



H. Lee & Associates, PLLC

Civil Engineering, Traffic Engineering, and Planning

MEMORANDUM

To: City of Boardman Staff

From: H. Lee & Associates, PLLC

Date: Revised June 9, 2026

Subject: Boardman Equipment Share Trip Generation Memorandum

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INTRODUCTION

The proposed Boardman Equipment Share development is located on the east side of SE First Street, immediately west of the Amazon data center on Parcel 2, Partition Plat 2021-23 in Boardman, Oregon. The project proposal is to develop the existing vacant lot into an Equipment Share with a 9,941 square foot building and outdoor storage yard. Two driveways are planned onto SE First Street which is classified as a collector.

Per City of Boardman Development Code Chapter 4.10 – Traffic Impact Study, a traffic impact study is required when a proposed development meets one or more specified criteria, which include generating 500 or more average daily trips, increasing movements to and from a state highway by 20 percent or more, generating an increase of 20 or more vehicles exceeding 20,000 pounds gross vehicle weight per day on adjacent streets, or creating operational or safety concerns.

This memorandum evaluates the anticipated trip generation and heavy vehicle activity associated with the proposed development to determine whether the project meets the threshold requiring preparation of a traffic impact study.

TRIP GENERATION

Since the Institute of Transportation Engineers (ITE) Trip Generation Manual does not contain a land use classification that specifically represents the proposed equipment share use of the site, trip generation estimates for the proposed Boardman Equipment Share development were developed using rates established in a previously conducted special trip generation survey by HLA for a heavy machinery retailer use that also leases/rents equipment. The HLA survey is considered the most representative and appropriate basis for estimating project trip generation of any data that is readily available. Attachment A contains the trip generation survey for the heavy machinery retailer use that also leases/rents equipment.

The proposed development is expected to generate approximately 66 average daily trips, including 8 A.M. peak hour trips (5 inbound, 3 outbound) and 6 P.M. peak hour trips (1 inbound, 5 outbound).

Boardman Equipment Share Traffic Generation Memorandum

Table 1. Trip Generation for Boardman Equipment Share

	Amount	Average Daily	A.M. Peak			P.M. Peak		
			In	Out	Total	In	Out	Total
Heavy Machinery Retailer – HLA								
Rate per 1,000 square feet (ksf)		6.66	0.51	0.27	0.78	0.11	0.52	0.63
Trips	9.941 ksf	66	5	3	8	1	5	6

Based on the analysis conducted as part of the Feenaughty Machinery Company traffic study prepared by HLA dated June 9, 2021, the heavy machinery retailer trip generation survey data was further analyzed to determine passenger car versus heavy truck trip percentages associated with the use. The passenger car and heavy truck percentages were derived from the analysis presented in Tables 6a, 6b, and 7 of the Feenaughty Machinery Company traffic study. The Feenaughty Machinery Company traffic study can be referenced in Attachment B. The resulting passenger car versus heavy truck trip percentages for the heavy machinery retailer use are summarized in Table 2.

Table 2. Heavy Machinery Retailer Passenger Car vs Heavy Truck Percentage Splits

Daily		A.M. Peak Hour		P.M. Peak Hour	
Percent Passenger Cars	Percent Heavy Trucks	Percent Passenger Cars	Percent Heavy Trucks	Percent Passenger Cars	Percent Heavy Trucks
72%	28%	75%	25%	87%	13%

The passenger car versus heavy truck percentages shown in Table 2 were applied to the project trip generation shown previously in Table 1. Based on the heavy machinery retailer passenger car versus heavy truck percentage splits, the Boardman Equipment Share development is expected to generate 18 daily heavy truck trips, 2 A.M. peak hour heavy truck trips, and 1 P.M. peak hour heavy truck trips. The passenger car versus heavy truck trip generation estimates for the proposed development are shown in Table 3.

Table 3. Passenger Cars vs Heavy Trucks Trip Generation for Boardman Equipment Share

	Average Daily	A.M. Peak Hour			P.M. Peak Hour		
		In	Out	Total	In	Out	Total
Boardman Equipment Share	66	5	3	8	1	5	6
Passenger Car – Daily 72%, A.M. 75%, P.M. 87%	48	4	2	6	1	4	5
Heavy Truck – Daily 28%, A.M. 25%, P.M. 13%	18	1	1	2	0	1	1

CONCLUSION

The proposed Boardman Equipment Share development is expected to generate approximately 66 average daily trips, which is substantially below the City of Boardman threshold of 500 average daily trips requiring preparation of a traffic impact study pursuant to Chapter 4.10 of the development code. The proposed development is also expected to generate approximately 18 average daily heavy truck trips, which is below the City of Boardman threshold of 20 or more vehicles exceeding 20,000 pounds gross vehicle weight per day on adjacent streets. Additionally, the proposed development is not expected to substantially increase traffic volumes on adjacent roadways or create operational or safety concerns.

Based on the estimated project trip generation, a traffic impact study is not warranted and no further traffic analysis is recommended at this time.

ATTACHMENT A



H. Lee & Associates, PLLC

Traffic Engineering, Transportation Planning, and Planning

MEMORANDUM

To: Clark County Staff

From: Hann Lee, P.E.

Date: May 24, 2021



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Subject: Feenaughty Machinery Development Trip Generation Survey

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The proposed Feenaughty Machinery Development is located 7301 and 7313 NE 13th Street and is comprised of tax lots 986056137, 986056136, 986053658, and 199429005 in Clark County, Washington. The proposed project is the development of a 29,820 square foot heavy machinery retailer facility. Access to the development will be from newly constructed driveways onto NE 113th Street and NE 110th Street. The “Trip Generation, 10th Edition” (Institute of Transportation Engineers (ITE), 2017) does not have a land use code specific to the proposed heavy machinery retailer use. Therefore, H. Lee & Associates, PLLC (HLA) conducted a special trip generation survey to establish local rates specific to the proposed heavy machinery retailer use to be able to properly estimate the trip generation of the proposed Feenaughty Machinery Development.

TRIP GENERATION SURVEY

The trip generation survey methodology was based on the *Trip Generation Handbook, 3rd Edition*, Chapter 9 (Institute of Transportation Engineers (ITE), August 2014). The reason for conducting the trip generation survey is that the description of the heavy machinery retailer is not covered by the land use classifications presented in ITE’s *Trip Generation Manual*. Therefore, the collection of local data is needed to establish a local rate for a heavy machinery retailer use.

The *Trip Generation Handbook* calls for at least three sites to be studied and five preferred. Per conversations with Clark County staff, four similar sites were surveyed as part of the trip generation survey. The four sites that were surveyed are summarized below:

- Papé Machinery– 2504 Talley Way, Kelso WA 98626
 - Approximately 19,650 square feet
- Papé Machinery– 1425 NE Columbia Boulevard, Portland OR 97211
 - Approximately 34,936 square feet
- Feenaughty Machinery – 4800 NE Columbia Boulevard, Portland OR 97218
 - Approximately 16,855 square feet
- Sonsray Machinery (Case) – 6457 NE Columbia Boulevard, Portland OR
 - Approximately 41,316 square feet

Feenaughty Machinery Development Trip Generation Survey

Twelve (12) hours of 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:

- Papé Machinery (Kelso) – April 1, 2021
- Papé Machinery (Portland) – March 31, 2021
- Feenaughty Machinery (Portland) – March 31, 2021
- Sonsray Machinery/Case (Portland) – March 31, 2021

The trip generation rates for weekday daily; peak hour of adjacent street one hour between 7:00 and 9:00 A.M.; 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 the sites. The independent variable chosen was the total building(s) square footage of each facility.

Attachment A contains the data utilized to derive the daily, A.M. peak hour, 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 heavy machinery retailer use is 6.66 trips per 1,000 square feet. The standard deviation is 2.88 which is 43.2% 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.

The A.M. peak hour trip generation rate is derived in Table 2. The A.M. peak hour rate was derived using a weighted average. The A.M. peak hour trip generation rate derived for the heavy machinery retailer use is 0.78 A.M. peak hour trips per 1,000 square feet. The standard deviation is 0.22 which is 28.2% 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.

The P.M. peak hour trip generation rate is derived in Table 3. In the P.M. peak hour, the use of all four survey sites yielded a standard deviation (64.2%) beyond the recommended maximum of 55 percent of the weighted average. To be in compliance with the ITE recommendation, the Papé Machinery (Portland) facility was eliminated to bring the derived P.M. peak hour trip generation rate within compliance. The adjusted P.M. peak hour trip generation rate derived for the heavy machinery retailer use is 0.63 P.M. peak hour trips per 1,000 square feet. The adjusted standard deviation is 0.33 which is 52.4% of the adjusted weighted average. The adjusted 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

Heavy Machinery Retailer	1,000 Square Feet (ksf)	Daily Trips	Daily Rate
Papé Machinery – Kelso	19.650	214	10.89
Papé Machinery – Portland	34.936	219	6.27
Feenaughty Machinery	16.855	144	8.54
Sonsray Machinery (Case)	41.316	174	4.21
Totals	112.757	751	6.66 ¹
Standard Deviation			2.88

¹Weighted Average

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

Heavy Machinery Retailer	1,000 Square Feet (ksf)	A.M. Peak Hour Trips ²	A.M. Peak Hour Rate
Papé Machinery – Kelso	19.650	22	1.12
Papé Machinery – Portland	34.936	22	0.63
Feenaughty Machinery	16.855	15	0.89
Sonsray Machinery (Case)	41.316	29	0.70
Totals	112.757	88	0.78 ¹
Standard Deviation			0.22

¹Weighted Average

²Inbound 65%, Outbound 35%

Table 3. Derived P.M. Peak Hour Trip Generation Rate

Heavy Machinery Retailer	1,000 Square Feet (ksf)	P.M. Peak Hour Trips ²	P.M. Peak Hour Rate
Papé Machinery – Kelso	19.650	18	0.92
Papé Machinery – Portland	34.936 ³	11 ³	0.31 ³
Feenaughty Machinery	16.855	16	0.95
Sonsray Machinery (Case)	41.316	15	0.36
Totals	112.757	60	0.63 ¹
Standard Deviation			0.33

¹Weighted Average

²Inbound 18%, Outbound 82%

³The square footage, trips, and rate were not used to calculate the weighted average because they are outside of the standard deviation allowance.

Feenaughty Machinery Development Trip Generation Survey

TRIP GENERATION

Estimates of daily, A.M. peak hour, and P.M. peak hour trips generated by the proposed Feenaughty Machinery Development were developed from the survey conducted by HLA that is detailed in the previous “Trip Generation Survey” section. The proposed project is expected to generate 199 daily, 23 A.M peak hour (15 in, 8 out), and 19 P.M. peak hour (3 in, 16 out) net new trips. Table 4 summarizes the project’s trip generation.

Table 4. Trip Generation for Feenaughty Machinery Development

	Amount	Average Daily	A.M. Peak			P.M. Peak		
			In	Out	Total	In	Out	Total
Heavy Machinery Retailer – HLA								
Rate per 1,000 square feet (ksf)		6.66	0.51	0.27	0.78	0.11	0.52	0.63
Trips	29.820 ksf	199	15	8	23	3	16	19

H. Lee & Associates, PLLC - Trip Generation Summary

Heavy Machinery Retailer	KSF	Daily Trips	AM Trips	PM Trips	Daily Rate	AM Rate	PM Rate
Pape Kelso	19.650	214	22	18	10.89	1.12	0.92
Pape Portland	34.936	219	22	11	6.27	0.63	0.31
Feenaughty Machinery	16.855	144	15	16	8.54	0.89	0.95
Sonsray Machinery (Case)	41.316	174	29	15	4.21	0.70	0.36
Totals	112.757	751	88	60			

	AM		PM	
	In	Out	In	Out
	12	10	8	10
	11	11	0	11
	13	2	1	15
	21	8	2	13
Totals	57	31	11	49
	65%	35%	18%	82%

Derived Weighted	Daily	AM	PM
Average Rates	6.66	0.78	0.53
Standard Deviation	2.88	0.22	0.34

Adjusted PM Rate	PM
Without Pape Portland	0.63
Standard Deviation	0.33

	Daily	AM	PM
Final Trip Generation Rates	6.66	0.78	0.63
Standard Deviation	2.88	0.22	0.33

Pape Kelso
Date 4/1/21

Driveway 1

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	0	0	0	0	0
6:15-6:30	0	0	0	0	0
6:30-6:45	1	0	1	0	2
6:45-7:00	8	1	1	1	9
7:00-7:15	2	1	0	0	2
7:15-7:30	2	0	2	0	4
7:30-7:45	1	0	1	0	2
7:45-8:00	0	0	1	0	1
8:00-8:15	0	0	2	0	2
8:15-8:30	1	0	1	0	2
8:30 - 8:45	4	1	1	1	5
8:45 - 9:00	3	1	2	0	5
9:00 - 9:15	1	0	2	0	3
9:15 - 9:30	1	0	3	1	4
9:30 - 9:45	2	0	1	1	3
9:45 - 10:00	1	0	0	0	1
10:00 - 10:15	4	2	1	1	5
10:15 - 10:30	7	0	2	0	9
10:30 - 10:45	1	0	1	0	2
10:45 - 11:00	1	1	2	1	3
11:00 - 11:15	0	0	0	0	0
11:15 - 11:30	3	0	1	0	4
11:30 - 11:45	3	0	2	0	5
11:45 - 12:00	2	0	3	0	5
12:00-12:15	2	1	0	0	2
12:15-12:30	0	0	0	0	0
12:30-12:45	0	0	0	0	0
12:45-1:00	0	0	0	0	0
1:00-1:15	0	0	0	0	0
1:15-1:30	0	0	0	0	0
1:30-1:45	0	0	0	0	0
1:45-2:00	0	0	0	0	0
2:00-2:15	0	0	0	0	0
2:15-2:30	0	0	0	0	0
2:30-2:45	0	0	0	0	0
2:45-3:00	0	0	0	0	0
3:00-3:15	0	0	0	0	0
3:15-3:30	0	0	0	0	0
3:30-3:45	0	0	0	0	0
3:45-4:00	0	0	0	0	0
4:00-4:15	0	0	0	0	0
4:15-4:30	0	0	0	0	0
4:30-4:45	0	0	0	0	0
4:45-5:00	0	0	0	0	0
5:00-5:15	0	0	0	0	0
5:15-5:30	0	0	0	0	0
5:30-5:45	0	0	0	0	0
5:45-6:00	0	0	0	0	0
Totals	50	8	30	6	80

Driveway 2

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	1	0	0	0	1
6:15-6:30	2	0	1	0	3
6:30-6:45	2	1	0	0	2
6:45-7:00	0	0	0	0	0
7:00-7:15	2	0	2	1	4
7:15-7:30	0	0	1	1	1
7:30-7:45	0	0	0	0	0
7:45-8:00	0	0	0	0	0
8:00-8:15	0	0	0	0	0
8:15-8:30	1	0	1	0	2
8:30 - 8:45	2	0	2	0	4
8:45 - 9:00	1	0	1	0	2
9:00 - 9:15	0	0	0	1	0
9:15 - 9:30	0	0	2	1	2
9:30 - 9:45	0	0	1	0	1
9:45 - 10:00	0	0	1	0	1
10:00 - 10:15	0	0	2	0	2
10:15 - 10:30	1	1	2	1	3
10:30 - 10:45	0	0	1	1	1
10:45 - 11:00	0	0	2	1	2
11:00 - 11:15	1	0	0	0	1
11:15 - 11:30	0	0	1	1	1
11:30 - 11:45	1	0	0	1	1
11:45 - 12:00	1	0	3	0	4
12:00-12:15	1	0	2	0	3
12:15-12:30	0	0	0	0	0
12:30-12:45	0	0	0	0	0
12:45-1:00	0	0	0	0	0
1:00-1:15	0	0	0	0	0
1:15-1:30	0	0	0	0	0
1:30-1:45	0	0	0	0	0
1:45-2:00	0	0	0	0	0
2:00-2:15	0	0	0	0	0
2:15-2:30	0	0	0	0	0
2:30-2:45	0	0	0	0	0
2:45-3:00	0	0	0	0	0
3:00-3:15	0	0	0	0	0
3:15-3:30	0	0	0	0	0
3:30-3:45	0	0	0	0	0
3:45-4:00	0	0	0	0	0
4:00-4:15	0	0	0	0	0
4:15-4:30	0	0	0	0	0
4:30-4:45	0	0	0	0	0
4:45-5:00	0	0	0	0	0
5:00-5:15	0	0	0	0	0
5:15-5:30	0	0	0	0	0
5:30-5:45	0	0	0	0	0
5:45-6:00	0	0	0	0	0
Totals	16	2	25	9	41

Comined Driveways Total

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	1	0	0	0	1
6:15-6:30	2	0	1	0	3
6:30-6:45	3	1	1	0	4
6:45-7:00	8	1	1	1	9
7:00-7:15	4	1	2	1	6
7:15-7:30	2	0	3	1	5
7:30-7:45	1	0	1	0	2
7:45-8:00	0	0	1	0	1
8:00-8:15	0	0	2	0	2
8:15-8:30	2	0	2	0	4
8:30 - 8:45	6	1	3	1	9
8:45 - 9:00	4	1	3	0	7
9:00 - 9:15	1	0	2	1	3
9:15 - 9:30	1	0	5	2	6
9:30 - 9:45	2	0	2	1	4
9:45 - 10:00	1	0	1	0	2
10:00 - 10:15	4	2	3	1	7
10:15 - 10:30	8	1	4	1	12
10:30 - 10:45	1	0	2	1	3
10:45 - 11:00	1	1	4	2	5
11:00 - 11:15	1	0	0	0	1
11:15 - 11:30	3	0	2	1	5
11:30 - 11:45	4	0	2	1	6
11:45 - 12:00	3	0	6	0	9
12:00-12:15	3	1	2	0	5
12:15-12:30	0	0	0	0	0
12:30-12:45	0	0	0	0	0
12:45-1:00	0	0	0	0	0
1:00-1:15	0	0	0	0	0
1:15-1:30	0	0	0	0	0
1:30-1:45	0	0	0	0	0
1:45-2:00	0	0	0	0	0
2:00-2:15	0	0	0	0	0
2:15-2:30	0	0	0	0	0
2:30-2:45	0	0	0	0	0
2:45-3:00	0	0	0	0	0
3:00-3:15	0	0	0	0	0
3:15-3:30	0	0	0	0	0
3:30-3:45	0	0	0	0	0
3:45-4:00	0	0	0	0	0
4:00-4:15	0	0	0	0	0
4:15-4:30	0	0	0	0	0
4:30-4:45	0	0	0	0	0
4:45-5:00	0	0	0	0	0
5:00-5:15	0	0	0	0	0
5:15-5:30	0	0	0	0	0
5:30-5:45	0	0	0	0	0
5:45-6:00	0	0	0	0	0
Totals	66	10	55	15	121

SE

Driveway 1

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	0	0	0	0	0
6:15-6:30	0	0	0	0	0
6:30-6:45	2	1	0	0	2
6:45-7:00	0	0	0	0	0
7:00-7:15	1	0	0	0	1
7:15-7:30	1	0	0	0	1
7:30-7:45	0	0	0	0	0
7:45-8:00	1	0	0	0	1
8:00-8:15	0	0	0	0	0
8:15-8:30	0	0	0	0	0
8:30 - 8:45	0	0	0	0	0
8:45 - 9:00	1	0	0	0	1
9:00 - 9:15	0	0	0	0	0
9:15 - 9:30	1	0	0	0	1
9:30 - 9:45	3	0	0	0	3
9:45 - 10:00	0	0	0	0	0
10:00 - 10:15	1	0	0	0	1
10:15 - 10:30	0	0	1	1	1
10:30 - 10:45	0	0	0	0	0
10:45 - 11:00	0	0	0	0	0
11:00 - 11:15	1	0	0	0	1
11:15 - 11:30	1	0	0	0	1
11:30 - 11:45	1	0	0	0	1
11:45 - 12:00	1	1	1	1	2
12:00-12:15	0	0	1	0	1
12:15-12:30	1	0	0	0	1
12:30-12:45	0	0	1	0	1
12:45-1:00	0	0	0	0	0
1:00-1:15	0	0	0	0	0
1:15-1:30	0	0	0	0	0
1:30-1:45	0	0	0	0	0
1:45-2:00	0	0	0	0	0
2:00-2:15	0	0	0	0	0
2:15-2:30	0	0	0	0	0
2:30-2:45	0	0	0	0	0
2:45-3:00	0	0	0	0	0
3:00-3:15	0	0	0	0	0
3:15-3:30	0	0	0	0	0
3:30-3:45	0	0	0	0	0
3:45-4:00	0	0	0	0	0
4:00-4:15	0	0	0	0	0
4:15-4:30	0	0	0	0	0
4:30-4:45	0	0	0	0	0
4:45-5:00	0	0	0	0	0
5:00-5:15	0	0	0	0	0
5:15-5:30	0	0	0	0	0
5:30-5:45	0	0	0	0	0
5:45-6:00	0	0	0	0	0
Totals	16	2	4	2	20

SW

Driveway 2

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	0	0	0	0	0
6:15-6:30	2	0	0	0	2
6:30-6:45	4	0	0	0	4
6:45-7:00	4	0	0	0	4
7:00-7:15	0	0	1	1	1
7:15-7:30	2	0	0	0	2
7:30-7:45	1	0	1	1	2
7:45-8:00	1	1	0	0	1
8:00-8:15	2	1	2	1	4
8:15-8:30	1	0	0	0	1
8:30 - 8:45	0	0	1	0	1
8:45 - 9:00	0	0	1	1	1
9:00 - 9:15	0	0	0	0	0
9:15 - 9:30	5	1	2	0	7
9:30 - 9:45	0	0	4	1	4
9:45 - 10:00	4	2	7	1	11
10:00 - 10:15	2	1	0	0	2
10:15 - 10:30	1	0	4	0	5
10:30 - 10:45	2	0	0	0	2
10:45 - 11:00	1	0	2	0	3
11:00 - 11:15	2	0	2	0	4
11:15 - 11:30	2	1	2	1	4
11:30 - 11:45	0	0	1	0	1
11:45 - 12:00	2	1	3	1	5
12:00-12:15	3	0	3	1	6
12:15-12:30	1	1	0	0	1
12:30-12:45	0	0	1	0	1
12:45-1:00	0	0	0	0	0
1:00-1:15	0	0	0	0	0
1:15-1:30	0	0	0	0	0
1:30-1:45	0	0	0	0	0
1:45-2:00	0	0	0	0	0
2:00-2:15	0	0	0	0	0
2:15-2:30	0	0	0	0	0
2:30-2:45	0	0	0	0	0
2:45-3:00	0	0	0	0	0
3:00-3:15	0	0	0	0	0
3:15-3:30	0	0	0	0	0
3:30-3:45	0	0	0	0	0
3:45-4:00	0	0	0	0	0
4:00-4:15	0	0	0	0	0
4:15-4:30	0	0	0	0	0
4:30-4:45	0	0	0	0	0
4:45-5:00	0	0	0	0	0
5:00-5:15	0	0	0	0	0
5:15-5:30	0	0	0	0	0
5:30-5:45	0	0	0	0	0
5:45-6:00	0	0	0	0	0
Totals	42	9	37	9	79

W1

Driveway 3

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	1	0	0	0	1
6:15-6:30	0	0	0	0	0
6:30-6:45	0	0	0	0	0
6:45-7:00	0	0	0	0	0
7:00-7:15	0	0	0	0	0
7:15-7:30	1	1	0	0	1
7:30-7:45	0	0	0	0	0
7:45-8:00	2	1	1	1	3
8:00-8:15	0	0	1	1	1
8:15-8:30	0	0	1	0	1
8:30 - 8:45	0	0	2	1	2
8:45 - 9:00	0	0	0	0	0
9:00 - 9:15	2	0	0	0	2
9:15 - 9:30	1	1	0	0	1
9:30 - 9:45	0	0	1	1	1
9:45 - 10:00	0	0	0	0	0
10:00 - 10:15	2	1	1	0	3
10:15 - 10:30	0	0	0	0	0
10:30 - 10:45	0	0	0	0	0
10:45 - 11:00	1	1	1	1	2
11:00 - 11:15	0	0	0	0	0
11:15 - 11:30	0	0	1	1	1
11:30 - 11:45	2	2	0	0	2
11:45 - 12:00	0	0	0	0	0
12:00-12:15	0	0	0	0	0
12:15-12:30	0	0	0	0	0
12:30-12:45	1	0	0	0	1
12:45-1:00	0	0	0	0	0
1:00-1:15	0	0	0	0	0
1:15-1:30	0	0	0	0	0
1:30-1:45	0	0	0	0	0
1:45-2:00	0	0	0	0	0
2:00-2:15	0	0	0	0	0
2:15-2:30	0	0	0	0	0
2:30-2:45	0	0	0	0	0
2:45-3:00	0	0	0	0	0
3:00-3:15	0	0	0	0	0
3:15-3:30	0	0	0	0	0
3:30-3:45	0	0	0	0	0
3:45-4:00	0	0	0	0	0
4:00-4:15	0	0	0	0	0
4:15-4:30	0	0	0	0	0
4:30-4:45	0	0	0	0	0
4:45-5:00	0	0	0	0	0
5:00-5:15	0	0	0	0	0
5:15-5:30	0	0	0	0	0
5:30-5:45	0	0	0	0	0
5:45-6:00	0	0	0	0	0
Totals	13	7	9	6	22

W2

Driveway 4

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	0	0	0	0	0
6:15-6:30	0	0	0	0	0
6:30-6:45	0	0	0	0	0
6:45-7:00	4	3	0	0	4
7:00-7:15	1	1	0	0	1
7:15-7:30	0	0	0	0	0
7:30-7:45	1	1	0	0	1
7:45-8:00	0	0	0	0	0
8:00-8:15	1	1	1	1	2
8:15-8:30	2	1	0	0	2
8:30 - 8:45	1	1	0	0	1
8:45 - 9:00	0	0	0	0	0
9:00 - 9:15	0	0	0	0	0
9:15 - 9:30	2	1	0	0	2
9:30 - 9:45	0	0	0	0	0
9:45 - 10:00	0	0	0	0	0
10:00 - 10:15	0	0	1	0	1
10:15 - 10:30	2	1	0	0	2
10:30 - 10:45	1	1	1	1	2
10:45 - 11:00	0	0	0	0	0
11:00 - 11:15	0	0	0	0	0
11:15 - 11:30	1	1	1	0	2
11:30 - 11:45	1	1	1	0	2
11:45 - 12:00	1	0	0	0	1
12:00-12:15	1	1	0	0	1
12:15-12:30	0	0	1	1	1
12:30-12:45	1	1	0	0	1
12:45-1:00	0	0	0	0	0
1:00-1:15	0	0	0	0	0
1:15-1:30	0	0	0	0	0
1:30-1:45	0	0	0	0	0
1:45-2:00	0	0	0	0	0
2:00-2:15	0	0	0	0	0
2:15-2:30	0	0	0	0	0
2:30-2:45	0	0	0	0	0
2:45-3:00	0	0	0	0	0
3:00-3:15	0	0	0	0	0
3:15-3:30	0	0	0	0	0
3:30-3:45	0	0	0	0	0
3:45-4:00	0	0	0	0	0
4:00-4:15	0	0	0	0	0
4:15-4:30	0	0	0	0	0
4:30-4:45	0	0	0	0	0
4:45-5:00	0	0	0	0	0
5:00-5:15	0	0	0	0	0
5:15-5:30	0	0	0	0	0
5:30-5:45	0	0	0	0	0
5:45-6:00	0	0	0	0	0
Totals	20	15	6	3	26

Driveway 5 - Exit Only

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	0	0	0	0	0
6:15-6:30	0	0	1	1	1
6:30-6:45	0	0	0	0	0
6:45-7:00	0	0	0	0	0
7:00-7:15	0	0	0	0	0
7:15-7:30	0	0	0	0	0
7:30-7:45	0	0	1	1	1
7:45-8:00	0	0	0	0	0
8:00-8:15	0	0	1	1	1
8:15-8:30	0	0	0	0	0
8:30 - 8:45	0	0	1	1	1
8:45 - 9:00	0	0	1	1	1
9:00 - 9:15	0	0	0	0	0
9:15 - 9:30	0	0	0	0	0
9:30 - 9:45	0	0	0	0	0
9:45 - 10:00	0	0	3	2	3
10:00 - 10:15	0	0	2	0	2
10:15 - 10:30	0	0	1	0	1
10:30 - 10:45	0	0	1	1	1
10:45 - 11:00	0	0	2	1	2
11:00 - 11:15	0	0	2	2	2
11:15 - 11:30	0	0	0	0	0
11:30 - 11:45	0	0	0	0	0
11:45 - 12:00	0	0	1	0	1
12:00-12:15	0	0	0	0	0
12:15-12:30	0	0	0	0	0
12:30-12:45	0	0	0	0	0
12:45-1:00	0	0	0	0	0
1:00-1:15	0	0	0	0	0
1:15-1:30	0	0	0	0	0
1:30-1:45	0	0	0	0	0
1:45-2:00	0	0	0	0	0
2:00-2:15	0	0	0	0	0
2:15-2:30	0	0	0	0	0
2:30-2:45	0	0	0	0	0
2:45-3:00	0	0	0	0	0
3:00-3:15	0	0	0	0	0
3:15-3:30	0	0	0	0	0
3:30-3:45	0	0	0	0	0
3:45-4:00	0	0	0	0	0
4:00-4:15	0	0	0	0	0
4:15-4:30	0	0	0	0	0
4:30-4:45	0	0	0	0	0
4:45-5:00	0	0	0	0	0
5:00-5:15	0	0	0	0	0
5:15-5:30	0	0	0	0	0
5:30-5:45	0	0	0	0	0
5:45-6:00	0	0	0	0	0
Totals	0	0	17	11	17

Driveway 1

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	0	0	0	0	0
6:15-6:30	0	0	0	0	0
6:30-6:45	0	0	0	0	0
6:45-7:00	1	0	0	0	1
7:00-7:15	0	0	0	0	0
7:15-7:30	3	1	1	0	4
7:30-7:45	1	0	0	0	1
7:45-8:00	4	0	0	0	4
8:00-8:15	0	0	0	0	0
8:15-8:30	1	0	0	0	1
8:30 - 8:45	0	0	0	0	0
8:45 - 9:00	0	0	0	0	0
9:00 - 9:15	3	0	0	0	3
9:15 - 9:30	1	1	2	0	3
9:30 - 9:45	1	0	0	0	1
9:45 - 10:00	1	1	1	0	2
10:00 - 10:15	1	0	1	0	2
10:15 - 10:30	2	1	0	0	2
10:30 - 10:45	4	2	1	0	5
10:45 - 11:00	1	0	3	2	4
11:00 - 11:15	1	1	0	0	1
11:15 - 11:30	5	2	3	0	8
11:30 - 11:45	3	1	0	0	3
11:45 - 12:00	1	0	2	1	3
12:00-12:15	2	0	4	2	6
12:15-12:30	2	2	2	2	4
12:30-12:45	1	0	0	0	1
12:45-1:00	1	0	1	1	2
1:00-1:15	2	0	0	0	2
1:15-1:30	0	0	0	0	0
1:30-1:45	0	0	0	0	0
1:45-2:00	1	0	1	1	2
2:00-2:15	1	0	1	0	2
2:15-2:30	1	0	1	0	2
2:30-2:45	2	1	1	0	3
2:45-3:00	1	0	0	0	1
3:00-3:15	1	1	1	0	2
3:15-3:30	1	0	0	0	1
3:30-3:45	0	0	0	0	0
3:45-4:00	0	0	1	0	1
4:00-4:15	1	1	1	1	2
4:15-4:30	0	0	0	0	0
4:30-4:45	0	0	1	0	1
4:45-5:00	0	0	0	0	0
5:00-5:15	0	0	0	0	0
5:15-5:30	1	0	0	0	1
5:30-5:45	0	0	0	0	0
5:45-6:00	0	0	0	0	0
Totals	52	15	29	10	81

