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MEMORANDUM

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PROFESSIONAL ENGINEER
1/3/23

To: Clark County Staff

From: H. Lee & Associates, PLLC

Date: January 3, 2023

Subject: Revised Oak Tree Station Traffic Impact Study

INTRODUCTION

H. Lee & Associates, PLLC (HLA) has revised the original Oak Tree Station traffic impact study conducted by Engineering Northwest on November 1, 2022. The revisions addressed comments by the City of Camas staff in regard to the project's trip generation. To remedy the concerns by city staff, HLA conducted a special trip generation study for the food cart portion of the project. In addition, the trip generation for the strip retail plaza was revised to be in alignment with the practices recommended in the most recent Institute of Transportation Engineers (ITE) Trip Generation, 11th Edition, 2021.

Per agreement with city staff, HLA focused on the trip generation and the 2027 "With Project" levels of service analysis revisions. The existing condition and background information in the Engineering Northwest traffic impact study was not revised since they do not influence the conclusions of the revised traffic impact study.

It should be noted that HLA already had recent traffic counts less than a year old at the City of Camas study area intersections. Therefore, the HLA traffic counts were used in the revised analysis.

PROJECT DESCRIPTION/STUDY AREA INTERSECTIONS

The proposed Oak Tree Station is located at the northwest corner of the NW Friberg-Strunk Street/NW Lake Road intersection in Camas, Washington and is comprised of tax lot 176162-000. The proposed project is the development of a 12,574 square foot commercial building, 600 square foot coffee shop with a drive thru, and a 4,704 square foot indoor eating area serving 22 food carts. Access will be provided from an existing driveway onto NW Friberg-Strunk Street and constructing a new right in, right out driveway onto NW Lake Road. Figure 1 shows the project site vicinity and Figure 2 shows the project's site plan.

The revised traffic impact study included the following City of Camas intersections:

- NW Lake Road/NW Friberg-Strunk Street/SE 1st Street
- NW Lake Road/NW Parker Street/NW Larkspur Street

- NW Friberg-Strunk Street/Project Access
- NW Lake Road/Project Access

No City of Vancouver intersections were included in the levels of service analysis. Instead, the trip distribution and assignment were extended to City of Vancouver intersections where the city is collecting pro-rata share fees for future improvements.

Figure 3 shows the existing lane configurations and traffic control at these intersections.

EXISTING TRAFFIC VOLUMES

A.M. and P.M. peak hour traffic counts were obtained at the study area intersections by H. Lee & Associates, PLLC (HLA) in March 2022. Per the Highway Capacity Manual (HCM) 7th Edition, peak 15-minute traffic volumes were multiplied by four (4) to arrive at the peak hour traffic volumes. With this methodology of developing peak hour traffic volumes, the peak hour factor (PHF) is set to 1.00 because the peaking has already occurred by multiplying the peak 15-minute traffic volume by four (4). The existing condition traffic volumes are presented in Figure 4. The existing traffic counts can be referenced in Appendix A.

2027 "WITHOUT PROJECT" TRAFFIC VOLUMES

The 2027 "Without Project" condition was analyzed as the future baseline condition for the traffic analysis and to define a baseline by which project impacts are determined. The 2027 "Without Project" condition traffic volumes were derived by using a 2.0 percent annual, compounded growth factor and adding traffic generated by "in process" developments. The "in-process" traffic volumes were obtained from the City of Camas staff and can be referenced in Appendix B. Figure 5 shows the 2027 "Without Project" traffic volumes.

TRIP GENERATION SURVEY FOR FOOD CARTS

Since ITE's Trip Generation, 11th Edition, 2021does not have sufficient information for the Food Cart Pod land use, HLA conducted a special trip generation survey to establish local rates specific to the proposed food cart station with indoor seating use to be able to properly estimate the trip generation of the proposed Oak Tree Station.

The trip generation survey methodology was based on the *Trip Generation Handbook, 3rd Edition*, Chapter 9 (Institute of Transportation Engineers (ITE), August 2014). The *Trip Generation Handbook* calls for at least three sites to be studied and five preferred. Per conversations with City of Camas staff, three similar sites were surveyed as part of the trip generation survey. The three sites that were surveyed are summarized below:

- Happy Valley Station Food Carts – 13551 SE 145th Avenue, Happy Valley, OR 97015
  22 food cart kitchens

- Troutdale Station Food Carts – 151 SW 257th Drive, Troutdale, OR 97060
  23 food cart kitchens

- Eastport Food Carts – 3905 SE 82nd Avenue, Portland, OR 97266
  25 food cart kitchens

Trip generation surveys were conducted at the survey sites on a typical Tuesday, Wednesday, or Thursday from one hour before opening to one hour after closing. The days each facility were counted are summarized below:

- Happy Valley Station Food Carts – 12/20/2017
- Troutdale Station Food Carts – 12/13/2022
- Eastport Food Carts – 12/13/2022

It should be noted that the Happy Valley Station Food Cart data was collected in 2017 for a previous project and reused in this study.

The trip generation rates for weekday daily; and peak hour of adjacent street one hour between 4:00 and 6:00 P.M. were derived from the data collected based on an overall weighted average of all three sites. The independent variable chosen was the total number of food cart kitchens of each station. It should be noted that none of the three sites surveyed are open during the A.M. peak hour and therefore no A.M. peak hour rate was derived.

Attachment C contains the data utilized to derive the daily and P.M. peak hour trip generation rates.

The daily trip generation rate is derived in Table 1. The daily rate was derived using a weighted average. The daily trip generation rate derived for the food cart station with indoor seating use is 24.77 trips per food cart kitchen. The standard deviation is 8.56 which is 34.6% of the weighted average. The standard deviation is within the recommended range to use by the ITE *Trip Generation Handbook* which recommends the standard deviation to be within 55 percent of the weighted average.

Table 1. Derived Daily Trip Generation Rate

Food Cart Station	Number of Food Cart Kitchens	Daily Trips	Daily Rate
Happy Valley Station Food Carts	22	627	28.50
Troutdale Station Food Carts	23	723	31.43
Eastport Food Carts	25	384	15.36
Totals	70	1,734	24.77[1]
Standard Deviation			8.56

[1]Weighted Average

The P.M. peak hour trip generation rate is derived in Table 2. The P.M. peak hour rate was derived using a weighted average. The P.M. peak hour trip generation rate derived for the food cart station with indoor seating use is 3.31 P.M. peak hour trips per food cart kitchen. The standard deviation is 1.03 which is 31.1% of the weighted average. The standard deviation is within the recommended range to use by the ITE *Trip Generation Handbook* which recommends the standard deviation to be within 55 percent of the weighted average.

Table 2. Derived P.M. Peak Hour Trip Generation Rate

Food Cart Station	Number of Food Cart Kitchens	P.M. Peak Hour Trips[2]	P.M. Peak Hour Rate
Happy Valley Station Food Carts	22	92	4.18
Troutdale Station Food Carts	23	85	3.70
Eastport Food Carts	25	55	2.20
Totals	70	232	3.31[1]
Standard Deviation			1.03

[1]Weighted Average
[2]Inbound 54%, Outbound 46%

TRIP GENERATION

Estimates of daily and P.M. peak hour trips generated by food cart station with indoor seating use were developed from the survey conducted by HLA that is detailed in the previous "Trip Generation Survey for Food Carts" section. Estimates of daily, A.M. peak hour, and P.M. peak hour trips generated by the strip retail plaza and coffee/donut shop with drive-thru window and no indoor seating uses were developed from rates published in "Trip Generation, 11th Edition" (Institute of Transportation Engineers, 2021). The proposed project is expected to generate 1,010 daily, 32 A.M peak hour (19 in, 13 out), and 125 P.M. peak hour (66 in, 59 out) net new trips. Table 3 summarizes the project's trip generation.

TRIP DISTRIBUTION AND ASSIGNMENT

A generalized peak hour trip distribution was developed from a select zone assignment from RTC's regional model. Attachment D contains the select zone assignment model run traffic volume plot. Figure 6a shows the resulting trip distribution pattern and assignment of net new project-generated trips. Figure 6b shows the resulting trip distribution pattern and assignment of the pass-by trips.

Table 3. Trip Generation for Oak Tree Station

	Amount	Average Daily	A.M. Peak			P.M. Peak		
			In	Out	Total	In	Out	Total
Food Cart Station – HLA								
Rate per food cart kitchen		25.10	-	-	-	1.79	1.52	3.31
Trips	22 units	552	-	-	-	40	33	73
Pass-By Trips – 43%		(237)	-	-	-	(16)	(15)	(31)
Net Total for Food Cart Station		315	-	-	-	24	18	42
Strip Retail Plaza (<40k sf) – ITE LUC 822								
Rate per 1,000 square feet (ksf)		54.45	1.42	0.94	2.36	3.29	3.30	6.59
Trips	12.574	685	18	12	30	42	41	83
Coffee/Donut Shop with Drive-Thru Window and No Indoor Seating – ITE LUC 938								
Rate per 1,000 square feet (ksf)		179.00	19.90	19.91	39.81	7.54	7.54	15.08
Trips	0.600	107	12	12	24	4	5	
Pass-By Trips – 90% AM – 98% PM		(96)	(11)	(11)	(22)	(4)	(5)	(31)
Net Total for ITE LUC 938		11	1	1	2	-	-	-
Gross Site Total		1,344	30	24	54	86	79	165
Pass-By Total		(334)	(11)	(11)	(22)	(20)	(20)	(40)
Net Site Total		**1,010**	**19**	**13**	**32**	**66**	**59**	**125**

2027 "WITH PROJECT" TRAFFIC VOLUMES AND LEVELS OF SERVICE

The traffic volumes shown in Figures 5, 6a, and 6b were combined to arrive at the 2027 "With Project" A.M. and P.M. peak hour traffic volumes. Figure 7 shows these traffic volumes. Levels of service were calculated for the 2027 "With Project" condition based on the traffic volumes shown in Figure 7 and the lane configurations previously shown in Figure 3. Appendix E contains the level of service worksheets for the 2027 "With Project" condition.

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. For non-arterial/collector intersections, LOS C is the adopted level of service standard.

The 2027 "With Project" A.M. and P.M. peak hour levels of service at the study area intersections are summarized in Table 4. As shown in Table 4, all of the study area intersections are projected to operate within the acceptable levels of service standards in the 2027 "With Project" condition.

Table 4. 2027 "Without Project" Levels of Service

Signalized Intersection	A.M. Peak Hour LOS	A.M. Peak Hour Average Delay (sec)	P.M. Peak Hour LOS	P.M. Peak Hour Average Delay (sec)
NW Lake Road/NW Friberg-Strunk Street/SE 1st Street	C	21.3	B	12.4
NW Lake Road/NW Parker Street/NW Larkspur Street	B	12.8	B	14.9
Unsignalized Intersection				
NW Friberg-Strunk Street/Project Access				
Southbound Left	A	7.9	A	8.4
Westbound Approach	B	11.0	B	13.3
NW Lake Road/Project Access				
Southbound Right	A	9.4	A	9.5

PROPORTIONATE SHARE FEES

The City of Vancouver is currently collecting proportionate share fees at the following City of Vancouver intersections:

- NE 192nd Avenue/NE 13th Street
- SE 192nd Avenue/SE 34th Street
- SE 192nd Avenue/SR-14 Westbound Ramps

The proportionate share fees are based on a cost per P.M. peak hour trip and P.M. peak hour project trip impact. The cost per P.M. peak hour trip of the proportionate share fees was obtained from City of Vancouver staff. Table 5 summarizes the required proportionate share fees for the Oak Tree Station based on the cost per P.M. peak hour trip and P.M. peak hour project trip impact.

It should be noted that the pro-rata share contributions identified is for the entire Oak Tree Station project. If the project is to be constructed by phase, the City of Vancouver should allow the pro-rata share contributions to be paid by phase based on the identified portion trip generation for each proposed use.

Table 5. Pro-Rata Share Contributions

Intersection	P.M. Peak Hour Impact: Project P.M. Peak Hour Trip Impact	P.M. Peak Hour Impact: Cost Per P.M. Peak Hour Trip Impact	P.M. Peak Hour Impact: Pro-rata Share Contribution Required
NE 192nd Avenue/NE 13th Street	19 P.M.	$400.00	$7,600.00
SE 192nd Avenue/SE 34th Street	17 P.M.	$150.00	$2,550.00
SE 192nd Avenue/SR-14 Westbound Ramps	11 P.M.	$2,000.00	$22,000.00

CONCLUSION

Based on the traffic impact analysis documented in this report, no physical, off-site mitigation would be needed. However, proportionate share fees toward three City of Vancouver pro-rata share contribution improvement projects will be required by the City of Vancouver. As previously discussed, if the project is to be constructed by phase, the City of Vancouver should allow the pro-rata share contributions to be paid by phase based on the identified portion trip generation for each proposed use.

Oak Tree Station TIA
Camas, WA

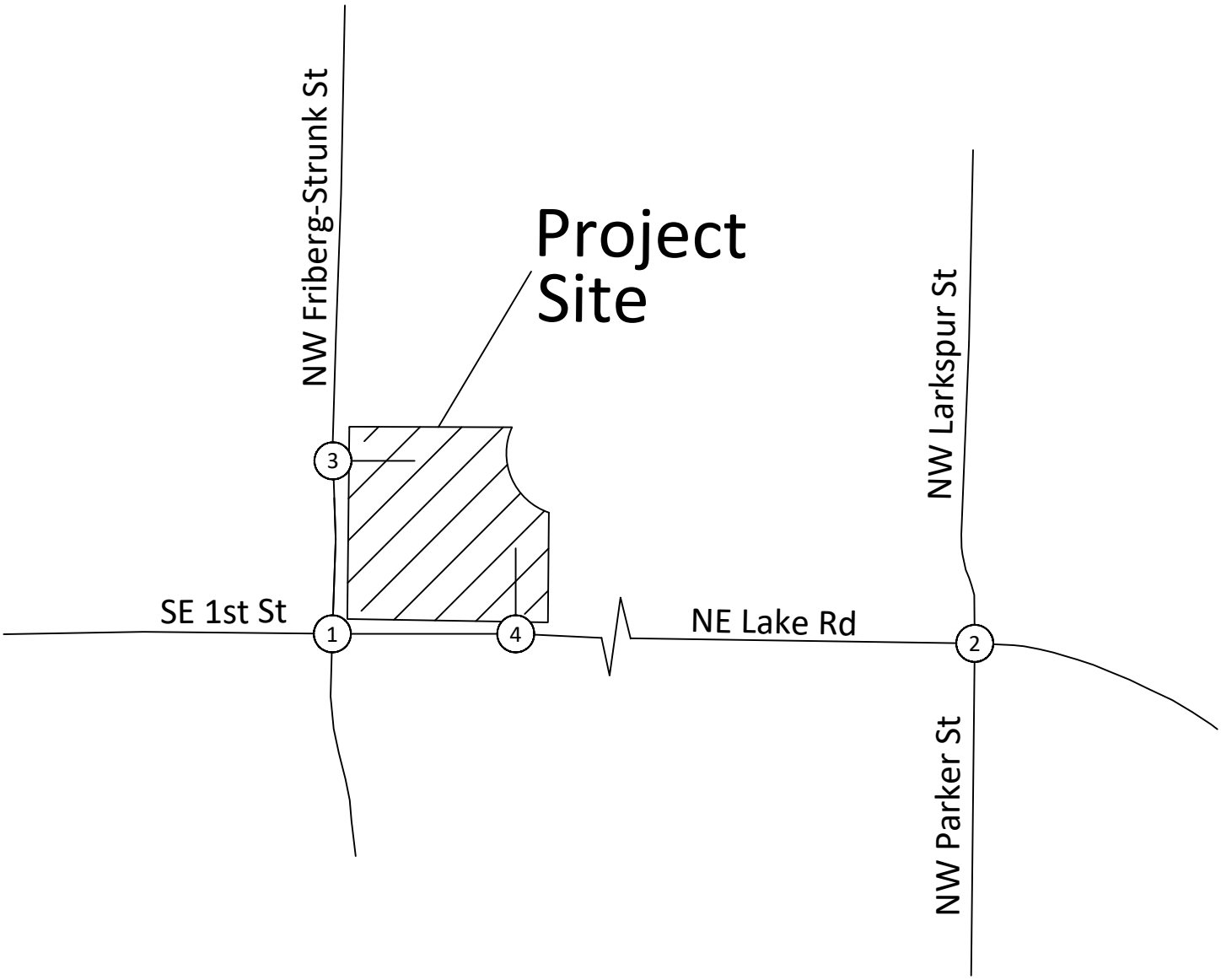

FIGURE 1
Vicinity Map

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Oak Tree Station TIA
Camas, WA

FIGURE 2
Site Plan

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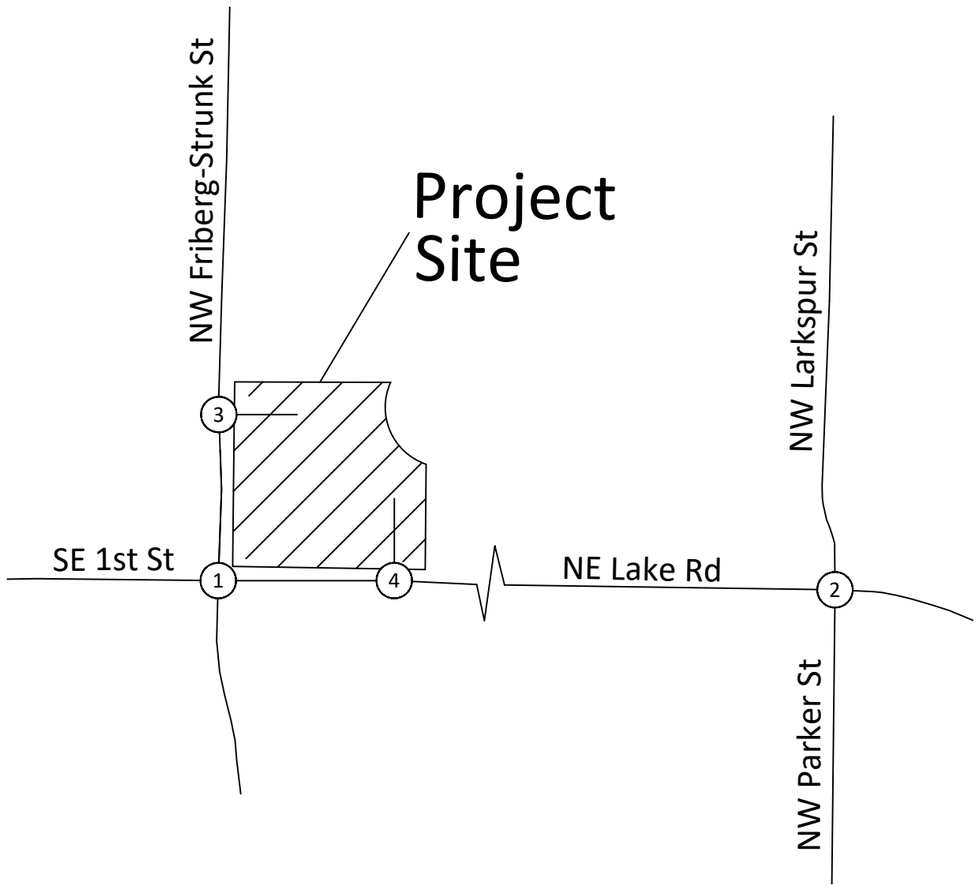
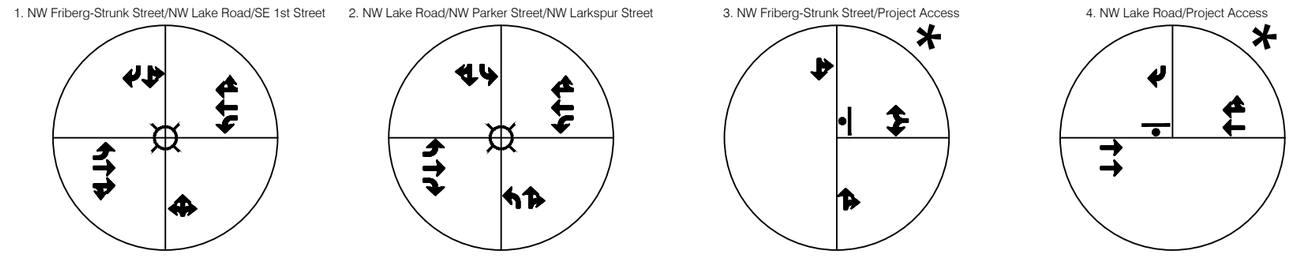
Oak Tree Station TIA
Camas, WA





LEGEND

- Lane Usage
- Traffic Signal
- Stop Sign
- Roundabout
- * 2027 "With Project" Lane Configuration

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FIGURE 3
Existing Lane Configuration and Traffic Control

