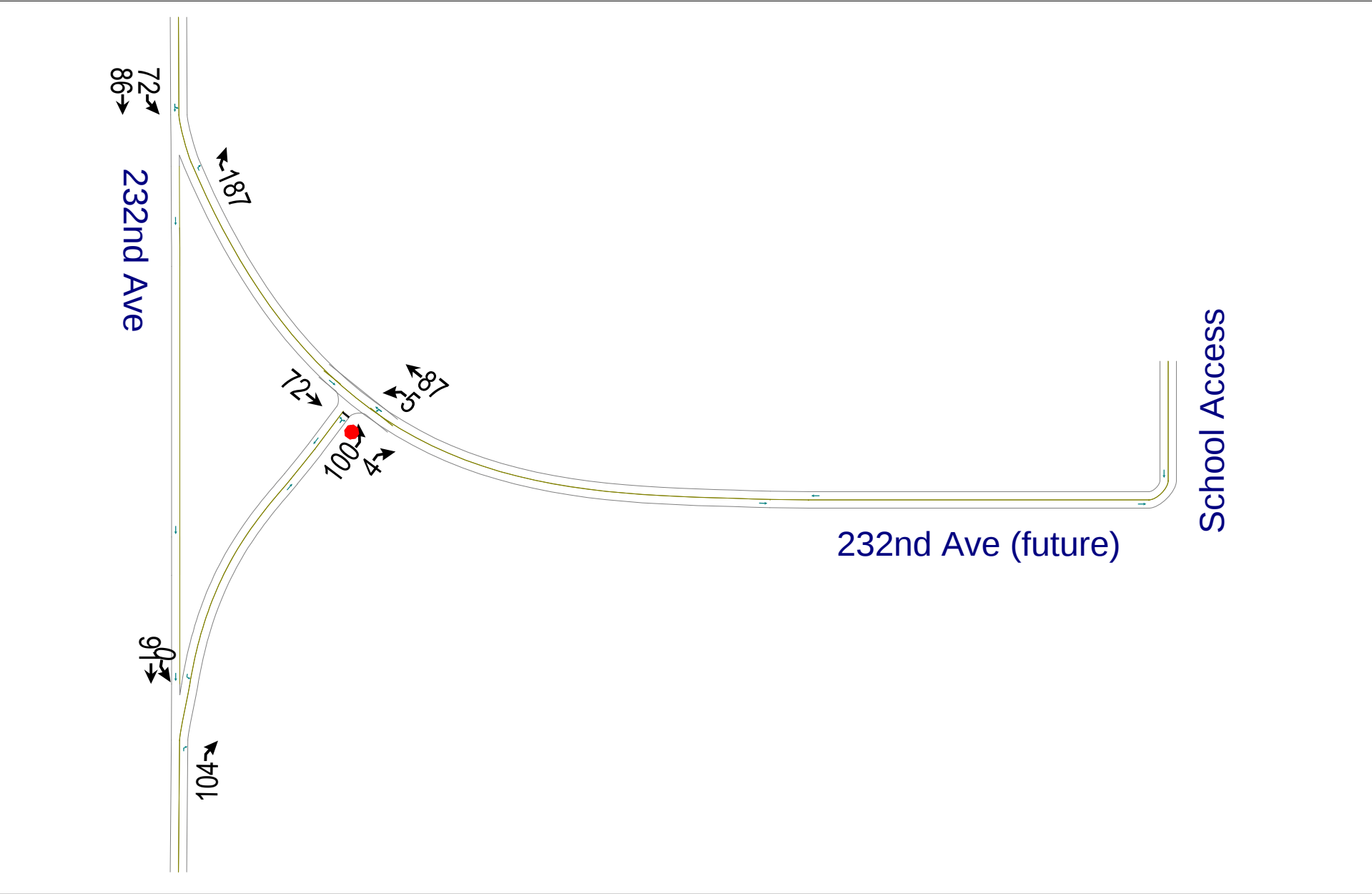
If you should have any questions, please contact Frank Charbonneau, PE, PTOE at 503.293.1118 or email Frank@CharbonneauEngineer.com.

Attachments

- Figure `a` Future Traffic Control
- Figure 1 Year 2025 Traffic AM Peak Hour
- Figure 2 Year 2025 Traffic Mid-Afternoon Peak Hour
- Figure 3 Year 2025 Traffic PM Peak Hour
- Synchro v10 LOS Printouts
- Figure 7 Year 2018 Total Traffic (Lacamas Heights Elementary School traffic analysis report, May 2016)
- Intersection Concept Plan (Robertson Engineering, 6/16/16)

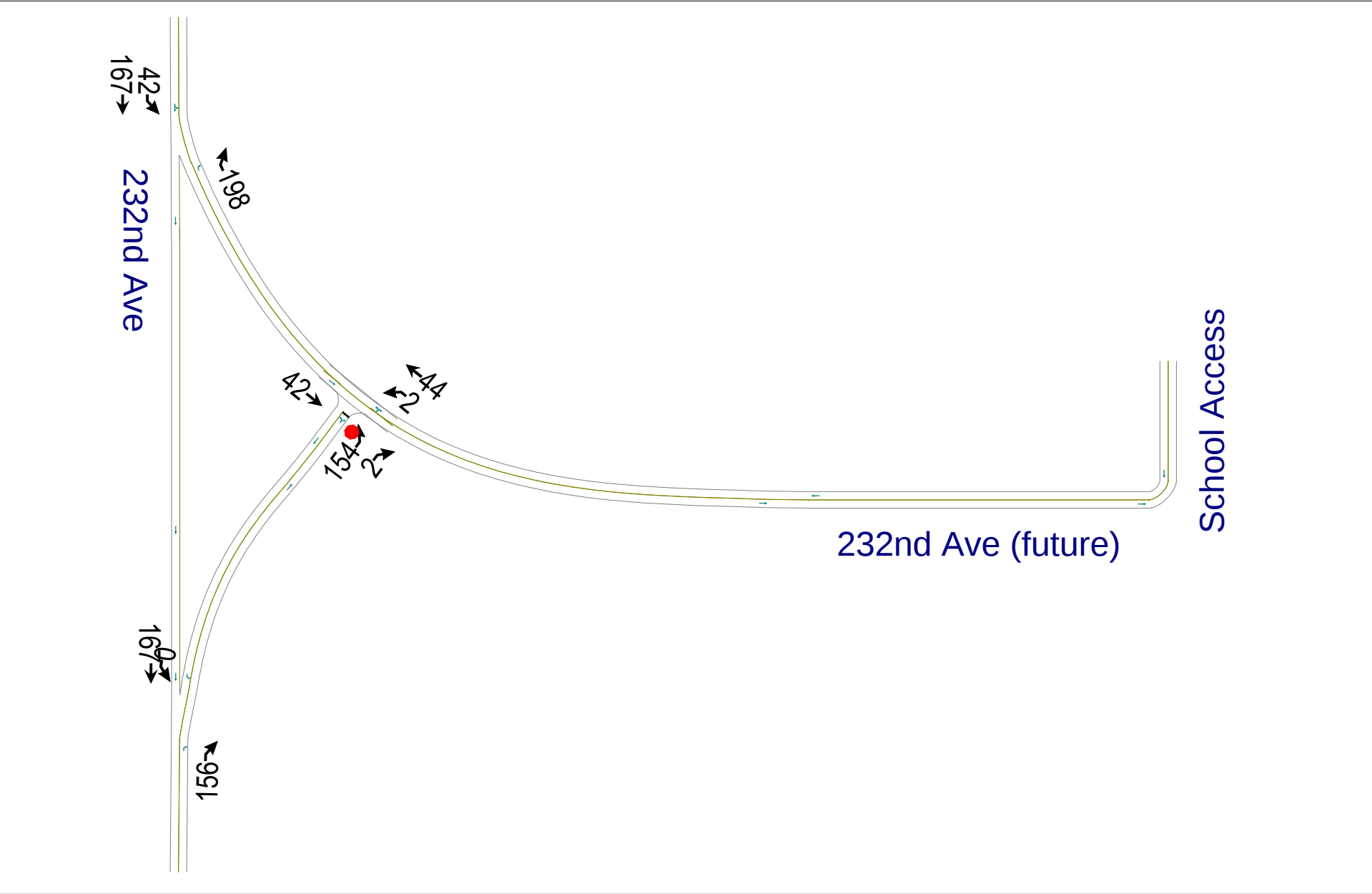






Proj #15-46
Lacamas Heights Elem Sch

Figure 2
Yr 2025 Tot Traffic Mid Pk Hr



Proj #15-46
Lacamas Heights Elem Sch

Figure 3
Yr 2025 Tot Traffic PM Pk Hr

12:

Intersection						
Int Delay, s/veh	4.4					
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	142	0	6	115	144	7
Future Vol, veh/h	142	0	6	115	144	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	92	92	92	92	92	92
Heavy Vehicles, %	10	2	20	15	2	15
Mvmt Flow	154	0	7	125	157	8
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	154	0	292	154
Stage 1	-	-	-	-	154	-
Stage 2	-	-	-	-	138	-
Critical Hdwy	-	-	4.3	-	6.42	6.35
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.38	-	3.518	3.435
Pot Cap-1 Maneuver	-	0	1324	-	699	859
Stage 1	-	0	-	-	874	-
Stage 2	-	0	-	-	889	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	1324	-	695	859
Mov Cap-2 Maneuver	-	-	-	-	695	-
Stage 1	-	-	-	-	874	-
Stage 2	-	-	-	-	884	-
Approach	SE		NW		NE	
HCM Control Delay, s	0		0.4		11.7	
HCM LOS	B					
Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET		
Capacity (veh/h)	701	1324	-	-		
HCM Lane V/C Ratio	0.234	0.005	-	-		
HCM Control Delay (s)	11.7	7.7	0	-		
HCM Lane LOS	B	A	A	-		
HCM 95th %tile Q(veh)	0.9	0	-	-		

12:

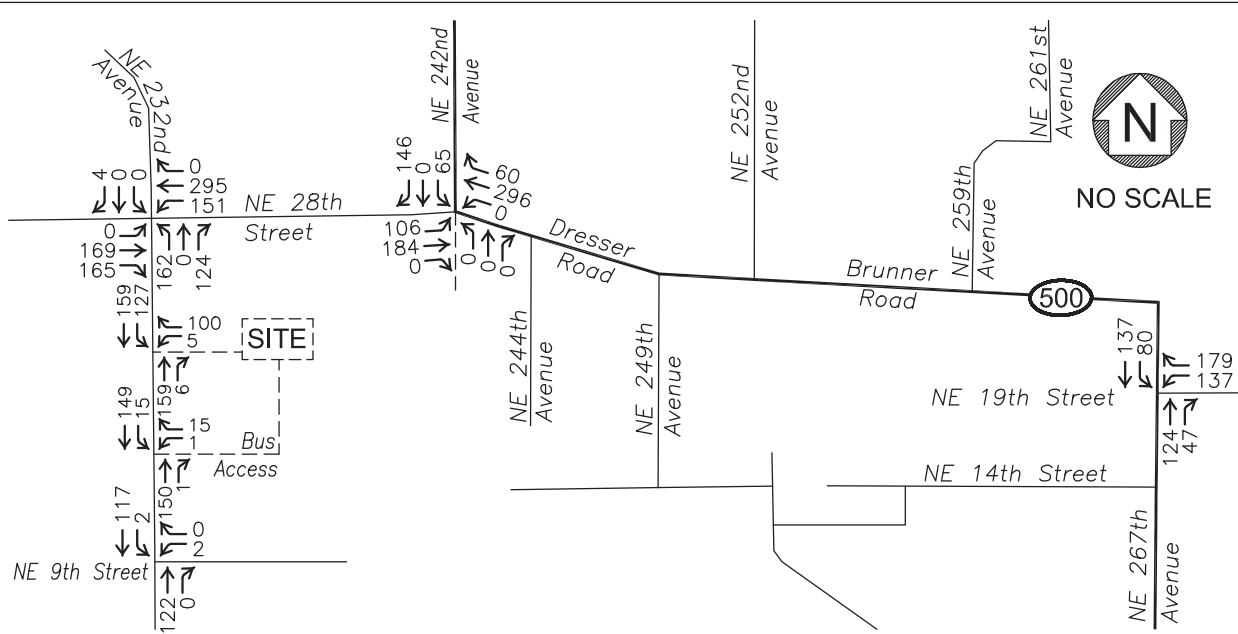
Intersection						
Int Delay, s/veh	4.1					
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	72	0	5	87	100	4
Future Vol, veh/h	72	0	5	87	100	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	15	2	2	15	2	10
Mvmt Flow	78	0	5	95	109	4
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	78	0	183	78
Stage 1	-	-	-	-	78	-
Stage 2	-	-	-	-	105	-
Critical Hdwy	-	-	4.12	-	6.42	6.3
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.39
Pot Cap-1 Maneuver	-	0	1520	-	806	961
Stage 1	-	0	-	-	945	-
Stage 2	-	0	-	-	919	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	1520	-	804	961
Mov Cap-2 Maneuver	-	-	-	-	804	-
Stage 1	-	-	-	-	945	-
Stage 2	-	-	-	-	916	-
Approach	SE		NW		NE	
HCM Control Delay, s	0		0.4		10.2	
HCM LOS					B	
Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET		
Capacity (veh/h)	809	1520	-	-		
HCM Lane V/C Ratio	0.14	0.004	-	-		
HCM Control Delay (s)	10.2	7.4	0	-		
HCM Lane LOS	B	A	A	-		
HCM 95th %tile Q(veh)	0.5	0	-	-		

12:

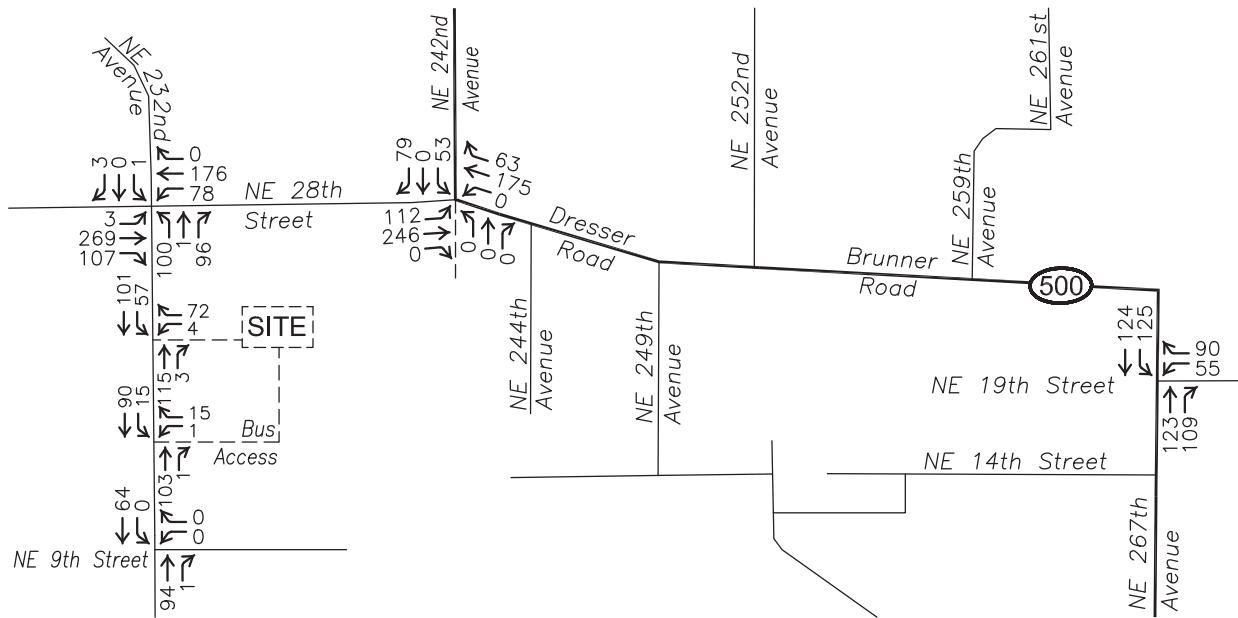
Intersection						
Int Delay, s/veh	6.4					
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	42	0	2	44	154	2
Future Vol, veh/h	42	0	2	44	154	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	2	2	5	2	2
Mvmt Flow	46	0	2	48	167	2
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	46	0	98	46
Stage 1	-	-	-	-	46	-
Stage 2	-	-	-	-	52	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	0	1562	-	901	1023
Stage 1	-	0	-	-	976	-
Stage 2	-	0	-	-	970	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1562	-	900	1023
Mov Cap-2 Maneuver	-	-	-	-	900	-
Stage 1	-	-	-	-	976	-
Stage 2	-	-	-	-	969	-
Approach	SE		NW		NE	
HCM Control Delay, s	0		0.3		9.9	
HCM LOS					A	
Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET		
Capacity (veh/h)	901	1562	-	-		
HCM Lane V/C Ratio	0.188	0.001	-	-		
HCM Control Delay (s)	9.9	7.3	0	-		
HCM Lane LOS	A	A	A	-		
HCM 95th %tile Q(veh)	0.7	0	-	-		

FILE NAME: 1546flow2.dwg

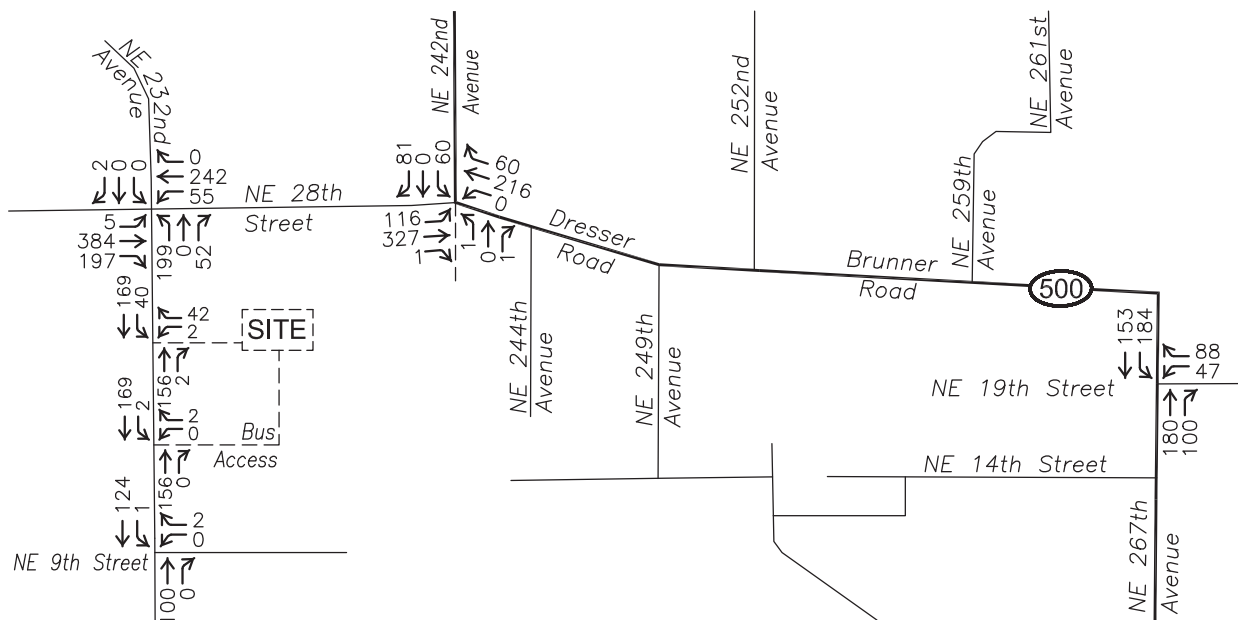
PLOT DATE: 05.19.16



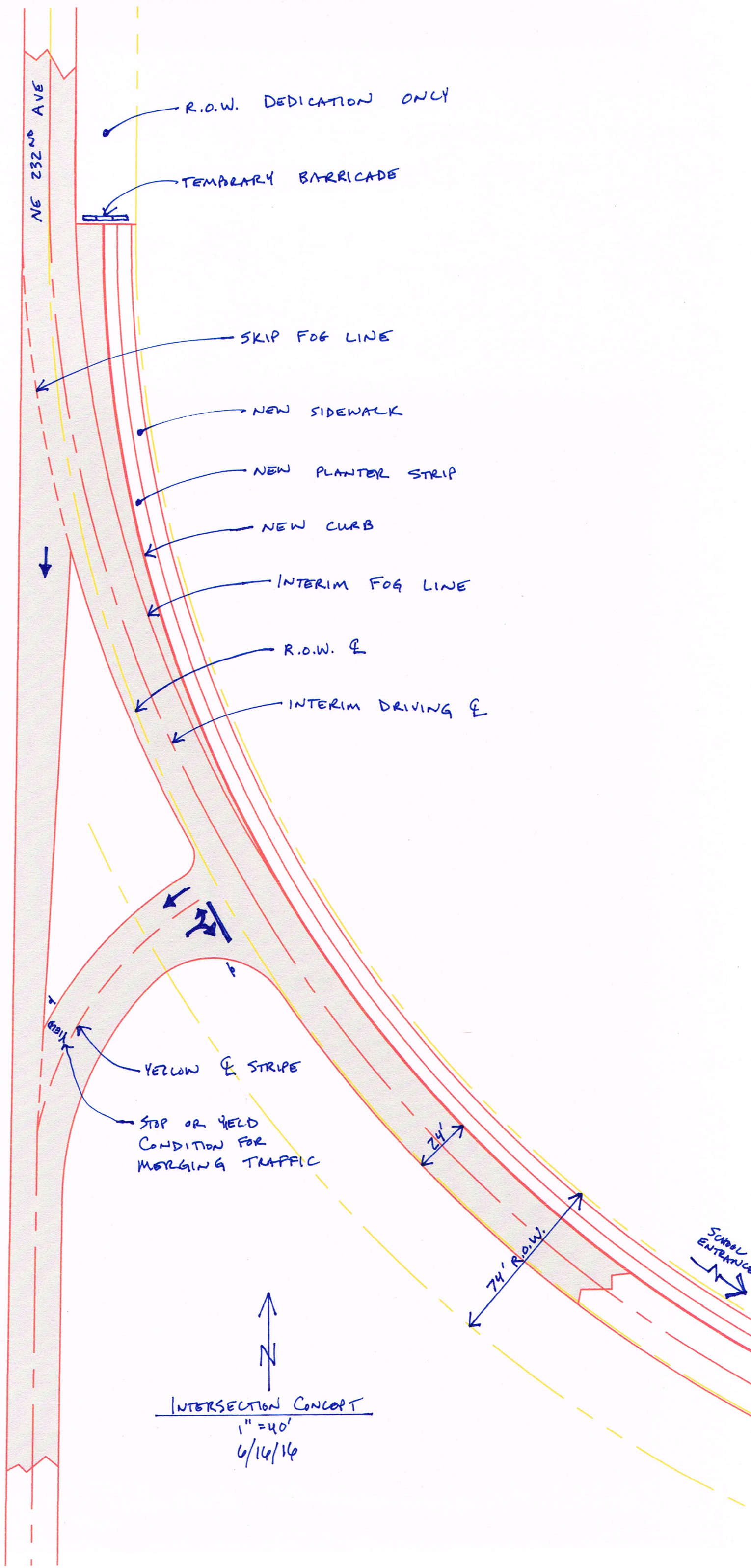
AM
PEAK
HOUR



MID-
AFTERNOON
PEAK
HOUR



PM
PEAK
HOUR



NE 232ND AVE

R.O.W. DEDICATION ONLY

TEMPORARY BARRICADE

SKIP FOG LINE

NEW SIDEWALK

NEW PLANTER STRIP

NEW CURB

INTERIM FOG LINE

R.O.W. &

INTERIM DRIVING &

YELLOW & STRIPE

STOP OR YIELD
CONDITION FOR
MERGING TRAFFIC

24'

74' R.O.W.