Driveway 2

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	0	0	0	0	0
6:15-6:30	0	0	0	0	0
6:30-6:45	0	0	0	0	0
6:45-7:00	0	0	0	0	0
7:00-7:15	1	1	0	1	1
7:15-7:30	0	0	0	0	0
7:30-7:45	2	0	0	0	2
7:45-8:00	2	1	1	0	3
8:00-8:15	1	0	0	0	1
8:15-8:30	0	0	1	1	1
8:30 - 8:45	0	0	0	0	0
8:45 - 9:00	0	0	1	0	1
9:00 - 9:15	0	1	0	0	0
9:15 - 9:30	0	0	2	1	2
9:30 - 9:45	0	0	0	0	0
9:45 - 10:00	2	0	1	0	3
10:00 - 10:15	0	0	1	0	1
10:15 - 10:30	1	0	2	1	3
10:30 - 10:45	1	1	0	0	1
10:45 - 11:00	1	0	2	1	3
11:00 - 11:15	1	1	1	0	2
11:15 - 11:30	2	0	3	2	5
11:30 - 11:45	0	0	4	1	4
11:45 - 12:00	1	0	4	2	5
12:00-12:15	0	0	2	2	2
12:15-12:30	0	0	1	0	1
12:30-12:45	0	0	0	0	0
12:45-1:00	0	0	0	0	0
1:00-1:15	0	0	0	0	0
1:15-1:30	0	0	0	0	0
1:30-1:45	0	0	0	0	0
1:45-2:00	0	0	0	0	0
2:00-2:15	0	0	0	0	0
2:15-2:30	0	0	0	0	0
2:30-2:45	0	0	0	0	0
2:45-3:00	0	0	4	1	4
3:00-3:15	1	0	1	0	2
3:15-3:30	0	0	0	0	0
3:30-3:45	0	0	0	0	0
3:45-4:00	0	0	2	0	2
4:00-4:15	0	0	1	1	1
4:15-4:30	0	0	5	0	5
4:30-4:45	0	0	3	0	3
4:45-5:00	0	0	4	0	4
5:00-5:15	0	0	1	0	1
5:15-5:30	0	0	0	0	0
5:30-5:45	0	0	0	0	0
5:45-6:00	0	0	0	0	0
Totals	16	5	47	14	63

Comined Driveways Total

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	0	0	0	0	0
6:15-6:30	0	0	0	0	0
6:30-6:45	0	0	0	0	0
6:45-7:00	1	0	0	0	1
7:00-7:15	1	1	0	1	1
7:15-7:30	3	1	1	0	4
7:30-7:45	3	0	0	0	3
7:45-8:00	6	1	1	0	7
8:00-8:15	1	0	0	0	1
8:15-8:30	1	0	1	1	2
8:30 - 8:45	0	0	0	0	0
8:45 - 9:00	0	0	1	0	1
9:00 - 9:15	3	1	0	0	3
9:15 - 9:30	1	1	4	1	5
9:30 - 9:45	1	0	0	0	1
9:45 - 10:00	3	1	2	0	5
10:00 - 10:15	1	0	2	0	3
10:15 - 10:30	3	1	2	1	5
10:30 - 10:45	5	3	1	0	6
10:45 - 11:00	2	0	5	3	7
11:00 - 11:15	2	2	1	0	3
11:15 - 11:30	7	2	6	2	13
11:30 - 11:45	3	1	4	1	7
11:45 - 12:00	2	0	6	3	8
12:00-12:15	2	0	6	4	8
12:15-12:30	2	2	3	2	5
12:30-12:45	1	0	0	0	1
12:45-1:00	1	0	1	1	2
1:00-1:15	2	0	0	0	2
1:15-1:30	0	0	0	0	0
1:30-1:45	0	0	0	0	0
1:45-2:00	1	0	1	1	2
2:00-2:15	1	0	1	0	2
2:15-2:30	1	0	1	0	2
2:30-2:45	2	1	1	0	3
2:45-3:00	1	0	4	1	5
3:00-3:15	2	1	2	0	4
3:15-3:30	1	0	0	0	1
3:30-3:45	0	0	0	0	0
3:45-4:00	0	0	3	0	3
4:00-4:15	1	1	2	2	3
4:15-4:30	0	0	5	0	5
4:30-4:45	0	0	4	0	4
4:45-5:00	0	0	4	0	4
5:00-5:15	0	0	1	0	1
5:15-5:30	1	0	0	0	1
5:30-5:45	0	0	0	0	0
5:45-6:00	0	0	0	0	0
Totals	68	20	76	24	144

Sonsray Machinery Case

Date 4/1/21

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	0	0	0	0	0
6:15-6:30	1	0	0	0	1
6:30-6:45	0	0	0	0	0
6:45-7:00	1	0	0	0	1
7:00-7:15	2	1	2	1	4
7:15-7:30	4	3	2	0	6
7:30-7:45	2	0	3	0	5
7:45-8:00	2	1	1	1	3
8:00-8:15	9	0	2	0	11
8:15-8:30	8	0	2	0	10
8:30 - 8:45	1	0	2	1	3
8:45 - 9:00	3	2	1	1	4
9:00 - 9:15	2	0	4	1	6
9:15 - 9:30	1	0	0	0	1
9:30 - 9:45	0	0	0	0	0
9:45 - 10:00	4	2	1	0	5
10:00 - 10:15	5	1	2	0	7
10:15 - 10:30	1	1	4	0	5
10:30 - 10:45	3	0	0	0	3
10:45 - 11:00	0	0	2	0	2
11:00 - 11:15	2	0	3	0	5
11:15 - 11:30	2	0	1	1	3
11:30 - 11:45	0	0	2	1	2
11:45 - 12:00	1	1	1	1	2
12:00-12:15	2	0	4	0	6
12:15-12:30	0	0	1	0	1
12:30-12:45	2	0	0	0	2
12:45-1:00	1	0	0	0	1
1:00-1:15	4	2	4	2	8
1:15-1:30	2	1	4	3	6
1:30-1:45	2	1	1	1	3
1:45-2:00	2	1	0	0	2
2:00-2:15	1	0	2	1	3
2:15-2:30	2	1	2	1	4
2:30-2:45	2	0	3	0	5
2:45-3:00	1	1	3	0	4
3:00-3:15	2	1	1	0	3
3:15-3:30	2	1	2	1	4
3:30-3:45	0	0	1	0	1
3:45-4:00	5	1	2	0	7
4:00-4:15	1	1	7	1	8
4:15-4:30	0	0	0	0	0
4:30-4:45	0	1	1	0	1
4:45-5:00	0	0	3	0	3
5:00-5:15	2	1	3	0	5
5:15-5:30	0	0	3	0	3
5:30-5:45	0	0	4	0	4
5:45-6:00	0	0	1	0	1
Totals	87	25	87	18	174

ATTACHMENT B

REPORT

Feenaughty Machinery Company Traffic Impact Study

June 9, 2021

H. Lee & Associates, PLLC

**FEENAUGHTY MACHINERY COMPANY
TRAFFIC IMPACT STUDY**



Prepared for:

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June 9, 2021

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SECTION I STUDY SUMMARY

INTRODUCTION

This traffic impact analysis has been prepared to assess transportation impacts related to the proposed Feenaughty Machinery Company in Clark County, Washington. The project site is located at 7301 and 7313 NE 13th Street and is comprised of tax lots 986056137, 986056136, 986053658, and 199429005. Figure 1 shows the project vicinity.

Project Description

The proposed project is the development of a 29,820 square foot heavy machinery retailer facility. Access to the development will be from newly constructed driveway onto NE 113th Street and NE 110th Street. The NE 113th Street access will be for passenger cars such as employees and customers. The NE 110th Street access will be gated and for heavy trucks such as heavy machinery deliveries and drop off. Figure 2 shows the project site plan.

Scope of Traffic Impact Study

The scope of the traffic impact study was developed from correspondence with Clark County staff and known Clark County traffic study requirements. From this information, the following intersections were determined to require analysis:

- NE 72nd Avenue/NE St. Johns Road/NE 113th Street
- NE 72nd Avenue/NE 110th Street
- NE 110th Street/Project Access

The remainder of this report presents the following analysis:

- Existing A.M. and P.M. peak hour traffic conditions in the project study area.
- The 2024 “Without Project” condition was analyzed to establish the future baseline condition for Clark County’s concurrency analysis. The 2024 “Without Project” condition traffic volumes were derived by using a two (2) percent compounded, annual growth factor and adding traffic generated by “in process” developments. The “in-process” traffic volumes were obtained from the Clark County staff.
- Trip generation estimates for the proposed development.
- Trip distribution and assignment of project-generated trips. Since the project generates less than 51 peak hour trips, the study area was limited to intersections of regional significance within one (1) mile from the site. This procedure is based on Clark County Code (CCC) 40.350.020.D.5.a.

- The 2024 “With Project” condition was analyzed to determine the project traffic impacts for Clark County’s concurrency analysis.

SUMMARY OF FINDINGS

The following are the findings and recommendations from the traffic analysis:

Findings

The following are the findings from the traffic analysis:

- The proposed project is expected to generate 199 daily, 23 A.M peak hour (15 in, 8 out), and 19 P.M. peak hour (3 in, 16 out) gross new trips. The passenger car trip generation of the Feenaughty Machinery Company was already accounted for in the previously approved Wiebold traffic study/development. Therefore, only the truck trips generated by the proposed project are considered net new trips. The proposed project net new trips are 56 daily, 6 A.M. peak hour (4 in, 2 out) and 2 P.M. peak hour (0 in, 2 out) trips.
- All of the study area intersections are projected to meet Clark County’s level of service standard for the 2024 “Without Project” and 2024 “With Project” conditions.
- Based on field measurements conducted by H. Lee & Associates, PLLC (HLA), the existing NE 72nd Avenue/NE 110th Street intersection and the proposed NE 113th Street/Project Access and NE 110th Street/Project Access intersections should be able to meet AASHTO heavy truck corner sight distance requirements as long as any existing vegetation within the sight distance triangles are properly maintained after construction and no obstructions are placed within the sight distance triangles that could impede a driver’s vision. Because the NE 113th Street and NE 110th Street project access approaches have not been designed or constructed yet, the corner sight distance should be reconfirmed at the final engineering/construction stage of development to assure that any design/construction element does not preclude the necessary corner sight distance requirement.
- Turn lane warrants at the existing NE 72nd Avenue/NE 110th Street intersection were not conducted because a southbound left turn lane already exists.

Turn lane warrants at the NE 113th Street/Project Access and NE 110th Street/Project Access intersections were not conducted due to low traffic volumes, good levels of service, and acceptable accident rates in the 2024 “With Project” condition.

Recommendations

- Based on the traffic impact analysis documented in this report, no physical, off-site mitigation would be needed.

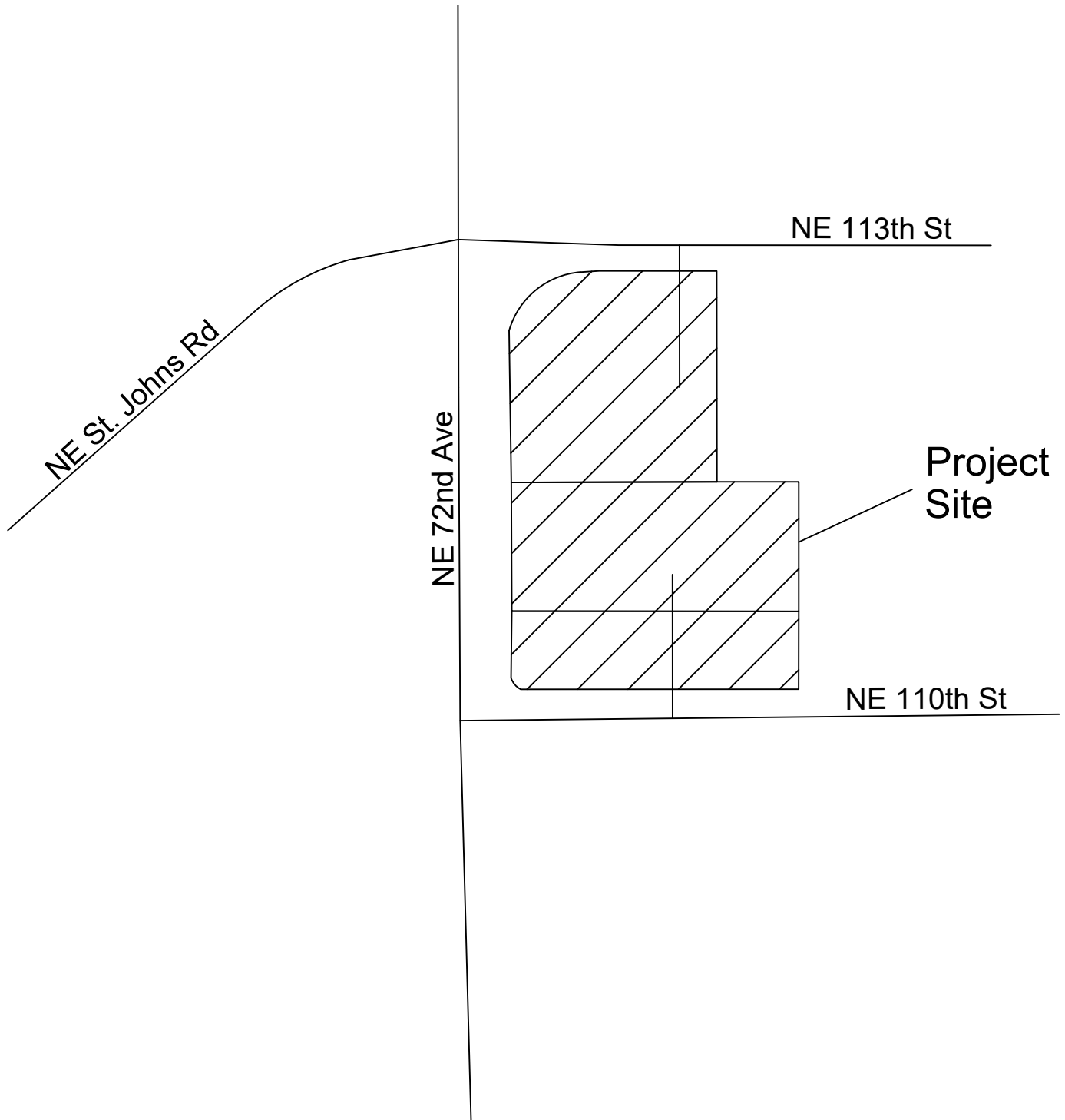


FIGURE 1
Site Vicinity Map

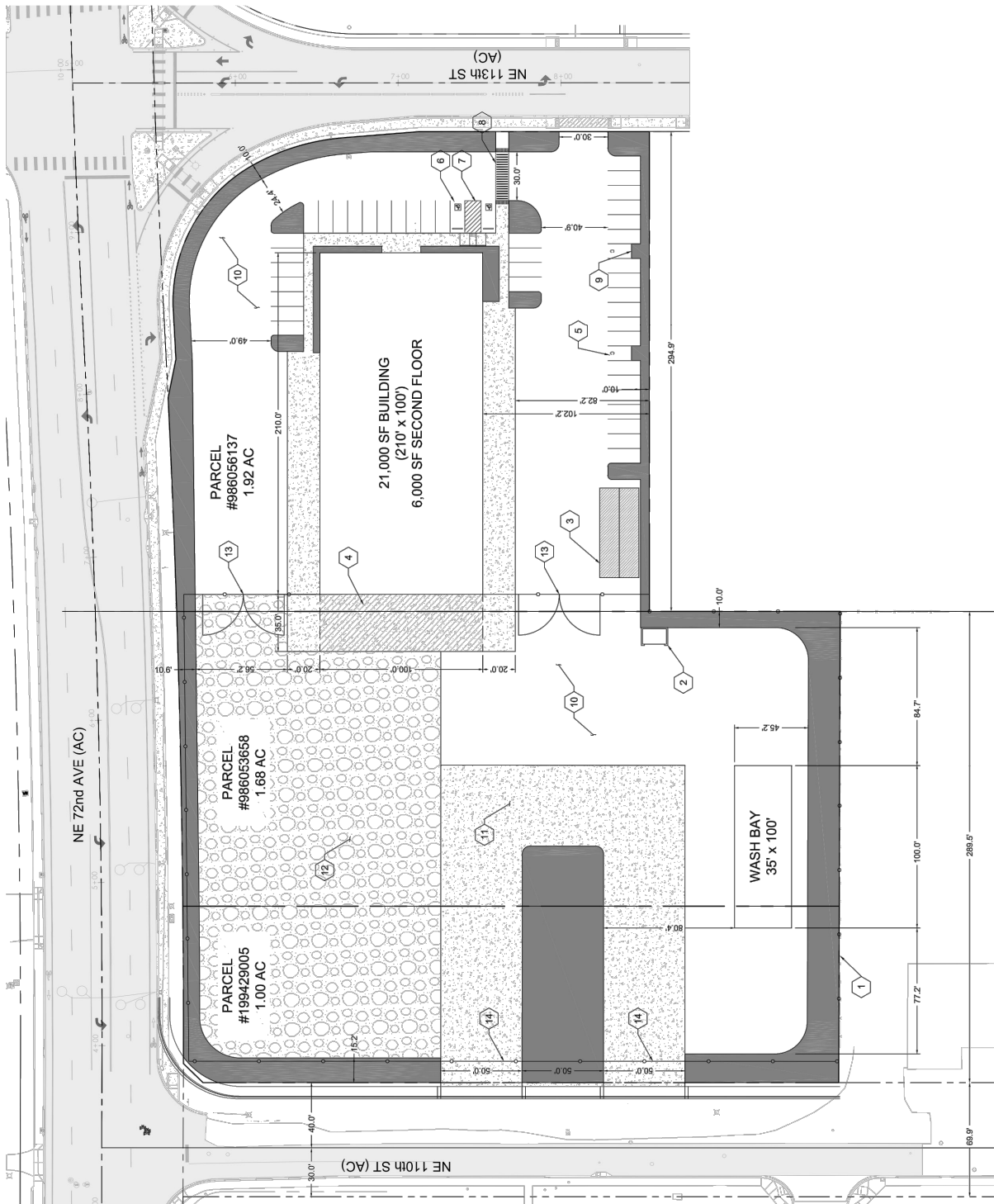


FIGURE 2
Site Plan

SECTION II EXISTING CONDITIONS

SITE CONDITION AND ADJACENT LAND USE

The project site is vacant and tax lots 986056137 and 986056136 of the previously approved Wiebold Development are part of the proposed project site. The remaining Wiebold Development lots exist to the north and east. The Ukrainian Baptist Church exists to the south. Residential uses exist to the west.

TRANSPORTATION FACILITIES

The following provides a description of the existing street system in the study area including a description of street classifications and characteristics.

NE 72nd Avenue: NE 72nd Avenue is a four lane principal arterial (Pr-4cb) roadway with a center turn lane/median and additional turn lanes at major intersections south of NE 119th Street. This section of roadway has sidewalks and bike lanes on both sides of the roadway and a posted speed limit of 45 mph. North of NE 119th Street, NE 72nd Avenue is as a two-lane principal arterial (Pr-4cb) roadway with additional turn lanes at major intersections and a posted speed limit of 50 mph.

NE 110th Street: NE 110th Street is a two-lane commercial industrial local roadway. There is no posted speed limit but is assumed to be 25 mph.

NE 113th Street: NE 113th Street is a two-lane commercial industrial local roadway with a center turn lane median and addition turn lanes at the NE 72nd Avenue/NE St. Johns Road/NE 113th Street intersection. Sidewalks exist along both sides of the roadway. There is no posted speed limit but is assumed to be 25 mph.

NE St. Johns Road: NE St. Johns Road is as a four-to-five-lane principal arterial (Pr-4cb) with additional turn lanes at major intersections. North of NE 88th Street, NE St. Johns Road has sidewalks and bike lanes along both sides of the roadway, as well as an intermittent center median. This section of NE St. Johns Road has a posted speed limit of 45 mph. South of NE 88th Street, NE St. Johns Road has sidewalks and bike lanes along both sides of the roadway and a posted speed limit of 40 mph.

As part of this study, levels of service analyses were performed for the following intersections:

- NE 72nd Avenue/NE St. Johns Road/NE 113th Street
- NE 72nd Avenue/NE 110th Street
- NE 110th Street/Project Access

The NE 72nd Avenue/NE St. Johns Road/NE 113th Street study area intersection is signalized. The remaining study area intersections are or will be unsignalized and stop sign controlled. Figure 3 shows the lane configuration and traffic control at the study area intersections.

EXISTING TRAFFIC VOLUMES

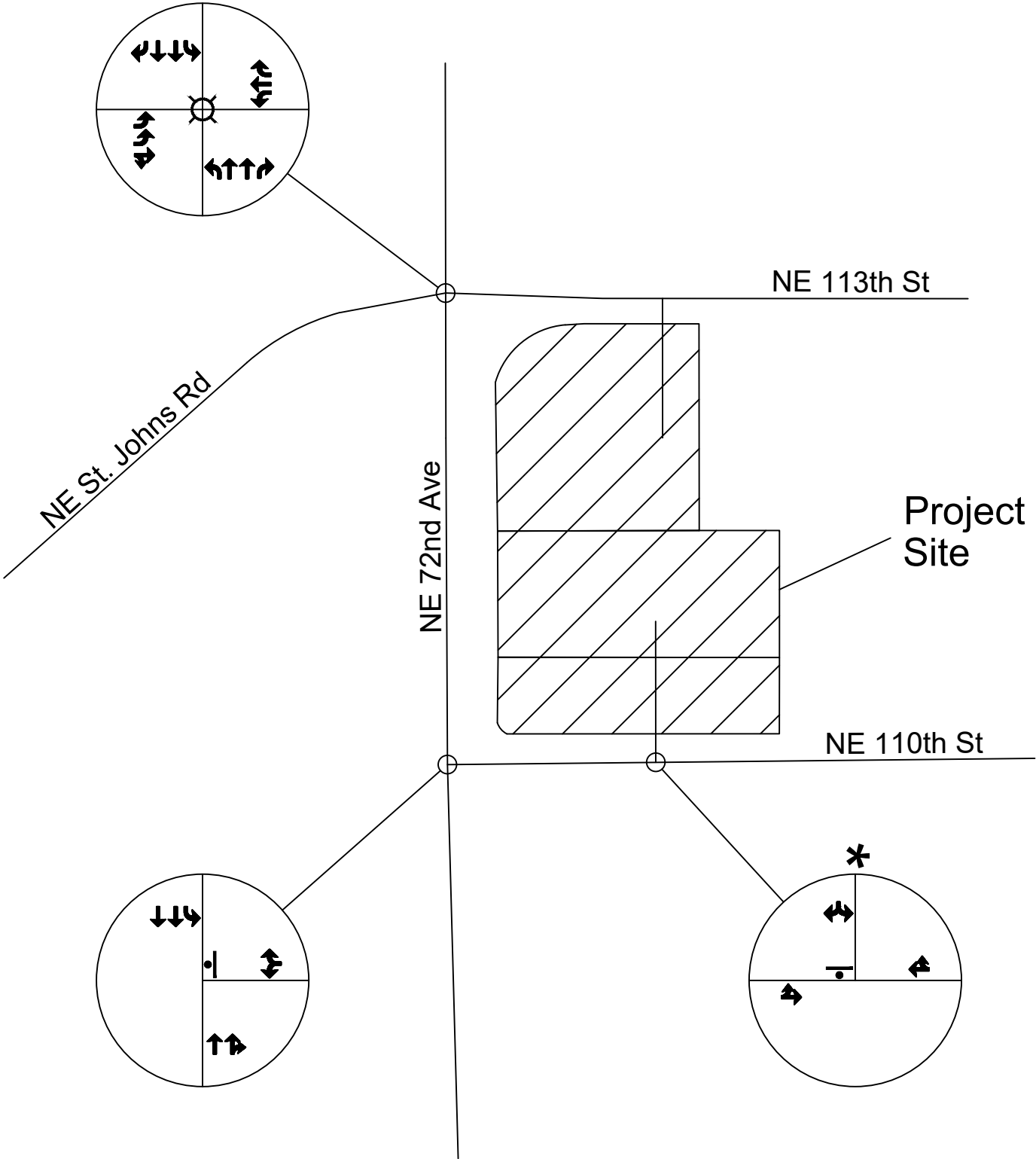
A.M. and P.M. peak hour traffic counts were obtained at the study area intersections by HLA in May 2021. Per the HCM, peak 15-minute traffic volumes were multiplied by four (4) to arrive at the peak hour traffic volumes. With this methodology of developing peak hour traffic volumes, the peak hour factor (PHF) is set to 1.00 because the peaking has already occurred by multiplying the peak 15-minute traffic volume by four (4).

To study for the potential decrease in overall traffic due to the pandemic, HLA compared the existing pandemic traffic counts to historical pre-pandemic traffic counts. HLA's most recent available pre-pandemic traffic data in the project vicinity are A.M. and P.M. peak hour traffic counts at the NE 72nd Avenue/NE St. Johns Road/NE 113th Street intersection conducted in 2019. To update this pre-pandemic count to the current year (2021), HLA developed an annual, compounded, historical growth rate from historical traffic data from 2016 and 2019 at the NE 72nd Avenue/NE St. Johns Road/NE 113th Street intersection. Table 1 summarizes the historical traffic counts and the historical annual growth rate developed.

Table 1. Historical Traffic Counts and Historical Growth Rate

Intersection	A.M. Peak Hour			P.M. Peak Hour		
	2016	2019	Growth Rate	2016	2019	Growth Rate
NE 72 nd Avenue/NE St. Johns Road/NE 113 th Street	1,454	1,467	0.03%	1,769	1,869	1.9%

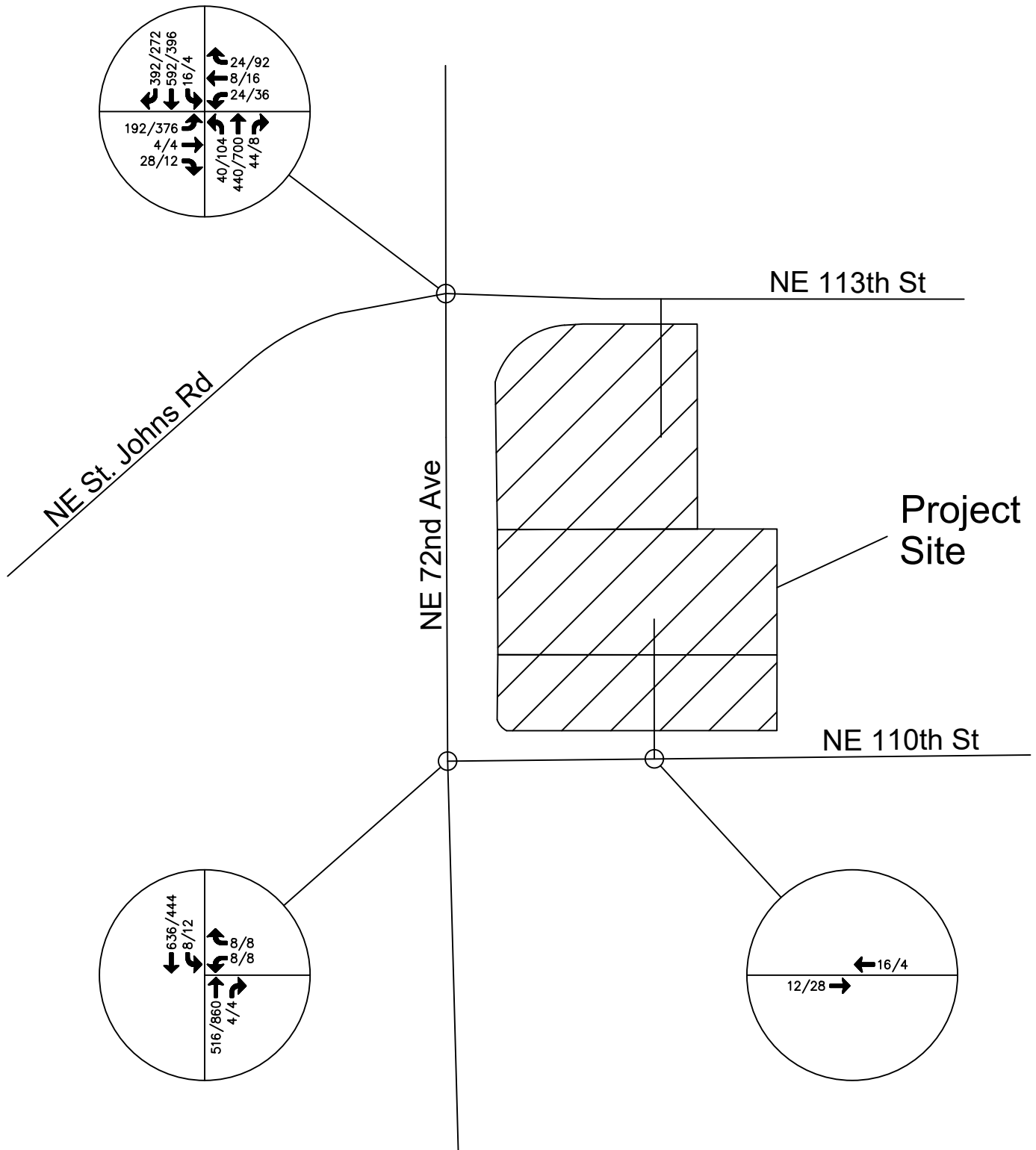
The higher (P.M. peak hour) historical annual growth rate was conservatively chosen to apply to both the 2019 A.M. and P.M. and peak hour traffic volumes to reach the year 2021 projected traffic volumes. Applying the 1.9% annual, compounded, historical growth rate to the A.M. peak hour yields a projected 2021 A.M. peak hour volume of 1,551. Applying the 1.9% annual, compounded, historical growth rate to the P.M. peak hour yields a projected 2021 P.M. peak hour volume of 1,977. The existing 2021 pandemic A.M. peak hour count volume is 1,630. The existing 2021 P.M. peak hour count volume is 1,947. Because the existing 2021 pandemic A.M. and P.M. peak hour traffic volumes are both within 98% of the projected 2021 A.M. and P.M. peak hour traffic volumes, no adjustments were made to the existing traffic counts. The existing condition traffic volumes are presented in Figure 4. The existing and historical traffic counts can be referenced in Appendix A.



LEGEND

- NOT TO SCALE
- Lane Usage
- Traffic Signal
- Stop Sign
- * 2024 "With Project" Lane Configuration and Traffic Control

FIGURE 3
Existing Lane Configuration and Traffic Control



LEGEND

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

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

EXISTING LEVELS OF SERVICE

Based on the traffic volumes in Figure 4 and the existing lane configurations presented in Figure 3, peak hour traffic operations were analyzed at the study area intersections using the methodologies outlined in the Highway Capacity Manual (HCM) 6th Edition. 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. For signalized intersections of regional significance within Clark County, individual movements at each signalized intersection shall not exceed an average of two (2) cycle lengths or two hundred forty (240) seconds of delay (whichever is less) per CCC 40.350.020.G.1.b.

For unsignalized intersections of regional significance within Clark County, LOS "E" is the minimum acceptable standard in Clark County, as long as signal warrants are not met per CCC 40.350.020.G.1.c. For unsignalized intersections, the level of service and delay reported is by approach or conflicting movement. If signal warrants are met, then the standard is LOS D or better. The signalization of an unsignalized intersection shall be at the sole discretion of the Clark County Public Works Director and shall not obligate Clark County to meet this level of service standard. However, proposed developments shall not be required to mitigate their impacts in order to obtain a concurrency approval unless:

- 1) The proposed development adds at least five (5) peak period trips to a failing approach; and
- 2) The worst movement on a failing approach is worsened by the proposed development. In determining whether the movement is worsened, the Public Works director shall consider trip volume, delay, and any other relevant factors.

