

TRAFFIC IMPACT ANALYSIS

OAK TREE STATION

Camas, Washington

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ENGINEERING NORTHWEST

Contents

INTRODUCTION	4
TRAFFIC ANALYSIS CONSIDERATION	5
SCOPE OF TRAFFIC IMPACT STUDY AREA.....	5
SITE CONDITIONS AND ADJACENT LAND USES	6
PEDESTRIAN AND BICYCLE FACILITIES.....	6
TRANSIT FACILITIES.....	6
PROPOSED DEVELOPMENT TRIP GENERATION ESTIMATE.....	6
TRIP DISTRIBUTION AND ASSIGNMENT	11
TRAFFIC OPERATIONAL ANALYSIS.....	12
CAPACITY ANALYSIS.....	12
QUEUING ANALYSIS.....	13
SIGHT DISTANCE.....	13
LEFT TURN LANE WARRANTS.....	14
2027 WITHOUT PROJECT TRAFFIC L.O.S.....	14
2027 WITH PROJECT TRAFFIC L.O.S.....	15
PROJECT CROSS CIRCULATION.....	15
FINDINGS AND RECOMMENDATIONS	15
REFERENCES.....	16

APPENDIX A

- Figure 1 Project Vicinity Map
- Figure 2 Existing Lane Configurations and Traffic Control
- Figure 3 Existing A.M. and P.M Peak Hour Traffic Volumes
- Figure 4 2023 “Without” A.M. and P.M. Peak Hour Traffic Volumes
- Figure 5 Trip Distribution and Assignment for Residential Use
- Figure 6 2023 “With Project” A.M. and P.M. Peak Hour Traffic Volumes
- Figure 7 Site Plan

APPENDIX B Existing Traffic Counts

APPENDIX C	Existing Level of Services
APPENDIX D	2023 “Without Project” LOS
APPENDIX E	2023 “With Project” LOS
APPENDIX F	Internal Capture Rate Worksheet
APPENDIX G	PM Peak Trip Calculator

INTRODUCTION

This project will consist of a 4,704 sq.ft indoor eating area which is surrounded by 22 food carts. Also the project will consist of a drive thru 600 sq.ft coffee shop located in the southwest corner of the project. The project also proposes to construct 12,574 square-foot commercial building which will be located along the project's north boundary line. Currently, all proposed parcels for the development are zoned Commercial Community (CC). Access will be provided by utilizing the existing driveway onto NW Friberg-Strunk St and constructing a new driveway approach onto NW Lake Road which will be right-in / right-out. Please refer to the plans included in this application for more information on the proposed lot layout.

As indicated on the vicinity map the 3.95-acre subject site is located north side of NW Lake Road in the City of Camas Washington. The approximate latitude and longitude are 45.81151278°N 122.6.9973816°W and the legal description is a portion of the SE 1/4, S29, T2N, R3E of the Willamette Meridian. The regulatory jurisdictional agency is the City of Camas, Washington.



Vicinity Map

The proposed development is estimated to generate more than 200 vpd. As per City of Camas a traffic impact study is required.

TRAFFIC ANALYSIS CONSIDERATION

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

- Inventory and record pertinent information such as traffic control devices, lane conditions, pedestrian & bicycle facilities, transit zones, parking conditions, and street characteristics
- Provide trip AM and PM Peak Distribution to and from the site down to less than 20 trips thru any given impacted intersection.
- Intersections to be analyzed will be based on trip to the intersection GREATER than 20 Peak trips.
- Record data on typical weekdays during the AM and PM peak traffic hours
- Forecast year 2027 traffic conditions during the weekday AM and PM peak hours
- Level of service (LOS) analysis of the study intersections to measure the approach delays for comparison to City of Camas standards
- Verification of intersection sight distance at the existing/proposed accesses.
- On-Site Access
- Implementation of the trip generation rates for AM & PM the proposed development

SCOPE OF TRAFFIC IMPACT STUDY AREA

The scope of the traffic impact study area included the following intersections:

- NW Friberg-Strunk Street/ NW Lake Road
- NW 192 Avenue / SE 1st Street (Within the City of Vancouver Limits)
- NW Payne Street / NW Lake Road

The remainder of this report presents the following analysis:

- Existing traffic conditions in the project study area
- 2027 “Without Project” condition to establish the baseline condition by which the project impacts could be determined.

- Trip generation estimates for the proposed development
- 2027 “With Project” condition to determine project traffic impacts

SITE CONDITIONS AND ADJACENT LAND USES

The study site is located northeast of the intersection of NW Friberg-Strunk Street and NW Lake Road. Table 1 summarizes the key characteristics of the adjacent roadways.

Table 1

Roadway	Classification	Cross Section	Speed Limit	Side-walks	Bicycle Lanes	Median	On-Street Parking
NW Lake Rd	Arterial Roadway	4-lanes 5-lane	40 35	yes	yes	yes	no
NW Friberg-Strunk rd	Collector Arterial	2-lanes	20	yes	yes	no	no
NW Larkspur St	Arterial Roadway	2-lanes	25	Intermit	No	No	no
NE 192 nd Ave	Principal Arterial	2/4-lanes	40	yes	yes	yes	No

PEDESTRIAN AND BICYCLE FACILITIES

Sidewalks are currently provided along the site frontage on NW Friberg-Strunk Rd and NW Lake Rd. Currently, no bike lanes exist on both sides of NW Friberg-Strunk Rd.

TRANSIT FACILITIES

C-Tran provides public transit service in Clark County. Currently, there is no transit service in the project vicinity.

PROPOSED DEVELOPMENT TRIP GENERATION ESTIMATE

The proposed land use is community commercial (CC), the area of the approved use is listed in CMC table 1 18.07.030. ITE has developed data regarding various trip types that all developments experience. These are found in several places, however, for this

analysis, the Trip Generation Manual 11th Edition as well as the Trip Generation Handbook were used to develop the criteria for this analysis.

Generally, all proposed developments will be made up of one or more of the following trip types: new (destination) trips, pass-by trips, diverted trips, and shared (internal trips). To better understand the trip types available for land access a description of each specific trip type follows.

New (Destination) Trips- These types of trips occur only to access a specific land use such as a new retail development. These types of the trip will travel to and from the new site and a single other destination such as home or work. This is the only trip type that will result in a net increase in the total amount of traffic within the study area. The reason primarily is that these trips represent planned trips to a specific destination that never took trips to that part of the City before the development was constructed and occupied. This project will develop new trips.

Pass-by Trips These trips represent vehicles that currently use adjacent roadways providing primary access to new land uses or project and are trip of convenience. These trips, however, have an ultimate destination other than the project in question. They should be viewed as customers who stop in on their way home from work. Pass-by trips are almost always associated with commercial/retail types of development along major roadways. Therefore, for this project pass-by trips will be considered.

Estimates of daily and weekday am and pm peak hour vehicle trip ends for the proposed development were calculated from empirical observations at other similar developments. As noted earlier, trip generation rates are determined by use of the Trip Generation Manual, 11th Edition published by the Institute of Transportation Engineers (ITE) to determine the number of trips generated during the AM and PM Peak Hour. The purpose of the Trip Generation Manual is to compile and quantify empirical trip generation rates for specific land uses within the US.

Proposed Land Uses

For the 12,547 sf (12.5 ksf) of proposed retail land use, Land Use Code LUC #822, Strip Retail Plaza (40<k) was used to establish the number of potential trips generated by the

future retail land use. The fitted curve equation and the anticipated number of AM and PM peak hour trips for the future retail land use are shown on Table 1.

Table 1 -Trip Generation Rates for LUC #822 – Strip Retail Plaza (<40K)

KSF	AM Peak Hour Trips			PM Peak Hour Trips		
	Vol. @ 2.36/Trips	Directional Distribution		Vol. @ Fitted Curve Equation / Trips	Directional Distribution	
		60% IN	40% Out		50% In	50% Out
12.5	30	18	12	82	41	41
Internal Capture	-	-	-	28	14	14
Pass-by*	4	2	2	8	4	4
New	26	16	10	46	23	23
Average Daily Trip End (ADT)				Fitted Curve Equation AM – $T = 2.36(x)$ PM - $\ln(T) = 0.711 \ln(x) + 2.72$ ADT – $\ln(T) = 42.20(x) + 22.68$ T = Trips/units		
KSF	Fitted Curve		ADT			
12.5			757			

- AM and PM 14% Pass-by Percentage per the ITE Trip Generation Handbook 3rd Edition.

For the 600 sf (0.6 ksf) of the proposed coffee shop with two drive-through windows, Land Use Code LUC #938, Coffee/Donut shop with drive-through windows was used to establish the number of potential trips generated by the retail land use. The average rate and the anticipated number of AM and PM peak-hour trips for future retail land use are shown in Table 2.

Table 2 -Trip Generation Rates for LUC #938 – Coffee/Donut Shop w/Drive-thru Win

KSF or Windows	AM Peak Hour Trips			PM Peak Hour Trips		
	Vol. @ 85.88/Trips	Directional Distribution		Vol. @ Fitted Curve Equation / Trips	Directional Distribution	
		51% IN	49% Out		50% In	50% Out
0.6 sf (2 win)	51	26	25	30	15	15
Internal Capture	-	-	-	25	12	13
Pass-by*	46	24	22	1	0	1
New	5	2	3	4	3	1
Average Daily Trip End (ADT)				Fitted Curve Equation AM – $T = 2.36(x)$ PM - $\ln(T) = 0.711 \ln(x) + 2.72$ ADT – $\ln(T) = 42.20(x) + 22.68$ T = Trips/units		
KSF	Fitted Curve		ADT			
12.5			757			

- AM Pass-by 90% per the ITE Trip Generation Manual 11th Edition
- PM 14% Pass-by Percentage per the ITE Trip Generation Handbook 3rd Edition.

For the 4,704 sf (4.7. ksf) proposed enclosed building area to be used for 800 sq.ft. bar area, and 400 sq.ft ice cream and 280 sq.ft. dessert with the remaining area as open space and general setting. To the north and east of the building the project proposed 22 food carts at 160 sf each, thus total high-turnover (sit-down restaurant is 5,000 sf (5.0 ksf) was used to establish the number of potential trips generated by the restaurant land use. The average rate and the anticipated number of PM peak hour trips for future high-turnover restaurant land use are shown in Table 3. The food carts will only be open to the public for lunch and dinner. The food cart and the enclosed building will not be open from 7 AM to 9 am which is the peak AM hour period.

Table 3 -Trip Generation Rates for LUC #932 –High-Turnover (Sit-Down) Restaurant

KSF	AM Peak Hour Trips			PM Peak Hour Trips		
	Vol. @ 9.57/Trips	Directional Distribution		Vol. @ Fitted Curve Equation / Trips	Directional Distribution	
		55% IN	45% Out		61% In	39% Out
5.0	-	-	-	45	27	18
Internal Capture	-	-	-	19	12	7
Pass-by*	-	-	-	4	2	2
New	-	-	-	22	13	9
Average Daily Trip End (ADT)						
KSF	Fitted Curve		ADT			
5.0			976			

- 14% for PM Pass-by Percentage per the ITE Trip Generation Handbook 3rd Edition.

Total New Trip Generation Summary (Proposed)

Land Use Code (LUC)	AM Peak Hour			PM Peak Hour		
	Vol. per LUC	Directional Distribution		Vol. per LUC	Directional Distribution	
		IN	OUT		IN	OUT
Strip Retail Plaza 822	26	16	10	46	23	23
Coffee w/drive-thru 938	5	2	3	4	3	1
High Turnover Restaurant 932	-	-	-	22	13	9
Total	31	18	13	72	39	33

TRIP DISTRIBUTION AND ASSIGNMENT

A generalized trip distribution pattern for the A.M. and P.M. peak hour project-generated trips was developed for the existing traffic counts, previous traffic studies, locations of major employment centers and residential areas, and logical travel paths to and from major travel corridors. Appendix A “Figure 5” shows the resulting trip distribution pattern and assignment of A.M. and P.M. peak hour project generated trips.

TRAFFIC OPERATIONAL ANALYSIS

In order to evaluate traffic flow and delay in the area the signalized intersection a Level of Services (LOS) analyses were completed in the pm peak hour period and am peak hour period for the following scenarios: The analyzed intersections identified below using the methodologies outlined in the 2010 Highway Capacity Manual (HCM). According to the HCM there are six levels of service (LOS) by which the operational performance of an intersection may be described. These levels of service range between LOS "A" which indicates a relatively free-flowing condition and LOS "F" which indicates operational breakdown. LOS "D" is the City of Camas adopted level of service standard for arterial/collector intersections. The overall level of service was reported in the table below.

Table 4: 2022 Existing Levels of Service

	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Average Delay (sec)	LOS	Average Delay (sec)
Signalized Intersections				
NW Friberg-Strunk St/NW Lake Rd	**	**	A	10.0
NW Lake Road / NW Larkspur Rd	**	**	B	14.7
SE 1 st St / NE & SE 192 Avenue	**	**	C	32.7

**The project doesn't send no more than 20 AM peak to the intersection listed in table 4, thus not required by code to analyze the Level of Services.

In order to perform the Level of Service (LOS) analysis at the intersections, manual traffic counts were conducted during the pm peak (4:00-6:00 pm) traffic hours and am peak (7:00-9:00 am). The existing volume data for the weekday peak hours (see Appendix A).

CAPACITY ANALYSIS

Capacity analysis was performed to determine the level of service for the weekday pm peak hour and weekday am peak hour. Synchro 10 software was used to determine the

level of service for each scenario considered. The program is based on the latest Highway Capacity Manual (HCS) methodology.

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. 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 the 2000 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

QUEUING ANALYSIS

Queuing analysis at the project access intersection was not conducted due to low traffic volumes, acceptable levels of service, and acceptable accident rate in the 2027 "With Project" conditions.

SIGHT DISTANCE

Sight distance at the driveway approach onto NW Friberg-Strunk was reviewed in the field in accordance with City of Camas standards. Based on a posted speed of 20 miles per hour, City of Camas requires a minimum of 200 of sight distance to be available in both directions. The sight distance is to be measured from an eye height of 3.5 feet, at least fifteen feet from the edge of the uncontrolled public travel way. Based on the measurements obtained from the existing driveway approach along NW Friberg-Strunk

Rd the project has 200 feet of sight distance is available to the north and south. This distance exceeds City of Camas minimum sight distance requirements of 200 feet.