SCHOOL
ENTRANCE

N

INTERSECTION CONCEPT

1" = 40'

6/14/16

Peak Hour Summary

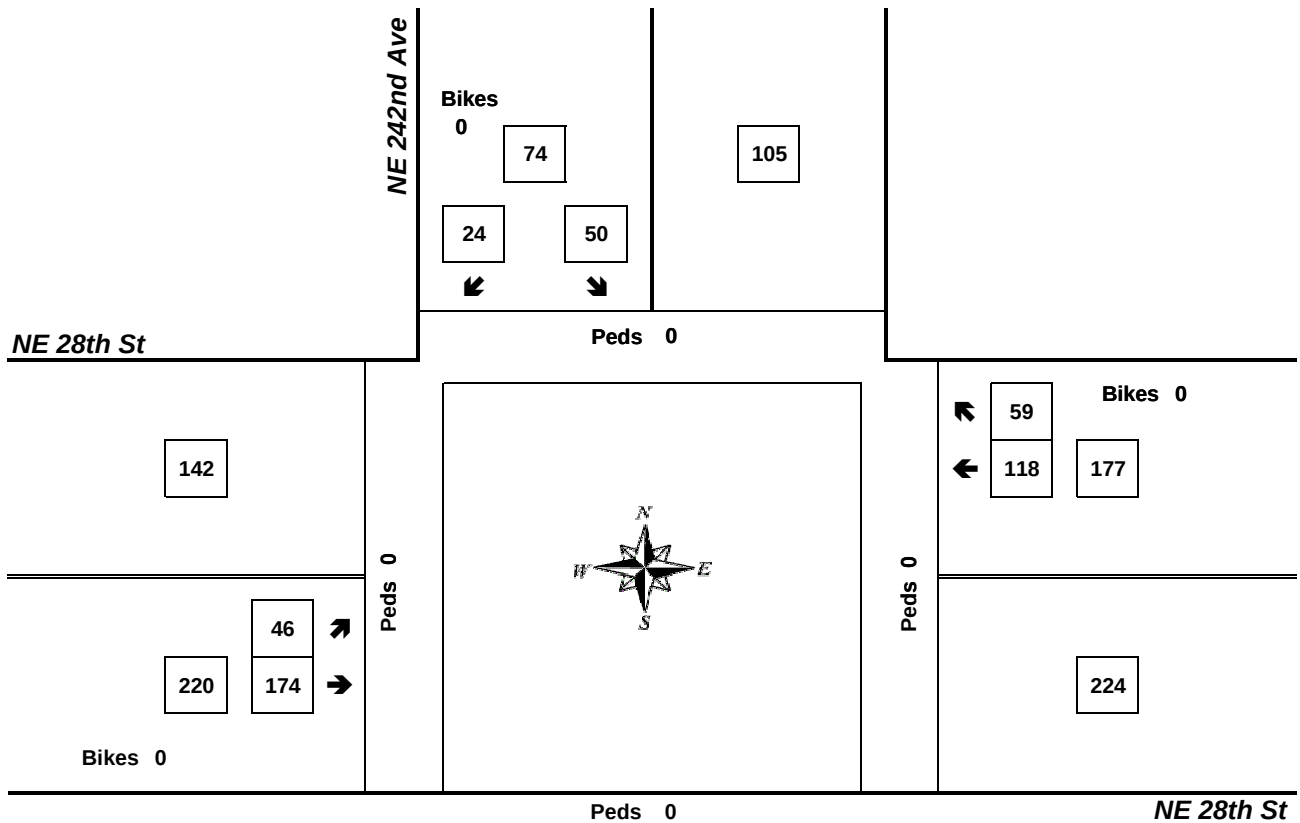


Clay Carney
(503) 833-2740

NE 242nd Ave & NE 28th St

2:45 PM to 3:45 PM

Tuesday, December 08, 2015



Bikes
0

Approach	PHF	HV%	Volume
EB	0.80	2.7%	220
WB	0.79	5.1%	177
NB	0.00	0.0%	0
SB	0.80	10.8%	74
Intersection	0.82	4.9%	471

Count Period: 1:45 PM to 3:45 PM

Total Vehicle Summary

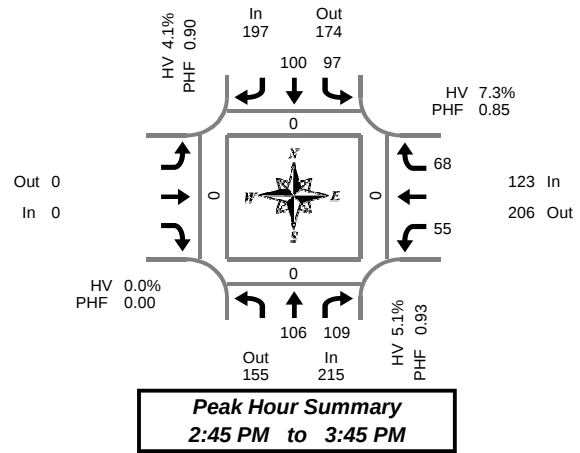


Clay Carney
(503) 833-2740

NE 267th Ave & NE 19th St

Tuesday, December 08, 2015

1:45 PM to 3:45 PM



15-Minute Interval Summary

1:45 PM to 3:45 PM

Interval Start Time	Northbound NE 267th Ave			Southbound NE 267th Ave			Eastbound NE 19th St			Westbound NE 19th St			Interval Total	Pedestrians Crosswalk			
	T	R	Bikes	L	T	Bikes			Bikes	L	R	Bikes		North	South	East	West
1:45 PM	26	18	0	18	15	0			0	12	14	0	103	0	0	0	0
2:00 PM	10	12	0	19	21	0			0	14	16	0	92	0	0	0	0
2:15 PM	26	20	0	17	22	0			0	19	18	0	122	0	0	0	0
2:30 PM	17	37	0	27	18	0			0	13	13	0	125	0	0	0	0
2:45 PM	17	31	0	16	27	0			0	19	13	0	123	0	0	0	0
3:00 PM	26	27	0	28	21	0			0	10	14	0	126	0	0	0	0
3:15 PM	39	19	0	27	28	0			0	16	20	0	149	0	0	0	0
3:30 PM	24	32	0	26	24	0			0	10	21	0	137	0	0	0	0
Total Survey	185	196	0	178	176	0			0	113	129	0	977	0	0	0	0

Peak Hour Summary

2:45 PM to 3:45 PM

By Approach	Northbound NE 267th Ave				Southbound NE 267th Ave				Eastbound NE 19th St				Westbound NE 19th St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	215	155	370	0	197	174	371	0	0	0	0	0	123	206	329	0	535	0	0	0	0
%HV	5.1%				4.1%				0.0%				7.3%				5.2%				
PHF	0.93				0.90				0.00				0.85				0.90				

By Movement	Northbound NE 267th Ave				Southbound NE 267th Ave				Eastbound NE 19th St				Westbound NE 19th St				Total
		T	R	Total	L	T		Total				Total	L		R	Total	
Volume		106	109	215	97	100		197				0	55		68	123	535
%HV	NA	3.8%	6.4%	5.1%	3.1%	5.0%	NA	4.1%	NA	NA	NA	0.0%	9.1%	NA	5.9%	7.3%	5.2%
PHF		0.68	0.85	0.93	0.87	0.89		0.90				0.00	0.72		0.81	0.85	0.90

Rolling Hour Summary

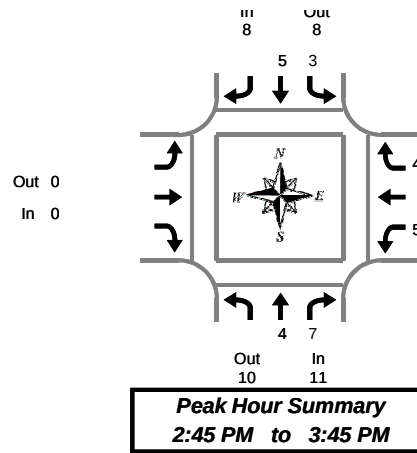
1:45 PM to 3:45 PM

Interval Start Time	Northbound NE 267th Ave			Southbound NE 267th Ave			Eastbound NE 19th St			Westbound NE 19th St			Interval Total	Pedestrians Crosswalk			
	T	R	Bikes	L	T	Bikes			Bikes	L	R	Bikes		North	South	East	West
1:45 PM	79	87	0	81	76	0			0	58	61	0	442	0	0	0	0
2:00 PM	70	100	0	79	88	0			0	65	60	0	462	0	0	0	0
2:15 PM	86	115	0	88	88	0			0	61	58	0	496	0	0	0	0
2:30 PM	99	114	0	98	94	0			0	58	60	0	523	0	0	0	0
2:45 PM	106	109	0	97	100	0			0	55	68	0	535	0	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



NE 267th Ave & NE 19th St

Tuesday, December 08, 2015

1:45 PM to 3:45 PM

Heavy Vehicle 15-Minute Interval Summary

1:45 PM to 3:45 PM

Interval Start Time	Northbound NE 267th Ave			Southbound NE 267th Ave			Eastbound NE 19th St			Westbound NE 19th St			Interval Total
	T	R	Total	L	T	Total			Total	L	R	Total	
1:45 PM	2	0	2	0	0	0			0	0		0	2
2:00 PM	0	0	0	0	0	0			0	0	1	1	1
2:15 PM	1	0	1	1	1	2			0	0	1	1	4
2:30 PM	1	0	1	2	0	2			0	0	0	0	3
2:45 PM	0	2	2	1	2	3			0	1	0	1	6
3:00 PM	2	4	6	0	0	0			0	1	3	4	10
3:15 PM	1	1	2	0	1	1			0	1	0	1	4
3:30 PM	1	0	1	2	2	4			0	2	1	3	8
Total Survey	8	7	15	6	6	12			0	5	6	11	38

Heavy Vehicle Peak Hour Summary

2:45 PM to 3:45 PM

By Approach	Northbound NE 267th Ave			Southbound NE 267th Ave			Eastbound NE 19th St			Westbound NE 19th St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	11	10	21	8	8	16	0	0	0	9	10	19	28
PHF	0.28			0.29			0.00			0.28			0.32

By Movement	Northbound NE 267th Ave			Southbound NE 267th Ave			Eastbound NE 19th St			Westbound NE 19th St			Total
	T	R	Total	L	T	Total			Total	L	R	Total	
Volume	4	7	11	3	5	8			0	5	4	9	28
PHF	0.25	0.25	0.28	0.19	0.42	0.29			0.00	0.31	0.25	0.28	0.32

Heavy Vehicle Rolling Hour Summary

1:45 PM to 3:45 PM

Interval Start Time	Northbound NE 267th Ave			Southbound NE 267th Ave			Eastbound NE 19th St			Westbound NE 19th St			Interval Total
	T	R	Total	L	T	Total			Total	L	R	Total	
1:45 PM	4	0	4	3	1	4			0	0	2	2	10
2:00 PM	2	2	4	4	3	7			0	1	2	3	14
2:15 PM	4	6	10	4	3	7			0	2	4	6	23
2:30 PM	4	7	11	3	3	6			0	3	3	6	23
2:45 PM	4	7	11	3	5	8			0	5	4	9	28

Peak Hour Summary

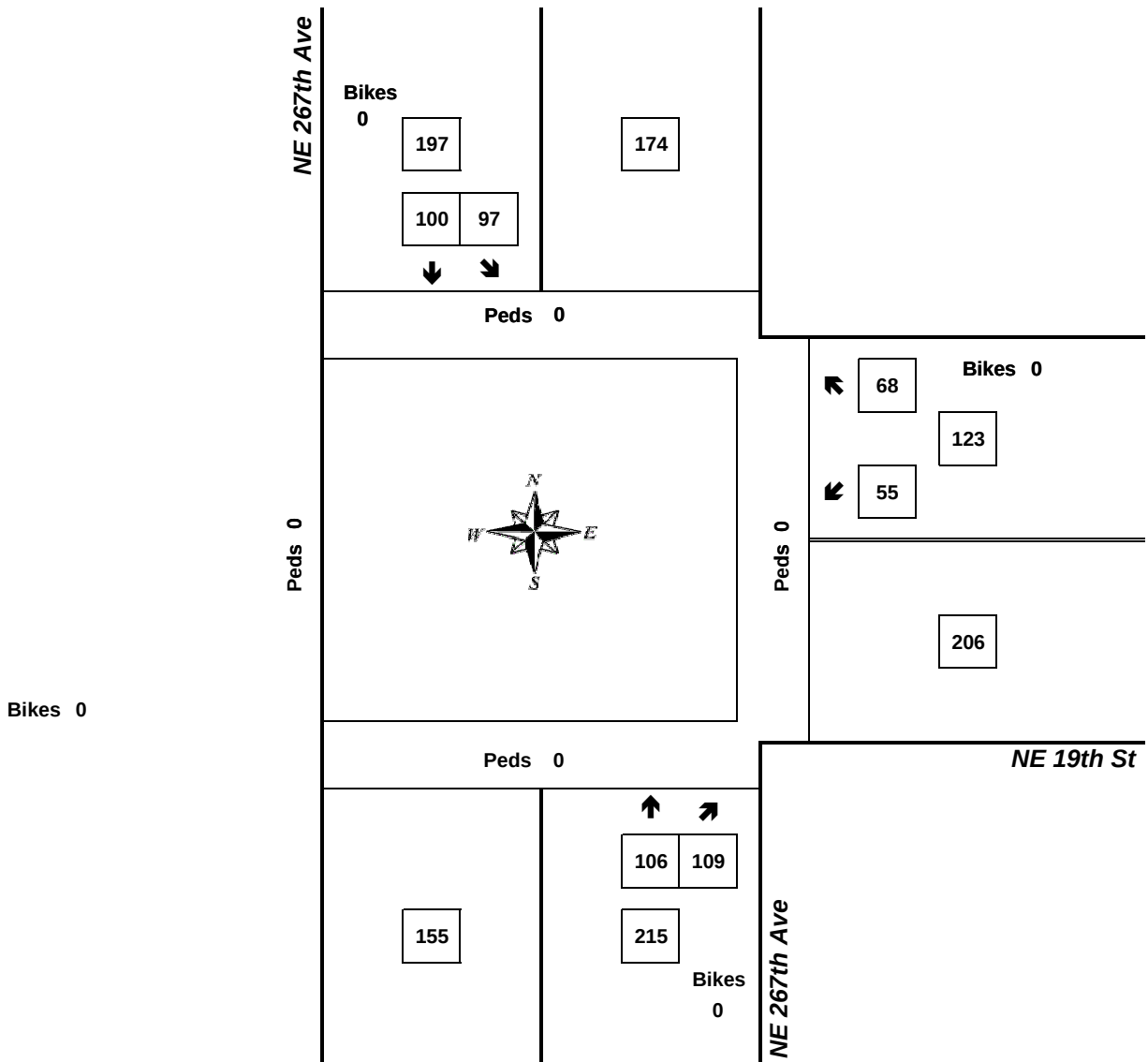


Clay Carney
(503) 833-2740

NE 267th Ave & NE 19th St

2:45 PM to 3:45 PM

Tuesday, December 08, 2015



Approach	PHF	HV%	Volume
EB	0.00	0.0%	0
WB	0.85	7.3%	123
NB	0.93	5.1%	215
SB	0.90	4.1%	197
Intersection	0.90	5.2%	535

Count Period: 1:45 PM to 3:45 PM

Total Vehicle Summary

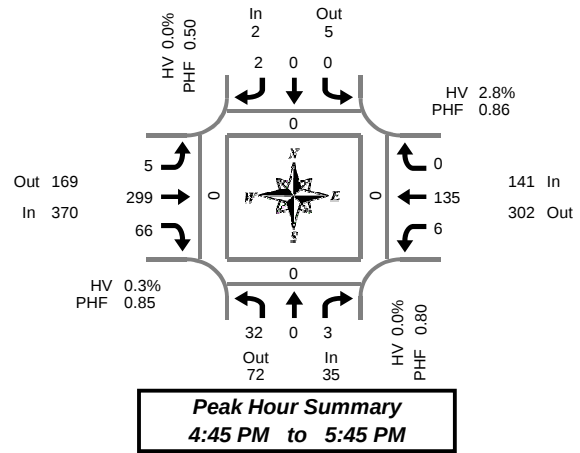


Clay Carney
(503) 833-2740

NE 232nd Ave & NE 28th St

Tuesday, December 08, 2015

4:00 PM to 6:00 PM



15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 28th St				Westbound NE 28th St				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	19	0	2	0	0	1	2	0	0	59	10	0	2	34	0	0	129	0	0	0	0
4:15 PM	13	0	0	0	0	0	0	0	2	51	8	0	1	30	0	0	105	0	0	0	0
4:30 PM	5	1	1	0	0	1	1	0	2	82	7	0	0	38	0	0	138	0	0	0	0
4:45 PM	10	0	1	0	0	0	1	0	1	71	15	0	4	37	0	0	140	0	0	0	0
5:00 PM	6	0	1	0	0	0	1	0	0	72	11	0	1	30	0	0	122	0	0	0	0
5:15 PM	10	0	0	0	0	0	0	0	1	87	21	0	0	28	0	0	147	0	0	0	0
5:30 PM	6	0	1	0	0	0	0	0	3	69	19	0	1	40	0	0	139	0	0	0	0
5:45 PM	11	0	1	0	0	0	0	0	0	82	10	0	1	22	0	0	127	0	0	0	0
Total Survey	80	1	7	0	0	2	5	0	9	573	101	0	10	259	0	0	1,047	0	0	0	0

Peak Hour Summary

4:45 PM to 5:45 PM

By Approach	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	35	72	107	0	2	5	7	0	370	169	539	0	141	302	443	0	548	0	0	0	0
%HV	0.0%				0.0%				0.3%				2.8%				0.9%				
PHF	0.80				0.50				0.85				0.86				0.93				

By Movement	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	32	0	3	35	0	0	2	2	5	299	66	370	6	135	0	141	548
%HV	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.5%	0.3%	0.0%	3.0%	0.0%	2.8%	0.9%
PHF	0.80	0.00	0.75	0.80	0.00	0.00	0.50	0.50	0.42	0.86	0.79	0.85	0.38	0.84	0.00	0.86	0.93

Rolling Hour Summary

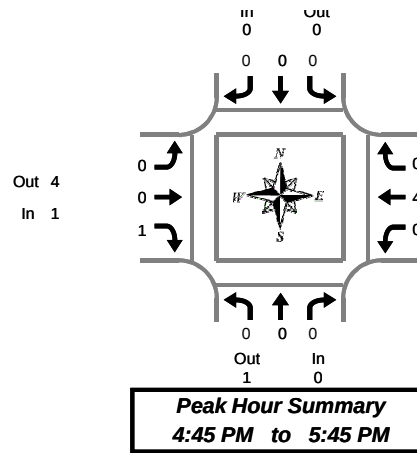
4:00 PM to 6:00 PM

Interval Start Time	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 28th St				Westbound NE 28th St				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	47	1	4	0	0	2	4	0	5	263	40	0	7	139	0	0	512	0	0	0	0
4:15 PM	34	1	3	0	0	1	3	0	5	276	41	0	6	135	0	0	505	0	0	0	0
4:30 PM	31	1	3	0	0	1	3	0	4	312	54	0	5	133	0	0	547	0	0	0	0
4:45 PM	32	0	3	0	0	0	2	0	5	299	66	0	6	135	0	0	548	0	0	0	0
5:00 PM	33	0	3	0	0	0	1	0	4	310	61	0	3	120	0	0	535	0	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



NE 232nd Ave & NE 28th St

Tuesday, December 08, 2015

4:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 28th St				Westbound NE 28th St				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	2	0	2	0	0	0	0	2
4:15 PM	0	0	0	0	0	0	0	0	0	2	0	2	1	1	0	2	4
4:30 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	2	3
5:00 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	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
5:45 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
Total Survey	0	0	0	0	0	0	0	0	0	6	1	7	1	5	0	6	13

Heavy Vehicle Peak Hour Summary

4:45 PM to 5:45 PM

By Approach	Northbound NE 232nd Ave			Southbound NE 232nd Ave			Eastbound NE 28th St			Westbound NE 28th St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	1	1	0	0	0	1	4	5	4	0	4	5
PHF	0.00			0.00			0.05			0.25			0.16

By Movement	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	0	0	0	0	0	0	0	0	0	1	1	0	4	0	4	5
PHF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.05	0.00	0.33	0.00	0.25	0.16

Heavy Vehicle Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 28th St				Westbound NE 28th St				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	5	1	6	1	3	0	4	10
4:15 PM	0	0	0	0	0	0	0	0	0	3	1	4	1	4	0	5	9
4:30 PM	0	0	0	0	0	0	0	0	0	1	1	2	0	3	0	3	5
4:45 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	4	0	4	5
5:00 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	2	3

All Traffic Data
Services Inc.

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

Total Vehicle Summary

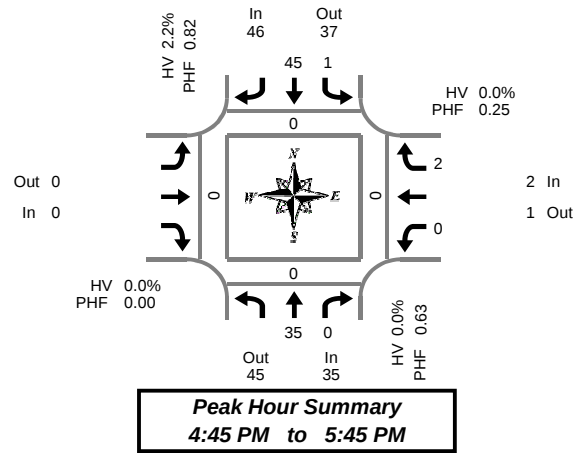


Clay Carney
(503) 833-2740

NE 232nd Ave & NE 9th St

Tuesday, December 08, 2015

4:00 PM to 6:00 PM



15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 9th St				Westbound NE 9th St				Interval Total	Pedestrians Crosswalk			
	T	R	Bikes		L	T		Bikes				Bikes	L		R	Bikes		North	South	East	West
4:00 PM	15	0	0		1	7		0				0	0		1	0	24	0	0	0	0
4:15 PM	9	0	0		0	7		0				0	1		0	0	17	0	0	0	0
4:30 PM	8	0	0		0	8		0				0	0		0	0	16	0	0	0	0
4:45 PM	14	0	0		0	10		0				0	0		0	0	24	0	0	0	0
5:00 PM	7	0	0		0	11		0				0	0		0	0	18	0	0	0	0
5:15 PM	6	0	0		0	11		0				0	0		0	0	17	0	0	0	0
5:30 PM	8	0	0		1	13		0				0	0		2	0	24	0	0	0	0
5:45 PM	12	1	0		0	8		0				0	0		0	0	21	0	0	0	0
Total Survey	79	1	0		2	75		0				0	1		3	0	161	0	0	0	0

Peak Hour Summary

4:45 PM to 5:45 PM

By Approach	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 9th St				Westbound NE 9th St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	35	45	80	0	46	37	83	0	0	0	0	0	2	1	3	0	83	0	0	0	0
%HV	0.0%				2.2%				0.0%				0.0%				1.2%				
PHF	0.63				0.82				0.00				0.25				0.86				

By Movement	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 9th St				Westbound NE 9th St				Total
	T	R	Total		L	T	Total				Total		L		R	Total	
Volume	35	0	35		1	45	46				0		0		2	2	83
%HV	NA	0.0%	0.0%	0.0%	0.0%	2.2%	NA	2.2%	NA	NA	0.0%	0.0%	0.0%	NA	0.0%	0.0%	1.2%
PHF	0.63	0.00	0.63		0.25	0.87	0.82				0.00		0.00		0.25	0.25	0.86

Rolling Hour Summary

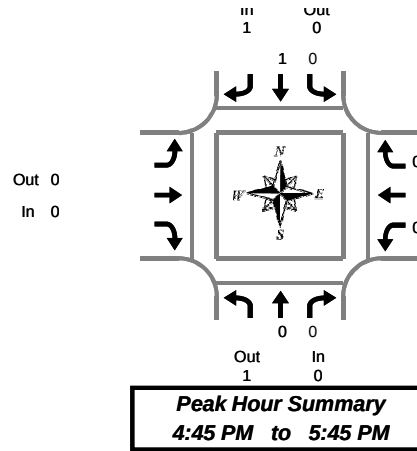
4:00 PM to 6:00 PM

Interval Start Time	Northbound NE 232nd Ave				Southbound NE 232nd Ave				Eastbound NE 9th St				Westbound NE 9th St				Interval Total	Pedestrians Crosswalk			
	T	R	Bikes		L	T		Bikes				Bikes	L		R	Bikes		North	South	East	West
4:00 PM	46	0	0		1	32		0				0	1		1	0	81	0	0	0	0
4:15 PM	38	0	0		0	36		0				0	1		0	0	75	0	0	0	0
4:30 PM	35	0	0		0	40		0				0	0		0	0	75	0	0	0	0
4:45 PM	35	0	0		1	45		0				0	0		2	0	83	0	0	0	0
5:00 PM	33	1	0		1	43		0				0	0		2	0	80	0	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



NE 232nd Ave & NE 9th St

Tuesday, December 08, 2015

4:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound NE 232nd Ave			Southbound NE 232nd Ave			Eastbound NE 9th St			Westbound NE 9th St			Interval Total
	T	R	Total	L	T	Total			Total	L	R	Total	
4:00 PM	0	0	0	0	0	0			0	0		0	0
4:15 PM	0	0	0	0	0	0			0	0		0	0
4:30 PM	0	0	0	0	0	0			0	0		0	0
4:45 PM	0	0	0	0	0	0			0	0		0	0
5:00 PM	0	0	0	0	1	1			0	0		0	1
5:15 PM	0	0	0	0	0	0			0	0		0	0
5:30 PM	0	0	0	0	0	0			0	0		0	0
5:45 PM	0	0	0	0	0	0			0	0		0	0
Total Survey	0	0	0	0	1	1			0	0		0	1

Heavy Vehicle Peak Hour Summary

4:45 PM to 5:45 PM

By Approach	Northbound NE 232nd Ave			Southbound NE 232nd Ave			Eastbound NE 9th St			Westbound NE 9th St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	1	1	1	0	1	0	0	0	0	0	0	1
PHF	0.00			0.25			0.00			0.00			0.25

By Movement	Northbound NE 232nd Ave			Southbound NE 232nd Ave			Eastbound NE 9th St			Westbound NE 9th St			Total
	T	R	Total	L	T	Total			Total	L	R	Total	
Volume	0	0	0	0	1	1			0	0		0	1
PHF	0.00	0.00	0.00	0.00	0.25	0.25			0.00	0.00		0.00	0.25

Heavy Vehicle Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound NE 232nd Ave			Southbound NE 232nd Ave			Eastbound NE 9th St			Westbound NE 9th St			Interval Total
	T	R	Total	L	T	Total			Total	L	R	Total	
4:00 PM	0	0	0	0	0	0			0	0		0	0
4:15 PM	0	0	0	0	1	1			0	0		0	1
4:30 PM	0	0	0	0	1	1			0	0		0	1
4:45 PM	0	0	0	0	1	1			0	0		0	1
5:00 PM	0	0	0	0	1	1			0	0		0	1

Peak Hour Summary

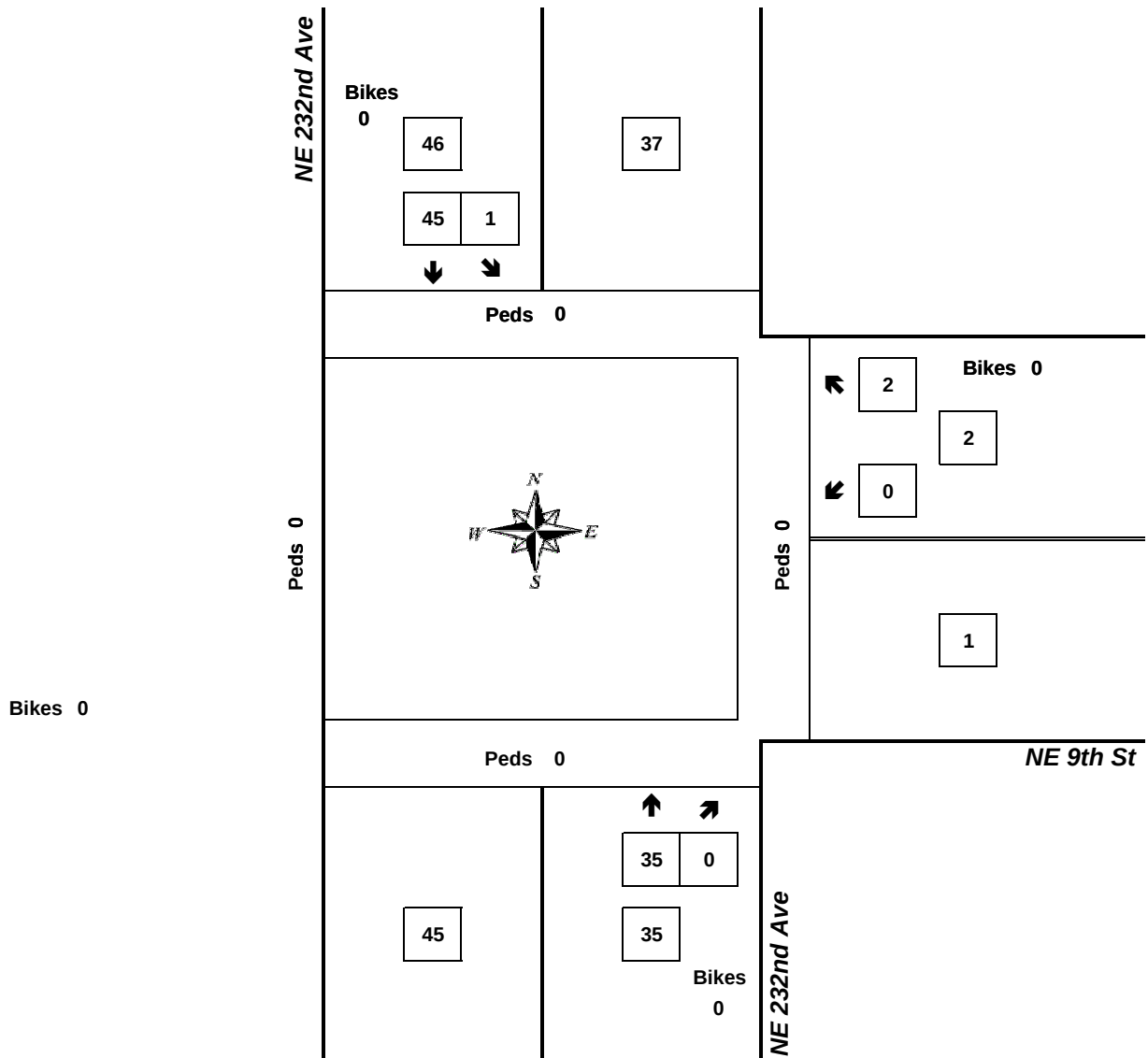


Clay Carney
(503) 833-2740

NE 232nd Ave & NE 9th St

4:45 PM to 5:45 PM

Tuesday, December 08, 2015



Approach	PHF	HV%	Volume
EB	0.00	0.0%	0
WB	0.25	0.0%	2
NB	0.63	0.0%	35
SB	0.82	2.2%	46
Intersection	0.86	1.2%	83