Existing A.M. and P.M. peak hour levels of service at the study area intersections are summarized in Table 2a. As shown in Table 2a, the signalized study area intersection individual movements operate within Clark County's concurrency standard of an average delay of less than two (2) cycle lengths or two hundred forty (240) seconds (whichever is less). The unsignalized study area intersection is currently operating at acceptable levels of service of LOS C or better in the existing condition. Appendix B contains the level of service worksheets for the existing condition.

Part of the traffic study requirements is to calculate v/c ratios of the roadway segments identified in the pre-application conference report per CCC 40.350.020.G.1.a and Table 40.350.020-1. Table 2b summarizes the v/c ratios for the study area roadway segments for the existing condition. The peak hour traffic volumes were taken from Figure 4 and the capacities were based on the roadway functional classifications and CCC Table 40.350.020-1. Per CCC 40.350.020.G.1.a, the study area roadway segment v/c ratio standard is 0.90. As shown in Table 2b, all of the study area roadway segment v/c ratios are all within the acceptable standard in the existing condition.

Table 2a. Existing Levels of Service

Signalized Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Average Delay (sec)	LOS	Average Delay (sec)
NE 72 nd Avenue/NE St. Johns Road/NE 113 th Street				
Eastbound Left	C	29.1	C	29.0
Eastbound Through/Right	C	23.9	C	21.5
Westbound Left	E	74.8	D	38.9
Westbound Through	C	27.6	C	27.9
Westbound Right	C	28.2	C	33.7
Northbound Left	C	29.1	D	38.4
Northbound Through	A	7.9	B	11.4
Northbound Right	A	6.3	A	7.5
Southbound Left	D	48.0	E	59.2
Southbound Through	B	10.2	B	13.0
Southbound Right	A	3.0	A	8.4
Overall	B	12.2	B	17.8
Unsignalized Intersection				
NE 72 nd Avenue/NE 110 th Street				
Westbound Approach	B	13.7	C	17.6
Southbound Left	A	8.5	A	9.8

Table 2b. Existing V/C Ratios for Study Area Roadway Segment

Roadway Segment	A.M. Peak Hour Volume	Capacity	A.M. V/C Ratio	P.M. Peak Hour Volume	Capacity	P.M. V/C Ratio
NE St. Johns Road						
West of NE 72 nd Avenue – EB	224	1,800	0.12	392	1,800	0.22
West of NE 72 nd Avenue – WB	440	1,800	0.24	392	1,800	0.22
NE 72 nd Avenue						
North of NE St. Johns Road – NB	656	1,800	0.36	1,168	1,800	0.65
North of NE St. Johns Road – SB	1,000	1,800	0.56	672	1,800	0.37
South of NE St. Johns Road – NB	524	1,800	0.29	812	1,800	0.45
South of NE St. Johns Road – SB	644	1,800	0.36	444	1,800	0.25

¹The traffic volume is the average of the upstream and downstream traffic volumes of the roadway segment.

ACCIDENT HISTORY

Accident data was obtained from the Washington State Department of Transportation (WSDOT) for the five year, five month, and two day period between January 1, 2016 and June 2, 2021. The data includes total crashes and crashes by severity (i.e., fatality, injury, or property damage only). The accident analysis is summarized in Table 3 for the study area intersections. Appendix C contains the accident data.

Generally, an accident rate of less than 1.00 accidents per million entering vehicles is considered acceptable and no further analysis is necessary. As shown in Table 3, all of the accident rates at the study area intersections are below 1.00 accidents per million entering vehicles, so no further analysis was conducted.

Table 3. Summary of Traffic Accident History at Intersections in the Study Area

Intersection	Average Annual Accidents				acc/mev ²
	PDO ¹	Injury	Fatal	Total	
NE 72nd Avenue/NE St. Johns Road/NE 113th Street	1.1	1.5	0.0	2.6	0.28
NE 72nd Avenue/NE 110th Street	0.2	0.0	0.0	0.2	0.03
NE 110 th Street/Project Access	0.0	0.0	0.0	0.0	0.00

¹ PDO = property damage only

² acc/mev = accidents per million entering vehicles

EXISTING PUBLIC TRANSIT SERVICE

C-Tran provides public transit service in Clark County. Currently there are no routes that provide service adjacent to the project site. The closest route to the project site is Route #25 – St. Johns, which provides service approximately 1.05 miles southwest of project site at the intersection of NE St. Johns Road/NE LaLonde Drive.

NON-MOTORIZED TRANSPORTATION

Sidewalks and bike lanes exist along both sides of NE 72nd Avenue and NE St. Johns Road adjacent to the project site. Sidewalks exist along both sides of NE 113th Street adjacent to the project site.

PLANNED TRANSPORTATION IMPROVEMENTS

A review of the Clark County's Six-Year Transportation Improvement Program (TIP), 2021-2026, revealed that there is are no reasonably funded projects in the study area. A review of the Clark County's Six-Year Transportation Improvement Program (TIP), 2021-2026, revealed that there is one partially funded project in the study area.

NE 72nd Avenue – NE 122nd Street to NE 133rd Street

This project includes upgrading the existing two-lane arterial roadway corridor to a five-lane urban arterial standard or provide intersection widening and spot safety upgrades. Traffic modeling and scoping is expected to be underway in 2021. The total estimated project cost is \$10,800,000.

SECTION III TRAFFIC IMPACT ANALYSIS

ANALYSIS METHODOLOGY

The A.M. and P.M. peak hour traffic impacts generated by the proposed Feenaughty Machinery Company were analyzed as follows:

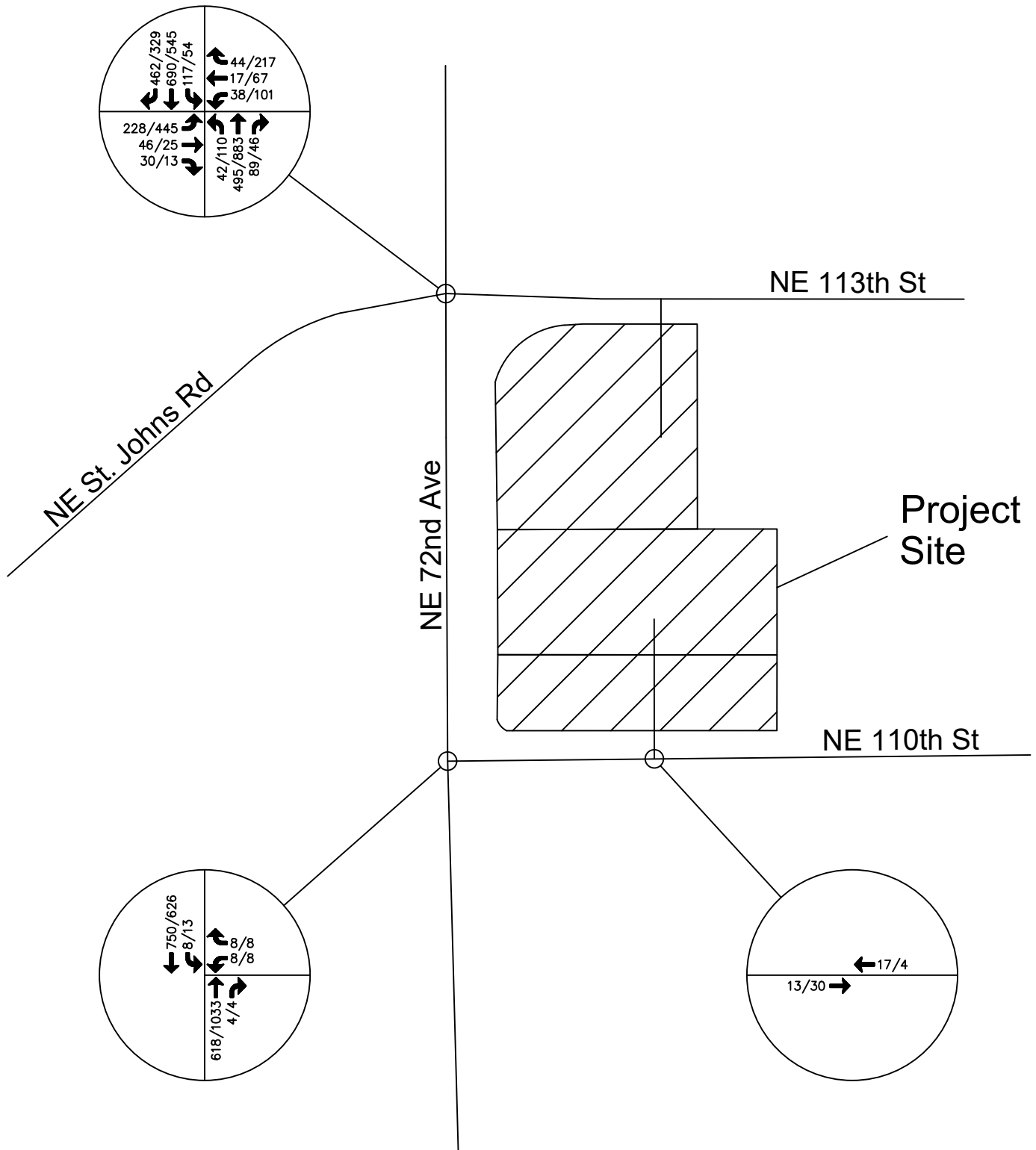
- The 2024 “Without Project” condition was analyzed to establish the future baseline condition for Clark County’s concurrency analysis. The 2024 “Without Project” condition traffic volumes were derived by using a two (2) percent compounded, annual growth factor and adding traffic generated by “in process” developments.
- A.M., P.M., and daily trip generation were estimated for the proposed development using rates developed from a heavy machinery retailer use trip generation survey conducted by HLA.
- Trip distribution and assignment of project-generated trips. Since the project generates less than 50 peak hour trips, the study area was limited to intersections of regional significance within one (1) mile from the site. This procedure is based on Clark County Code (CCC) 40.350.020.D.5.a.
- The 2024 “With Project” condition was analyzed to determine the project traffic impacts for Clark County’s concurrency analysis.

The remainder of this section contains a detailed discussion of the methodology summarized above and the analysis results.

2024 “WITHOUT PROJECT” TRAFFIC VOLUMES AND LEVELS OF SERVICE

The 2024 “Without Project” condition was analyzed to establish the baseline for the concurrency analysis and to define a baseline by which project impacts could be determined. The 2024 “Without Project” condition traffic volumes were derived by using a two (2) percent compounded, annual growth factor and adding traffic generated by “in process” developments. Appendix D contains the “in-process” worksheets obtained from Clark County staff. Figure 5 shows the 2024 “Without Project” traffic volumes.

Levels of service were calculated at the study area intersections with the 2024 “Without Project” traffic volumes shown in Figure 5 and the lane configurations shown earlier in Figure 3. Appendix E contains the level of service worksheets for the 2024 “Without Project” condition.



LEGEND

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

FIGURE 5
2024 "Without Project"
A.M. and P.M. Peak Hour Traffic Volumes

The 2024 “Without Project” A.M. and P.M. peak hour levels of service at the study area intersections are summarized in Table 4a. As shown in Table 4a, the signalized study area intersection individual movements are projected to operate within Clark County’s concurrency standard of an average delay of less than two (2) cycle lengths or two hundred forty (240) seconds (whichever is less). The unsignalized study area intersection is projected to operate at acceptable levels of service of LOS C or better in the 2024 “Without Project” condition.

Part of the traffic study requirements is to calculate v/c ratios of the roadway segments identified in the pre-application conference report per CCC 40.350.020.G.1.a and Table 40.350.020-1. Table 4b summarizes the v/c ratios for the study area roadway segments for the 2024 “Without Project” condition. The peak hour traffic volumes were taken from Figure 5 and the capacities were based on the roadway functional classifications and CCC Table 40.350.020-1. Per CCC 40.350.020.G.1.a, the study area roadway segment v/c ratio standard is 0.90. As shown in Table 4b, all of the study area roadway segment v/c ratios are all within the acceptable standard in the 2024 “Without Project” condition.

Table 4a. 2024 “Without Project” Levels of Service

Signalized Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Average Delay (sec)	LOS	Average Delay (sec)
NE 72 nd Avenue/NE St. Johns Road/NE 113 th Street				
Eastbound Left	C	28.9	D	38.1
Eastbound Through/Right	C	24.2	C	23.0
Westbound Left	F	82.4	D	45.5
Westbound Through	C	27.5	C	29.0
Westbound Right	C	23.3	C	31.7
Northbound Left	D	47.9	D	44.3
Northbound Through	B	11.9	C	20.2
Northbound Right	A	9.5	B	11.0
Southbound Left	D	35.8	D	47.2
Southbound Through	B	10.5	B	19.2
Southbound Right	A	3.3	B	12.4
Overall	B	15.1	C	25.2
Unsignalized Intersection				
NE 72 nd Avenue/NE 110 th Street				
Westbound Approach	C	15.7	C	23.2
Southbound Left	A	8.9	B	10.6

Table 4b. 2024 “Without Project” V/C Ratios for Study Area Roadway Segment

Roadway Segment	A.M. Peak Hour Volume	Capacity	A.M. V/C Ratio	P.M. Peak Hour Volume	Capacity	P.M. V/C Ratio
NE St. Johns Road						
West of NE 72 nd Avenue – EB	304	1,800	0.17	483	1,800	0.27
West of NE 72 nd Avenue – WB	521	1,800	0.29	506	1,800	0.28
NE 72 nd Avenue						
North of NE St. Johns Road – NB	767	1,800	0.43	1,545	1,800	0.86
North of NE St. Johns Road – SB	1,269	1,800	0.71	928	1,800	0.52
South of NE St. Johns Road – NB	626	1,800	0.35	1,039	1,800	0.58
South of NE St. Johns Road – SB	758	1,800	0.42	659	1,800	0.37

¹The traffic volume is the average of the upstream and downstream traffic volumes of the roadway segment.

DEVELOPMENT PLANS

As previously stated, the proposed project is the development of a 29,820 square foot heavy machinery retailer facility. Access to the development will be from newly constructed driveway onto NE 113th Street and NE 110th Street. The NE 113th Street access will be for passenger cars such as employees and customers. The NE 110th Street access will be gated and for heavy trucks such as heavy machinery deliveries and drop off. As previously shown, Figure 2 shows the project site plan.

TRIP GENERATION

Estimates of daily, A.M. peak hour, and P.M. peak hour trips generated by the proposed Feenaughty Machinery Development were developed from a heavy machinery retailer use trip generation survey conducted by HLA. Appendix F contains the special trip generation survey conducted by HLA for heavy machinery retailer use. The proposed project is expected to generate 199 daily, 23 A.M peak hour (15 in, 8 out), and 19 P.M. peak hour (3 in, 16 out) gross new trips. Table 5 summarizes the project’s trip generation.

Table 5. Trip Generation for Feenaughty Machinery Development

	Amount	Average Daily	A.M. Peak Hour			P.M. Peak Hour		
			In	Out	Total	In	Out	Total
Heavy Machinery Retailer – HLA								
Rate per 1,000 square feet (ksf)		6.66	0.51	0.27	0.78	0.11	0.52	0.63
Trips	29.820 ksf	199	15	8	23	3	16	19

Since the passenger car trip generation of the Feenaughty Machinery Company was already accounted for in the previously approved Wiebold Development traffic study, the passenger car to heavy truck splits were developed for the daily, A.M. peak hour, and P.M. peak hour conditions. Table 6a summarizes the daily passenger cars to heavy trucks splits for the proposed heavy machinery retailer use. Table 6b summarizes the A.M. and P.M. peak hour passenger cars to heavy trucks splits for the proposed heavy machinery retailer use. The data shown in Tables 6a and 6b can be referenced in the trip generation survey contained in Appendix F.

Table 6a. Daily Passenger Cars vs Heavy Trucks

Survey Site	Daily			
	Total Vehicles	Total Heavy Trucks	Percent Passenger Car	Percent Heavy Trucks
Papé Machinery – Kelso	214 ¹	N/A	N/A	N/A
Papé Machinery – Portland	219 ¹	N/A	N/A	N/A
Feenaughty Machinery	144	44	69%	31%
Sonsray Machinery (Case)	174	43	75%	25%
Average			72%	28%

¹Heavy truck splits were not available for the entire day at this site.

Table 6b. A.M. and P.M. Peak Hour Passenger Cars vs Heavy Trucks

Survey Site	A.M. Peak Hour		P.M. Peak Hour		A.M. Peak Hour		P.M. Peak Hour	
	Total Vehicles	Total Heavy Trucks	Total Vehicles	Total Heavy Trucks	Percent Passenger Car	Percent Heavy Trucks	Percent Passenger Cars	Percent Heavy Trucks
Papé Machinery – Kelso	22	3	18 ¹	N/A	86%	14%	N/A	N/A
Papé Machinery – Portland	22	13	11 ¹	N/A	41%	59%	N/A	N/A
Feenaughty Machinery	15	3	16	3	80%	20%	81%	19%
Sonsray Machinery (Case)	29	2	15	1	93%	7%	93%	7%
Average					75%	25%	87%	13%

¹Heavy truck splits were not available for the P.M. peak hour at this site.

Applying the passenger car to heavy truck splits shown in Tables 6a and 6b to the gross trip generation of the proposed Feenaughty Machinery Company, the Feenaughty Machinery Company is expected to generate 143 daily, 17 A.M. peak hour (11 in, 6 out), and 17 P.M. peak hour (3 in, 14 out) passenger car trips and 56 daily, 6 A.M. peak hour (4 in, 2 out), and 2 P.M. peak hour (0 in, 2 out) heavy truck trips. Table 7 summarizes the passenger car to heavy truck trip generation of the proposed site.

**Table 7. Passenger Cars vs Heavy Trucks Trip Generation
for Feenaughty Machinery Company**

Vehicle Type	Average Daily	A.M. Peak Hour			P.M. Peak Hour		
		In	Out	Total	In	Out	Total
Feenaughty Machinery Company Net Trips	199	15	8	23	3	16	19
Passenger Car – Daily 72%, A.M. 75%, P.M. 87%	143	11	6	17	3	14	17
Heavy Truck – Daily 28%, A.M. 25%, P.M. 13%	56	4	2	6	0	2	2

WIEBOLD DEVELOPMENT TRIP ACCOUNTING

Since tax lots 986056137 and 986056136 were approved as part of the Wiebold Development, any project generated trips by the proposed Feenaughty Machinery Company utilizing the NE 113th Street/Project Access intersection can be drawn down out of the previously approved Wiebold Development trip generation. The previously approved trip generation for the Wiebold Development is summarized in Table 8 and is from the Wiebold Development traffic study dated September 29, 2017. The previously approved Wiebold Development was originally vested for 2,563 daily, 211 A.M. peak hour (177 in, 34 out), and 284 P.M. peak hour (81 in, 203 out) net trips. It should be noted that the previously approved Wiebold Development trip generation estimates of daily, A.M. peak hour, and P.M. peak hour trips generated were developed from rates published in “Trip Generation, 9th Edition” (Institute of Transportation Engineers, 2012).

Table 8. Previously Approved Wiebold Development Trip Generation

	Average Daily	A.M. Peak			P.M. Peak		
		In	Out	Total	In	Out	Total
Previously Approved Trip Generation	2,563	177	34	211	81	203	284

Since the approval of the Wiebold Development, several lots have been built out with various uses. Table 9 summarizes the current build out trip generation of the approved Wiebold Development. It should be noted that the built out trip generation of the Wiebold Development estimates of daily, A.M. peak hour, and P.M. peak hour trips generated were developed from rates published in “Trip Generation, 10th Edition” (Institute of Transportation Engineers, 2017). The current build out of the Wiebold Development is expected to generate 716 daily, 96 A.M peak hour (46 in, 50 out), and 64 P.M. peak hour (19 in, 46 out) net new trips.

Table 9. Current Build Out Trip Generation of the Wiebold Development

Land Use	Amount	Average Daily	A.M. Peak			P.M. Peak		
			In	Out	Total	In	Out	Total
Lot 1								
Corporate Headquarters (ITE Code 714)								
Rate per thousand square feet (ksf)		7.95	0.68	0.04	0.72	0.02	0.58	0.60
Trips	21.600 ksf	172	15	1	16	1	12	13
Lot 3								
Industrial Park (ITE Code 130)								
Rate per thousand square feet (ksf)		3.37	0.04	0.36	0.40	0.08	0.32	0.40
Trips	34.490 ksf	116	2	12	14	3	11	14
Lot 5								
Card Lock Fueling Station (HLA)								
Rate per fueling bay		39.74	3.23	3.22	6.45	1.56	1.63	3.19
Trips	9 fueling bays	358	29	29	58	14	15	29
Lot 9								
Industrial Park (ITE Code 130)								
Rate per thousand square feet (ksf)		3.37	0.04	0.36	0.40	0.08	0.32	0.40
Trips	20.900 ksf	70	0	8	8	1	7	8
Net Total Build Out for Wiebold		716	46	50	96	19	46	64

After accounting for the build out of Lots 1, 3, 5, and 9 of the Wiebold Development, there are 1,847 daily, 115 A.M. peak hour (131 in, -16 out), and 220 P.M. peak hour (63 in, 157 out) net trips remaining for future development. Table 10 summarizes the Wiebold Development vested trips remaining for future development.

Table 10. Wiebold Development Vested Trips Remaining for Future Development

	Average Daily	A.M. Peak			P.M. Peak		
		In	Out	Total	In	Out	Total
Previously Approved Wiebold Trip Generation	2,563	177	34	211	81	203	284
Current Build Out of Wiebold Development	716	46	50	96	19	46	64
Trips Remaining For Future Development	1,847	131	(16)	115	63	157	220

Table 11 summarizes the trip accounting of passenger cars of the Feenaughty Machinery Company. After accounting for the passenger cars of the Feenaughty Machinery Company, there are 1,704 daily, 98 A.M. peak hour (120 in, -22 out), and 203 P.M. peak hour (60 in, 143 out) net trips remaining for future development of Wiebold Development lots.

Table 11. Trip Accounting for Feenaughty Machinery Company

	Average Daily	A.M. Peak			P.M. Peak		
		In	Out	Total	In	Out	Total
Trips Remaining For Future Development	1,847	131	(16)	115	63	157	220
Feenuaghty Machinery Company – Passenger Cars	143	11	6	17	3	14	17
Trips Remaining For Future Development	1,704	120	(22)	98	60	143	203

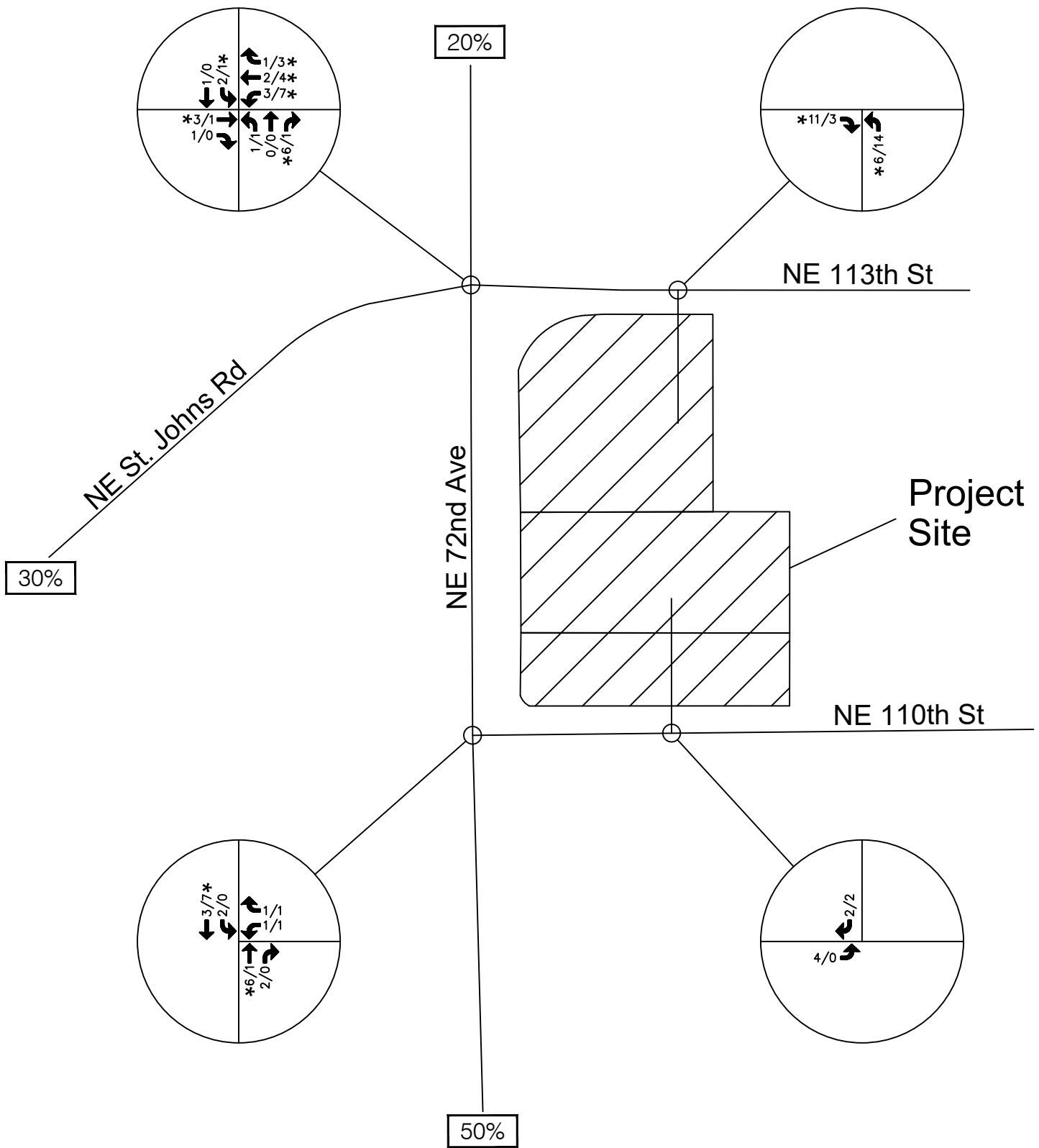
After accounting for the drawn down of passenger car trips of the Feenaughty Machinery Company from the vested Wiebold Development trip generation, the Feenaughty Machinery Company is expected to generate 56 daily, 6 A.M peak hour (4 in, 2 out), and 2 P.M. peak hour (0 in, 2 out) net new heavy truck trips. Table 12 summarizes the net trip generation impact of the Feenaughty Machinery Company.

Table 12. Feenaughty Machinery Company Net Trips after Trip Accounting

	Average Daily	A.M. Peak			P.M. Peak		
		In	Out	Total	In	Out	Total
Feenaughty Machinery Company Net Trips	56	4	2	6	0	2	2

TRIP DISTRIBUTION AND ASSIGNMENT

A generalized trip distribution for the A.M. and P.M. peak hours was developed from the existing traffic counts, locations of major residential areas, locations of major employment centers, and logical travel paths to and from major travel corridors. Figure 6 shows the resulting trip distribution pattern and assignment of the net project-generated trips. Based on Clark County requirements, trip assignments were determined within one (1) mile of the proposed development site. This procedure is based on CCC 40.350.020.D.5.a.



LEGEND

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

10%

Peak Hour Trip Distribution

* Passenger Car Trips. Only Shown for Trip Distribution & Assignment Purposes

FIGURE 6
Trip Distribution and Assignment
Traffic Volumes

2024 “WITH PROJECT” TRAFFIC VOLUMES AND LEVELS OF SERVICE

The traffic volumes shown in Figures 5 and 6 were combined to arrive at the 2024 “With Project” A.M. and P.M. peak hour traffic volumes. Figure 7 shows the 2024 “With Project” traffic volumes. Levels of service were calculated at the study area intersections with the 2024 “With Project” traffic volumes shown in Figure 7 and the lane configurations shown earlier in Figure 3. Appendix G contains the level of service worksheets for the 2024 “With Project” condition.

The 2024 “With Project” A.M. and P.M. peak hour levels of service at the study area intersections are summarized in Table 13a. As shown in Table 13a, the signalized study area intersection individual movements are projected to operate within Clark County’s concurrency standard of an average delay of less than two (2) cycle lengths or two hundred forty (240) seconds (whichever is less). The unsignalized study area intersections are projected to operate at acceptable levels of service of LOS C or better in the 2024 “With Project” condition.

Part of the traffic study requirements is to calculate v/c ratios of the roadway segments identified in the pre-application conference report per CCC 40.350.020.G.1.a and Table 40.350.020-1. Table 13b summarizes the v/c ratios for the study area roadway segments for the 2024 “With Project” condition. The peak hour traffic volumes were taken from Figure 7 and the capacities were based on the roadway functional classifications and CCC Table 40.350.020-1. Per CCC 40.350.020.G.1.a, the study area roadway segment v/c ratio standard is 0.90. As shown in Table 13b, all of the study area roadway segment v/c ratios are all within the acceptable standard in the 2024 “With Project” condition.

Table 13a. 2024 "With Project" Level of Service

Signalized Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Average Delay (sec)	LOS	Average Delay (sec)
NE 72 nd Avenue/NE St. Johns Road/NE 113 th Street				
Eastbound Left	C	28.9	D	38.1
Eastbound Through/Right	C	24.2	C	23.0
Westbound Left	F	82.5	D	45.5
Westbound Through	C	27.5	C	29.0
Westbound Right	C	23.3	C	31.7
Northbound Left	D	48.1	D	44.2
Northbound Through	B	11.9	C	20.2
Northbound Right	A	9.5	B	11.0
Southbound Left	D	35.8	D	47.2
Southbound Through	B	10.5	B	19.3
Southbound Right	A	3.3	B	12.4
Overall	B	15.1	C	25.3

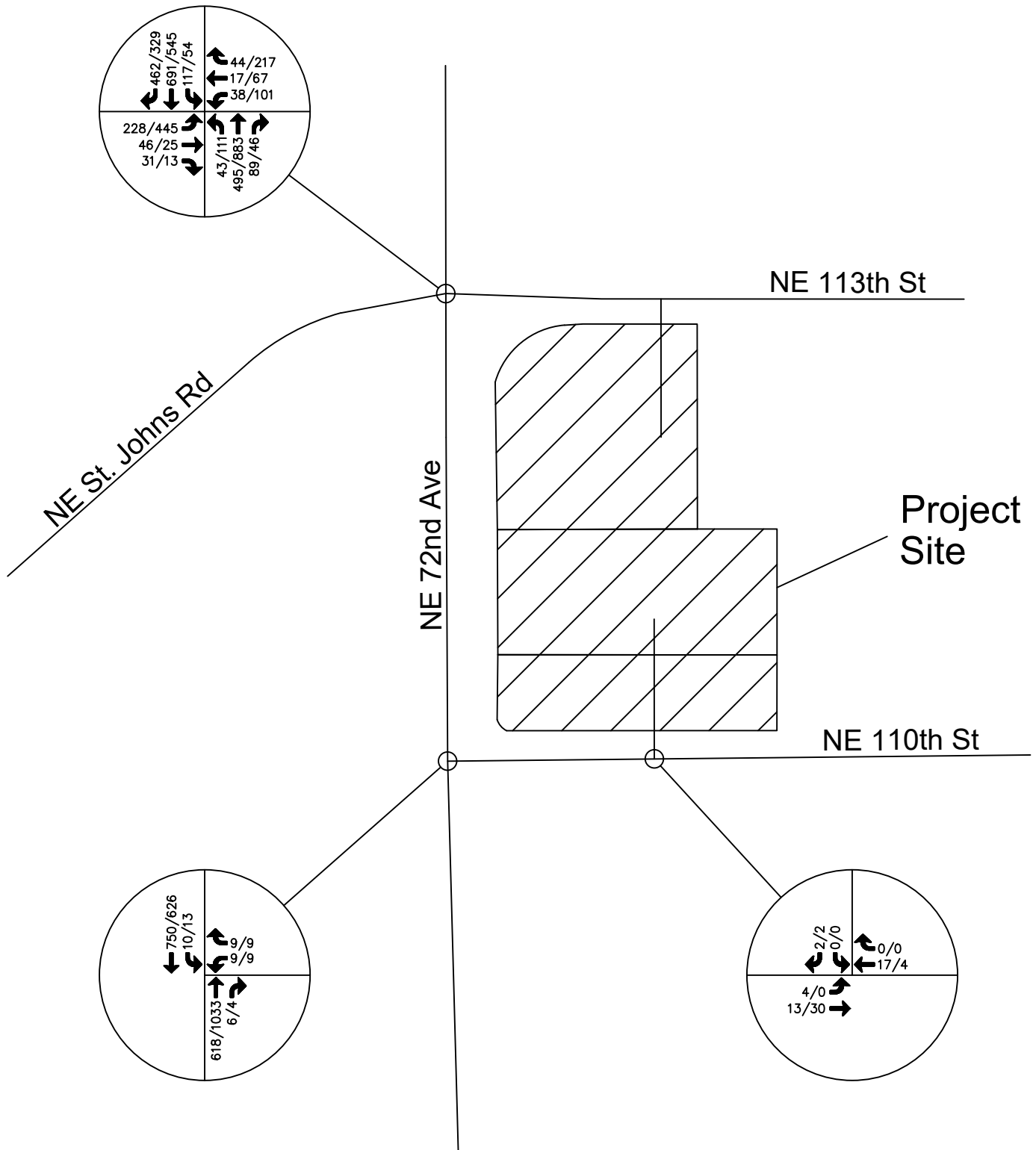
Table 13a. 2024 "With Project" Level of Service Continued

Unsignalized Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Average Delay (sec)	LOS	Average Delay (sec)
NE 72 nd Avenue/NE 110 th Street				
Westbound Approach	C	15.8	C	23.4
Southbound Left	A	8.9	B	10.6
NE 110 th Street/Project Access				
Eastbound Left	A	7.2	A	0.0
Southbound Approach	A	8.4	A	8.3

Table 13b. 2024 "With Project" V/C Ratios for Study Area Roadway Segment

Roadway Segment	A.M. Peak Hour Volume	Capacity	A.M. V/C Ratio	P.M. Peak Hour Volume	Capacity	P.M. V/C Ratio
NE St. Johns Road						
West of NE 72 nd Avenue – EB	305	1,800	0.17	483	1,800	0.27
West of NE 72 nd Avenue – WB	522	1,800	0.29	507	1,800	0.28
NE 72 nd Avenue						
North of NE St. Johns Road – NB	767	1,800	0.43	1,545	1,800	0.86
North of NE St. Johns Road – SB	1,270	1,800	0.71	928	1,800	0.52
South of NE St. Johns Road – NB	627	1,800	0.35	1,040	1,800	0.58
South of NE St. Johns Road – SB	760	1,800	0.42	659	1,800	0.37

¹The traffic volume is the average of the upstream and downstream traffic volumes of the roadway segment.