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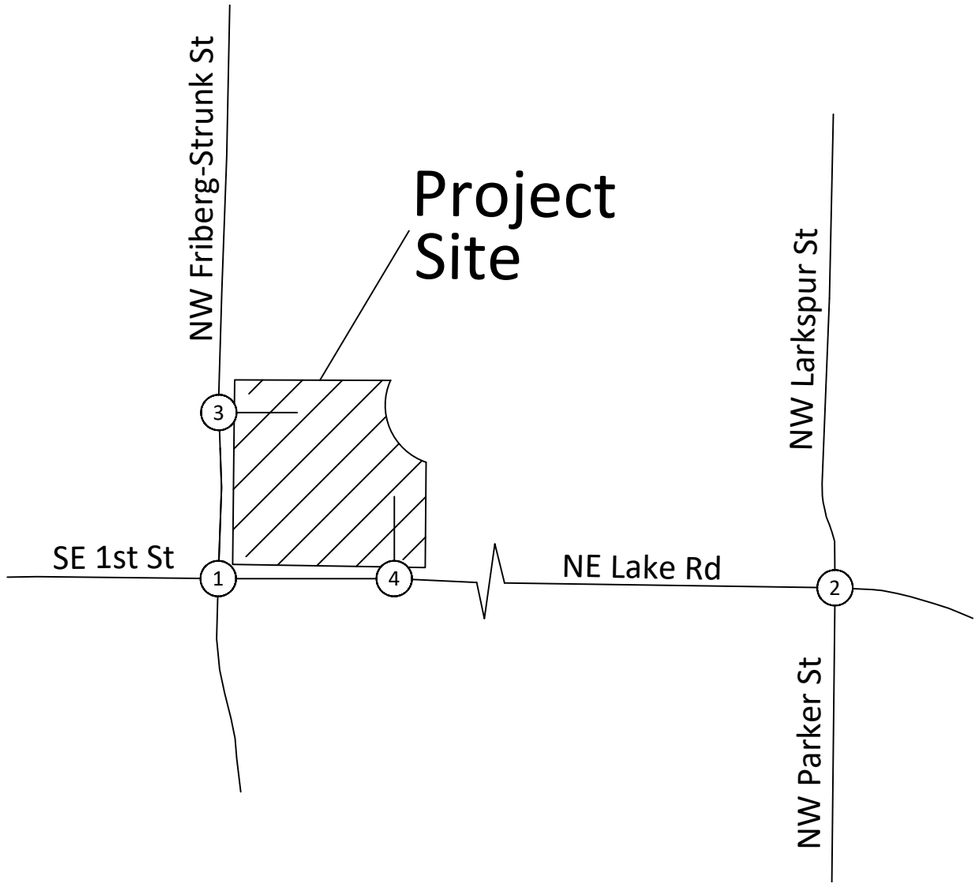
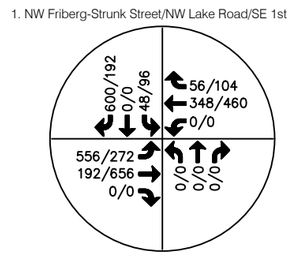
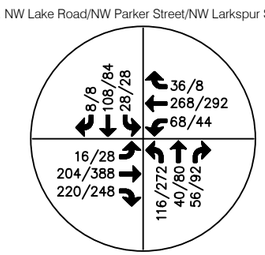
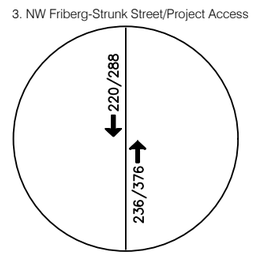
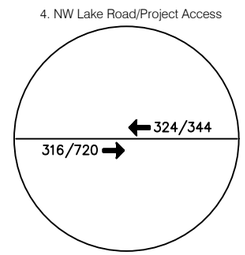
Oak Tree Station TIA
Camas, WA











LEGEND

128/200 A.M./P.M. Peak Hour Traffic Volume

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FIGURE 4
Existing A.M. and P.M.
Peak Hour Traffic Volumes

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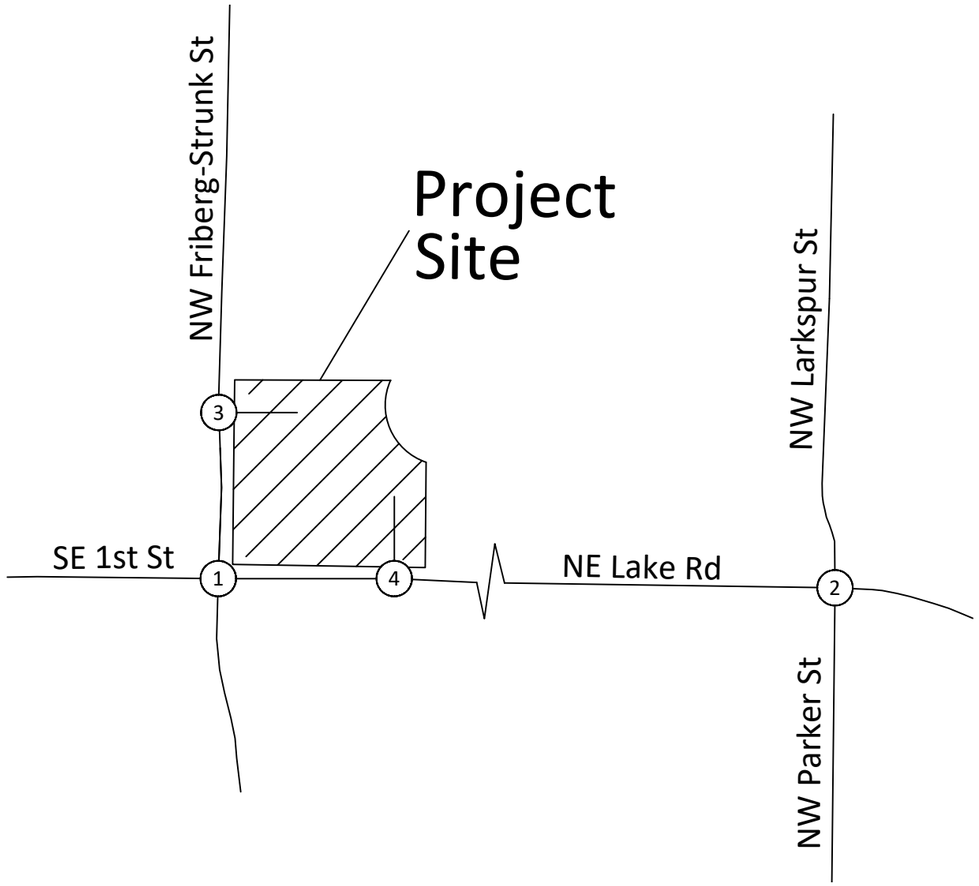
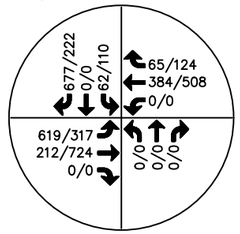
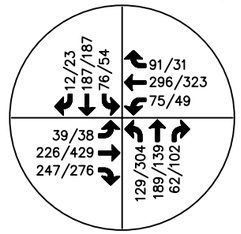
Oak Tree Station TIA
Camas, WA



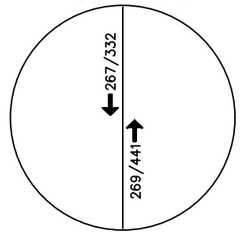
1. NW Friberg-Strunk Street/NW Lake Road/SE 1st Street



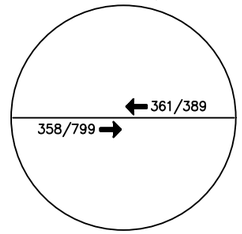
2. NW Lake Road/NW Parker Street/NW Larkspur Street



3. NW Friberg-Strunk Street/Project Access



4. NW Lake Road/Project Access



LEGEND

128/200 A.M./P.M. Peak Hour Traffic Volume

NOT TO SCALE

FIGURE 5
2027 "Without Project"
A.M. and P.M. Peak Hour Traffic Volumes

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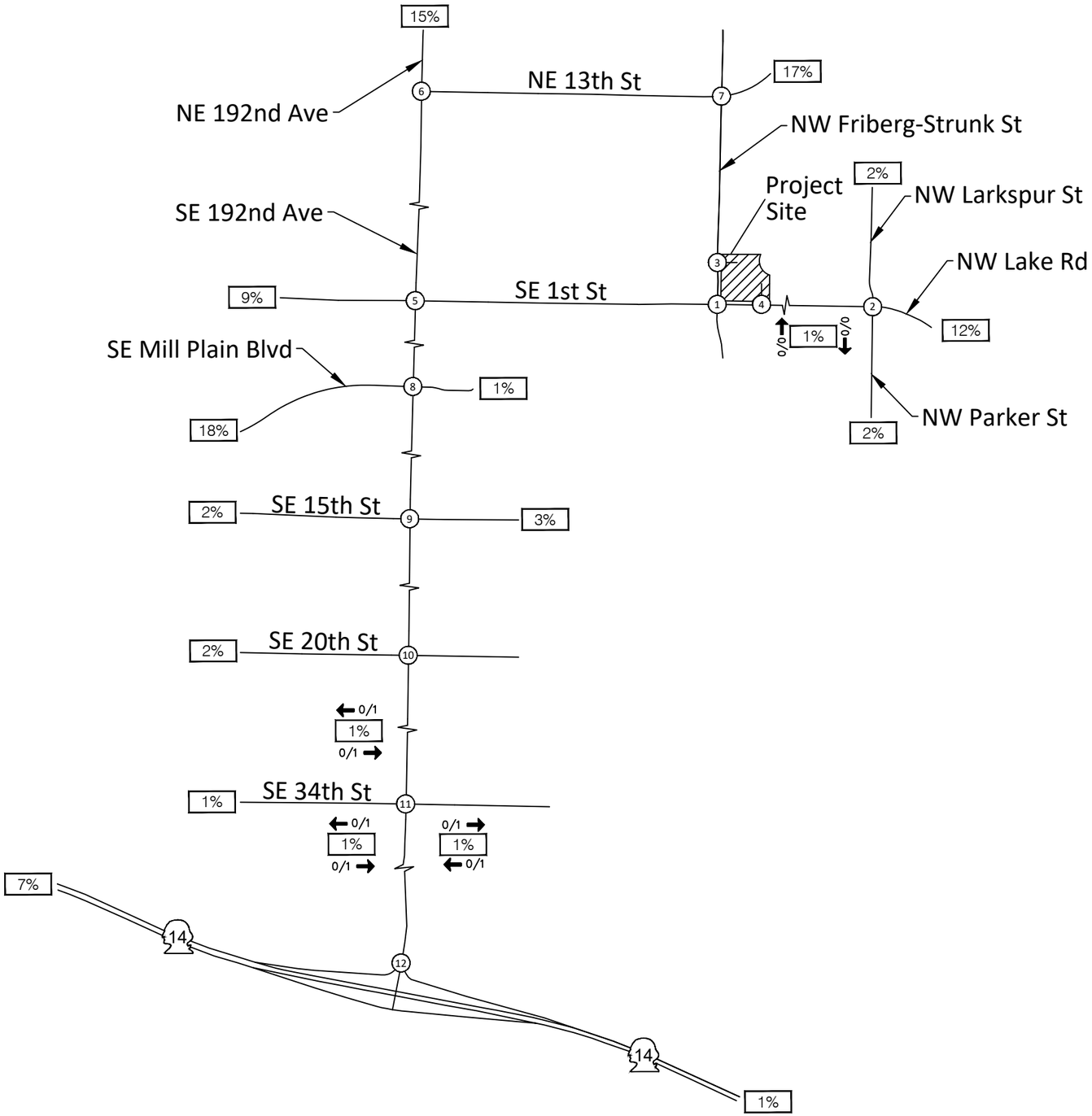
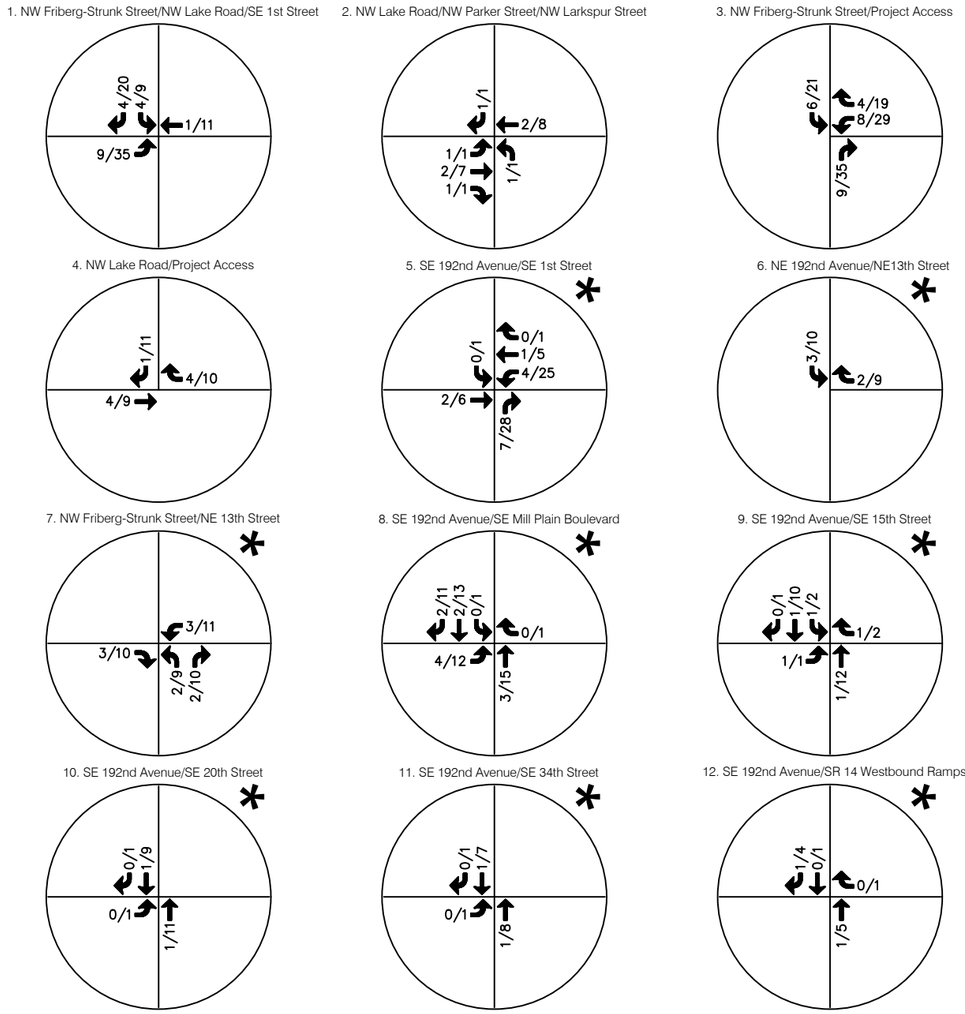
Oak Tree Station TIA
Camas, WA





LEGEND

128/200 A.M./P.M. Peak Hour Traffic Volume

10% Peak Hour Trip Distribution

* Not Study Area Intersections. Shown for Trip Distribution and Assignment Purposes Only

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FIGURE 6a
Trip Distribution and Assignment
Traffic Volumes

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Oak Tree Station TIA
Camas, WA

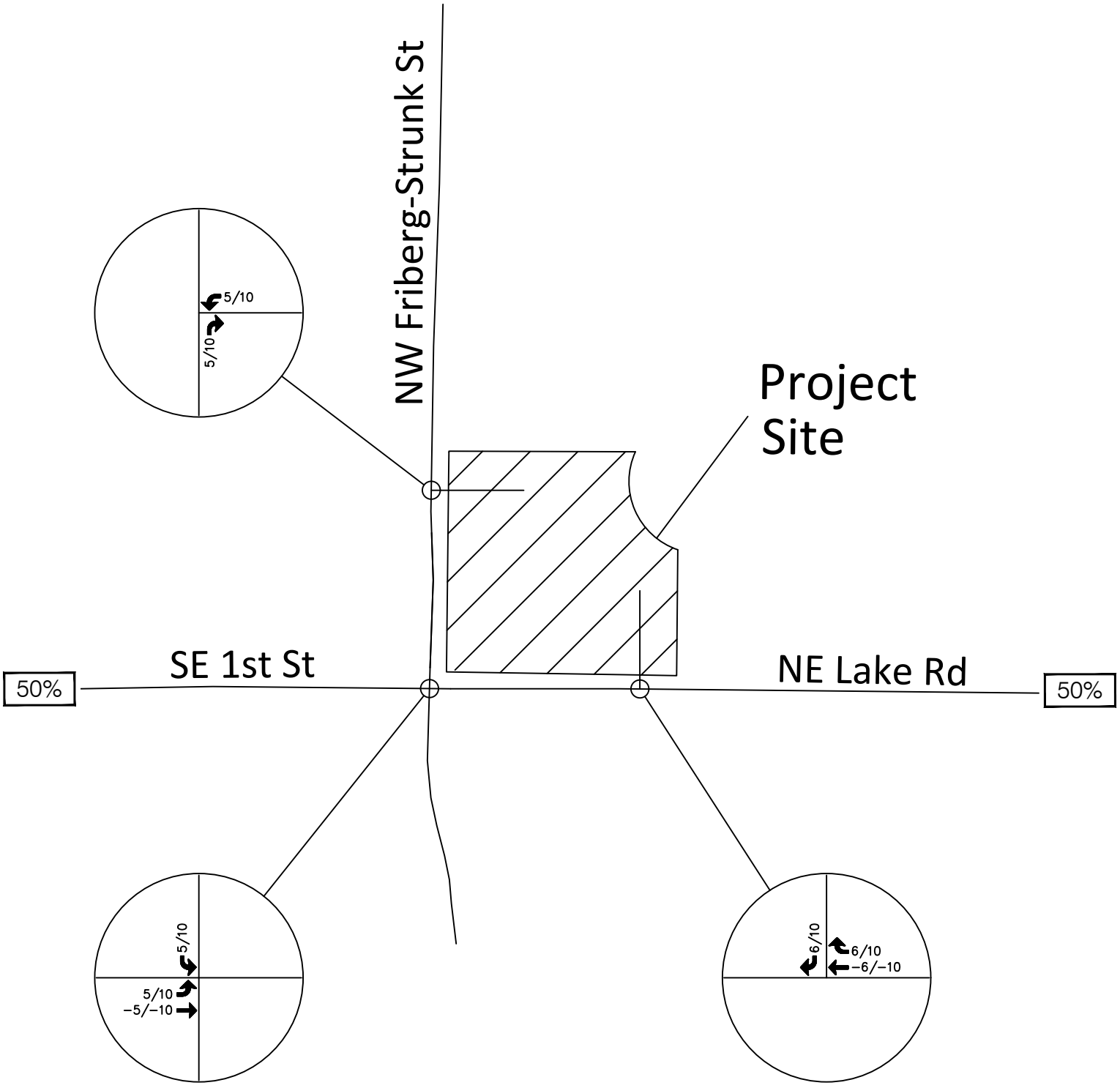

FIGURE 6b
Pass-By Trips
Trip Distribution and Assignment
Traffic Volumes

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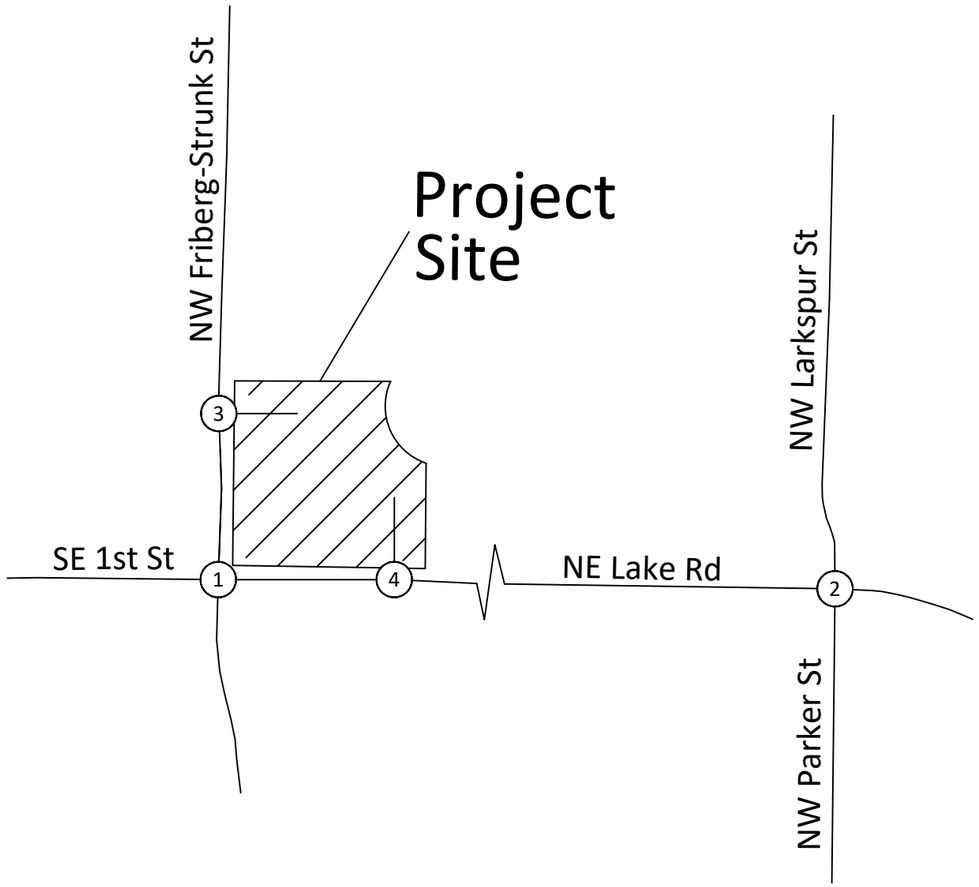
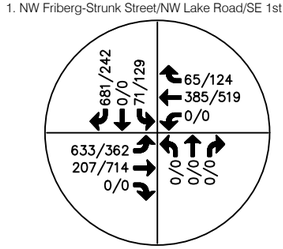
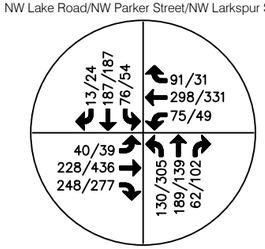
Oak Tree Station TIA
Camas, WA



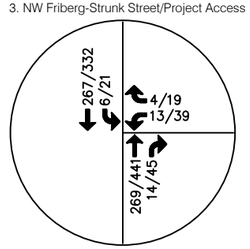
1. NW Friberg-Strunk Street/NW Lake Road/SE 1st Street