Sight distance at the driveway approach onto NW Lake Rd was reviewed in the field in accordance with City of Camas standards. Based on a posted speed of 40 miles per hour, the City of Camas requires a minimum of 400 of sight distance to be available in both directions. The sight distance is to be measured from an eye height of 3.5 feet, at least fifteen feet from the edge of the uncontrolled public travel way. Based on the measurements obtained from the proposed driveway approach along NW lake Rd the project has 400 feet of sight distance is available to the east. This distance exceeds City of Camas minimum sight distance requirements of 400 feet.

LEFT TURN LANE WARRANTS

None

2027 WITHOUT PROJECT TRAFFIC L.O.S.

The 2027 “Without Project” traffic volumes were calculated using a nominal 0.5 percent annual compounded growth factor as established by pervious traffic studies

Table 5: 2027 “Without Project” Levels of Service

	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Average Delay (sec)	LOS	Average Delay (sec)
Signalized Intersections	**	**		
NW Friberg-Strunk St/NW Lake Rd	**	**	A	9.3
NW Lake Road / NW Larkspur Rd	**	**	A	8.4
SE 1 st St / NE & SE 192 Avenue	**	**	D	38.4

**The project doesn't send no more than 20 AM peak to the intersection listed in table 5, thus not required by code to analyze Level of Services.

2027 WITH PROJECT TRAFFIC L.O.S.

The 2027 “Without Project” traffic volumes were calculated using a nominal 0.5 percent annual compounded growth factor as established by previous traffic studies.

The traffic study area intersection is projected to operate within the adopted level of service standards in the 2027 “With Project”

Table 6: 2027 “With Project” Levels of Service

	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Average Delay (sec)	LOS	Average Delay (sec)
Signalized Intersections				
NW Friberg-Strunk St/NW Lake Rd	**	**	B	15.0
NW Lake Road / NW Larkspur Rd	**	**	A	7.7
SE 1 st St / NE & SE 192 Avenue	**	**		

**The project doesn't send no more than 20 AM peak to the intersection listed in table 6, thus not required by code to analyze Level of Services.

PROJECT CROSS CIRCULATION

This project will not provide a private connection to the parcel to the east because a significant portion of the parcel is wetland and currently owned by the City of Camas.

FINDINGS AND RECOMMENDATIONS

Based on the results of the transportation impact analysis, the proposed Oak Tree Station development can be constructed while maintaining acceptable levels of service and safety at the study intersections. The primary findings and recommendations of this study are summarized below.

Existing Conditions

- All of the study intersections operated within operating standards deemed acceptable by the City of Camas during the weekday am and pm peak hours.

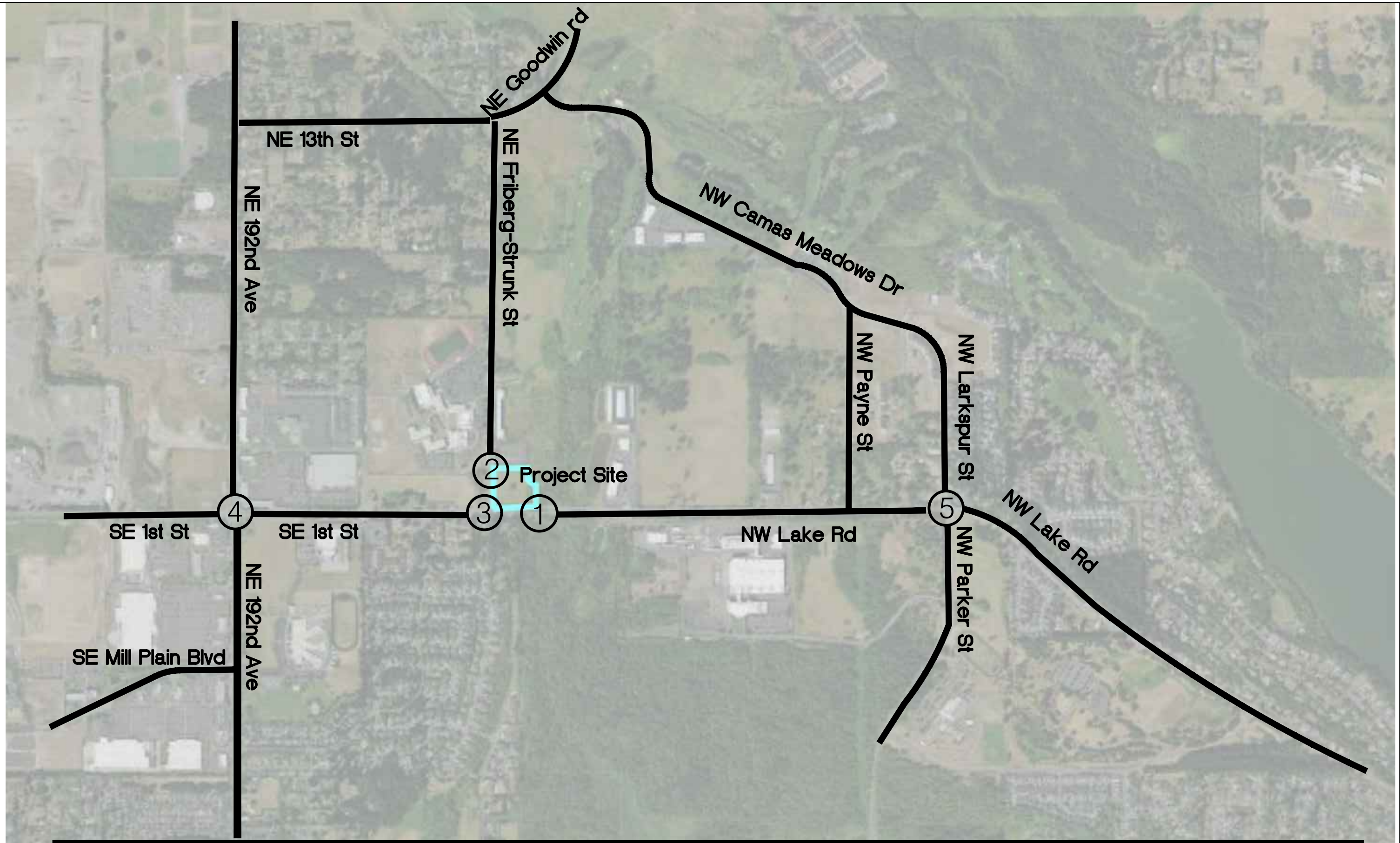
The YEAR 2022 and 2027 Total Traffic Conditions

- Year 2018 and 2023 total traffic conditions were estimated assuming continued local and regional growth plus the proposed site traffic. Operational analysis indicates that the study intersections are forecast to continue to operate at acceptable levels.
- Engineering Northwest LLC performed field sight distance measurements. The project access intersection will be able to meet the sight distance requirements assuming any vegetation within the sight distance triangles is properly maintained after construction.

REFERENCES

- 1) C-Tran, <http://www.c-tran.com>. March 201
- 2) Institute of Transportation Engineers, Trip Generation, 10th Editions
- 3) Transportation Research Board, Highway Capacity Manual, 2010

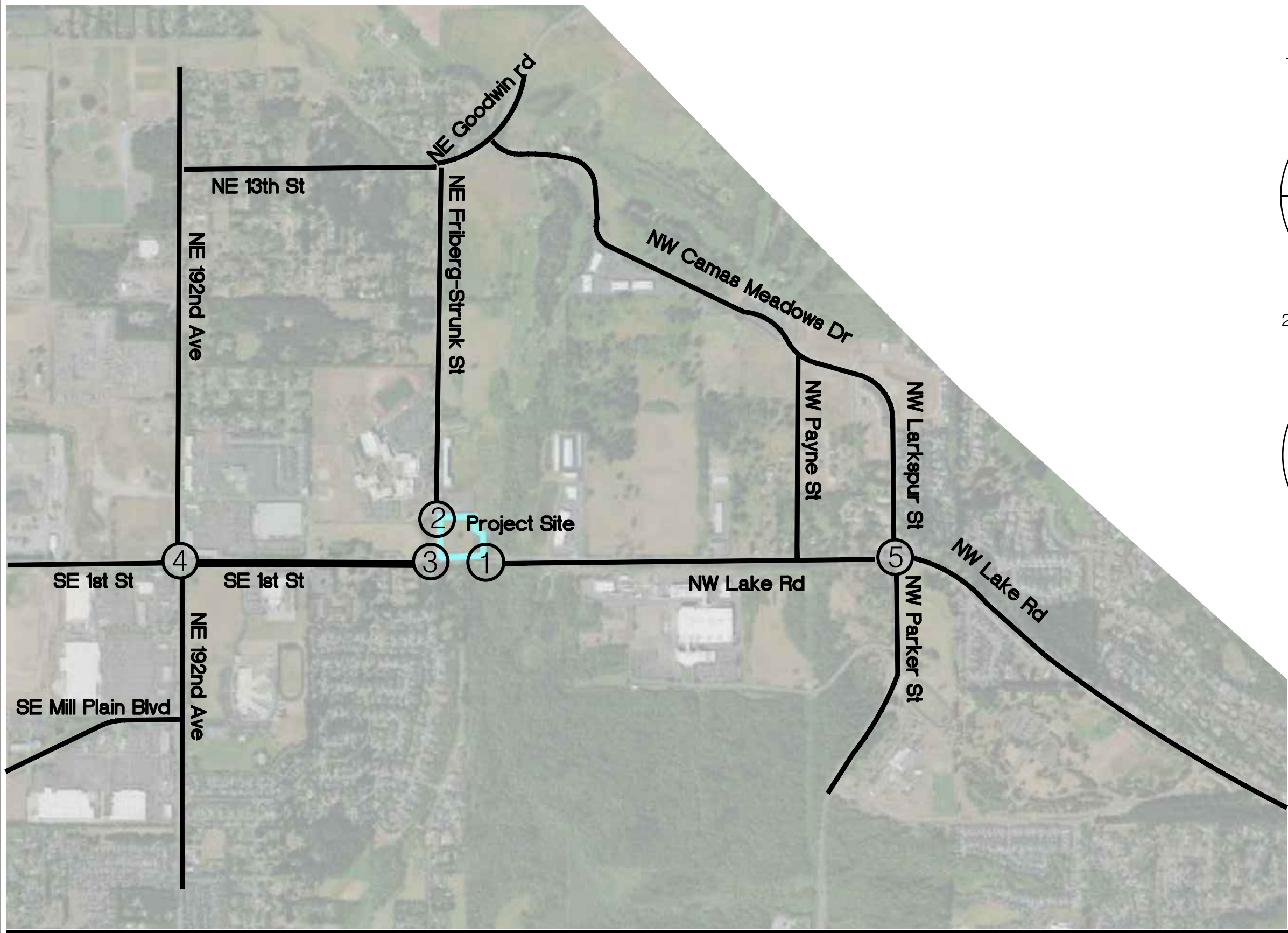
Appendix A



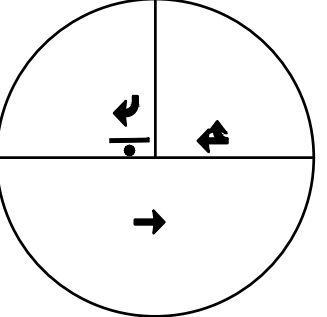
NOT TO SCALE

Site Vicinity Map
Camas, Washington

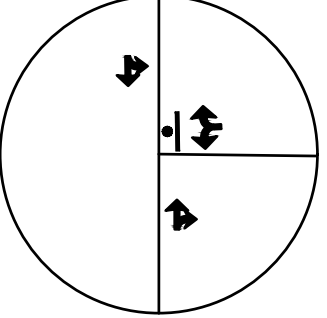
FIGURE
1



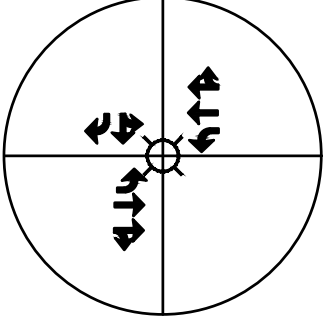
1. NW Lake Rd
/Project Access (South)



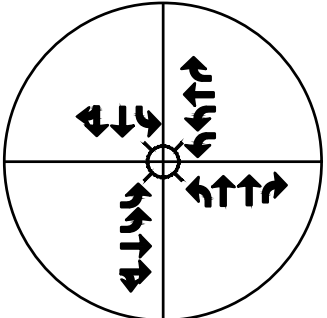
2. NE Fridberg Strunk
/Project Access (West)



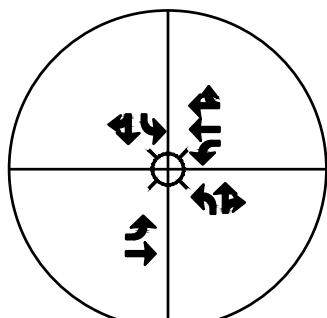
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/NW Lake Rd



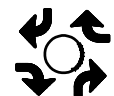
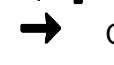
4. NE 1st Street
NE & SE 192nd Ave