LEGEND

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

FIGURE 7
2024 "With Project"
A.M. and P.M. Peak Hour Traffic Volumes

SITE ACCESS CORNER SIGHT DISTANCE

The minimum auto/heavy truck (combination truck) corner sight distance required for the existing NE 72nd Avenue/NE 110th Street intersection and the proposed NE 113th Street/Project Access and NE 110th Street/Project Access intersections is based on AASHTO¹. The worst case scenario of the heavy truck sight distance was analyzed.

The heavy truck corner sight distance requirement was derived from AASHTO¹. The worst case condition which AASHTO refers to as Case B1 was applied which is a left turn from a stop on the minor road. The time gap assumed for case B1 is 11.5 seconds². The calculated heavy truck corner sight distance based on the AASHTO formula³ and the 45 mph posted speed limit along NE 72nd Avenue is 761 feet. Based on sight distance measurements conducted by HLA, over 761 feet of corner sight distance appears to be available to both the north and south of the existing NE 72nd Avenue/NE 110th Street intersection as long as the sight distance triangles are properly maintained. It should be noted that although over 761 feet of corner sight distance appears to be available to the south, the corner sight distance is slightly impeded by street tree foliage. The sight distance triangles should be maintained in a manner which removes any impediments that obstruct sight distance to the south.

The heavy truck corner sight distance requirement for the proposed NE 113th Street/Project Access and NE 110th Street/Project Access intersections were also developed from the AASHTO methodology. With a time gap for Case B1 of 11.5 seconds and an assumed speed limit of 25 mph, the calculated heavy truck corner sight distance is 423 feet. Based on sight distance measurements conducted by HLA, the AASHTO heavy truck corner sight distance can be met because the sight distance is available to the terminus of the roadways or 423 feet is available.

The sight distance triangles should be maintained in such a manner that any vegetation within the sight distance triangles do not encumber the sight lines. Also, any physical objects placed within the sight distance triangles should not encumber the sight lines of the motorist at the project access intersection. Because the NE 113th Street and NE 110th Street project access approaches have not been fully designed or constructed yet, the corner sight distance should be reconfirmed at the final engineering/construction stage of development to assure that any design/construction element does not preclude the necessary corner sight distance requirement.

¹ "A Policy on Geometric Design of Highways and Street", American Association of State Highway and Transportation Officials (AASHTO), 2018, pages 9-35 to 9-55.

² "A Policy on Geometric Design of Highways and Street", American Association of State Highway and Transportation Officials (AASHTO), 2018, page 9-44.

³ "A Policy on Geometric Design of Highways and Street", American Association of State Highway and Transportation Officials (AASHTO), 2018, page 9-45.

LANE WARRANT ANALYSIS

Turn lane warrants at the existing NE 72nd Avenue/NE 110th Street intersection were not conducted because a southbound left turn lane already exists.

Turn lane warrants at the NE 113th Street/Project Access and NE 110th Street/Project Access intersections were not conducted due to low traffic volumes, good levels of service, and acceptable accident rates in the 2024 “With Project” condition.

CONCLUSIONS

The following are the findings and recommendations from the traffic analysis:

Findings

The following are the findings from the traffic analysis:

- The proposed project is expected to generate 199 daily, 23 A.M peak hour (15 in, 8 out), and 19 P.M. peak hour (3 in, 16 out) gross new trips. The passenger car trip generation of the Feenaughty Machinery Company was already accounted for in the previously approved Wiebold traffic study/development. Therefore, only the truck trips generated by the proposed project are considered net new trips. The proposed project net new trips are 56 daily, 6 A.M. peak hour (4 in, 2 out) and 2 P.M. peak hour (0 in, 2 out) trips.
- All of the study area intersections are projected to meet Clark County's level of service standard for the 2024 "Without Project" and 2024 "With Project" conditions.
- Based on field measurements conducted by H. Lee & Associates, PLLC (HLA), the existing NE 72nd Avenue/NE 110th Street intersection and the proposed NE 113th Street/Project Access and NE 110th Street/Project Access intersections should be able to meet AASHTO heavy truck corner sight distance requirements as long as any existing vegetation within the sight distance triangles are properly maintained after construction and no obstructions are placed within the sight distance triangles that could impede a driver's vision. Because the NE 113th Street and NE 110th Street project access approaches have not been designed or constructed yet, the corner sight distance should be reconfirmed at the final engineering/construction stage of development to assure that any design/construction element does not preclude the necessary corner sight distance requirement.
- Turn lane warrants at the existing NE 72nd Avenue/NE 110th Street intersection were not conducted because a southbound left turn lane already exists.

Turn lane warrants at the NE 113th Street/Project Access and NE 110th Street/Project Access intersections were not conducted due to low traffic volumes, good levels of service, and acceptable accident rates in the 2024 "With Project" condition.

Recommendations

- Based on the traffic impact analysis documented in this report, no physical, off-site mitigation would be needed.

APPENDIX A
TRAFFIC COUNTS

Intersection: NE 72nd Avenue/NE St. Johns Road
 AM Peak Hour Turning Movement Volumes

Historical
 Date: 11/29/16

Time	<u>SB</u>				<u>WB</u>				<u>NB</u>				<u>EB</u>				Total
	SBR	SBT	SBL	Trucks	WBR	WBT	WBL	Trucks	NBR	NBT	NBL	Trucks	EBR	EBT	EBL	Trucks	
<u>15 Minute Totals</u>																	
7:00 - 7:15 AM	89	116	0	4	0	0	0	0	0	52	12	7	3	0	39	1	311
7:15 - 7:30 AM	82	133	0	11	0	0	0	0	0	61	23	3	5	0	44	3	348
7:30 - 7:45 AM	85	145	0	6	0	0	0	0	0	74	11	6	6	0	60	5	381
7:45 - 8:00 AM	90	170	0	4	0	0	0	0	0	82	9	5	7	0	52	3	410
8:00 - 8:15 AM	78	108	0	5	0	0	0	0	0	64	12	2	6	0	47	3	315
8:15 - 8:30 AM	73	123	0	4	0	0	0	0	0	63	9	2	8	0	50	0	326
8:30 - 8:45 AM	58	117	0	2	0	0	0	0	0	76	10	5	9	0	47	3	317
8:45 - 9:00 AM	65	92	0	4	0	0	0	0	0	68	11	6	7	0	34	0	277
<u>Hourly Total by 15 minutes</u>																	
7:00 - 8:00 AM	346	564	0	25	0	0	0	0	0	269	55	21	21	0	195	12	1,450
7:15 - 8:15 AM	335	556	0	26	0	0	0	0	0	281	55	16	24	0	203	14	1,454
7:30 - 8:30 AM	326	546	0	19	0	0	0	0	0	283	41	15	27	0	209	11	1,432
7:45 - 8:45 AM	299	518	0	15	0	0	0	0	0	285	40	14	30	0	196	9	1,368
8:00 - 9:00 AM	274	440	0	15	0	0	0	0	0	271	42	15	30	0	178	6	1,235
Peak Hour 7:15 - 8:15 AM	335	556	0	26	0	0	0	0	0	281	55	16	24	0	203	14	1,454
Peak Hour Factor	0.86				0.00				0.92				0.86				0.89
Peak Hour % Trucks	3%				0%				5%				6%				
Peak 15 Min % Trucks	2%				0%				5%				5%				

Intersection: NE 72nd Avenue/NE St. Johns Road
PM Peak Hour Turning Movement Volumes

Historical
Date: 11/29/16

Time	<u>SB</u>				<u>WB</u>				<u>NB</u>				<u>EB</u>				Total
	SBR	SBT	SBL	Trucks	WBR	WBT	WBL	Trucks	NBR	NBT	NBL	Trucks	EBR	EBT	EBL	Trucks	
<u>15 Minute Totals</u>																	
4:00 - 4:15 PM	52	104	0	1	0	0	0	0	0	147	15	1	8	0	109	4	435
4:15 - 4:30 PM	65	101	0	0	0	0	0	0	0	149	17	3	5	0	75	2	412
4:30 - 4:45 PM	61	120	0	0	0	0	0	0	0	161	19	2	6	0	85	3	452
4:45 - 5:00 PM	56	91	0	1	0	0	0	0	0	164	22	2	5	0	96	1	434
5:00 - 5:15 PM	42	70	0	2	0	0	0	0	0	163	20	1	4	0	114	1	413
5:15 - 5:30 PM	53	119	0	2	0	0	0	0	0	179	16	2	10	0	93	0	470
5:30 - 5:45 PM	39	66	0	0	0	0	0	0	0	148	20	0	5	0	80	1	358
5:45 - 6:00 PM	39	79	0	1	0	0	0	0	0	136	20	0	9	0	61	2	344
<u>Hourly Total by 15 minutes</u>																	
4:00 - 5:00 PM	234	416	0	2	0	0	0	0	0	621	73	8	24	0	365	10	1,733
4:15 - 5:15 PM	224	382	0	3	0	0	0	0	0	637	78	8	20	0	370	7	1,711
4:30 - 5:30 PM	212	400	0	5	0	0	0	0	0	667	77	7	25	0	388	5	1,769
4:45 - 5:45 PM	190	346	0	5	0	0	0	0	0	654	78	5	24	0	383	3	1,675
5:00 - 6:00 PM	173	334	0	5	0	0	0	0	0	626	76	3	28	0	348	4	1,585
Peak Hour 4:30 - 5:30 PM	212	400	0	5	0	0	0	0	0	667	77	7	25	0	388	5	1,769
Peak Hour Factor		0.85				0.00				0.95				0.88			0.94
Peak Hour % Trucks		1%				0%				1%				1%			
Peak 15 Min % Trucks		1%				0%				1%				0%			

Intersection: NE 72nd Avenue/NE St. Johns Road
AM Peak Hour Turning Movement Volumes

Historical
Date: 02/20/19

Time	SB				WB				NB				EB				Total
	SBR	SBT	SBL	Trucks	WBR	WBT	WBL	Trucks	NBR	NBT	NBL	Trucks	EBR	EBT	EBL	Trucks	
<u>15 Minute Totals</u>																	
7:00 - 7:15 AM	68	155	0	14	1	0	0	1	0	44	14	3	7	0	29	2	318
7:15 - 7:30 AM	79	171	1	20	0	0	0	0	0	80	9	8	3	0	37	1	380
7:30 - 7:45 AM	89	157	0	15	1	0	0	1	1	76	8	7	4	0	36	1	372
7:45 - 8:00 AM	92	175	1	21	0	0	1	0	0	77	12	11	6	0	33	6	397
8:00 - 8:15 AM	56	129	0	14	1	0	0	1	1	71	5	12	1	0	52	3	316
8:15 - 8:30 AM	65	103	0	17	0	0	0	0	1	62	12	7	4	0	42	9	289
8:30 - 8:45 AM	77	135	1	23	2	0	0	2	0	78	12	13	5	0	60	9	370
8:45 - 9:00 AM	58	109	0	12	0	0	0	0	0	92	10	13	1	0	51	3	321
																Peak 15 Total	397
<u>Hourly Total by 15 minutes</u>																	
7:00 - 8:00 AM	328	658	2	70	2	0	1	2	1	277	43	29	20	0	135	10	1,467
7:15 - 8:15 AM	316	632	2	70	2	0	1	2	2	304	34	38	14	0	158	11	1,465
7:30 - 8:30 AM	302	564	1	67	2	0	1	2	3	286	37	37	15	0	163	19	1,374
7:45 - 8:45 AM	290	542	2	75	3	0	1	3	2	288	41	43	16	0	187	27	1,372
8:00 - 9:00 AM	256	476	1	66	3	0	0	3	2	303	39	45	11	0	205	24	1,296
Peak Hour 7:00 - 8:00 AM	328	658	2	70	2	0	1	2	1	277	43	29	20	0	135	10	1,467
Peak Hour Factor	0.92				0.75				0.90				0.97				0.92
Peak Hour % Trucks	7%				67%				9%				6%				
Peak 15 Min % Trucks	8%				0%				12%				15%				

Intersection: NE 72nd Avenue/NE St. Johns Road
PM Peak Hour Turning Movement Volumes

Historical
Date: 02/20/19

Time	SB				WB				NB				EB				Total	
	SBR	SBT	SBL	Trucks	WBR	WBT	WBL	Trucks	NBR	NBT	NBL	Trucks	EBR	EBT	EBL	Trucks		
<u>15 Minute Totals</u>																		
4:00 - 4:15 PM	73	85	0	10	0	0	0	0	0	194	14	6	5	0	87	7	458	
4:15 - 4:30 PM	60	104	0	9	0	0	0	0	0	149	26	5	13	0	87	5	439	
4:30 - 4:45 PM	50	104	0	5	0	0	0	0	0	180	27	11	4	0	88	6	453	
4:45 - 5:00 PM	53	85	0	2	0	0	0	0	0	176	24	13	3	0	75	6	416	
5:00 - 5:15 PM	51	95	0	3	0	0	0	0	0	220	24	8	7	0	103	4	500	
5:15 - 5:30 PM	64	111	0	8	0	0	0	0	0	156	20	5	11	0	124	5	486	
5:30 - 5:45 PM	51	85	0	6	0	0	0	0	0	195	31	2	9	0	76	5	447	
5:45 - 6:00 PM	43	88	0	5	0	0	0	0	0	189	31	7	4	0	81	2	436	
																Peak 15 Total		500
<u>Hourly Total by 15 minutes</u>																		
4:00 - 5:00 PM	236	378	0	26	0	0	0	0	0	699	91	35	25	0	337	24	1,766	
4:15 - 5:15 PM	214	388	0	19	0	0	0	0	0	725	101	37	27	0	353	21	1,808	
4:30 - 5:30 PM	218	395	0	18	0	0	0	0	0	732	95	37	25	0	390	21	1,855	
4:45 - 5:45 PM	219	376	0	19	0	0	0	0	0	747	99	28	30	0	378	20	1,849	
5:00 - 6:00 PM	209	379	0	22	0	0	0	0	0	760	106	22	31	0	384	16	1,869	
Peak Hour 5:00 - 6:00 PM	209	379	0	22	0	0	0	0	0	760	106	22	31	0	384	16	1,869	
Peak Hour Factor	0.84				0.00				0.89				0.77				0.93	
Peak Hour % Trucks	4%				0%				3%				4%					
Peak 15 Min % Trucks	2%				0%				3%				4%					

Intersection: NE 72nd Avenue/NE St. Johns Road/NE 113th Street
 AM Peak Hour Turning Movement Volumes

Date: 05/19/21

Time	SB				WB				NB				EB				Total
	SBR	SBT	SBL	Trucks	WBR	WBT	WBL	Trucks	NBR	NBT	NBL	Trucks	EBR	EBT	EBL	Trucks	
<u>15 Minute Totals</u>																	
7:00 - 7:15 AM	52	119	6	4	5	0	7	8	4	52	14	3	6	2	39	1	306
7:15 - 7:30 AM	68	125	5	9	2	0	1	1	2	56	4	6	1	2	42	4	308
7:30 - 7:45 AM	48	145	6	11	3	0	5	3	2	94	8	9	4	2	77	7	394
7:45 - 8:00 AM	98	148	4	7	6	2	6	5	11	110	10	12	7	1	48	4	451
8:00 - 8:15 AM	96	145	8	7	4	1	7	3	6	99	5	9	5	2	72	6	450
8:15 - 8:30 AM	60	136	3	8	3	2	6	2	3	64	4	4	1	2	51	2	335
8:30 - 8:45 AM	59	129	3	7	5	0	3	2	4	72	8	9	3	2	46	1	334
8:45 - 9:00 AM	58	111	3	5	5	1	2	2	2	71	12	4	2	0	45	8	312
															Peak 15 Total		451
<u>Hourly Total by 15 minutes</u>																	
7:00 - 8:00 AM	266	537	21	31	16	2	19	17	19	312	36	30	18	7	206	16	1,459
7:15 - 8:15 AM	310	563	23	34	15	3	19	12	21	359	27	36	17	7	239	21	1,603
7:30 - 8:30 AM	302	574	21	33	16	5	24	13	22	367	27	34	17	7	248	19	1,630
7:45 - 8:45 AM	313	558	18	29	18	5	22	12	24	345	27	34	16	7	217	13	1,570
8:00 - 9:00 AM	273	521	17	27	17	4	18	9	15	306	29	26	11	6	214	17	1,431
Peak Hour 7:30 - 8:30 AM	302	574	21	33	16	5	24	13	22	367	27	34	17	7	248	19	1,630
Peak Hour Factor	0.90				0.80				0.79				0.82				0.90
Peak Hour - % Trucks	4%				29%				8%				7%				
Peak 15 - % Trucks	3%				36%				9%				7%				

Intersection: NE 72nd Avenue/NE St. Johns Road/NE 113th Street
 PM Peak Hour Turning Movement Volumes

Date: 05/18/21

Time	SB				WB				NB				EB				Total
	SBR	SBT	SBL	Trucks	WBR	WBT	WBL	Trucks	NBR	NBT	NBL	Trucks	EBR	EBT	EBL	Trucks	
15 Minute Totals																	
4:00 - 4:15 PM	74	110	4	6	11	1	2	2	8	162	3	4	2	2	98	5	477
4:15 - 4:30 PM	80	113	2	4	9	2	4	2	2	166	15	5	2	0	82	5	477
4:30 - 4:45 PM	61	104	2	3	11	0	2	0	6	187	24	5	8	1	89	6	495
4:45 - 5:00 PM	43	118	3	6	6	1	7	0	7	160	20	3	2	1	84	3	452
5:00 - 5:15 PM	68	99	1	4	23	4	9	2	2	175	26	2	3	1	94	1	505
5:15 - 5:30 PM	59	98	2	4	9	1	3	0	3	194	16	1	1	1	108	1	495
5:30 - 5:45 PM	69	97	1	1	9	0	3	1	2	149	16	3	4	1	89	3	440
5:45 - 6:00 PM	49	89	4	4	3	1	1	0	1	153	29	3	5	1	60	1	396
													Peak 15 Total				505
Hourly Total by 15 minutes																	
4:00 - 5:00 PM	258	445	11	19	37	4	15	4	23	675	62	17	14	4	353	19	1,901
4:15 - 5:15 PM	252	434	8	17	49	7	22	4	17	688	85	15	15	3	349	15	1,929
4:30 - 5:30 PM	231	419	8	17	49	6	21	2	18	716	86	11	14	4	375	11	1,947
4:45 - 5:45 PM	239	412	7	15	47	6	22	3	14	678	78	9	10	4	375	8	1,892
5:00 - 6:00 PM	245	383	8	13	44	6	16	3	8	671	87	9	13	4	351	6	1,836
Peak Hour 4:30 - 5:30 PM	231	419	8	17	49	6	21	2	18	716	86	11	14	4	375	11	1,947
Peak Hour Factor	0.98				0.53				0.94				0.89				0.96
Peak Hour - % Trucks	3%				3%				1%				3%				
Peak 15 - % Trucks	2%				6%				1%				1%				

Intersection: NE 72nd Avenue/NE 110th Street
 AM Peak Hour Turning Movement Volumes

Date: 05/19/21

Time	SB				WB				NB				EB				Total
	SBR	SBT	SBL	Trucks	WBR	WBT	WBL	Trucks	NBR	NBT	NBL	Trucks	EBR	EBT	EBL	Trucks	
15 Minute Totals																	
7:00 - 7:15 AM	0	132	0	5	1	0	0	0	0	69	0	0	0	0	0	0	202
7:15 - 7:30 AM	0	125	1	6	0	0	1	0	1	61	0	5	0	0	0	0	189
7:30 - 7:45 AM	0	152	2	10	1	0	1	0	0	103	0	10	0	0	0	0	259
7:45 - 8:00 AM	0	159	2	6	2	0	2	0	1	129	0	14	0	0	0	0	295
8:00 - 8:15 AM	0	156	1	6	0	0	1	0	0	110	0	7	0	0	0	0	268
8:15 - 8:30 AM	0	143	0	4	0	0	1	0	0	71	0	4	0	0	0	0	215
8:30 - 8:45 AM	0	135	0	3	0	0	1	0	0	84	0	7	0	0	0	0	220
8:45 - 9:00 AM	0	112	3	3	0	0	0	0	2	83	0	4	0	0	0	0	200
		1114	9						4	710				Peak 15 Total			295
Hourly Total by 15 minutes																	
7:00 - 8:00 AM	0	568	5	27	4	0	4	0	2	362	0	29	0	0	0	0	945
7:15 - 8:15 AM	0	592	6	28	3	0	5	0	2	403	0	36	0	0	0	0	1,011
7:30 - 8:30 AM	0	610	5	26	3	0	5	0	1	413	0	35	0	0	0	0	1,037
7:45 - 8:45 AM	0	593	3	19	2	0	5	0	1	394	0	32	0	0	0	0	998
8:00 - 9:00 AM	0	546	4	16	0	0	3	0	2	348	0	22	0	0	0	0	903
Peak Hour 7:30 - 8:30 AM	0	610	5	26	3	0	5	0	1	413	0	35	0	0	0	0	1,037
Peak Hour Factor	0.95				0.50				0.80				0.00				0.88
Peak Hour - % Trucks	4%				0%				8%				0%				
Peak 15 - % Trucks	4%				0%				11%				0%				

Intersection: NE 72nd Avenue/NE 110th Street

Date: 05/18/21

Time	SB				WB				NB				EB				Total
	SBR	SBT	SBL	Trucks	WBR	WBT	WBL	Trucks	NBR	NBT	NBL	Trucks	EBR	EBT	EBL	Trucks	
15 Minute Totals																	
4:00 - 4:15 PM	0	111	3	3	0	0	2	0	4	169	0	5	0	0	0	0	289
4:15 - 4:30 PM	0	119	1	3	2	0	1	0	2	179	0	5	0	0	0	0	304
4:30 - 4:45 PM	0	111	3	4	2	0	2	0	1	215	0	4	0	0	0	0	334
4:45 - 5:00 PM	0	126	1	4	2	0	0	0	1	184	0	5	0	0	0	0	314
5:00 - 5:15 PM	0	106	5	4	1	0	0	0	2	200	0	4	0	0	0	0	314
5:15 - 5:30 PM	0	100	2	1	1	0	0	0	0	212	0	1	0	0	0	0	315
5:30 - 5:45 PM	0	102	2	1	2	0	0	0	2	163	0	6	0	0	0	0	271
5:45 - 6:00 PM	0	91	4	1	2	0	0	0	0	180	0	4	0	0	0	0	277
																Peak 15 Total	334
Hourly Total by 15 minutes																	
4:00 - 5:00 PM	0	467	8	14	6	0	5	0	8	747	0	19	0	0	0	0	1,241
4:15 - 5:15 PM	0	462	10	15	7	0	3	0	6	778	0	18	0	0	0	0	1,266
4:30 - 5:30 PM	0	443	11	13	6	0	2	0	4	811	0	14	0	0	0	0	1,277
4:45 - 5:45 PM	0	434	10	10	6	0	0	0	5	759	0	16	0	0	0	0	1,214
5:00 - 6:00 PM	0	399	13	7	6	0	0	0	4	755	0	15	0	0	0	0	1,177
Peak Hour 4:30 - 5:30 PM	0	443	11	13	6	0	2	0	4	811	0	14	0	0	0	0	1,277
Peak Hour Factor	0.89				0.50				0.94				0.00				0.96
Peak Hour - % Trucks	3%				0%				2%				0%				
Peak 15 - % Trucks	4%				0%				2%				0%				

Intersection: NE 113th Street/Project Access
AM Peak Hour Turning Movement Volumes

Date: 05/19/21

Time	<u>SB</u>				<u>WB</u>				<u>NB</u>				<u>EB</u>				Total	
	SBR	SBT	SBL	Trucks	WBR	WBT	WBL	Trucks	NBR	NBT	NBL	Trucks	EBR	EBT	EBL	Trucks		
<u>15 Minute Totals</u>																		
7:00 - 7:15 AM	0	0	0	0	0	12	0	8	0	0	0	0	0	12	0	1	24	
7:15 - 7:30 AM	0	0	0	0	0	3	0	1	0	0	0	0	0	9	0	2	12	
7:30 - 7:45 AM	0	0	0	0	0	8	0	3	0	0	0	0	0	10	0	3	18	
7:45 - 8:00 AM	0	0	0	0	0	14	0	5	0	0	0	0	0	16	0	2	30	
8:00 - 8:15 AM	0	0	0	0	0	12	0	3	0	0	0	0	0	16	0	2	28	
8:15 - 8:30 AM	0	0	0	0	0	11	0	2	0	0	0	0	0	8	0	1	19	
8:30 - 8:45 AM	0	0	0	0	0	8	0	2	0	0	0	0	0	9	0	2	17	
8:45 - 9:00 AM	0	0	0	0	0	8	0	2	0	0	0	0	0	5	0	2	13	
																Peak 15 Total		30
<u>Hourly Total by 15 minutes</u>																		
7:00 - 8:00 AM	0	0	0	0	0	37	0	17	0	0	0	0	0	47	0	8	84	
7:15 - 8:15 AM	0	0	0	0	0	37	0	12	0	0	0	0	0	51	0	9	88	
7:30 - 8:30 AM	0	0	0	0	0	45	0	13	0	0	0	0	0	50	0	8	95	
7:45 - 8:45 AM	0	0	0	0	0	45	0	12	0	0	0	0	0	49	0	7	94	
8:00 - 9:00 AM	0	0	0	0	0	39	0	9	0	0	0	0	0	38	0	7	77	
Peak Hour 7:30 - 8:30 AM	0	0	0	0	0	45	0	13	0	0	0	0	0	50	0	8	95	
Peak Hour Factor	0.00				0.80				0.00				0.78				0.79	
Peak Hour - % Trucks	0%				29%				0%				16%					
Peak 15 - % Trucks	0%				36%				0%				13%					

Intersection: NE 113th Street/Project Access
PM Peak Hour Turning Movement Volumes

Date: 05/18/21

Time	<u>SB</u>				<u>WB</u>				<u>NB</u>				<u>EB</u>				Total
	SBR	SBT	SBL	Trucks	WBR	WBT	WBL	Trucks	NBR	NBT	NBL	Trucks	EBR	EBT	EBL	Trucks	
<u>15 Minute Totals</u>																	
4:00 - 4:15 PM	0	0	0	0	0	14	0	2	0	0	0	0	0	14	0	3	28
4:15 - 4:30 PM	0	0	0	0	0	15	0	2	0	0	0	0	0	4	0	3	19
4:30 - 4:45 PM	0	0	0	0	0	13	0	0	0	0	0	0	0	9	0	3	22
4:45 - 5:00 PM	0	0	0	0	0	14	0	0	0	0	0	0	0	11	0	2	25
5:00 - 5:15 PM	0	0	0	0	0	36	0	2	0	0	0	0	0	4	0	1	40
5:15 - 5:30 PM	0	0	0	0	0	13	0	0	0	0	0	0	0	6	0	1	19
5:30 - 5:45 PM	0	0	0	0	0	12	0	1	0	0	0	0	0	4	0	1	16
5:45 - 6:00 PM	0	0	0	0	0	5	0	0	0	0	0	0	0	6	0	2	11
																Peak 15 Total	40
<u>Hourly Total by 15 minutes</u>																	
4:00 - 5:00 PM	0	0	0	0	0	56	0	4	0	0	0	0	0	38	0	11	94
4:15 - 5:15 PM	0	0	0	0	0	78	0	4	0	0	0	0	0	28	0	9	106
4:30 - 5:30 PM	0	0	0	0	0	76	0	2	0	0	0	0	0	30	0	7	106
4:45 - 5:45 PM	0	0	0	0	0	75	0	3	0	0	0	0	0	25	0	5	100
5:00 - 6:00 PM	0	0	0	0	0	66	0	3	0	0	0	0	0	20	0	5	86
Peak Hour 4:15 - 5:15 PM	0	0	0	0	0	78	0	4	0	0	0	0	0	28	0	9	106
Peak Hour Factor	0.00				0.54				0.00				0.64				0.66
Peak Hour - % Trucks	0%				5%				0%				32%				
Peak 15 - % Trucks	0%				6%				0%				25%				

Intersection: NE 110th Street/Project Access
 AM Peak Hour Turning Movement Volumes

Date: 05/19/21

Time	<u>SB</u>				<u>WB</u>				<u>NB</u>				<u>EB</u>				Total
	SBR	SBT	SBL	Trucks	WBR	WBT	WBL	Trucks	NBR	NBT	NBL	Trucks	EBR	EBT	EBL	Trucks	
<u>15 Minute Totals</u>																	
7:00 - 7:15 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
7:15 - 7:30 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	3
7:30 - 7:45 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	4
7:45 - 8:00 AM	0	0	0	0	0	4	0	0	0	0	0	0	0	3	0	0	7
8:00 - 8:15 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2
8:15 - 8:30 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
8:30 - 8:45 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
8:45 - 9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5
																Peak 15 Total	7
<u>Hourly Total by 15 minutes</u>																	
7:00 - 8:00 AM	0	0	0	0	0	8	0	0	0	0	0	0	0	7	0	0	15
7:15 - 8:15 AM	0	0	0	0	0	8	0	0	0	0	0	0	0	8	0	0	16
7:30 - 8:30 AM	0	0	0	0	0	8	0	0	0	0	0	0	0	6	0	0	14
7:45 - 8:45 AM	0	0	0	0	0	7	0	0	0	0	0	0	0	4	0	0	11
8:00 - 9:00 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	6	0	0	9
Peak Hour 7:15 - 8:15 AM	0	0	0	0	0	8	0	0	0	0	0	0	0	8	0	0	16
Peak Hour Factor	0.00				0.50				0.00				0.67				0.57
Peak Hour - % Trucks	0%				0%				0%				0%				
Peak 15 - % Trucks	0%				0%				0%				0%				