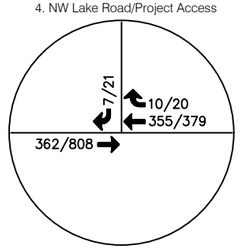
2. NW Lake Road/NW Parker Street/NW Larkspur Street



3. NW Friberg-Strunk Street/Project Access



4. NW Lake Road/Project Access



LEGEND

128/200 A.M./P.M. Peak Hour Traffic Volume

NOT TO SCALE

FIGURE 7
2027 "With Project"
A.M. and P.M. Peak Hour Traffic Volumes

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ATTACHMENT A

Intersection: NW Lake Road/NW Friberg-Strunk Street/SE 1st Street Date: 03/02/22

AM Peak Hour Turning Movement Volumes

	SB				WB				NB				EB				
Time	SBR	SBT	SBL	Trucks	WBR	WBT	WBL	Trucks	NBR	NBT	NBL	Trucks	EBR	EBT	EBL	Trucks	Total
15 Minute Totals																	
7:00 - 7:15 AM	15	0	9	1	14	36	0	2	0	0	1	0	0	42	12	1	129
7:15 - 7:30 AM	25	0	14	1	9	42	0	2	0	0	0	0	0	39	36	2	165
7:30 - 7:45 AM	28	0	15	1	17	45	0	3	0	0	0	0	0	63	29	2	197
7:45 - 8:00 AM	30	0	25	2	17	69	0	1	1	0	0	0	0	95	42	4	279
8:00 - 8:15 AM	31	0	17	2	20	60	0	2	0	0	2	0	0	62	61	7	253
8:15 - 8:30 AM	79	0	14	9	10	60	0	0	0	0	0	0	0	78	147	14	388
8:30 - 8:45 AM	150	0	12	9	14	87	0	3	0	0	0	0	0	48	139	2	450
8:45 - 9:00 AM	19	0	12	5	8	99	0	1	0	0	0	0	0	55	22	4	215
															Peak 15 Total		450
Hourly Total by 15 minutes																	
7:00 - 8:00 AM	98	0	63	5	57	192	0	8	1	0	1	0	0	239	119	9	770
7:15 - 8:15 AM	114	0	71	6	63	216	0	8	1	0	2	0	0	259	168	15	894
7:30 - 8:30 AM	168	0	71	14	64	234	0	6	1	0	2	0	0	298	279	27	1,117
7:45 - 8:45 AM	290	0	68	22	61	276	0	6	1	0	2	0	0	283	389	27	1,370
8:00 - 9:00 AM	279	0	55	25	52	306	0	6	0	0	2	0	0	243	369	27	1,306
Peak Hour 7:45 - 8:45 AM	290	0	68	22	61	276	0	6	1	0	2	0	0	283	389	27	1,370
Peak Hour Factor		0.55				0.83				0.38				0.75			0.76
Peak Hour % Trucks		6%				2%				0%				4%			
Peak 15 Min % Trucks		6%				3%				0%				1%			

Intersection: NW Lake Road/NW Friberg-Strunk Street/SE 1st Street Date: 03/01/22

PM Peak Hour Turning Movement Volumes

	SB				WB				NB				EB				
Time	SBR	SBT	SBL	Trucks	WBR	WBT	WBL	Trucks	NBR	NBT	NBL	Trucks	EBR	EBT	EBL	Trucks	Total
15 Minute Totals																	
4:00 - 4:15 PM	27	0	3	0	23	117	0	3	0	0	0	0	0	114	59	1	343
4:15 - 4:30 PM	42	0	13	1	18	80	0	0	0	0	0	0	0	137	56	1	346
4:30 - 4:45 PM	21	0	14	0	25	91	0	2	0	0	0	0	0	145	59	4	355
4:45 - 5:00 PM	31	0	18	1	29	83	0	3	0	0	0	0	0	130	65	0	356
5:00 - 5:15 PM	34	0	25	0	28	111	0	0	0	0	0	0	0	155	77	2	430
5:15 - 5:30 PM	48	0	24	0	26	115	0	2	0	0	0	0	0	164	68	1	445
5:30 - 5:45 PM	40	0	18	0	23	107	0	4	0	0	0	0	0	162	69	1	419
5:45 - 6:00 PM	35	0	19	0	18	104	0	0	0	0	0	0	0	151	56	0	383
															Peak 15 Total		445
Hourly Total by 15 minutes																	
4:00 - 5:00 PM	121	0	48	2	95	371	0	8	0	0	0	0	0	526	239	6	1,400
4:15 - 5:15 PM	128	0	70	2	100	365	0	5	0	0	0	0	0	567	257	7	1,487
4:30 - 5:30 PM	134	0	81	1	108	400	0	7	0	0	0	0	0	594	269	7	1,586
4:45 - 5:45 PM	153	0	85	1	106	416	0	9	0	0	0	0	0	611	279	4	1,650
5:00 - 6:00 PM	157	0	86	0	95	437	0	6	0	0	0	0	0	632	270	4	1,677
Peak Hour 5:00 - 6:00 PM	157	0	86	0	95	437	0	6	0	0	0	0	0	632	270	4	1,677
Peak Hour Factor		0.84				0.94				0.00				0.97			0.94
Peak Hour % Trucks		0%				1%				0%				0%			
Peak 15 Min % Trucks		0%				3%				0%				1%			

Intersection: NW Lake Road/NW Parker Street/NW Larkspur Street Date: 03/02/22

AM Peak Hour Turning Movement Volumes

	SB				WB				NB				EB				
Time	SBR	SBT	SBL	Trucks	WBR	WBT	WBL	Trucks	NBR	NBT	NBL	Trucks	EBR	EBT	EBL	Trucks	Total
15 Minute Totals																	
7:00 - 7:15 AM	2	8	1	0	1	40	9	2	1	6	11	0	17	30	0	1	126
7:15 - 7:30 AM	1	13	2	0	0	42	8	1	5	5	15	1	17	26	3	0	137
7:30 - 7:45 AM	6	17	5	1	2	52	16	4	3	13	10	0	41	34	2	2	201
7:45 - 8:00 AM	2	27	7	0	9	67	17	1	14	10	29	1	55	51	4	0	292
8:00 - 8:15 AM	4	14	8	0	7	57	17	3	15	17	18	1	32	37	1	4	227
8:15 - 8:30 AM	4	9	10	3	7	65	19	2	15	6	26	2	30	51	5	4	247
8:30 - 8:45 AM	6	23	7	0	8	50	36	1	28	19	20	1	15	36	3	2	251
8:45 - 9:00 AM	6	15	6	0	11	69	19	2	48	14	29	2	19	35	6	3	277
															Peak 15 Total		292
Hourly Total by 15 minutes																	
7:00 - 8:00 AM	11	65	15	1	12	201	50	8	23	34	65	2	130	141	9	3	756
7:15 - 8:15 AM	13	71	22	1	18	218	58	9	37	45	72	3	145	148	10	6	857
7:30 - 8:30 AM	16	67	30	4	25	241	69	10	47	46	83	4	158	173	12	10	967
7:45 - 8:45 AM	16	73	32	3	31	239	89	7	72	52	93	5	132	175	13	10	1,017
8:00 - 9:00 AM	20	61	31	3	33	241	91	8	106	56	93	6	96	159	15	13	1,002
Peak Hour 7:45 - 8:45 AM	16	73	32	3	31	239	89	7	72	52	93	5	132	175	13	10	1,017
Peak Hour Factor		0.84				0.95				0.81				0.73			0.87
Peak Hour % Trucks		2%				2%				2%				3%			
Peak 15 Min % Trucks		0%				1%				2%				0%			

Intersection: NW Lake Road/NW Parker Street/NW Larkspur Street Date: 03/01/22

PM Peak Hour Turning Movement Volumes

	SB				WB				NB				EB				
Time	SBR	SBT	SBL	Trucks	WBR	WBT	WBL	Trucks	NBR	NBT	NBL	Trucks	EBR	EBT	EBL	Trucks	Total
15 Minute Totals																	
4:00 - 4:15 PM	4	13	5	1	9	90	8	2	13	15	38	2	23	77	6	0	301
4:15 - 4:30 PM	3	11	4	1	3	67	14	0	9	15	31	2	24	83	11	2	275
4:30 - 4:45 PM	5	5	6	0	2	70	9	1	11	25	36	1	26	104	10	1	309
4:45 - 5:00 PM	4	18	5	0	5	72	4	0	15	10	27	2	39	82	5	1	286
5:00 - 5:15 PM	4	13	3	0	3	69	9	0	14	22	62	1	39	93	10	1	341
5:15 - 5:30 PM	5	19	14	0	6	68	13	3	17	15	63	3	35	94	3	1	352
5:30 - 5:45 PM	2	21	7	1	2	73	11	0	23	20	68	1	62	97	7	0	393
5:45 - 6:00 PM	3	6	8	0	1	53	15	0	24	21	47	0	45	70	6	0	299
															Peak 15 Total		393
Hourly Total by 15 minutes																	
4:00 - 5:00 PM	16	47	20	2	19	299	35	3	48	65	132	7	112	346	32	4	1,171
4:15 - 5:15 PM	16	47	18	1	13	278	36	1	49	72	156	6	128	362	36	5	1,211
4:30 - 5:30 PM	18	55	28	0	16	279	35	4	57	72	188	7	139	373	28	4	1,288
4:45 - 5:45 PM	15	71	29	1	16	282	37	3	69	67	220	7	175	366	25	3	1,372
5:00 - 6:00 PM	14	59	32	1	12	263	48	3	78	78	240	5	181	354	26	2	1,385
Peak Hour 5:00 - 6:00 PM	14	59	32	1	12	263	48	3	78	78	240	5	181	354	26	2	1,385
Peak Hour Factor		0.69				0.93				0.89				0.84			0.88
Peak Hour % Trucks		1%				1%				1%				0%			
Peak 15 Min % Trucks		3%				0%				1%				0%			

Intersection: NW Friberg-Strunk Street/Project Access Date: 03/02/22

AM Peak Hour Turning Movement Volumes

	SB				WB				NB				EB				
Time	SBR	SBT	SBL	Trucks	WBR	WBT	WBL	Trucks	NBR	NBT	NBL	Trucks	EBR	EBT	EBL	Trucks	Total
15 Minute Totals																	
7:00 - 7:15 AM	0	24	0	1	0	0	0	0	0	26	0	2	0	0	0	0	50
7:15 - 7:30 AM	0	39	0	1	0	0	0	0	0	45	0	2	0	0	0	0	84
7:30 - 7:45 AM	0	43	0	1	0	0	0	0	0	46	0	3	0	0	0	0	89
7:45 - 8:00 AM	0	55	0	2	0	0	0	0	0	59	0	3	0	0	0	0	114
8:00 - 8:15 AM	0	48	0	2	0	0	0	0	0	81	0	5	0	0	0	0	129
8:15 - 8:30 AM	0	93	0	9	0	0	0	0	0	157	0	7	0	0	0	0	250
8:30 - 8:45 AM	0	162	0	9	0	0	0	0	0	153	0	3	0	0	0	0	315
8:45 - 9:00 AM	0	31	0	5	0	0	0	0	0	30	0	3	0	0	0	0	61
															Peak 15 Total		315
Hourly Total by 15 minutes																	
7:00 - 8:00 AM	0	161	0	5	0	0	0	0	0	176	0	9	0	0	0	0	337
7:15 - 8:15 AM	0	185	0	6	0	0	0	0	0	231	0	12	0	0	0	0	416
7:30 - 8:30 AM	0	239	0	14	0	0	0	0	0	343	0	17	0	0	0	0	582
7:45 - 8:45 AM	0	358	0	22	0	0	0	0	0	450	0	17	0	0	0	0	808
8:00 - 9:00 AM	0	334	0	25	0	0	0	0	0	421	0	17	0	0	0	0	755
Peak Hour 7:45 - 8:45 AM	0	358	0	22	0	0	0	0	0	450	0	16.5	0	0	0	0	808
Peak Hour Factor		0.55				0.00				0.72				0.00			0.64
Peak Hour % Trucks		6%				0%				4%				0%			
Peak 15 Min % Trucks		4%				0%				4%				0%			

Intersection: NW Friberg-Strunk Street/Project Access Date: 03/01/22

PM Peak Hour Turning Movement Volumes

	SB				WB				NB				EB				
Time	SBR	SBT	SBL	Trucks	WBR	WBT	WBL	Trucks	NBR	NBT	NBL	Trucks	EBR	EBT	EBL	Trucks	Total
15 Minute Totals																	
4:00 - 4:15 PM	0	30	0	0	0	0	0	0	0	82	0	2	0	0	0	0	112
4:15 - 4:30 PM	0	55	0	1	0	0	0	0	0	74	0	1	0	0	0	0	129
4:30 - 4:45 PM	0	35	0	0	0	0	0	0	0	84	0	3	0	0	0	0	119
4:45 - 5:00 PM	0	49	0	1	0	0	0	0	0	94	0	2	0	0	0	0	143
5:00 - 5:15 PM	0	59	0	0	0	0	0	0	0	105	0	1	0	0	0	0	164
5:15 - 5:30 PM	0	72	0	0	0	0	0	0	0	94	0	2	0	0	0	0	166
5:30 - 5:45 PM	0	58	0	0	0	0	0	0	0	92	0	3	0	0	0	0	150
5:45 - 6:00 PM	0	54	0	0	0	0	0	0	0	74	0	0	0	0	0	0	128
															Peak 15 Total		166
Hourly Total by 15 minutes																	
4:00 - 5:00 PM	0	169	0	2	0	0	0	0	0	334	0	7	0	0	0	0	503
4:15 - 5:15 PM	0	198	0	2	0	0	0	0	0	357	0	6	0	0	0	0	555
4:30 - 5:30 PM	0	215	0	1	0	0	0	0	0	377	0	7	0	0	0	0	592
4:45 - 5:45 PM	0	238	0	1	0	0	0	0	0	385	0	7	0	0	0	0	623
5:00 - 6:00 PM	0	243	0	0	0	0	0	0	0	365	0	5	0	0	0	0	608
Peak Hour 4:45 - 5:45 PM	0	238	0	1	0	0	0	0	0	385	0	6.5	0	0	0	0	623
Peak Hour Factor		0.83				0.00				0.92				0.00			0.94
Peak Hour % Trucks		0%				0%				2%				0%			
Peak 15 Min % Trucks		0%				0%				2%				0%			

Intersection: NW Lake Road/Project Access Date: 03/02/22

AM Peak Hour Turning Movement Volumes

	SB				WB				NB				EB				
Time	SBR	SBT	SBL	Trucks	WBR	WBT	WBL	Trucks	NBR	NBT	NBL	Trucks	EBR	EBT	EBL	Trucks	Total
15 Minute Totals																	
7:00 - 7:15 AM	0	0	0	0	0	50	0	2	0	0	0	0	0	51	0	3	101
7:15 - 7:30 AM	0	0	0	0	0	50	0	2	0	0	0	0	0	53	0	0	103
7:30 - 7:45 AM	0	0	0	0	0	70	0	3	0	0	0	0	0	78	0	2	148
7:45 - 8:00 AM	0	0	0	0	0	93	0	1	0	0	0	0	0	121	0	3	214
8:00 - 8:15 AM	0	0	0	0	0	81	0	2	0	0	0	0	0	79	0	0	160
8:15 - 8:30 AM	0	0	0	0	0	91	0	0	0	0	0	0	0	92	0	2	183
8:30 - 8:45 AM	0	0	0	0	0	94	0	3	0	0	0	0	0	60	0	4	154
8:45 - 9:00 AM	0	0	0	0	0	99	0	1	0	0	0	0	0	67	0	0	166
															Peak 15 Total		214
Hourly Total by 15 minutes																	
7:00 - 8:00 AM	0	0	0	0	0	263	0	8	0	0	0	0	0	303	0	8	566
7:15 - 8:15 AM	0	0	0	0	0	294	0	8	0	0	0	0	0	331	0	5	625
7:30 - 8:30 AM	0	0	0	0	0	335	0	6	0	0	0	0	0	370	0	7	705
7:45 - 8:45 AM	0	0	0	0	0	359	0	6	0	0	0	0	0	352	0	9	711
8:00 - 9:00 AM	0	0	0	0	0	365	0	6	0	0	0	0	0	298	0	6	663
Peak Hour 7:45 - 8:45 AM	0	0	0	0	0	359	0	6	0	0	0	0	0	352	0	9	711
Peak Hour Factor		0.00				0.95				0.00				0.73			0.83
Peak Hour % Trucks		0%				2%				0%				3%			
Peak 15 Min % Trucks		0%				2%				0%				0%			

Intersection: NW Lake Road/Project Access Date: 03/01/22

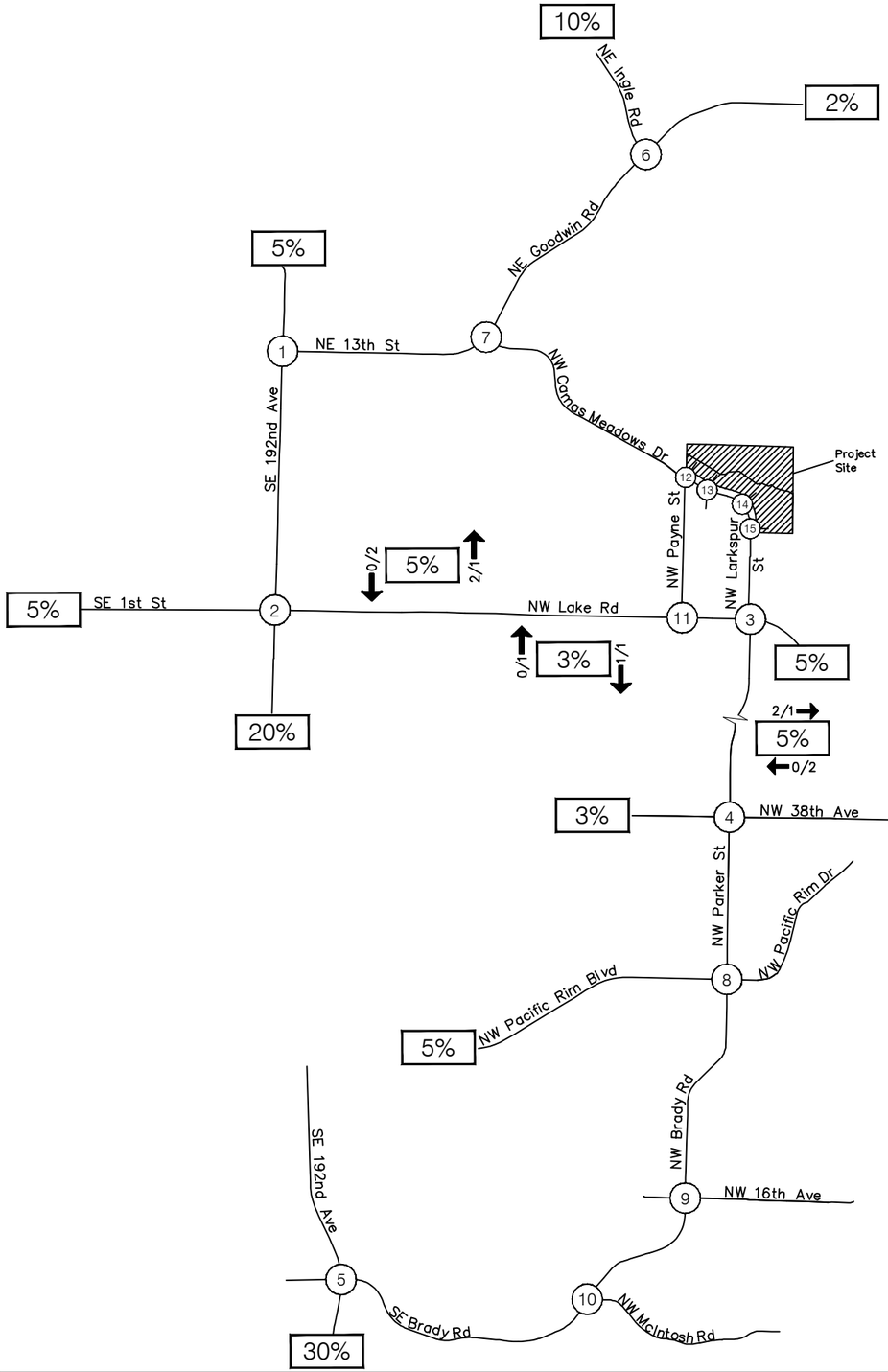
PM Peak Hour Turning Movement Volumes

	SB				WB				NB				EB				
Time	SBR	SBT	SBL	Trucks	WBR	WBT	WBL	Trucks	NBR	NBT	NBL	Trucks	EBR	EBT	EBL	Trucks	Total
15 Minute Totals																	
4:00 - 4:15 PM	0	0	0	0	0	107	0	3	0	0	0	0	0	117	0	1	224
4:15 - 4:30 PM	0	0	0	0	0	84	0	0	0	0	0	0	0	150	0	0	234
4:30 - 4:45 PM	0	0	0	0	0	81	0	2	0	0	0	0	0	159	0	2	240
4:45 - 5:00 PM	0	0	0	0	0	81	0	3	0	0	0	0	0	148	0	0	229
5:00 - 5:15 PM	0	0	0	0	0	81	0	0	0	0	0	0	0	180	0	4	261
5:15 - 5:30 PM	0	0	0	0	0	87	0	2	0	0	0	0	0	188	0	4	275
5:30 - 5:45 PM	0	0	0	0	0	86	0	4	0	0	0	0	0	180	0	2	266
5:45 - 6:00 PM	0	0	0	0	0	69	0	0	0	0	0	0	0	170	0	3	239
															Peak 15 Total		275
Hourly Total by 15 minutes																	
4:00 - 5:00 PM	0	0	0	0	0	353	0	8	0	0	0	0	0	574	0	3	927
4:15 - 5:15 PM	0	0	0	0	0	327	0	5	0	0	0	0	0	637	0	6	964
4:30 - 5:30 PM	0	0	0	0	0	330	0	7	0	0	0	0	0	675	0	10	1,005
4:45 - 5:45 PM	0	0	0	0	0	335	0	9	0	0	0	0	0	696	0	10	1,031
5:00 - 6:00 PM	0	0	0	0	0	323	0	6	0	0	0	0	0	718	0	13	1,041
Peak Hour 5:00 - 6:00 PM	0	0	0	0	0	323	0	6	0	0	0	0	0	718	0	13	1,041
Peak Hour Factor		0.00				0.93				0.00				0.95			0.95
Peak Hour % Trucks		0%				2%				0%				2%			
Peak 15 Min % Trucks		0%				5%				0%				1%			