5. NW Larkspur
NW Lake Rd



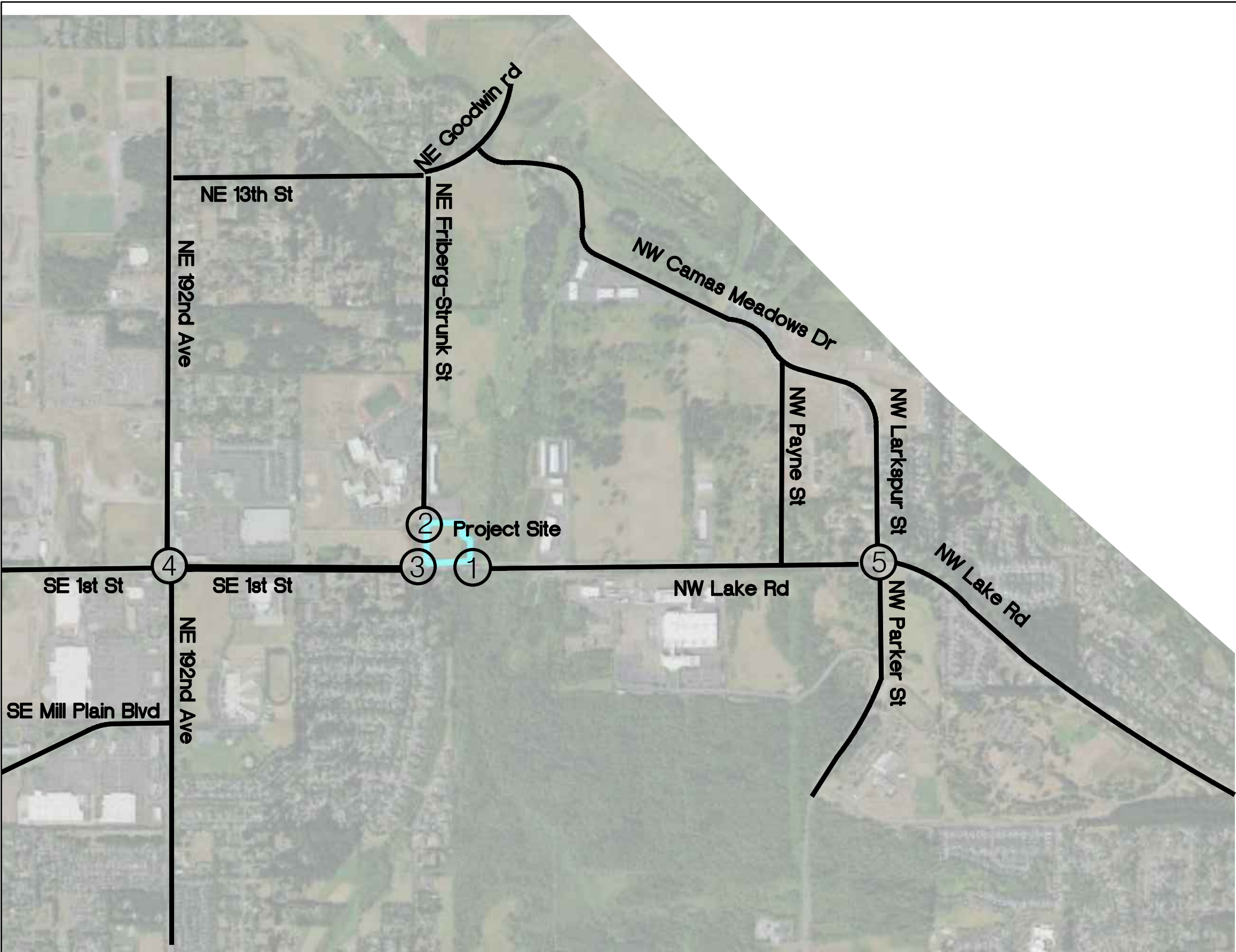
LEGEND

-  Roundabout
-  Channelized
-  Stop Sign
-  Traffic Signal

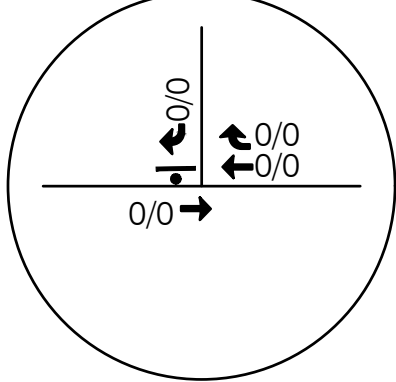
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Year 2022 Existing Lane Configuration
and Traffic Control

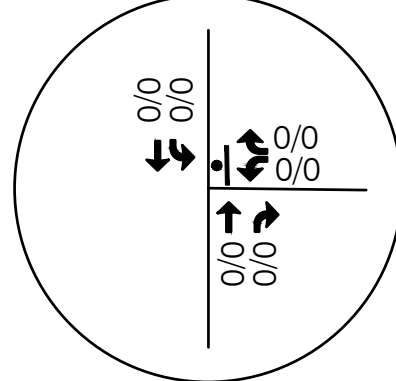
FIGURE
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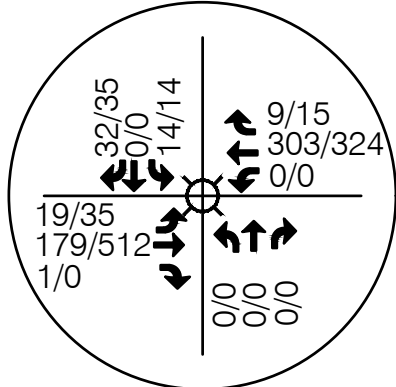
1. NW Lake Rd
/Project Access (South)



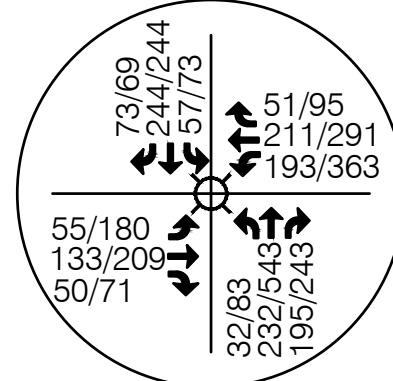
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/Project Access (West)



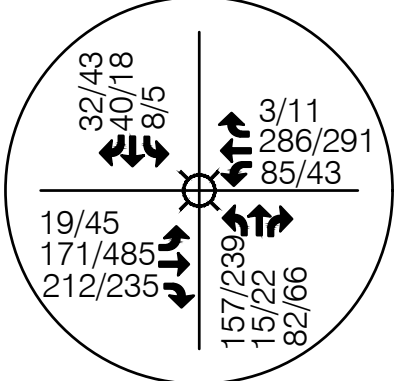
3. NE Fridberg Struck
/NW Lake Rd



4. NE 1st Street
NE & SE 192nd Ave



5. NW Larkspur
NW Lake Rd



LEGEND
##

A.M./P.M. Peak Hour
Traffic Volume

NOT TO SCALE

Year 2022 Existing Traffic Conditions
Weekday A.M. and P.M.
Peak Hour Traffic Volumes

FIGURE
3

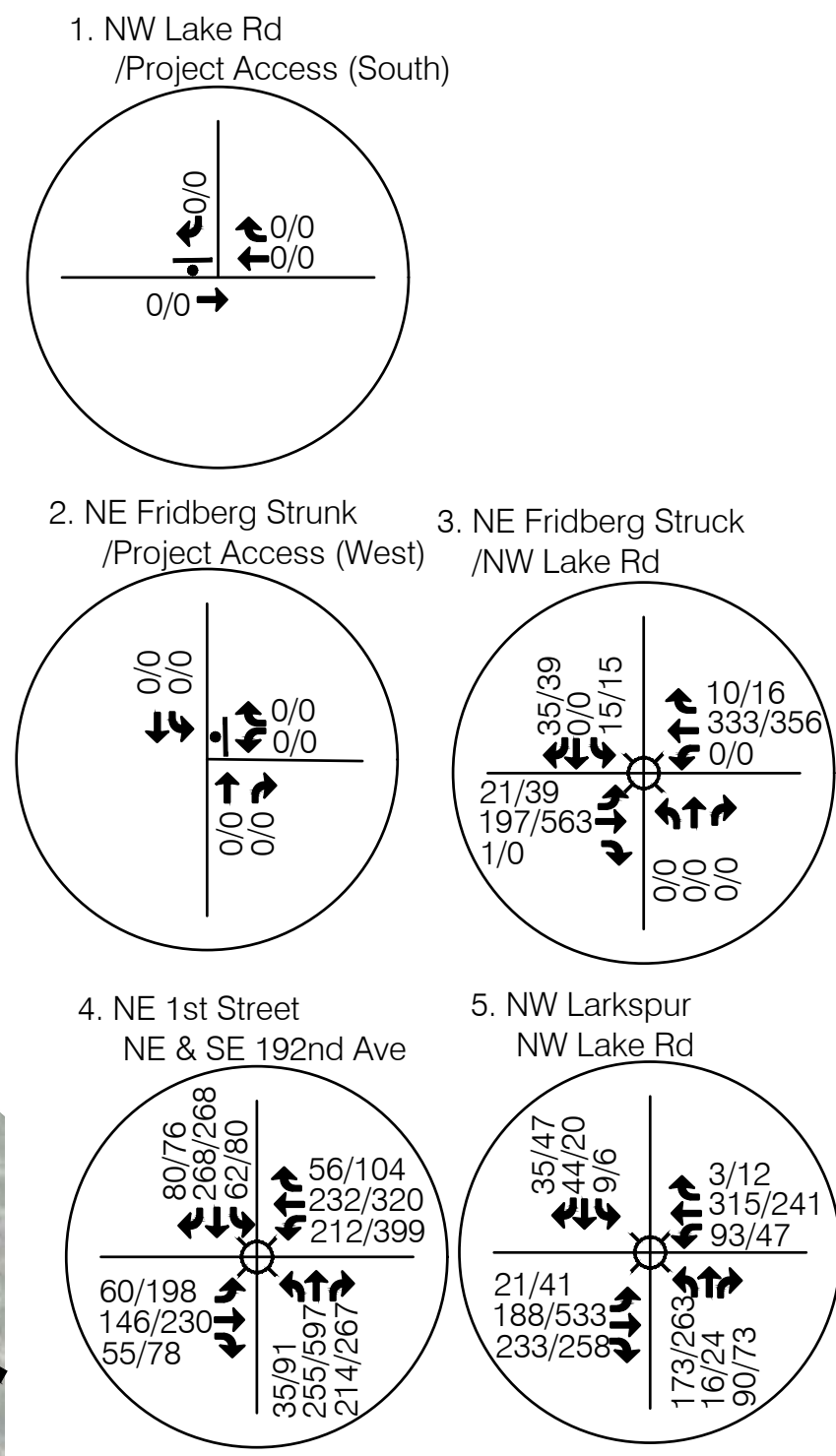
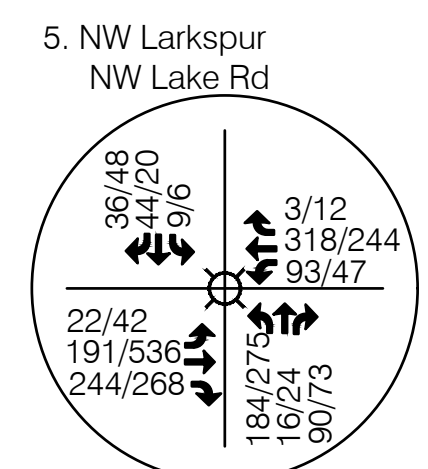
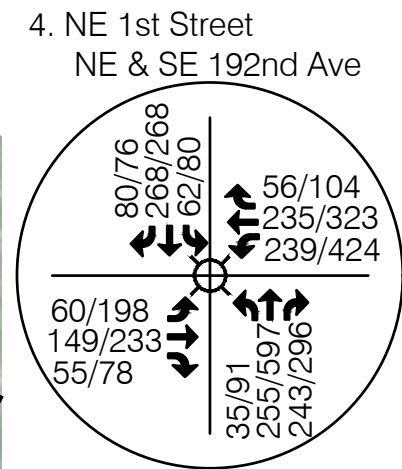
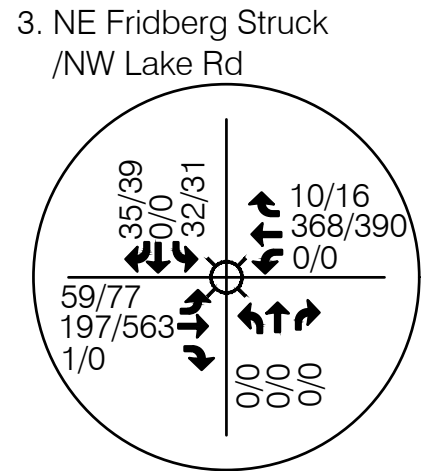
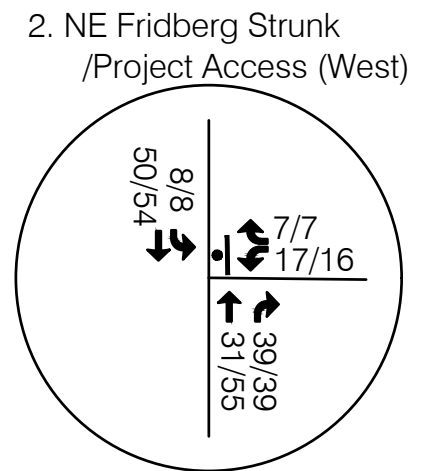
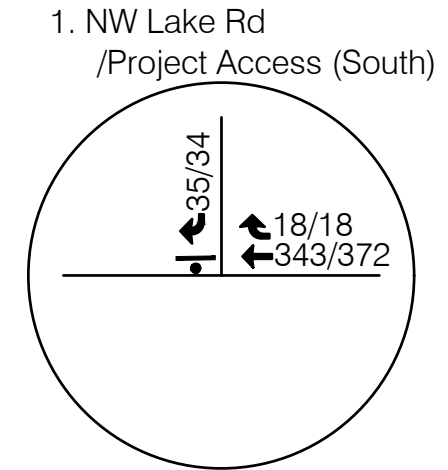
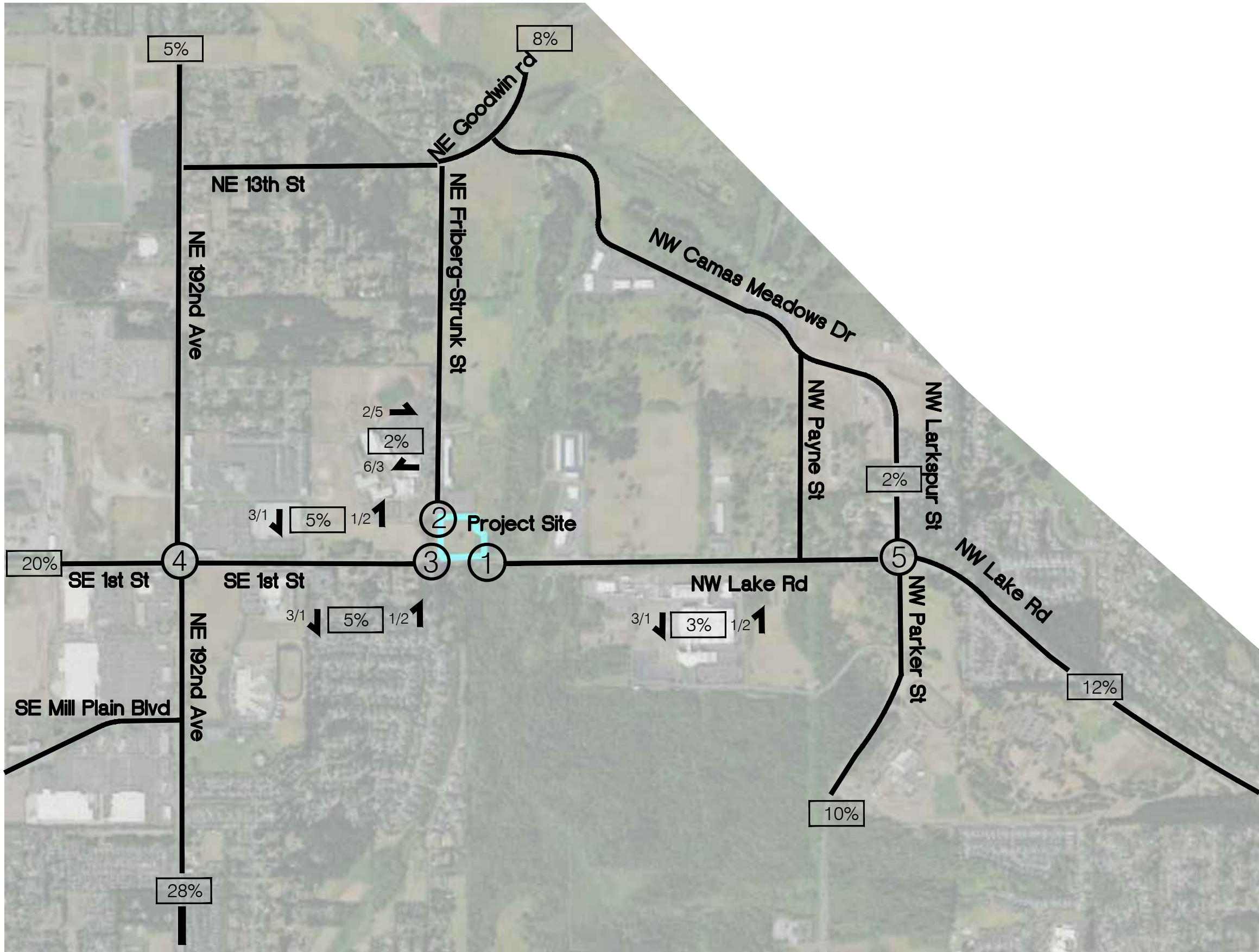