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

Total Vehicle Summary

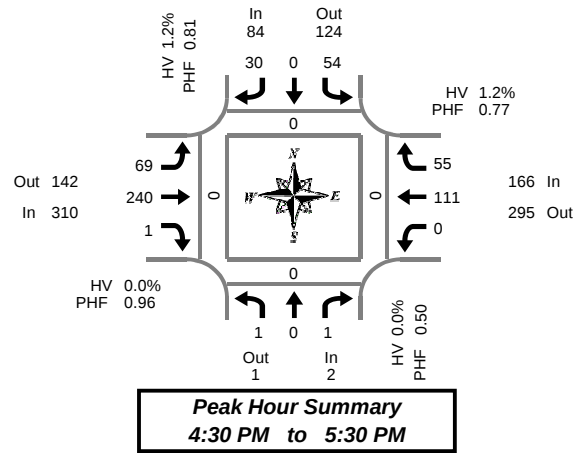


Clay Carney
(503) 833-2740

NE 242nd Ave & NE 28th St

Tuesday, December 08, 2015

4:00 PM to 6:00 PM



15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound NE 242nd Ave				Southbound NE 242nd Ave				Eastbound NE 28th St				Westbound NE 28th St				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	0	0	0	16	0	11	0	15	55	0	0	0	23	14	0	134	0	0	1	0
4:15 PM	0	0	0	0	20	0	7	0	8	45	0	0	0	27	14	0	121	0	0	0	0
4:30 PM	0	0	0	0	10	0	5	0	22	59	0	0	0	36	18	0	150	0	0	0	0
4:45 PM	1	0	0	0	16	0	10	0	18	53	0	0	0	29	16	0	143	0	0	0	0
5:00 PM	0	0	1	0	13	0	5	0	13	65	0	0	0	27	10	0	134	0	0	0	0
5:15 PM	0	0	0	0	15	0	10	0	16	63	1	0	0	19	11	0	135	0	0	0	0
5:30 PM	0	0	1	0	14	0	4	0	18	51	1	0	0	36	16	0	141	0	0	0	0
5:45 PM	1	0	0	0	7	0	2	0	13	67	0	0	0	20	11	0	121	0	0	0	0
Total Survey	2	0	2	0	111	0	54	0	123	458	2	0	0	217	110	0	1,079	0	0	1	0

Peak Hour Summary

4:30 PM to 5:30 PM

By Approach	Northbound NE 242nd Ave				Southbound NE 242nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	2	1	3	0	84	124	208	0	310	142	452	0	166	295	461	0	562	0	0	0	0
%HV	0.0%				1.2%				0.0%				1.2%				0.5%				
PHF	0.50				0.81				0.96				0.77				0.94				

By Movement	Northbound NE 242nd Ave				Southbound NE 242nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	1	0	1	2	54	0	30	84	69	240	1	310	0	111	55	166	562
%HV	0.0%	0.0%	0.0%	0.0%	1.9%	0.0%	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	1.8%	0.0%	1.2%	0.5%
PHF	0.25	0.00	0.25	0.50	0.84	0.00	0.75	0.81	0.78	0.92	0.25	0.96	0.00	0.77	0.76	0.77	0.94

Rolling Hour Summary

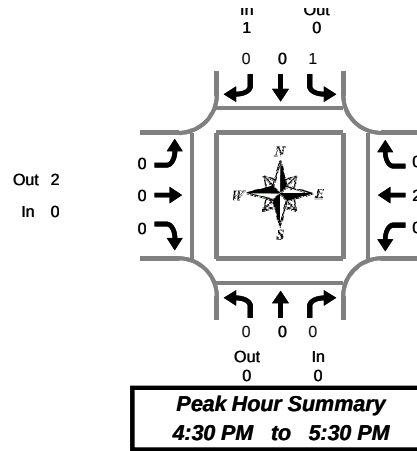
4:00 PM to 6:00 PM

Interval Start Time	Northbound NE 242nd Ave				Southbound NE 242nd Ave				Eastbound NE 28th St				Westbound NE 28th St				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	0	0	0	62	0	33	0	63	212	0	0	0	115	62	0	548	0	0	1	0
4:15 PM	1	0	1	0	59	0	27	0	61	222	0	0	0	119	58	0	548	0	0	0	0
4:30 PM	1	0	1	0	54	0	30	0	69	240	1	0	0	111	55	0	562	0	0	0	0
4:45 PM	1	0	2	0	58	0	29	0	65	232	2	0	0	111	53	0	553	0	0	0	0
5:00 PM	1	0	2	0	49	0	21	0	60	246	2	0	0	102	48	0	531	0	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



NE 242nd Ave & NE 28th St

Tuesday, December 08, 2015

4:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound NE 242nd Ave				Southbound NE 242nd Ave				Eastbound NE 28th St				Westbound NE 28th St				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	2	0	2	0	0	0	0	2
4:15 PM	0	0	0	0	1	0	2	3	1	1	0	2	0	1	3	4	9
4:30 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	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	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
Total Survey	0	0	0	0	2	0	2	4	1	4	0	5	0	3	3	6	15

Heavy Vehicle Peak Hour Summary

4:30 PM to 5:30 PM

By Approach	Northbound NE 242nd Ave			Southbound NE 242nd Ave			Eastbound NE 28th St			Westbound NE 28th St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	0	0	0	1	0	1	0	2	2	2	1	3	3
PHF	0.00			0.06			0.00			0.08			0.06

By Movement	Northbound NE 242nd Ave				Southbound NE 242nd Ave				Eastbound NE 28th St				Westbound NE 28th St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	0	0	0	1	0	0	1	0	0	0	0	0	2	0	2	3
PHF	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.08	0.06

Heavy Vehicle Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound NE 242nd Ave				Southbound NE 242nd Ave				Eastbound NE 28th St				Westbound NE 28th St				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	2	0	2	4	1	3	0	4	0	3	3	6	14
4:15 PM	0	0	0	0	2	0	2	4	1	1	0	2	0	3	3	6	12
4:30 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	2	0	2	3
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
5:00 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1

All Traffic Data
Services Inc.

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

Total Vehicle Summary

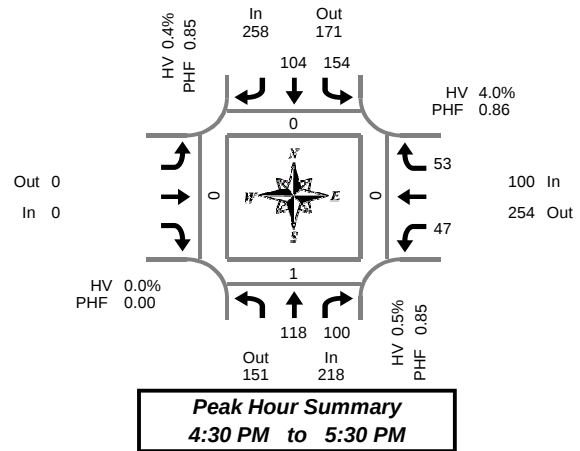


Clay Carney
(503) 833-2740

NE 267th Ave & NE 19th St

Tuesday, December 08, 2015

4:00 PM to 6:00 PM



15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound NE 267th Ave			Southbound NE 267th Ave			Eastbound NE 19th St			Westbound NE 19th St			Interval Total	Pedestrians Crosswalk			
	T	R	Bikes	L	T	Bikes			Bikes	L	R	Bikes		North	South	East	West
4:00 PM	25	26	0	28	32	0			0	8	14	0	133	0	0	0	0
4:15 PM	24	24	0	25	34	0			0	17	19	0	143	0	0	0	0
4:30 PM	36	28	0	41	19	0			0	10	19	0	153	0	0	0	0
4:45 PM	35	29	0	26	25	0			0	16	11	0	142	0	0	0	0
5:00 PM	15	22	0	43	33	0			0	6	12	0	131	0	1	0	0
5:15 PM	32	21	0	44	27	0			0	15	11	0	150	0	0	0	0
5:30 PM	21	27	0	32	25	0			0	15	16	0	136	0	0	0	0
5:45 PM	13	23	0	37	26	0			0	12	12	0	123	0	0	0	0
Total Survey	201	200	0	276	221	0			0	99	114	0	1,111	0	1	0	0

Peak Hour Summary

4:30 PM to 5:30 PM

By Approach	Northbound NE 267th Ave			Southbound NE 267th Ave			Eastbound NE 19th St			Westbound NE 19th St			Total	Pedestrians Crosswalk			
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total		North	South	East	West
Volume	218	151	369	0	258	171	429	0	0	100	254	354	576	0	1	0	0
%HV	0.5%			0.4%			0.0%			4.0%			1.0%				
PHF	0.85			0.85			0.00			0.86			0.94				

By Movement	Northbound NE 267th Ave			Southbound NE 267th Ave			Eastbound NE 19th St			Westbound NE 19th St			Total
	T	R	Total	L	T	Total			Total	L	R	Total	
Volume	118	100	218	154	104	258			0	47	53	100	576
%HV	NA	0.0%	1.0%	0.6%	0.0%	NA	0.4%	NA	0.0%	4.3%	NA	3.8%	1.0%
PHF	0.82	0.86	0.85	0.88	0.79	0.85			0.00	0.73	0.70	0.86	0.94

Rolling Hour Summary

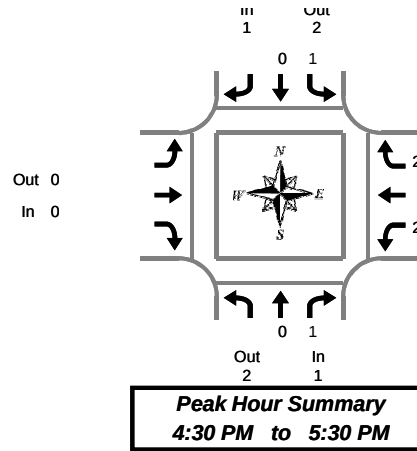
4:00 PM to 6:00 PM

Interval Start Time	Northbound NE 267th Ave			Southbound NE 267th Ave			Eastbound NE 19th St			Westbound NE 19th St			Interval Total	Pedestrians Crosswalk			
	T	R	Bikes	L	T	Bikes			Bikes	L	R	Bikes		North	South	East	West
4:00 PM	120	107	0	120	110	0			0	51	63	0	571	0	0	0	0
4:15 PM	110	103	0	135	111	0			0	49	61	0	569	0	1	0	0
4:30 PM	118	100	0	154	104	0			0	47	53	0	576	0	1	0	0
4:45 PM	103	99	0	145	110	0			0	52	50	0	559	0	1	0	0
5:00 PM	81	93	0	156	111	0			0	48	51	0	540	0	1	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



NE 267th Ave & NE 19th St

Tuesday, December 08, 2015

4:00 PM to 6:00 PM

Heavy Vehicle 15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound NE 267th Ave			Southbound NE 267th Ave			Eastbound NE 19th St			Westbound NE 19th St			Interval Total
	T	R	Total	L	T	Total			Total	L	R	Total	
4:00 PM	1	0	1	1	1	2			0	0	1	1	4
4:15 PM	0	0	0	0	2	2			0	3	3	6	8
4:30 PM	0	0	0	1	0	1			0	1	0	1	2
4:45 PM	0	0	0	0	0	0			0	1	0	1	1
5:00 PM	0	1	1	0	0	0			0	0	2	2	3
5:15 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
5:45 PM	0	0	0	0	1	1			0	0	0	0	1
Total Survey	1	1	2	2	4	6			0	5	6	11	19

Heavy Vehicle Peak Hour Summary

4:30 PM to 5:30 PM

By Approach	Northbound NE 267th Ave			Southbound NE 267th Ave			Eastbound NE 19th St			Westbound NE 19th St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	1	2	3	1	2	3	0	0	0	4	2	6	6
PHF	0.25			0.05			0.00			0.13			0.11

By Movement	Northbound NE 267th Ave			Southbound NE 267th Ave			Eastbound NE 19th St			Westbound NE 19th St			Total
	T	R	Total	L	T	Total			Total	L	R	Total	
Volume	0	1	1	1	0	1			0	2	2	4	6
PHF	0.00	0.25	0.25	0.13	0.00	0.05			0.00	0.10	0.13	0.13	0.11

Heavy Vehicle Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound NE 267th Ave			Southbound NE 267th Ave			Eastbound NE 19th St			Westbound NE 19th St			Interval Total
	T	R	Total	L	T	Total			Total	L	R	Total	
4:00 PM	1	0	1	2	3	5			0	5	4	9	15
4:15 PM	0	1	1	1	2	3			0	5	5	10	14
4:30 PM	0	1	1	1	0	1			0	2	2	4	6
4:45 PM	0	1	1	0	0	0			0	1	2	3	4
5:00 PM	0	1	1	0	1	1			0	0	2	2	4

Peak Hour Summary

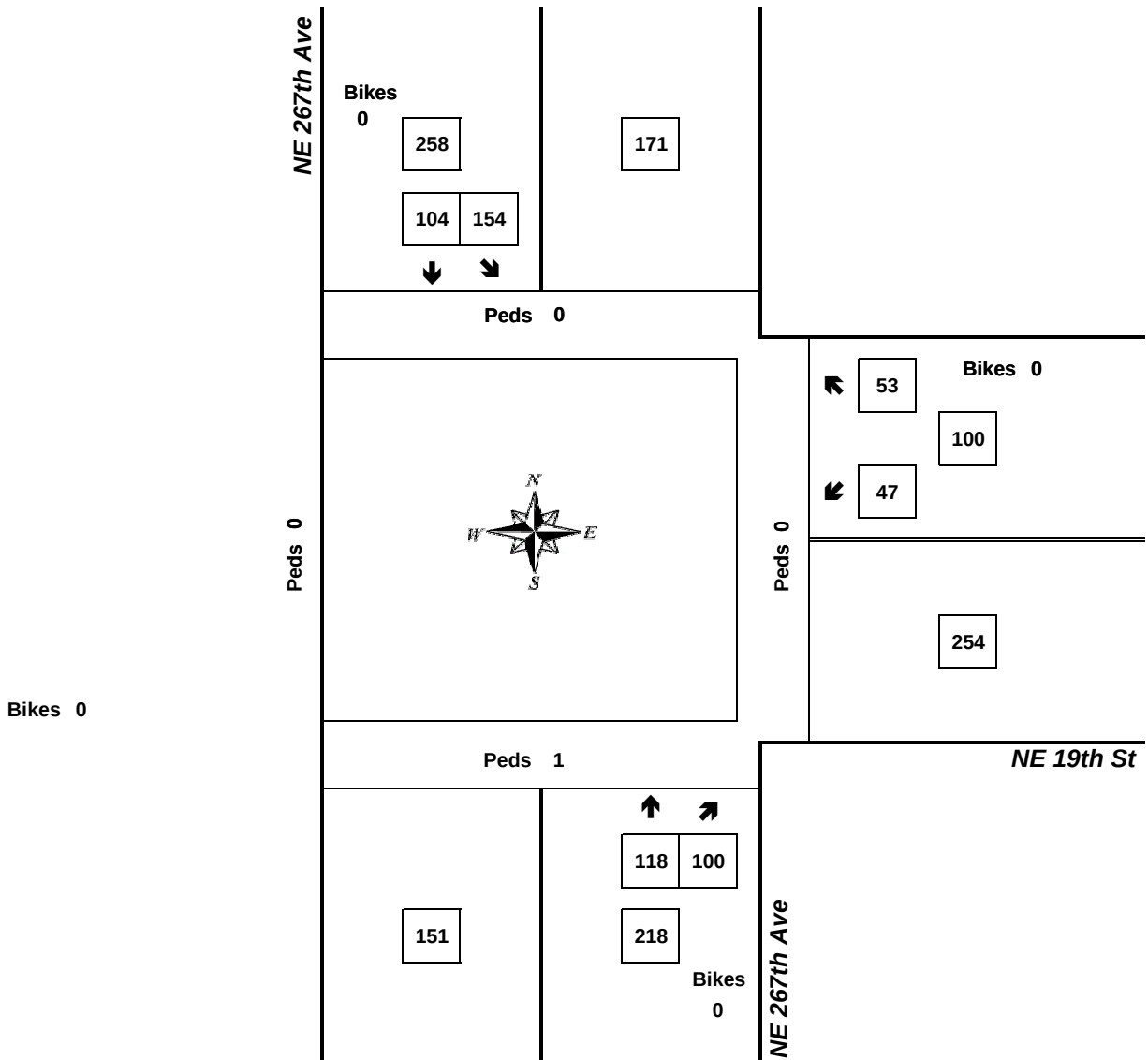


Clay Carney
(503) 833-2740

NE 267th Ave & NE 19th St

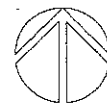
4:30 PM to 5:30 PM

Tuesday, December 08, 2015

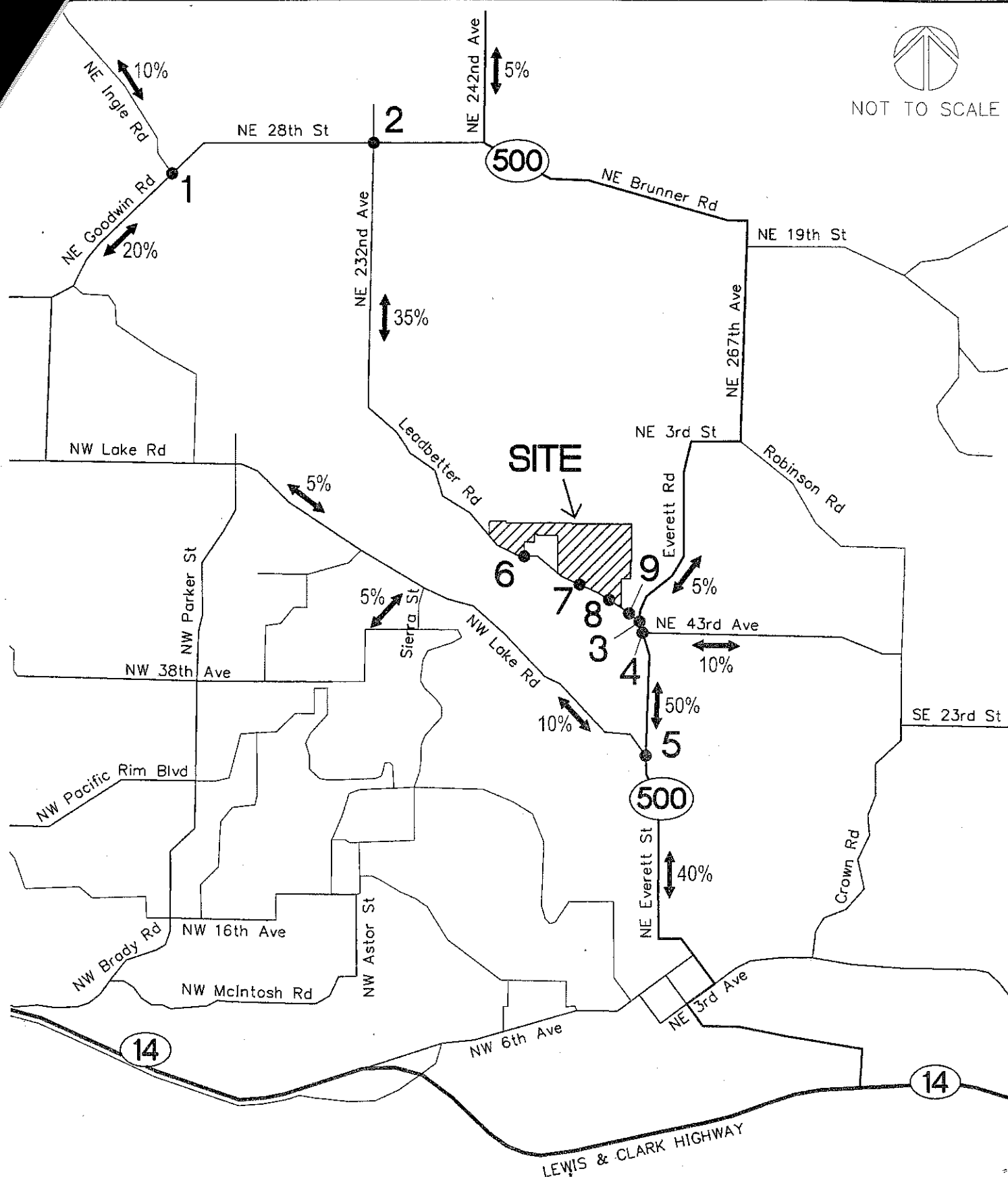


Approach	PHF	HV%	Volume
EB	0.00	0.0%	0
WB	0.86	4.0%	100
NB	0.85	0.5%	218
SB	0.85	0.4%	258
Intersection	0.94	1.0%	576

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



NOT TO SCALE



GROUP
MACKENZIE

Portland OR Vancouver WA Seattle WA
503.224.9560 360.695.7879 206.749.9993

© GROUP MACKENZIE 2010 ALL RIGHTS RESERVED

THESE DRAWINGS ARE THE PROPERTY OF GROUP MACKENZIE AND ARE NOT TO BE
USED OR REPRODUCED IN ANY MANNER, WITHOUT PRIOR WRITTEN PERMISSION

DATE: 08.03.10

DRAWN BY: DAH

CHECKED BY: BTA

JOB NO:

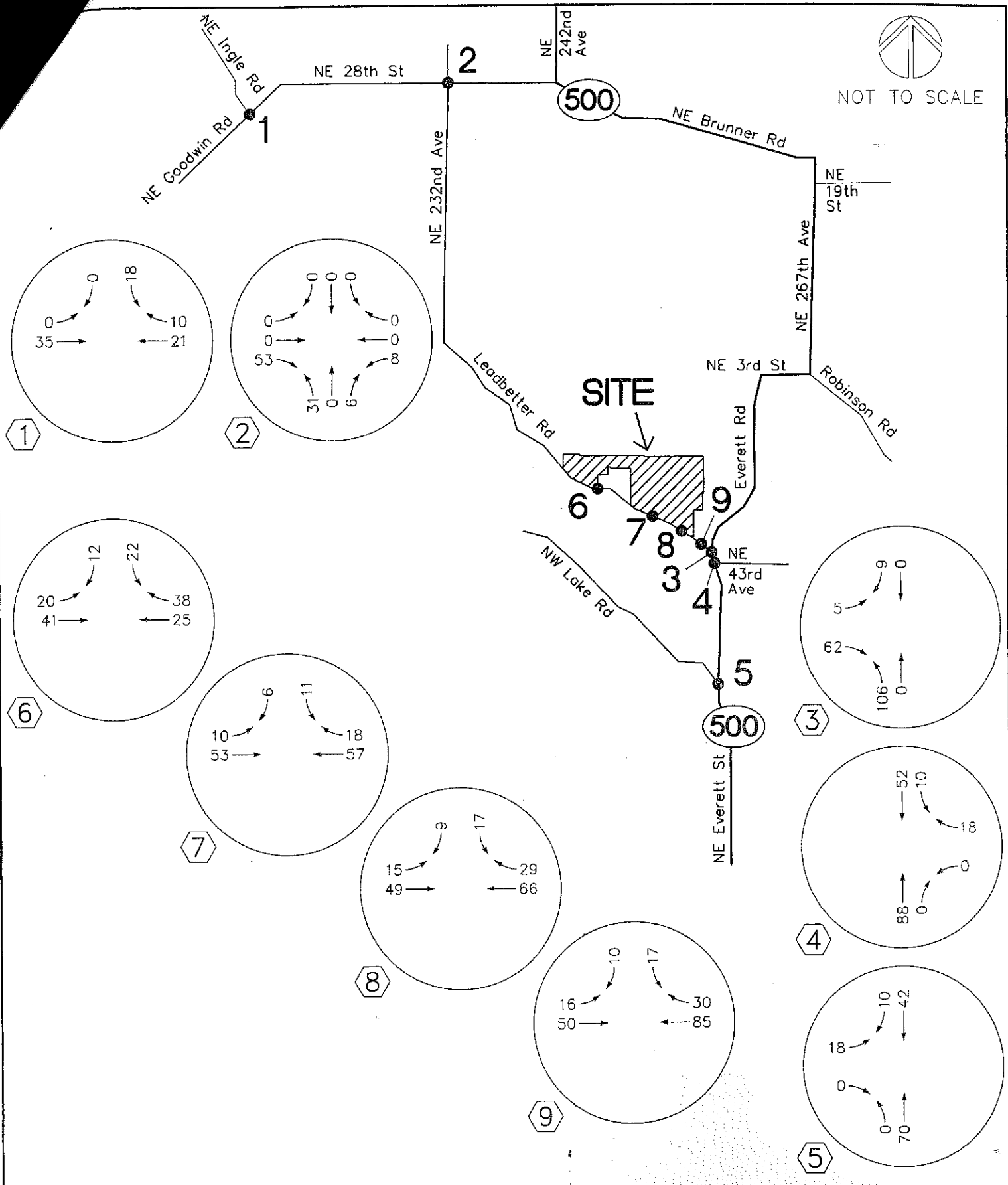
2050186.01

SITE TRIP DISTRIBUTION

CJ DENS RESIDENTIAL SUBDIVISION
CAMAS, WASHINGTON

FIGURE

8



GROUP

MACKENZIE

Portland OR Vancouver WA Seattle WA
503.224.9590 360.895.7879 206.749.9893

© GROUP MACKENZIE 2010 ALL RIGHTS RESERVED

THESE DRAWINGS ARE THE PROPERTY OF GROUP MACKENZIE AND ARE NOT TO BE USED OR REPRODUCED IN ANY MANNER, WITHOUT PRIOR WRITTEN PERMISSION

DATE: 08.03.10

DRAWN BY: DAH/KLA

CHECKED BY: BTA

JOB NO:

2050186.01

**SITE TRIP ASSIGNMENTS -
PM PEAK HOUR**

**CJ DENS RESIDENTIAL SUBDIVISION
CAMAS, WASHINGTON**

FIGURE

9B



NOTES: Trip distribution based on engineering judgement.

FIGURE

4

FILE NAME: 0560flow.dwg

PLOT DATE: 10/05/20



**CHARBONNEAU
ENGINEERING LLC**
PROJECT: 05-60

NOTES: Trip generation based on Single-Family Residential (ITE 210) trip rates.