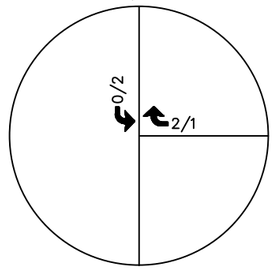
ATTACHMENT B

Residential: 100% Built out (42 SFR Lots)
Commercial: 0% Built out

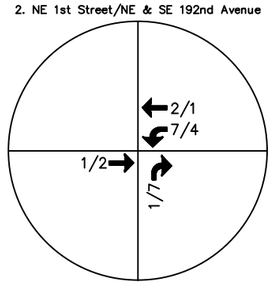
Parklands at Camas Meadows TIA
Camas, WA



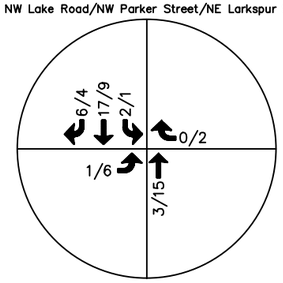
1. NE 13th Street/NE 192nd Avenue



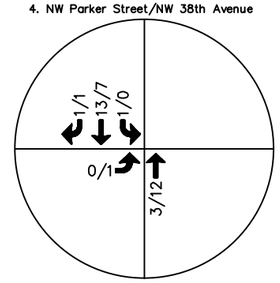
2. NE 1st Street/NE & SE 192nd Avenue



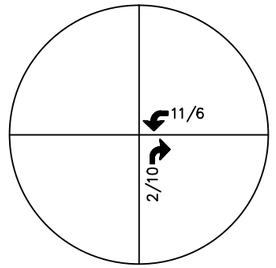
3. NW Lake Road/NW Parker Street/NE Larkspur Street



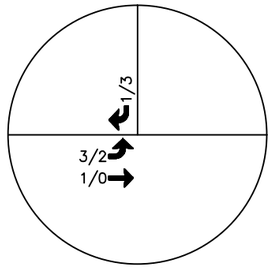
4. NW Parker Street/NW 38th Avenue



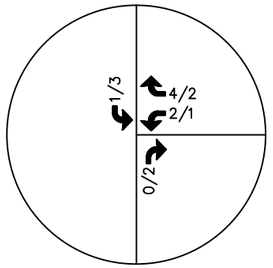
5. SE Brady Road/SE 192nd Avenue



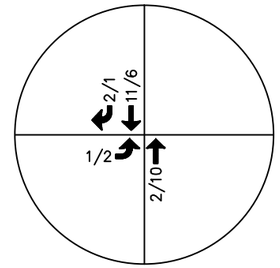
6. NE Goodwin Road/NE Ingle Road



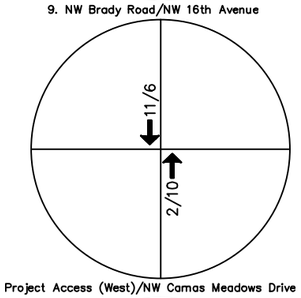
7. NE Goodwin Road/NW Camas Meadows Drive



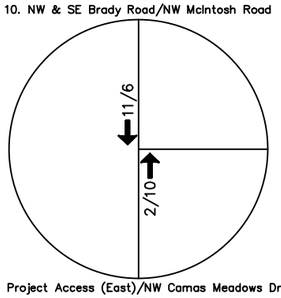
8. NW Parker Street/NW Pacific Rim Boulevard/NW Pacific Rim Drive



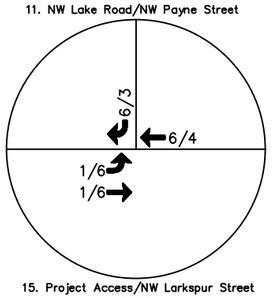
9. NW Brady Road/NW 16th Avenue



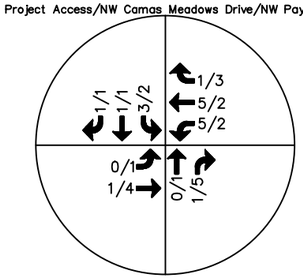
10. NW & SE Brady Road/NW McIntosh Road



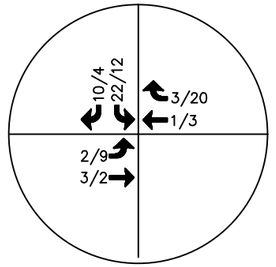
11. NW Lake Road/NW Payne Street



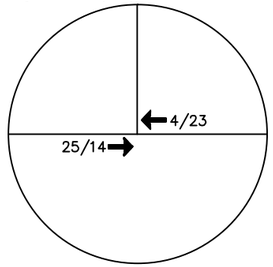
12. Project Access/NW Camas Meadows Drive/NW Payne Street



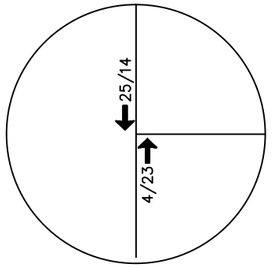
13. Project Access (West)/NW Camas Meadows Drive



14. Project Access (East)/NW Camas Meadows Drive



15. Project Access/NW Larkspur Street



NOT TO SCALE

LEGEND

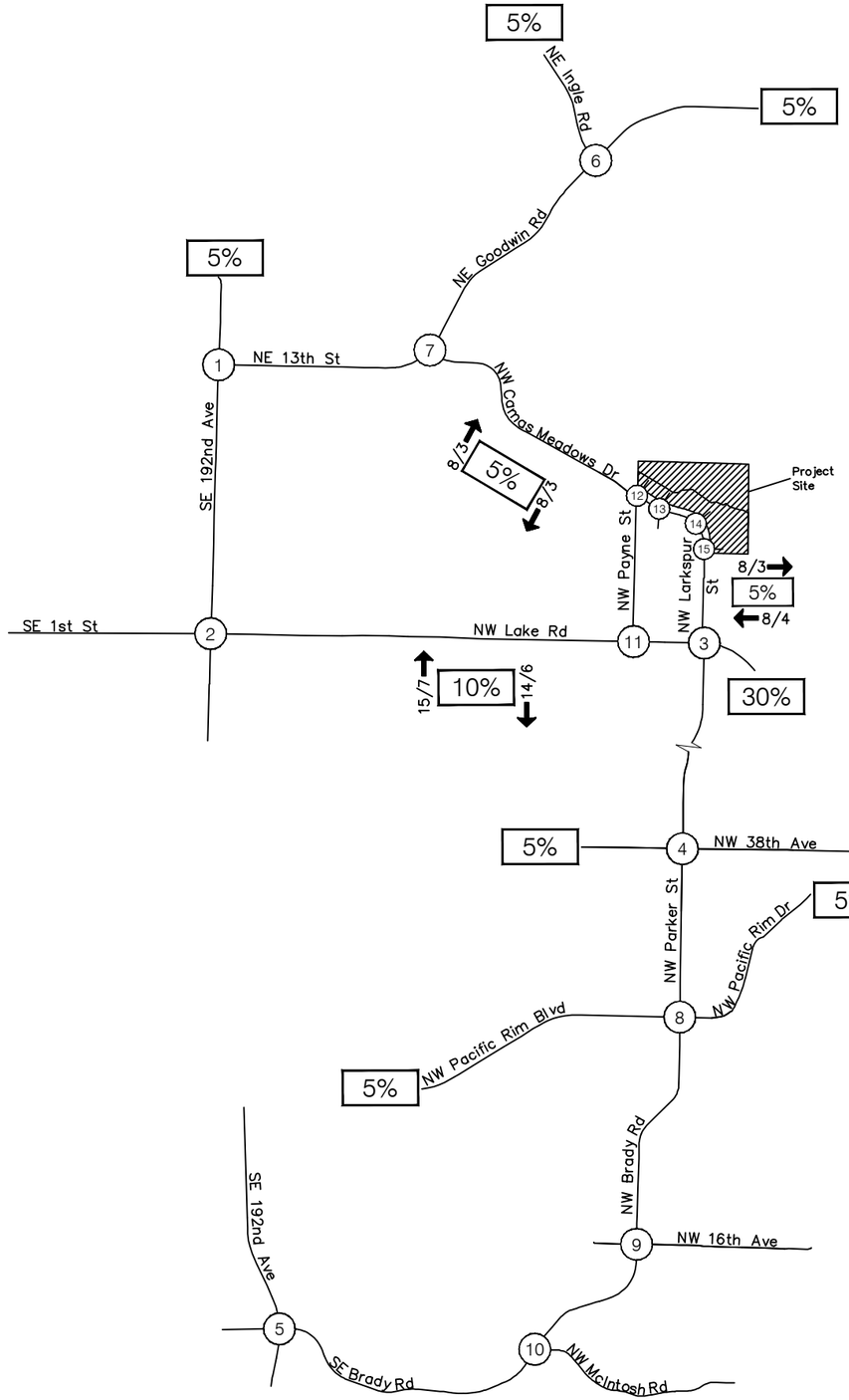
128/200 A.M./P.M. Peak Hour Traffic Volume

10% A.M. and P.M. Peak Hour Trip Distribution

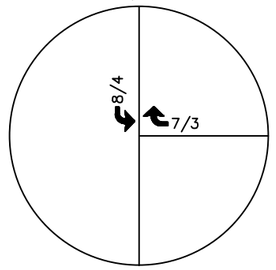
FIGURE 6a
"Residential"
Trip Distribution and Assignment
Traffic Volumes

315021.0Figures.Dwg

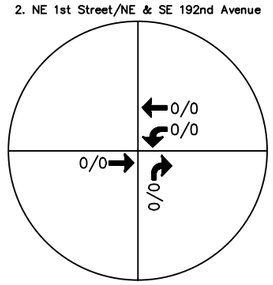
Parklands at Camas Meadows TIA
Camas, WA



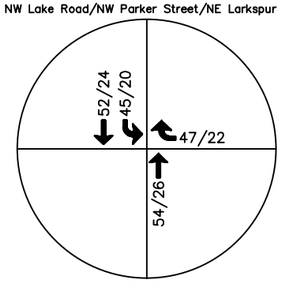
1. NE 13th Street/NE 192nd Avenue



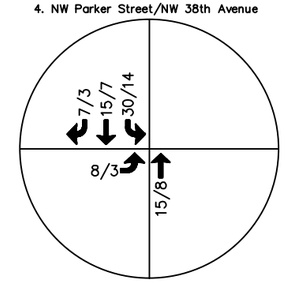
2. NE 1st Street/NE & SE 192nd Avenue



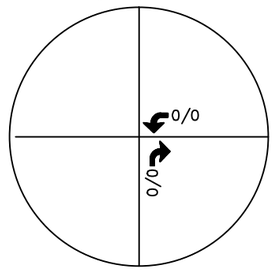
3. NW Lake Road/NW Parker Street/NE Larkspur Street



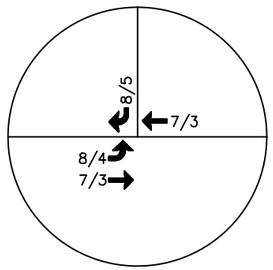
4. NW Parker Street/NW 38th Avenue



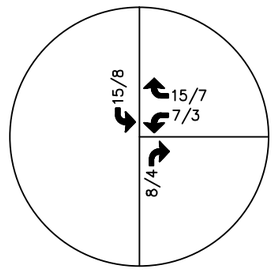
5. SE Brady Road/SE 192nd Avenue



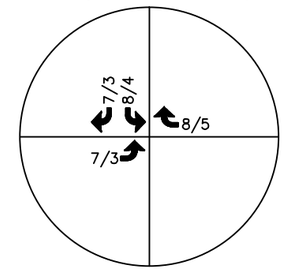
6. NE Goodwin Road/NE Ingle Road



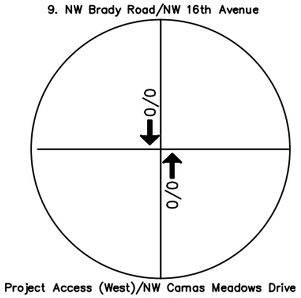
7. NE Goodwin Road/NW Camas Meadows Drive



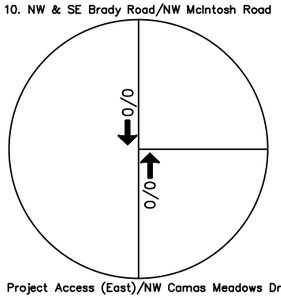
8. NW Parker Street/NW Pacific Rim Boulevard/NW Pacific Rim Drive



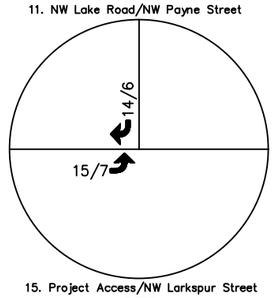
9. NW Brady Road/NW 16th Avenue



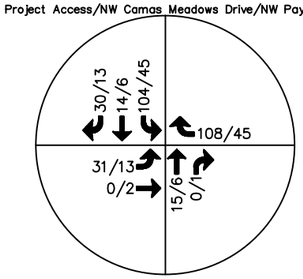
10. NW & SE Brady Road/NW McIntosh Road



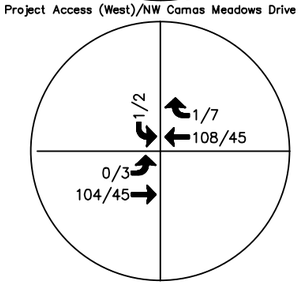
11. NW Lake Road/NW Payne Street



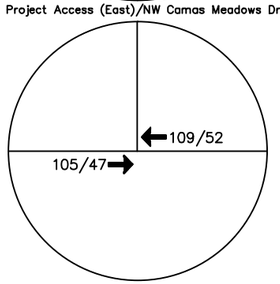
12. Project Access/NW Camas Meadows Drive/NW Payne Street



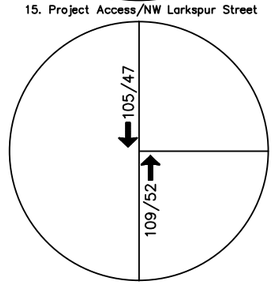
13. Project Access (West)/NW Camas Meadows Drive



14. Project Access (East)/NW Camas Meadows Drive



15. Project Access/NW Larkspur Street



NOT TO SCALE

LEGEND

100/128 A.M./P.M. Peak Hour Traffic Volumes

10% A.M. and P.M. Peak Hour Trip Distribution

FIGURE 6b
"Coffee Shop/Quality Restaurant"
Trip Distribution and Assignment
Traffic Volumes

315021.0Figures.Dwg

Parklands at Camas Meadows TIA
Camas, WA

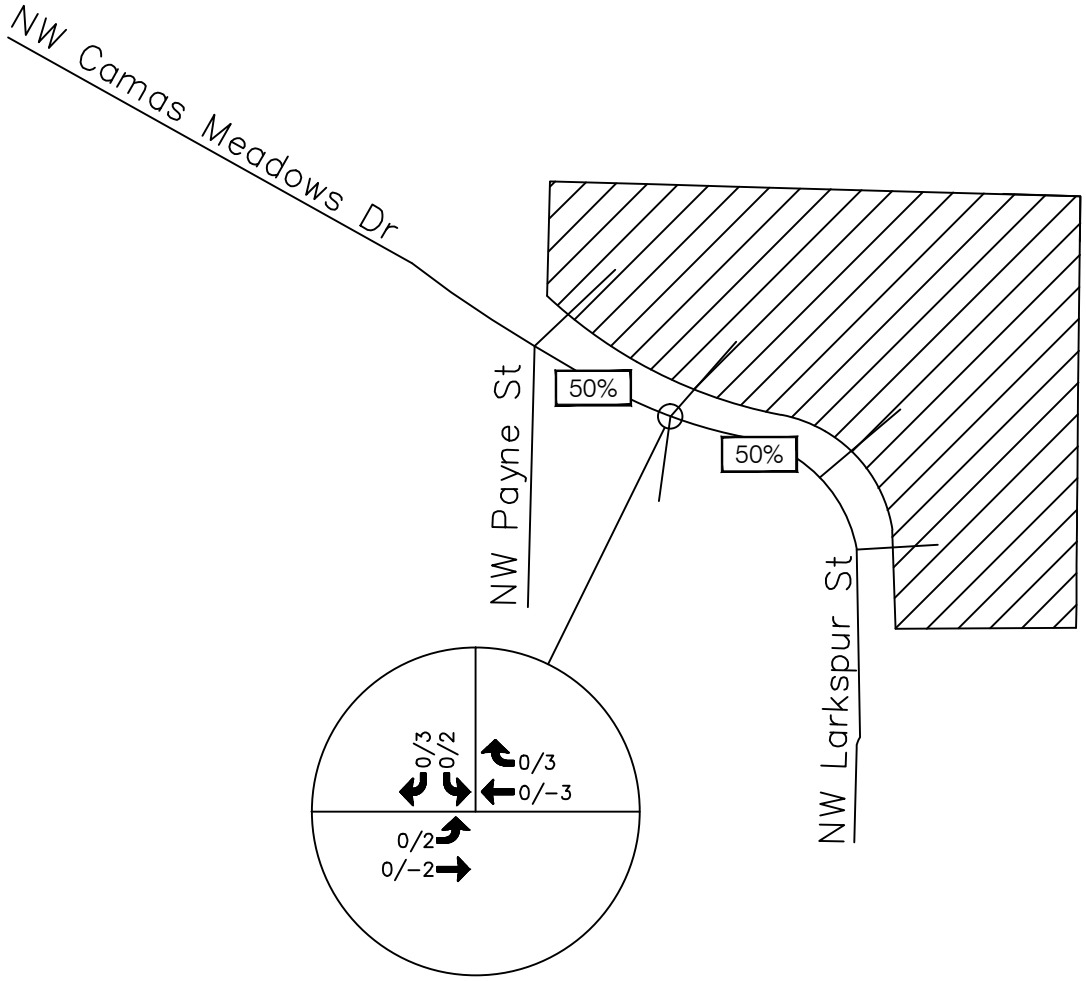
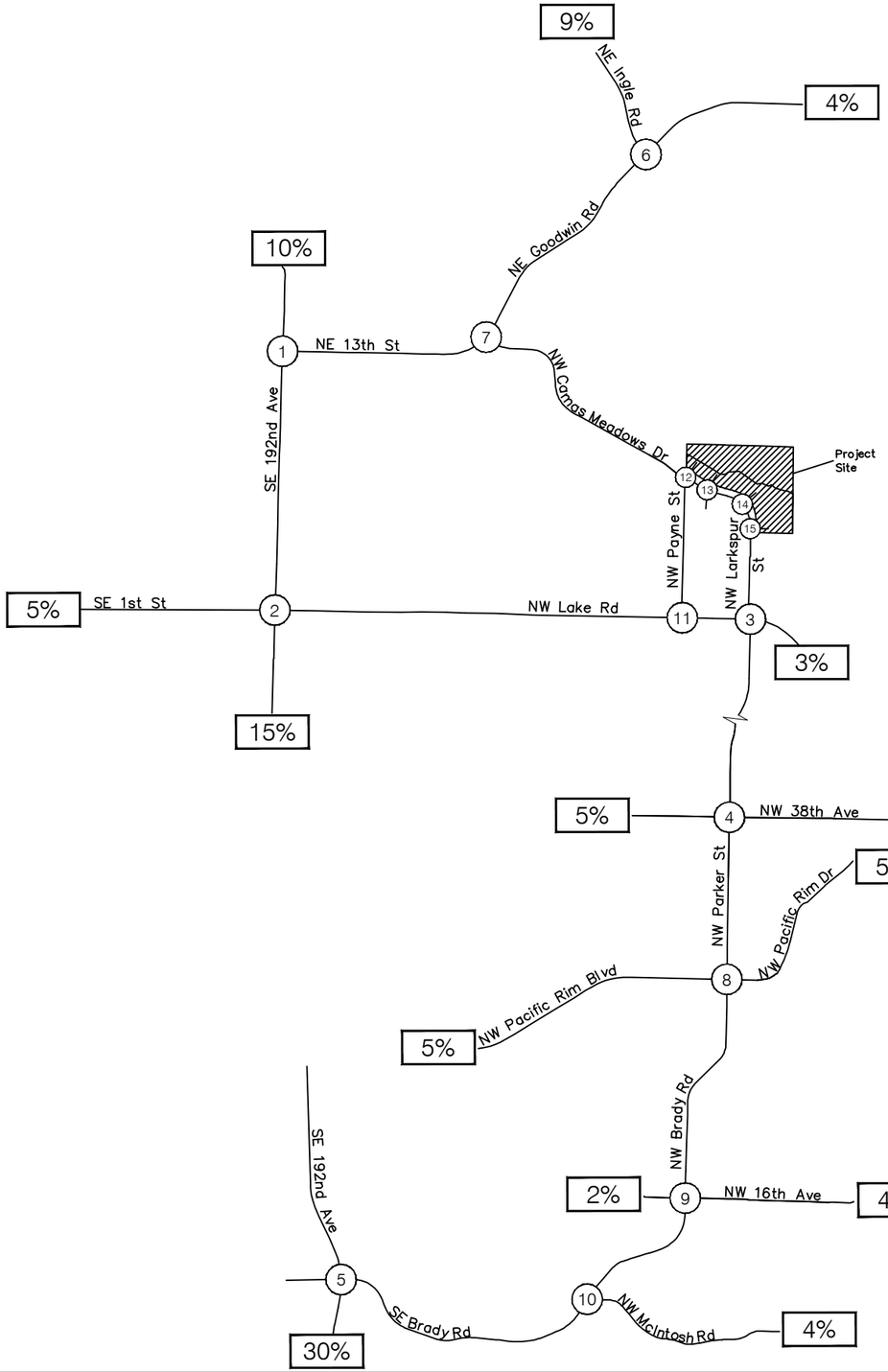