Intersection: NE 110th Street/Project Access
PM Peak Hour Turning Movement Volumes

Date: 05/18/21

Time	<u>SB</u>				<u>WB</u>				<u>NB</u>				<u>EB</u>				Total	
	SBR	SBT	SBL	Trucks	WBR	WBT	WBL	Trucks	NBR	NBT	NBL	Trucks	EBR	EBT	EBL	Trucks		
<u>15 Minute Totals</u>																		
4:00 - 4:15 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	7	0	0	9	
4:15 - 4:30 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	6	
4:30 - 4:45 PM	0	0	0	0	0	4	0	0	0	0	0	0	0	3	0	0	7	
4:45 - 5:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	4	
5:00 - 5:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	7	0	0	8	
5:15 - 5:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	3	
5:30 - 5:45 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	4	0	0	6	
5:45 - 6:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	4	0	0	6	
																Peak 15 Total		9
<u>Hourly Total by 15 minutes</u>																		
4:00 - 5:00 PM	0	0	0	0	0	11	0	0	0	0	0	0	0	15	0	0	26	
4:15 - 5:15 PM	0	0	0	0	0	10	0	0	0	0	0	0	0	15	0	0	25	
4:30 - 5:30 PM	0	0	0	0	0	8	0	0	0	0	0	0	0	14	0	0	22	
4:45 - 5:45 PM	0	0	0	0	0	6	0	0	0	0	0	0	0	15	0	0	21	
5:00 - 6:00 PM	0	0	0	0	0	6	0	0	0	0	0	0	0	17	0	0	23	
Peak Hour 4:00 - 5:00 PM	0	0	0	0	0	11	0	0	0	0	0	0	0	15	0	0	26	
Peak Hour Factor	0.00				0.69				0.00				0.54				0.72	
Peak Hour - % Trucks	0%				0%				0%				0%					
Peak 15 - % Trucks	0%				0%				0%				0%					

APPENDIX B

EXISTING LEVELS OF SERVICE

Lanes, Volumes, Timings

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

06/08/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	192	4	28	24	8	24	40	440	44	16	592	392
Future Volume (vph)	192	4	28	24	8	24	40	440	44	16	592	392
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	240		0	200		70	260		140	250		540
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.869				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3273	1543	0	1327	1397	1188	1656	3312	1482	1752	3505	1568
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3273	1543	0	1327	1397	1188	1656	3312	1482	1752	3505	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28				182			127			392
Link Speed (mph)		45			25			45			45	
Link Distance (ft)		859			878			669			718	
Travel Time (s)		13.0			23.9			10.1			10.9	
Peak Hour 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
Heavy Vehicles (%)	7%	7%	7%	36%	36%	36%	9%	9%	9%	3%	3%	3%
Adj. Flow (vph)	192	4	28	24	8	24	40	440	44	16	592	392
Shared Lane Traffic (%)												
Lane Group Flow (vph)	192	32	0	24	8	24	40	440	44	16	592	392
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7

Lanes, Volumes, Timings

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

06/08/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	8						2					
Detector Phase	7	4		3	8	1	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0
Minimum Split (s)	8.5	22.5		8.5	22.5	8.5	8.5	22.5	8.5	8.5	22.5	8.5
Total Split (s)	21.0	31.5		12.0	22.5	9.0	12.0	37.5	12.0	9.0	34.5	21.0
Total Split (%)	23.3%	35.0%		13.3%	25.0%	10.0%	13.3%	41.7%	13.3%	10.0%	38.3%	23.3%
Maximum Green (s)	16.5	27.0		7.5	18.0	4.5	7.5	33.0	7.5	4.5	30.0	16.5
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max	None	None	Max	None
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	10.6	7.7		7.2	6.1	6.5	6.8	34.2	47.0	4.7	33.2	50.9
Actuated g/C Ratio	0.18	0.13		0.12	0.10	0.11	0.12	0.58	0.80	0.08	0.56	0.87
v/c Ratio	0.33	0.14		0.15	0.05	0.08	0.21	0.23	0.04	0.12	0.30	0.28
Control Delay	23.9	14.3		30.3	30.1	0.5	30.7	8.9	0.0	32.9	10.3	1.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.9	14.3		30.3	30.1	0.5	30.7	8.9	0.0	32.9	10.3	1.0
LOS	C	B		C	C	A	C	A	A	C	B	A
Approach Delay		22.5			17.5			9.8			7.0	
Approach LOS		C			B			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 58.8

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.33

Intersection Signal Delay: 10.1

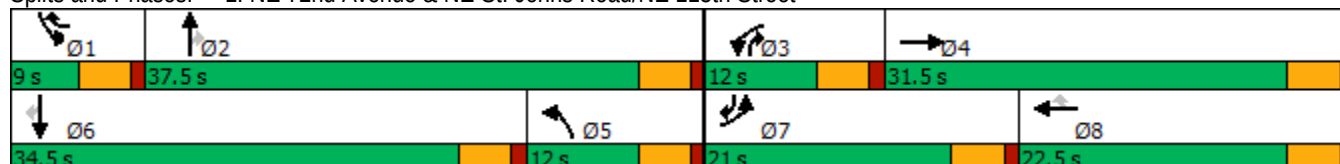
Intersection LOS: B

Intersection Capacity Utilization 43.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street



Queues

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

06/08/2021



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	192	32	24	8	24	40	440	44	16	592	392
v/c Ratio	0.33	0.14	0.15	0.05	0.08	0.21	0.23	0.04	0.12	0.30	0.28
Control Delay	23.9	14.3	30.3	30.1	0.5	30.7	8.9	0.0	32.9	10.3	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.9	14.3	30.3	30.1	0.5	30.7	8.9	0.0	32.9	10.3	1.0
Queue Length 50th (ft)	26	1	6	2	0	11	22	0	5	31	0
Queue Length 95th (ft)	70	24	33	16	0	46	100	0	26	145	13
Internal Link Dist (ft)		779		798			589			638	
Turn Bay Length (ft)	240		200		70	260		140	250		540
Base Capacity (vph)	970	748	182	443	292	218	1924	1256	139	1978	1421
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.04	0.13	0.02	0.08	0.18	0.23	0.04	0.12	0.30	0.28

Intersection Summary

HCM 6th Signalized Intersection Summary

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

06/08/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 							 			 	
Traffic Volume (veh/h)	192	4	28	24	8	24	40	440	44	16	592	392
Future Volume (veh/h)	192	4	28	24	8	24	40	440	44	16	592	392
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1796	1796	1796	1366	1366	1366	1767	1767	1767	1856	1856	1856
Adj Flow Rate, veh/h	192	4	28	24	8	24	40	440	44	16	592	392
Peak Hour 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
Percent Heavy Veh, %	7	7	7	36	36	36	9	9	9	3	3	3
Cap, veh/h	304	26	181	28	86	91	108	1802	836	27	1720	911
Arrive On Green	0.09	0.13	0.13	0.02	0.06	0.06	0.06	0.54	0.54	0.02	0.49	0.49
Sat Flow, veh/h	3319	194	1358	1301	1366	1158	1682	3357	1497	1767	3526	1572
Grp Volume(v), veh/h	192	0	32	24	8	24	40	440	44	16	592	392
Grp Sat Flow(s),veh/h/ln	1659	0	1552	1301	1366	1158	1682	1678	1497	1767	1763	1572
Q Serve(g_s), s	3.4	0.0	1.1	1.1	0.3	1.2	1.4	4.3	0.8	0.6	6.4	2.8
Cycle Q Clear(g_c), s	3.4	0.0	1.1	1.1	0.3	1.2	1.4	4.3	0.8	0.6	6.4	2.8
Prop In Lane	1.00		0.88	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	304	0	206	28	86	91	108	1802	836	27	1720	911
V/C Ratio(X)	0.63	0.00	0.16	0.84	0.09	0.26	0.37	0.24	0.05	0.58	0.34	0.43
Avail Cap(c_a), veh/h	891	0	682	159	400	357	205	1802	836	129	1720	911
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.9	0.0	23.6	30.0	27.1	26.6	27.6	7.6	6.2	30.1	9.7	1.5
Incr Delay (d2), s/veh	2.2	0.0	0.3	44.8	0.5	1.5	2.1	0.3	0.1	18.0	0.5	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.4	0.7	0.1	0.4	0.6	1.2	0.2	0.4	2.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.1	0.0	23.9	74.8	27.6	28.2	29.7	7.9	6.3	48.0	10.2	3.0
LnGrp LOS	C	A	C	E	C	C	C	A	A	D	B	A
Approach Vol, veh/h	224			56			524			1000		
Approach Delay, s/veh	28.3			48.1			9.4			8.0		
Approach LOS	C			D			A			A		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.5	37.5	5.8	12.7	8.5	34.5	10.1	8.4				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	4.5	33.0	7.5	27.0	7.5	30.0	16.5	18.0				
Max Q Clear Time (g_c+l1), s	2.6	6.3	3.1	3.1	3.4	8.4	5.4	3.2				
Green Ext Time (p_c), s	0.0	2.9	0.0	0.1	0.0	5.1	0.4	0.1				
Intersection Summary												
HCM 6th Ctrl Delay	12.2											
HCM 6th LOS	B											

Lanes, Volumes, Timings
2: NE 72nd Avenue & NE 110th Street

06/08/2021

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	8	8	516	4	8	636
Future Volume (vph)	8	8	516	4	8	636
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	300	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.932		0.999			
Flt Protected	0.976				0.950	
Satd. Flow (prot)	1728	0	3249	0	1736	3471
Flt Permitted	0.976				0.950	
Satd. Flow (perm)	1728	0	3249	0	1736	3471
Link Speed (mph)	25		45			45
Link Distance (ft)	318		572			669
Travel Time (s)	8.7		8.7			10.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	11%	11%	4%	4%
Adj. Flow (vph)	8	8	516	4	8	636
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	520	0	8	636
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	27.6%			ICU Level of Service A		
Analysis Period (min)	15					

HCM 6th TWSC
2: NE 72nd Avenue & NE 110th Street

06/08/2021

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	8	516	4	8	636
Future Vol, veh/h	8	8	516	4	8	636
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	11	11	4	4
Mvmt Flow	8	8	516	4	8	636
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	852	260	0	0	520	0
Stage 1	518	-	-	-	-	-
Stage 2	334	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.18	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.24	-
Pot Cap-1 Maneuver	303	745	-	-	1028	-
Stage 1	568	-	-	-	-	-
Stage 2	703	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	301	745	-	-	1028	-
Mov Cap-2 Maneuver	301	-	-	-	-	-
Stage 1	568	-	-	-	-	-
Stage 2	697	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	13.7	0	0.1			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	429	1028	-	
HCM Lane V/C Ratio	-	-	0.037	0.008	-	
HCM Control Delay (s)	-	-	13.7	8.5	-	
HCM Lane LOS	-	-	B	A	-	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

Lanes, Volumes, Timings

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

06/08/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	376	4	12	36	16	92	104	700	8	4	396	272
Future Volume (vph)	376	4	12	36	16	92	104	700	8	4	396	272
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	240		0	200		70	260		140	250		540
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.887				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3467	1669	0	1703	1792	1524	1787	3574	1599	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3467	1669	0	1703	1792	1524	1787	3574	1599	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12				182			127			272
Link Speed (mph)		45			25			45			45	
Link Distance (ft)		859			878			669			718	
Travel Time (s)		13.0			23.9			10.1			10.9	
Peak Hour 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
Heavy Vehicles (%)	1%	1%	1%	6%	6%	6%	1%	1%	1%	2%	2%	2%
Adj. Flow (vph)	376	4	12	36	16	92	104	700	8	4	396	272
Shared Lane Traffic (%)												
Lane Group Flow (vph)	376	16	0	36	16	92	104	700	8	4	396	272
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7

Lanes, Volumes, Timings

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

06/08/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	8						2					
Detector Phase	7	4		3	8	1	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5		9.5	22.5	9.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	21.0	32.5		11.0	22.5	10.0	17.0	36.5	11.0	10.0	29.5	21.0
Total Split (%)	23.3%	36.1%		12.2%	25.0%	11.1%	18.9%	40.6%	12.2%	11.1%	32.8%	23.3%
Maximum Green (s)	16.5	28.0		6.5	18.0	5.5	12.5	32.0	6.5	5.5	25.0	16.5
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max	None	None	Max	None
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	12.2	10.8		7.8	6.3	7.6	9.0	32.8	45.2	5.6	29.5	47.5
Actuated g/C Ratio	0.19	0.17		0.12	0.10	0.12	0.14	0.51	0.71	0.09	0.46	0.74
v/c Ratio	0.57	0.05		0.17	0.09	0.27	0.41	0.38	0.01	0.03	0.24	0.22
Control Delay	28.0	16.4		30.3	31.2	1.9	32.3	12.1	0.0	31.8	14.0	1.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.0	16.4		30.3	31.2	1.9	32.3	12.1	0.0	31.8	14.0	1.4
LOS	C	B		C	C	A	C	B	A	C	B	A
Approach Delay		27.5			12.3			14.6			9.0	
Approach LOS		C			B			B			A	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 63.8

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 15.1

Intersection LOS: B

Intersection Capacity Utilization 52.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

 Ø1	 Ø2	 Ø3	 Ø4
10 s	36.5 s	11 s	32.5 s
 Ø5	 Ø6	 Ø7	 Ø8
17 s	29.5 s	21 s	22.5 s

Queues

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

06/08/2021



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	376	16	36	16	92	104	700	8	4	396	272
v/c Ratio	0.57	0.05	0.17	0.09	0.27	0.41	0.38	0.01	0.03	0.24	0.22
Control Delay	28.0	16.4	30.3	31.2	1.9	32.3	12.1	0.0	31.8	14.0	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.0	16.4	30.3	31.2	1.9	32.3	12.1	0.0	31.8	14.0	1.4
Queue Length 50th (ft)	68	1	13	6	0	37	79	0	1	46	0
Queue Length 95th (ft)	128	17	45	26	0	93	181	0	11	116	29
Internal Link Dist (ft)		779		798			589			638	
Turn Bay Length (ft)	240		200		70	260		140	250		540
Base Capacity (vph)	918	756	217	517	341	358	1835	1177	156	1637	1301
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.02	0.17	0.03	0.27	0.29	0.38	0.01	0.03	0.24	0.21
Intersection Summary											

HCM 6th Signalized Intersection Summary

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

06/08/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	376	4	12	36	16	92	104	700	8	4	396	272
Future Volume (veh/h)	376	4	12	36	16	92	104	700	8	4	396	272
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1885	1885	1811	1811	1811	1885	1885	1885	1870	1870	1870
Adj Flow Rate, veh/h	376	4	12	36	16	92	104	700	8	4	396	272
Peak Hour 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
Percent Heavy Veh, %	1	1	1	6	6	6	1	1	1	2	2	2
Cap, veh/h	508	82	245	63	157	142	136	1746	837	10	1483	893
Arrive On Green	0.15	0.20	0.20	0.04	0.09	0.09	0.08	0.49	0.49	0.01	0.42	0.42
Sat Flow, veh/h	3483	415	1246	1725	1811	1535	1795	3582	1598	1781	3554	1585
Grp Volume(v), veh/h	376	0	16	36	16	92	104	700	8	4	396	272
Grp Sat Flow(s),veh/h/ln	1742	0	1661	1725	1811	1535	1795	1791	1598	1781	1777	1585
Q Serve(g_s), s	6.8	0.0	0.5	1.3	0.5	3.8	3.7	8.2	0.2	0.1	4.8	5.9
Cycle Q Clear(g_c), s	6.8	0.0	0.5	1.3	0.5	3.8	3.7	8.2	0.2	0.1	4.8	5.9
Prop In Lane	1.00		0.75	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	508	0	326	63	157	142	136	1746	837	10	1483	893
V/C Ratio(X)	0.74	0.00	0.05	0.57	0.10	0.65	0.77	0.40	0.01	0.42	0.27	0.30
Avail Cap(c_a), veh/h	876	0	708	171	497	429	342	1746	837	149	1483	893
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.8	0.0	21.4	31.1	27.6	28.8	29.8	10.7	7.5	32.5	12.5	7.6
Incr Delay (d2), s/veh	2.1	0.0	0.1	7.8	0.3	4.9	8.7	0.7	0.0	26.7	0.4	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.0	0.2	0.7	0.2	1.6	1.8	2.7	0.1	0.1	1.7	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.0	0.0	21.5	38.9	27.9	33.7	38.4	11.4	7.5	59.2	13.0	8.4
LnGrp LOS	C	A	C	D	C	C	D	B	A	E	B	A
Approach Vol, veh/h	392			144			812			672		
Approach Delay, s/veh	28.7			34.4			14.8			11.4		
Approach LOS	C			C			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	4.9	36.5	6.9	17.4	9.5	31.9	14.1	10.2				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.5	32.0	6.5	28.0	12.5	25.0	16.5	18.0				
Max Q Clear Time (g_c+I1), s	2.1	10.2	3.3	2.5	5.7	7.9	8.8	5.8				
Green Ext Time (p_c), s	0.0	4.4	0.0	0.0	0.1	3.0	0.8	0.2				
Intersection Summary												
HCM 6th Ctrl Delay	17.8											
HCM 6th LOS	B											

Lanes, Volumes, Timings
2: NE 72nd Avenue & NE 110th Street

06/08/2021

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	8	8	860	4	12	444
Future Volume (vph)	8	8	860	4	12	444
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	300	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.932		0.999			
Flt Protected	0.976				0.950	
Satd. Flow (prot)	1728	0	3536	0	1736	3471
Flt Permitted	0.976				0.950	
Satd. Flow (perm)	1728	0	3536	0	1736	3471
Link Speed (mph)	25		45			45
Link Distance (ft)	318		572			669
Travel Time (s)	8.7		8.7			10.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	2%	2%	4%	4%
Adj. Flow (vph)	8	8	860	4	12	444
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	864	0	12	444
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	33.9%			ICU Level of Service A		
Analysis Period (min)	15					

HCM 6th TWSC
2: NE 72nd Avenue & NE 110th Street

06/08/2021

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	8	860	4	12	444
Future Vol, veh/h	8	8	860	4	12	444
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	2	2	4	4
Mvmt Flow	8	8	860	4	12	444
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1108	432	0	0	864	0
Stage 1	862	-	-	-	-	-
Stage 2	246	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.18	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.24	-
Pot Cap-1 Maneuver	207	577	-	-	762	-
Stage 1	379	-	-	-	-	-
Stage 2	778	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	204	577	-	-	762	-
Mov Cap-2 Maneuver	204	-	-	-	-	-
Stage 1	379	-	-	-	-	-
Stage 2	766	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	17.6	0	0.3			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	301	762	-	
HCM Lane V/C Ratio	-	-	0.053	0.016	-	
HCM Control Delay (s)	-	-	17.6	9.8	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	0.2	0	-	

APPENDIX C
ACCIDENT DATA

INTERSECTIONS

72nd Ave (Co Rd #92190, mp 6.880 - 6.920) @ 110th St (Co Rd #21761, mp 0.000 - 0.020)

72nd Ave (Co Rd #92190, mp 7.010 - 7.030) @ St Johns Rd (Co Rd #91250, mp 2.910 - 2.950)

ROAD SEGMENTS

110th St (Co Rd #21761, mp 0.000 - 0.110) from 72nd Ave to its terminus to the east - *No Reported Crashes*

113th St (*New road) from 72nd Ave to its terminus to the east - *No Reported Crashes*

*Note: *New road not complete until January 2021, so it will not be added to the Clark County road log until later this year*

OFFICER REPORTED CRASHES THAT OCCURRED AT TWO INTERSECTIONS & TWO ROAD SEGMENTS IN CLARK COUNTY

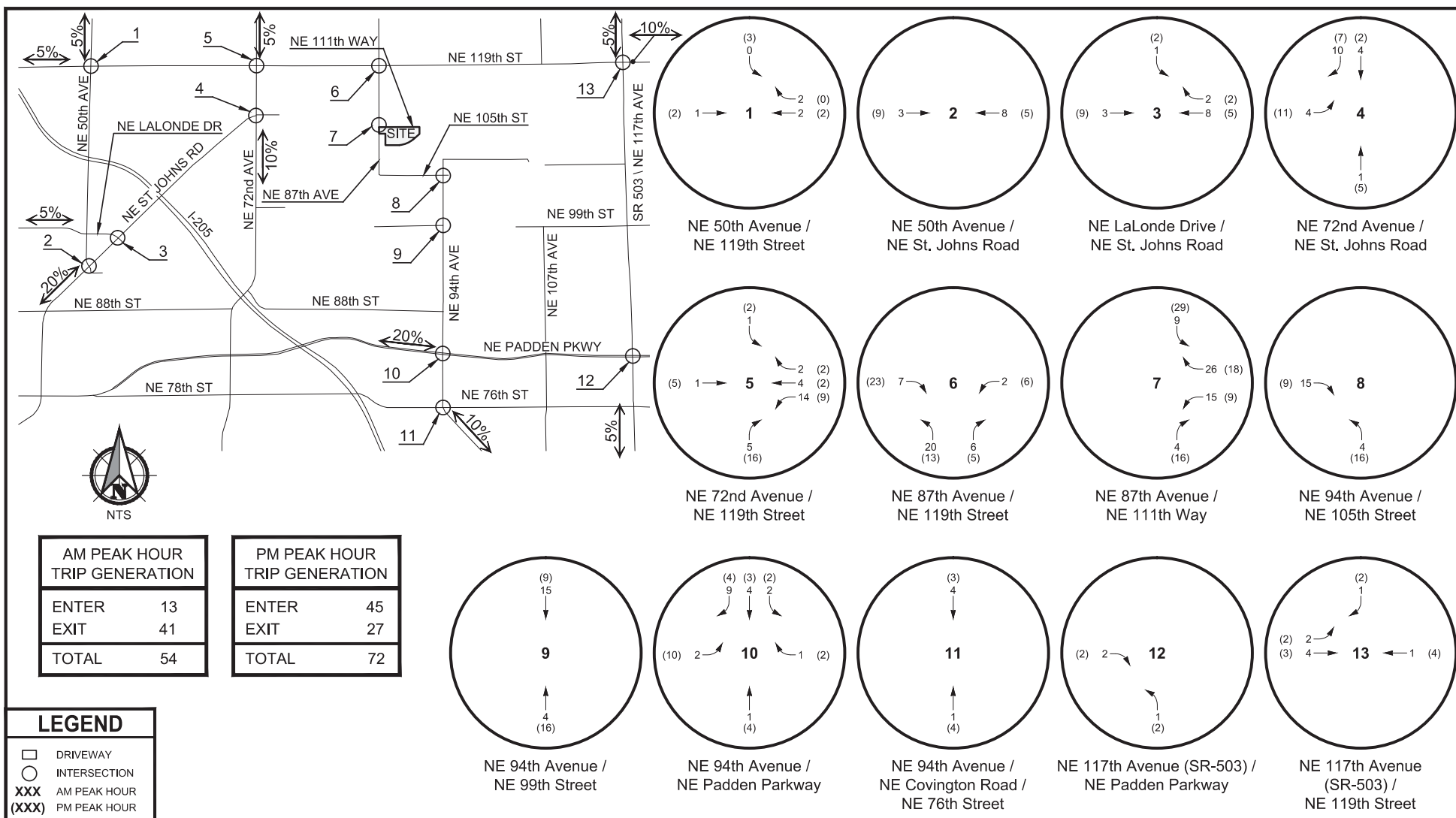
01/01/2016 - available 2021 See 2nd tab below for road information

Under 23 U.S. Code § 148 and 23 U.S. Code § 409, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

JURISDICTION	COUNTY	CITY	PRIMARY TRAFFICWAY	MILEPOST	A / B	BLOCK NUMBER	INTERSECTING TRAFFICWAY	INTERSECTING COUNTY ROAD MILEPOST	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	SR ONLY HISTORY/ SUSPENSE	REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FATAL	# VEH	# PROP	VEHICLE 1 TYPE	VEHICLE 2 TYPE	JUNCTION RELATIONSHIP	WEATHER	ROADWAY SURFACE CONDITION	LIGHTING CONDITION	FIRST COLLISION TYPE / OBJECT STRUCK	VEHICLE 1 ACTION	VEHICLE 2 ACTION	VEHICLE 1 COMPASS DIRECTION FROM	VEHICLE 1 COMPASS DIRECTION TO	VEHICLE 2 COMPASS DIRECTION FROM	VEHICLE 2 COMPASS DIRECTION TO	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 2 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 2)	FIRST IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)	WA STATE PLANE SOUTH - X 2010 - FORWARD	WA STATE PLANE SOUTH - Y 2010 - FORWARD
County Road	Clark		91250	2.930									No	E772782	02/19/2018	13:34	Possible Injury	3	0	2	0	Passenger Car	Passenger Car	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - one left turn - one straight	Going Straight Ahead	Making Left Turn	North	South	South	West	None		Did Not Grant RW to Vehicle	Lane of Primary Trafficway	1104052.97	142038.71
County Road	Clark		91250	2.930									No	E900020	03/04/2019	07:40	No Apparent Injury	0	0	2	0	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	Intersection Related but Not at Intersection	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped for Traffic	North	South	Vehicle Stopped	Vehicle Stopped	Follow Too Closely		None	Lane of Primary Trafficway	1104022.8	142147.17
County Road	Clark		91250	2.930			92190	7.030					No	E632546	01/15/2017	16:01	Possible Injury	1	0	2	0	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	Intersection Related but Not at Intersection	Clear or Partly Cloudy	Ice	Daylight	From same direction - both going straight - one stopped - rear-end	Slowing	Stopped for Traffic	Southwest	Northeast	Vehicle Stopped	Vehicle Stopped	None		None	Lane of Primary Trafficway	1103927.03	142018.09
County Road	Clark		91250	2.930			92190	7.030					No	E632591	01/14/2017	14:25	Suspecte d Serious Injury	1	0	3	0	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	At Intersection and Related	Clear or Partly Cloudy	Ice	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	East	West	South	North	Disregard Stop and Go Light	Exceeding Stated Speed Limit	None	Lane of Primary Trafficway	1104118.96	143667.29
County Road	Clark		91250	2.930			92190	7.030					No	E801470	05/23/2018	18:15	No Apparent Injury	0	0	2	0	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Making Left Turn	Going Straight Ahead	West	North	South	North	Grooming		None	Lane of Primary Trafficway	1104052.97	142038.71
County Road	Clark		91250	2.930			92190	7.030					No	E807445	06/11/2018	23:55	No Apparent Injury	0	0	2	0	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	At Intersection and Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	South	West	North	South	Driver Not Distracted		Driver Not Distracted	Lane of Primary Trafficway	1104052.97	142038.73
County Road	Clark		91250	2.930			92190	7.030					No	E868149	11/19/2018	21:45	No Apparent Injury	0	0	2	0	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	Intersection Related but Not at Intersection	Clear or Partly Cloudy	Dry	Dark-Street Lights On	From same direction - both going straight - both moving - rear-end	Going Straight Ahead	Changing Lanes	Southwest	North	Southwest	North	None	Other Contributing Circ Not Listed		Lane of Primary Trafficway	1103982.72	142002.65
County Road	Clark		91250	2.930			92190	7.030					No	EA27058	03/08/2020	05:43	No Apparent Injury	0	0	2	0	Passenger Car	Passenger Car	At Intersection and Related	Clear	Dry	Dark-Street Lights On	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped at Signal or Stop Sign	West	East	Vehicle Stopped	Vehicle Stopped	Distracted by Adjusting Vehicle Cntrls		None	Lane of Primary Trafficway	1103979.88	142002.18
County Road	Clark		91250	2.930			92190	7.030					No	EA33566	05/12/2020	13:04	Possible Injury	1	0	2	0	Passenger Car	Passenger Car	At Intersection and Related	Overcast	Dry	Daylight	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	North	East	South	North	Did Not Grant RW to Vehicle		None	Lane of Primary Trafficway	1104052.97	142038.73
County Road	Clark		91250	2.930			92190	7.030					No	EB03270	11/17/2020	20:43	Suspecte d Minor Injury	1	0	2	0	Motorcycle	Passenger Car	At Intersection and Related	Raining	Wet	Dark-No Street Lights	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped at Signal or Stop Sign	South	North	Vehicle Stopped	Vehicle Stopped	Operating Recklessly or Aggressively		None	Lane of Primary Trafficway	1104084.64	142006.86
County Road	Clark		92190	6.880									No	E998754	12/22/2019	17:57	No Apparent Injury	0	0	2	0	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	Intersection Related but Not at Intersection	Raining	Wet	Dark-Street Lights On	From same direction - all others	Making U-Turn	Going Straight Ahead	South	North	South	North	Inattention		None	Lane of Primary Trafficway	1104056.8	141459.99
County Road	Clark		92190	7.030			91250	2.930					No	E541612	05/08/2016	18:54	Possible Injury	1	0	1	0	Passenger Car		At Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Linear Curb	Going Straight Ahead		North	South			Driver Not Distracted	Median Shoulder of Primary Trafficway	1104052.98	142038.72		
County Road	Clark		92190	7.030			91250	2.930					No	E711579	09/13/2017	15:31	Possible Injury	1	0	2	0	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	South	West	North	South	None		None	Lane of Primary Trafficway	1104052.97	142038.71
County Road	Clark		92190	7.030			91250	2.930					No	E765649	02/03/2018	21:23	Suspecte d Minor Injury	1	0	2	0	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	South	West	North	South	Did Not Grant RW to Vehicle		None	Lane of Primary Trafficway	1104052.97	142038.71
County Road	Clark		92190	7.030			91250	2.930					No	E961784	09/08/2019	21:42	No Apparent Injury	0	0	1	0	Pickup,Panel Truck or Vanette under 10,000 lb		Intersection Related but Not at Intersection	Overcast	Wet	Dark-No Street Lights	Utility Pole	Making Left Turn		Southwest	North			Inattention	Past the Outside Shoulder of Primary Trafficway	1104089.56	142159.76		