FIGURE
4



Trip Distribution and Assignment Traffic Volumes



LEGEND
/#

A.M./P.M. Peak Hour
Traffic Volume

NOT TO SCALE

2023 "With Project"
A.M. and P.M. Peak Hour Traffic Volumes

FIGURE
6

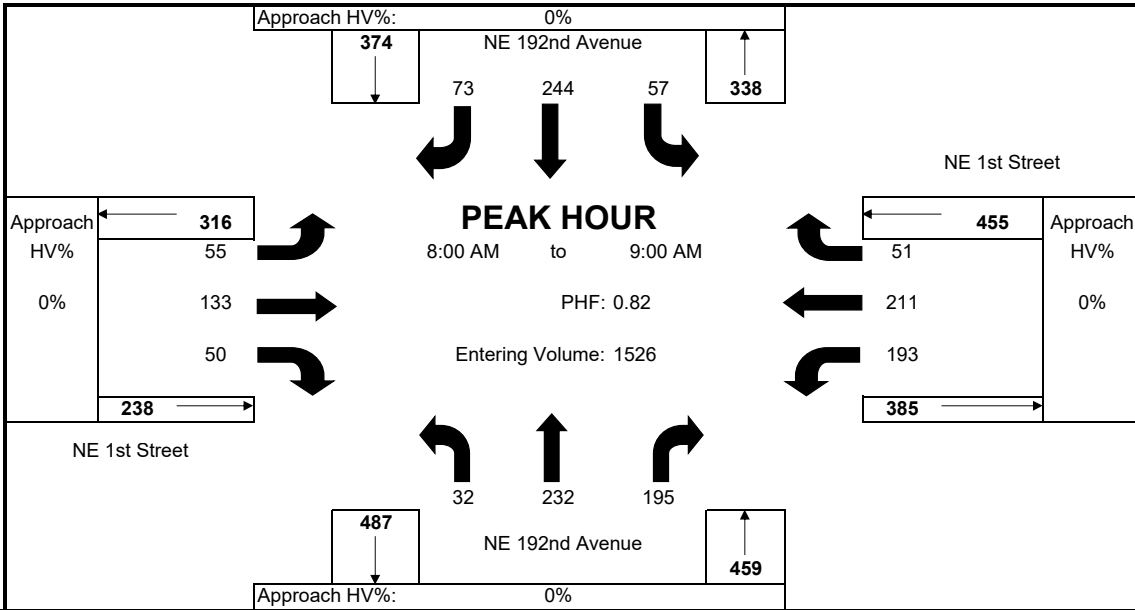
Appendix B

Existing Traffic Counts

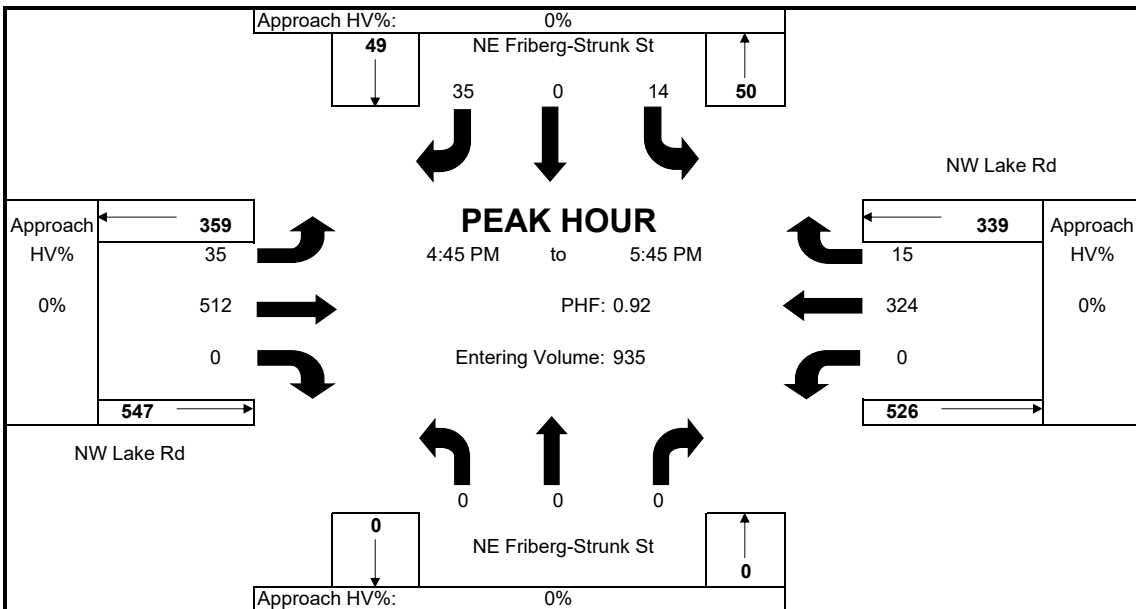
DATE: 1/5/2022
DAY: Wenesday
TIME: 7:30 to 8:30

LOCATION:
NE 192nd Avenue & NE 1st Street
Ridgefield, WA

DATE: 1/5/2022
DAY: Wednesday
TIME: 7:30 to 8:30



Time Period	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	←	↑	→	←	↓	↘	↑	→	↘	↓	←	↑	
7:30 7:45	13	54	78	17	80	15	17	56	13	73	70	22	508
7:45 8:00	7	50	37	12	68	20	12	32	18	36	38	18	348
8:00 8:15	9	62	29	19	54	9	17	21	12	32	32	13	309
8:15 8:30	10	52	42	21	56	15	8	28	10	35	35	9	321
8:30 8:45	8	58	46	14	75	16	12	39	15	61	68	17	429
8:45 9:00	5	60	78	19	59	17	18	45	13	65	76	12	467
9:00 9:15	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 9:30	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 9:45	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 10:00	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 10:15	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 10:30	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL:	52	336	310	102	392	92	84	221	81	302	319	91	2382
Peak HR %HV:	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Peak HR Factor:	0.80	0.94	0.63	0.87	0.81	0.84	0.76	0.74	0.83	0.74	0.69	0.75	

LOCATION:NE Friberg-Strunk St & NW Lake Rd
Camas, WA**DATE:** 1/5/2022**DAY:** Wednesday**TIME:** 16:00 to 9:00

Time Period	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	←	↑	→	←	↓	→	↑	→	↓	↓	←	↑	
16:00 16:15	0	0	0	5	0	6	10	95	0	0	77	6	199
16:15 16:30	1	0	0	8	0	4	5	120	0	0	98	3	239
16:30 16:45	0	0	0	6	0	3	10	119	0	0	92	2	232
16:45 17:00	0	0	0	9	0	5	5	106	0	0	91	4	220
17:00 17:15	0	0	0	10	0	3	12	118	0	0	75	5	223
17:15 17:30	0	0	0	9	0	2	7	165	0	0	66	4	253
17:30 17:45	0	0	0	7	0	4	11	123	0	0	92	2	239
17:45 18:00	0	0	0	5	0	3	5	119	0	0	68	4	204
18:00 18:15	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15 18:30	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30 18:45	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45 19:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL:	1	0	0	59	0	30	65	965	0	0	659	30	1809
Peak HR %HV:	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Peak HR Factor:	0.00	0.00	0.00	0.88	0.00	0.70	0.73	0.78	0.00	0.00	0.88	0.75	

DATE: 1/5/2022
DAY: Wednesday
TIME: 16:00 to 9:00

DATE: 1/5/2022
DAY: Wednesday
TIME: 16:00 to 9:00

Appendix C

Existing Level of Services

Lanes, Volumes, Timings

NE 192nd Ave & SE 1st St

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	133	50	193	211	51	32	232	195	57	244	73
Future Volume (vph)	55	133	50	193	211	51	32	232	195	57	244	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.97	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Fr't		0.959				0.850			0.850		0.966	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3394	0	3433	1863	1583	1770	3539	1583	1770	3419	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3394	0	3433	1863	1583	1770	3539	1583	1770	3419	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		46				112			238		33	
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		687			2643			1144			1304	
Travel Time (s)		11.7			45.1			19.5			22.2	
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
Adj. Flow (vph)	67	162	61	235	257	62	39	283	238	70	298	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	67	223	0	235	257	62	39	283	238	70	387	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6	3	7	4	1	3	8	
Permitted Phases						6			4			
Detector Phase	5	2		1	6	3	7	4	1	3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	15.0	5.0	5.0	15.0	

Baseline

Synchro 10 Light Report
Page 1

Lanes, Volumes, Timings

NE 192nd Ave & SE 1st St

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	9.5	22.5		9.5	22.5	22.5	9.5	22.5	9.5	22.5	22.5	
Total Split (s)	9.5	22.5		12.0	25.0	22.5	45.5	23.0	12.0	22.5	22.5	
Total Split (%)	9.3%	22.0%		11.7%	24.4%	22.0%	44.4%	22.4%	11.7%	22.0%	22.0%	
Maximum Green (s)	5.0	18.0		7.5	20.5	18.0	41.0	18.5	7.5	18.0	18.0	
Yellow Time (s)	3.5	3.5		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	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		None	Max	Max	None	C-Max	None	Max	Max	
Walk Time (s)		7.0			7.0	7.0		7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0		0		0	0	
Act Effect Green (s)	5.0	18.0		7.5	22.4	44.9	7.8	41.0	53.0	18.0	55.4	
Actuated g/C Ratio	0.05	0.18		0.07	0.22	0.44	0.08	0.40	0.52	0.18	0.54	
v/c Ratio	0.40	0.35		0.94	0.63	0.08	0.29	0.20	0.26	0.23	0.21	
Control Delay	54.7	31.0		90.9	45.3	0.8	49.6	20.5	2.4	38.5	12.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	54.7	31.0		90.9	45.3	0.8	49.6	20.5	2.4	38.5	12.5	
LOS	D	C		F	D	A	D	C	A	D	B	
Approach Delay		36.5			59.7			14.9			16.5	
Approach LOS		D			E			B			B	
Queue Length 50th (ft)	22	53		80	158	0	25	62	0	40	65	
Queue Length 95th (ft)	41	80		#133	219	1	51	83	26	73	88	
Internal Link Dist (ft)		607			2563			1064			1224	
Turn Bay Length (ft)												
Base Capacity (vph)	167	633		251	407	756	708	1415	933	310	1864	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.40	0.35		0.94	0.63	0.08	0.06	0.20	0.26	0.23	0.21	

Intersection Summary

Area Type: Other

Cycle Length: 102.5

Actuated Cycle Length: 102.5

Offset: 0 (0%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 32.0

Intersection LOS: C

Intersection Capacity Utilization 46.9%

ICU Level of Service A

Analysis Period (min) 15

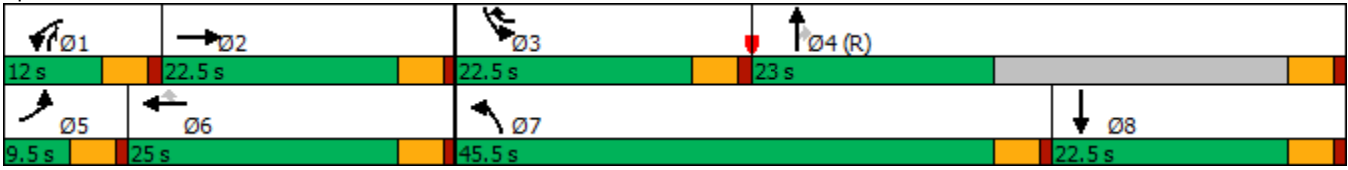
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
NE 192nd Ave & SE 1st St

AM PEAK

Splits and Phases: 3:



Lanes, Volumes, Timings

NE Friberg & NW Lake Rd

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	179	1	0	303	9	0	0	0	14	0	32
Future Volume (vph)	19	179	1	0	303	9	0	0	0	14	0	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999				0.850						0.850
Flt Protected	0.950										0.950	
Satd. Flow (prot)	1770	3536	0	0	3539	1583	0	1863	0	0	1770	1583
Flt Permitted	0.553										0.757	
Satd. Flow (perm)	1030	3536	0	0	3539	1583	0	1863	0	0	1410	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				36						36
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2643			4666			279			633	
Travel Time (s)		60.1			106.0			6.3			14.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	195	1	0	329	10	0	0	0	15	0	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	196	0	0	329	10	0	0	0	0	15	35
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA			NA	Perm				Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		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	1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0			0.0	0.0
Total Lost Time (s)	4.5	4.5			4.5	4.5		4.5			4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	0
Act Effect Green (s)	18.0	18.0			18.0	18.0					18.0	18.0
Actuated g/C Ratio	0.40	0.40			0.40	0.40					0.40	0.40
v/c Ratio	0.05	0.14			0.23	0.02					0.03	0.05
Control Delay	8.8	8.9			9.5	1.0					8.4	3.9
Queue Delay	0.0	0.0			0.0	0.0					0.0	0.0
Total Delay	8.8	8.9			9.5	1.0					8.4	3.9

Baseline

Synchro 10 Light Report
Page 1

Lanes, Volumes, Timings

NE Friberg & NW Lake Rd

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	A	A			A	A					A	A
Approach Delay		8.9			9.2						5.3	
Approach LOS		A			A						A	
Queue Length 50th (ft)	3	15			27	0					2	0
Queue Length 95th (ft)	13	31			48	2					10	11
Internal Link Dist (ft)		2563			4586			199			553	
Turn Bay Length (ft)												
Base Capacity (vph)	412	1415			1415	654					564	654
Starvation Cap Reductn	0	0			0	0					0	0
Spillback Cap Reductn	0	0			0	0					0	0
Storage Cap Reductn	0	0			0	0					0	0
Reduced v/c Ratio	0.05	0.14			0.23	0.02					0.03	0.05

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 45

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.23

Intersection Signal Delay: 8.8

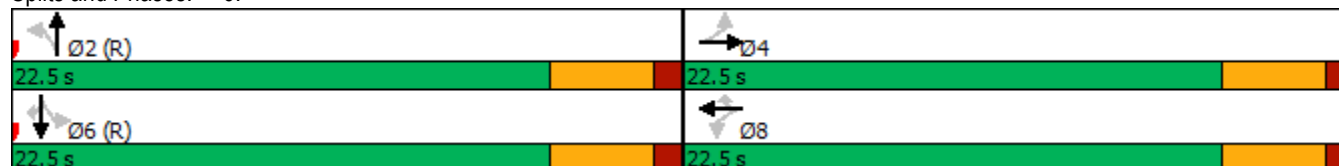
Intersection LOS: A

Intersection Capacity Utilization 27.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6:



Lanes, Volumes, Timings

NW Parker St & NW Lake Rd

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	171	212	85	286	3	157	15	82	8	40	32
Future Volume (vph)	19	171	212	85	286	3	157	15	82	8	40	32
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	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr't			0.850		0.999			0.873			0.933	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	3536	0	1770	1626	0	1770	1738	0
Flt Permitted	0.561			0.640			0.706			0.689		
Satd. Flow (perm)	1045	1863	1583	1192	3536	0	1315	1626	0	1283	1738	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			230		2			89			35	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		4666			452			981			831	
Travel Time (s)		106.0			10.3			22.3			18.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	186	230	92	311	3	171	16	89	9	43	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	186	230	92	314	0	171	105	0	9	78	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5	22.5	22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	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	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	18.0	18.0	18.0	18.0	18.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40		0.40	0.40		0.40	0.40	
v/c Ratio	0.05	0.25	0.30	0.19	0.22		0.33	0.15		0.02	0.11	
Control Delay	9.5	10.2	4.3	10.2	9.4		11.5	3.9		8.4	6.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	9.5	10.2	4.3	10.2	9.4		11.5	3.9		8.4	6.0	

Baseline

Synchro 10 Light Report
Page 1

Lanes, Volumes, Timings

NW Parker St & NW Lake Rd

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	A	B	A	B	A		B	A		A	A	
Approach Delay		7.1			9.5			8.6			6.3	
Approach LOS		A			A			A			A	
Queue Length 50th (ft)	3	26	0	15	26		29	2		1	6	
Queue Length 95th (ft)	13	62	32	37	46		64	23		7	24	
Internal Link Dist (ft)		4586			372			901			751	
Turn Bay Length (ft)												
Base Capacity (vph)	418	745	771	476	1415		526	703		513	716	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.05	0.25	0.30	0.19	0.22		0.33	0.15		0.02	0.11	

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 45

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.33

Intersection Signal Delay: 8.2

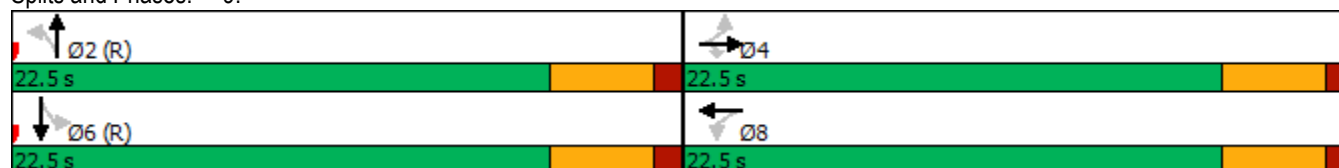
Intersection LOS: A

Intersection Capacity Utilization 40.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 9:



Lanes, Volumes, Timings

NE 192nd Ave & SE 1st St

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	209	71	363	291	95	83	543	243	73	244	69
Future Volume (vph)	180	209	71	363	291	95	83	543	243	73	244	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	280		0	330		1000	200		220	270		0
Storage Lanes	2		0	2		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.962				0.850			0.850		0.967	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3405	0	3433	1863	1583	1770	3539	1583	1770	3422	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3405	0	3433	1863	1583	1770	3539	1583	1770	3422	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		41				65			261		39	
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		687			2643			1144			1304	
Travel Time (s)		11.7			45.1			19.5			22.2	
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
Adj. Flow (vph)	194	225	76	390	313	102	89	584	261	78	262	74
Shared Lane Traffic (%)												
Lane Group Flow (vph)	194	301	0	390	313	102	89	584	261	78	336	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6	3	7	4	1	3	8	
Permitted Phases						6			4			

Baseline

Synchro 10 Light Report
Page 1

Lanes, Volumes, Timings

NE 192nd Ave & SE 1st St

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2		1	6	3	7	4	1	3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	15.0	5.0	5.0	15.0	
Minimum Split (s)	9.5	22.5		9.5	22.5	22.5	9.5	22.5	9.5	22.5	22.5	
Total Split (s)	15.0	24.0		23.0	32.0	22.5	15.1	30.5	23.0	22.5	37.9	
Total Split (%)	15.0%	24.0%		23.0%	32.0%	22.5%	15.1%	30.5%	23.0%	22.5%	37.9%	
Maximum Green (s)	10.5	19.5		18.5	27.5	18.0	10.6	26.0	18.5	18.0	33.4	
Yellow Time (s)	3.5	3.5		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	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		None	Max	Max	None	C-Max	None	Max	Max	
Walk Time (s)		7.0			7.0	7.0		7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0		0		0	0	
Act Effect Green (s)	9.8	21.9		16.1	28.2	50.7	9.3	26.0	46.6	18.0	36.9	
Actuated g/C Ratio	0.10	0.22		0.16	0.28	0.51	0.09	0.26	0.47	0.18	0.37	
v/c Ratio	0.58	0.39		0.71	0.60	0.12	0.54	0.63	0.30	0.25	0.26	
Control Delay	50.1	31.0		46.9	36.9	6.2	55.5	36.5	2.8	37.6	21.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	50.1	31.0		46.9	36.9	6.2	55.5	36.5	2.8	37.6	21.1	
LOS	D	C		D	D	A	E	D	A	D	C	
Approach Delay		38.5			37.8			28.9			24.2	
Approach LOS		D			D			C			C	
Queue Length 50th (ft)	61	74		122	174	12	55	173	0	43	71	
Queue Length 95th (ft)	97	118		168	265	39	105	232	40	86	108	
Internal Link Dist (ft)		607			2563			1064			1224	
Turn Bay Length (ft)	280			330		1000	200		220	270		
Base Capacity (vph)	360	777		635	525	834	187	920	908	318	1285	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.54	0.39		0.61	0.60	0.12	0.48	0.63	0.29	0.25	0.26	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 32.7

Intersection LOS: C

Intersection Capacity Utilization 54.6%

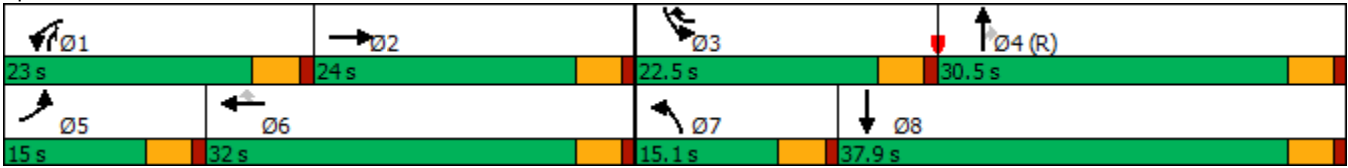
ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings
NE 192nd Ave & SE 1st St

PM PEAK

Splits and Phases: 3:



Lanes, Volumes, Timings

NE Friberg St & NW Lake Rd

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	512	0	0	324	15	0	0	0	14	0	35
Future Volume (vph)	35	512	0	0	324	15	0	0	0	14	0	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850						0.850
Flt Protected	0.950										0.950	
Satd. Flow (prot)	1770	3539	0	0	3539	1583	0	1863	0	0	1770	1583
Flt Permitted	0.541										0.757	
Satd. Flow (perm)	1008	3539	0	0	3539	1583	0	1863	0	0	1410	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						36						38
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2643			4666			279			633	
Travel Time (s)		60.1			106.0			6.3			14.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	557	0	0	352	16	0	0	0	15	0	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	557	0	0	352	16	0	0	0	0	15	38
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			36			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA			NA	Perm				Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		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	1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0			0.0	0.0
Total Lost Time (s)	4.5	4.5			4.5	4.5		4.5			4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	0
Act Effect Green (s)	18.0	18.0			18.0	18.0					18.0	18.0
Actuated g/C Ratio	0.40	0.40			0.40	0.40					0.40	0.40
v/c Ratio	0.09	0.39			0.25	0.02					0.03	0.06
Control Delay	9.3	10.7			10.0	3.7					8.4	3.9
Queue Delay	0.0	0.0			0.0	0.0					0.0	0.0
Total Delay	9.3	10.7			10.0	3.7					8.4	3.9

Baseline

 Synchro 10 Light Report
 Page 1

Lanes, Volumes, Timings

NE Friberg St & NW Lake Rd

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	A	B			B	A					A	A
Approach Delay		10.6			9.8						5.2	
Approach LOS		B			A						A	
Queue Length 50th (ft)	6	51			28	0					2	0
Queue Length 95th (ft)	19	81			56	m4					10	12
Internal Link Dist (ft)		2563			4586			199			553	
Turn Bay Length (ft)												
Base Capacity (vph)	403	1415			1415	654					564	656
Starvation Cap Reductn	0	0			0	0					0	0
Spillback Cap Reductn	0	0			0	0					0	0
Storage Cap Reductn	0	0			0	0					0	0
Reduced v/c Ratio	0.09	0.39			0.25	0.02					0.03	0.06

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 45

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 10.0

Intersection LOS: A

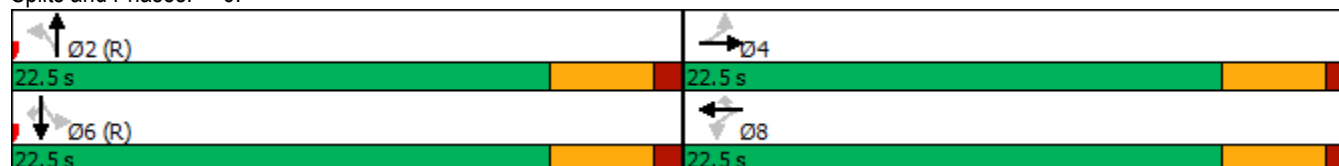
Intersection Capacity Utilization 38.5%

ICU Level of Service A

Analysis Period (min) 15

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

Splits and Phases: 6:



Lanes, Volumes, Timings NW Parker St & NW Lake Rd

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	485	235	43	291	11	239	22	66	5	18	43
Future Volume (vph)	45	485	235	43	291	11	239	22	66	5	18	43
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	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.995			0.887			0.895	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	3522	0	1770	1652	0	1770	1667	0
Flt Permitted	0.554			0.295			0.713			0.695		
Satd. Flow (perm)	1032	1863	1583	550	3522	0	1328	1652	0	1295	1667	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			255		10			72			47	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		4666			452			981			831	
Travel Time (s)		106.0			10.3			22.3			18.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	527	255	47	316	12	260	24	72	5	20	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	527	255	47	328	0	260	96	0	5	67	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5	22.5	22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	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	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	18.0	18.0	18.0	18.0	18.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40		0.40	0.40		0.40	0.40	
v/c Ratio	0.12	0.71	0.32	0.21	0.23		0.49	0.14		0.01	0.10	
Control Delay	15.8	24.9	8.1	12.0	9.2		14.0	4.4		8.2	4.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	15.8	24.9	8.1	12.0	9.2		14.0	4.4		8.2	4.8	

Baseline

Synchro 10 Light Report
Page 1

Lanes, Volumes, Timings

Parker St & NW Lake Rd

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B	C	A	B	A		B	A		A	A	
Approach Delay		19.2			9.5			11.4			5.1	
Approach LOS		B			A			B			A	
Queue Length 50th (ft)	10	124	0	8	26		47	4		1	3	
Queue Length 95th (ft)	m29	#210	61	26	47		98	23		5	19	
Internal Link Dist (ft)		4586			372			901			751	
Turn Bay Length (ft)												
Base Capacity (vph)	412	745	786	220	1414		531	704		518	695	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.12	0.71	0.32	0.21	0.23		0.49	0.14		0.01	0.10	

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 45

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 14.7

Intersection LOS: B

Intersection Capacity Utilization 60.9%

ICU Level of Service B

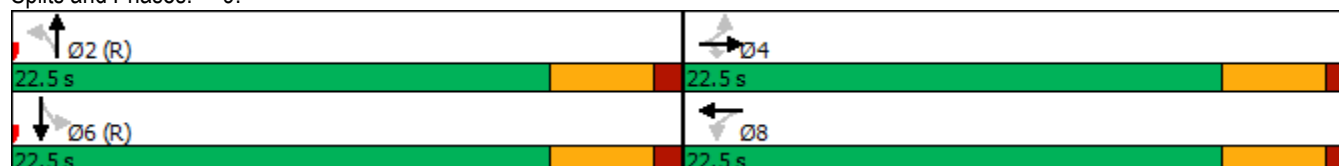
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 9:



Appendix D
2023 Without Project Level of Services

Lanes, Volumes, Timings

NE 192nd Ave & SE 1st St

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	133	50	193	211	51	32	232	195	57	244	73
Future Volume (vph)	55	133	50	193	211	51	32	232	195	57	244	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.97	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Fr't		0.959				0.850			0.850		0.965	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3394	0	3433	1863	1583	1770	3539	1583	1770	3415	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3394	0	3433	1863	1583	1770	3539	1583	1770	3415	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		46				112			262		33	
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		687			2643			1144			1304	
Travel Time (s)		11.7			45.1			19.5			22.2	
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
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Adj. Flow (vph)	74	178	67	259	283	68	43	311	262	76	327	98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	245	0	259	283	68	43	311	262	76	425	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6	3	7	4	1	3	8	
Permitted Phases						6			4			
Detector Phase	5	2		1	6	3	7	4	1	3	8	
Switch Phase												

Baseline

Synchro 10 Light Report
Page 1

Lanes, Volumes, Timings

NE 192nd Ave & SE 1st St

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	15.0	5.0	5.0	15.0	
Minimum Split (s)	9.5	22.5		9.5	22.5	22.5	9.5	22.5	9.5	22.5	22.5	
Total Split (s)	9.5	22.5		12.0	25.0	22.5	45.5	23.0	12.0	22.5	22.5	
Total Split (%)	9.3%	22.0%		11.7%	24.4%	22.0%	44.4%	22.4%	11.7%	22.0%	22.0%	
Maximum Green (s)	5.0	18.0		7.5	20.5	18.0	41.0	18.5	7.5	18.0	18.0	
Yellow Time (s)	3.5	3.5		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	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		None	Max	Max	None	C-Max	None	Max	Max	
Walk Time (s)		7.0			7.0	7.0		7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0		0		0	0	
Act Effect Green (s)	5.0	18.0		7.5	22.4	44.9	8.0	41.0	53.0	18.0	55.3	
Actuated g/C Ratio	0.05	0.18		0.07	0.22	0.44	0.08	0.40	0.52	0.18	0.54	
v/c Ratio	0.44	0.39		1.03	0.70	0.09	0.31	0.22	0.28	0.25	0.23	
Control Delay	56.1	32.2		112.9	48.3	1.2	49.9	20.8	2.4	38.8	12.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	56.1	32.2		112.9	48.3	1.2	49.9	20.8	2.4	38.8	12.9	
LOS	E	C		F	D	A	D	C	A	D	B	
Approach Delay		37.7			70.5			15.0			16.8	
Approach LOS		D			E			B			B	
Queue Length 50th (ft)	24	60		~94	176	0	27	68	0	43	73	
Queue Length 95th (ft)	44	87		#152	242	3	55	90	26	78	98	
Internal Link Dist (ft)		607			2563			1064			1224	
Turn Bay Length (ft)												
Base Capacity (vph)	167	633		251	407	756	708	1415	945	310	1856	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.44	0.39		1.03	0.70	0.09	0.06	0.22	0.28	0.25	0.23	

Intersection Summary

Area Type: Other

Cycle Length: 102.5

Actuated Cycle Length: 102.5

Offset: 0 (0%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.03

Intersection Signal Delay: 35.5

Intersection LOS: D

Intersection Capacity Utilization 48.0%

ICU Level of Service A

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

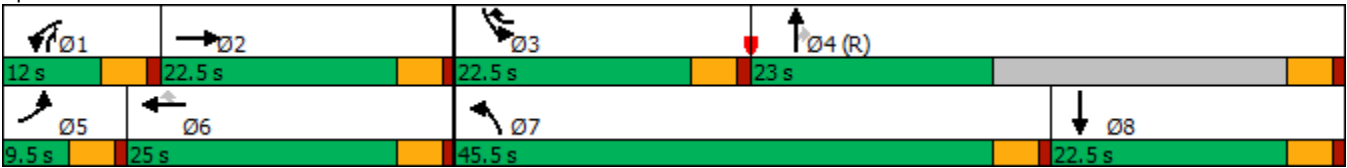
95th percentile volume exceeds capacity, queue may be longer.

Lanes, Volumes, Timings
NE 192nd Ave & SE 1st St

AM PEAK

Queue shown is maximum after two cycles.

Splits and Phases: 3:



Lanes, Volumes, Timings

NE Friberg St & NW Lake Rd

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	179	1	0	303	9	0	0	0	14	0	32
Future Volume (vph)	19	179	1	0	303	9	0	0	0	14	0	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr't		0.999				0.850						0.850
Flt Protected	0.950										0.950	
Satd. Flow (prot)	1770	3536	0	0	3539	1583	0	1863	0	0	1770	1583
Flt Permitted	0.536										0.757	
Satd. Flow (perm)	998	3536	0	0	3539	1583	0	1863	0	0	1410	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				36						38
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2643			4666			279			633	
Travel Time (s)		60.1			106.0			6.3			14.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Adj. Flow (vph)	23	214	1	0	362	11	0	0	0	17	0	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	215	0	0	362	11	0	0	0	0	17	38
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA			NA	Perm				Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		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	1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0			0.0	0.0
Total Lost Time (s)	4.5	4.5			4.5	4.5		4.5			4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	0
Act Effect Green (s)	18.0	18.0			18.0	18.0					18.0	18.0
Actuated g/C Ratio	0.40	0.40			0.40	0.40					0.40	0.40
v/c Ratio	0.06	0.15			0.26	0.02					0.03	0.06
Control Delay	8.9	9.0			10.5	3.0					8.4	3.9
Queue Delay	0.0	0.0			0.0	0.0					0.0	0.0

Baseline

Synchro 10 Light Report
Page 4

Lanes, Volumes, Timings

NE 192nd Ave & SE 1st St

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	8.9	9.0			10.5	3.0					8.4	3.9
LOS	A	A			B	A					A	A
Approach Delay		9.0			10.3						5.3	
Approach LOS		A			B						A	
Queue Length 50th (ft)	4	17			30	0					3	0
Queue Length 95th (ft)	14	33			58	m0					11	12
Internal Link Dist (ft)		2563			4586			199			553	
Turn Bay Length (ft)												
Base Capacity (vph)	399	1415			1415	654					564	656
Starvation Cap Reductn	0	0			0	0					0	0
Spillback Cap Reductn	0	0			0	0					0	0
Storage Cap Reductn	0	0			0	0					0	0
Reduced v/c Ratio	0.06	0.15			0.26	0.02					0.03	0.06

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 45

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.26

Intersection Signal Delay: 9.4

Intersection LOS: A

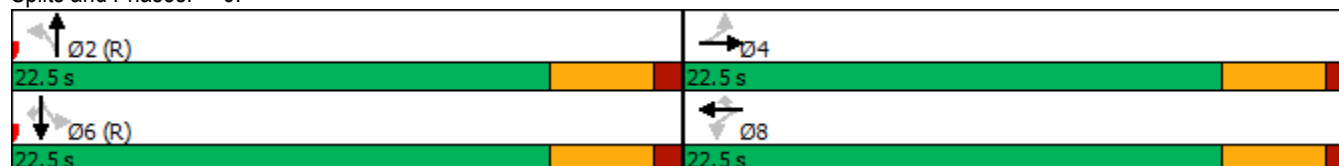
Intersection Capacity Utilization 29.0%

ICU Level of Service A

Analysis Period (min) 15

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

Splits and Phases: 6:



Lanes, Volumes, Timings

NW Parker St & NW Lake Rd

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	171	212	85	286	3	157	15	82	8	40	32
Future Volume (vph)	19	171	212	85	286	3	157	15	82	8	40	32
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	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.998			0.873			0.934	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	3532	0	1770	1626	0	1770	1740	0
Flt Permitted	0.544			0.630			0.701			0.682		
Satd. Flow (perm)	1013	1863	1583	1174	3532	0	1306	1626	0	1270	1740	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			253		3			98			38	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		4666			452			981			831	
Travel Time (s)		106.0			10.3			22.3			18.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Adj. Flow (vph)	23	204	253	102	342	4	188	18	98	10	48	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	204	253	102	346	0	188	116	0	10	86	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5	22.5	22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	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	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	18.0	18.0	18.0	18.0	18.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40		0.40	0.40		0.40	0.40	
v/c Ratio	0.06	0.27	0.32	0.22	0.24		0.36	0.16		0.02	0.12	
Control Delay	9.9	10.7	4.7	10.4	9.5		12.0	3.9		8.4	6.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	

Baseline

Synchro 10 Light Report
Page 6

Lanes, Volumes, Timings

NW Parker St & NW Lake Rd

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	9.9	10.7	4.7	10.4	9.5		12.0	3.9		8.4	6.1	
LOS	A	B	A	B	A		B	A		A	A	
Approach Delay		7.5			9.7			8.9			6.3	
Approach LOS		A			A			A			A	
Queue Length 50th (ft)	3	29	0	16	29		32	3		2	7	
Queue Length 95th (ft)	15	69	36	41	50		70	24		8	26	
Internal Link Dist (ft)		4586			372			901			751	
Turn Bay Length (ft)												
Base Capacity (vph)	405	745	785	469	1414		522	709		508	718	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.06	0.27	0.32	0.22	0.24		0.36	0.16		0.02	0.12	

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 45

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.36

Intersection Signal Delay: 8.5

Intersection LOS: A

Intersection Capacity Utilization 42.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 9:

 Ø2 (R)	 Ø4
22.5 s	22.5 s
 Ø6 (R)	 Ø8
22.5 s	22.5 s

Lanes, Volumes, Timings

NE 192nd Ave & SE 1st St

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	209	71	363	291	95	83	543	243	73	244	69
Future Volume (vph)	180	209	71	363	291	95	83	543	243	73	244	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	280		0	330		1000	200		220	270		0
Storage Lanes	2		0	2		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.962				0.850			0.850		0.967	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3405	0	3433	1863	1583	1770	3539	1583	1770	3422	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3405	0	3433	1863	1583	1770	3539	1583	1770	3422	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		42				65			287		39	
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		687			2643			1144			1304	
Travel Time (s)		11.7			45.1			19.5			22.2	
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
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Adj. Flow (vph)	213	247	84	429	344	112	98	642	287	86	289	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	213	331	0	429	344	112	98	642	287	86	371	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6	3	7	4	1	3	8	

Baseline

 Synchro 10 Light Report
 Page 1

Lanes, Volumes, Timings

NE 192nd Ave & SE 1st St

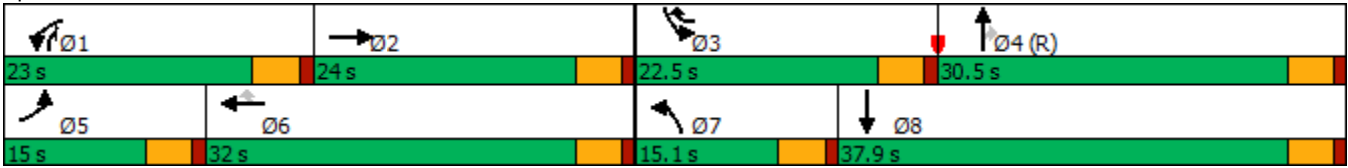
PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				6			4					
Detector Phase	5	2		1	6	3	7	4	1	3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	15.0	5.0	5.0	15.0	
Minimum Split (s)	9.5	22.5		9.5	22.5	22.5	9.5	22.5	9.5	22.5	22.5	
Total Split (s)	15.0	24.0		23.0	32.0	22.5	15.1	30.5	23.0	22.5	37.9	
Total Split (%)	15.0%	24.0%		23.0%	32.0%	22.5%	15.1%	30.5%	23.0%	22.5%	37.9%	
Maximum Green (s)	10.5	19.5		18.5	27.5	18.0	10.6	26.0	18.5	18.0	33.4	
Yellow Time (s)	3.5	3.5		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	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		None	Max	Max	None	C-Max	None	Max	Max	
Walk Time (s)		7.0			7.0	7.0		7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0		0		0	0	
Act Effct Green (s)	10.0	21.3		16.7	28.0	50.5	9.5	26.0	47.2	18.0	36.7	
Actuated g/C Ratio	0.10	0.21		0.17	0.28	0.50	0.10	0.26	0.47	0.18	0.37	
v/c Ratio	0.62	0.44		0.75	0.66	0.13	0.58	0.70	0.32	0.27	0.29	
Control Delay	51.5	32.2		48.2	39.1	6.7	57.3	38.2	2.7	38.0	21.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	51.5	32.2		48.2	39.1	6.7	57.3	38.2	2.7	38.0	21.7	
LOS	D	C		D	D	A	E	D	A	D	C	
Approach Delay		39.8			39.4			30.1			24.8	
Approach LOS		D			D			C			C	
Queue Length 50th (ft)	68	85		134	195	15	60	194	0	48	81	
Queue Length 95th (ft)	105	130		184	294	43	113	257	41	93	120	
Internal Link Dist (ft)		607			2563			1064			1224	
Turn Bay Length (ft)	280			330		1000	200		220	270		
Base Capacity (vph)	360	758		635	521	831	187	920	922	318	1280	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.59	0.44		0.68	0.66	0.13	0.52	0.70	0.31	0.27	0.29	
Intersection Summary												
Area Type:	Other											
Cycle Length: 100												
Actuated Cycle Length: 100												
Offset: 0 (0%), Referenced to phase 4:NBT, Start of Green												
Natural Cycle: 80												
Control Type: Actuated-Coordinated												
Maximum v/c Ratio: 0.75												
Intersection Signal Delay: 33.9				Intersection LOS: C								
Intersection Capacity Utilization 58.5%				ICU Level of Service B								
Analysis Period (min) 15												

Lanes, Volumes, Timings
NE 192nd Ave & SE 1st St

PM PEAK

Splits and Phases: 3:



Lanes, Volumes, Timings

NE Friberg St & NW Lake Rd

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	512	0	0	324	15	0	0	0	14	0	35
Future Volume (vph)	35	512	0	0	324	15	0	0	0	14	0	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr't						0.850						0.850
Flt Protected	0.950										0.950	
Satd. Flow (prot)	1770	3539	0	0	3539	1583	0	1863	0	0	1770	1583
Flt Permitted	0.523										0.757	
Satd. Flow (perm)	974	3539	0	0	3539	1583	0	1863	0	0	1410	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						36						42
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2643			4666			279			633	
Travel Time (s)		60.1			106.0			6.3			14.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Adj. Flow (vph)	42	612	0	0	387	18	0	0	0	17	0	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	612	0	0	387	18	0	0	0	0	17	42
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			36			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA			NA	Perm				Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		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	1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0			0.0	0.0
Total Lost Time (s)	4.5	4.5			4.5	4.5		4.5			4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	0
Act Effect Green (s)	18.0	18.0			18.0	18.0					18.0	18.0
Actuated g/C Ratio	0.40	0.40			0.40	0.40					0.40	0.40
v/c Ratio	0.11	0.43			0.27	0.03					0.03	0.06
Control Delay	9.4	11.0			9.4	3.2					8.4	3.8
Queue Delay	0.0	0.0			0.0	0.0					0.0	0.0

Baseline

Synchro 10 Light Report
Page 4

Lanes, Volumes, Timings

NE Friberg St & NW Lake Rd

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	9.4	11.0			9.4	3.2					8.4	3.8
LOS	A	B			A	A					A	A
Approach Delay		10.9			9.1						5.1	
Approach LOS		B			A						A	
Queue Length 50th (ft)	6	56			27	0					3	0
Queue Length 95th (ft)	21	90			53	m1					11	12
Internal Link Dist (ft)		2563			4586			199			553	
Turn Bay Length (ft)												
Base Capacity (vph)	389	1415			1415	654					564	658
Starvation Cap Reductn	0	0			0	0					0	0
Spillback Cap Reductn	0	0			0	0					0	0
Storage Cap Reductn	0	0			0	0					0	0
Reduced v/c Ratio	0.11	0.43			0.27	0.03					0.03	0.06

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 45

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.43

Intersection Signal Delay: 9.9

Intersection LOS: A

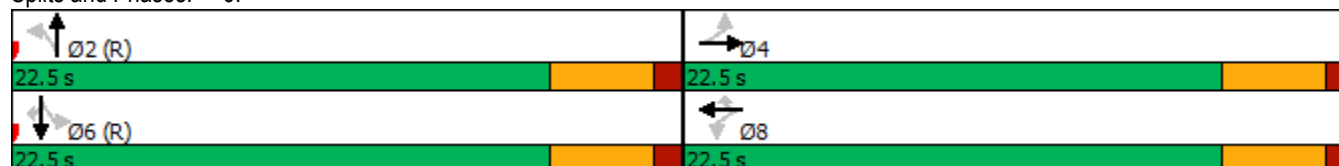
Intersection Capacity Utilization 40.8%

ICU Level of Service A

Analysis Period (min) 15

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

Splits and Phases: 6:



Lanes, Volumes, Timings

NW Parker St & NW Lake Rd

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	485	235	43	291	11	239	22	66	5	18	43
Future Volume (vph)	45	485	235	43	291	11	239	22	66	5	18	43
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	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.995			0.887			0.895	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	3522	0	1770	1652	0	1770	1667	0
Flt Permitted	0.536			0.239			0.709			0.689		
Satd. Flow (perm)	998	1863	1583	445	3522	0	1321	1652	0	1283	1667	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			281		10			79			51	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		4666			452			981			831	
Travel Time (s)		106.0			10.3			22.3			18.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Adj. Flow (vph)	54	580	281	51	348	13	286	26	79	6	22	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	580	281	51	361	0	286	105	0	6	73	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5	22.5	22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	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	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	18.0	18.0	18.0	18.0	18.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40		0.40	0.40		0.40	0.40	
v/c Ratio	0.14	0.78	0.35	0.29	0.26		0.54	0.15		0.01	0.10	
Control Delay	16.1	28.4	8.4	14.5	9.4		15.1	4.4		8.3	4.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	

Baseline

Synchro 10 Light Report
Page 6

Lanes, Volumes, Timings

NW Parker St & NW Lake Rd

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	16.1	28.4	8.4	14.5	9.4		15.1	4.4		8.3	4.8	
LOS	B	C	A	B	A		B	A		A	A	
Approach Delay		21.5			10.0			12.2			5.1	
Approach LOS		C			A			B			A	
Queue Length 50th (ft)	11	141	0	8	30		53	4		1	3	
Queue Length 95th (ft)	m31	#255	67	30	52		111	24		6	20	
Internal Link Dist (ft)		4586			372			901			751	
Turn Bay Length (ft)												
Base Capacity (vph)	399	745	801	178	1414		528	708		513	697	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.14	0.78	0.35	0.29	0.26		0.54	0.15		0.01	0.10	

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 45

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 16.1

Intersection LOS: B

Intersection Capacity Utilization 64.7%

ICU Level of Service C

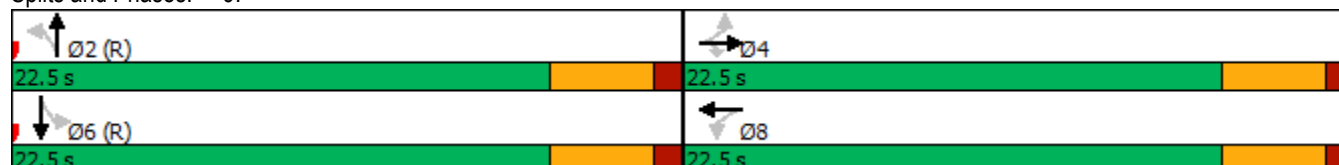
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 9:



Appendix E

2023 With Project Level of Services

Lanes, Volumes, Timings

3: SE 192nd Ave & SE 1st St

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	136	50	220	214	51	32	232	224	57	244	73
Future Volume (vph)	55	136	50	220	214	51	32	232	224	57	244	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.97	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Fr't		0.960				0.850			0.850		0.965	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3398	0	3433	1863	1583	1770	3539	1583	1770	3415	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3398	0	3433	1863	1583	1770	3539	1583	1770	3415	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		45				112			300		33	
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		687			2643			1144			1304	
Travel Time (s)		11.7			45.1			19.5			22.2	
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
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Adj. Flow (vph)	74	182	67	295	287	68	43	311	300	76	327	98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	249	0	295	287	68	43	311	300	76	425	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6	3	7	4	1	3	8	
Permitted Phases						6			4			
Detector Phase	5	2		1	6	3	7	4	1	3	8	
Switch Phase												

Baseline

Synchro 10 Light Report
Page 1

Lanes, Volumes, Timings

3: SE 192nd Ave & SE 1st St

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	15.0	5.0	5.0	15.0	
Minimum Split (s)	9.5	22.5		9.5	22.5	22.5	9.5	22.5	9.5	22.5	22.5	
Total Split (s)	9.5	22.5		12.0	25.0	22.5	45.5	23.0	12.0	22.5	22.5	
Total Split (%)	9.3%	22.0%		11.7%	24.4%	22.0%	44.4%	22.4%	11.7%	22.0%	22.0%	
Maximum Green (s)	5.0	18.0		7.5	20.5	18.0	41.0	18.5	7.5	18.0	18.0	
Yellow Time (s)	3.5	3.5		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	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		None	Max	Max	None	C-Max	None	Max	Max	
Walk Time (s)		7.0			7.0	7.0		7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0	0		0		0	0	
Act Effect Green (s)	5.0	18.0		7.5	22.4	44.9	8.0	41.0	53.0	18.0	55.3	
Actuated g/C Ratio	0.05	0.18		0.07	0.22	0.44	0.08	0.40	0.52	0.18	0.54	
v/c Ratio	0.44	0.39		1.18	0.71	0.09	0.31	0.22	0.31	0.25	0.23	
Control Delay	56.1	32.5		155.1	48.8	1.2	49.9	20.8	2.5	38.8	12.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	56.1	32.5		155.1	48.8	1.2	49.9	20.8	2.5	38.8	12.9	
LOS	E	C		F	D	A	D	C	A	D	B	
Approach Delay		37.9			92.1			14.3			16.8	
Approach LOS		D			F			B			B	
Queue Length 50th (ft)	24	62		~119	179	0	27	68	0	43	73	
Queue Length 95th (ft)	44	89		#178	244	3	55	90	27	78	98	
Internal Link Dist (ft)		607			2563			1064			1224	
Turn Bay Length (ft)												
Base Capacity (vph)	167	633		251	407	756	708	1415	963	310	1856	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.44	0.39		1.18	0.71	0.09	0.06	0.22	0.31	0.25	0.23	

Intersection Summary

Area Type: Other

Cycle Length: 102.5

Actuated Cycle Length: 102.5

Offset: 0 (0%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.18

Intersection Signal Delay: 42.2

Intersection LOS: D

Intersection Capacity Utilization 48.2%

ICU Level of Service A

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

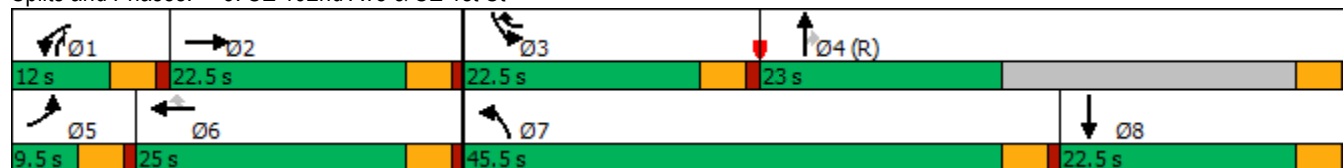
Lanes, Volumes, Timings

3: SE 192nd Ave & SE 1st St

AM PEAK

Queue shown is maximum after two cycles.

Splits and Phases: 3: SE 192nd Ave & SE 1st St



Lanes, Volumes, Timings

6: SE 1st St/NW Lake Rd & NE Fridberg Struck

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	179	1	0	338	9	0	0	0	31	0	32
Future Volume (vph)	57	179	1	0	338	9	0	0	0	31	0	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999				0.850						0.850
Flt Protected	0.950										0.950	
Satd. Flow (prot)	1770	3536	0	0	3539	1583	0	1863	0	0	1770	1583
Flt Permitted	0.514										0.757	
Satd. Flow (perm)	957	3536	0	0	3539	1583	0	1863	0	0	1410	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				36						38
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2643			4666			279			633	
Travel Time (s)		60.1			106.0			6.3			14.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Adj. Flow (vph)	68	214	1	0	404	11	0	0	0	37	0	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	68	215	0	0	404	11	0	0	0	0	37	38
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA			NA	Perm				Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		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	1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0			0.0	0.0
Total Lost Time (s)	4.5	4.5			4.5	4.5		4.5			4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	0
Act Effect Green (s)	18.0	18.0			18.0	18.0					18.0	18.0
Actuated g/C Ratio	0.40	0.40			0.40	0.40					0.40	0.40
v/c Ratio	0.18	0.15			0.29	0.02					0.07	0.06
Control Delay	10.3	9.0			10.5	2.9					8.8	3.9
Queue Delay	0.0	0.0			0.0	0.0					0.0	0.0

Baseline

Synchro 10 Light Report
Page 4

Lanes, Volumes, Timings

6: SE 1st St/NW Lake Rd & NE Fridberg Struck

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	10.3	9.0			10.5	2.9					8.8	3.9
LOS	B	A			B	A					A	A
Approach Delay		9.3			10.3						6.3	
Approach LOS		A			B						A	
Queue Length 50th (ft)	11	17			34	0					6	0
Queue Length 95th (ft)	30	33			64	m0					18	12
Internal Link Dist (ft)		2563			4586			199			553	
Turn Bay Length (ft)												
Base Capacity (vph)	382	1415			1415	654					564	656
Starvation Cap Reductn	0	0			0	0					0	0
Spillback Cap Reductn	0	0			0	0					0	0
Storage Cap Reductn	0	0			0	0					0	0
Reduced v/c Ratio	0.18	0.15			0.29	0.02					0.07	0.06

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 45

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.29

Intersection Signal Delay: 9.6

Intersection LOS: A

Intersection Capacity Utilization 31.2%

ICU Level of Service A

Analysis Period (min) 15

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

Splits and Phases: 6: SE 1st St/NW Lake Rd & NE Fridberg Struck

			
Ø2 (R)			Ø4
22.5 s			22.5 s
			
Ø6 (R)			Ø8
22.5 s			22.5 s

Lanes, Volumes, Timings

9: NW Larkspur & NW Lake Rd

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	174	222	85	289	3	168	15	82	8	40	33
Future Volume (vph)	20	174	222	85	289	3	168	15	82	8	40	33
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	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.998			0.873			0.933	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	3532	0	1770	1626	0	1770	1738	0
Flt Permitted	0.542			0.628			0.701			0.682		
Satd. Flow (perm)	1010	1863	1583	1170	3532	0	1306	1626	0	1270	1738	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			265		3			98			39	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		4666			452			981			831	
Travel Time (s)		106.0			10.3			22.3			18.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Adj. Flow (vph)	24	208	265	102	346	4	201	18	98	10	48	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	208	265	102	350	0	201	116	0	10	87	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5	22.5	22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	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	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	18.0	18.0	18.0	18.0	18.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40		0.40	0.40		0.40	0.40	
v/c Ratio	0.06	0.28	0.33	0.22	0.25		0.39	0.16		0.02	0.12	
Control Delay	9.7	10.5	4.5	10.4	9.5		12.3	3.9		8.4	6.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	

Baseline

Synchro 10 Light Report
Page 6

Lanes, Volumes, Timings

9: NW Larkspur & NW Lake Rd

AM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	9.7	10.5	4.5	10.4	9.5		12.3	3.9		8.4	6.1	
LOS	A	B	A	B	A		B	A		A	A	
Approach Delay		7.3			9.7			9.2			6.3	
Approach LOS		A			A			A			A	
Queue Length 50th (ft)	3	30	0	16	29		35	3		2	7	
Queue Length 95th (ft)	15	70	35	41	51		75	24		8	26	
Internal Link Dist (ft)		4586			372			901			751	
Turn Bay Length (ft)												
Base Capacity (vph)	404	745	792	468	1414		522	709		508	718	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.06	0.28	0.33	0.22	0.25		0.39	0.16		0.02	0.12	

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 45

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 8.5

Intersection LOS: A

Intersection Capacity Utilization 43.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 9: NW Larkspur & NW Lake Rd