**TRIP ASSIGNMENT
PM PEAK HOUR
DEERHAVEN SUBDIVISION**

**FIGURE
5b**

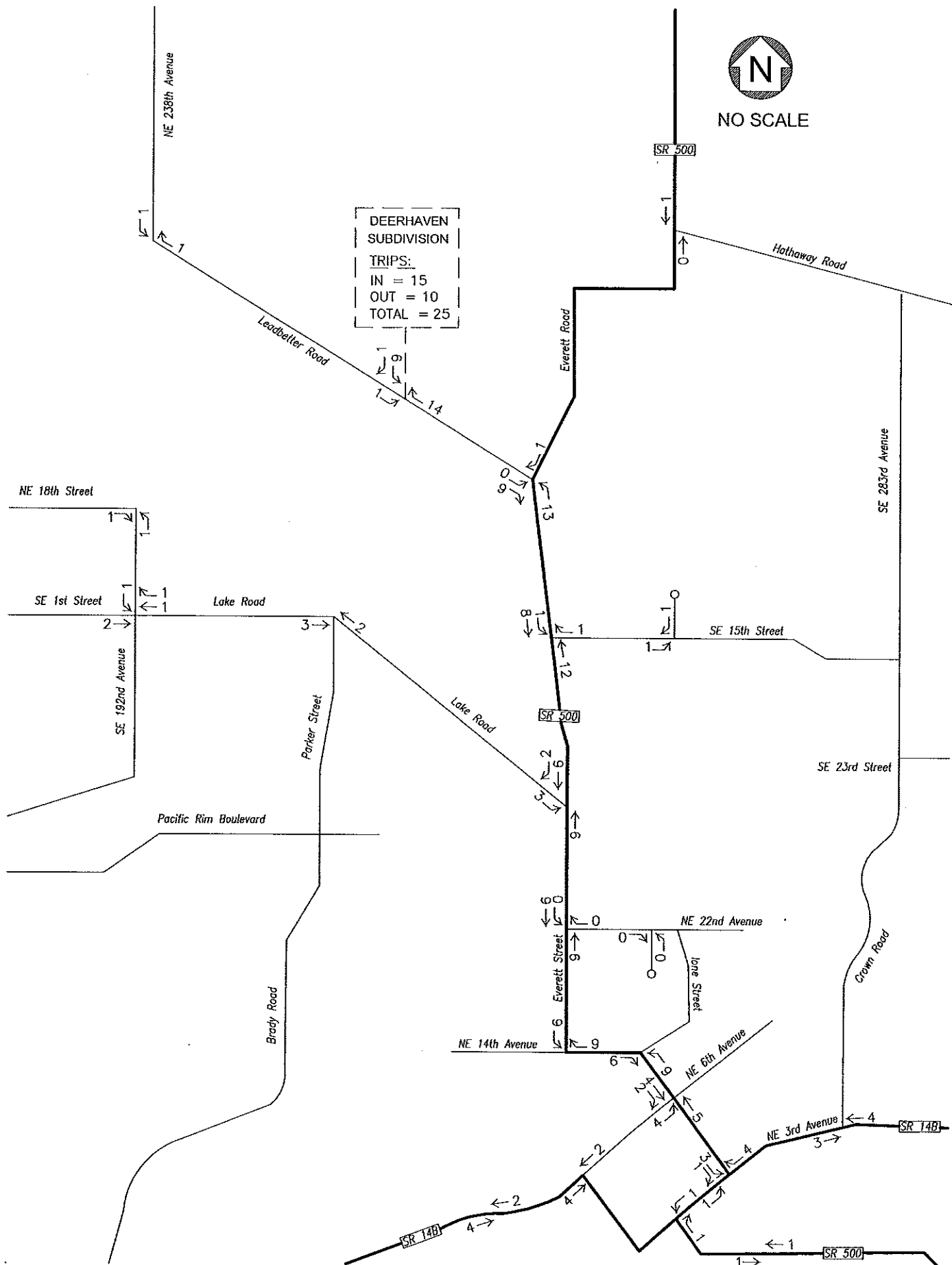


Table 4: Trip Generation Estimate – Phase 1

Land Use	ITE Code	Size	Daily	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
Single-Family Detached Housing	210	215 units	2,050	160	40	120	215	135	80

Table 5: Trip Generation Estimate – Build-out (Includes Phase 1)

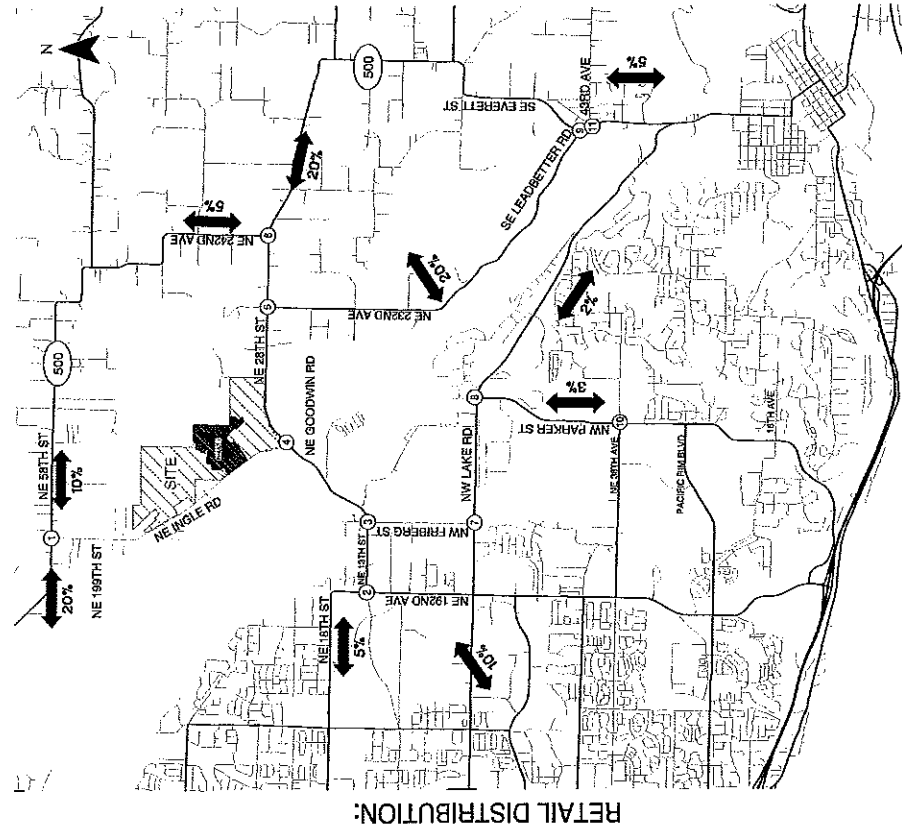
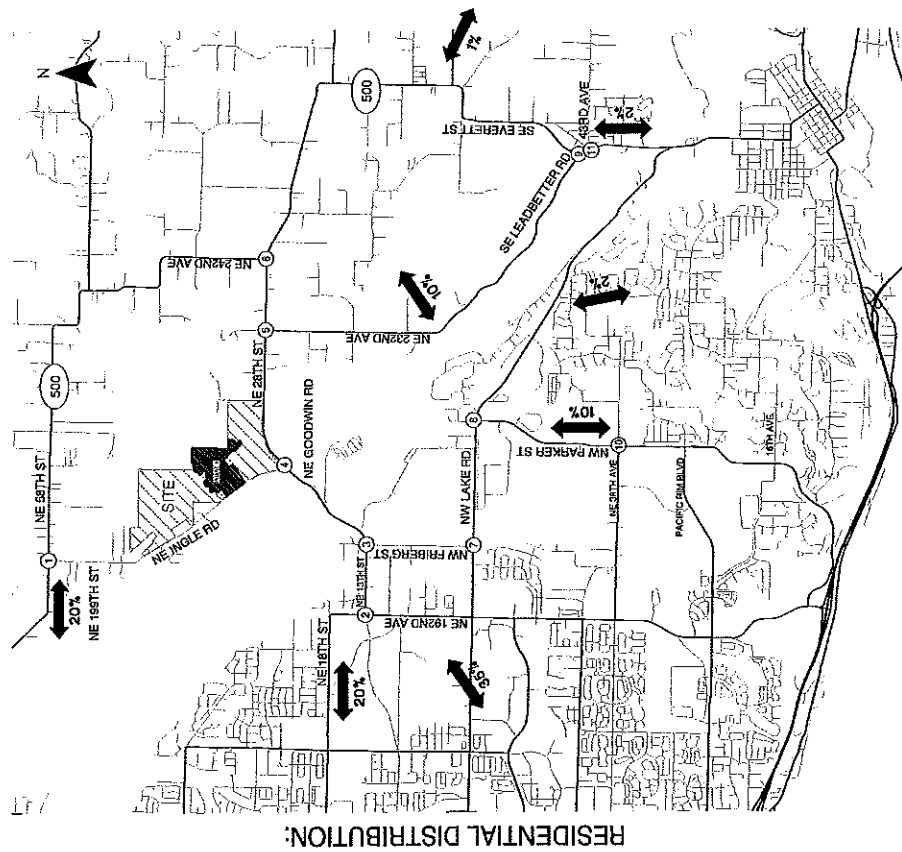
Land Use	ITE Code	Size	Daily	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
Apartment	220	536 units	3,570	275	55	220	330	215	115
Single-Family Detached Housing	210	764 units	7,270	575	145	430	765	480	285
Total Residential (1,300 units)			10,840	850	200	650	1,095	695	400
Internalization (6% Daily, 5% PM)			630	0	0	0	60	30	30
Shopping Center	820	90,000 square feet	6,340	145	90	55	560	270	290
Internalization (10% Daily, 11% PM)			630	0	0	0	60	30	30
Pass-By Trips (34%)			1,940	50	25	25	170	85	85
Total Trips			17,180	995	290	705	1,655	965	690
Less Internalization			1,260	0	0	0	120	60	60
Less Pass-by trips			1,940	50	25	25	170	85	85
Net New Trips for Full Build-out			13,980	945	265	680	1,365	820	545

Trip Distribution

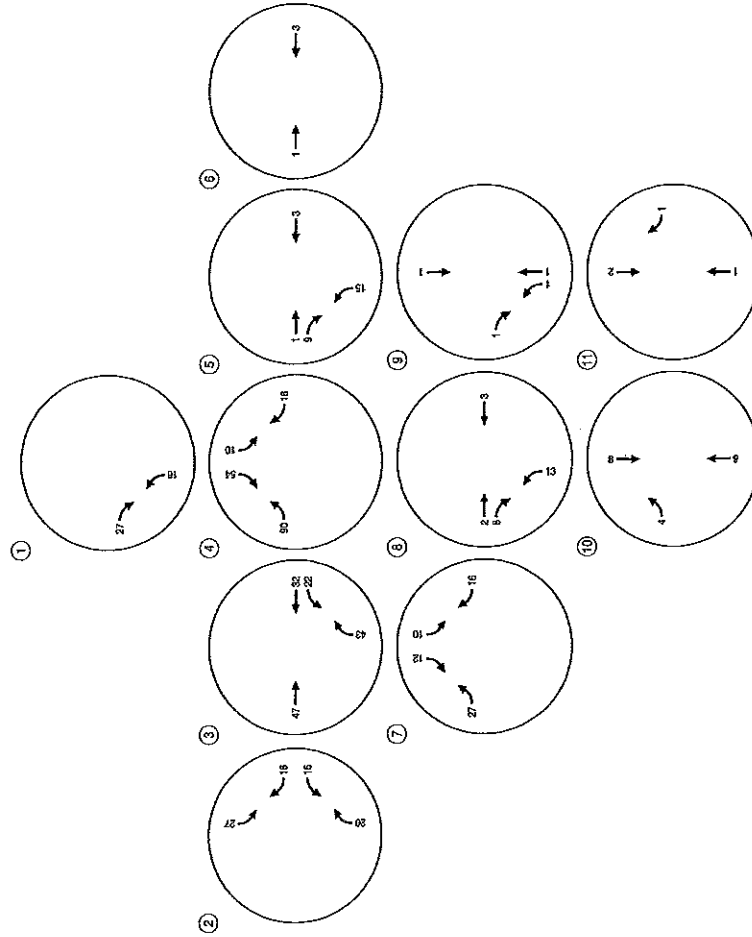
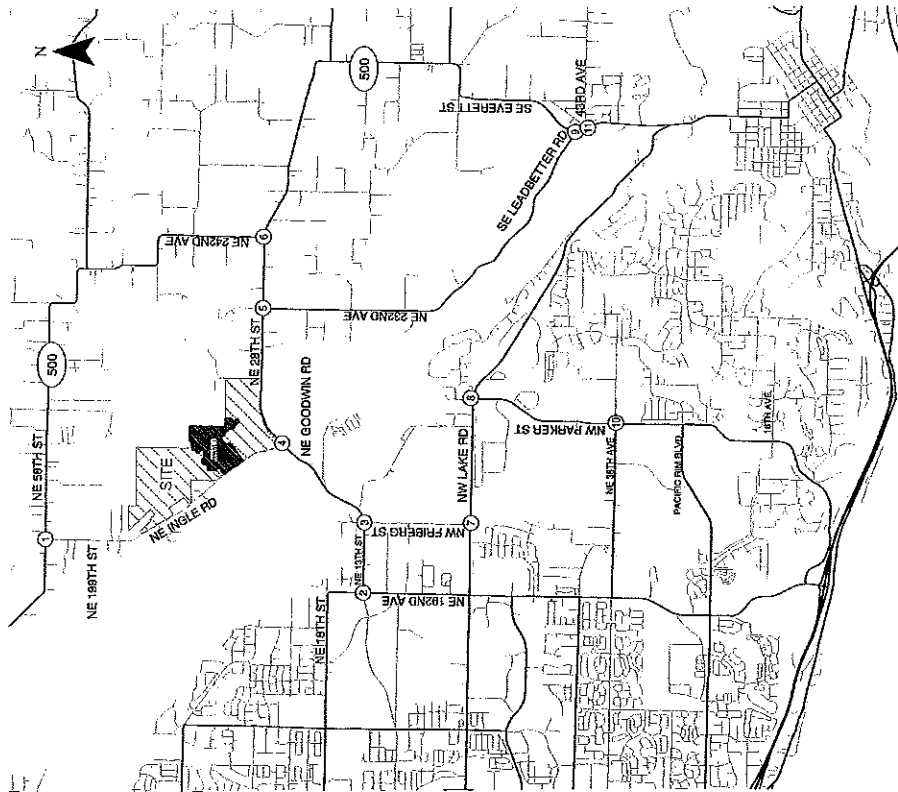
The distribution of site-generated trips onto the study area roadway system was estimated based on a review of surrounding roadway characteristics, existing uses, the 2035 travel demand model maintained by the Southwest Washington Regional Transportation Council (RTC), and review agency guidance. Trip distribution patterns were developed separately for the residential and retail trips. Figure 6 illustrates the trip distribution patterns for the residential and retail trips.

Trip Assignment

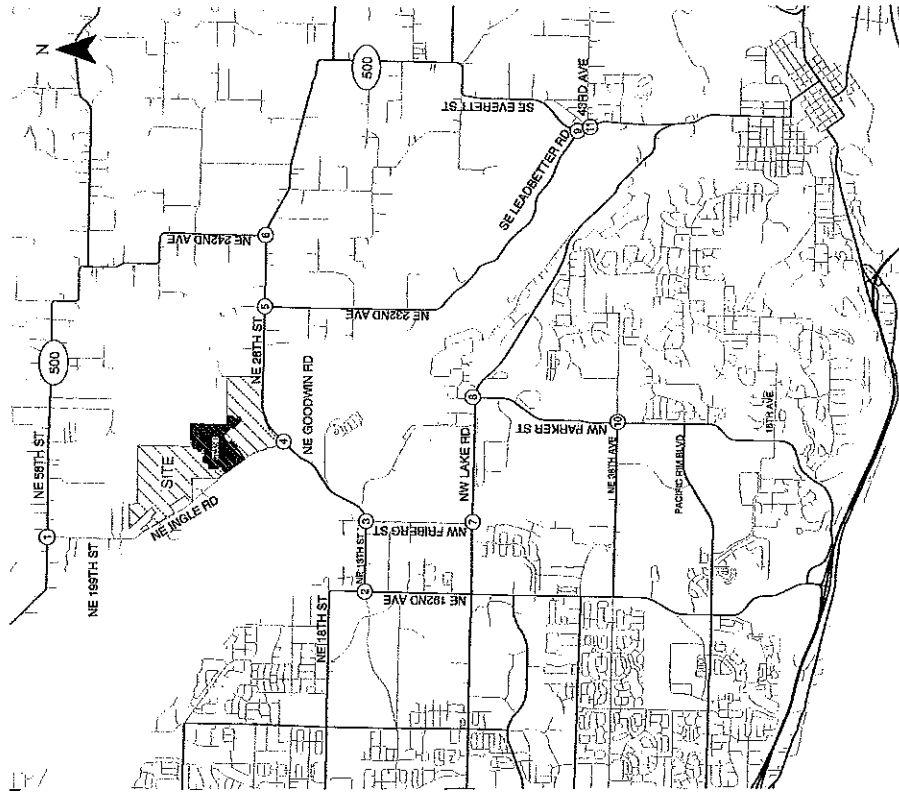
The weekday a.m. and p.m. peak hour site trips shown in Tables 4 and 5 were assigned to the roadway network based on the trip distribution patterns shown in Figure 6. Figures 7 through 10 show the assignment of site-generated trips during the weekday a.m. and p.m. peak hours for Phase 1 and at Build-out. Note that the site-generated build-out volumes shown in Figures 9 and 10 include the Phase 1 site-generated trips and thus reflect the total number of trips generated. A figure showing the assignment of pass-by trips is provided in Appendix "E".



Estimated Trip Distribution Pattern
Camas, Washington



Total Estimated Trip Assignment - Phase 1
Weekday PM Peak Hour
Camas, Washington



**Total Estimated Trip Assignment - Full Build-Out
Weekday PM Peak Hour
Camas, Washington**

Traffic Volumes

The traffic counts in this report were conducted from 7:00 to 9:00 am and 4:00 to 6:00 pm during February 2014. The AM peak hour occurred between approximately 7:15 to 8:15 am and the PM peak hour occurred between approximately 4:30 to 5:30 pm. The peak hour is the one-hour time period when traffic volumes are the highest and congestion on the adjacent streets is most likely to occur. The existing traffic volumes are shown in Figures 3a and 3b. The raw traffic count data is shown in Appendix A.

Trip Generation/Distribution

The Green Mountain Estates subdivision could generate approximately 3,779 *new* trips per day, ITE Trip Generation Manual, 9th edition. A trip is a one-directional vehicle movement. Two hundred ninety-eight new trips could occur during the AM peak hour and 397 new trips could occur during the PM peak hour. The trip generation rates are shown in Table 1.

Table 1, Site Traffic Generation

Land Use	ITE code	Trip Generation	Units *	Trips/ Day	Trips/ AM Peak	Trips/ PM Peak
Single-Family Detached Homes	210	9.52/dwell unit-Day 0.75/dwell unit-AM Peak Hour 1.00/dwell unit-PM Peak Hour	400 - 3 existing = 397 new	3,779	298 (in-74, out-224)	397 (in-250, out-147)

* credit for the 3 existing homes was accounted for in the existing traffic volumes

The directional distribution of traffic generated by the development was assigned to the study area intersections. This distribution was based on the existing traffic volumes and discussions with staff from the City of Camas. The site traffic distribution and assignment are shown in Figures 7a through 7d.

Year 2019 Traffic Volumes

The year 2019 traffic volumes at the study area intersections included in-process traffic from the Lacamas Prairie Estates PUD development. The Lacamas Prairie Estates PUD is a 176-lot development located at the NE 25th Street/NE 187th Avenue intersection in Clark County. The in-process traffic is shown in Figures 5a and 5b and was included to provide an analysis for build-out of the Green Mountain Estates subdivision, forecast year 2019 traffic conditions.