APPENDIX D

IN-PROCESS



PBS Engineering and Environmental Inc.
Project No. 71319.000

Proposed Trip Distribution & Trip Assignment NE 87th Avenue Subdivision

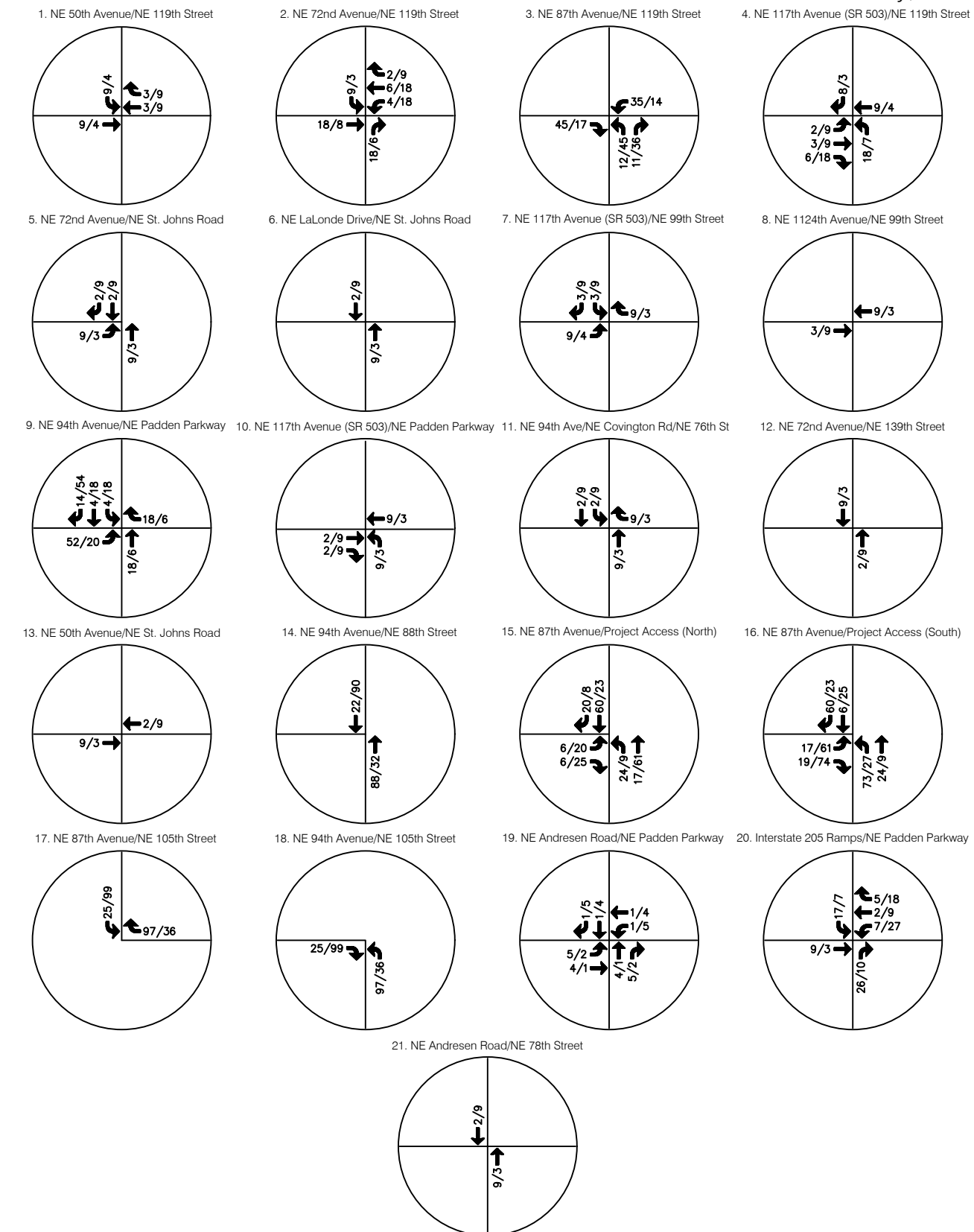
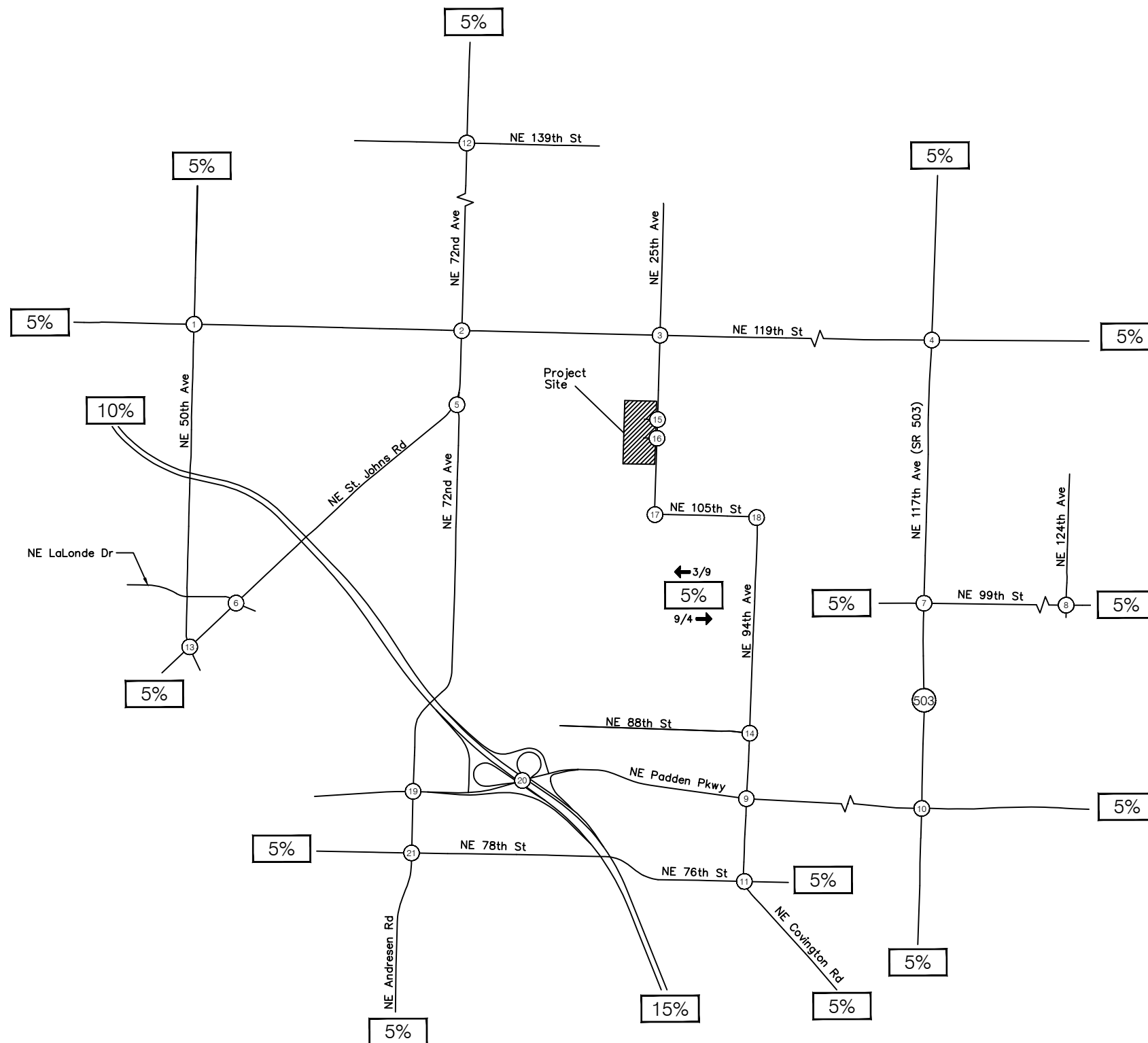
APR 2019

FIGURE

9

Traffic Study
April 2019

Curtin Creek Warehouses TIA
Clark County, WA



LEGEND

100/128

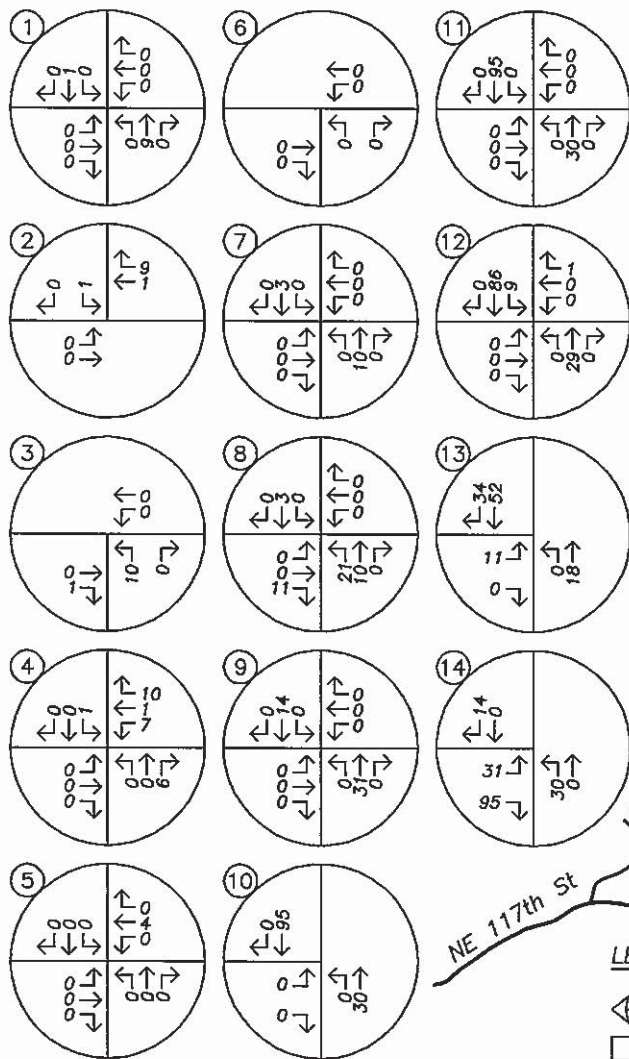
A.M./P.M. Peak Hour
Traffic Volumes

10%

Peak Hour Trip Distribution

NOT TO SCALE

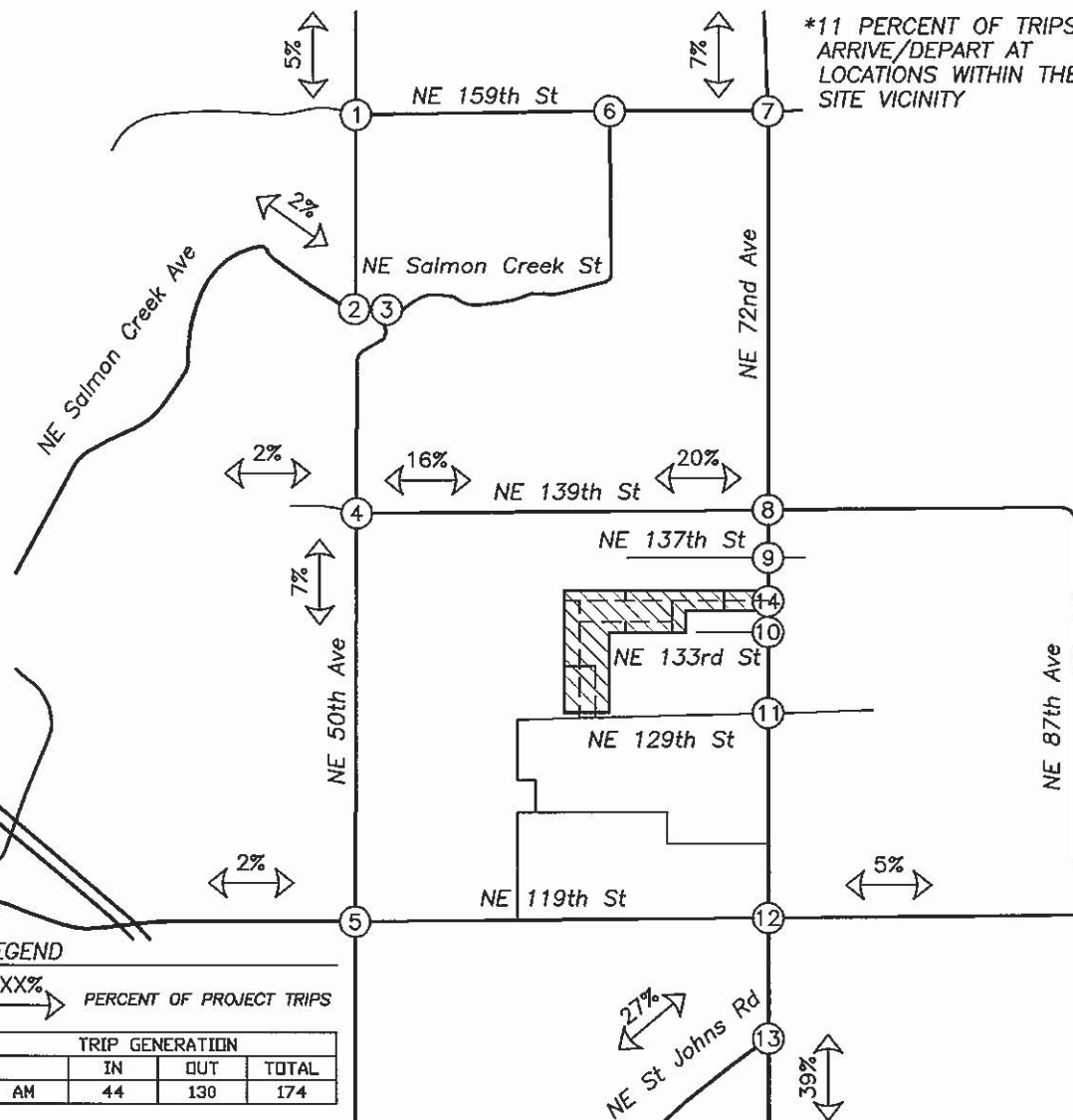
FIGURE 6
Trip Distribution and Assignment
Traffic Volumes



LEGEND

XX% PERCENT OF PROJECT TRIPS

TRIP GENERATION			
	IN	OUT	TOTAL
AM	44	130	174



*11 PERCENT OF TRIPS
ARRIVE/DEPART AT
LOCATIONS WITHIN THE
SITE VICINITY

16

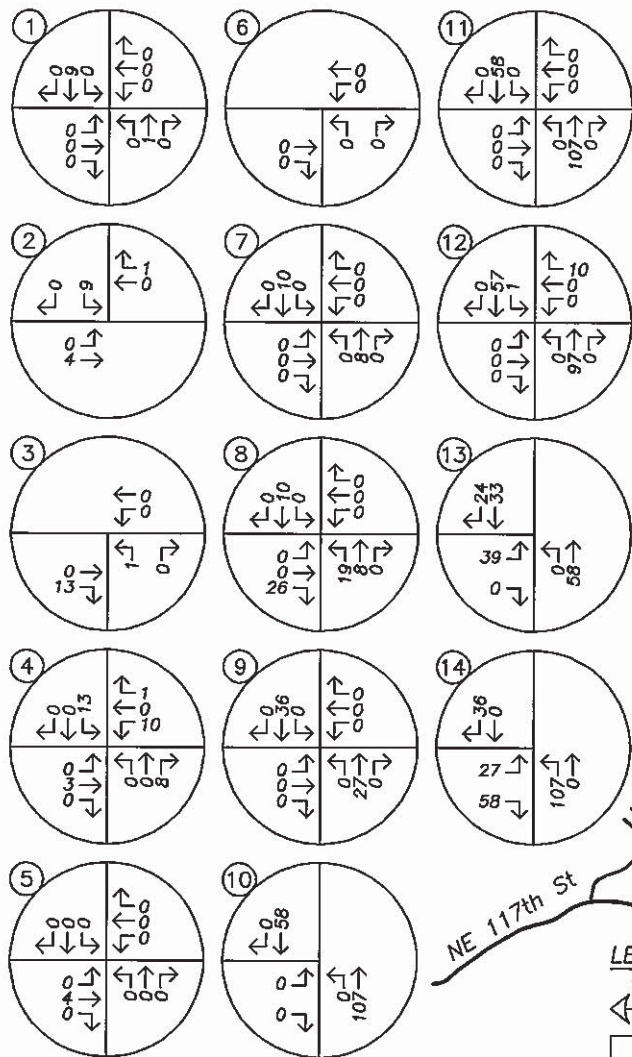
PROPOSED DEVELOPMENT SITE
Site Trip Distribution and Assignment
AM Peak Hour



no scale

FIGURE
4

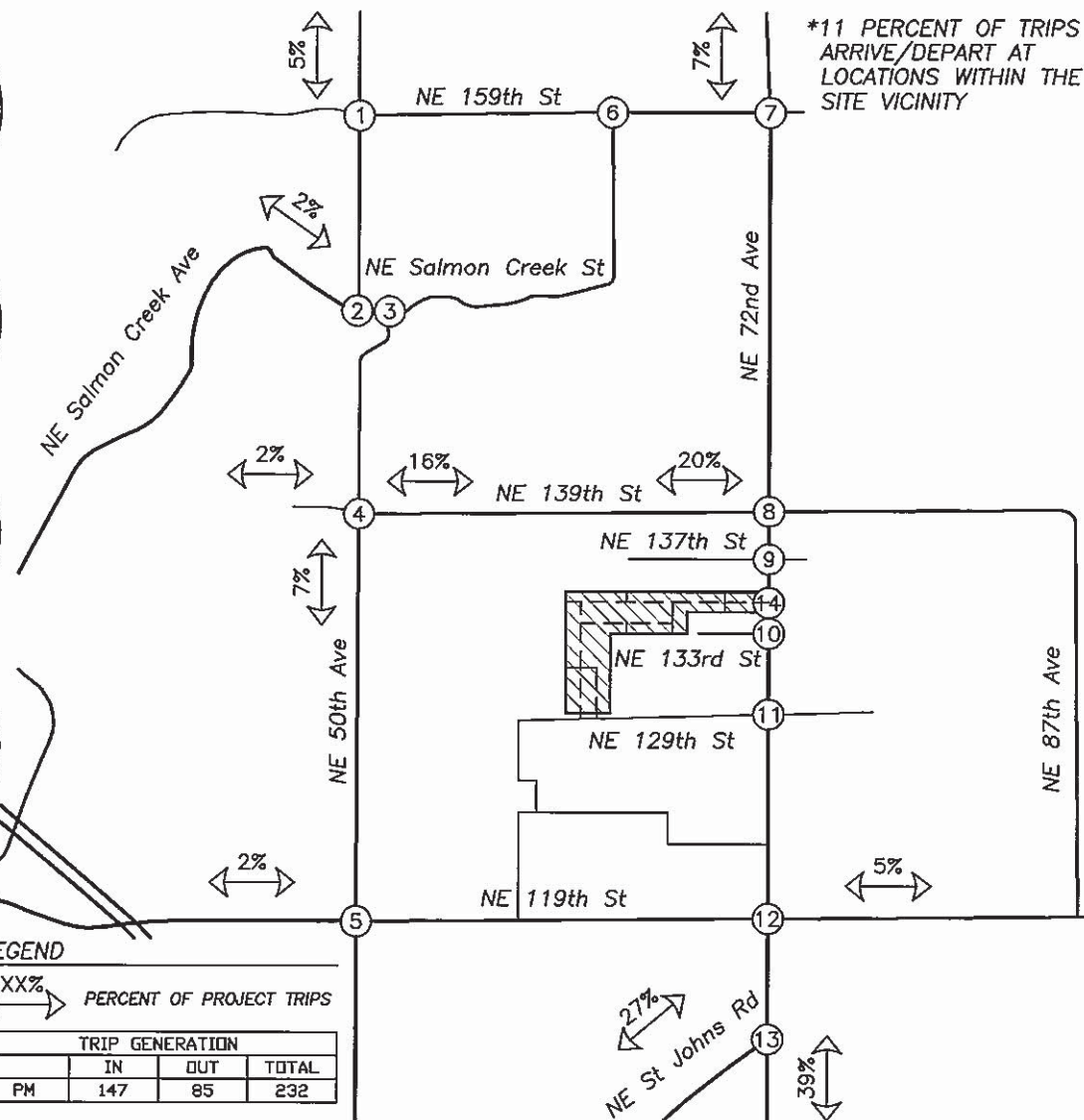
PAGE
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LEGEND

XX% PERCENT OF PROJECT TRIPS

TRIP GENERATION			
	IN	OUT	TOTAL
PM	147	85	232



*11 PERCENT OF TRIPS
ARRIVE/DEPART AT
LOCATIONS WITHIN THE
SITE VICINITY

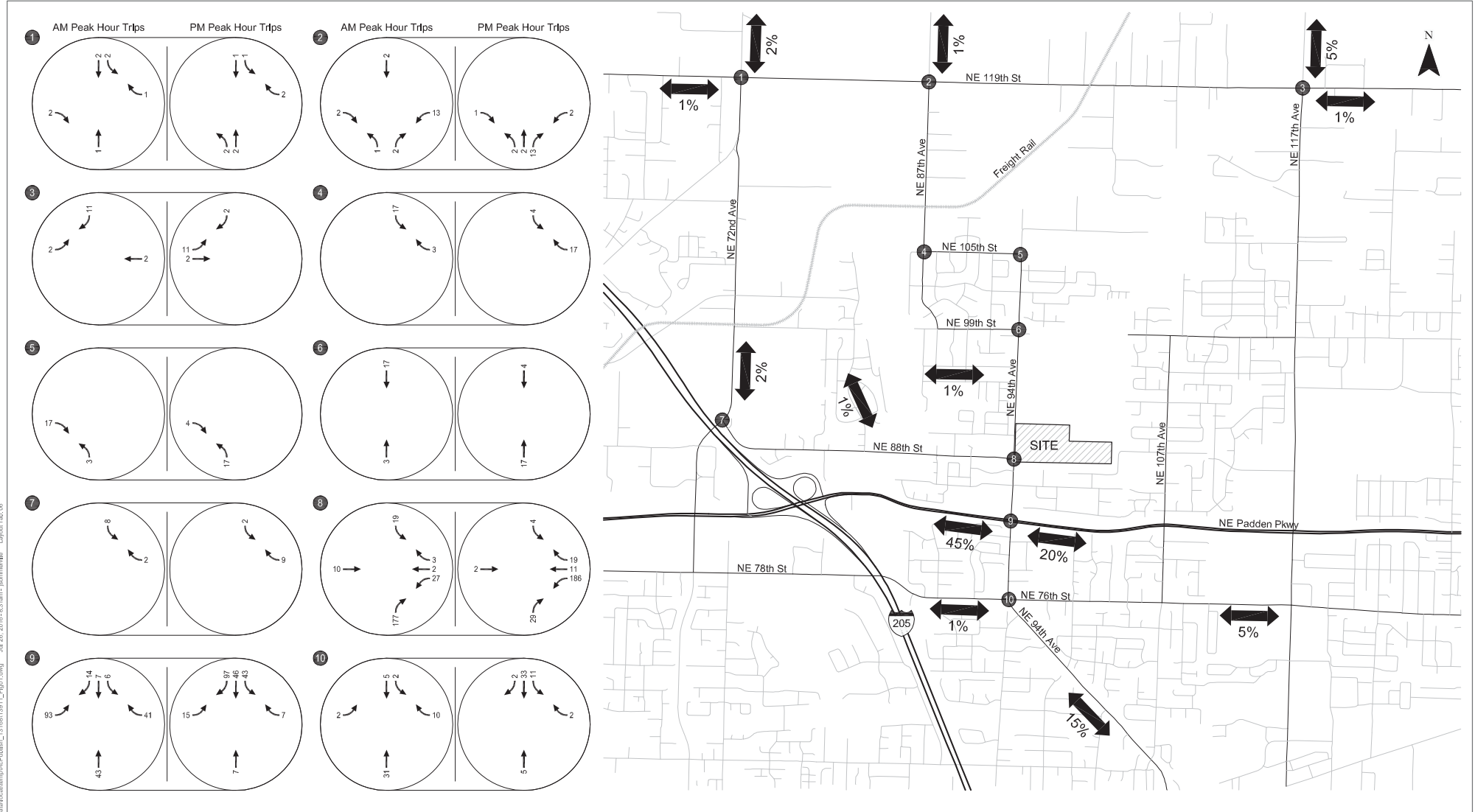
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PROPOSED DEVELOPMENT SITE
Site Trip Distribution and Assignment
PM Peak Hour



FIGURE
5

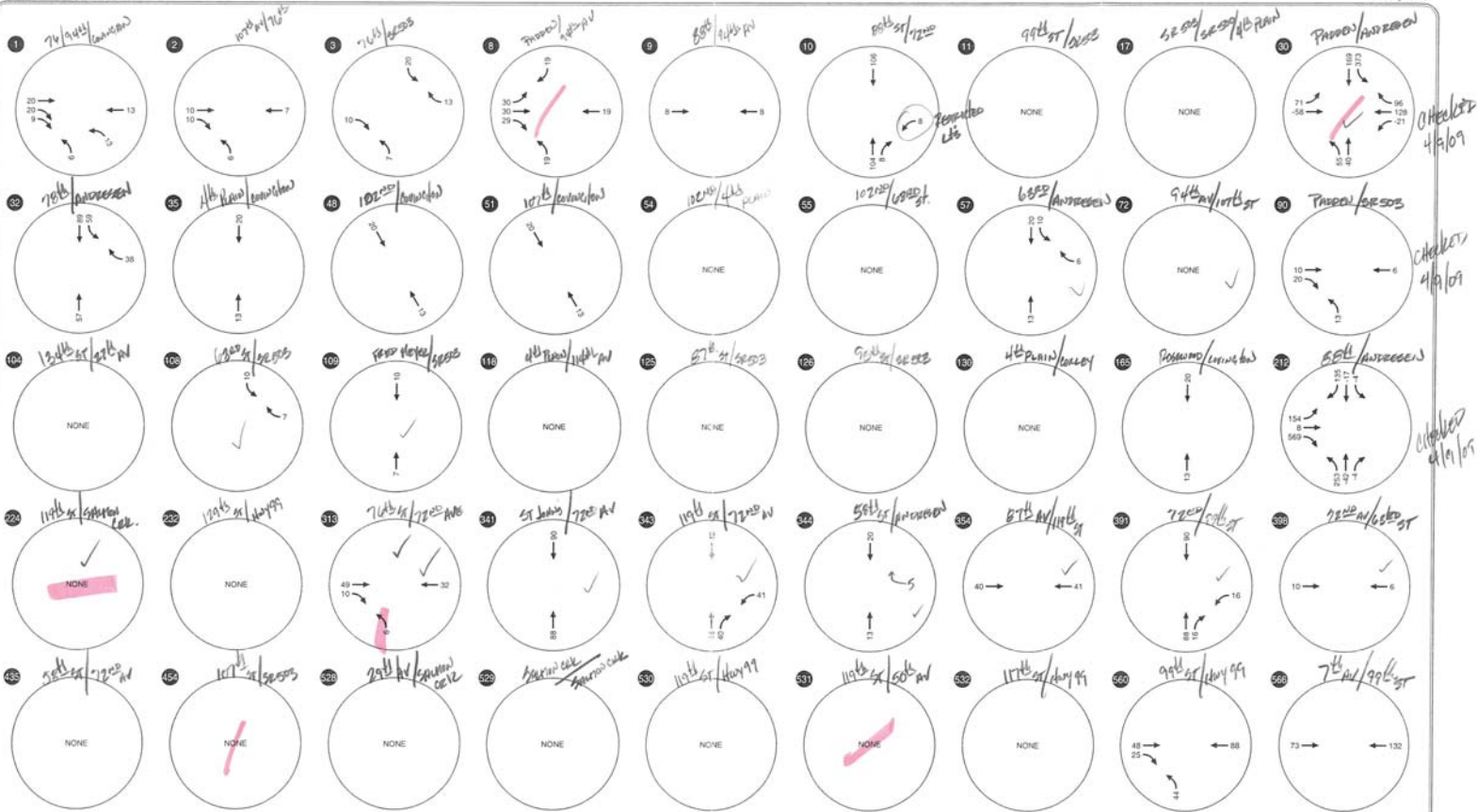
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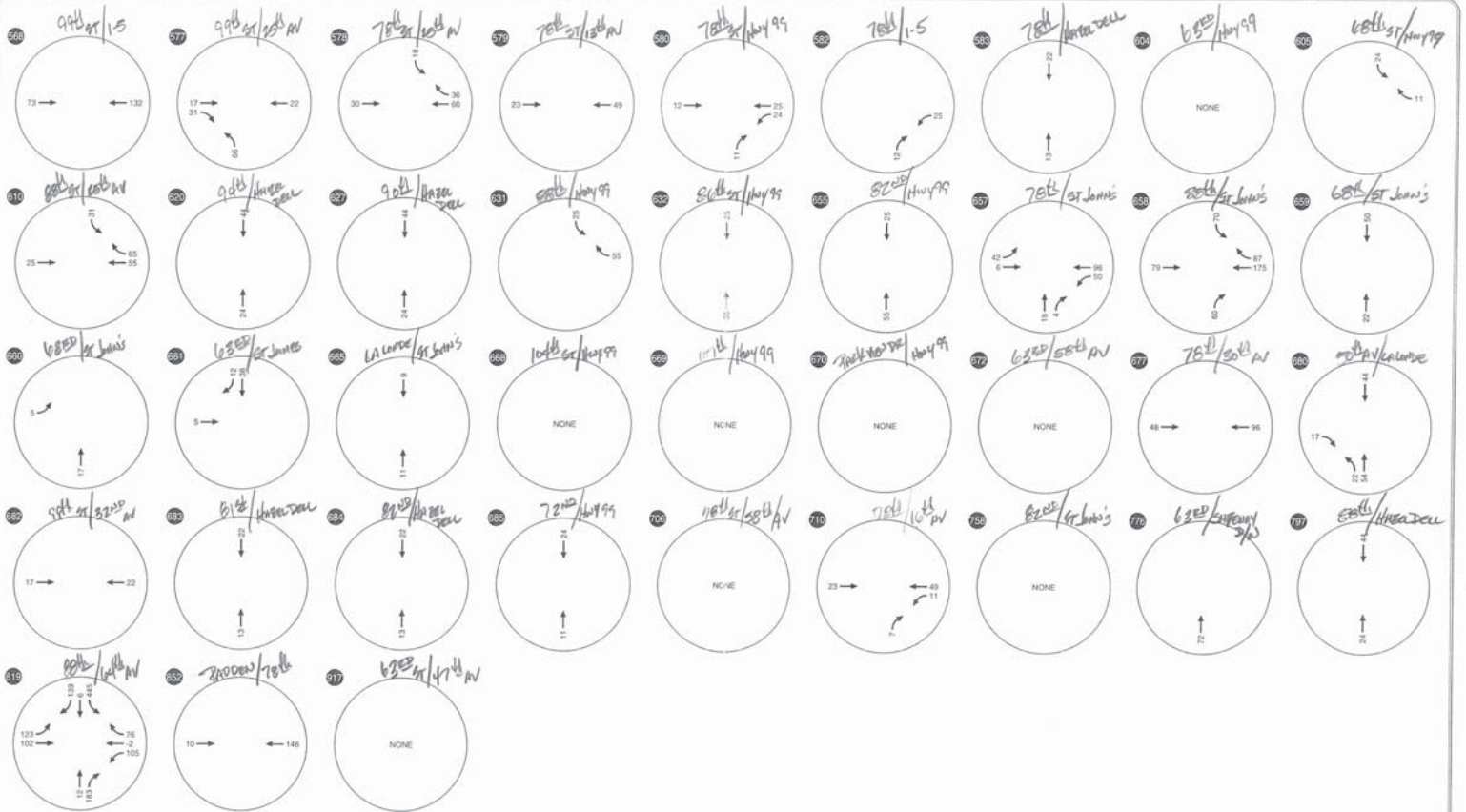
Estimated Trip Distribution Pattern and Weekday AM and PM Peak Hour Site-generated Trip Assignment
Clark County, Washington

Figure
6





WEEKDAY PHASE A-E PM PEAK HOUR CONCURRENCY TRIP ASSIGNMENT
CLARK COUNTY, WASHINGTON

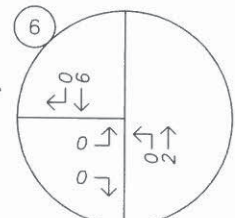
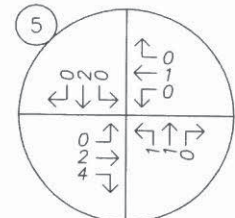
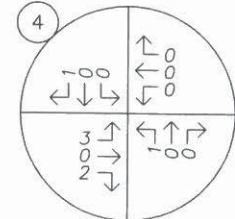
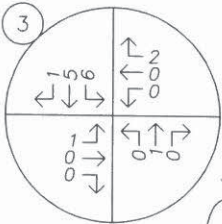
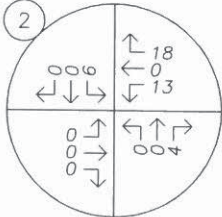
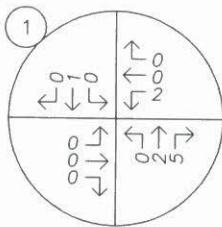