 Ø2 (R)	 Ø4
22.5 s	22.5 s
 Ø6 (R)	 Ø8
22.5 s	22.5 s

Lanes, Volumes, Timings

3: NE 192nd Ave & SE 1st St

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	212	71	388	294	95	83	543	272	73	244	69
Future Volume (vph)	180	212	71	388	294	95	83	543	272	73	244	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	280		0	330		1000	200		220	270		0
Storage Lanes	2		0	2		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.962				0.850			0.850		0.967	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3405	0	3433	1863	1583	1770	3539	1583	1770	3422	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3405	0	3433	1863	1583	1770	3539	1583	1770	3422	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		41				65			322		39	
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		687			2643			1144			1304	
Travel Time (s)		11.7			45.1			19.5			22.2	
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
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Adj. Flow (vph)	213	251	84	459	348	112	98	642	322	86	289	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	213	335	0	459	348	112	98	642	322	86	371	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	5	2		1	6	3	7	4	1	3	8	

Baseline

 Synchro 10 Light Report
 Page 1

Lanes, Volumes, Timings

3: NE 192nd Ave & SE 1st St

PM PEAK

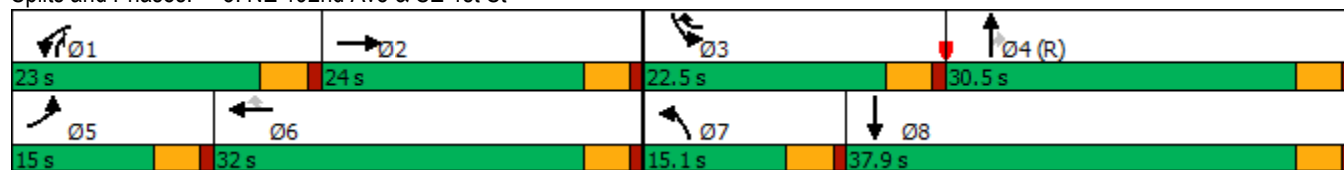
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						6			4			
Detector Phase	5	2	1		6	3	7	4	1	3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0	5.0	15.0	5.0	5.0	15.0	
Minimum Split (s)	9.5	22.5	9.5		22.5	22.5	9.5	22.5	9.5	22.5	22.5	
Total Split (s)	15.0	24.0	23.0		32.0	22.5	15.1	30.5	23.0	22.5	37.9	
Total Split (%)	15.0%	24.0%	23.0%		32.0%	22.5%	15.1%	30.5%	23.0%	22.5%	37.9%	
Maximum Green (s)	10.5	19.5	18.5		27.5	18.0	10.6	26.0	18.5	18.0	33.4	
Yellow Time (s)	3.5	3.5	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	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lead		Lag	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max	None		Max	Max	None	C-Max	None	Max	Max	
Walk Time (s)	7.0				7.0	7.0	7.0		7.0		7.0	
Flash Dont Walk (s)	11.0				11.0	11.0	11.0		11.0		11.0	
Pedestrian Calls (#/hr)	0				0	0	0		0		0	
Act Effct Green (s)	10.0	20.8	17.2		28.0	50.5	9.5	26.0	47.7	18.0	36.7	
Actuated g/C Ratio	0.10	0.21	0.17		0.28	0.50	0.10	0.26	0.48	0.18	0.37	
v/c Ratio	0.62	0.45	0.78		0.67	0.13	0.58	0.70	0.35	0.27	0.29	
Control Delay	51.5	32.9	49.4		39.4	6.7	57.3	38.2	2.8	38.0	21.7	
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	51.5	32.9	49.4		39.4	6.7	57.3	38.2	2.8	38.0	21.7	
LOS	D	C	D		D	A	E	D	A	D	C	
Approach Delay	40.1				40.4			29.2			24.8	
Approach LOS	D				D			C			C	
Queue Length 50th (ft)	68	87	143		198	15	60	194	0	48	81	
Queue Length 95th (ft)	105	132	197		298	43	113	257	43	93	120	
Internal Link Dist (ft)	607				2563			1064			1224	
Turn Bay Length (ft)	280			330	1000		200	220		270		
Base Capacity (vph)	360	741	635		521	831	187	920	939	318	1280	
Starvation Cap Reductn	0	0	0		0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0		0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0		0	0	0	0	0	0	0	
Reduced v/c Ratio	0.59	0.45	0.72		0.67	0.13	0.52	0.70	0.34	0.27	0.29	
Intersection Summary												
Area Type:	Other											
Cycle Length: 100												
Actuated Cycle Length: 100												
Offset: 0 (0%), Referenced to phase 4:NBT, Start of Green												
Natural Cycle: 80												
Control Type: Actuated-Coordinated												
Maximum v/c Ratio: 0.78												
Intersection Signal Delay: 34.0					Intersection LOS: C							
Intersection Capacity Utilization 58.6%					ICU Level of Service B							
Analysis Period (min) 15												

Lanes, Volumes, Timings

3: NE 192nd Ave & SE 1st St

PM PEAK

Splits and Phases: 3: NE 192nd Ave & SE 1st St



Lanes, Volumes, Timings

6: SE 1st St/NW Lake Rd & NE Frodnerg Strunk

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	512	0	0	358	15	0	0	0	30	0	35
Future Volume (vph)	73	512	0	0	358	15	0	0	0	30	0	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850						0.850
Flt Protected	0.950										0.950	
Satd. Flow (prot)	1770	3539	0	0	3539	1583	0	1863	0	0	1770	1583
Flt Permitted	0.503										0.757	
Satd. Flow (perm)	937	3539	0	0	3539	1583	0	1863	0	0	1410	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						36						42
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2643			4666			279			633	
Travel Time (s)		60.1			106.0			6.3			14.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Adj. Flow (vph)	87	612	0	0	428	18	0	0	0	36	0	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	612	0	0	428	18	0	0	0	0	36	42
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			36			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA			NA	Perm				Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0		18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		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	1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0			0.0	0.0
Total Lost Time (s)	4.5	4.5			4.5	4.5		4.5			4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	0
Act Effect Green (s)	18.0	18.0			18.0	18.0					18.0	18.0
Actuated g/C Ratio	0.40	0.40			0.40	0.40					0.40	0.40
v/c Ratio	0.23	0.43			0.30	0.03					0.06	0.06
Control Delay	11.0	11.0			9.3	3.1					8.8	3.8
Queue Delay	0.0	0.0			0.0	0.0					0.0	0.0

Baseline

Synchro 10 Light Report
Page 4

Lanes, Volumes, Timings

6: SE 1st St/NW Lake Rd & NE Frodnerg Strunk

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	11.0	11.0			9.3	3.1					8.8	3.8
LOS	B	B			A	A					A	A
Approach Delay		11.0			9.1						6.1	
Approach LOS		B			A						A	
Queue Length 50th (ft)	14	56			30	0					5	0
Queue Length 95th (ft)	38	90			57	m1					18	12
Internal Link Dist (ft)		2563			4586			199			553	
Turn Bay Length (ft)												
Base Capacity (vph)	374	1415			1415	654					564	658
Starvation Cap Reductn	0	0			0	0					0	0
Spillback Cap Reductn	0	0			0	0					0	0
Storage Cap Reductn	0	0			0	0					0	0
Reduced v/c Ratio	0.23	0.43			0.30	0.03					0.06	0.06

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 45

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.43

Intersection Signal Delay: 10.0

Intersection LOS: A

Intersection Capacity Utilization 41.9%

ICU Level of Service A

Analysis Period (min) 15

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

Splits and Phases: 6: SE 1st St/NW Lake Rd & NE Frodnerg Strunk

					
Ø2 (R)			Ø4		
22.5 s			22.5 s		
					
Ø6 (R)			Ø8		
22.5 s			22.5 s		

Lanes, Volumes, Timings

9: NW Lake Rd & NW Larkspur

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	488	245	43	289	11	251	22	66	5	18	44
Future Volume (vph)	46	488	245	43	289	11	251	22	66	5	18	44
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	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.995			0.887			0.894	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	3522	0	1770	1652	0	1770	1665	0
Flt Permitted	0.537			0.236			0.708			0.689		
Satd. Flow (perm)	1000	1863	1583	440	3522	0	1319	1652	0	1283	1665	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			293		10			79			53	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		4666			452			981			831	
Travel Time (s)		106.0			10.3			22.3			18.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%	110%
Adj. Flow (vph)	55	583	293	51	346	13	300	26	79	6	22	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	583	293	51	359	0	300	105	0	6	75	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	22.5	22.5	22.5	22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.5	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	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effect Green (s)	18.0	18.0	18.0	18.0	18.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40		0.40	0.40		0.40	0.40	
v/c Ratio	0.14	0.78	0.36	0.29	0.25		0.57	0.15		0.01	0.11	
Control Delay	16.0	28.4	8.2	14.6	9.4		15.7	4.4		8.3	4.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	

Baseline

Synchro 10 Light Report
Page 6

Lanes, Volumes, Timings

9: NW Lake Rd & NW Larkspur

PM PEAK

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	16.0	28.4	8.2	14.6	9.4		15.7	4.4		8.3	4.7	
LOS	B	C	A	B	A		B	A		A	A	
Approach Delay		21.3			10.0			12.8			5.0	
Approach LOS		C			B			B			A	
Queue Length 50th (ft)	11	142	0	8	30		57	4		1	3	
Queue Length 95th (ft)	m31	#258	67	30	51		118	24		6	20	
Internal Link Dist (ft)		4586			372			901			751	
Turn Bay Length (ft)												
Base Capacity (vph)	400	745	809	176	1414		527	708		513	697	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.14	0.78	0.36	0.29	0.25		0.57	0.15		0.01	0.11	

Intersection Summary

Area Type: Other

Cycle Length: 45

Actuated Cycle Length: 45

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 16.2

Intersection LOS: B

Intersection Capacity Utilization 65.6%

ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

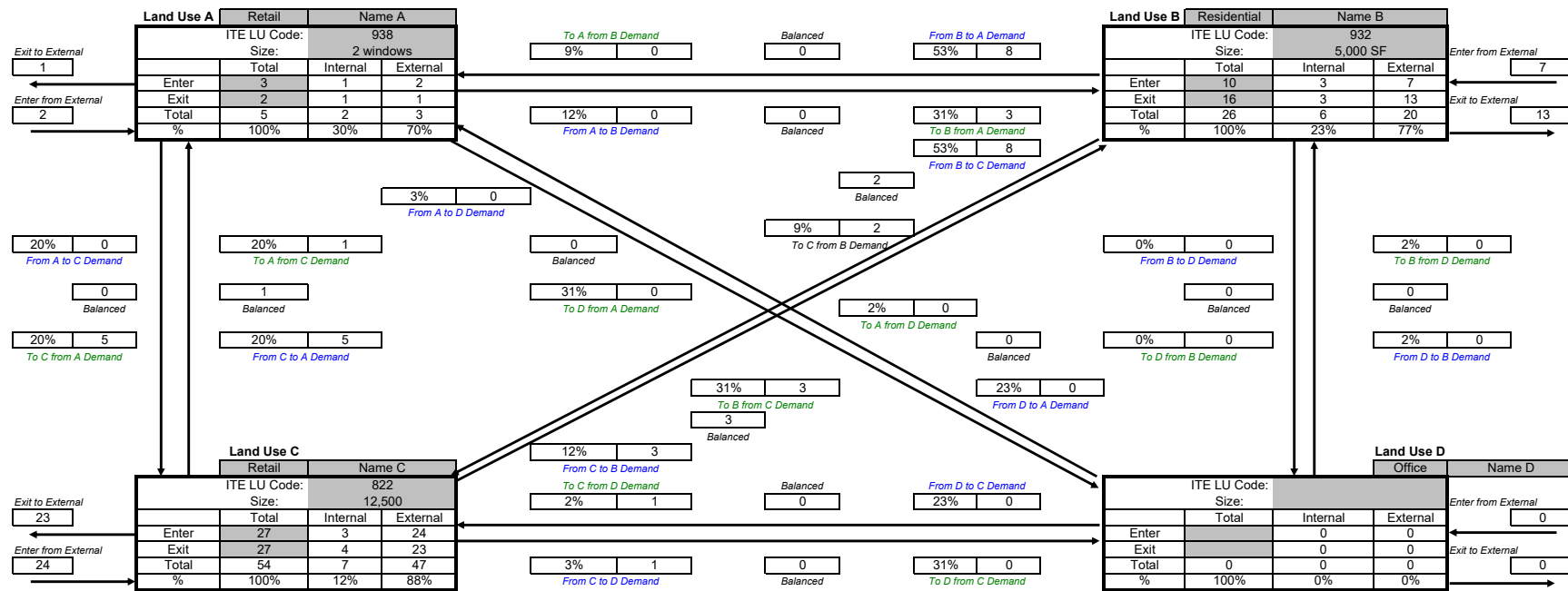
Splits and Phases: 9: NW Lake Rd & NW Larkspur

					
Ø2 (R)			Ø4		
22.5 s			22.5 s		
					
Ø6 (R)			Ø8		
22.5 s			22.5 s		

Appendix F

Internal Capture Rate Worksheet

Street PM Peak Internal Capture Rate Worksheet



Net External Trips for Multi-Use Development					
	Name A	Name B	Name C	Name D	Total
Enter	2	7	24	0	33
Exit	1	13	23	0	38
Total	3	20	47	0	71
Single-Use	5	26	54	0	85
Single-use %	0.302	0.23230769	0.12092593		

INTERNAL CAPTURE 17%

Internal Capture Rates for Trip Origins				
		Mid-day Peak	PM Peak of Street	Daily
from OFFICE	to Office	2%	1%	2%
	to Retail	20%	23%	22%
	to Residential	0%	2%	2%
from RETAIL	to Office	3%	3%	3%
	to Retail	29%	20%	30%
	to Residential	7%	12%	11%
from RESIDENTIAL	to Office	0%	0%	0%
	to Retail	34%	53%	38%
	to Residential	0%	0%	0%

Internal Capture Rates for Trip Destinations				
		Mid-day Peak	PM Peak of Street	Daily
to OFFICE	from Office	6%	6%	2%
	from Retail	38%	31%	15%
	from Residential	0%	0%	0%
to RETAIL	from Office	4%	2%	4%
	from Retail	31%	20%	28%
	from Residential	5%	9%	9%
to RESIDENTIAL	from Office	0%	2%	3%
	from Retail	37%	31%	33%
	from Residential	0%	0%	0%

Appendix G

PM Peak Trip Calculation