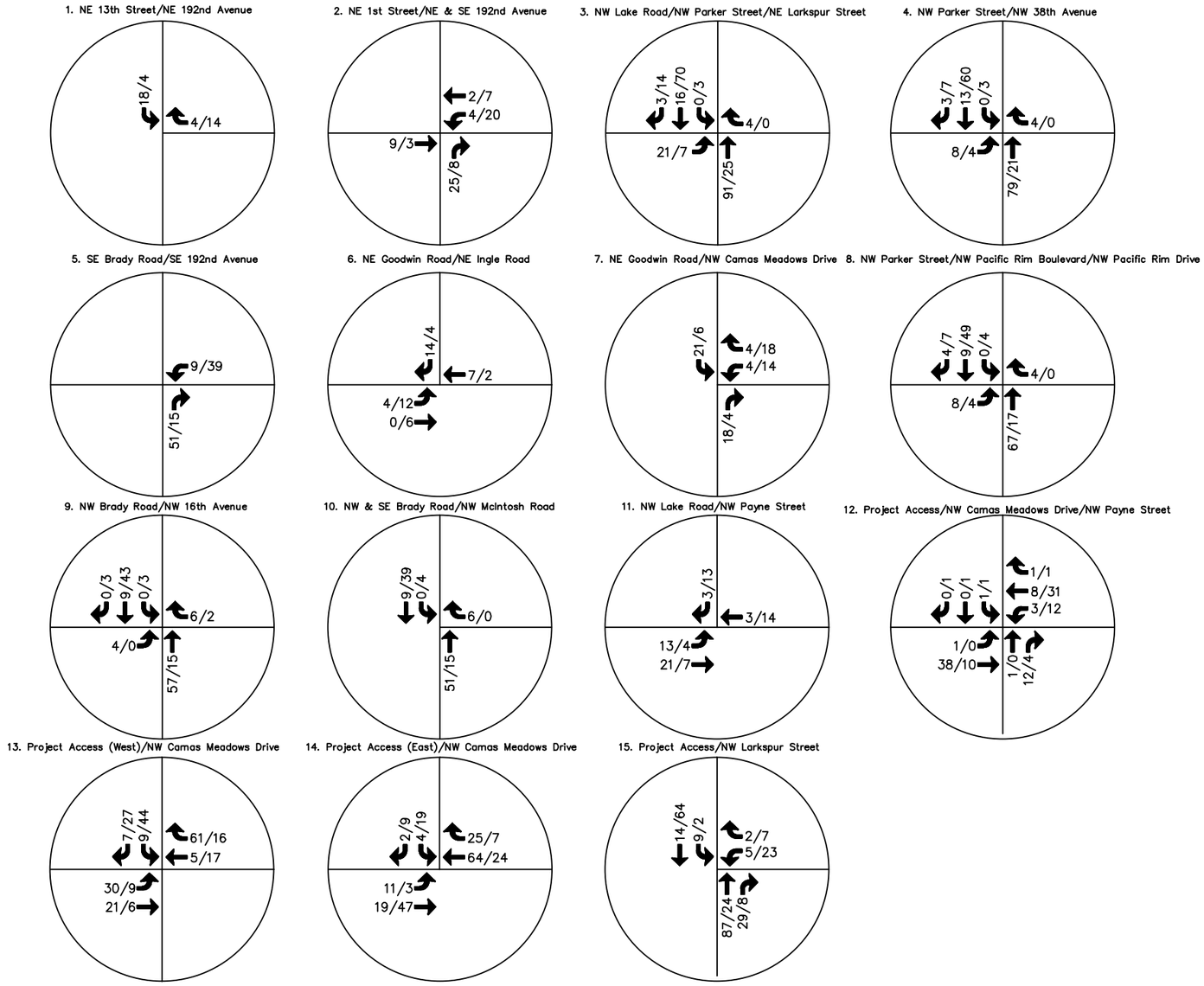
FIGURE 6c
"Quality Restaurant"
Pass-By Trips
Traffic Volumes

NOT TO SCALE

315021.0Figures.Dwg

Parklands at Camas Meadows TIA
Camas, WA





LEGEND

100/128 A.M./P.M. Peak Hour Traffic Volumes

10% A.M. and P.M. Peak Hour Trip Distribution

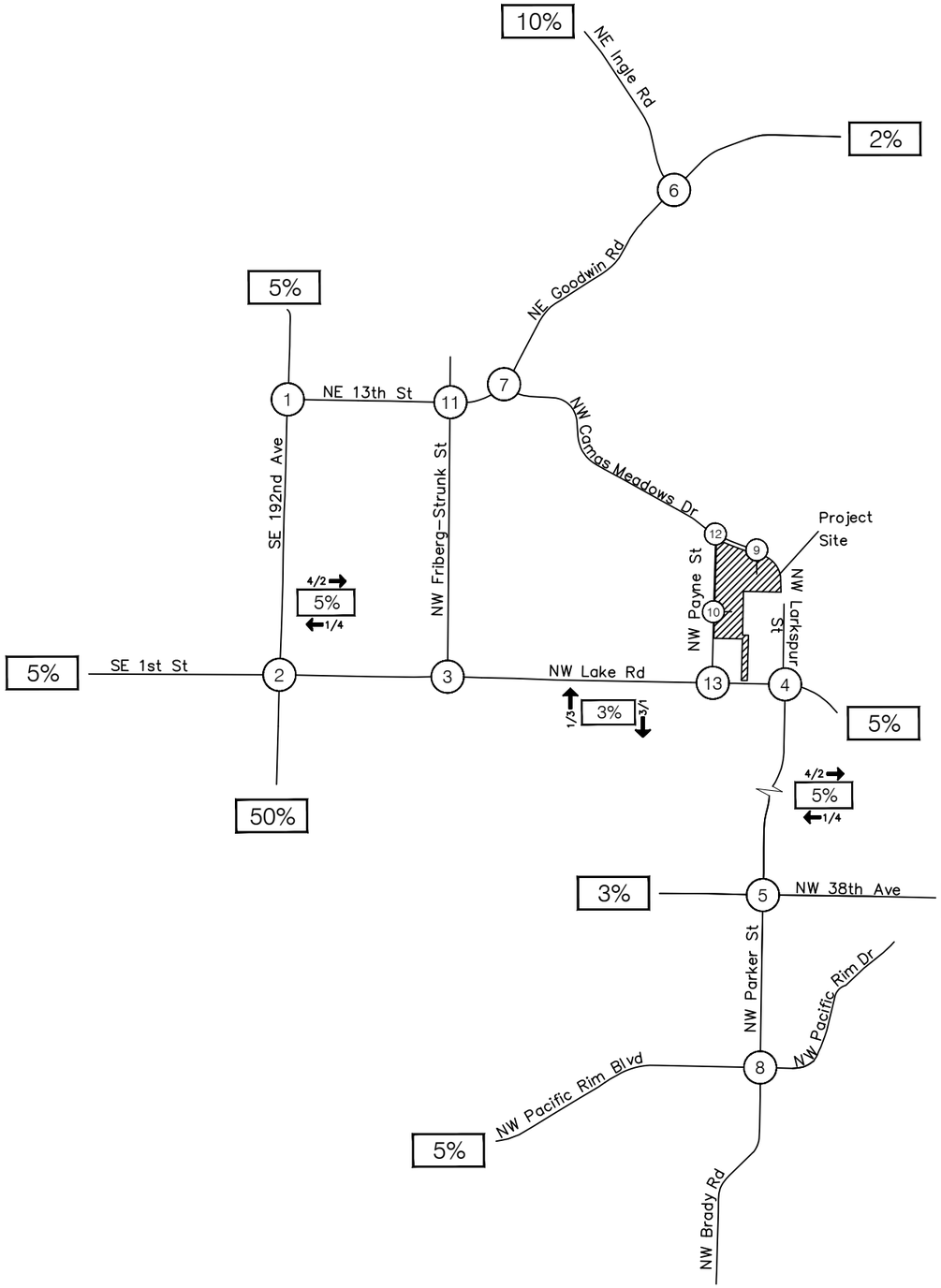
NOT TO SCALE

FIGURE 6d
"Business Park"
Trip Distribution and Assignment
Traffic Volumes

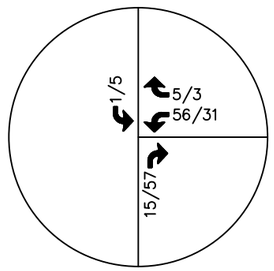
315021.0Figures.Dwg

75% Built out

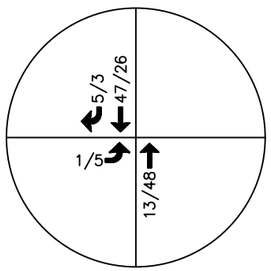
Village at Camas Meadows TIA
Camas, WA



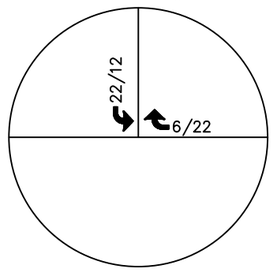
1. NE 13th Street/NE 192nd Avenue



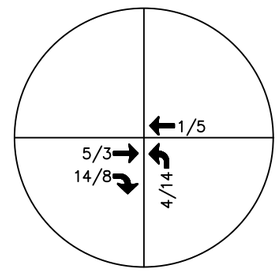
2. NE 1st Street/NE & SE 192nd Avenue



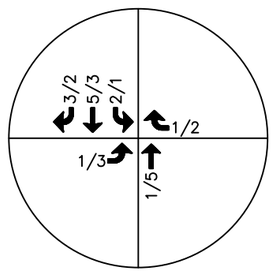
3. NW Lake Road/NW Friberg–Strunk Street



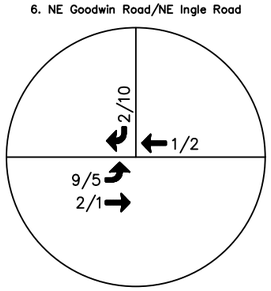
4. NW Lake Road/NW Parker Street/NE Larkspur Street



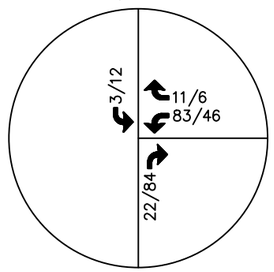
5. NW Parker Street/NW 38th Avenue



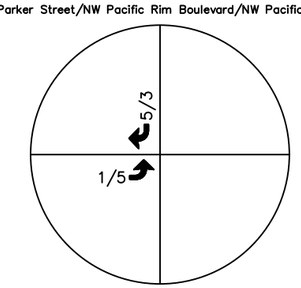
6. NE Goodwin Road/NE Ingle Road



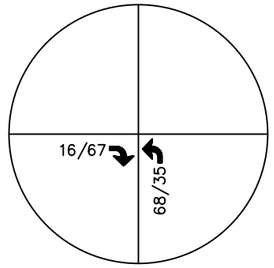
7. NE Goodwin Road/NW Camas Meadows Drive



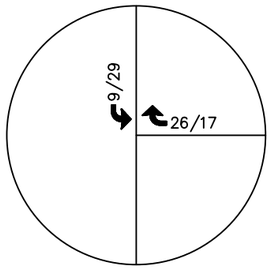
8. NW Parker Street/NW Pacific Rim Boulevard/NW Pacific Rim Drive



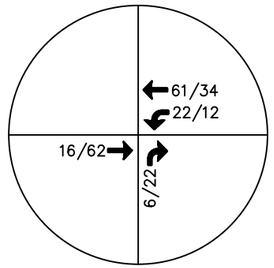
9. NW Camas Meadows Drive/Project Access



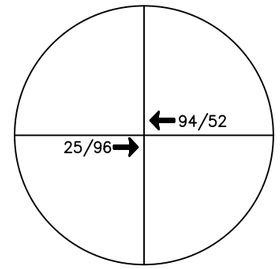
10. NW Payne Street/Project Access



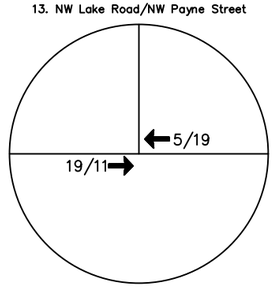
11. NW Friberg–Strunk Street/NE 13th Street/NE Goodwin Road



12. NW Payne Street/NW Camas Meadows Drive



13. NW Lake Road/NW Payne Street



LEGEND

128/200 A.M./P.M. Peak Hour Traffic Volume

10% A.M. and P.M. Peak Hour Trip Distribution

NOT TO SCALE

FIGURE 6
Trip Distribution and Assignment
Traffic Volumes

16025_Figures.Dwg

50% Build out for Phases 1-6:
GME Phases 1-3: 100%
GME Phases 4-6: 0%

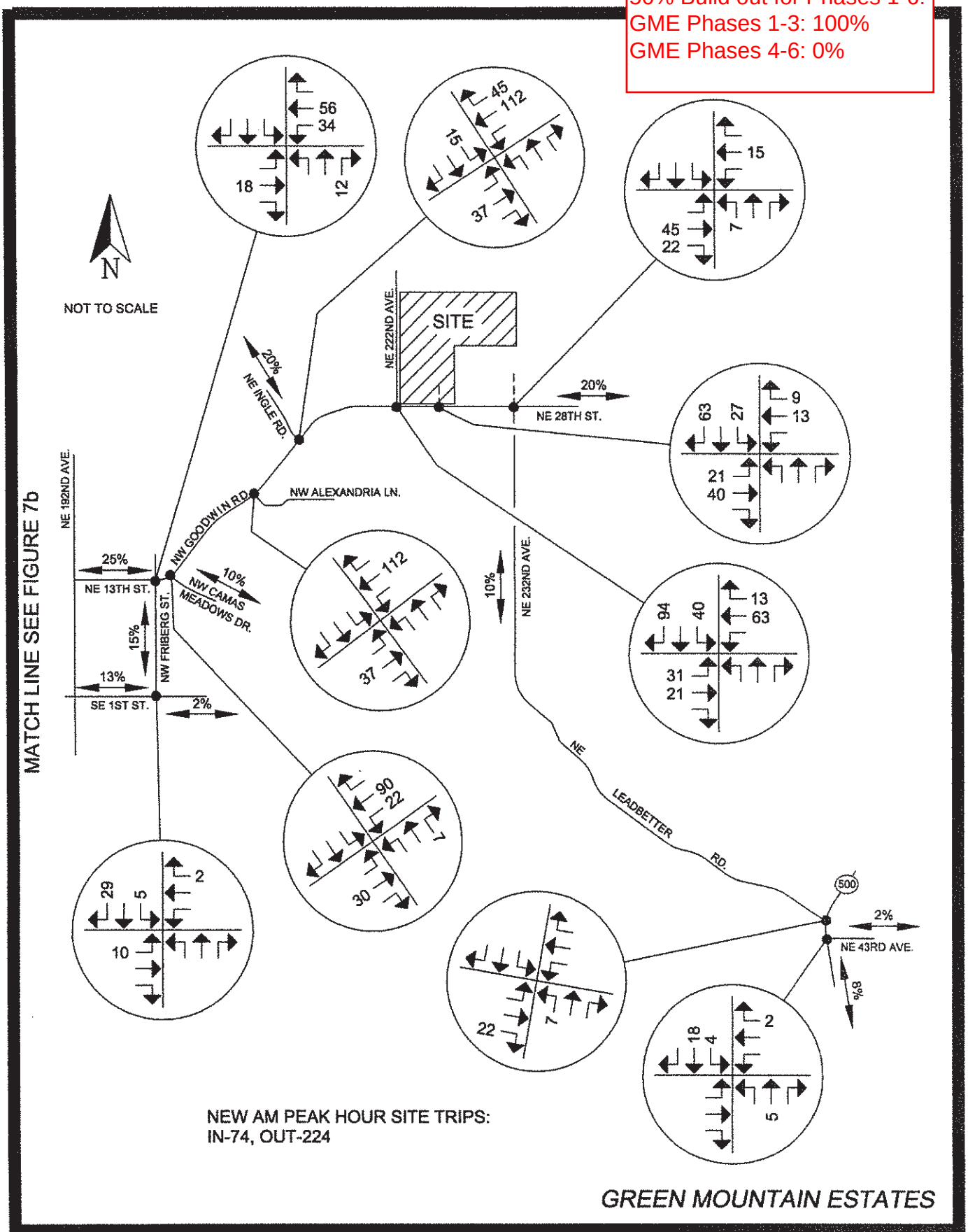


FIGURE 7a
SITE TRAFFIC DISTRIBUTION/ ASSIGNMENT, AM PEAK HOUR

KELLY ENGINEERING
316 E. Fourth Plain, A-2, Vancouver, WA 98663
Phone: 360-433-7530

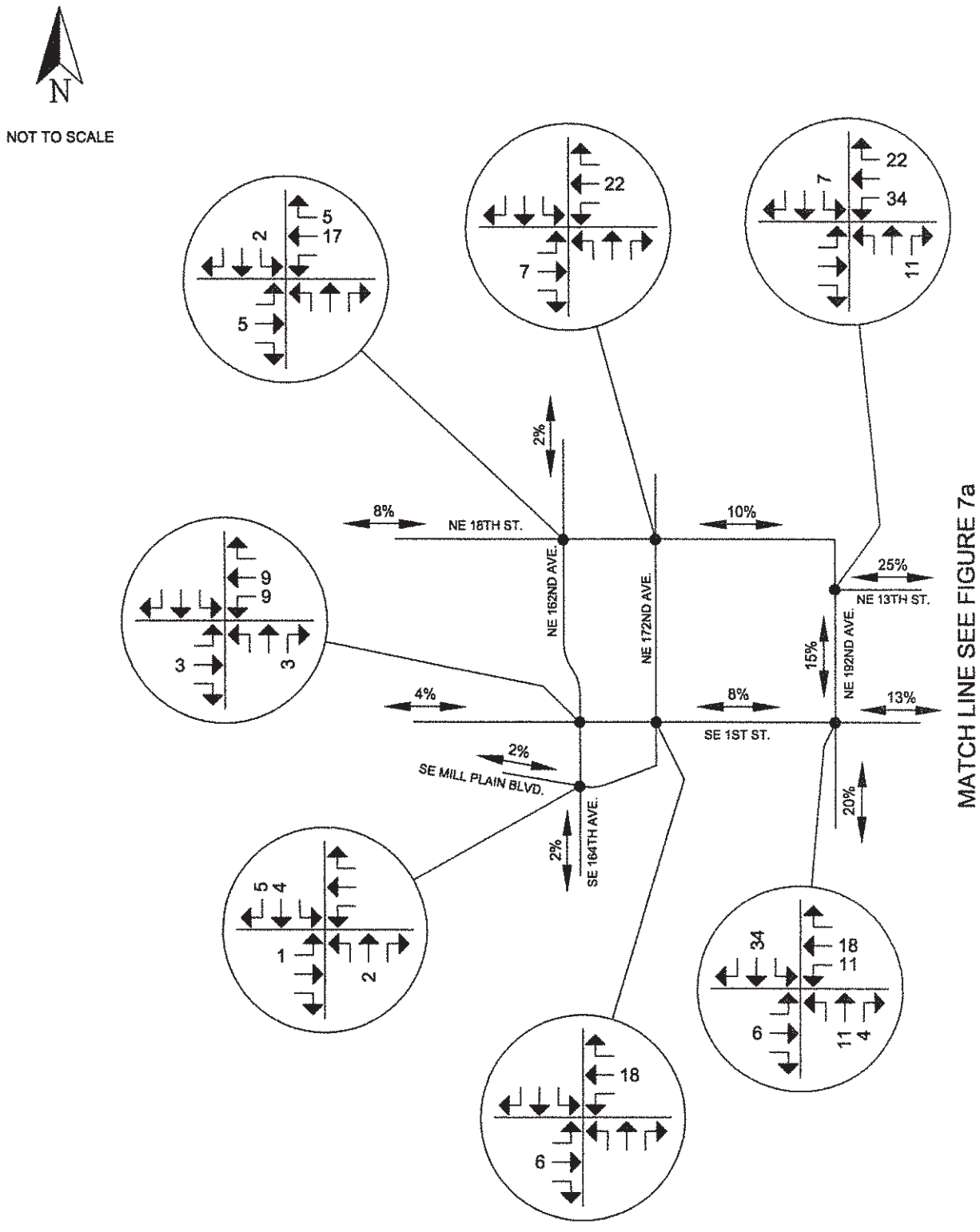


FIGURE 7b
SITE TRAFFIC DISTRIBUTION/ ASSIGNMENT, AM PEAK HOUR

KELLY ENGINEERING
316 E. Fourth Plain, A-2, Vancouver, WA 98663
Phone: 360-433-7530