WEEKDAY PHASE A-E PM PEAK HOUR CONCURRENCY TRIP ASSIGNMENT
CLARK COUNTY, WASHINGTON

LEGEND

XX%
PERCENT OF SITE TRIPS

TRIP GENERATION			
	IN	OUT	TOTAL
AM	10	31	41



NOTE: 5 PERCENT OF TRIPS ARRIVE/DEPART
FROM LOCALES WITHIN THE SITE VICINITY

SITE TRIP DISTRIBUTION & ASSIGNMENT
Proposed Development Plan – Net Additional Site Trips
AM Peak Hour

no scale

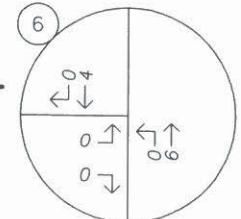
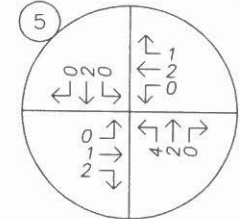
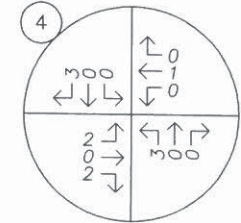
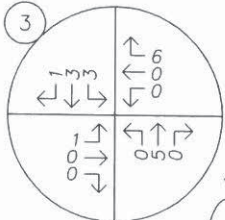
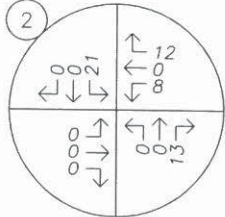
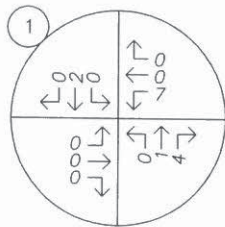
FIGURE
4

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LEGEND

XX% PERCENT OF SITE TRIPS

TRIP GENERATION			
	IN	OUT	TOTAL
PM	34	20	54



NOTE: 5 PERCENT OF TRIPS ARRIVE/DEPART FROM LOCALES WITHIN THE SITE VICINITY



SITE TRIP DISTRIBUTION & ASSIGNMENT
Proposed Development Plan – Net Additional Site Trips
PM Peak Hour



FIGURE
5

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APPENDIX E

2024 “WITHOUT PROJECT” LEVEL OF SERVICE

Lanes, Volumes, Timings

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

06/08/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	228	46	30	38	17	44	42	495	89	117	690	462
Future Volume (vph)	228	46	30	38	17	44	42	495	89	117	690	462
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	240		0	200		70	260		140	250		540
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.941				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3273	1671	0	1327	1397	1188	1656	3312	1482	1752	3505	1568
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3273	1671	0	1327	1397	1188	1656	3312	1482	1752	3505	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30				182			127			462
Link Speed (mph)		45			25			45			45	
Link Distance (ft)		859			878			669			718	
Travel Time (s)		13.0			23.9			10.1			10.9	
Peak Hour 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
Heavy Vehicles (%)	7%	7%	7%	36%	36%	36%	9%	9%	9%	3%	3%	3%
Adj. Flow (vph)	228	46	30	38	17	44	42	495	89	117	690	462
Shared Lane Traffic (%)												
Lane Group Flow (vph)	228	76	0	38	17	44	42	495	89	117	690	462
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7

Lanes, Volumes, Timings

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

06/08/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	8						2					
Detector Phase	7	4		3	8	1	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0
Minimum Split (s)	8.5	22.5		8.5	22.5	8.5	8.5	22.5	8.5	8.5	22.5	8.5
Total Split (s)	21.0	31.1		12.4	22.5	17.0	11.2	29.5	12.4	17.0	35.3	21.0
Total Split (%)	23.3%	34.6%		13.8%	25.0%	18.9%	12.4%	32.8%	13.8%	18.9%	39.2%	23.3%
Maximum Green (s)	16.5	26.6		7.9	18.0	12.5	6.7	25.0	7.9	12.5	30.8	16.5
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max	None	None	Max	None
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	15.4	8.7		7.1	6.6	11.7	6.5	28.2	39.9	9.6	33.3	54.8
Actuated g/C Ratio	0.23	0.13		0.11	0.10	0.18	0.10	0.43	0.60	0.15	0.50	0.83
v/c Ratio	0.30	0.31		0.27	0.12	0.12	0.26	0.35	0.09	0.46	0.39	0.34
Control Delay	23.5	22.6		35.9	33.0	0.7	35.8	17.1	1.3	34.8	13.8	1.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.5	22.6		35.9	33.0	0.7	35.8	17.1	1.3	34.8	13.8	1.1
LOS	C	C		D	C	A	D	B	A	C	B	A
Approach Delay		23.3			19.8			16.1			11.1	
Approach LOS		C			B			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 66.2

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.46

Intersection Signal Delay: 14.4

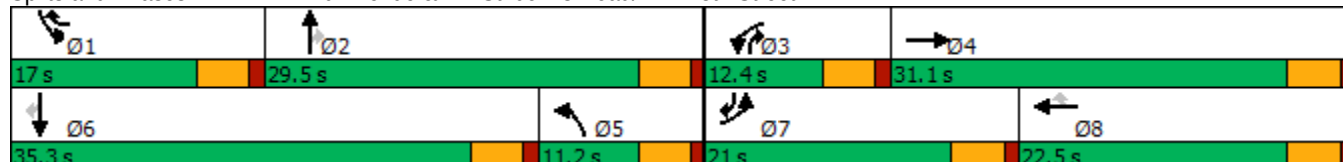
Intersection LOS: B

Intersection Capacity Utilization 47.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street



Queues

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

06/08/2021



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	228	76	38	17	44	42	495	89	117	690	462
v/c Ratio	0.30	0.31	0.27	0.12	0.12	0.26	0.35	0.09	0.46	0.39	0.34
Control Delay	23.5	22.6	35.9	33.0	0.7	35.8	17.1	1.3	34.8	13.8	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.5	22.6	35.9	33.0	0.7	35.8	17.1	1.3	34.8	13.8	1.1
Queue Length 50th (ft)	39	19	15	7	0	17	78	0	47	105	0
Queue Length 95th (ft)	82	54	46	26	0	50	144	12	101	178	15
Internal Link Dist (ft)		779		798			589			638	
Turn Bay Length (ft)	240		200		70	260		140	250		540
Base Capacity (vph)	913	711	163	392	410	173	1409	965	341	1761	1383
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.11	0.23	0.04	0.11	0.24	0.35	0.09	0.34	0.39	0.33
Intersection Summary											

HCM 6th Signalized Intersection Summary

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

06/08/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	228	46	30	38	17	44	42	495	89	117	690	462
Future Volume (veh/h)	228	46	30	38	17	44	42	495	89	117	690	462
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1796	1796	1796	1366	1366	1366	1767	1767	1767	1856	1856	1856
Adj Flow Rate, veh/h	228	46	30	38	17	44	42	495	89	117	690	462
Peak Hour 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
Percent Heavy Veh, %	7	7	7	36	36	36	9	9	9	3	3	3
Cap, veh/h	347	152	99	40	105	188	56	1488	710	152	1748	944
Arrive On Green	0.10	0.15	0.15	0.03	0.08	0.08	0.03	0.44	0.44	0.09	0.50	0.50
Sat Flow, veh/h	3319	1015	662	1301	1366	1158	1682	3357	1497	1767	3526	1572
Grp Volume(v), veh/h	228	0	76	38	17	44	42	495	89	117	690	462
Grp Sat Flow(s),veh/h/ln	1659	0	1677	1301	1366	1158	1682	1678	1497	1767	1763	1572
Q Serve(g_s), s	4.1	0.0	2.5	1.8	0.7	2.1	1.5	6.0	2.1	4.0	7.6	3.9
Cycle Q Clear(g_c), s	4.1	0.0	2.5	1.8	0.7	2.1	1.5	6.0	2.1	4.0	7.6	3.9
Prop In Lane	1.00		0.39	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	347	0	252	40	105	188	56	1488	710	152	1748	944
V/C Ratio(X)	0.66	0.00	0.30	0.94	0.16	0.23	0.75	0.33	0.13	0.77	0.39	0.49
Avail Cap(c_a), veh/h	882	0	718	166	396	435	182	1488	710	356	1748	944
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.7	0.0	23.5	30.0	26.8	22.6	29.8	11.3	9.1	27.8	9.8	1.5
Incr Delay (d2), s/veh	2.1	0.0	0.7	52.4	0.7	0.6	18.2	0.6	0.4	8.0	0.7	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	0.9	1.1	0.2	0.6	0.8	1.9	0.7	1.9	2.4	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.9	0.0	24.2	82.4	27.5	23.3	47.9	11.9	9.5	35.8	10.5	3.3
LnGrp LOS	C	A	C	F	C	C	D	B	A	D	B	A
Approach Vol, veh/h	304			99			626			1269		
Approach Delay, s/veh	27.7			46.7			14.0			10.2		
Approach LOS	C			D			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.8	32.0	6.4	13.8	6.6	35.3	11.0	9.3				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	12.5	25.0	7.9	26.6	6.7	30.8	16.5	18.0				
Max Q Clear Time (g_c+I1), s	6.0	8.0	3.8	4.5	3.5	9.6	6.1	4.1				
Green Ext Time (p_c), s	0.1	3.0	0.0	0.3	0.0	6.1	0.5	0.1				
Intersection Summary												
HCM 6th Ctrl Delay	15.1											
HCM 6th LOS	B											

Lanes, Volumes, Timings
2: NE 72nd Avenue & NE 110th Street

06/08/2021

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	8	8	618	4	8	750
Future Volume (vph)	8	8	618	4	8	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	300	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.932		0.999			
Flt Protected	0.976				0.950	
Satd. Flow (prot)	1728	0	3249	0	1736	3471
Flt Permitted	0.976				0.950	
Satd. Flow (perm)	1728	0	3249	0	1736	3471
Link Speed (mph)	25		45			45
Link Distance (ft)	318		572			669
Travel Time (s)	8.7		8.7			10.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	11%	11%	4%	4%
Adj. Flow (vph)	8	8	618	4	8	750
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	622	0	8	750
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	30.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM 6th TWSC
2: NE 72nd Avenue & NE 110th Street

06/08/2021

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	8	618	4	8	750
Future Vol, veh/h	8	8	618	4	8	750
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	11	11	4	4
Mvmt Flow	8	8	618	4	8	750
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1011	311	0	0	622	0
Stage 1	620	-	-	-	-	-
Stage 2	391	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.18	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.24	-
Pot Cap-1 Maneuver	239	691	-	-	941	-
Stage 1	504	-	-	-	-	-
Stage 2	659	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	237	691	-	-	941	-
Mov Cap-2 Maneuver	237	-	-	-	-	-
Stage 1	504	-	-	-	-	-
Stage 2	653	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	15.7	0		0.1		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	-	353	941	-	
HCM Lane V/C Ratio	-	-	0.045	0.009	-	
HCM Control Delay (s)	-	-	15.7	8.9	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

Lanes, Volumes, Timings

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

06/08/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	445	25	13	101	67	217	110	883	46	54	545	329
Future Volume (vph)	445	25	13	101	67	217	110	883	46	54	545	329
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	240		0	200		70	260		140	250		540
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.949				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3467	1785	0	1703	1792	1524	1787	3574	1599	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3467	1785	0	1703	1792	1524	1787	3574	1599	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13				127			73			329
Link Speed (mph)		45			25			45			45	
Link Distance (ft)		859			878			669			718	
Travel Time (s)		13.0			23.9			10.1			10.9	
Peak Hour 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
Heavy Vehicles (%)	1%	1%	1%	6%	6%	6%	1%	1%	1%	2%	2%	2%
Adj. Flow (vph)	445	25	13	101	67	217	110	883	46	54	545	329
Shared Lane Traffic (%)												
Lane Group Flow (vph)	445	38	0	101	67	217	110	883	46	54	545	329
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7

Lanes, Volumes, Timings

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

06/08/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	8						2					
Detector Phase	7	4		3	8	1	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5		9.5	22.5	9.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	20.0	25.9		16.6	22.5	11.0	16.6	36.5	16.6	11.0	30.9	20.0
Total Split (%)	22.2%	28.8%		18.4%	25.0%	12.2%	18.4%	40.6%	18.4%	12.2%	34.3%	22.2%
Maximum Green (s)	15.5	21.4		12.1	18.0	6.5	12.1	32.0	12.1	6.5	26.4	15.5
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max	None	None	Max	None
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	14.0	11.6		12.9	8.3	16.7	9.7	32.4	49.8	6.3	31.8	51.4
Actuated g/C Ratio	0.18	0.15		0.17	0.11	0.22	0.13	0.42	0.65	0.08	0.41	0.67
v/c Ratio	0.70	0.14		0.35	0.35	0.50	0.49	0.59	0.04	0.37	0.37	0.28
Control Delay	37.0	22.7		34.7	38.3	15.8	40.4	20.4	1.0	43.4	20.0	1.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.0	22.7		34.7	38.3	15.8	40.4	20.4	1.0	43.4	20.0	1.8
LOS	D	C		C	D	B	D	C	A	D	C	A
Approach Delay		35.8			24.7			21.7			14.9	
Approach LOS		D			C			C			B	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 76.7

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 22.3

Intersection LOS: C

Intersection Capacity Utilization 61.8%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

 Ø1	 Ø2	 Ø3	 Ø4
11 s	36.5 s	16.6 s	25.9 s
 Ø5	 Ø6	 Ø7	 Ø8
16.6 s	30.9 s	20 s	22.5 s

Queues

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

06/08/2021



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	445	38	101	67	217	110	883	46	54	545	329
v/c Ratio	0.70	0.14	0.35	0.35	0.50	0.49	0.59	0.04	0.37	0.37	0.28
Control Delay	37.0	22.7	34.7	38.3	15.8	40.4	20.4	1.0	43.4	20.0	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.0	22.7	34.7	38.3	15.8	40.4	20.4	1.0	43.4	20.0	1.8
Queue Length 50th (ft)	107	11	48	32	37	52	181	0	26	108	0
Queue Length 95th (ft)	162	37	97	70	97	103	257	7	63	167	34
Internal Link Dist (ft)		779		798			589			638	
Turn Bay Length (ft)	240		200		70	260		140	250		540
Base Capacity (vph)	709	513	329	425	434	285	1509	1103	151	1464	1175
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.07	0.31	0.16	0.50	0.39	0.59	0.04	0.36	0.37	0.28

Intersection Summary

HCM 6th Signalized Intersection Summary

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

06/08/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	445	25	13	101	67	217	110	883	46	54	545	329
Future Volume (veh/h)	445	25	13	101	67	217	110	883	46	54	545	329
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1885	1885	1811	1811	1811	1885	1885	1885	1870	1870	1870
Adj Flow Rate, veh/h	445	25	13	101	67	217	110	883	46	54	545	329
Peak Hour 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
Percent Heavy Veh, %	1	1	1	6	6	6	1	1	1	2	2	2
Cap, veh/h	546	286	149	129	295	318	142	1458	770	78	1323	839
Arrive On Green	0.16	0.24	0.24	0.07	0.16	0.16	0.08	0.41	0.41	0.04	0.37	0.37
Sat Flow, veh/h	3483	1168	608	1725	1811	1535	1795	3582	1598	1781	3554	1585
Grp Volume(v), veh/h	445	0	38	101	67	217	110	883	46	54	545	329
Grp Sat Flow(s),veh/h/ln	1742	0	1776	1725	1811	1535	1795	1791	1598	1781	1777	1585
Q Serve(g_s), s	9.7	0.0	1.3	4.5	2.5	10.3	4.7	15.2	1.2	2.3	8.9	9.7
Cycle Q Clear(g_c), s	9.7	0.0	1.3	4.5	2.5	10.3	4.7	15.2	1.2	2.3	8.9	9.7
Prop In Lane	1.00		0.34	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	546	0	435	129	295	318	142	1458	770	78	1323	839
V/C Ratio(X)	0.82	0.00	0.09	0.78	0.23	0.68	0.78	0.61	0.06	0.69	0.41	0.39
Avail Cap(c_a), veh/h	687	0	484	266	415	419	276	1458	770	147	1323	839
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.0	0.0	22.9	35.7	28.6	28.8	35.5	18.3	10.9	37.0	18.3	11.0
Incr Delay (d2), s/veh	6.1	0.0	0.1	9.8	0.4	2.9	8.7	1.9	0.1	10.2	0.9	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.0	0.5	2.2	1.1	4.0	2.3	5.9	0.4	1.2	3.4	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.1	0.0	23.0	45.5	29.0	31.7	44.3	20.2	11.0	47.2	19.2	12.4
LnGrp LOS	D	A	C	D	C	C	D	C	B	D	B	B
Approach Vol, veh/h	483			385			1039			928		
Approach Delay, s/veh	36.9			34.8			22.3			18.4		
Approach LOS	D			C			C			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.0	36.5	10.4	23.7	10.7	33.8	16.8	17.3				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	6.5	32.0	12.1	21.4	12.1	26.4	15.5	18.0				
Max Q Clear Time (g_c+l1), s	4.3	17.2	6.5	3.3	6.7	11.7	11.7	12.3				
Green Ext Time (p_c), s	0.0	5.0	0.1	0.1	0.1	3.9	0.6	0.5				
Intersection Summary												
HCM 6th Ctrl Delay	25.2											
HCM 6th LOS	C											

Lanes, Volumes, Timings
2: NE 72nd Avenue & NE 110th Street

06/08/2021

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	8	8	1033	4	13	626
Future Volume (vph)	8	8	1033	4	13	626
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	300	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.932		0.999			
Flt Protected	0.976				0.950	
Satd. Flow (prot)	1728	0	3536	0	1736	3471
Flt Permitted	0.976				0.950	
Satd. Flow (perm)	1728	0	3536	0	1736	3471
Link Speed (mph)	25		45			45
Link Distance (ft)	318		572			669
Travel Time (s)	8.7		8.7			10.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	2%	2%	4%	4%
Adj. Flow (vph)	8	8	1033	4	13	626
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	1037	0	13	626
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	38.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM 6th TWSC
2: NE 72nd Avenue & NE 110th Street

06/08/2021

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	8	1033	4	13	626
Future Vol, veh/h	8	8	1033	4	13	626
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	2	2	4	4
Mvmt Flow	8	8	1033	4	13	626
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1374	519	0	0	1037	0
Stage 1	1035	-	-	-	-	-
Stage 2	339	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.18	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.24	-
Pot Cap-1 Maneuver	139	507	-	-	654	-
Stage 1	308	-	-	-	-	-
Stage 2	699	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	136	507	-	-	654	-
Mov Cap-2 Maneuver	136	-	-	-	-	-
Stage 1	308	-	-	-	-	-
Stage 2	685	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	23.2	0	0.2			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	214	654	-	
HCM Lane V/C Ratio	-	-	0.075	0.02	-	
HCM Control Delay (s)	-	-	23.2	10.6	-	
HCM Lane LOS	-	-	C	B	-	
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-	

APPENDIX F

TRIP GENERATION SURVEY



H. Lee & Associates, PLLC

Traffic Engineering, Transportation Planning, and Planning

MEMORANDUM

To: Clark County Staff

From: Hann Lee, P.E.

Date: May 24, 2021



P.O. Box 1849
Vancouver, WA 98668
Phone: (360) 727-3119

Subject: Feenaughty Machinery Development Trip Generation Survey

Page 1 of 4

The proposed Feenaughty Machinery Development is located 7301 and 7313 NE 13th Street and is comprised of tax lots 986056137, 986056136, 986053658, and 199429005 in Clark County, Washington. The proposed project is the development of a 29,820 square foot heavy machinery retailer facility. Access to the development will be from newly constructed driveways onto NE 113th Street and NE 110th Street. The “Trip Generation, 10th Edition” (Institute of Transportation Engineers (ITE), 2017) does not have a land use code specific to the proposed heavy machinery retailer use. Therefore, H. Lee & Associates, PLLC (HLA) conducted a special trip generation survey to establish local rates specific to the proposed heavy machinery retailer use to be able to properly estimate the trip generation of the proposed Feenaughty Machinery Development.

TRIP GENERATION SURVEY

The trip generation survey methodology was based on the *Trip Generation Handbook, 3rd Edition*, Chapter 9 (Institute of Transportation Engineers (ITE), August 2014). The reason for conducting the trip generation survey is that the description of the heavy machinery retailer is not covered by the land use classifications presented in ITE’s *Trip Generation Manual*. Therefore, the collection of local data is needed to establish a local rate for a heavy machinery retailer use.

The *Trip Generation Handbook* calls for at least three sites to be studied and five preferred. Per conversations with Clark County staff, four similar sites were surveyed as part of the trip generation survey. The four sites that were surveyed are summarized below:

- Papé Machinery– 2504 Talley Way, Kelso WA 98626
 - Approximately 19,650 square feet
- Papé Machinery– 1425 NE Columbia Boulevard, Portland OR 97211
 - Approximately 34,936 square feet
- Feenaughty Machinery – 4800 NE Columbia Boulevard, Portland OR 97218
 - Approximately 16,855 square feet
- Sonsray Machinery (Case) – 6457 NE Columbia Boulevard, Portland OR
 - Approximately 41,316 square feet

Feenaughty Machinery Development Trip Generation Survey

Twelve (12) hours of 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:

- Papé Machinery (Kelso) – April 1, 2021
- Papé Machinery (Portland) – March 31, 2021
- Feenaughty Machinery (Portland) – March 31, 2021
- Sonsray Machinery/Case (Portland) – March 31, 2021

The trip generation rates for weekday daily; peak hour of adjacent street one hour between 7:00 and 9:00 A.M.; 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 the sites. The independent variable chosen was the total building(s) square footage of each facility.

Attachment A contains the data utilized to derive the daily, A.M. peak hour, 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 heavy machinery retailer use is 6.66 trips per 1,000 square feet. The standard deviation is 2.88 which is 43.2% 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.

The A.M. peak hour trip generation rate is derived in Table 2. The A.M. peak hour rate was derived using a weighted average. The A.M. peak hour trip generation rate derived for the heavy machinery retailer use is 0.78 A.M. peak hour trips per 1,000 square feet. The standard deviation is 0.22 which is 28.2% 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.

The P.M. peak hour trip generation rate is derived in Table 3. In the P.M. peak hour, the use of all four survey sites yielded a standard deviation (64.2%) beyond the recommended maximum of 55 percent of the weighted average. To be in compliance with the ITE recommendation, the Papé Machinery (Portland) facility was eliminated to bring the derived P.M. peak hour trip generation rate within compliance. The adjusted P.M. peak hour trip generation rate derived for the heavy machinery retailer use is 0.63 P.M. peak hour trips per 1,000 square feet. The adjusted standard deviation is 0.33 which is 52.4% of the adjusted weighted average. The adjusted 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

Heavy Machinery Retailer	1,000 Square Feet (ksf)	Daily Trips	Daily Rate
Papé Machinery – Kelso	19.650	214	10.89
Papé Machinery – Portland	34.936	219	6.27
Feenaughty Machinery	16.855	144	8.54
Sonsray Machinery (Case)	41.316	174	4.21
Totals	112.757	751	6.66 ¹
Standard Deviation			2.88

¹Weighted Average

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

Heavy Machinery Retailer	1,000 Square Feet (ksf)	A.M. Peak Hour Trips ²	A.M. Peak Hour Rate
Papé Machinery – Kelso	19.650	22	1.12
Papé Machinery – Portland	34.936	22	0.63
Feenaughty Machinery	16.855	15	0.89
Sonsray Machinery (Case)	41.316	29	0.70
Totals	112.757	88	0.78 ¹
Standard Deviation			0.22

¹Weighted Average

²Inbound 65%, Outbound 35%

Table 3. Derived P.M. Peak Hour Trip Generation Rate

Heavy Machinery Retailer	1,000 Square Feet (ksf)	P.M. Peak Hour Trips ²	P.M. Peak Hour Rate
Papé Machinery – Kelso	19.650	18	0.92
Papé Machinery – Portland	34.936 ³	11 ³	0.31 ³
Feenaughty Machinery	16.855	16	0.95
Sonsray Machinery (Case)	41.316	15	0.36
Totals	112.757	60	0.63 ¹
Standard Deviation			0.33

¹Weighted Average

²Inbound 18%, Outbound 82%

³The square footage, trips, and rate were not used to calculate the weighted average because they are outside of the standard deviation allowance.

Feenaughty Machinery Development Trip Generation Survey

TRIP GENERATION

Estimates of daily, A.M. peak hour, and P.M. peak hour trips generated by the proposed Feenaughty Machinery Development were developed from the survey conducted by HLA that is detailed in the previous “Trip Generation Survey” section. The proposed project is expected to generate 199 daily, 23 A.M peak hour (15 in, 8 out), and 19 P.M. peak hour (3 in, 16 out) net new trips. Table 4 summarizes the project’s trip generation.

Table 4. Trip Generation for Feenaughty Machinery Development

	Amount	Average Daily	A.M. Peak			P.M. Peak		
			In	Out	Total	In	Out	Total
Heavy Machinery Retailer – HLA								
Rate per 1,000 square feet (ksf)		6.66	0.51	0.27	0.78	0.11	0.52	0.63
Trips	29.820 ksf	199	15	8	23	3	16	19

H. Lee & Associates, PLLC - Trip Generation Summary

Heavy Machinery Retailer	KSF	Daily Trips	AM Trips	PM Trips	Daily Rate	AM Rate	PM Rate
Pape Kelso	19.650	214	22	18	10.89	1.12	0.92
Pape Portland	34.936	219	22	11	6.27	0.63	0.31
Feenaughty Machinery	16.855	144	15	16	8.54	0.89	0.95
Sonsray Machinery (Case)	41.316	174	29	15	4.21	0.70	0.36
Totals	112.757	751	88	60			

	AM		PM	
	In	Out	In	Out
	12	10	8	10
	11	11	0	11
	13	2	1	15
	21	8	2	13
Totals	57	31	11	49
	65%	35%	18%	82%

Derived Weighted	Daily	AM	PM
Average Rates	6.66	0.78	0.53
Standard Deviation	2.88	0.22	0.34

Adjusted PM Rate	PM
Without Pape Portland	0.63
Standard Deviation	0.33

	Daily	AM	PM
Final Trip Generation Rates	6.66	0.78	0.63
Standard Deviation	2.88	0.22	0.33

Pape Kelso
Date 4/1/21

Driveway 1

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	0	0	0	0	0
6:15-6:30	0	0	0	0	0
6:30-6:45	1	0	1	0	2
6:45-7:00	8	1	1	1	9
7:00-7:15	2	1	0	0	2
7:15-7:30	2	0	2	0	4
7:30-7:45	1	0	1	0	2
7:45-8:00	0	0	1	0	1
8:00-8:15	0	0	2	0	2
8:15-8:30	1	0	1	0	2
8:30 - 8:45	4	1	1	1	5
8:45 - 9:00	3	1	2	0	5
9:00 - 9:15	1	0	2	0	3
9:15 - 9:30	1	0	3	1	4
9:30 - 9:45	2	0	1	1	3
9:45 - 10:00	1	0	0	0	1
10:00 - 10:15	4	2	1	1	5
10:15 - 10:30	7	0	2	0	9
10:30 - 10:45	1	0	1	0	2
10:45 - 11:00	1	1	2	1	3
11:00 - 11:15	0	0	0	0	0
11:15 - 11:30	3	0	1	0	4
11:30 - 11:45	3	0	2	0	5
11:45 - 12:00	2	0	3	0	5
12:00-12:15	2	1	0	0	2
12:15-12:30	0	0	0	0	0
12:30-12:45	0	0	0	0	0
12:45-1:00	0	0	0	0	0
1:00-1:15	0	0	0	0	0
1:15-1:30	0	0	0	0	0
1:30-1:45	0	0	0	0	0
1:45-2:00	0	0	0	0	0
2:00-2:15	0	0	0	0	0
2:15-2:30	0	0	0	0	0
2:30-2:45	0	0	0	0	0
2:45-3:00	0	0	0	0	0
3:00-3:15	0	0	0	0	0
3:15-3:30	0	0	0	0	0
3:30-3:45	0	0	0	0	0
3:45-4:00	0	0	0	0	0
4:00-4:15	0	0	0	0	0
4:15-4:30	0	0	0	0	0
4:30-4:45	0	0	0	0	0
4:45-5:00	0	0	0	0	0
5:00-5:15	0	0	0	0	0
5:15-5:30	0	0	0	0	0
5:30-5:45	0	0	0	0	0
5:45-6:00	0	0	0	0	0
Totals	50	8	30	6	80

Driveway 2

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	1	0	0	0	1
6:15-6:30	2	0	1	0	3
6:30-6:45	2	1	0	0	2
6:45-7:00	0	0	0	0	0
7:00-7:15	2	0	2	1	4
7:15-7:30	0	0	1	1	1
7:30-7:45	0	0	0	0	0
7:45-8:00	0	0	0	0	0
8:00-8:15	0	0	0	0	0
8:15-8:30	1	0	1	0	2
8:30 - 8:45	2	0	2	0	4
8:45 - 9:00	1	0	1	0	2
9:00 - 9:15	0	0	0	1	0
9:15 - 9:30	0	0	2	1	2
9:30 - 9:45	0	0	1	0	1
9:45 - 10:00	0	0	1	0	1
10:00 - 10:15	0	0	2	0	2
10:15 - 10:30	1	1	2	1	3
10:30 - 10:45	0	0	1	1	1
10:45 - 11:00	0	0	2	1	2
11:00 - 11:15	1	0	0	0	1
11:15 - 11:30	0	0	1	1	1
11:30 - 11:45	1	0	0	1	1
11:45 - 12:00	1	0	3	0	4
12:00-12:15	1	0	2	0	3
12:15-12:30	0	0	0	0	0
12:30-12:45	0	0	0	0	0
12:45-1:00	0	0	0	0	0
1:00-1:15	0	0	0	0	0
1:15-1:30	0	0	0	0	0
1:30-1:45	0	0	0	0	0
1:45-2:00	0	0	0	0	0
2:00-2:15	0	0	0	0	0
2:15-2:30	0	0	0	0	0
2:30-2:45	0	0	0	0	0
2:45-3:00	0	0	0	0	0
3:00-3:15	0	0	0	0	0
3:15-3:30	0	0	0	0	0
3:30-3:45	0	0	0	0	0
3:45-4:00	0	0	0	0	0
4:00-4:15	0	0	0	0	0
4:15-4:30	0	0	0	0	0
4:30-4:45	0	0	0	0	0
4:45-5:00	0	0	0	0	0
5:00-5:15	0	0	0	0	0
5:15-5:30	0	0	0	0	0
5:30-5:45	0	0	0	0	0
5:45-6:00	0	0	0	0	0
Totals	16	2	25	9	41

Comined Driveways Total

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	1	0	0	0	1
6:15-6:30	2	0	1	0	3
6:30-6:45	3	1	1	0	4
6:45-7:00	8	1	1	1	9
7:00-7:15	4	1	2	1	6
7:15-7:30	2	0	3	1	5
7:30-7:45	1	0	1	0	2
7:45-8:00	0	0	1	0	1
8:00-8:15	0	0	2	0	2
8:15-8:30	2	0	2	0	4
8:30 - 8:45	6	1	3	1	9
8:45 - 9:00	4	1	3	0	7
9:00 - 9:15	1	0	2	1	3
9:15 - 9:30	1	0	5	2	6
9:30 - 9:45	2	0	2	1	4
9:45 - 10:00	1	0	1	0	2
10:00 - 10:15	4	2	3	1	7
10:15 - 10:30	8	1	4	1	12
10:30 - 10:45	1	0	2	1	3
10:45 - 11:00	1	1	4	2	5
11:00 - 11:15	1	0	0	0	1
11:15 - 11:30	3	0	2	1	5
11:30 - 11:45	4	0	2	1	6
11:45 - 12:00	3	0	6	0	9
12:00-12:15	3	1	2	0	5
12:15-12:30	0	0	0	0	0
12:30-12:45	0	0	0	0	0
12:45-1:00	0	0	0	0	0
1:00-1:15	0	0	0	0	0
1:15-1:30	0	0	0	0	0
1:30-1:45	0	0	0	0	0
1:45-2:00	0	0	0	0	0
2:00-2:15	0	0	0	0	0
2:15-2:30	0	0	0	0	0
2:30-2:45	0	0	0	0	0
2:45-3:00	0	0	0	0	0
3:00-3:15	0	0	0	0	0
3:15-3:30	0	0	0	0	0
3:30-3:45	0	0	0	0	0
3:45-4:00	0	0	0	0	0
4:00-4:15	0	0	0	0	0
4:15-4:30	0	0	0	0	0
4:30-4:45	0	0	0	0	0
4:45-5:00	0	0	0	0	0
5:00-5:15	0	0	0	0	0
5:15-5:30	0	0	0	0	0
5:30-5:45	0	0	0	0	0
5:45-6:00	0	0	0	0	0
Totals	66	10	55	15	121