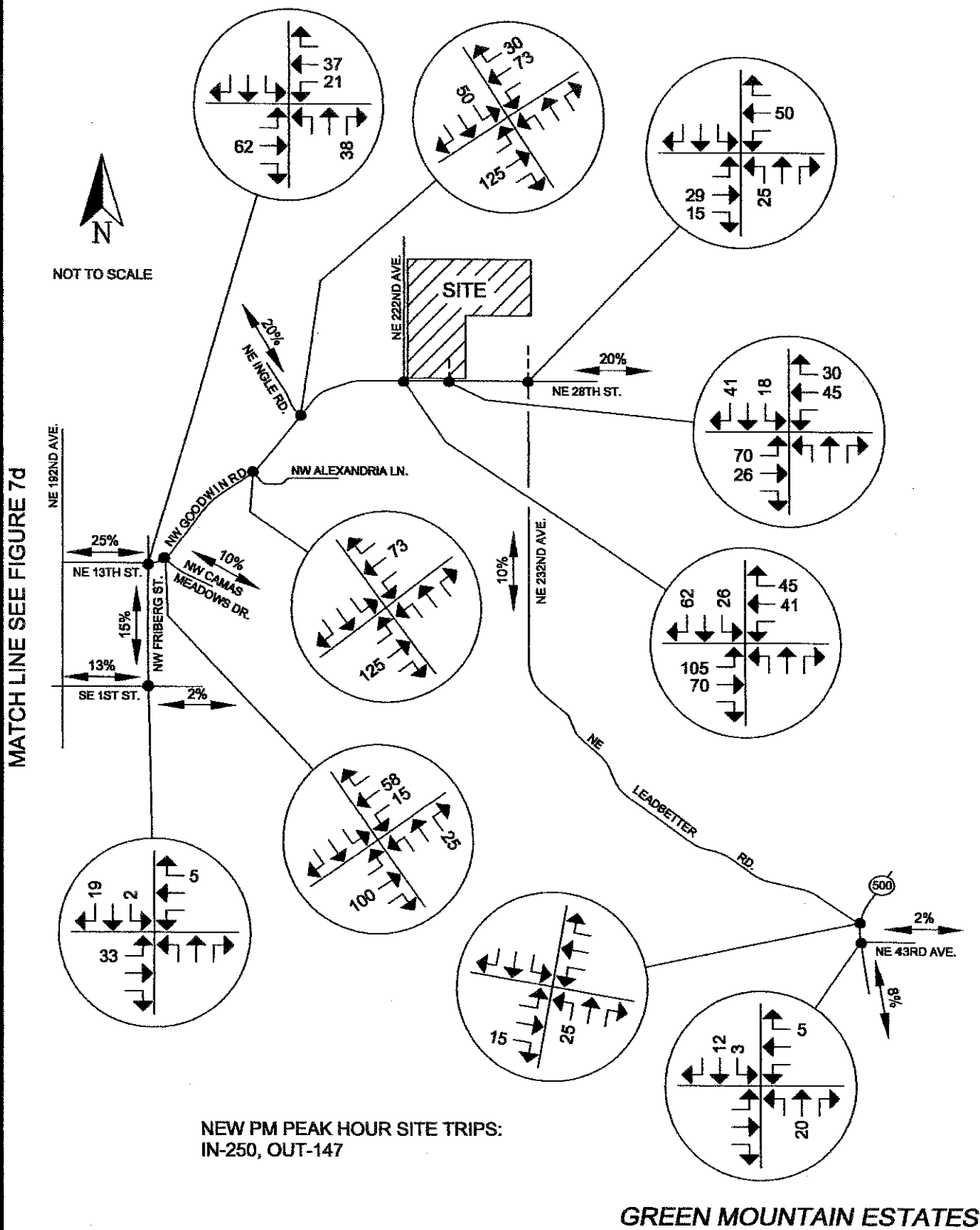


FIGURE 7c
SITE TRAFFIC DISTRIBUTION/
ASSIGNMENT, PM PEAK HOUR

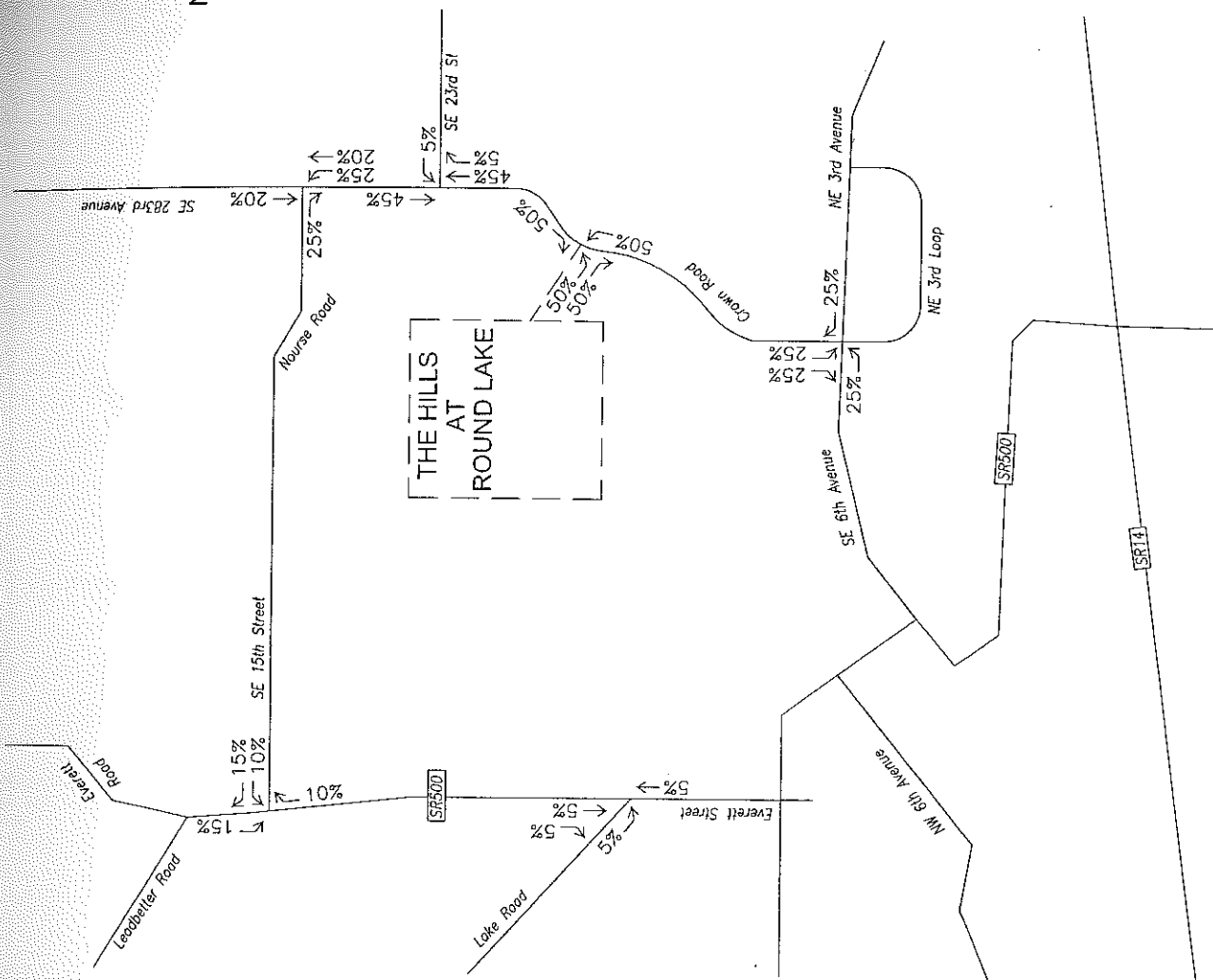
KELLY ENGINEERING

316 E. Fourth Plain, A-2, Vancouver, WA 98663

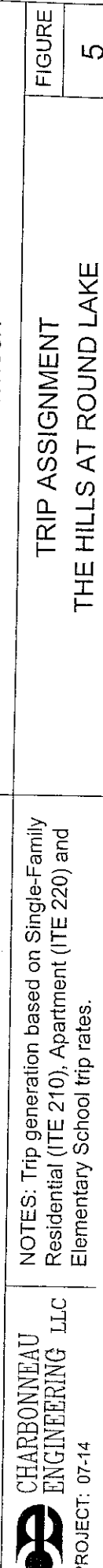
Phone: 360-433-7530



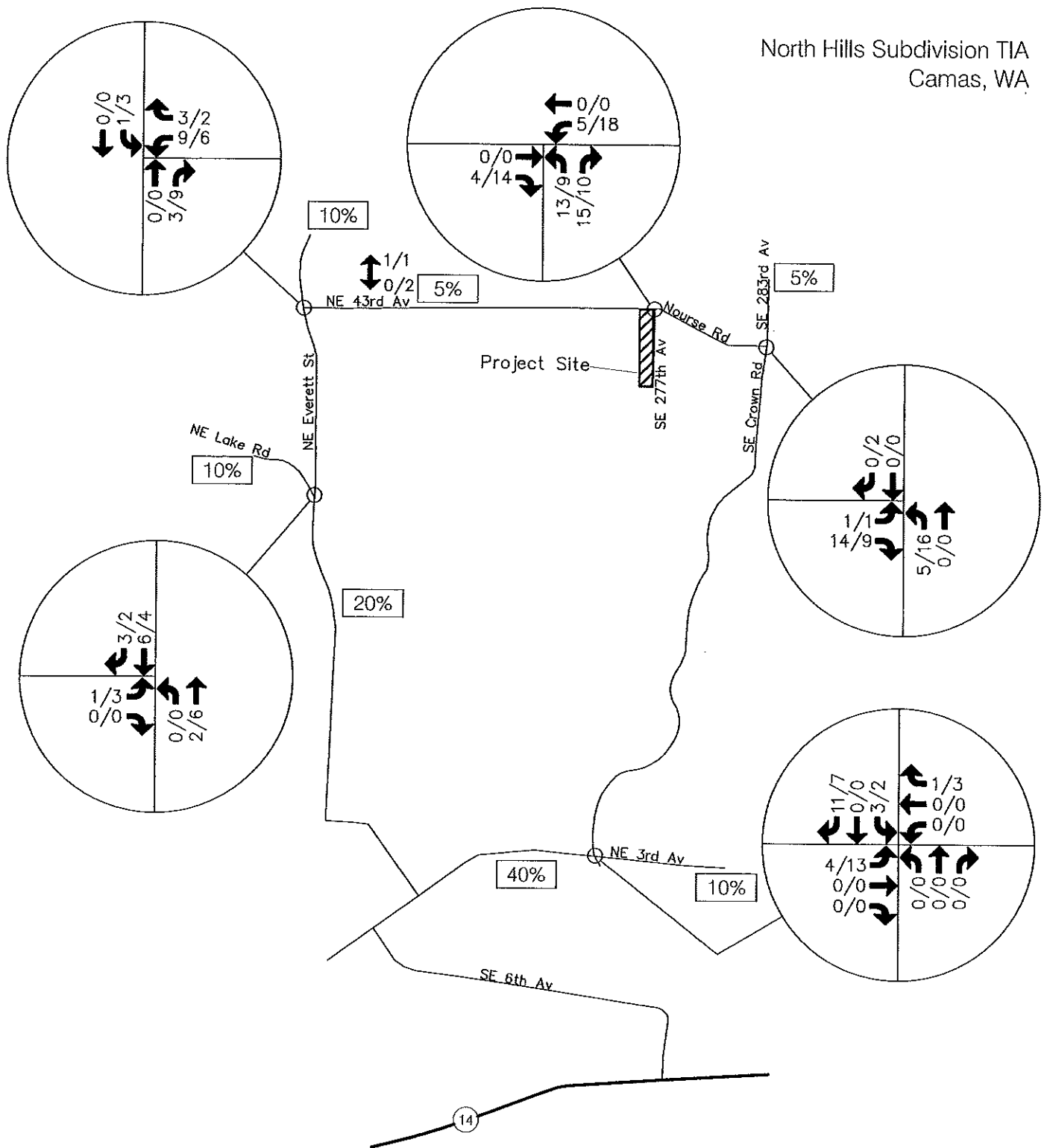
NO SCALE



AM AND PM PEAK HOUR



North Hills Subdivision TIA
Camas, WA



LEGEND

100/128

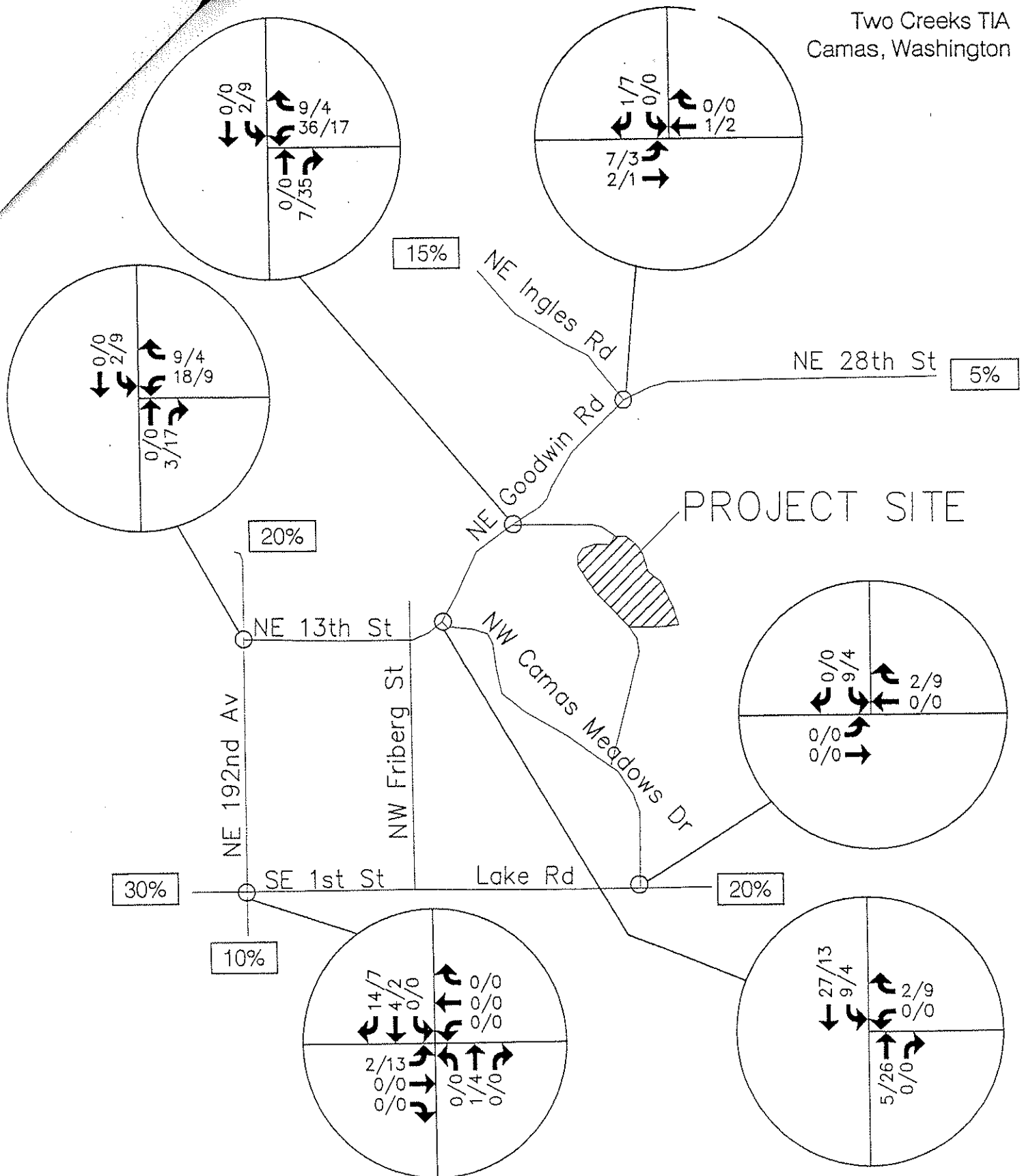
AM/PM Peak Hour
Traffic Volumes

8%

Inbound Peak Hour Trip Distribution



FIGURE 6
Trip Distribution and Assignment for
Study Area Intersections



LEGEND

5/10

A.M. and P.M. Peak Hour
Traffic Volumes

40%

A.M. and P.M. Peak Hour Trip Distribution

NOT TO SCALE

FIGURE 6
Trip Distribution and Assignment

Alternative 23
(123 UNITS)

ALT. #1 WAS 112 UNITS

304031.0Figures.dwg

Figure 4 provides a summary of the existing turning-movement counts, which are rounded to the nearest five vehicles per hour for the weekday a.m. and p.m. peak hours, respectively. *Appendix "B" contains the traffic count worksheets used in this study.*

As shown in Figure 4, the study intersections operate acceptably during both study periods. *Appendix "C" contains the existing conditions traffic operations worksheets.*

DEVELOPMENT TRIP GENERATION

As discussed above, the proposed development includes 179 single family units, which is a reduction of 25 units compared to the plan approved in 2006. Trip generation estimates for the currently proposed development were generated based on information provided in the standard reference manual *Trip Generation, 9th Edition* published by the Institute of Transportation Engineers (ITE – Reference 3). In the 2006 TIA, rates from the 7th Edition of the *Trip Generation* manual were utilized, which are slightly higher than those from the 9th Edition. Table 1 compares the trip generation from the current site plan with that previously proposed.

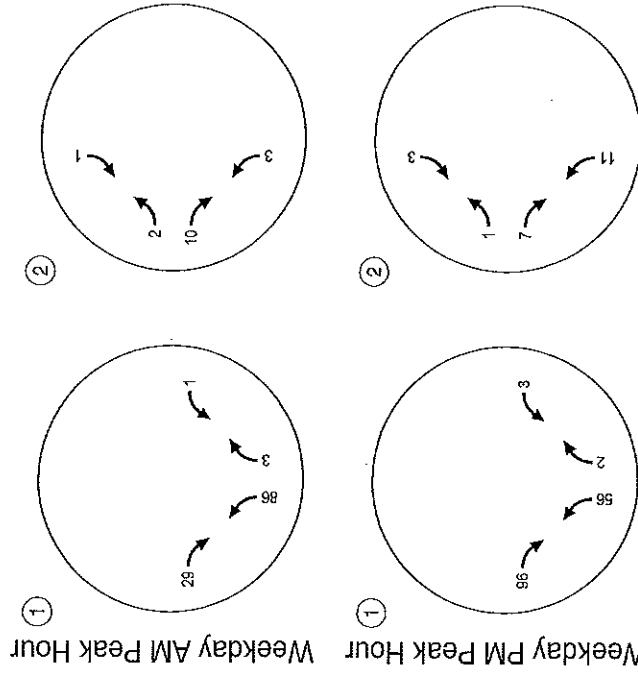
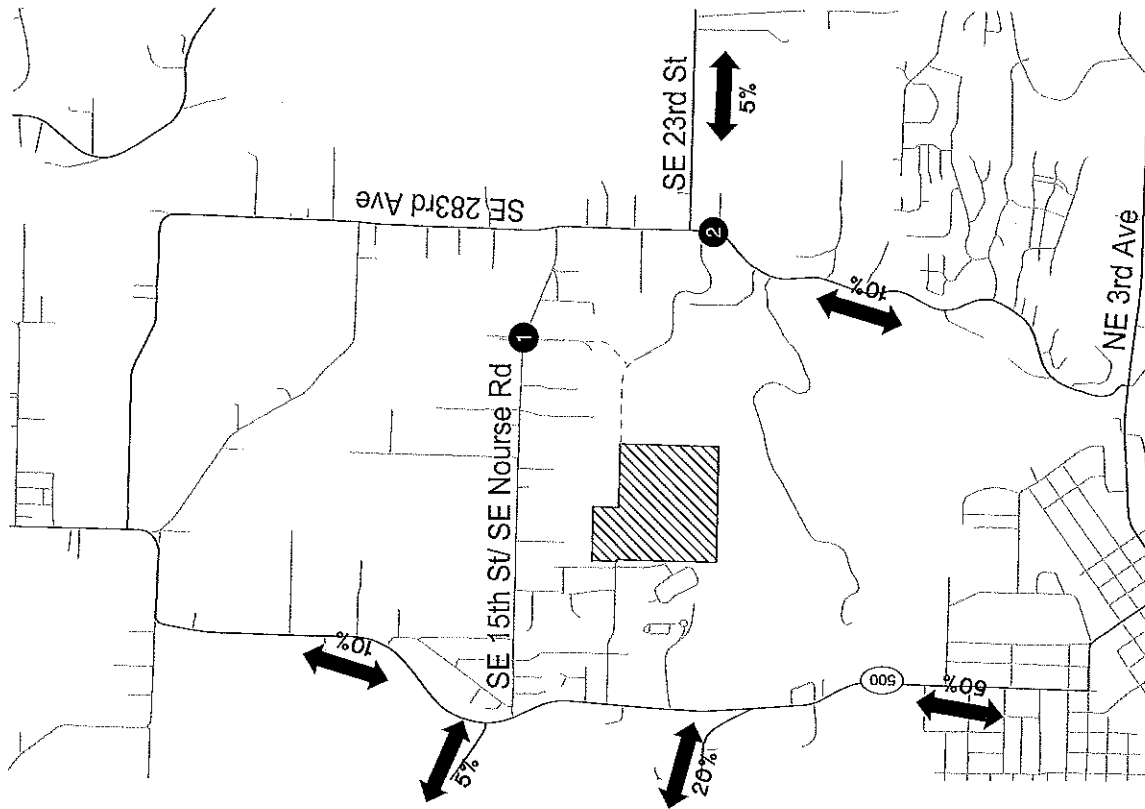
Table 1: Trip Generation Comparison

Scenario	ITE Code	Size	Daily	Weekday AM Peak Hour			Weekday PM Peak Hour		
				In	Out	Total	In	Out	Total
Current Site Plan	210	179 units	1,704	34	101	135	113	66	179
2006 TIA	210	204 units	2,004	38	114	152	128	75	203
Difference	-	-25 units	-300	-4	-13	-17	-15	-9	-24

As seen in the table, the current proposal results in 17 fewer trips during the a.m. peak hour and 24 fewer trips during the p.m. peak hour.

Trip Distribution

The distribution of site-generated trips onto the study area roadway system was estimated using the trip distribution pattern utilized in the 2006 TIA, accounting for the change in trip generation and new proposed access routes. The weekday a.m. and p.m. peak hour site trips shown in Table 1 were assigned to the roadway network based on the trip distribution pattern. Figure 5 shows the assignment of site-generated trips during the weekday a.m. and p.m. peak hours.



Trip Distribution and Assignment
Camas, Washington

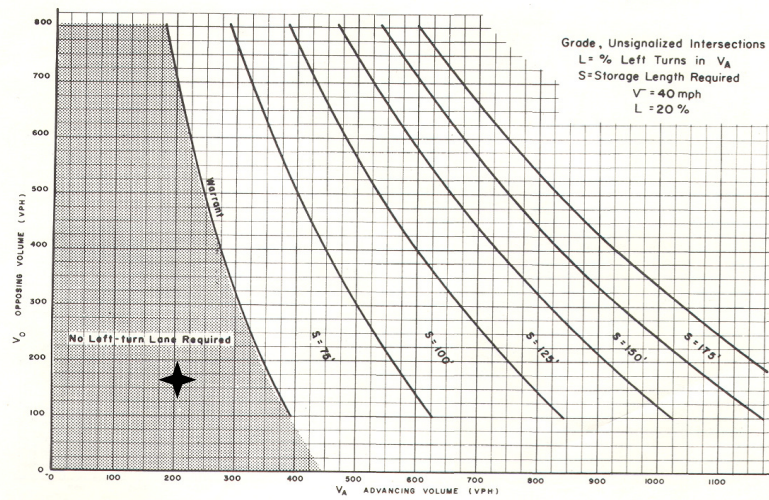


Figure 5. Warrant for left-turn storage lanes on two-lane highways.

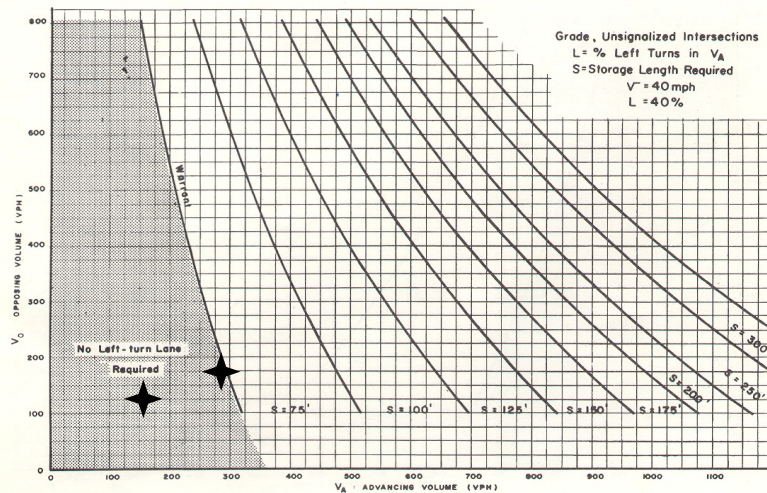


Figure 7. Warrant for left-turn storage lanes on two-lane highways.

Storage requirements for critical left-turn movements at unsignalized intersections on 2-lane roads.

Intersection	Mov't	Analysis Period	Speed V (mph)	Left Turns in Advancing Volume (vph)	Advancing Volume V_A (vph)	Opposing Volume V_O (vph)	% Left Turns in Advancing Volume L	Storage Req'd (ft)
NE 28th Street and NE 232nd Ave.	WB LT	2018 Background - AM Peak	50	12	307	331	4% → 5%	None
		2018 Total - AM Peak		151	446	334	33% → 30%	100'
		2018 Bkgd. - Mid. Afternoon Peak		7	183	378	4% → 5%	None
		2018 Total - Mid. Afternoon Peak		78	254	379	31% → 30%	75'
		2018 Bkgd. - PM Peak		14	256	585	5%	None
		2018 Total - PM Peak		55	297	586	19% → 20%	75'
Non-Bus Access and NE 232nd Ave.	SB LT	2018 Total - AM Peak	45	127	286	165	44% → 40%	None
		2018 Total - Mid. Afternoon Peak		57	158	118	36% → 40%	None
		2018 Total - PM Peak		40	209	158	19% → 20%	None

Source: Highway Research Record #211, Harmelink, M. D.

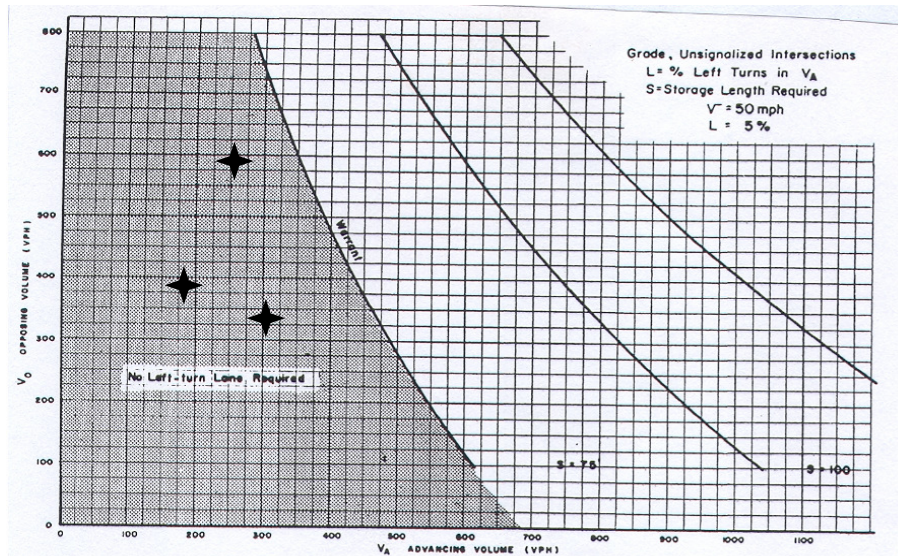


Figure 8. Warrant for left-turn storage lanes on two-lane highways.

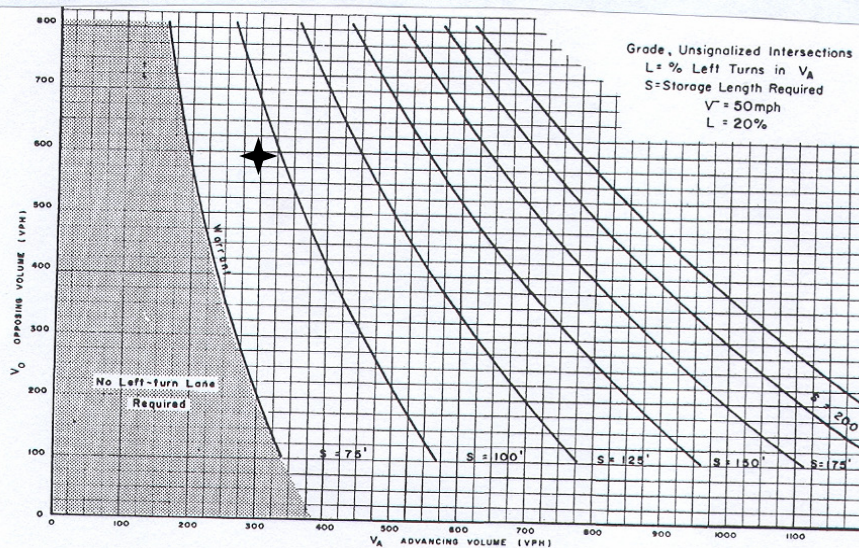


Figure 11. Warrant for left-turn storage lanes on two-lane highways.

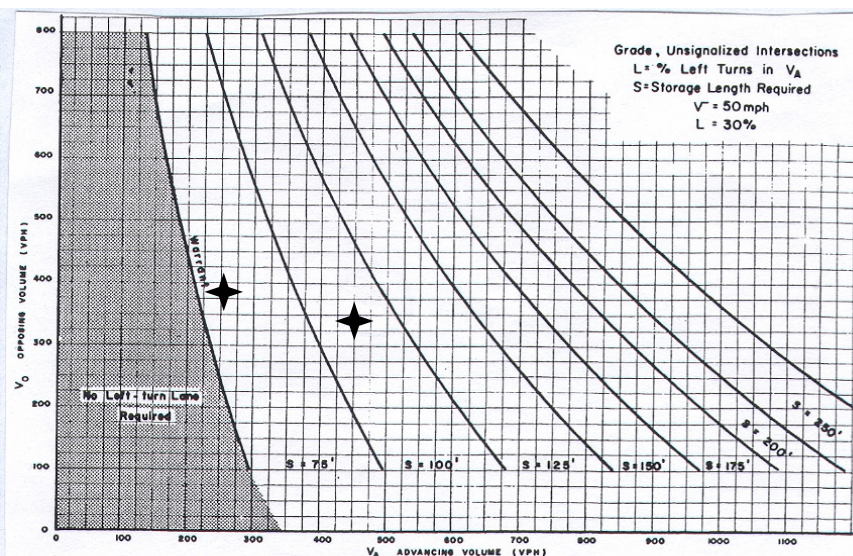
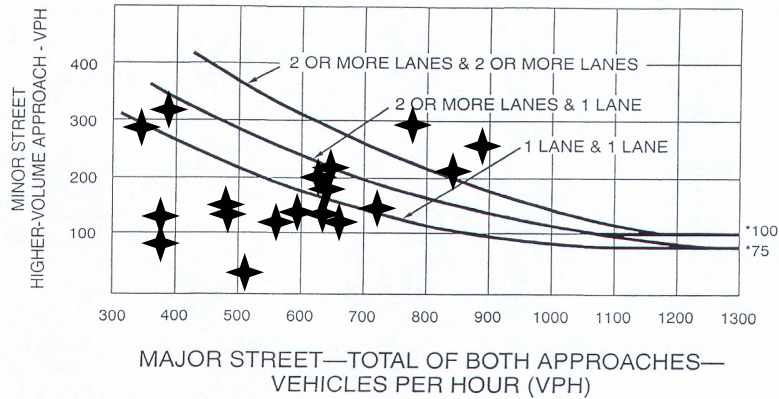


Figure 12. Warrant for left-turn storage lanes on two-lane highways.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Peak hour volume warrant for signalization data.

Intersection	Analysis Period	Major Street Speed (mph)	Major Street		Minor Street High Volume Approach		Signal Warranted?
			Volume (vph)	Lanes (#)	Volume (vph)	Lanes (#)	
NE 28th Street and NE 232nd Avenue	2018 Extg. AM Peak	50	376	1	73	1	No
	2018 Bkgd. - AM Peak		638		171		Yes
	2018 Total - AM Peak		780		286		Yes
	2018 Bkgd. - Mid. Afternoon Peak		561		110		No
	2018 Total - Mid. Afternoon Peak		633		197		Yes
	2018 Extg. PM Peak		511		35		No
	2018 Bkgd. - PM Peak		841		207		Yes
	2018 Total - PM Peak		883		251		Yes
NE 9th Street and NE 232nd Avenue	2018 Total - AM Peak	45	241	1	2	1	No
	2018 Total - Mid. Afternoon Peak		159		0		No
	2018 Total - PM Peak		225		2		No
NE 28th Street/ Dresser Road and NE 242nd Avenue	2018 Bkgd. - AM Peak	50	484	1	121	1	No
	2018 Total - AM Peak		646		211		Yes
	2018 Total - Mid. Afternoon Peak		596		132		No
	2018 Bkgd. - PM Peak		662		115		No
	2018 Total - PM Peak		720		141		Yes
NE 19th Street and NE 267th Avenue	2018 Bkgd. - AM Peak	50	343	1	279	1	No
	2018 Total - AM Peak		388		316		Yes
	2018 Total - Mid. Afternoon Peak		481		145		No
	2018 Total - PM Peak		617		135		No

Source: *Manual on Uniform Traffic Control Devices (MUTCD)*, 2003 Edition.