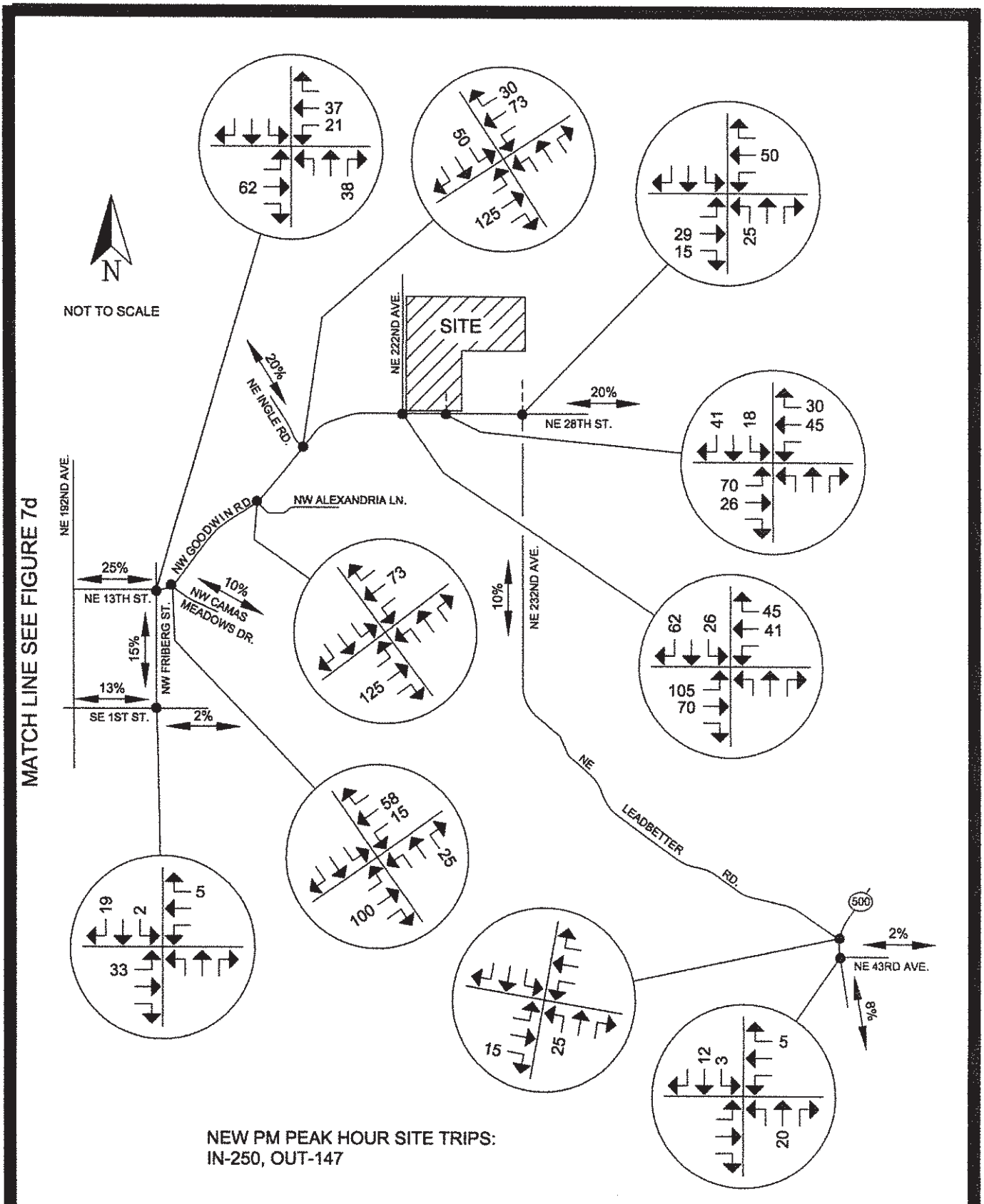


FIGURE 7c
SITE TRAFFIC DISTRIBUTION/ ASSIGNMENT, PM PEAK HOUR

KELLY ENGINEERING
316 E. Fourth Plain, A-2, Vancouver, WA 98663
Phone: 360-433-7530

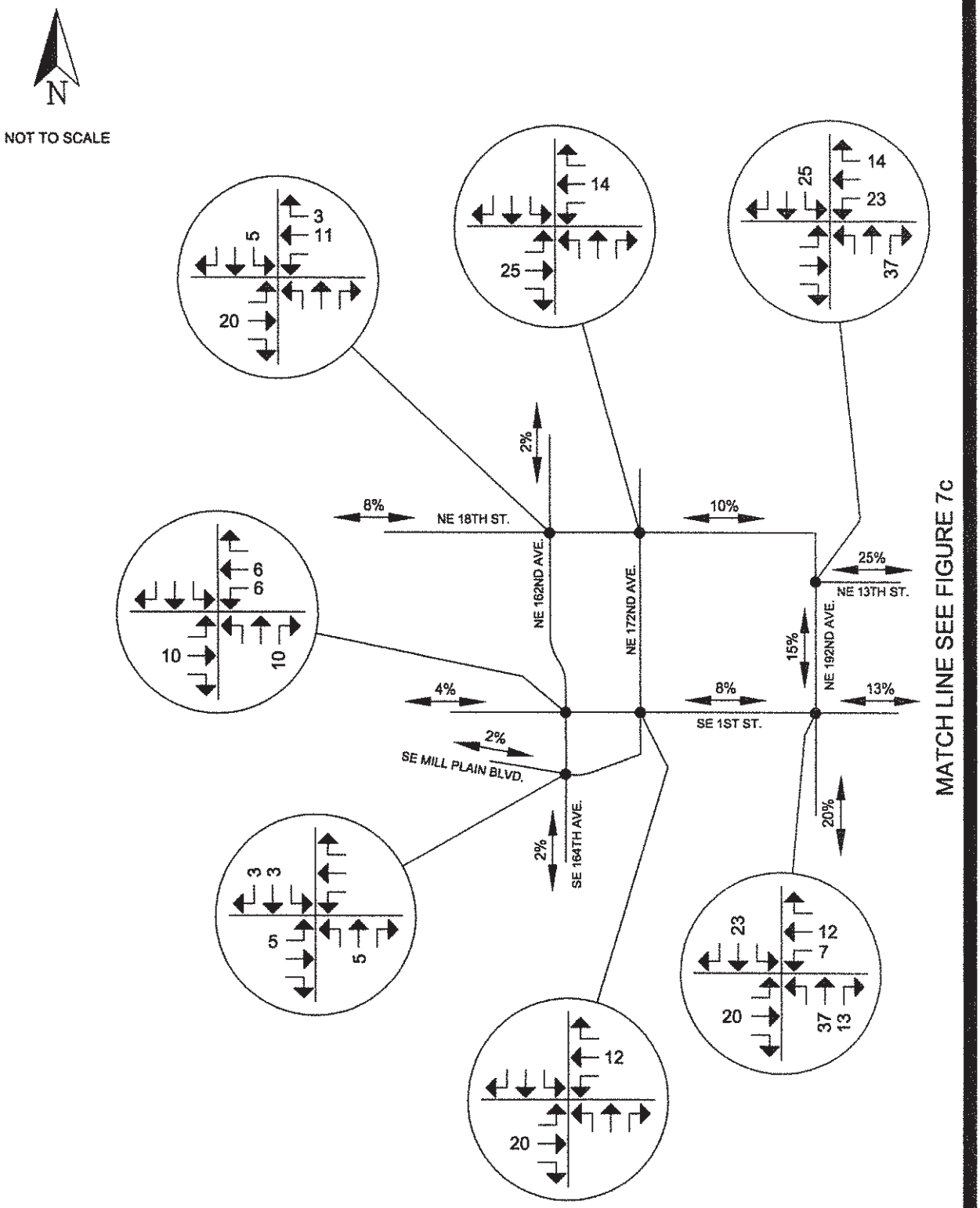
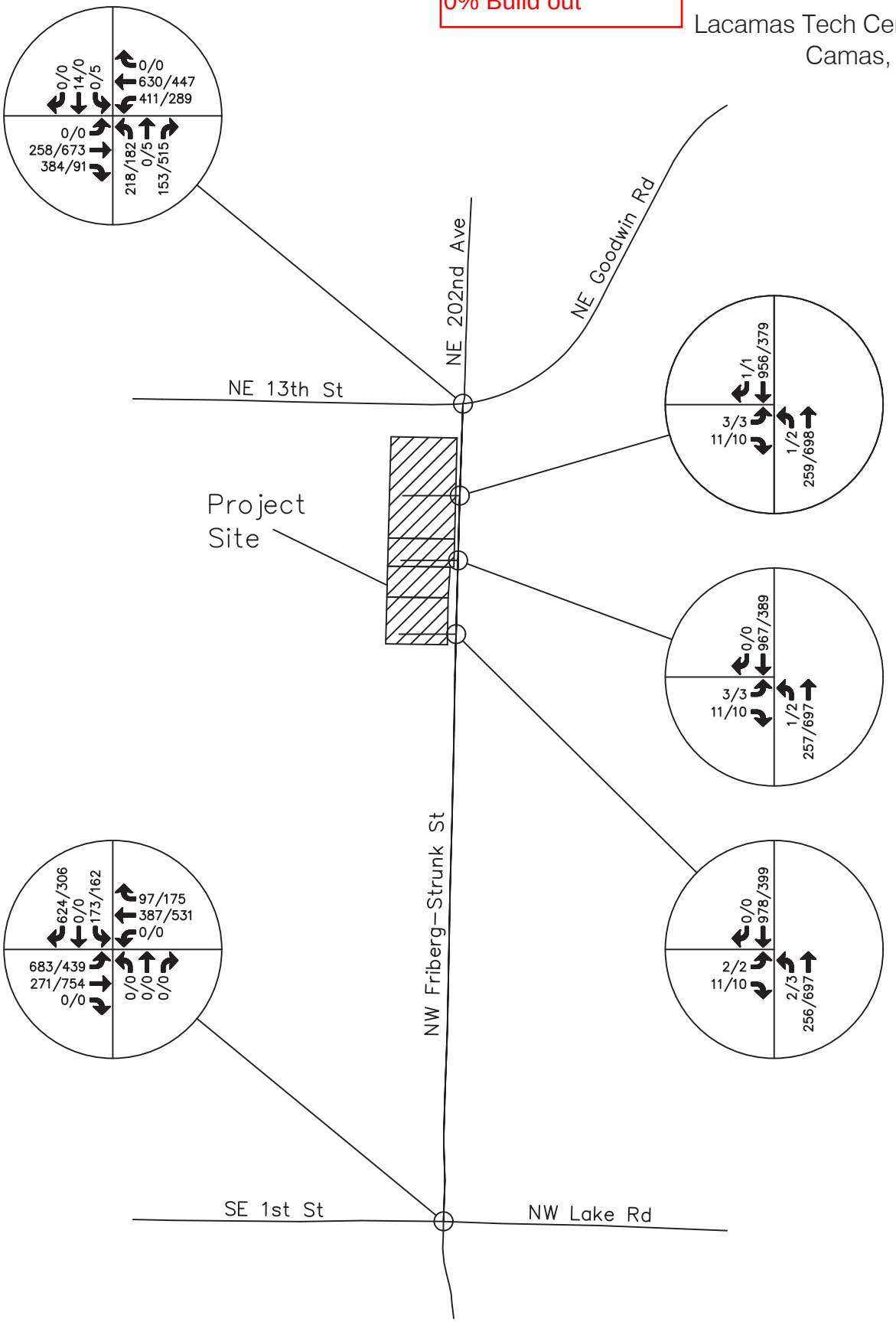


FIGURE 7d
SITE TRAFFIC DISTRIBUTION/
ASSIGNMENT, PM PEAK HOUR

KELLY ENGINEERING
316 E. Fourth Plain, A-2, Vancouver, WA 98663
Phone: 360-433-7530

0% Build out

Lacamas Tech Center
Camas, WA



LEGEND

128/200 A.M./P.M. Peak Hour Traffic Volume

NOT TO SCALE

FIGURE 7
2022 "With Project"
A.M. and P.M. Peak Hour Traffic Volumes

18047_Figures.Dwg

ATTACHMENT C

H. Lee & Associates, PLLC - Trip Generation Summary

Food Cart Facility	Food Cart Units	Daily Trips	AM Trips	PM Trips	Daily Rate	AM Rate	PM Rate
Happy Valley Food Carts	22	627	0	92	28.50	0.00	4.18
Troutdale Station Food Carts	23	723	0	85	31.43	0.00	3.70
Eastport Food Carts	25	384	0	55	15.36	0.00	2.20
Totals	**70**	**1734**	**0**	**232**			

	AM		PM	
	In	Out	In	Out
	0	0	57	35
	0	0	41	44
	0	0	28	27
Totals	**0**	**0**	**126**	**106**
			54%	46%

Derived Weighted Average Rates	Daily	AM	PM
	24.77	0.00	3.31
Standard Deviation	8.56	0.00	1.03

Eastport Food Carts (North Entrance)
Date 12/13/22

North Access

Time	IN	OUT	Total
9:00 - 9:15	0	0	0
9:15 - 9:30	0	0	0
9:30 - 9:45	1	3	4
9:45 - 10:00	1	2	3
10:00 - 10:15	0	1	1
10:15 - 10:30	3	2	5
10:30 - 10:45	2	2	4
10:45 - 11:00	0	0	0
11:00 - 11:15	2	1	3
11:15 - 11:30	1	0	1
11:30 - 11:45	1	1	2
11:45 - 12:00	2	1	3
12:00-12:15	2	3	5
12:15-12:30	2	2	4
12:30-12:45	3	3	6
12:45-1:00	3	7	10
1:00-1:15	3	4	7
1:15-1:30	2	2	4
1:30-1:45	1	3	4
1:45-2:00	2	2	4
2:00-2:15	2	2	4
2:15-2:30	3	2	5
2:30-2:45	3	4	7
2:45-3:00	3	5	8
3:00-3:15	1	1	2
3:15-3:30	4	2	6
3:30-3:45	3	3	6
3:45-4:00	3	3	6
4:00-4:15	2	2	4
4:15-4:30	2	6	8
4:30-4:45	3	1	4
4:45-5:00	3	3	6
5:00-5:15	6	5	11
5:15-5:30	4	5	9
5:30-5:45	4	4	8
5:45-6:00	3	3	6
6:00-6:15	2	2	4
6:15-6:30	2	4	6
6:30-6:45	5	4	9
6:45-7:00	3	2	5
7:00-7:15	3	4	7
7:15-7:30	4	2	6
7:30-7:45	3	5	8
7:45-8:00	5	4	9
8:00-8:15	0	2	2
8:15-8:30	2	2	4
8:30 - 8:45	0	0	0
8:45 - 9:00	0	0	0
9:00 - 9:15	1	2	3
9:15 - 9:30	0	2	2
9:30 - 9:45	1	3	4
9:45 - 10:00	1	1	2
Totals	112	129	241

South & East Access

Time	IN	OUT	Total
9:00 - 9:15	0	0	0
9:15 - 9:30	0	0	0
9:30 - 9:45	1	1	2
9:45 - 10:00	0	0	0
10:00 - 10:15	0	1	1
10:15 - 10:30	0	1	1
10:30 - 10:45	1	1	2
10:45 - 11:00	2	1	3
11:00 - 11:15	0	0	0
11:15 - 11:30	3	0	3
11:30 - 11:45	2	2	4
11:45 - 12:00	3	2	5
12:00-12:15	2	3	5
12:15-12:30	3	1	4
12:30-12:45	3	3	6
12:45-1:00	0	3	3
1:00-1:15	1	2	3
1:15-1:30	1	0	1
1:30-1:45	1	0	1
1:45-2:00	0	3	3
2:00-2:15	0	0	0
2:15-2:30	1	0	1
2:30-2:45	1	2	3
2:45-3:00	1	0	1
3:00-3:15	2	1	3
3:15-3:30	1	0	1
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3:45-4:00	1	1	2
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4:15-4:30	2	2	4
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6:00-6:15	1	3	4
6:15-6:30	4	2	6
6:30-6:45	4	1	5
6:45-7:00	1	4	5
7:00-7:15	5	4	9
7:15-7:30	2	4	6
7:30-7:45	1	3	4
7:45-8:00	0	0	0
8:00-8:15	1	1	2
8:15-8:30	1	0	1
8:30 - 8:45	0	1	1
8:45 - 9:00	0	0	0
9:00 - 9:15	0	0	0
9:15 - 9:30	0	0	0
9:30 - 9:45	0	0	0
9:45 - 10:00	0	0	0
Totals	71	72	143

Combined Access

Time	IN	OUT	Total
9:00 - 9:15	0	0	0
9:15 - 9:30	0	0	0
9:30 - 9:45	2	4	6
9:45 - 10:00	1	2	3
10:00 - 10:15	0	2	2
10:15 - 10:30	3	3	6
10:30 - 10:45	3	3	6
10:45 - 11:00	2	1	3
11:00 - 11:15	2	1	3
11:15 - 11:30	4	0	4
11:30 - 11:45	3	3	6
11:45 - 12:00	5	3	8
12:00-12:15	4	6	10
12:15-12:30	5	3	8
12:30-12:45	6	6	12
12:45-1:00	3	10	13
1:00-1:15	4	6	10
1:15-1:30	3	2	5
1:30-1:45	2	3	5
1:45-2:00	2	5	7
2:00-2:15	2	2	4
2:15-2:30	4	2	6
2:30-2:45	4	6	10
2:45-3:00	4	5	9
3:00-3:15	3	2	5
3:15-3:30	5	2	7
3:30-3:45	4	5	9
3:45-4:00	4	4	8
4:00-4:15	4	4	8
4:15-4:30	4	8	12
4:30-4:45	6	4	10
4:45-5:00	5	5	10
5:00-5:15	8	7	15
5:15-5:30	6	7	13
5:30-5:45	8	6	14
5:45-6:00	6	7	13
6:00-6:15	3	5	8
6:15-6:30	6	6	12
6:30-6:45	9	5	14
6:45-7:00	4	6	10
7:00-7:15	8	8	16
7:15-7:30	6	6	12
7:30-7:45	4	8	12
7:45-8:00	5	4	9
8:00-8:15	1	3	4
8:15-8:30	3	2	5
8:30 - 8:45	0	1	1
8:45 - 9:00	0	0	0
9:00 - 9:15	1	2	3
9:15 - 9:30	0	2	2
9:30 - 9:45	1	3	4
9:45 - 10:00	1	1	2
Totals	183	201	384

Oak Tree Station
Date 12/13/22

Count

Time	IN	OUT	Total
10:00 - 10:15	5	1	6
10:15 - 10:30	2	3	5
10:30 - 10:45	3	4	7
10:45 - 11:00	5	0	5
11:00 - 11:15	12	5	17
11:15 - 11:30	10	5	15
11:30 - 11:45	12	10	22
11:45 - 12:00	16	8	24
12:00-12:15	11	6	17
12:15-12:30	20	7	27
12:30-12:45	9	9	18
12:45-1:00	5	14	19
1:00-1:15	20	7	27
1:15-1:30	10	16	26
1:30-1:45	4	10	14
1:45-2:00	8	8	16
2:00-2:15	11	7	18
2:15-2:30	4	12	16
2:30-2:45	3	13	16
2:45-3:00	8	10	18
3:00-3:15	8	4	12
3:15-3:30	7	9	16
3:30-3:45	7	10	17
3:45-4:00	14	5	19
4:00-4:15	11	13	24
4:15-4:30	11	8	19
4:30-4:45	9	9	18
4:45-5:00	11	5	16
5:00-5:15	9	6	15
5:15-5:30	10	12	22
5:30-5:45	12	16	28
5:45-6:00	10	10	20
6:00-6:15	14	15	29
6:15-6:30	12	13	25
6:30-6:45	9	6	15
6:45-7:00	6	12	18
7:00-7:15	8	18	26
7:15-7:30	6	4	10
7:30-7:45	3	13	16
7:45-8:00	5	10	15
8:00-8:15	0	6	6
8:15-8:30	0	0	0
8:30 - 8:45	0	1	1
8:45 - 9:00	0	0	0
9:00 - 9:15	1	1	2
9:15 - 9:30	0	0	0
9:30 - 9:45	0	1	1
9:45 - 10:00	0	0	0
Totals	361	362	723

Happy Vally Food Carts Combined Accesses
Date 12/20/17

	East Access		South Access				
Time	In	Out	In	Out	Total In	Total Out	
10:00 - 10:15	1	3	0	0	1	3	
10:15 - 10:30	2	1	0	0	2	1	
10:30 - 10:45	3	2	0	0	3	2	
10:45 - 11:00	2	2	0	0	2	2	
11:00 - 11:15	4	1	0	1	4	2	
11:15 - 11:30	3	3	1	0	4	3	
11:30 - 11:45	11	4	9	2	20	6	
11:45 - 12:00	11	8	10	3	21	11	
12:00-12:15	5	6	7	5	12	11	
12:15-12:30	9	8	6	7	15	15	
12:30-12:45	4	0	2	10	6	10	
12:45-1:00	2	4	0	6	2	10	
1:00-1:15	3	8	4	10	7	18	
1:15-1:30	5	2	2	2	7	4	
1:30-1:45	3	0	2	2	5	2	
1:45-2:00	2	3	3	3	5	6	
2:00-2:15	8	7	2	4	10	11	
2:15-2:30	3	6	3	0	6	6	
2:30-2:45	1	5	4	5	5	10	
2:45-3:00	3	2	2	3	5	5	
3:00-3:15	4	6	2	0	6	6	
3:15-3:30	5	2	2	7	7	9	
3:30-3:45	4	2	4	3	8	5	
3:45-4:00	5	5	3	1	8	6	
4:00-4:15	2	7	4	5	6	12	
4:15-4:30	6	4	2	4	8	8	
4:30-4:45	3	2	3	4	6	6	
4:45-5:00	3	0	4	2	7	2	
5:00-5:15	2	5	7	2	9	7	
5:15-5:30	12	3	8	5	20	8	
5:30-5:45	6	5	8	6	14	11	
5:45-6:00	9	7	5	2	14	9	
6:00-6:15	6	7	5	2	11	9	
6:15-6:30	7	3	1	9	8	12	
6:30-6:45	4	5	6	8	10	13	
6:45-7:00	2	5	5	8	7	13	
7:00-7:15	2	0	0	3	2	3	
7:15-7:30	3	3	4	5	7	8	
7:30-7:45	1	7	4	7	5	14	
7:45-8:00	1	8	0	7	1	15	
8:00-8:15	0	0	1	3	1	3	
8:15-8:30	0	0	0	1	0	1	
8:30 - 8:45	0	0	0	0	0	0	
8:45 - 9:00	0	0	0	2	0	2	Total
Totals	**172**	**161**	**135**	**159**	**307**	**320**	**627**

ATTACHMENT D

km²

MEMORANDUM

TO: Grant Stonex, H. Lee and Associates
FROM: Mark Harrington, Transportation Planner
DATE: December 21, 2022
SUBJECT: Select Zone Assignment for TAZ 1779

Enclosed are plots showing auto volumes and distributions (additional volumes) during the PM peak 1 hour for the years 2015 and 2040. TAZ 1779 was selected for auto assignment. Please note a new TAZ numbering scheme – 425 is now 1779. These assignments are based on the 2040 RTP adopted in March 2019.