Lanes, Volumes, Timings
3: NE 232nd Avenue & NE 28th Street

2015 Existing Traffic, AM Peak Hour

5/15/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	0	90	45	8	233	0	68	0	5	0	0	4
Future Volume (vph)	0	90	45	8	233	0	68	0	5	0	0	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	150		150	150		150	150		150
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.955						0.992			0.865	
Flt Protected					0.998			0.955				
Satd. Flow (prot)	0	1762	0	0	1877	0	0	1731	0	0	1644	0
Flt Permitted					0.998			0.955				
Satd. Flow (perm)	0	1762	0	0	1877	0	0	1731	0	0	1644	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		173			726			420			142	
Travel Time (s)		3.9			16.5			9.5			3.2	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	4%	4%	4%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	148	0	0	265	0	0	80	0	0	4	0
Sign Control		Free			Free			Stop			Yield	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 36.1% ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	2.1											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	90	45	8	233	0	68	0	5	0	0	4
Future Vol, veh/h	0	90	45	8	233	0	68	0	5	0	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Yield	Yield	Yield
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	3	3	3	1	1	1	4	4	4	0	0	0
Mvmt Flow	0	99	49	9	256	0	75	0	5	0	0	4

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	256	0	0	148	0	0	398	398	124
Stage 1	-	-	-	-	-	-	124	124	-
Stage 2	-	-	-	-	-	-	274	274	-
Critical Hdwy	4.13	-	-	4.11	-	-	7.14	6.54	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-
Follow-up Hdwy	2.227	-	-	2.209	-	-	3.536	4.036	3.336
Pot Cap-1 Maneuver	1303	-	-	1440	-	-	559	537	921
Stage 1	-	-	-	-	-	-	875	789	-
Stage 2	-	-	-	-	-	-	728	680	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1303	-	-	1440	-	-	556	533	921
Mov Cap-2 Maneuver	-	-	-	-	-	-	556	533	-
Stage 1	-	-	-	-	-	-	875	789	-
Stage 2	-	-	-	-	-	-	723	675	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	12.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	572	1303	-	-	1440	-	-
HCM Lane V/C Ratio	0.14	-	-	-	0.006	-	-
HCM Control Delay (s)	12.3	0	-	-	7.5	0	-
HCM Lane LOS	B	A	-	-	A	A	-
HCM 95th %tile Q(veh)	0.5	0	-	-	0	-	-

Lanes, Volumes, Timings
6: NE 232nd Avenue & NE 9th Street

2015 Existing Traffic, AM Peak Hour

5/15/2016

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	2	0	56	0	2	58
Future Volume (vph)	2	0	56	0	2	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected	0.950					0.998
Satd. Flow (prot)	1805	0	1863	0	0	1841
Flt Permitted	0.950					0.998
Satd. Flow (perm)	1805	0	1863	0	0	1841
Link Speed (mph)	30		30			30
Link Distance (ft)	120		210			420
Travel Time (s)	2.7		4.8			9.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	2%	3%	3%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2	0	61	0	0	65
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	14.7%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	2	0	56	0	2	58
Future Vol, veh/h	2	0	56	0	2	58
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	92	92	92	92	92	92
Heavy Vehicles, %	0	0	2	2	3	3
Mvmt Flow	2	0	61	0	2	63
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	128	61	0	0	61	0
Stage 1	61	-	-	-	-	-
Stage 2	67	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.13	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.227	-
Pot Cap-1 Maneuver	871	1010	-	-	1536	-
Stage 1	967	-	-	-	-	-
Stage 2	961	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	870	1010	-	-	1536	-
Mov Cap-2 Maneuver	870	-	-	-	-	-
Stage 1	967	-	-	-	-	-
Stage 2	960	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.1	0		0.2		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	870	1536	-	
HCM Lane V/C Ratio	-	-	0.002	0.001	-	
HCM Control Delay (s)	-	-	9.1	7.3	0	
HCM Lane LOS	-	-	A	A	A	
HCM 95th %tile Q(veh)	-	-	0	0	-	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	77	0	0	195	53	0	0	0	60	0	42
Future Volume (vph)	15	77	0	0	195	53	0	0	0	60	0	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.971						0.944	
Flt Protected		0.992									0.972	
Satd. Flow (prot)	0	1761	0	0	1809	0	0	1900	0	0	1614	0
Flt Permitted		0.992									0.972	
Satd. Flow (perm)	0	1761	0	0	1809	0	0	1900	0	0	1614	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		726			1294			158			162	
Travel Time (s)		16.5			29.4			3.6			3.7	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	7%	7%	7%	2%	2%	2%	0%	0%	0%	8%	8%	8%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	111	0	0	299	0	0	0	0	0	123	0
Sign Control		Free			Free			Yield			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 29.4%

ICU Level of Service A

Analysis Period (min) 15

Intersection

Int Delay, s/veh 3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	15	77	0	0	195	53	0	0	0	60	0	42
Future Vol, veh/h	15	77	0	0	195	53	0	0	0	60	0	42
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Yield	Yield	Yield	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	7	7	7	2	2	2	0	0	0	8	8	8
Mvmt Flow	18	93	0	0	235	64	0	0	0	72	0	51

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	299	0	0	93	0	0	396	396	267
Stage 1	-	-	-	-	-	-	267	267	-
Stage 2	-	-	-	-	-	-	129	129	-
Critical Hdwy	4.17	-	-	4.12	-	-	7.18	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	6.18	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.18	5.58	-
Follow-up Hdwy	2.263	-	-	2.218	-	-	3.572	4.072	3.372
Pot Cap-1 Maneuver	1234	-	-	1501	-	-	553	532	757
Stage 1	-	-	-	-	-	-	725	677	-
Stage 2	-	-	-	-	-	-	860	778	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1234	-	-	1501	-	-	547	524	757
Mov Cap-2 Maneuver	-	-	-	-	-	-	547	524	-
Stage 1	-	-	-	-	-	-	714	677	-
Stage 2	-	-	-	-	-	-	847	766	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	12.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	1234	-	-	1501	-	-	618
HCM Lane V/C Ratio	0.015	-	-	-	-	-	0.199
HCM Control Delay (s)	8	0	-	0	-	-	12.3
HCM Lane LOS	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	0	-	-	0.7

Lanes, Volumes, Timings
14: NE 267th Avenue & NE 19th Street

2015 Existing Traffic, AM Peak Hour

5/15/2016

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	137	137	95	47	42	100
Future Volume (vph)	137	137	95	47	42	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.932		0.955			
Flt Protected	0.976					0.985
Satd. Flow (prot)	1662	0	1696	0	0	1766
Flt Permitted	0.976					0.985
Satd. Flow (perm)	1662	0	1696	0	0	1766
Link Speed (mph)	30		30			30
Link Distance (ft)	300		343			240
Travel Time (s)	6.8		7.8			5.5
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Heavy Vehicles (%)	4%	4%	7%	7%	6%	6%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	376	0	194	0	0	195
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 41.4% ICU Level of Service A

Analysis Period (min) 15

Intersection						
Int Delay, s/veh	8.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	137	137	95	47	42	100
Future Vol, veh/h	137	137	95	47	42	100
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	73	73	73	73	73	73
Heavy Vehicles, %	4	4	7	7	6	6
Mvmt Flow	188	188	130	64	58	137
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	414	162	0	0	195	0
Stage 1	162	-	-	-	-	-
Stage 2	252	-	-	-	-	-
Critical Hdwy	6.44	6.24	-	-	4.16	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	-	-	2.254	-
Pot Cap-1 Maneuver	591	878	-	-	1354	-
Stage 1	862	-	-	-	-	-
Stage 2	785	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	564	878	-	-	1354	-
Mov Cap-2 Maneuver	564	-	-	-	-	-
Stage 1	862	-	-	-	-	-
Stage 2	749	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	16.4	0		2.3		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 687	1354	-		
HCM Lane V/C Ratio	-	- 0.546	0.042	-		
HCM Control Delay (s)	-	- 16.4	7.8	0		
HCM Lane LOS	-	- C	A	A		
HCM 95th %tile Q(veh)	-	- 3.3	0.1	-		

Lanes, Volumes, Timings
3: NE 232nd Avenue & NE 28th Street

2015 Existing Traffic, Mid-Afternoon Pk

5/15/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	220	33	5	138	0	41	1	7	1	0	3
Future Volume (vph)	3	220	33	5	138	0	41	1	7	1	0	3
Satd. Flow (prot)	0	1794	0	0	1823	0	0	1721	0	0	1350	0
Flt Permitted		0.999			0.998			0.960			0.988	
Satd. Flow (perm)	0	1794	0	0	1823	0	0	1721	0	0	1350	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	25%	25%	25%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	297	0	0	166	0	0	57	0	0	4	0
Sign Control		Free			Free			Stop			Yield	

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 29.0%

ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	3	220	33	5	138	0	41	1	7	1	0	3
Future Vol, veh/h	3	220	33	5	138	0	41	1	7	1	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Yield	Yield	Yield
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	25	25	25
Mvmt Flow	3	256	38	6	160	0	48	1	8	1	0	3
Major/Minor	Major1			Major2			Minor1					
Conflicting Flow All	160	0	0	294	0	0	454	454	275			
Stage 1	-	-	-	-	-	-	282	282	-			
Stage 2	-	-	-	-	-	-	172	172	-			
Critical Hdwy	4.14	-	-	4.14	-	-	7.14	6.54	6.24			
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-			
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-			
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.536	4.036	3.336			
Pot Cap-1 Maneuver	1407	-	-	1256	-	-	513	499	759			
Stage 1	-	-	-	-	-	-	721	674	-			
Stage 2	-	-	-	-	-	-	825	753	-			
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1407	-	-	1256	-	-	510	495	759			
Mov Cap-2 Maneuver	-	-	-	-	-	-	510	495	-			
Stage 1	-	-	-	-	-	-	719	672	-			
Stage 2	-	-	-	-	-	-	821	749	-			
Approach	EB			WB			NB					
HCM Control Delay, s	0.1			0.3			12.5					
HCM LOS							B					
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR					
Capacity (veh/h)	535	1407	-	-	1256	-	-					
HCM Lane V/C Ratio	0.106	0.002	-	-	0.005	-	-					
HCM Control Delay (s)	12.5	7.6	0	-	7.9	0	-					
HCM Lane LOS	B	A	A	-	A	A	-					
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-					

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	53	1	0	26
Future Volume (vph)	0	0	53	1	0	26
Satd. Flow (prot)	1900	0	1823	0	0	1900
Fit Permitted						
Satd. Flow (perm)	1900	0	1823	0	0	1900
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	0%	0%	4%	4%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	67	0	0	33
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 6.7%			ICU Level of Service A			
Analysis Period (min) 15						

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	0	0	53	1	0	26
Future Vol, veh/h	0	0	53	1	0	26
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	80	80	80	80	80	80
Heavy Vehicles, %	0	0	4	4	0	0
Mvmt Flow	0	0	66	1	0	33
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	100	67	0	0	68	0
Stage 1	67	-	-	-	-	-
Stage 2	33	-	-	-	-	-
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	904	1002	-	-	1546	-
Stage 1	961	-	-	-	-	-
Stage 2	995	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	904	1002	-	-	1546	-
Mov Cap-2 Maneuver	904	-	-	-	-	-
Stage 1	961	-	-	-	-	-
Stage 2	995	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	0		0		0	
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	-	1546	-	
HCM Lane V/C Ratio	-	-	-	-	-	
HCM Control Delay (s)	-	-	0	0	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	-	0	-	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	174	0	0	118	59	0	0	0	50	0	24
Future Volume (vph)	46	174	0	0	118	59	0	0	0	50	0	24
Satd. Flow (prot)	0	1826	0	0	1728	0	0	1900	0	0	1582	0
Flt Permitted		0.990									0.967	
Satd. Flow (perm)	0	1826	0	0	1728	0	0	1900	0	0	1582	0
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	0%	0%	0%	11%	11%	11%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	268	0	0	216	0	0	0	0	0	90	0
Sign Control		Free			Free			Yield			Stop	

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 35.7%

ICU Level of Service A

Analysis Period (min) 15

Intersection

Int Delay, s/veh 2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	46	174	0	0	118	59	0	0	0	50	0	24
Future Vol, veh/h	46	174	0	0	118	59	0	0	0	50	0	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Yield	Yield	Yield	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	3	3	3	5	5	5	0	0	0	11	11	11
Mvmt Flow	56	212	0	0	144	72	0	0	0	61	0	29

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	216	0	0	212	0	0	504	504	180
Stage 1	-	-	-	-	-	-	180	180	-
Stage 2	-	-	-	-	-	-	324	324	-
Critical Hdwy	4.13	-	-	4.15	-	-	7.21	6.61	6.31
Critical Hdwy Stg 1	-	-	-	-	-	-	6.21	5.61	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.21	5.61	-
Follow-up Hdwy	2.227	-	-	2.245	-	-	3.599	4.099	3.399
Pot Cap-1 Maneuver	1348	-	-	1341	-	-	464	458	840
Stage 1	-	-	-	-	-	-	801	734	-
Stage 2	-	-	-	-	-	-	670	634	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1348	-	-	1341	-	-	447	436	840
Mov Cap-2 Maneuver	-	-	-	-	-	-	447	436	-
Stage 1	-	-	-	-	-	-	763	734	-
Stage 2	-	-	-	-	-	-	639	604	-

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	13.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	1348	-	-	1341	-	-	527
HCM Lane V/C Ratio	0.042	-	-	-	-	-	0.171
HCM Control Delay (s)	7.8	0	-	0	-	-	13.2
HCM Lane LOS	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	0	-	-	0.6

Lanes, Volumes, Timings
14: NE 267th Avenue & NE 19th Street

2015 Existing Traffic, Mid-Afternoon Pk

5/15/2016

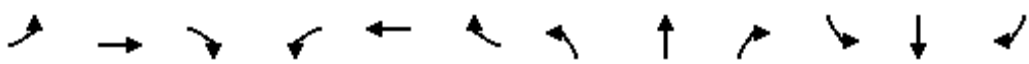
						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	55	68	106	109	97	100
Future Volume (vph)	55	68	106	109	97	100
Satd. Flow (prot)	1606	0	1686	0	0	1783
Flt Permitted	0.978					0.976
Satd. Flow (perm)	1606	0	1686	0	0	1783
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	7%	7%	5%	5%	4%	4%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	137	0	239	0	0	219
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 40.1%			ICU Level of Service A			
Analysis Period (min) 15						

Intersection						
Int Delay, s/veh	4.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	55	68	106	109	97	100
Future Vol, veh/h	55	68	106	109	97	100
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	90	90	90	90	90	90
Heavy Vehicles, %	7	7	5	5	4	4
Mvmt Flow	61	76	118	121	108	111
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	505	178	0	0	239	0
Stage 1	178	-	-	-	-	-
Stage 2	327	-	-	-	-	-
Critical Hdwy	6.47	6.27	-	-	4.14	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.363	-	-	2.236	-
Pot Cap-1 Maneuver	518	852	-	-	1316	-
Stage 1	841	-	-	-	-	-
Stage 2	720	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	473	852	-	-	1316	-
Mov Cap-2 Maneuver	473	-	-	-	-	-
Stage 1	841	-	-	-	-	-
Stage 2	657	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	12.3	0		3.9		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 627	1316	-		
HCM Lane V/C Ratio	-	- 0.218	0.082	-		
HCM Control Delay (s)	-	- 12.3	8	0		
HCM Lane LOS	-	- B	A	A		
HCM 95th %tile Q(veh)	-	- 0.8	0.3	-		

Lanes, Volumes, Timings
3: NE 232nd Avenue & NE 28th Street

2015 Existing Traffic, PM Peak Hour

5/15/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	5	299	66	6	135	0	32	0	3	0	0	2
Future Volume (vph)	5	299	66	6	135	0	32	0	3	0	0	2
Satd. Flow (prot)	0	1853	0	0	1841	0	0	1796	0	0	1644	0
Flt Permitted		0.999			0.998			0.956				
Satd. Flow (perm)	0	1853	0	0	1841	0	0	1796	0	0	1644	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	3%	3%	3%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	398	0	0	151	0	0	37	0	0	2	0
Sign Control		Free			Free			Stop			Yield	

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 36.9%

ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	5	299	66	6	135	0	32	0	3	0	0	2
Future Vol, veh/h	5	299	66	6	135	0	32	0	3	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Yield	Yield	Yield
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	3	3	3	0	0	0	0	0	0
Mvmt Flow	5	322	71	6	145	0	34	0	3	0	0	2

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	145	0	0	392	0	0	526	526	357
Stage 1	-	-	-	-	-	-	368	368	-
Stage 2	-	-	-	-	-	-	158	158	-
Critical Hdwy	4.1	-	-	4.13	-	-	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.227	-	-	3.5	4	3.3
Pot Cap-1 Maneuver	1450	-	-	1161	-	-	466	460	692
Stage 1	-	-	-	-	-	-	656	625	-
Stage 2	-	-	-	-	-	-	849	771	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1450	-	-	1161	-	-	462	455	692
Mov Cap-2 Maneuver	-	-	-	-	-	-	462	455	-
Stage 1	-	-	-	-	-	-	653	623	-
Stage 2	-	-	-	-	-	-	844	766	-

Approach	EB	WB	NB
HCM Control Delay, s	0.1	0.3	13.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	476	1450	-	-	1161	-	-
HCM Lane V/C Ratio	0.079	0.004	-	-	0.006	-	-
HCM Control Delay (s)	13.2	7.5	0	-	8.1	0	-
HCM Lane LOS	B	A	A	-	A	A	-
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-

Lanes, Volumes, Timings
6: NE 232nd Avenue & NE 9th Street

2015 Existing Traffic, PM Peak Hour

5/15/2016

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	2	35	0	1	45
Future Volume (vph)	0	2	35	0	1	45
Satd. Flow (prot)	1644	0	1900	0	0	1861
Flt Permitted						0.999
Satd. Flow (perm)	1644	0	1900	0	0	1861
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	0%	2%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2	0	41	0	0	53
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 13.3%			ICU Level of Service A			
Analysis Period (min) 15						

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	0	2	35	0	1	45
Future Vol, veh/h	0	2	35	0	1	45
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	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	2	41	0	1	52
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	96	41	0	0	41	0
Stage 1	41	-	-	-	-	-
Stage 2	55	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.12	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.218	-
Pot Cap-1 Maneuver	908	1036	-	-	1568	-
Stage 1	987	-	-	-	-	-
Stage 2	973	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	907	1036	-	-	1568	-
Mov Cap-2 Maneuver	907	-	-	-	-	-
Stage 1	987	-	-	-	-	-
Stage 2	972	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	8.5	0		0.2		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 1036	1568	-		
HCM Lane V/C Ratio	-	- 0.002	0.001	-		
HCM Control Delay (s)	-	- 8.5	7.3	0		
HCM Lane LOS	-	- A	A	A		
HCM 95th %tile Q(veh)	-	- 0	0	-		

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	240	1	0	111	55	1	0	1	54	0	30
Future Volume (vph)	69	240	1	0	111	55	1	0	1	54	0	30
Satd. Flow (prot)	0	1879	0	0	1797	0	0	1728	0	0	1734	0
Flt Permitted		0.989						0.976			0.969	
Satd. Flow (perm)	0	1879	0	0	1797	0	0	1728	0	0	1734	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	0%	0%	0%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	329	0	0	177	0	0	2	0	0	89	0
Sign Control		Free			Free			Yield			Stop	

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 42.4%

ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	2.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	69	240	1	0	111	55	1	0	1	54	0	30
Future Vol, veh/h	69	240	1	0	111	55	1	0	1	54	0	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Yield	Yield	Yield	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	1	1	1	0	0	0	1	1	1
Mvmt Flow	73	255	1	0	118	59	1	0	1	57	0	32
Major/Minor	Major1			Major2			Minor2					
Conflicting Flow All	177	0	0	256	0	0	550	550	147	-	-	-
Stage 1	-	-	-	-	-	-	147	147	-	-	-	-
Stage 2	-	-	-	-	-	-	403	403	-	-	-	-
Critical Hdwy	4.1	-	-	4.11	-	-	7.11	6.51	6.21	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.209	-	-	3.509	4.009	3.309	-	-	-
Pot Cap-1 Maneuver	1411	-	-	1315	-	-	447	444	903	-	-	-
Stage 1	-	-	-	-	-	-	858	777	-	-	-	-
Stage 2	-	-	-	-	-	-	626	601	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1411	-	-	1315	-	-	427	417	903	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	427	417	-	-	-	-
Stage 1	-	-	-	-	-	-	807	777	-	-	-	-
Stage 2	-	-	-	-	-	-	588	565	-	-	-	-
Approach	EB			WB			SB					
HCM Control Delay, s	1.7	-	-	0	-	-	13.2	-	-	-	-	-
HCM LOS	-	-	-	-	-	-	B	-	-	-	-	-
Minor Lane/Major Mvmt	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1					
Capacity (veh/h)	1411	-	-	1315	-	-	526					
HCM Lane V/C Ratio	0.052	-	-	-	-	-	0.17					
HCM Control Delay (s)	7.7	0	-	0	-	-	13.2					
HCM Lane LOS	A	A	-	A	-	-	B					
HCM 95th %tile Q(veh)	0.2	-	-	0	-	-	0.6					

Lanes, Volumes, Timings
14: NE 267th Avenue & NE 19th Street

2015 Existing Traffic, PM Peak Hour

5/15/2016

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	47	53	118	100	154	104
Future Volume (vph)	47	53	118	100	154	104
Satd. Flow (prot)	1658	0	1765	0	0	1845
Flt Permitted	0.977					0.971
Satd. Flow (perm)	1658	0	1765	0	0	1845
Confl. Peds. (#/hr)	1					
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	4%	4%	1%	1%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	106	0	232	0	0	275
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 42.2%			ICU Level of Service A			
Analysis Period (min) 15						

Intersection						
Int Delay, s/veh	4.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	47	53	118	100	154	104
Future Vol, veh/h	47	53	118	100	154	104
Conflicting Peds, #/hr	1	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	94	94	94	94	94	94
Heavy Vehicles, %	4	4	1	1	0	0
Mvmt Flow	50	56	126	106	164	111
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	618	180	0	0	233	0
Stage 1	180	-	-	-	-	-
Stage 2	438	-	-	-	-	-
Critical Hdwy	6.44	6.24	-	-	4.1	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	-	-	2.2	-
Pot Cap-1 Maneuver	450	858	-	-	1346	-
Stage 1	846	-	-	-	-	-
Stage 2	646	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	391	857	-	-	1346	-
Mov Cap-2 Maneuver	391	-	-	-	-	-
Stage 1	845	-	-	-	-	-
Stage 2	562	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	13.1	0		4.8		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	549	1346	-	
HCM Lane V/C Ratio	-	-	0.194	0.122	-	
HCM Control Delay (s)	-	-	13.1	8	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.7	0.4	-	

Lanes, Volumes, Timings
3: NE 232nd Avenue & NE 28th Street

2018 Background Traffic, AM Peak Hour

5/15/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	169	162	12	295	0	160	0	11	0	0	4
Future Volume (vph)	0	169	162	12	295	0	160	0	11	0	0	4
Satd. Flow (prot)	0	1723	0	0	1877	0	0	1729	0	0	1644	0
Flt Permitted					0.998			0.955				
Satd. Flow (perm)	0	1723	0	0	1877	0	0	1729	0	0	1644	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	4%	4%	4%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	364	0	0	337	0	0	188	0	0	4	0
Sign Control		Free			Free			Stop			Yield	

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 48.1%

ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	4.7											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	169	162	12	295	0	160	0	11	0	0	4
Future Vol, veh/h	0	169	162	12	295	0	160	0	11	0	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Yield	Yield	Yield
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	3	3	3	1	1	1	4	4	4	0	0	0
Mvmt Flow	0	186	178	13	324	0	176	0	12	0	0	4

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	324	0	0	364	0	0	626	626	275
Stage 1	-	-	-	-	-	-	275	275	-
Stage 2	-	-	-	-	-	-	351	351	-
Critical Hdwy	4.13	-	-	4.11	-	-	7.14	6.54	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-
Follow-up Hdwy	2.227	-	-	2.209	-	-	3.536	4.036	3.336
Pot Cap-1 Maneuver	1230	-	-	1200	-	-	394	398	759
Stage 1	-	-	-	-	-	-	727	679	-
Stage 2	-	-	-	-	-	-	661	629	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1230	-	-	1200	-	-	390	393	759
Mov Cap-2 Maneuver	-	-	-	-	-	-	390	393	-
Stage 1	-	-	-	-	-	-	727	679	-
Stage 2	-	-	-	-	-	-	652	621	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	21.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	403	1230	-	-	1200	-	-
HCM Lane V/C Ratio	0.466	-	-	-	0.011	-	-
HCM Control Delay (s)	21.5	0	-	-	8	0	-
HCM Lane LOS	C	A	-	-	A	A	-
HCM 95th %tile Q(veh)	2.4	0	-	-	0	-	-

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	2	0	115	0	2	111
Future Volume (vph)	2	0	115	0	2	111
Satd. Flow (prot)	1805	0	1863	0	0	1843
Flt Permitted	0.950					0.999
Satd. Flow (perm)	1805	0	1863	0	0	1843
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	0%	0%	2%	2%	3%	3%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	3	0	144	0	0	142
Sign Control	Stop		Free			Free

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 17.4% ICU Level of Service A

Analysis Period (min) 15

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	2	0	115	0	2	111
Future Vol, veh/h	2	0	115	0	2	111
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	80	80	80	80	80	80
Heavy Vehicles, %	0	0	2	2	3	3
Mvmt Flow	3	0	144	0	3	139
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	288	144	0	0	144	0
Stage 1	144	-	-	-	-	-
Stage 2	144	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.13	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.227	-
Pot Cap-1 Maneuver	707	909	-	-	1432	-
Stage 1	888	-	-	-	-	-
Stage 2	888	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	706	909	-	-	1432	-
Mov Cap-2 Maneuver	706	-	-	-	-	-
Stage 1	888	-	-	-	-	-
Stage 2	886	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	10.1	0		0.1		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	706	1432	-	
HCM Lane V/C Ratio	-	-	0.004	0.002	-	
HCM Control Delay (s)	-	-	10.1	7.5	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0	0	-	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	144	0	0	247	60	0	0	0	65	0	56
Future Volume (vph)	33	144	0	0	247	60	0	0	0	65	0	56
Satd. Flow (prot)	0	1760	0	0	1814	0	0	1900	0	0	1607	0
Flt Permitted		0.991									0.974	
Satd. Flow (perm)	0	1760	0	0	1814	0	0	1900	0	0	1607	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	7%	7%	7%	2%	2%	2%	0%	0%	0%	8%	8%	8%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	213	0	0	370	0	0	0	0	0	145	0
Sign Control		Free			Free			Yield			Stop	

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 43.1%

ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	3.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	33	144	0	0	247	60	0	0	0	65	0	56
Future Vol, veh/h	33	144	0	0	247	60	0	0	0	65	0	56
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Yield	Yield	Yield	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	7	7	7	2	2	2	0	0	0	8	8	8
Mvmt Flow	40	173	0	0	298	72	0	0	0	78	0	67
Major/Minor	Major1			Major2			Minor2					
Conflicting Flow All	370	0	0	173	0	0	587	587	334	-	-	-
Stage 1	-	-	-	-	-	-	334	334	-	-	-	-
Stage 2	-	-	-	-	-	-	253	253	-	-	-	-
Critical Hdwy	4.17	-	-	4.12	-	-	7.18	6.58	6.28	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	6.18	5.58	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.18	5.58	-	-	-	-
Follow-up Hdwy	2.263	-	-	2.218	-	-	3.572	4.072	3.372	-	-	-
Pot Cap-1 Maneuver	1161	-	-	1404	-	-	412	414	694	-	-	-
Stage 1	-	-	-	-	-	-	667	633	-	-	-	-
Stage 2	-	-	-	-	-	-	738	687	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1161	-	-	1404	-	-	400	398	694	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	400	398	-	-	-	-
Stage 1	-	-	-	-	-	-	642	633	-	-	-	-
Stage 2	-	-	-	-	-	-	710	661	-	-	-	-
Approach	EB			WB			SB					
HCM Control Delay, s	1.5			0			15.2					
HCM LOS							C					
Minor Lane/Major Mvmt	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1					
Capacity (veh/h)	1161	-	-	1404	-	-	498					
HCM Lane V/C Ratio	0.034	-	-	-	-	-	0.293					
HCM Control Delay (s)	8.2	0	-	0	-	-	15.2					
HCM Lane LOS	A	A	-	A	-	-	C					
HCM 95th %tile Q(veh)	0.1	-	-	0	-	-	1.2					