.

- 2015 Base HWY w/ 2015 Demand – TAZ 1779
- 2040 RTP w/ 2040 Demand – TAZ 1779
- TAZ Maps
- Land Use

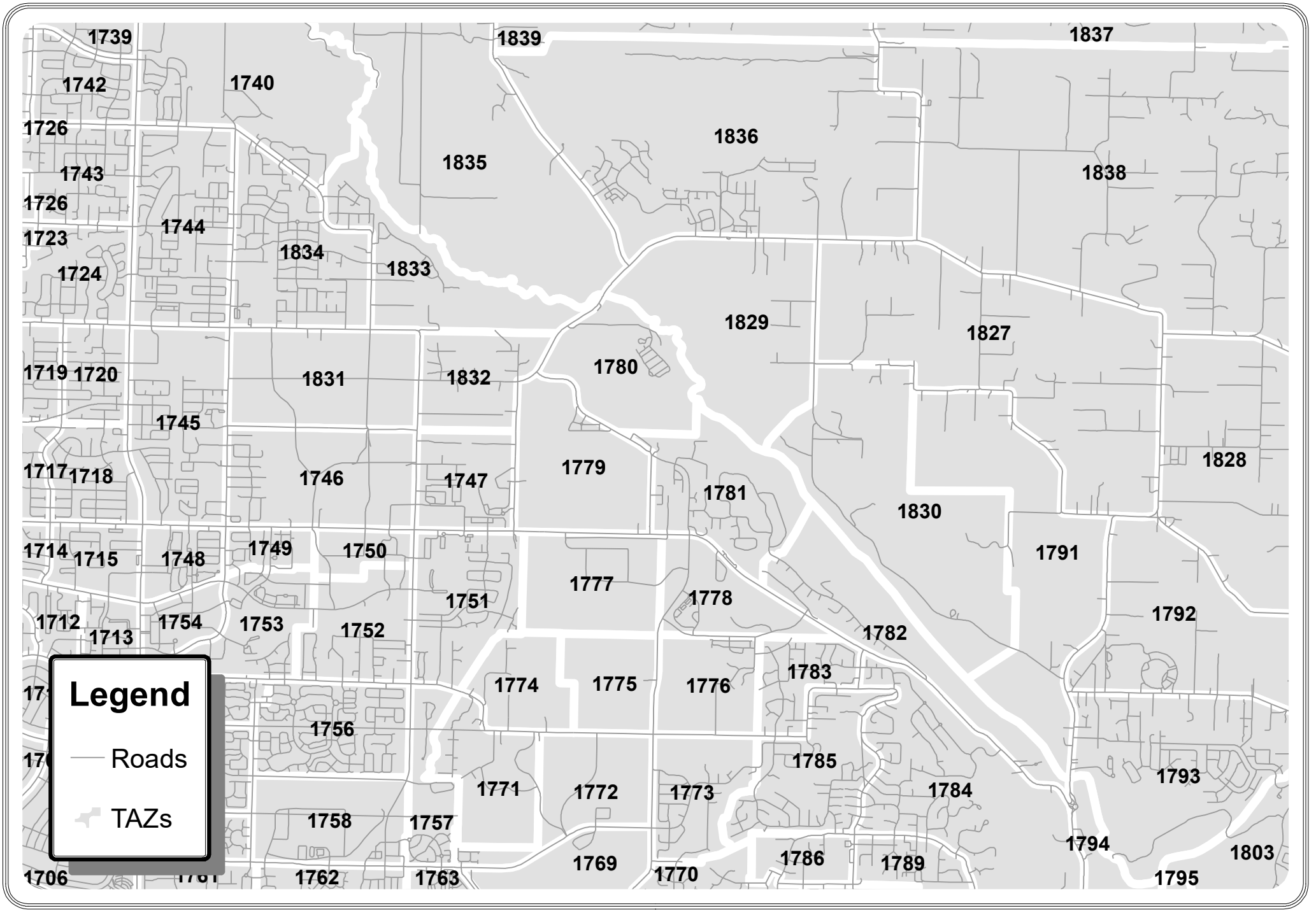
TAZ	2015 HH	2015 Jobs	2040 HH	2040 Jobs
1779	6	309	36	2151

An invoice will be sent to you under a separate cover for 2 hours of staff time and other costs. If you have any questions, please let me know.

Enclosures:

cc: Shari Harer, RTC

TAZ MAP


1739
1742
1740
1726
1743
1726
1723
1724
1744
1834
1833
1835
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1836
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1838
1829
1827
1780
1719
1720
1831
1832
1745
1717
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1746
1747
1779
1781
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1714
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1748
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1750
1777
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1791
1792
1712
1713
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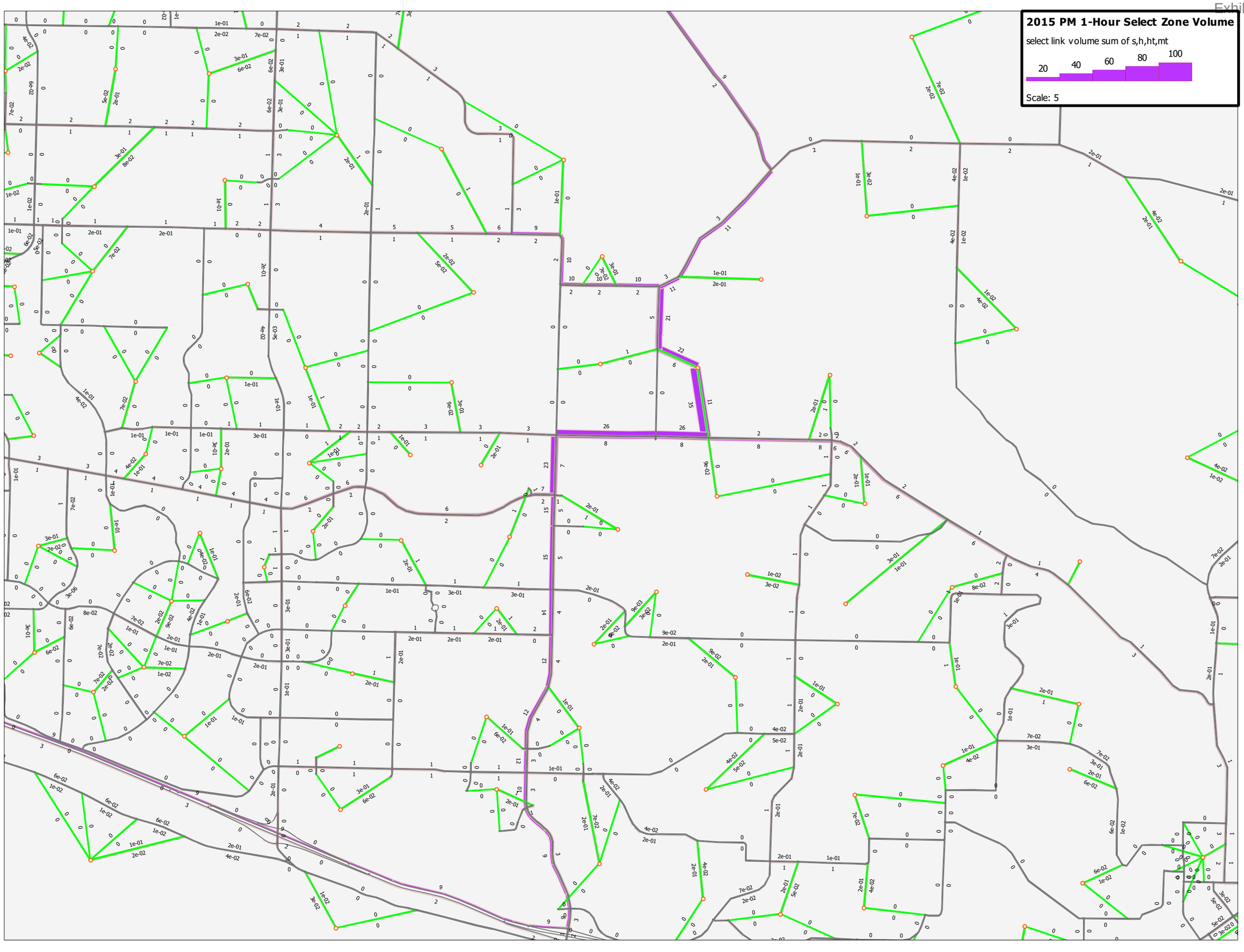
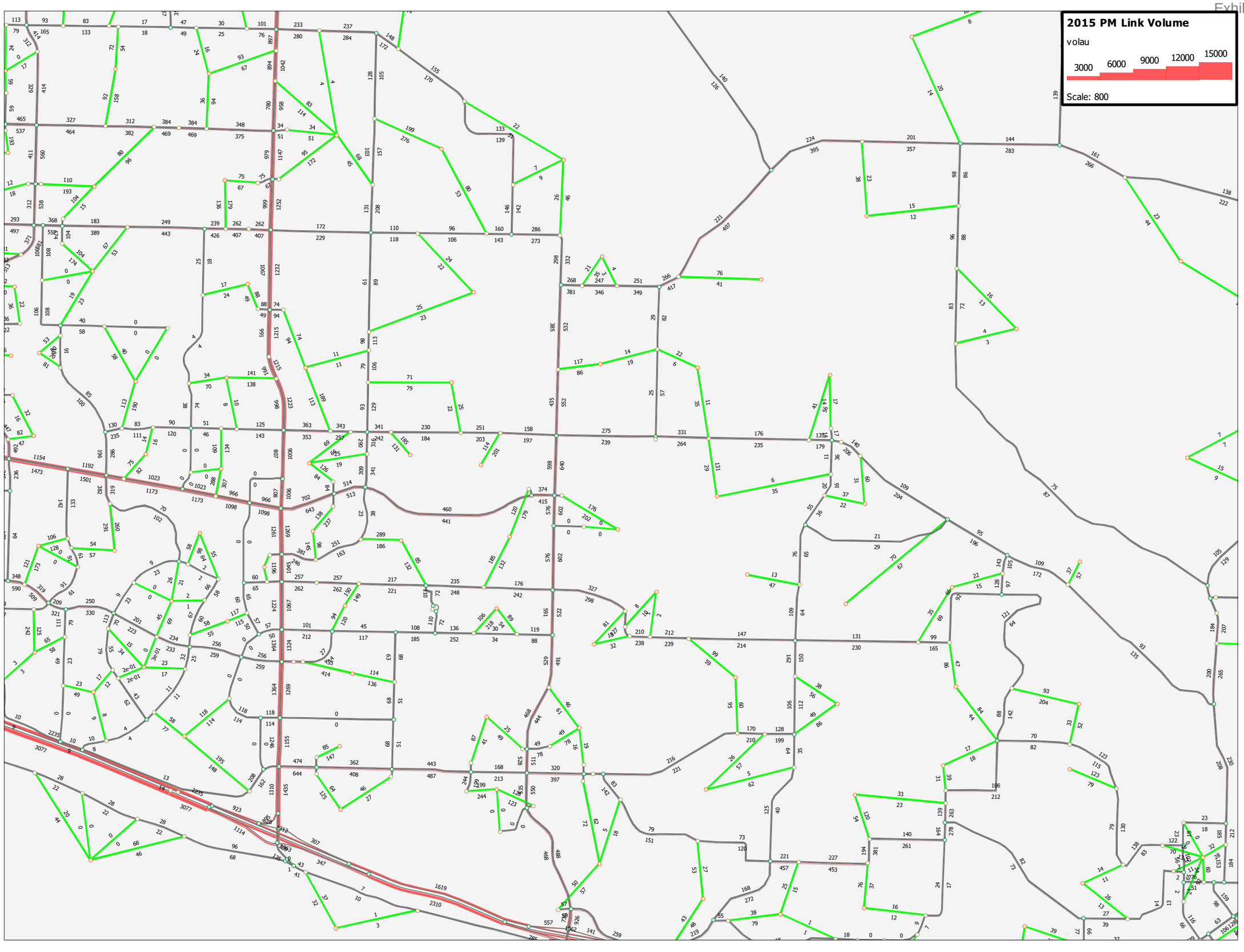
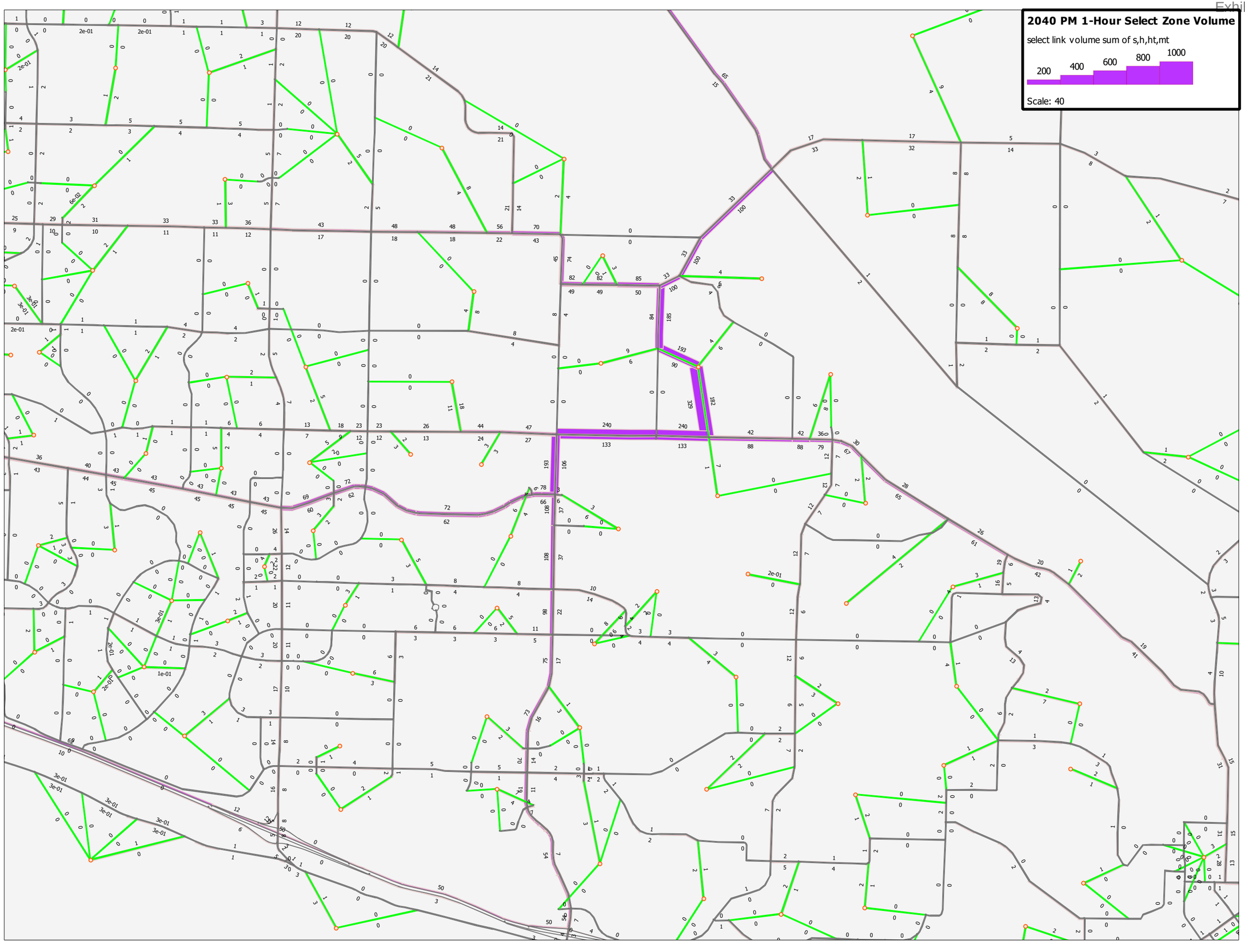
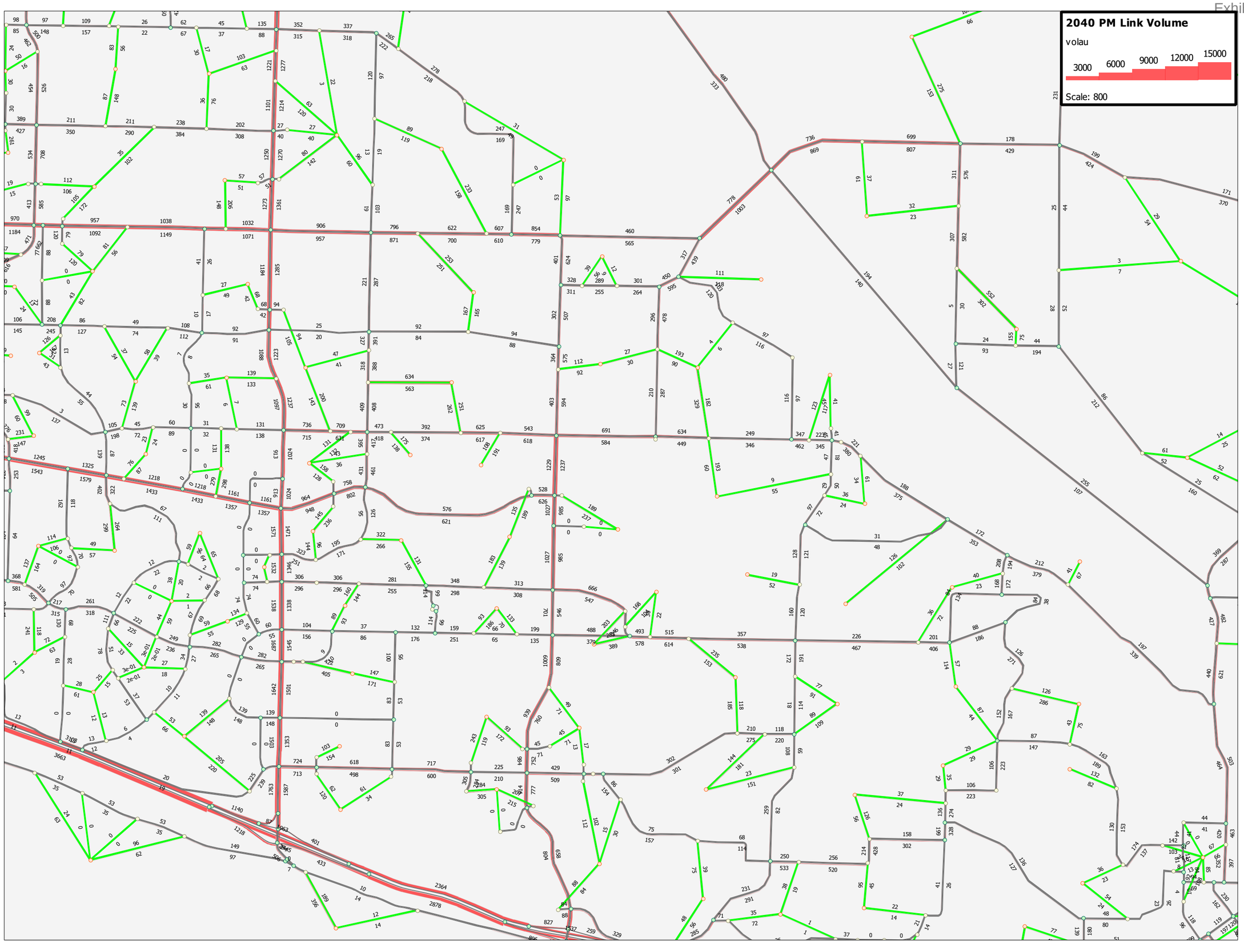
1753
1752
1782
1783
1774
1775
1776
1756
1785
1793
1771
1772
1773
1784
1758
1757
1794
1803
1706
1762
1763
1769
1770
1786
1789
1795
Legend
Roads
TAZs


2015 PM 1-Hour Select Zone Volume
select link volume sum of s,h,ht,mt
20
40
60
80
100
Scale: 5


2015 PM Link Volume
volau
3000
6000
9000
12000
15000
Scale: 800


2040 PM 1-Hour Select Zone Volume
select link volume sum of s,h,ht,mt
200
400
600
800
1000
Scale: 40


2040 PM Link Volume
volau
3000
6000
9000
12000
15000
Scale: 800

ATTACHMENT E

Oak Tree Station

Vistro File: O:\...\WP AM.vistro
Report File: O:\...\WP AM.pdf

Scenario: Base Scenario
12/29/2022

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	NW Lake Road/NW Friberg-Strunk Street/SE 1st Street	Signalized	HCM 7th Edition	WB Right	0.948	21.3	C
2	NW Lake Road/NW Larkspur Road/NW Parker Street	Signalized	HCM 7th Edition	SB Thru	0.509	12.8	B
3	NW Friberg-Strunk Street/Project Access	Two-way stop	HCM 7th Edition	WB Left	0.023	11.4	B
4	NW Lake Road/Project Access	Two-way stop	HCM 7th Edition	SB Right	0.008	9.3	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: NW Lake Road/NW Friberg-Strunk Street/SE 1st Street

Control Type:	Signalized	Delay (sec / veh):	21.3
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.948

Intersection Setup

Name				NW Friberg-Strunk Street			SE 1st Street			NW Lake Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	150.00	100.00	100.00	320.00	100.00	100.00	190.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	49.21	0.00	0.00	0.00
Speed [mph]	25.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name				NW Friberg-Strunk Street			SE 1st Street			NW Lake Road		
Base Volume Input [veh/h]	0	0	0	71	0	681	633	207	0	0	385	65
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	6.00	6.00	6.00	1.00	1.00	1.00	3.00	3.00	3.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	71	0	681	633	207	0	0	385	65
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	18	0	170	158	52	0	0	96	16
Total Analysis Volume [veh/h]	0	0	0	71	0	681	633	207	0	0	385	65
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	10	0	0	10	10	5	10	0	5	10	0
Maximum Green [s]	0	30	0	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	5	0	0	5	5	0	5	0	0	5	0
Pedestrian Clearance [s]	0	15	0	0	18	18	0	6	0	0	9	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No	No	No	No		No	No	
Maximum Recall		No			No	No	No	No		No	No	
Pedestrian Recall		No			No	No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	6.0	0.0	0.0	6.0	6.0	20.0	6.0	0.0	20.0	6.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	L	C	C	L	C	C
C, Cycle Length [s]	71	71	71	71	71	71	71	71	71
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	20	20	52	28	39	39	0	12	12
g / C, Green / Cycle	0.28	0.28	0.72	0.39	0.55	0.55	0.00	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.00	0.05	0.44	0.35	0.05	0.05	0.00	0.12	0.13
s, saturation flow rate [veh/h]	1900	1405	1538	1795	1885	1885	1767	1855	1763
c, Capacity [veh/h]	579	492	1115	701	1043	1043	0	303	288
d1, Uniform Delay [s]	0.00	19.39	4.85	20.48	7.53	7.53	0.00	28.52	28.58
k, delay calibration	0.11	0.11	0.49	0.33	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.00	0.13	2.45	12.39	0.04	0.04	0.00	3.87	4.30
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.00	0.14	0.61	0.90	0.10	0.10	0.00	0.76	0.77
d, Delay for Lane Group [s/veh]	0.00	19.52	7.30	32.88	7.57	7.57	0.00	32.39	32.88
Lane Group LOS	A	B	A	C	A	A	A	C	C
Critical Lane Group	No	No	Yes	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.00	0.83	3.34	10.95	0.61	0.61	0.00	3.78	3.68
50th-Percentile Queue Length [ft/ln]	0.00	20.72	83.40	273.65	15.36	15.36	0.00	94.57	92.12
95th-Percentile Queue Length [veh/ln]	0.00	1.49	6.00	16.37	1.11	1.11	0.00	6.81	6.63
95th-Percentile Queue Length [ft/ln]	0.00	37.30	150.12	409.30	27.65	27.65	0.00	170.22	165.82

Movement, Approach, & Intersection Results

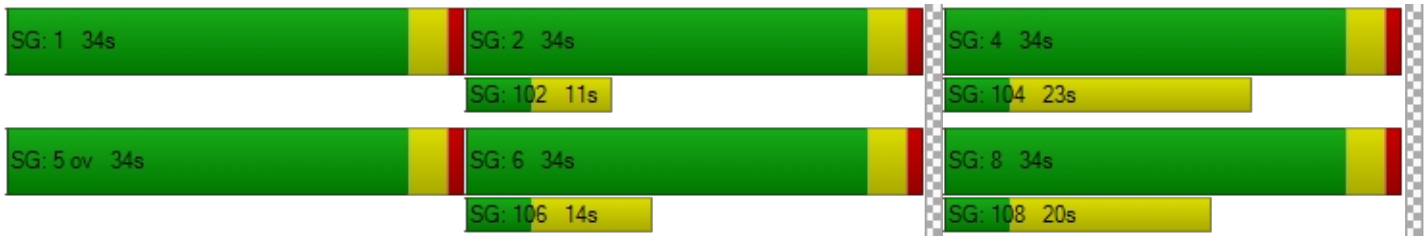
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	19.52	19.52	7.30	32.88	7.57	7.57	0.00	32.59	32.88
Movement LOS	A	A	A	B	B	A	C	A	A	A	C	C
d_A, Approach Delay [s/veh]	0.00			8.45			26.64			32.63		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	21.26											
Intersection LOS	C											
Intersection V/C	0.948											

Other Modes

g_Walk,mi, Effective Walk Time [s]	9.0	9.0	9.0	9.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	27.19	27.19	27.19	27.19
l_p,int, Pedestrian LOS Score for Intersection	1.705	2.558	2.856	2.580
Crosswalk LOS	A	B	C	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	842	842	842	842
d_b, Bicycle Delay [s]	11.94	11.94	11.94	11.94
l_b,int, Bicycle LOS Score for Intersection	1.560	2.800	2.253	1.931
Bicycle LOS	A	C	B	A

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: NW Lake Road/NW Larkspur Road/NW Parker Street

Control Type:	Signalized	Delay (sec / veh):	12.8
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.509

Intersection Setup

Name	NW Parker Street			NW Larkspur Street			NW Lake Road					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	340.00	100.00	100.00	140.00	100.00	100.00	215.00	100.00	100.00	232.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	35.00			25.00			40.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	NW Parker Street			NW Larkspur Street			NW Lake Road					
Base Volume Input [veh/h]	130	189	62	76	187	13	40	228	248	75	298	91
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	130	189	62	76	187	13	40	228	248	75	298	91
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	47	16	19	47	3	10	57	62	19	75	23
Total Analysis Volume [veh/h]	130	189	62	76	187	13	40	228	248	75	298	91
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	9.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss	ProtPer	Permiss	Overlap	ProtPer	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups									2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	0	5	10	10	5	10	0
Maximum Green [s]	30	30	0	30	30	0	30	30	30	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	5	0	5	0
Pedestrian Clearance [s]	0	12	0	0	15	0	0	9	9	0	9	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No	No	No	No	
Maximum Recall	No	No		No	No		No	No	No	No	No	
Pedestrian Recall	No	No		No	No		No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	6.0	0.0	20.0	6.0	0.0	6.0	6.0	6.0	20.0	6.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	R	L	C	C
C, Cycle Length [s]	44	44	44	44	44	44	44	44	44	44
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	0.00	2.00	0.00	2.00	0.00	0.00	2.00	2.00
g_i, Effective Green Time [s]	19	12	19	9	17	10	20	17	11	11
g / C, Green / Cycle	0.43	0.27	0.43	0.21	0.38	0.23	0.45	0.38	0.25	0.25
(v / s)_i Volume / Saturation Flow Rate	0.09	0.14	0.06	0.11	0.03	0.12	0.15	0.06	0.11	0.11
s, saturation flow rate [veh/h]	1433	1792	1322	1878	1198	1900	1615	1184	1885	1737
c, Capacity [veh/h]	755	493	687	390	612	428	731	600	470	433
d1, Uniform Delay [s]	7.86	13.56	7.71	15.60	8.79	15.14	7.85	9.04	13.99	14.02
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.11	0.81	0.07	1.05	0.04	1.03	0.27	0.09	0.61	0.69
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.17	0.51	0.11	0.51	0.07	0.53	0.34	0.13	0.43	0.44
d, Delay for Lane Group [s/veh]	7.97	14.37	7.78	16.64	8.83	16.17	8.12	9.14	14.60	14.71
Lane Group LOS	A	B	A	B	A	B	A	A	B	B
Critical Lane Group	No	Yes	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.56	1.81	0.35	1.70	0.18	1.72	1.05	0.36	1.45	1.38
50th-Percentile Queue Length [ft/ln]	14.03	45.15	8.85	42.46	4.51	43.08	26.23	9.09	36.22	34.39
95th-Percentile Queue Length [veh/ln]	1.01	3.25	0.64	3.06	0.32	3.10	1.89	0.65	2.61	2.48
95th-Percentile Queue Length [ft/ln]	25.26	81.28	15.94	76.42	8.11	77.55	47.21	16.36	65.20	61.91

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	7.97	14.37	14.37	7.78	16.64	16.64	8.83	16.17	8.12	9.14	14.64	14.71
Movement LOS	A	B	B	A	B	B	A	B	A	A	B	B
d_A, Approach Delay [s/veh]	12.19			14.20			11.73			13.76		
Approach LOS	B			B			B			B		
d_I, Intersection Delay [s/veh]	12.83											
Intersection LOS	B											
Intersection V/C	0.509											

Other Modes

g_Walk,mi, Effective Walk Time [s]	9.0	9.0	9.0	9.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	14.04	14.04	14.04	14.04
l_p,int, Pedestrian LOS Score for Intersection	2.270	2.082	2.559	2.365
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1356	1356	1356	1356
d_b, Bicycle Delay [s]	2.29	2.29	2.29	2.29
l_b,int, Bicycle LOS Score for Intersection	2.188	2.015	2.411	1.942
Bicycle LOS	B	B	B	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: NW Friberg-Strunk Street/Project Access

Control Type:	Two-way stop	Delay (sec / veh):	11.4
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.023

Intersection Setup

Name	NW Friberg-Strunk Street		NW Friberg-Strunk Street			
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	NW Friberg-Strunk Street		NW Friberg-Strunk Street			
Base Volume Input [veh/h]	269	14	6	267	13	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.00	4.00	4.00	4.00	0.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	269	14	6	267	13	4
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	67	4	2	67	3	1
Total Analysis Volume [veh/h]	269	14	6	267	13	4
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	1

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.02	0.01
d_M, Delay for Movement [s/veh]	0.00	0.00	7.85	0.00	11.40	9.86
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.01	0.00	0.09	0.09
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.36	0.00	2.14	2.14
d_A, Approach Delay [s/veh]	0.00		0.17		11.04	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	0.41					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 4: NW Lake Road/Project Access

Control Type:	Two-way stop	Delay (sec / veh):	9.3
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.008

Intersection Setup

Name			NW Lake Road		NW Lake Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name			NW Lake Road		NW Lake Road	
Base Volume Input [veh/h]	0	7	0	362	355	10
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	0.00	2.00	0.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	7	0	362	355	10
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	2	0	91	89	3
Total Analysis Volume [veh/h]	0	7	0	362	355	10
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.01	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	9.35	0.00	0.00	0.00	0.00
Movement LOS		A		A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.03	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.63	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	9.35		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.09					
Intersection LOS	A					

Oak Tree Station

Vistro File: O:\...\WP PM.vistro
Report File: O:\...\WP PM.pdf

Scenario: Base Scenario
12/29/2022

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	NW Lake Road/NW Friberg-Strunk Street/SE 1st Street	Signalized	HCM 7th Edition	WB Right	0.752	12.4	B
2	NW Lake Road/NW Larkspur Road/NW Parker Street	Signalized	HCM 7th Edition	SB Thru	0.710	14.9	B
3	NW Friberg-Strunk Street/Project Access	Two-way stop	HCM 7th Edition	WB Left	0.086	13.9	B
4	NW Lake Road/Project Access	Two-way stop	HCM 7th Edition	SB Right	0.026	9.5	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: NW Lake Road/NW Friberg-Strunk Street/SE 1st Street

Control Type:	Signalized	Delay (sec / veh):	12.4
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.752

Intersection Setup

Name				NW Friberg-Strunk Street			SE 1st Street			NW Lake Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	150.00	100.00	100.00	320.00	100.00	100.00	190.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	49.21	0.00	0.00	0.00
Speed [mph]	25.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name				NW Friberg-Strunk Street			SE 1st Street			NW Lake Road		
Base Volume Input [veh/h]	0	0	0	129	0	242	362	714	0	0	519	124
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	3.00	3.00	3.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	129	0	242	362	714	0	0	519	124
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	32	0	61	91	179	0	0	130	31
Total Analysis Volume [veh/h]	0	0	0	129	0	242	362	714	0	0	519	124
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	4	5	2	0	1	6	0
Auxiliary Signal Groups						4,5						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	10	0	0	10	10	5	10	0	5	10	0
Maximum Green [s]	0	30	0	0	30	30	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	5	0	0	5	5	0	5	0	0	5	0
Pedestrian Clearance [s]	0	15	0	0	18	18	0	6	0	0	9	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No	No	No	No		No	No	
Maximum Recall		No			No	No	No	No		No	No	
Pedestrian Recall		No			No	No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	6.0	0.0	0.0	6.0	6.0	20.0	6.0	0.0	20.0	6.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	L	C	C	L	C	C
C, Cycle Length [s]	45	45	45	45	45	45	45	45	45
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	10	26	12	23	23	0	11	11
g / C, Green / Cycle	0.22	0.22	0.58	0.27	0.51	0.51	0.00	0.25	0.25
(v / s)_i Volume / Saturation Flow Rate	0.00	0.09	0.15	0.20	0.19	0.19	0.00	0.18	0.18
s, saturation flow rate [veh/h]	1900	1513	1615	1795	1885	1885	1767	1855	1733
c, Capacity [veh/h]	498	493	930	480	968	968	0	457	427
d1, Uniform Delay [s]	0.00	14.79	4.77	15.16	6.58	6.58	0.00	15.57	15.60
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.00	0.28	0.15	2.44	0.23	0.23	0.00	2.19	2.41
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.00	0.26	0.26	0.75	0.37	0.37	0.00	0.72	0.73
d, Delay for Lane Group [s/veh]	0.00	15.07	4.91	17.59	6.81	6.81	0.00	17.77	18.01
Lane Group LOS	A	B	A	B	A	A	A	B	B
Critical Lane Group	No	No	Yes	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.00	0.93	0.60	2.96	1.27	1.27	0.00	2.73	2.60
50th-Percentile Queue Length [ft/ln]	0.00	23.19	14.89	74.12	31.85	31.85	0.00	68.25	64.95
95th-Percentile Queue Length [veh/ln]	0.00	1.67	1.07	5.34	2.29	2.29	0.00	4.91	4.68
95th-Percentile Queue Length [ft/ln]	0.00	41.74	26.80	133.42	57.32	57.32	0.00	122.86	116.90

Movement, Approach, & Intersection Results

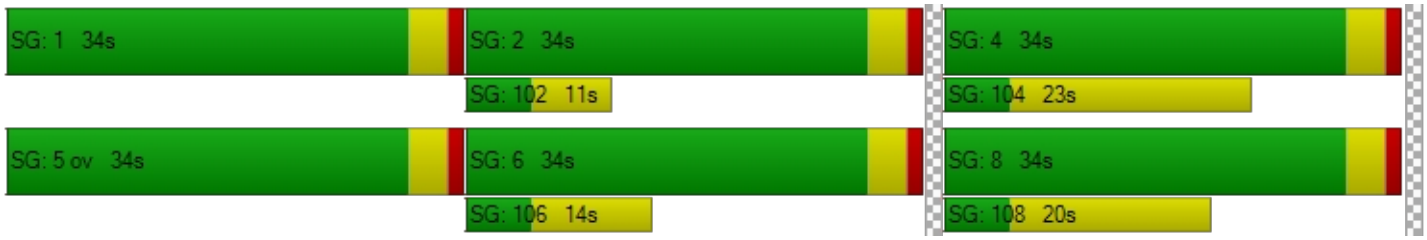
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	15.07	15.07	4.91	17.59	6.81	6.81	0.00	17.86	18.01
Movement LOS	A	A	A	B	B	A	B	A	A	A	B	B
d_A, Approach Delay [s/veh]	0.00			8.44			10.44			17.89		
Approach LOS	A			A			B			B		
d_I, Intersection Delay [s/veh]	12.38											
Intersection LOS	B											
Intersection V/C	0.752											

Other Modes

g_Walk,mi, Effective Walk Time [s]	9.0	9.0	9.0	9.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	14.39	14.39	14.39	14.39
l_p,int, Pedestrian LOS Score for Intersection	1.679	2.276	2.815	2.834
Crosswalk LOS	A	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1334	1334	1334	1334
d_b, Bicycle Delay [s]	2.49	2.49	2.49	2.49
l_b,int, Bicycle LOS Score for Intersection	1.560	2.172	2.447	2.090
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: NW Lake Road/NW Larkspur Road/NW Parker Street

Control Type:	Signalized	Delay (sec / veh):	14.9
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.710

Intersection Setup

Name	NW Parker Street			NW Larkspur Street			NW Lake Road					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	340.00	100.00	100.00	140.00	100.00	100.00	215.00	100.00	100.00	232.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	35.00			25.00			40.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	NW Parker Street			NW Larkspur Street			NW Lake Road					
Base Volume Input [veh/h]	305	139	102	54	187	24	39	436	277	49	331	31
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.00	1.00	1.00	3.00	3.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	305	139	102	54	187	24	39	436	277	49	331	31
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	76	35	26	14	47	6	10	109	69	12	83	8
Total Analysis Volume [veh/h]	305	139	102	54	187	24	39	436	277	49	331	31
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	9.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss	ProtPer	Permiss	Overlap	ProtPer	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	2	1	6	0
Auxiliary Signal Groups									2,3			
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	0	5	10	10	5	10	0
Maximum Green [s]	30	30	0	30	30	0	30	30	30	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	5	0	5	0
Pedestrian Clearance [s]	0	12	0	0	15	0	0	9	9	0	9	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No	No	No	No	
Maximum Recall	No	No		No	No		No	No	No	No	No	
Pedestrian Recall	No	No		No	No		No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	6.0	0.0	20.0	6.0	0.0	6.0	6.0	6.0	20.0	6.0	0.0
I, Upstream Filtering 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

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	R	L	C	C
C, Cycle Length [s]	53	53	53	53	53	53	53	53	53	53
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	0.00	2.00	0.00	2.00	0.00	0.00	2.00	2.00
g_i, Effective Green Time [s]	23	17	23	10	22	15	29	22	16	16
g / C, Green / Cycle	0.44	0.31	0.44	0.18	0.41	0.29	0.55	0.41	0.29	0.29
(v / s)_i Volume / Saturation Flow Rate	0.20	0.14	0.04	0.12	0.03	0.23	0.17	0.05	0.10	0.10
s, saturation flow rate [veh/h]	1491	1754	1260	1818	1185	1900	1615	971	1900	1844
c, Capacity [veh/h]	728	547	631	326	615	547	883	444	561	544
d1, Uniform Delay [s]	10.57	14.68	9.02	20.36	9.60	17.59	6.62	10.78	14.69	14.71
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.39	0.56	0.06	2.15	0.04	2.72	0.20	0.11	0.34	0.35
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.42	0.44	0.09	0.65	0.06	0.80	0.31	0.11	0.33	0.33
d, Delay for Lane Group [s/veh]	10.96	15.24	9.08	22.51	9.65	20.31	6.82	10.89	15.03	15.06
Lane Group LOS	B	B	A	C	A	C	A	B	B	B
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.99	2.06	0.32	2.46	0.22	4.49	1.18	0.30	1.54	1.51
50th-Percentile Queue Length [ft/ln]	49.68	51.57	8.12	61.46	5.54	112.33	29.48	7.39	38.38	37.70
95th-Percentile Queue Length [veh/ln]	3.58	3.71	0.58	4.43	0.40	7.97	2.12	0.53	2.76	2.71
95th-Percentile Queue Length [ft/ln]	89.43	92.82	14.62	110.63	9.98	199.24	53.06	13.31	69.08	67.86

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	10.96	15.24	15.24	9.08	22.51	22.51	9.65	20.31	6.82	10.89	15.04	15.06
Movement LOS	B	B	B	A	C	C	A	C	A	B	B	B
d_A, Approach Delay [s/veh]	12.85			19.77			14.79			14.55		
Approach LOS	B			B			B			B		
d_I, Intersection Delay [s/veh]	14.87											
Intersection LOS	B											
Intersection V/C	0.710											

Other Modes

g_Walk,mi, Effective Walk Time [s]	9.0	9.0	9.0	9.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	18.40	18.40	18.40	18.40
l_p,int, Pedestrian LOS Score for Intersection	2.338	2.061	2.735	2.417
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1126	1126	1126	1126
d_b, Bicycle Delay [s]	5.09	5.09	5.09	5.09
l_b,int, Bicycle LOS Score for Intersection	2.461	1.997	2.800	1.899
Bicycle LOS	B	A	C	A

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: NW Friberg-Strunk Street/Project Access

Control Type:	Two-way stop	Delay (sec / veh):	13.9
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.086

Intersection Setup

Name	NW Friberg-Strunk Street		NW Friberg-Strunk Street			
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name	NW Friberg-Strunk Street		NW Friberg-Strunk Street			
Base Volume Input [veh/h]	441	45	21	332	39	19
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	0.00	0.00	0.00	0.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	441	45	21	332	39	19
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	110	11	5	83	10	5
Total Analysis Volume [veh/h]	441	45	21	332	39	19
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	1

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.02	0.00	0.09	0.03
d_M, Delay for Movement [s/veh]	0.00	0.00	8.38	0.00	13.91	11.94
Movement LOS	A	A	A	A	B	B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.06	0.00	0.40	0.40
95th-Percentile Queue Length [ft/ln]	0.00	0.00	1.48	0.00	9.92	9.92
d_A, Approach Delay [s/veh]	0.00		0.50		13.27	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	1.05					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 4: NW Lake Road/Project Access

Control Type:	Two-way stop	Delay (sec / veh):	9.5
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.026

Intersection Setup

Name			NW Lake Road		NW Lake Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		40.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name			NW Lake Road		NW Lake Road	
Base Volume Input [veh/h]	0	21	0	808	379	20
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	0.00	2.00	2.00	5.00	5.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	21	0	808	379	20
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	5	0	202	95	5
Total Analysis Volume [veh/h]	0	21	0	808	379	20
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.03	0.00	0.01	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	9.54	0.00	0.00	0.00	0.00
Movement LOS		A		A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.08	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	1.98	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	9.54		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.16					
Intersection LOS	A					