Lanes, Volumes, Timings
14: NE 267th Avenue & NE 19th Street

2018 Background Traffic, AM Peak Hour

5/15/2016

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	137	142	116	47	50	130
Future Volume (vph)	137	142	116	47	50	130
Satd. Flow (prot)	1660	0	1706	0	0	1767
Flt Permitted	0.976					0.986
Satd. Flow (perm)	1660	0	1706	0	0	1767
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Heavy Vehicles (%)	4%	4%	7%	7%	6%	6%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	383	0	223	0	0	246
Sign Control	Stop		Free			Free

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 44.9% ICU Level of Service A

Analysis Period (min) 15

Intersection						
Int Delay, s/veh	9.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	137	142	116	47	50	130
Future Vol, veh/h	137	142	116	47	50	130
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	73	73	73	73	73	73
Heavy Vehicles, %	4	4	7	7	6	6
Mvmt Flow	188	195	159	64	68	178
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	506	191	0	0	223	0
Stage 1	191	-	-	-	-	-
Stage 2	315	-	-	-	-	-
Critical Hdwy	6.44	6.24	-	-	4.16	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	-	-	2.254	-
Pot Cap-1 Maneuver	523	846	-	-	1323	-
Stage 1	837	-	-	-	-	-
Stage 2	735	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	493	846	-	-	1323	-
Mov Cap-2 Maneuver	493	-	-	-	-	-
Stage 1	837	-	-	-	-	-
Stage 2	693	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	19.3	0		2.2		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	626	1323	-	
HCM Lane V/C Ratio	-	-	0.611	0.052	-	
HCM Control Delay (s)	-	-	19.3	7.9	0	
HCM Lane LOS	-	-	C	A	A	
HCM 95th %tile Q(veh)	-	-	4.1	0.2	-	

Lanes, Volumes, Timings
3: NE 232nd Avenue & NE 28th Street

2018 Background Traffic, Mid-Afternoon Pk

5/15/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	269	106	7	176	0	98	1	11	1	0	3
Future Volume (vph)	3	269	106	7	176	0	98	1	11	1	0	3
Satd. Flow (prot)	0	1757	0	0	1823	0	0	1724	0	0	1350	0
Flt Permitted					0.998			0.957			0.988	
Satd. Flow (perm)	0	1757	0	0	1823	0	0	1724	0	0	1350	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	25%	25%	25%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	439	0	0	213	0	0	128	0	0	4	0
Sign Control		Free			Free			Stop			Yield	

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 41.3%

ICU Level of Service A

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	3	269	106	7	176	0	98	1	11	1	0	3
Future Vol, veh/h	3	269	106	7	176	0	98	1	11	1	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Yield	Yield	Yield
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	25	25	25
Mvmt Flow	3	313	123	8	205	0	114	1	13	1	0	3
Major/Minor	Major1			Major2			Minor1					
Conflicting Flow All	205	0	0	436	0	0	602	602	374			
Stage 1	-	-	-	-	-	-	381	381	-			
Stage 2	-	-	-	-	-	-	221	221	-			
Critical Hdwy	4.14	-	-	4.14	-	-	7.14	6.54	6.24			
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-			
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-			
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.536	4.036	3.336			
Pot Cap-1 Maneuver	1355	-	-	1113	-	-	409	411	668			
Stage 1	-	-	-	-	-	-	637	610	-			
Stage 2	-	-	-	-	-	-	777	717	-			
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1355	-	-	1113	-	-	406	406	668			
Mov Cap-2 Maneuver	-	-	-	-	-	-	406	406	-			
Stage 1	-	-	-	-	-	-	635	608	-			
Stage 2	-	-	-	-	-	-	771	711	-			
Approach	EB			WB			NB					
HCM Control Delay, s	0.1			0.3			17.2					
HCM LOS							C					
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR					
Capacity (veh/h)	423	1355	-	-	1113	-	-					
HCM Lane V/C Ratio	0.302	0.003	-	-	0.007	-	-					
HCM Control Delay (s)	17.2	7.7	0	-	8.3	0	-					
HCM Lane LOS	C	A	A	-	A	A	-					
HCM 95th %tile Q(veh)	1.3	0	-	-	0	-	-					

Lanes, Volumes, Timings
6: NE 232nd Avenue & NE 9th Street

2018 Background Traffic, Mid-Afternoon Pk

5/15/2016

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	90	1	0	59
Future Volume (vph)	0	0	90	1	0	59
Satd. Flow (prot)	1900	0	1825	0	0	1900
Fit Permitted						
Satd. Flow (perm)	1900	0	1825	0	0	1900
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	0%	0%	4%	4%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	114	0	0	74
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 8.1%			ICU Level of Service A			
Analysis Period (min) 15						

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	0	0	90	1	0	59
Future Vol, veh/h	0	0	90	1	0	59
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	80	80	80	80	80	80
Heavy Vehicles, %	0	0	4	4	0	0
Mvmt Flow	0	0	113	1	0	74
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	187	113	0	0	114	0
Stage 1	113	-	-	-	-	-
Stage 2	74	-	-	-	-	-
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	807	945	-	-	1488	-
Stage 1	917	-	-	-	-	-
Stage 2	954	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	807	945	-	-	1488	-
Mov Cap-2 Maneuver	807	-	-	-	-	-
Stage 1	917	-	-	-	-	-
Stage 2	954	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	0	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	-	1488	-	
HCM Lane V/C Ratio	-	-	-	-	-	
HCM Control Delay (s)	-	-	0	0	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	-	0	-	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	216	0	0	150	63	0	0	0	53	0	33
Future Volume (vph)	57	216	0	0	150	63	0	0	0	53	0	33
Satd. Flow (prot)	0	1826	0	0	1737	0	0	1900	0	0	1576	0
Flt Permitted		0.990									0.970	
Satd. Flow (perm)	0	1826	0	0	1737	0	0	1900	0	0	1576	0
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	0%	0%	0%	11%	11%	11%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	333	0	0	260	0	0	0	0	0	105	0
Sign Control		Free			Free			Yield			Stop	

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 41.2%

ICU Level of Service A

Analysis Period (min) 15

Intersection

Int Delay, s/veh 3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	57	216	0	0	150	63	0	0	0	53	0	33
Future Vol, veh/h	57	216	0	0	150	63	0	0	0	53	0	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Yield	Yield	Yield	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	3	3	3	5	5	5	0	0	0	11	11	11
Mvmt Flow	70	263	0	0	183	77	0	0	0	65	0	40

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	260	0	0	263	0	0	623	623	221
Stage 1	-	-	-	-	-	-	221	221	-
Stage 2	-	-	-	-	-	-	402	402	-
Critical Hdwy	4.13	-	-	4.15	-	-	7.21	6.61	6.31
Critical Hdwy Stg 1	-	-	-	-	-	-	6.21	5.61	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.21	5.61	-
Follow-up Hdwy	2.227	-	-	2.245	-	-	3.599	4.099	3.399
Pot Cap-1 Maneuver	1299	-	-	1284	-	-	386	391	797
Stage 1	-	-	-	-	-	-	761	704	-
Stage 2	-	-	-	-	-	-	607	585	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1299	-	-	1284	-	-	367	366	797
Mov Cap-2 Maneuver	-	-	-	-	-	-	367	366	-
Stage 1	-	-	-	-	-	-	713	704	-
Stage 2	-	-	-	-	-	-	569	548	-

Approach	EB	WB	SB
HCM Control Delay, s	1.7	0	15
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	1299	-	-	1284	-	-	463
HCM Lane V/C Ratio	0.054	-	-	-	-	-	0.227
HCM Control Delay (s)	7.9	0	-	0	-	-	15
HCM Lane LOS	A	A	-	A	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	0	-	-	0.9

Lanes, Volumes, Timings
14: NE 267th Avenue & NE 19th Street

2018 Background Traffic, Mid-Afternoon Pk

5/15/2016

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	55	71	119	109	102	119
Future Volume (vph)	55	71	119	109	102	119
Satd. Flow (prot)	1606	0	1692	0	0	1785
Flt Permitted	0.979					0.977
Satd. Flow (perm)	1606	0	1692	0	0	1785
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	7%	7%	5%	5%	4%	4%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	140	0	253	0	0	245
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 42.2%			ICU Level of Service A			
Analysis Period (min) 15						

Intersection						
Int Delay, s/veh	4.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	55	71	119	109	102	119
Future Vol, veh/h	55	71	119	109	102	119
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	90	90	90	90	90	90
Heavy Vehicles, %	7	7	5	5	4	4
Mvmt Flow	61	79	132	121	113	132
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	552	193	0	0	253	0
Stage 1	193	-	-	-	-	-
Stage 2	359	-	-	-	-	-
Critical Hdwy	6.47	6.27	-	-	4.14	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.363	-	-	2.236	-
Pot Cap-1 Maneuver	486	836	-	-	1301	-
Stage 1	828	-	-	-	-	-
Stage 2	696	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	440	836	-	-	1301	-
Mov Cap-2 Maneuver	440	-	-	-	-	-
Stage 1	828	-	-	-	-	-
Stage 2	631	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	12.8	0		3.7		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 600	1301	-		
HCM Lane V/C Ratio	-	- 0.233	0.087	-		
HCM Control Delay (s)	-	- 12.8	8	0		
HCM Lane LOS	-	- B	A	A		
HCM 95th %tile Q(veh)	-	- 0.9	0.3	-		

Lanes, Volumes, Timings
3: NE 232nd Avenue & NE 28th Street

2018 Background Traffic, PM Peak Hour

5/15/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	384	196	14	242	0	198	0	9	0	0	2
Future Volume (vph)	5	384	196	14	242	0	198	0	9	0	0	2
Satd. Flow (prot)	0	1814	0	0	1839	0	0	1802	0	0	1644	0
Flt Permitted					0.997			0.954				
Satd. Flow (perm)	0	1814	0	0	1839	0	0	1802	0	0	1644	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	3%	3%	3%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	629	0	0	275	0	0	223	0	0	2	0
Sign Control		Free			Free			Stop			Yield	

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 58.6%

ICU Level of Service B

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	9.2											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	5	384	196	14	242	0	198	0	9	0	0	2
Future Vol, veh/h	5	384	196	14	242	0	198	0	9	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Yield	Yield	Yield
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	3	3	3	0	0	0	0	0	0
Mvmt Flow	5	413	211	15	260	0	213	0	10	0	0	2

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	260	0	0	624	0	0	819	819	518
Stage 1	-	-	-	-	-	-	529	529	-
Stage 2	-	-	-	-	-	-	290	290	-
Critical Hdwy	4.1	-	-	4.13	-	-	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.227	-	-	3.5	4	3.3
Pot Cap-1 Maneuver	1316	-	-	952	-	-	297	312	562
Stage 1	-	-	-	-	-	-	537	530	-
Stage 2	-	-	-	-	-	-	722	676	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1316	-	-	952	-	-	292	305	562
Mov Cap-2 Maneuver	-	-	-	-	-	-	292	305	-
Stage 1	-	-	-	-	-	-	534	527	-
Stage 2	-	-	-	-	-	-	709	664	-

Approach	EB	WB	NB
HCM Control Delay, s	0.1	0.5	45.6
HCM LOS	E		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	298	1316	-	-	952	-	-
HCM Lane V/C Ratio	0.747	0.004	-	-	0.016	-	-
HCM Control Delay (s)	45.6	7.7	0	-	8.8	0	-
HCM Lane LOS	E	A	A	-	A	A	-
HCM 95th %tile Q(veh)	5.6	0	-	-	0	-	-

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	2	98	0	1	122
Future Volume (vph)	0	2	98	0	1	122
Satd. Flow (prot)	1644	0	1900	0	0	1863
Flt Permitted						
Satd. Flow (perm)	1644	0	1900	0	0	1863
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	0%	2%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2	0	114	0	0	143
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 17.2%			ICU Level of Service A			
Analysis Period (min) 15						

Intersection

Int Delay, s/veh 0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	0	2	98	0	1	122
Future Vol, veh/h	0	2	98	0	1	122
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	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	2	114	0	1	142

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	258	114	0
Stage 1	114	-	-
Stage 2	144	-	-
Critical Hdwy	6.4	6.2	4.12
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.4	-	-
Follow-up Hdwy	3.5	3.3	2.218
Pot Cap-1 Maneuver	735	944	1475
Stage 1	916	-	-
Stage 2	888	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	734	944	1475
Mov Cap-2 Maneuver	734	-	-
Stage 1	916	-	-
Stage 2	887	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.8	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	944	1475
HCM Lane V/C Ratio	-	-	0.002	0.001
HCM Control Delay (s)	-	-	8.8	7.4
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	89	311	1	0	201	60	1	0	1	60	0	55
Future Volume (vph)	89	311	1	0	201	60	1	0	1	60	0	55
Satd. Flow (prot)	0	1879	0	0	1823	0	0	1728	0	0	1715	0
Flt Permitted		0.989						0.976			0.975	
Satd. Flow (perm)	0	1879	0	0	1823	0	0	1728	0	0	1715	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	0%	0%	0%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	427	0	0	278	0	0	2	0	0	123	0
Sign Control		Free			Free			Yield			Stop	

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 54.1%

ICU Level of Service A

Analysis Period (min) 15

Intersection

Int Delay, s/veh 3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	89	311	1	0	201	60	1	0	1	60	0	55
Future Vol, veh/h	89	311	1	0	201	60	1	0	1	60	0	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Yield	Yield	Yield	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	1	1	1	0	0	0	1	1	1
Mvmt Flow	95	331	1	0	214	64	1	0	1	64	0	59

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	278	0	0	332	0	0	767	767	246
Stage 1	-	-	-	-	-	-	246	246	-
Stage 2	-	-	-	-	-	-	521	521	-
Critical Hdwy	4.1	-	-	4.11	-	-	7.11	6.51	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-
Follow-up Hdwy	2.2	-	-	2.209	-	-	3.509	4.009	3.309
Pot Cap-1 Maneuver	1296	-	-	1233	-	-	320	334	795
Stage 1	-	-	-	-	-	-	760	704	-
Stage 2	-	-	-	-	-	-	540	533	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1296	-	-	1233	-	-	298	304	795
Mov Cap-2 Maneuver	-	-	-	-	-	-	298	304	-
Stage 1	-	-	-	-	-	-	692	704	-
Stage 2	-	-	-	-	-	-	491	485	-

Approach	EB	WB	SB
HCM Control Delay, s	1.8	0	16.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	1296	-	-	1233	-	-	425
HCM Lane V/C Ratio	0.073	-	-	-	-	-	0.288
HCM Control Delay (s)	8	0	-	0	-	-	16.9
HCM Lane LOS	A	A	-	A	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	0	-	-	1.2

Lanes, Volumes, Timings
14: NE 267th Avenue & NE 19th Street

2018 Background Traffic, PM Peak Hour

5/15/2016

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	47	76	178	100	172	151
Future Volume (vph)	47	76	178	100	172	151
Satd. Flow (prot)	1709	0	1789	0	0	1851
Flt Permitted	0.981					0.974
Satd. Flow (perm)	1709	0	1789	0	0	1851
Confl. Peds. (#/hr)	1					
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	1%	1%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	131	0	295	0	0	344
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 50.2%			ICU Level of Service A			
Analysis Period (min) 15						

Intersection						
Int Delay, s/veh	4.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	47	76	178	100	172	151
Future Vol, veh/h	47	76	178	100	172	151
Conflicting Peds, #/hr	1	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	94	94	94	94	94	94
Heavy Vehicles, %	0	0	1	1	0	0
Mvmt Flow	50	81	189	106	183	161
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	771	244	0	0	297	0
Stage 1	244	-	-	-	-	-
Stage 2	527	-	-	-	-	-
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	371	800	-	-	1276	-
Stage 1	801	-	-	-	-	-
Stage 2	596	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	312	799	-	-	1276	-
Mov Cap-2 Maneuver	312	-	-	-	-	-
Stage 1	800	-	-	-	-	-
Stage 2	502	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	14.7	0		4.4		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 500	1276	-		
HCM Lane V/C Ratio	-	- 0.262	0.143	-		
HCM Control Delay (s)	-	- 14.7	8.3	0		
HCM Lane LOS	-	- B	A	A		
HCM 95th %tile Q(veh)	-	- 1	0.5	-		

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	169	165	151	295	0	162	0	124	0	0	4
Future Volume (vph)	0	169	165	151	295	0	162	0	124	0	0	4
Satd. Flow (prot)	0	1721	0	0	1849	0	0	1673	0	0	1644	0
Flt Permitted					0.983			0.972				
Satd. Flow (perm)	0	1721	0	0	1849	0	0	1673	0	0	1644	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	4%	4%	4%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	367	0	0	490	0	0	314	0	0	4	0
Sign Control		Free			Free			Stop			Yield	

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 76.1%

ICU Level of Service D

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	26.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	169	165	151	295	0	162	0	124	0	0	4
Future Vol, veh/h	0	169	165	151	295	0	162	0	124	0	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Yield	Yield	Yield
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	3	3	3	1	1	1	4	4	4	0	0	0
Mvmt Flow	0	186	181	166	324	0	178	0	136	0	0	4
Major/Minor	Major1			Major2			Minor1					
Conflicting Flow All	324	0	0	367	0	0	932	932	276			
Stage 1	-	-	-	-	-	-	276	276	-			
Stage 2	-	-	-	-	-	-	656	656	-			
Critical Hdwy	4.13	-	-	4.11	-	-	7.14	6.54	6.24			
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-			
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-			
Follow-up Hdwy	2.227	-	-	2.209	-	-	3.536	4.036	3.336			
Pot Cap-1 Maneuver	1230	-	-	1197	-	-	245	264	758			
Stage 1	-	-	-	-	-	-	726	678	-			
Stage 2	-	-	-	-	-	-	451	459	-			
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1230	-	-	1197	-	-	213	219	758			
Mov Cap-2 Maneuver	-	-	-	-	-	-	213	219	-			
Stage 1	-	-	-	-	-	-	726	678	-			
Stage 2	-	-	-	-	-	-	375	381	-			
Approach	EB			WB			NB					
HCM Control Delay, s	0			2.9			93.6					
HCM LOS							F					
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR					
Capacity (veh/h)	309	1230	-	-	1197	-	-					
HCM Lane V/C Ratio	1.017	-	-	-	0.139	-	-					
HCM Control Delay (s)	93.6	0	-	-	8.5	0	-					
HCM Lane LOS	F	A	-	-	A	A	-					
HCM 95th %tile Q(veh)	11.2	0	-	-	0.5	-	-					

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	5	100	159	6	127	159
Future Volume (vph)	5	100	159	6	127	159
Satd. Flow (prot)	1619	0	1853	0	0	1822
Flt Permitted	0.998					0.978
Satd. Flow (perm)	1619	0	1853	0	0	1822
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	114	0	180	0	0	311
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 40.6%			ICU Level of Service A			
Analysis Period (min) 15						

Intersection						
Int Delay, s/veh	3.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	5	100	159	6	127	159
Future Vol, veh/h	5	100	159	6	127	159
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	109	173	7	138	173
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	625	176	0	0	179	0
Stage 1	176	-	-	-	-	-
Stage 2	449	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	449	867	-	-	1397	-
Stage 1	855	-	-	-	-	-
Stage 2	643	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	400	867	-	-	1397	-
Mov Cap-2 Maneuver	400	-	-	-	-	-
Stage 1	855	-	-	-	-	-
Stage 2	573	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	10.1	0		3.5		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 821	1397	-		
HCM Lane V/C Ratio	-	- 0.139	0.099	-		
HCM Control Delay (s)	-	- 10.1	7.9	0		
HCM Lane LOS	-	- B	A	A		
HCM 95th %tile Q(veh)	-	- 0.5	0.3	-		

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	2	0	122	0	2	117
Future Volume (vph)	2	0	122	0	2	117
Satd. Flow (prot)	1805	0	1863	0	0	1843
Flt Permitted	0.950					0.999
Satd. Flow (perm)	1805	0	1863	0	0	1843
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	0%	0%	2%	2%	3%	3%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	3	0	153	0	0	149
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 17.8%			ICU Level of Service A			
Analysis Period (min) 15						

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	2	0	122	0	2	117
Future Vol, veh/h	2	0	122	0	2	117
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	80	80	80	80	80	80
Heavy Vehicles, %	0	0	2	2	3	3
Mvmt Flow	3	0	153	0	3	146
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	304	153	0	0	153	0
Stage 1	153	-	-	-	-	-
Stage 2	151	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.13	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.227	-
Pot Cap-1 Maneuver	692	898	-	-	1421	-
Stage 1	880	-	-	-	-	-
Stage 2	882	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	691	898	-	-	1421	-
Mov Cap-2 Maneuver	691	-	-	-	-	-
Stage 1	880	-	-	-	-	-
Stage 2	880	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	10.2	0		0.1		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	691	1421	-	
HCM Lane V/C Ratio	-	-	0.004	0.002	-	
HCM Control Delay (s)	-	-	10.2	7.5	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0	0	-	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	184	0	0	296	60	0	0	0	65	0	146
Future Volume (vph)	106	184	0	0	296	60	0	0	0	65	0	146
Satd. Flow (prot)	0	1744	0	0	1820	0	0	1900	0	0	1570	0
Flt Permitted		0.982									0.985	
Satd. Flow (perm)	0	1744	0	0	1820	0	0	1900	0	0	1570	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	7%	7%	7%	2%	2%	2%	0%	0%	0%	8%	8%	8%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	350	0	0	429	0	0	0	0	0	254	0
Sign Control		Free			Free			Yield			Stop	

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 57.4%

ICU Level of Service B

Analysis Period (min) 15

Intersection

Int Delay, s/veh 7.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	106	184	0	0	296	60	0	0	0	65	0	146
Future Vol, veh/h	106	184	0	0	296	60	0	0	0	65	0	146
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Yield	Yield	Yield	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	7	7	7	2	2	2	0	0	0	8	8	8
Mvmt Flow	128	222	0	0	357	72	0	0	0	78	0	176

Major/Minor	Major1			Major2			Minor2			
Conflicting Flow All	429	0	0	222	0	0	870	870	393	
Stage 1	-	-	-	-	-	-	393	393	-	
Stage 2	-	-	-	-	-	-	477	477	-	
Critical Hdwy	4.17	-	-	4.12	-	-	7.18	6.58	6.28	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.18	5.58	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.18	5.58	-	
Follow-up Hdwy	2.263	-	-	2.218	-	-	3.572	4.072	3.372	
Pot Cap-1 Maneuver	1104	-	-	1347	-	-	265	283	643	
Stage 1	-	-	-	-	-	-	620	596	-	
Stage 2	-	-	-	-	-	-	558	546	-	
Platoon blocked, %		-	-		-	-				
Mov Cap-1 Maneuver	1104	-	-	1347	-	-	238	246	643	
Mov Cap-2 Maneuver	-	-	-	-	-	-	238	246	-	
Stage 1	-	-	-	-	-	-	538	596	-	
Stage 2	-	-	-	-	-	-	484	474	-	

Approach	EB	WB	SB
HCM Control Delay, s	3.2	0	25.6
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	1104	-	-	1347	-	-	422
HCM Lane V/C Ratio	0.116	-	-	-	-	-	0.602
HCM Control Delay (s)	8.7	0	-	0	-	-	25.6
HCM Lane LOS	A	A	-	A	-	-	D
HCM 95th %tile Q(veh)	0.4	-	-	0	-	-	3.8

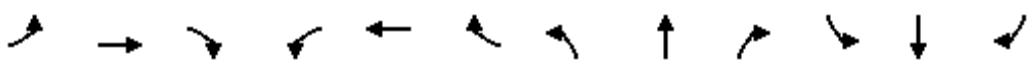
						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	137	179	124	47	80	137
Future Volume (vph)	137	179	124	47	80	137
Satd. Flow (prot)	1653	0	1710	0	0	1760
Flt Permitted	0.979					0.982
Satd. Flow (perm)	1653	0	1710	0	0	1760
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Heavy Vehicles (%)	4%	4%	7%	7%	6%	6%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	433	0	234	0	0	298
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 49.6%			ICU Level of Service A			
Analysis Period (min) 15						

Intersection						
Int Delay, s/veh	13.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	137	179	124	47	80	137
Future Vol, veh/h	137	179	124	47	80	137
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	73	73	73	73	73	73
Heavy Vehicles, %	4	4	7	7	6	6
Mvmt Flow	188	245	170	64	110	188
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	609	202	0	0	234	0
Stage 1	202	-	-	-	-	-
Stage 2	407	-	-	-	-	-
Critical Hdwy	6.44	6.24	-	-	4.16	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	-	-	2.254	-
Pot Cap-1 Maneuver	455	834	-	-	1310	-
Stage 1	827	-	-	-	-	-
Stage 2	668	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	412	834	-	-	1310	-
Mov Cap-2 Maneuver	412	-	-	-	-	-
Stage 1	827	-	-	-	-	-
Stage 2	605	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	27.5	0		2.9		
HCM LOS	D					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	578	1310	-	
HCM Lane V/C Ratio	-	-	0.749	0.084	-	
HCM Control Delay (s)	-	-	27.5	8	0	
HCM Lane LOS	-	-	D	A	A	
HCM 95th %tile Q(veh)	-	-	6.6	0.3	-	

Lanes, Volumes, Timings
3: NE 232nd Avenue & NE 28th Street

2018 Total-MIT w NB LT, AM Peak Hour

5/18/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔			↔	
Traffic Volume (vph)	0	169	165	151	295	0	162	0	124	0	0	4
Future Volume (vph)	0	169	165	151	295	0	162	0	124	0	0	4
Satd. Flow (prot)	0	1721	0	0	1849	0	1736	1553	0	0	1644	0
Flt Permitted					0.983		0.950					
Satd. Flow (perm)	0	1721	0	0	1849	0	1736	1553	0	0	1644	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	4%	4%	4%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	367	0	0	490	0	178	136	0	0	4	0
Sign Control		Free			Free			Stop			Yield	

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 68.5%

ICU Level of Service C

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	13.5											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	169	165	151	295	0	162	0	124	0	0	4
Future Vol, veh/h	0	169	165	151	295	0	162	0	124	0	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Yield	Yield	Yield
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	3	3	3	1	1	1	4	4	4	0	0	0
Mvmt Flow	0	186	181	166	324	0	178	0	136	0	0	4

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	324	0	0	367	0	0	932	932	276
Stage 1	-	-	-	-	-	-	276	276	-
Stage 2	-	-	-	-	-	-	656	656	-
Critical Hdwy	4.13	-	-	4.11	-	-	7.14	6.54	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-
Follow-up Hdwy	2.227	-	-	2.209	-	-	3.536	4.036	3.336
Pot Cap-1 Maneuver	1230	-	-	1197	-	-	245	264	758
Stage 1	-	-	-	-	-	-	726	678	-
Stage 2	-	-	-	-	-	-	451	459	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1230	-	-	1197	-	-	213	219	758
Mov Cap-2 Maneuver	-	-	-	-	-	-	213	219	-
Stage 1	-	-	-	-	-	-	726	678	-
Stage 2	-	-	-	-	-	-	375	381	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.9	45.9
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	213	758	1230	-	-	1197	-	-
HCM Lane V/C Ratio	0.836	0.18	-	-	-	0.139	-	-
HCM Control Delay (s)	72.8	10.8	0	-	-	8.5	0	-
HCM Lane LOS	F	B	A	-	-	A	A	-
HCM 95th %tile Q(veh)	6.3	0.7	0	-	-	0.5	-	-

Lanes, Volumes, Timings
3: NE 232nd Avenue & NE 28th Street

2018 Total-MIT w sig, AM Peak Hour

5/18/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	169	165	151	295	0	162	0	124	0	0	4
Future Volume (vph)	0	169	165	151	295	0	162	0	124	0	0	4
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	4%	4%	4%	0%	0%	0%
Shared Lane Traffic (%)												
Turn Type		NA		Perm	NA		Perm	NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		25.0	25.0	
Total Split (%)	58.3%	58.3%		58.3%	58.3%		41.7%	41.7%		41.7%	41.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effect Green (s)		21.0			21.0			13.5			13.5	
Actuated g/C Ratio		0.47			0.47			0.30			0.30	
v/c Ratio		0.42			0.73			0.66			0.00	
Control Delay		6.9			17.6			19.0			0.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		6.9			17.6			19.0			0.0	
LOS		A			B			B			A	
Approach Delay		6.9			17.6			19.0			0.0	
Approach LOS		A			B			B			A	

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 44.4

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 14.6

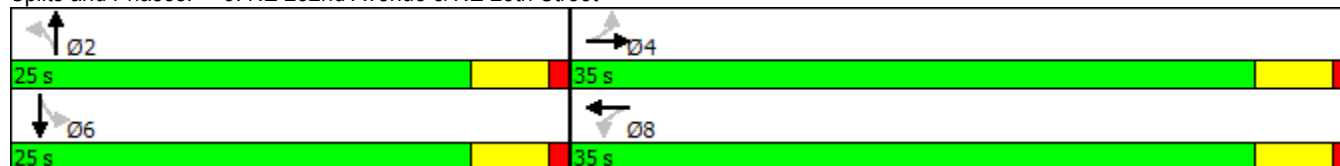
Intersection LOS: B

Intersection Capacity Utilization 77.3%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 3: NE 232nd Avenue & NE 28th Street



Lanes, Volumes, Timings 2018 Total Traffic (232nd Access analysis), Mid-Afternoon Pk
 3: NE 232nd Avenue & NE 28th Street 5/15/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	269	107	78	176	0	100	1	96	1	0	3
Future Volume (vph)	3	269	107	78	176	0	100	1	96	1	0	3
Satd. Flow (prot)	0	1757	0	0	1800	0	0	1664	0	0	1350	0
Flt Permitted					0.985			0.975			0.988	
Satd. Flow (perm)	0	1757	0	0	1800	0	0	1664	0	0	1350	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	25%	25%	25%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	440	0	0	296	0	0	229	0	0	4	0
Sign Control		Free			Free			Stop			Yield	

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 62.6% ICU Level of Service B

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	6.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	3	269	107	78	176	0	100	1	96	1	0	3
Future Vol, veh/h	3	269	107	78	176	0	100	1	96	1	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Yield	Yield	Yield
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	25	25	25
Mvmt Flow	3	313	124	91	205	0	116	1	112	1	0	3
Major/Minor	Major1			Major2			Minor1					
Conflicting Flow All	205	0	0	437	0	0	768	768	375			
Stage 1	-	-	-	-	-	-	382	382	-			
Stage 2	-	-	-	-	-	-	386	386	-			
Critical Hdwy	4.14	-	-	4.14	-	-	7.14	6.54	6.24			
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-			
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-			
Follow-up Hdwy	2.236	-	-	2.236	-	-	3.536	4.036	3.336			
Pot Cap-1 Maneuver	1355	-	-	1112	-	-	316	330	667			
Stage 1	-	-	-	-	-	-	636	609	-			
Stage 2	-	-	-	-	-	-	633	607	-			
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1355	-	-	1112	-	-	293	299	667			
Mov Cap-2 Maneuver	-	-	-	-	-	-	293	299	-			
Stage 1	-	-	-	-	-	-	634	607	-			
Stage 2	-	-	-	-	-	-	575	551	-			
Approach	EB			WB			NB					
HCM Control Delay, s	0.1			2.6			25.1					
HCM LOS							D					
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR					
Capacity (veh/h)	403	1355	-	-	1112	-	-					
HCM Lane V/C Ratio	0.568	0.003	-	-	0.082	-	-					
HCM Control Delay (s)	25.1	7.7	0	-	8.5	0	-					
HCM Lane LOS	D	A	A	-	A	A	-					
HCM 95th %tile Q(veh)	3.4	0	-	-	0.3	-	-					

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	72	115	3	57	101
Future Volume (vph)	4	72	115	3	57	101
Satd. Flow (prot)	1621	0	1857	0	0	1829
Fit Permitted	0.998					0.982
Satd. Flow (perm)	1621	0	1857	0	0	1829
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	82	0	128	0	0	172
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 26.5%			ICU Level of Service A			
Analysis Period (min) 15						

Intersection						
Int Delay, s/veh	3.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	4	72	115	3	57	101
Future Vol, veh/h	4	72	115	3	57	101
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	78	125	3	62	110
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	361	127	0	0	128	0
Stage 1	127	-	-	-	-	-
Stage 2	234	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	638	923	-	-	1458	-
Stage 1	899	-	-	-	-	-
Stage 2	805	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	609	923	-	-	1458	-
Mov Cap-2 Maneuver	609	-	-	-	-	-
Stage 1	899	-	-	-	-	-
Stage 2	769	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.4	0		2.7		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 899	1458	-		
HCM Lane V/C Ratio	-	- 0.092	0.042	-		
HCM Control Delay (s)	-	- 9.4	7.6	0		
HCM Lane LOS	-	- A	A	A		
HCM 95th %tile Q(veh)	-	- 0.3	0.1	-		

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	94	1	0	64
Future Volume (vph)	0	0	94	1	0	64
Satd. Flow (prot)	1900	0	1825	0	0	1900
Flt Permitted						
Satd. Flow (perm)	1900	0	1825	0	0	1900
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	0%	0%	4%	4%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	119	0	0	80
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 8.3%			ICU Level of Service A			
Analysis Period (min) 15						

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	0	0	94	1	0	64
Future Vol, veh/h	0	0	94	1	0	64
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	80	80	80	80	80	80
Heavy Vehicles, %	0	0	4	4	0	0
Mvmt Flow	0	0	118	1	0	80
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	198	118	0	0	119	0
Stage 1	118	-	-	-	-	-
Stage 2	80	-	-	-	-	-
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	795	939	-	-	1482	-
Stage 1	912	-	-	-	-	-
Stage 2	948	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	795	939	-	-	1482	-
Mov Cap-2 Maneuver	795	-	-	-	-	-
Stage 1	912	-	-	-	-	-
Stage 2	948	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	0	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	-	1482	-	
HCM Lane V/C Ratio	-	-	-	-	-	
HCM Control Delay (s)	-	-	0	0	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	-	0	-	

Lanes, Volumes, Timings 2018 Total Traffic (232nd Access analysis), Mid-Afternoon Pk
 10: Driveway/NE 242nd Avenue & NE 28th Street/Dresser Road 5/15/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	112	246	0	0	175	63	0	0	0	53	0	79
Future Volume (vph)	112	246	0	0	175	63	0	0	0	53	0	79
Satd. Flow (prot)	0	1817	0	0	1744	0	0	1900	0	0	1543	0
Flt Permitted		0.985									0.980	
Satd. Flow (perm)	0	1817	0	0	1744	0	0	1900	0	0	1543	0
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	0%	0%	0%	11%	11%	11%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	437	0	0	290	0	0	0	0	0	161	0
Sign Control		Free			Free			Yield			Stop	

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 50.0% ICU Level of Service A

Analysis Period (min) 15

Intersection

Int Delay, s/veh 4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	112	246	0	0	175	63	0	0	0	53	0	79
Future Vol, veh/h	112	246	0	0	175	63	0	0	0	53	0	79
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Yield	Yield	Yield	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	3	3	3	5	5	5	0	0	0	11	11	11
Mvmt Flow	137	300	0	0	213	77	0	0	0	65	0	96

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	290	0	0	300	0	0	825	825	252
Stage 1	-	-	-	-	-	-	252	252	-
Stage 2	-	-	-	-	-	-	573	573	-
Critical Hdwy	4.13	-	-	4.15	-	-	7.21	6.61	6.31
Critical Hdwy Stg 1	-	-	-	-	-	-	6.21	5.61	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.21	5.61	-
Follow-up Hdwy	2.227	-	-	2.245	-	-	3.599	4.099	3.399
Pot Cap-1 Maneuver	1266	-	-	1244	-	-	281	298	765
Stage 1	-	-	-	-	-	-	733	682	-
Stage 2	-	-	-	-	-	-	489	490	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1266	-	-	1244	-	-	253	259	765
Mov Cap-2 Maneuver	-	-	-	-	-	-	253	259	-
Stage 1	-	-	-	-	-	-	638	682	-
Stage 2	-	-	-	-	-	-	425	426	-

Approach	EB	WB	SB
HCM Control Delay, s	2.6	0	18.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	1266	-	-	1244	-	-	422
HCM Lane V/C Ratio	0.108	-	-	-	-	-	0.381
HCM Control Delay (s)	8.2	0	-	0	-	-	18.7
HCM Lane LOS	A	A	-	A	-	-	C
HCM 95th %tile Q(veh)	0.4	-	-	0	-	-	1.8

Lanes, Volumes, Timings 2018 Total Traffic (232nd Access analysis), Mid-Afternoon Pk
 14: NE 267th Avenue & NE 19th Street 5/15/2016

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	55	90	123	109	125	124
Future Volume (vph)	55	90	123	109	125	124
Satd. Flow (prot)	1596	0	1696	0	0	1783
Flt Permitted	0.981					0.976
Satd. Flow (perm)	1596	0	1696	0	0	1783
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	7%	7%	5%	5%	4%	4%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	161	0	258	0	0	277
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 45.2%			ICU Level of Service A			
Analysis Period (min) 15						

Intersection

Int Delay, s/veh 4.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	55	90	123	109	125	124
Future Vol, veh/h	55	90	123	109	125	124
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	90	90	90	90	90	90
Heavy Vehicles, %	7	7	5	5	4	4
Mvmt Flow	61	100	137	121	139	138

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	613	197	0
Stage 1	197	-	-
Stage 2	416	-	-
Critical Hdwy	6.47	6.27	4.14
Critical Hdwy Stg 1	5.47	-	-
Critical Hdwy Stg 2	5.47	-	-
Follow-up Hdwy	3.563	3.363	2.236
Pot Cap-1 Maneuver	448	832	1295
Stage 1	824	-	-
Stage 2	655	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	396	832	1295
Mov Cap-2 Maneuver	396	-	-
Stage 1	824	-	-
Stage 2	579	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.4	0	4.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	587	1295
HCM Lane V/C Ratio	-	-	0.274	0.107
HCM Control Delay (s)	-	-	13.4	8.1
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	1.1	0.4

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	384	197	55	242	0	199	0	52	0	0	2
Future Volume (vph)	5	384	197	55	242	0	199	0	52	0	0	2
Satd. Flow (prot)	0	1814	0	0	1828	0	0	1777	0	0	1644	0
Flt Permitted					0.991			0.962				
Satd. Flow (perm)	0	1814	0	0	1828	0	0	1777	0	0	1644	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	3%	3%	3%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	630	0	0	319	0	0	270	0	0	2	0
Sign Control		Free			Free			Stop			Yield	

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 79.1%

ICU Level of Service D

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	20.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	5	384	197	55	242	0	199	0	52	0	0	2
Future Vol, veh/h	5	384	197	55	242	0	199	0	52	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Yield	Yield	Yield
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	3	3	3	0	0	0	0	0	0
Mvmt Flow	5	413	212	59	260	0	214	0	56	0	0	2
Major/Minor	Major1			Major2			Minor1					
Conflicting Flow All	260	0	0	625	0	0	908	908	519			
Stage 1	-	-	-	-	-	-	530	530	-			
Stage 2	-	-	-	-	-	-	378	378	-			
Critical Hdwy	4.1	-	-	4.13	-	-	7.1	6.5	6.2			
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-			
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-			
Follow-up Hdwy	2.2	-	-	2.227	-	-	3.5	4	3.3			
Pot Cap-1 Maneuver	1316	-	-	952	-	-	258	277	561			
Stage 1	-	-	-	-	-	-	536	530	-			
Stage 2	-	-	-	-	-	-	648	619	-			
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1316	-	-	952	-	-	243	256	561			
Mov Cap-2 Maneuver	-	-	-	-	-	-	243	256	-			
Stage 1	-	-	-	-	-	-	533	527	-			
Stage 2	-	-	-	-	-	-	601	574	-			
Approach	EB			WB			NB					
HCM Control Delay, s	0.1			1.7			90.1					
HCM LOS							F					
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR					
Capacity (veh/h)	275	1316	-	-	952	-	-					
HCM Lane V/C Ratio	0.981	0.004	-	-	0.062	-	-					
HCM Control Delay (s)	90.1	7.7	0	-	9	0	-					
HCM Lane LOS	F	A	A	-	A	A	-					
HCM 95th %tile Q(veh)	9.7	0	-	-	0.2	-	-					

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	2	42	156	2	40	169
Future Volume (vph)	2	42	156	2	40	169
Satd. Flow (prot)	1619	0	1859	0	0	1846
Flt Permitted	0.998					0.991
Satd. Flow (perm)	1619	0	1859	0	0	1846
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	48	0	172	0	0	227
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 32.8%			ICU Level of Service A			
Analysis Period (min) 15						

Intersection						
Int Delay, s/veh	1.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	2	42	156	2	40	169
Future Vol, veh/h	2	42	156	2	40	169
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	46	170	2	43	184
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	442	171	0	0	172	0
Stage 1	171	-	-	-	-	-
Stage 2	271	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	573	873	-	-	1405	-
Stage 1	859	-	-	-	-	-
Stage 2	775	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	554	873	-	-	1405	-
Mov Cap-2 Maneuver	554	-	-	-	-	-
Stage 1	859	-	-	-	-	-
Stage 2	749	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.5	0		1.5		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 851	1405	-		
HCM Lane V/C Ratio	-	- 0.056	0.031	-		
HCM Control Delay (s)	-	- 9.5	7.6	0		
HCM Lane LOS	-	- A	A	A		
HCM 95th %tile Q(veh)	-	- 0.2	0.1	-		

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	2	100	0	1	124
Future Volume (vph)	0	2	100	0	1	124
Satd. Flow (prot)	1644	0	1900	0	0	1863
Flt Permitted						
Satd. Flow (perm)	1644	0	1900	0	0	1863
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	0%	2%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2	0	116	0	0	145
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 17.3%			ICU Level of Service A			
Analysis Period (min) 15						

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	0	2	100	0	1	124
Future Vol, veh/h	0	2	100	0	1	124
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	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	2	116	0	1	144
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	263	116	0	0	116	0
Stage 1	116	-	-	-	-	-
Stage 2	147	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.12	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.218	-
Pot Cap-1 Maneuver	730	942	-	-	1473	-
Stage 1	914	-	-	-	-	-
Stage 2	885	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	729	942	-	-	1473	-
Mov Cap-2 Maneuver	729	-	-	-	-	-
Stage 1	914	-	-	-	-	-
Stage 2	884	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	8.8	0		0.1		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	- 942	1473	-		
HCM Lane V/C Ratio	-	- 0.002	0.001	-		
HCM Control Delay (s)	-	- 8.8	7.4	0		
HCM Lane LOS	-	- A	A	A		
HCM 95th %tile Q(veh)	-	- 0	0	-		

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	327	1	0	216	60	1	0	1	60	0	81
Future Volume (vph)	116	327	1	0	216	60	1	0	1	60	0	81
Satd. Flow (prot)	0	1875	0	0	1827	0	0	1728	0	0	1700	0
Flt Permitted		0.987						0.976			0.979	
Satd. Flow (perm)	0	1875	0	0	1827	0	0	1728	0	0	1700	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	0%	0%	0%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	472	0	0	294	0	0	2	0	0	150	0
Sign Control		Free			Free			Yield			Stop	

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 58.5%

ICU Level of Service B

Analysis Period (min) 15

Intersection

Int Delay, s/veh 4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	116	327	1	0	216	60	1	0	1	60	0	81
Future Vol, veh/h	116	327	1	0	216	60	1	0	1	60	0	81
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Yield	Yield	Yield	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	1	1	1	0	0	0	1	1	1
Mvmt Flow	123	348	1	0	230	64	1	0	1	64	0	86

Major/Minor	Major1			Major2			Minor2			
Conflicting Flow All	294	0	0	349	0	0	857	858	262	
Stage 1	-	-	-	-	-	-	262	262	-	
Stage 2	-	-	-	-	-	-	595	596	-	
Critical Hdwy	4.1	-	-	4.11	-	-	7.11	6.51	6.21	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	
Follow-up Hdwy	2.2	-	-	2.209	-	-	3.509	4.009	3.309	
Pot Cap-1 Maneuver	1279	-	-	1215	-	-	279	295	779	
Stage 1	-	-	-	-	-	-	745	693	-	
Stage 2	-	-	-	-	-	-	493	493	-	
Platoon blocked, %		-	-		-	-				
Mov Cap-1 Maneuver	1279	-	-	1215	-	-	254	260	779	
Mov Cap-2 Maneuver	-	-	-	-	-	-	254	260	-	
Stage 1	-	-	-	-	-	-	656	693	-	
Stage 2	-	-	-	-	-	-	434	434	-	

Approach	EB	WB	SB
HCM Control Delay, s	2.1	0	18.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	1279	-	-	1215	-	-	414
HCM Lane V/C Ratio	0.096	-	-	-	-	-	0.362
HCM Control Delay (s)	8.1	0	-	0	-	-	18.6
HCM Lane LOS	A	A	-	A	-	-	C
HCM 95th %tile Q(veh)	0.3	-	-	0	-	-	1.6

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	47	88	180	100	184	153
Future Volume (vph)	47	88	180	100	184	153
Satd. Flow (prot)	1638	0	1791	0	0	1849
Flt Permitted	0.983					0.973
Satd. Flow (perm)	1638	0	1791	0	0	1849
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	4%	4%	1%	1%	0%	0%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	144	0	297	0	0	359
Sign Control	Stop		Free			Free
Intersection Summary						
Control Type: Unsignalized						
Intersection Capacity Utilization 51.8%			ICU Level of Service A			
Analysis Period (min) 15						

Intersection						
Int Delay, s/veh	4.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	47	88	180	100	184	153
Future Vol, veh/h	47	88	180	100	184	153
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	94	94	94	94	94	94
Heavy Vehicles, %	4	4	1	1	0	0
Mvmt Flow	50	94	191	106	196	163
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	799	245	0	0	298	0
Stage 1	245	-	-	-	-	-
Stage 2	554	-	-	-	-	-
Critical Hdwy	6.44	6.24	-	-	4.1	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	-	-	2.2	-
Pot Cap-1 Maneuver	352	789	-	-	1275	-
Stage 1	791	-	-	-	-	-
Stage 2	572	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	293	789	-	-	1275	-
Mov Cap-2 Maneuver	293	-	-	-	-	-
Stage 1	791	-	-	-	-	-
Stage 2	475	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	15.2	0		4.6		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	496	1275	-	
HCM Lane V/C Ratio	-	-	0.29	0.154	-	
HCM Control Delay (s)	-	-	15.2	8.3	0	
HCM Lane LOS	-	-	C	A	A	
HCM 95th %tile Q(veh)	-	-	1.2	0.5	-	

Lanes, Volumes, Timings
3: NE 232nd Avenue & NE 28th Street

2018 Total Traffic-MIT w NB LT, PM Peak Hour

5/18/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	384	197	55	242	0	199	0	52	0	0	2
Future Volume (vph)	5	384	197	55	242	0	199	0	52	0	0	2
Satd. Flow (prot)	0	1814	0	0	1828	0	1805	1615	0	0	1644	0
Flt Permitted					0.991		0.950					
Satd. Flow (perm)	0	1814	0	0	1828	0	1805	1615	0	0	1644	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	3%	3%	3%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	630	0	0	319	0	214	56	0	0	2	0
Sign Control		Free			Free			Stop			Yield	

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 76.0%

ICU Level of Service D

Analysis Period (min) 15

Intersection												
Int Delay, s/veh	14.1											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	5	384	197	55	242	0	199	0	52	0	0	2
Future Vol, veh/h	5	384	197	55	242	0	199	0	52	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Yield	Yield	Yield
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	3	3	3	0	0	0	0	0	0
Mvmt Flow	5	413	212	59	260	0	214	0	56	0	0	2

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	260	0	0	625	0	0	908	908	519
Stage 1	-	-	-	-	-	-	530	530	-
Stage 2	-	-	-	-	-	-	378	378	-
Critical Hdwy	4.1	-	-	4.13	-	-	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.227	-	-	3.5	4	3.3
Pot Cap-1 Maneuver	1316	-	-	952	-	-	258	277	561
Stage 1	-	-	-	-	-	-	536	530	-
Stage 2	-	-	-	-	-	-	648	619	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1316	-	-	952	-	-	243	256	561
Mov Cap-2 Maneuver	-	-	-	-	-	-	243	256	-
Stage 1	-	-	-	-	-	-	533	527	-
Stage 2	-	-	-	-	-	-	601	574	-

Approach	EB	WB	NB
HCM Control Delay, s	0.1	1.7	61.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	243	561	1316	-	-	952	-	-
HCM Lane V/C Ratio	0.881	0.1	0.004	-	-	0.062	-	-
HCM Control Delay (s)	74.1	12.1	7.7	0	-	9	0	-
HCM Lane LOS	F	B	A	A	-	A	A	-
HCM 95th %tile Q(veh)	7.3	0.3	0	-	-	0.2	-	-

Lanes, Volumes, Timings
3: NE 232nd Avenue & NE 28th Street

2018 Total-MIT w sig, PM Peak Hour

5/18/2016

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	384	197	55	242	0	199	0	52	0	0	2
Future Volume (vph)	5	384	197	55	242	0	199	0	52	0	0	2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	3%	3%	3%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		25.0	25.0	
Total Split (%)	58.3%	58.3%		58.3%	58.3%		41.7%	41.7%		41.7%	41.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effect Green (s)		19.4			19.4			12.9			12.9	
Actuated g/C Ratio		0.46			0.46			0.31			0.31	
v/c Ratio		0.73			0.44			0.59			0.00	
Control Delay		14.3			10.3			18.6			0.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		14.3			10.3			18.6			0.0	
LOS		B			B			B			A	
Approach Delay		14.3			10.3			18.6			0.0	
Approach LOS		B			B			B			A	

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 42.1

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 14.2

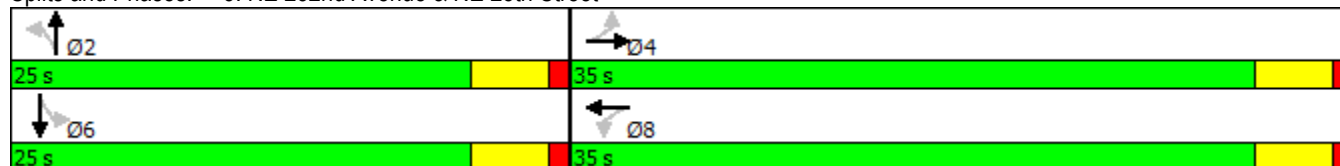
Intersection LOS: B

Intersection Capacity Utilization 80.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 3: NE 232nd Avenue & NE 28th Street



HCM 2010 Signalized Intersection Summary
3: NE 232nd Avenue & NE 28th Street

2018 Total-MIT w sig, PM Peak Hour

5/18/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	384	197	55	242	0	199	0	52	0	0	2
Future Volume (veh/h)	5	384	197	55	242	0	199	0	52	0	0	2
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1845	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	5	413	212	59	260	0	214	0	56	0	0	2
Adj No. of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	0	0	3	3	3	0	0	0	0	0	0
Cap, veh/h	100	596	303	202	754	0	461	11	78	0	0	409
Arrive On Green	0.50	0.50	0.50	0.50	0.50	0.00	0.25	0.00	0.25	0.00	0.00	0.25
Sat Flow, veh/h	3	1185	603	171	1501	0	1131	44	307	0	0	1615
Grp Volume(v), veh/h	630	0	0	319	0	0	270	0	0	0	0	2
Grp Sat Flow(s),veh/h/ln	1791	0	0	1673	0	0	1482	0	0	0	0	1615
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	5.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	9.9	0.0	0.0	3.8	0.0	0.0	6.1	0.0	0.0	0.0	0.0	0.0
Prop In Lane	0.01		0.34	0.18		0.00	0.79		0.21	0.00		1.00
Lane Grp Cap(c), veh/h	999	0	0	956	0	0	550	0	0	0	0	409
V/C Ratio(X)	0.63	0.00	0.00	0.33	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.00
Avail Cap(c_a), veh/h	1580	0	0	1438	0	0	997	0	0	0	0	899
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	7.0	0.0	0.0	5.5	0.0	0.0	12.5	0.0	0.0	0.0	0.0	10.3
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.2	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	0.0	0.0	2.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0
LnGrp Delay(d),s/veh	7.7	0.0	0.0	5.7	0.0	0.0	13.2	0.0	0.0	0.0	0.0	10.3
LnGrp LOS	A			A			B					B
Approach Vol, veh/h		630			319			270				2
Approach Delay, s/veh		7.7			5.7			13.2				10.3
Approach LOS		A			A			B				B
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		13.8		23.0		13.8		23.0				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		20.5		30.5		20.5		30.5				
Max Q Clear Time (g_c+l1), s		8.1		11.9		2.0		5.8				
Green Ext Time (p_c), s		1.2		6.6		1.5		7.4				
Intersection Summary												
HCM 2010 Ctrl Delay				8.4								
HCM 2010 LOS				A								

OFFICER REPORTED CRASHES THAT OCCURRED ON ALL ROADS IN THE CITY OF CAMAS

1/1/2010 - 12/31/2014

UNDER 23 UNITED STATES CODE – SECTION 409, THIS DATA CANNOT BE USED IN DISCOVERY OR AS EVIDENCE

AT TRIAL IN ANY ACTION FOR DAMAGES AGAINST THE WSDOT, OR ANY JURISDICTIONS INVOLVED IN THE DATA

PRIMARY TRAFFICWAY	CITY OR MISC BLOCK NUMBER	CITY OR MISC DISTANCE FROM REFERENCE POINT	CITY OR MISC REFERENCE POINT MILES OR FEET	CITY OR MISC COMPASS DIRECTION FROM REFERENCE POINT	CITY OR MISC REFERENCE POINT NAME	REPORT NUMBER	DATE	# IN J	# V E H	FIRST COLLISION TYPE/OBJECT STRUCK	VEH 1 ACTION	MV DRIVER CONT CIRC 1 (UNIT 1)	VEH 1 COMP DIR FROM	VEH 1 COMP DIR TO
NE 232ND AVE	1000	200	F	N	NE 9TH ST	E213264	12/09/2012	0	1	Over Embankment - No Guardrail Present	Going Straight Ahead	Exceeding Reas. Safe Speed	North	South
NE 28TH ST	22800	0.19	M	W	NE 232ND AVE	3252967	09/21/2012	0	1	Domestic animal (horse, cow, sheep,	Going Straight Ahead	Other	West	East

City of Camas TIF PROJECT LOCATIONS



NO SCALE

LEGEND

North District TIF Projects

- Roadway Projects
- Intersection Projects

South District TIF Projects

- Roadway Projects
- Intersection Projects