SE

Driveway 1

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	0	0	0	0	0
6:15-6:30	0	0	0	0	0
6:30-6:45	2	1	0	0	2
6:45-7:00	0	0	0	0	0
7:00-7:15	1	0	0	0	1
7:15-7:30	1	0	0	0	1
7:30-7:45	0	0	0	0	0
7:45-8:00	1	0	0	0	1
8:00-8:15	0	0	0	0	0
8:15-8:30	0	0	0	0	0
8:30 - 8:45	0	0	0	0	0
8:45 - 9:00	1	0	0	0	1
9:00 - 9:15	0	0	0	0	0
9:15 - 9:30	1	0	0	0	1
9:30 - 9:45	3	0	0	0	3
9:45 - 10:00	0	0	0	0	0
10:00 - 10:15	1	0	0	0	1
10:15 - 10:30	0	0	1	1	1
10:30 - 10:45	0	0	0	0	0
10:45 - 11:00	0	0	0	0	0
11:00 - 11:15	1	0	0	0	1
11:15 - 11:30	1	0	0	0	1
11:30 - 11:45	1	0	0	0	1
11:45 - 12:00	1	1	1	1	2
12:00-12:15	0	0	1	0	1
12:15-12:30	1	0	0	0	1
12:30-12:45	0	0	1	0	1
12:45-1:00	0	0	0	0	0
1:00-1:15	0	0	0	0	0
1:15-1:30	0	0	0	0	0
1:30-1:45	0	0	0	0	0
1:45-2:00	0	0	0	0	0
2:00-2:15	0	0	0	0	0
2:15-2:30	0	0	0	0	0
2:30-2:45	0	0	0	0	0
2:45-3:00	0	0	0	0	0
3:00-3:15	0	0	0	0	0
3:15-3:30	0	0	0	0	0
3:30-3:45	0	0	0	0	0
3:45-4:00	0	0	0	0	0
4:00-4:15	0	0	0	0	0
4:15-4:30	0	0	0	0	0
4:30-4:45	0	0	0	0	0
4:45-5:00	0	0	0	0	0
5:00-5:15	0	0	0	0	0
5:15-5:30	0	0	0	0	0
5:30-5:45	0	0	0	0	0
5:45-6:00	0	0	0	0	0
Totals	16	2	4	2	20

SW

Driveway 2

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	0	0	0	0	0
6:15-6:30	2	0	0	0	2
6:30-6:45	4	0	0	0	4
6:45-7:00	4	0	0	0	4
7:00-7:15	0	0	1	1	1
7:15-7:30	2	0	0	0	2
7:30-7:45	1	0	1	1	2
7:45-8:00	1	1	0	0	1
8:00-8:15	2	1	2	1	4
8:15-8:30	1	0	0	0	1
8:30 - 8:45	0	0	1	0	1
8:45 - 9:00	0	0	1	1	1
9:00 - 9:15	0	0	0	0	0
9:15 - 9:30	5	1	2	0	7
9:30 - 9:45	0	0	4	1	4
9:45 - 10:00	4	2	7	1	11
10:00 - 10:15	2	1	0	0	2
10:15 - 10:30	1	0	4	0	5
10:30 - 10:45	2	0	0	0	2
10:45 - 11:00	1	0	2	0	3
11:00 - 11:15	2	0	2	0	4
11:15 - 11:30	2	1	2	1	4
11:30 - 11:45	0	0	1	0	1
11:45 - 12:00	2	1	3	1	5
12:00-12:15	3	0	3	1	6
12:15-12:30	1	1	0	0	1
12:30-12:45	0	0	1	0	1
12:45-1:00	0	0	0	0	0
1:00-1:15	0	0	0	0	0
1:15-1:30	0	0	0	0	0
1:30-1:45	0	0	0	0	0
1:45-2:00	0	0	0	0	0
2:00-2:15	0	0	0	0	0
2:15-2:30	0	0	0	0	0
2:30-2:45	0	0	0	0	0
2:45-3:00	0	0	0	0	0
3:00-3:15	0	0	0	0	0
3:15-3:30	0	0	0	0	0
3:30-3:45	0	0	0	0	0
3:45-4:00	0	0	0	0	0
4:00-4:15	0	0	0	0	0
4:15-4:30	0	0	0	0	0
4:30-4:45	0	0	0	0	0
4:45-5:00	0	0	0	0	0
5:00-5:15	0	0	0	0	0
5:15-5:30	0	0	0	0	0
5:30-5:45	0	0	0	0	0
5:45-6:00	0	0	0	0	0
Totals	42	9	37	9	79

W1

Driveway 3

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	1	0	0	0	1
6:15-6:30	0	0	0	0	0
6:30-6:45	0	0	0	0	0
6:45-7:00	0	0	0	0	0
7:00-7:15	0	0	0	0	0
7:15-7:30	1	1	0	0	1
7:30-7:45	0	0	0	0	0
7:45-8:00	2	1	1	1	3
8:00-8:15	0	0	1	1	1
8:15-8:30	0	0	1	0	1
8:30 - 8:45	0	0	2	1	2
8:45 - 9:00	0	0	0	0	0
9:00 - 9:15	2	0	0	0	2
9:15 - 9:30	1	1	0	0	1
9:30 - 9:45	0	0	1	1	1
9:45 - 10:00	0	0	0	0	0
10:00 - 10:15	2	1	1	0	3
10:15 - 10:30	0	0	0	0	0
10:30 - 10:45	0	0	0	0	0
10:45 - 11:00	1	1	1	1	2
11:00 - 11:15	0	0	0	0	0
11:15 - 11:30	0	0	1	1	1
11:30 - 11:45	2	2	0	0	2
11:45 - 12:00	0	0	0	0	0
12:00-12:15	0	0	0	0	0
12:15-12:30	0	0	0	0	0
12:30-12:45	1	0	0	0	1
12:45-1:00	0	0	0	0	0
1:00-1:15	0	0	0	0	0
1:15-1:30	0	0	0	0	0
1:30-1:45	0	0	0	0	0
1:45-2:00	0	0	0	0	0
2:00-2:15	0	0	0	0	0
2:15-2:30	0	0	0	0	0
2:30-2:45	0	0	0	0	0
2:45-3:00	0	0	0	0	0
3:00-3:15	0	0	0	0	0
3:15-3:30	0	0	0	0	0
3:30-3:45	0	0	0	0	0
3:45-4:00	0	0	0	0	0
4:00-4:15	0	0	0	0	0
4:15-4:30	0	0	0	0	0
4:30-4:45	0	0	0	0	0
4:45-5:00	0	0	0	0	0
5:00-5:15	0	0	0	0	0
5:15-5:30	0	0	0	0	0
5:30-5:45	0	0	0	0	0
5:45-6:00	0	0	0	0	0
Totals	13	7	9	6	22

W2

Driveway 4

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	0	0	0	0	0
6:15-6:30	0	0	0	0	0
6:30-6:45	0	0	0	0	0
6:45-7:00	4	3	0	0	4
7:00-7:15	1	1	0	0	1
7:15-7:30	0	0	0	0	0
7:30-7:45	1	1	0	0	1
7:45-8:00	0	0	0	0	0
8:00-8:15	1	1	1	1	2
8:15-8:30	2	1	0	0	2
8:30 - 8:45	1	1	0	0	1
8:45 - 9:00	0	0	0	0	0
9:00 - 9:15	0	0	0	0	0
9:15 - 9:30	2	1	0	0	2
9:30 - 9:45	0	0	0	0	0
9:45 - 10:00	0	0	0	0	0
10:00 - 10:15	0	0	1	0	1
10:15 - 10:30	2	1	0	0	2
10:30 - 10:45	1	1	1	1	2
10:45 - 11:00	0	0	0	0	0
11:00 - 11:15	0	0	0	0	0
11:15 - 11:30	1	1	1	0	2
11:30 - 11:45	1	1	1	0	2
11:45 - 12:00	1	0	0	0	1
12:00-12:15	1	1	0	0	1
12:15-12:30	0	0	1	1	1
12:30-12:45	1	1	0	0	1
12:45-1:00	0	0	0	0	0
1:00-1:15	0	0	0	0	0
1:15-1:30	0	0	0	0	0
1:30-1:45	0	0	0	0	0
1:45-2:00	0	0	0	0	0
2:00-2:15	0	0	0	0	0
2:15-2:30	0	0	0	0	0
2:30-2:45	0	0	0	0	0
2:45-3:00	0	0	0	0	0
3:00-3:15	0	0	0	0	0
3:15-3:30	0	0	0	0	0
3:30-3:45	0	0	0	0	0
3:45-4:00	0	0	0	0	0
4:00-4:15	0	0	0	0	0
4:15-4:30	0	0	0	0	0
4:30-4:45	0	0	0	0	0
4:45-5:00	0	0	0	0	0
5:00-5:15	0	0	0	0	0
5:15-5:30	0	0	0	0	0
5:30-5:45	0	0	0	0	0
5:45-6:00	0	0	0	0	0
Totals	20	15	6	3	26

Driveway 5 - Exit Only

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	0	0	0	0	0
6:15-6:30	0	0	1	1	1
6:30-6:45	0	0	0	0	0
6:45-7:00	0	0	0	0	0
7:00-7:15	0	0	0	0	0
7:15-7:30	0	0	0	0	0
7:30-7:45	0	0	1	1	1
7:45-8:00	0	0	0	0	0
8:00-8:15	0	0	1	1	1
8:15-8:30	0	0	0	0	0
8:30 - 8:45	0	0	1	1	1
8:45 - 9:00	0	0	1	1	1
9:00 - 9:15	0	0	0	0	0
9:15 - 9:30	0	0	0	0	0
9:30 - 9:45	0	0	0	0	0
9:45 - 10:00	0	0	3	2	3
10:00 - 10:15	0	0	2	0	2
10:15 - 10:30	0	0	1	0	1
10:30 - 10:45	0	0	1	1	1
10:45 - 11:00	0	0	2	1	2
11:00 - 11:15	0	0	2	2	2
11:15 - 11:30	0	0	0	0	0
11:30 - 11:45	0	0	0	0	0
11:45 - 12:00	0	0	1	0	1
12:00-12:15	0	0	0	0	0
12:15-12:30	0	0	0	0	0
12:30-12:45	0	0	0	0	0
12:45-1:00	0	0	0	0	0
1:00-1:15	0	0	0	0	0
1:15-1:30	0	0	0	0	0
1:30-1:45	0	0	0	0	0
1:45-2:00	0	0	0	0	0
2:00-2:15	0	0	0	0	0
2:15-2:30	0	0	0	0	0
2:30-2:45	0	0	0	0	0
2:45-3:00	0	0	0	0	0
3:00-3:15	0	0	0	0	0
3:15-3:30	0	0	0	0	0
3:30-3:45	0	0	0	0	0
3:45-4:00	0	0	0	0	0
4:00-4:15	0	0	0	0	0
4:15-4:30	0	0	0	0	0
4:30-4:45	0	0	0	0	0
4:45-5:00	0	0	0	0	0
5:00-5:15	0	0	0	0	0
5:15-5:30	0	0	0	0	0
5:30-5:45	0	0	0	0	0
5:45-6:00	0	0	0	0	0
Totals	0	0	17	11	17

Feenaughty Machinery

Date 4/1/21

Driveway 1

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	0	0	0	0	0
6:15-6:30	0	0	0	0	0
6:30-6:45	0	0	0	0	0
6:45-7:00	1	0	0	0	1
7:00-7:15	0	0	0	0	0
7:15-7:30	3	1	1	0	4
7:30-7:45	1	0	0	0	1
7:45-8:00	4	0	0	0	4
8:00-8:15	0	0	0	0	0
8:15-8:30	1	0	0	0	1
8:30 - 8:45	0	0	0	0	0
8:45 - 9:00	0	0	0	0	0
9:00 - 9:15	3	0	0	0	3
9:15 - 9:30	1	1	2	0	3
9:30 - 9:45	1	0	0	0	1
9:45 - 10:00	1	1	1	0	2
10:00 - 10:15	1	0	1	0	2
10:15 - 10:30	2	1	0	0	2
10:30 - 10:45	4	2	1	0	5
10:45 - 11:00	1	0	3	2	4
11:00 - 11:15	1	1	0	0	1
11:15 - 11:30	5	2	3	0	8
11:30 - 11:45	3	1	0	0	3
11:45 - 12:00	1	0	2	1	3
12:00-12:15	2	0	4	2	6
12:15-12:30	2	2	2	2	4
12:30-12:45	1	0	0	0	1
12:45-1:00	1	0	1	1	2
1:00-1:15	2	0	0	0	2
1:15-1:30	0	0	0	0	0
1:30-1:45	0	0	0	0	0
1:45-2:00	1	0	1	1	2
2:00-2:15	1	0	1	0	2
2:15-2:30	1	0	1	0	2
2:30-2:45	2	1	1	0	3
2:45-3:00	1	0	0	0	1
3:00-3:15	1	1	1	0	2
3:15-3:30	1	0	0	0	1
3:30-3:45	0	0	0	0	0
3:45-4:00	0	0	1	0	1
4:00-4:15	1	1	1	1	2
4:15-4:30	0	0	0	0	0
4:30-4:45	0	0	1	0	1
4:45-5:00	0	0	0	0	0
5:00-5:15	0	0	0	0	0
5:15-5:30	1	0	0	0	1
5:30-5:45	0	0	0	0	0
5:45-6:00	0	0	0	0	0
Totals	52	15	29	10	81

Driveway 2

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	0	0	0	0	0
6:15-6:30	0	0	0	0	0
6:30-6:45	0	0	0	0	0
6:45-7:00	0	0	0	0	0
7:00-7:15	1	1	0	1	1
7:15-7:30	0	0	0	0	0
7:30-7:45	2	0	0	0	2
7:45-8:00	2	1	1	0	3
8:00-8:15	1	0	0	0	1
8:15-8:30	0	0	1	1	1
8:30 - 8:45	0	0	0	0	0
8:45 - 9:00	0	0	1	0	1
9:00 - 9:15	0	1	0	0	0
9:15 - 9:30	0	0	2	1	2
9:30 - 9:45	0	0	0	0	0
9:45 - 10:00	2	0	1	0	3
10:00 - 10:15	0	0	1	0	1
10:15 - 10:30	1	0	2	1	3
10:30 - 10:45	1	1	0	0	1
10:45 - 11:00	1	0	2	1	3
11:00 - 11:15	1	1	1	0	2
11:15 - 11:30	2	0	3	2	5
11:30 - 11:45	0	0	4	1	4
11:45 - 12:00	1	0	4	2	5
12:00-12:15	0	0	2	2	2
12:15-12:30	0	0	1	0	1
12:30-12:45	0	0	0	0	0
12:45-1:00	0	0	0	0	0
1:00-1:15	0	0	0	0	0
1:15-1:30	0	0	0	0	0
1:30-1:45	0	0	0	0	0
1:45-2:00	0	0	0	0	0
2:00-2:15	0	0	0	0	0
2:15-2:30	0	0	0	0	0
2:30-2:45	0	0	0	0	0
2:45-3:00	0	0	4	1	4
3:00-3:15	1	0	1	0	2
3:15-3:30	0	0	0	0	0
3:30-3:45	0	0	0	0	0
3:45-4:00	0	0	2	0	2
4:00-4:15	0	0	1	1	1
4:15-4:30	0	0	5	0	5
4:30-4:45	0	0	3	0	3
4:45-5:00	0	0	4	0	4
5:00-5:15	0	0	1	0	1
5:15-5:30	0	0	0	0	0
5:30-5:45	0	0	0	0	0
5:45-6:00	0	0	0	0	0
Totals	16	5	47	14	63

Comined Driveways Total

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	0	0	0	0	0
6:15-6:30	0	0	0	0	0
6:30-6:45	0	0	0	0	0
6:45-7:00	1	0	0	0	1
7:00-7:15	1	1	0	1	1
7:15-7:30	3	1	1	0	4
7:30-7:45	3	0	0	0	3
7:45-8:00	6	1	1	0	7
8:00-8:15	1	0	0	0	1
8:15-8:30	1	0	1	1	2
8:30 - 8:45	0	0	0	0	0
8:45 - 9:00	0	0	1	0	1
9:00 - 9:15	3	1	0	0	3
9:15 - 9:30	1	1	4	1	5
9:30 - 9:45	1	0	0	0	1
9:45 - 10:00	3	1	2	0	5
10:00 - 10:15	1	0	2	0	3
10:15 - 10:30	3	1	2	1	5
10:30 - 10:45	5	3	1	0	6
10:45 - 11:00	2	0	5	3	7
11:00 - 11:15	2	2	1	0	3
11:15 - 11:30	7	2	6	2	13
11:30 - 11:45	3	1	4	1	7
11:45 - 12:00	2	0	6	3	8
12:00-12:15	2	0	6	4	8
12:15-12:30	2	2	3	2	5
12:30-12:45	1	0	0	0	1
12:45-1:00	1	0	1	1	2
1:00-1:15	2	0	0	0	2
1:15-1:30	0	0	0	0	0
1:30-1:45	0	0	0	0	0
1:45-2:00	1	0	1	1	2
2:00-2:15	1	0	1	0	2
2:15-2:30	1	0	1	0	2
2:30-2:45	2	1	1	0	3
2:45-3:00	1	0	4	1	5
3:00-3:15	2	1	2	0	4
3:15-3:30	1	0	0	0	1
3:30-3:45	0	0	0	0	0
3:45-4:00	0	0	3	0	3
4:00-4:15	1	1	2	2	3
4:15-4:30	0	0	5	0	5
4:30-4:45	0	0	4	0	4
4:45-5:00	0	0	4	0	4
5:00-5:15	0	0	1	0	1
5:15-5:30	1	0	0	0	1
5:30-5:45	0	0	0	0	0
5:45-6:00	0	0	0	0	0
Totals	68	20	76	24	144

Sonsray Machinery Case

Date 4/1/21

Time	IN	TRKS	OUT	TRKS	Total
6:00-6:15	0	0	0	0	0
6:15-6:30	1	0	0	0	1
6:30-6:45	0	0	0	0	0
6:45-7:00	1	0	0	0	1
7:00-7:15	2	1	2	1	4
7:15-7:30	4	3	2	0	6
7:30-7:45	2	0	3	0	5
7:45-8:00	2	1	1	1	3
8:00-8:15	9	0	2	0	11
8:15-8:30	8	0	2	0	10
8:30 - 8:45	1	0	2	1	3
8:45 - 9:00	3	2	1	1	4
9:00 - 9:15	2	0	4	1	6
9:15 - 9:30	1	0	0	0	1
9:30 - 9:45	0	0	0	0	0
9:45 - 10:00	4	2	1	0	5
10:00 - 10:15	5	1	2	0	7
10:15 - 10:30	1	1	4	0	5
10:30 - 10:45	3	0	0	0	3
10:45 - 11:00	0	0	2	0	2
11:00 - 11:15	2	0	3	0	5
11:15 - 11:30	2	0	1	1	3
11:30 - 11:45	0	0	2	1	2
11:45 - 12:00	1	1	1	1	2
12:00-12:15	2	0	4	0	6
12:15-12:30	0	0	1	0	1
12:30-12:45	2	0	0	0	2
12:45-1:00	1	0	0	0	1
1:00-1:15	4	2	4	2	8
1:15-1:30	2	1	4	3	6
1:30-1:45	2	1	1	1	3
1:45-2:00	2	1	0	0	2
2:00-2:15	1	0	2	1	3
2:15-2:30	2	1	2	1	4
2:30-2:45	2	0	3	0	5
2:45-3:00	1	1	3	0	4
3:00-3:15	2	1	1	0	3
3:15-3:30	2	1	2	1	4
3:30-3:45	0	0	1	0	1
3:45-4:00	5	1	2	0	7
4:00-4:15	1	1	7	1	8
4:15-4:30	0	0	0	0	0
4:30-4:45	0	1	1	0	1
4:45-5:00	0	0	3	0	3
5:00-5:15	2	1	3	0	5
5:15-5:30	0	0	3	0	3
5:30-5:45	0	0	4	0	4
5:45-6:00	0	0	1	0	1
Totals	87	25	87	18	174

APPENDIX G

2024 “WITH PROJECT” LEVEL OF SERVICE

Lanes, Volumes, Timings

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

06/08/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	228	46	31	38	17	44	43	495	89	117	691	462
Future Volume (vph)	228	46	31	38	17	44	43	495	89	117	691	462
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	240		0	200		70	260		140	250		540
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.940				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3273	1669	0	1327	1397	1188	1656	3312	1482	1752	3505	1568
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3273	1669	0	1327	1397	1188	1656	3312	1482	1752	3505	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31				182			127			462
Link Speed (mph)		45			25			45			45	
Link Distance (ft)		859			878			669			718	
Travel Time (s)		13.0			23.9			10.1			10.9	
Peak Hour 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
Heavy Vehicles (%)	7%	7%	7%	36%	36%	36%	9%	9%	9%	3%	3%	3%
Adj. Flow (vph)	228	46	31	38	17	44	43	495	89	117	691	462
Shared Lane Traffic (%)												
Lane Group Flow (vph)	228	77	0	38	17	44	43	495	89	117	691	462
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7

Lanes, Volumes, Timings

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

06/08/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	8						2					
Detector Phase	7	4		3	8	1	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0
Minimum Split (s)	8.5	22.5		8.5	22.5	8.5	8.5	22.5	8.5	8.5	22.5	8.5
Total Split (s)	21.0	31.1		12.4	22.5	17.0	11.2	29.5	12.4	17.0	35.3	21.0
Total Split (%)	23.3%	34.6%		13.8%	25.0%	18.9%	12.4%	32.8%	13.8%	18.9%	39.2%	23.3%
Maximum Green (s)	16.5	26.6		7.9	18.0	12.5	6.7	25.0	7.9	12.5	30.8	16.5
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max	None	None	Max	None
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	15.4	8.7		7.1	6.6	11.7	6.5	28.2	39.9	9.6	33.3	54.8
Actuated g/C Ratio	0.23	0.13		0.11	0.10	0.18	0.10	0.43	0.60	0.15	0.50	0.83
v/c Ratio	0.30	0.31		0.27	0.12	0.12	0.27	0.35	0.09	0.46	0.39	0.34
Control Delay	23.5	22.5		35.9	33.0	0.7	35.9	17.1	1.3	34.8	13.8	1.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.5	22.5		35.9	33.0	0.7	35.9	17.1	1.3	34.8	13.8	1.1
LOS	C	C		D	C	A	D	B	A	C	B	A
Approach Delay		23.2			19.8			16.2			11.1	
Approach LOS		C			B			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 66.2

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.46

Intersection Signal Delay: 14.4

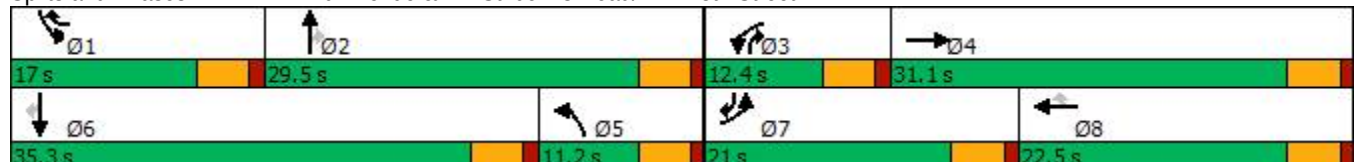
Intersection LOS: B

Intersection Capacity Utilization 47.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street



Queues

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

06/08/2021



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	228	77	38	17	44	43	495	89	117	691	462
v/c Ratio	0.30	0.31	0.27	0.12	0.12	0.27	0.35	0.09	0.46	0.39	0.34
Control Delay	23.5	22.5	35.9	33.0	0.7	35.9	17.1	1.3	34.8	13.8	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.5	22.5	35.9	33.0	0.7	35.9	17.1	1.3	34.8	13.8	1.1
Queue Length 50th (ft)	39	19	15	7	0	18	78	0	47	105	0
Queue Length 95th (ft)	82	55	46	26	0	50	144	12	101	179	15
Internal Link Dist (ft)		779		798			589			638	
Turn Bay Length (ft)	240		200		70	260		140	250		540
Base Capacity (vph)	913	710	163	392	410	173	1409	965	341	1761	1383
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.11	0.23	0.04	0.11	0.25	0.35	0.09	0.34	0.39	0.33

Intersection Summary

HCM 6th Signalized Intersection Summary

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

06/08/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	228	46	31	38	17	44	43	495	89	117	691	462
Future Volume (veh/h)	228	46	31	38	17	44	43	495	89	117	691	462
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1796	1796	1796	1366	1366	1366	1767	1767	1767	1856	1856	1856
Adj Flow Rate, veh/h	228	46	31	38	17	44	43	495	89	117	691	462
Peak Hour 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
Percent Heavy Veh, %	7	7	7	36	36	36	9	9	9	3	3	3
Cap, veh/h	347	150	101	40	105	188	57	1488	710	152	1747	944
Arrive On Green	0.10	0.15	0.15	0.03	0.08	0.08	0.03	0.44	0.44	0.09	0.50	0.50
Sat Flow, veh/h	3319	1001	674	1301	1366	1158	1682	3357	1497	1767	3526	1572
Grp Volume(v), veh/h	228	0	77	38	17	44	43	495	89	117	691	462
Grp Sat Flow(s),veh/h/ln	1659	0	1675	1301	1366	1158	1682	1678	1497	1767	1763	1572
Q Serve(g_s), s	4.1	0.0	2.5	1.8	0.7	2.1	1.6	6.0	2.1	4.0	7.6	3.9
Cycle Q Clear(g_c), s	4.1	0.0	2.5	1.8	0.7	2.1	1.6	6.0	2.1	4.0	7.6	3.9
Prop In Lane	1.00		0.40	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	347	0	251	40	105	188	57	1488	710	152	1747	944
V/C Ratio(X)	0.66	0.00	0.31	0.94	0.16	0.23	0.76	0.33	0.13	0.77	0.40	0.49
Avail Cap(c_a), veh/h	881	0	717	165	396	435	181	1488	710	355	1747	944
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.8	0.0	23.5	30.1	26.8	22.7	29.8	11.3	9.1	27.8	9.8	1.5
Incr Delay (d2), s/veh	2.1	0.0	0.7	52.4	0.7	0.6	18.4	0.6	0.4	8.0	0.7	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	0.9	1.1	0.2	0.6	0.9	1.9	0.7	1.9	2.4	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.9	0.0	24.2	82.5	27.5	23.3	48.1	11.9	9.5	35.8	10.5	3.3
LnGrp LOS	C	A	C	F	C	C	D	B	A	D	B	A
Approach Vol, veh/h	305			99			627			1270		
Approach Delay, s/veh	27.7			46.7			14.0			10.2		
Approach LOS	C			D			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.8	32.1	6.4	13.8	6.6	35.3	11.0	9.3				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	12.5	25.0	7.9	26.6	6.7	30.8	16.5	18.0				
Max Q Clear Time (g_c+I1), s	6.0	8.0	3.8	4.5	3.6	9.6	6.1	4.1				
Green Ext Time (p_c), s	0.1	3.0	0.0	0.3	0.0	6.1	0.5	0.1				
Intersection Summary												
HCM 6th Ctrl Delay	15.1											
HCM 6th LOS	B											

Lanes, Volumes, Timings
2: NE 72nd Avenue & NE 110th Street

06/08/2021

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	9	618	6	10	750
Future Volume (vph)	9	9	618	6	10	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	300	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.932		0.999			
Flt Protected	0.976				0.950	
Satd. Flow (prot)	1728	0	3249	0	1736	3471
Flt Permitted	0.976				0.950	
Satd. Flow (perm)	1728	0	3249	0	1736	3471
Link Speed (mph)	25		45			45
Link Distance (ft)	318		572			669
Travel Time (s)	8.7		8.7			10.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	11%	11%	4%	4%
Adj. Flow (vph)	9	9	618	6	10	750
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	0	624	0	10	750
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	30.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM 6th TWSC
2: NE 72nd Avenue & NE 110th Street

06/08/2021

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	9	9	618	6	10	750
Future Vol, veh/h	9	9	618	6	10	750
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	11	11	4	4
Mvmt Flow	9	9	618	6	10	750
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1016	312	0	0	624	0
Stage 1	621	-	-	-	-	-
Stage 2	395	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.18	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.24	-
Pot Cap-1 Maneuver	238	690	-	-	940	-
Stage 1	504	-	-	-	-	-
Stage 2	656	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	235	690	-	-	940	-
Mov Cap-2 Maneuver	235	-	-	-	-	-
Stage 1	504	-	-	-	-	-
Stage 2	649	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	15.8	0		0.1		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	351	940	-	
HCM Lane V/C Ratio	-	-	0.051	0.011	-	
HCM Control Delay (s)	-	-	15.8	8.9	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	0.2	0	-	

Lanes, Volumes, Timings

3: NE 110th Street & Project Access

06/08/2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	13	17	0	0	2
Future Volume (vph)	4	13	17	0	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.865	
Flt Protected		0.988				
Satd. Flow (prot)	0	1877	1900	0	1644	0
Flt Permitted		0.988				
Satd. Flow (perm)	0	1877	1900	0	1644	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		318	794		508	
Travel Time (s)		8.7	21.7		13.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	4	13	17	0	0	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	17	17	0	2	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	14.2%			ICU Level of Service A		
Analysis Period (min)	15					

HCM 6th TWSC
3: NE 110th Street & Project Access

06/08/2021

Intersection

Int Delay, s/veh 1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	13	17	0	0	2
Future Vol, veh/h	4	13	17	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	4	13	17	0	0	2

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	17	0	38
Stage 1	-	-	17
Stage 2	-	-	21
Critical Hdwy	4.1	-	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.2	-	3.5
Pot Cap-1 Maneuver	1613	-	979
Stage 1	-	-	1011
Stage 2	-	-	1007
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1613	-	977
Mov Cap-2 Maneuver	-	-	977
Stage 1	-	-	1009
Stage 2	-	-	1007

Approach	EB	WB	SB
HCM Control Delay, s	1.7	0	8.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1613	-	-	-	1068
HCM Lane V/C Ratio	0.002	-	-	-	0.002
HCM Control Delay (s)	7.2	0	-	-	8.4
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Lanes, Volumes, Timings

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

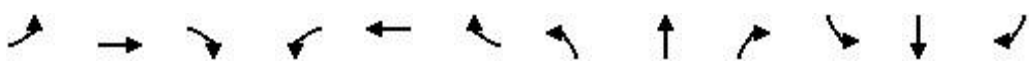
06/08/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	445	25	13	101	67	217	111	883	46	54	545	329
Future Volume (vph)	445	25	13	101	67	217	111	883	46	54	545	329
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	240		0	200		70	260		140	250		540
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.949				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3467	1785	0	1703	1792	1524	1787	3574	1599	1770	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3467	1785	0	1703	1792	1524	1787	3574	1599	1770	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13				127			73			329
Link Speed (mph)		45			25			45			45	
Link Distance (ft)		859			878			669			718	
Travel Time (s)		13.0			23.9			10.1			10.9	
Peak Hour 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
Heavy Vehicles (%)	1%	1%	1%	6%	6%	6%	1%	1%	1%	2%	2%	2%
Adj. Flow (vph)	445	25	13	101	67	217	111	883	46	54	545	329
Shared Lane Traffic (%)												
Lane Group Flow (vph)	445	38	0	101	67	217	111	883	46	54	545	329
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7

Lanes, Volumes, Timings

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

06/08/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	8						2					
Detector Phase	7	4		3	8	1	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5		9.5	22.5	9.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	20.0	25.9		16.6	22.5	11.0	16.6	36.5	16.6	11.0	30.9	20.0
Total Split (%)	22.2%	28.8%		18.4%	25.0%	12.2%	18.4%	40.6%	18.4%	12.2%	34.3%	22.2%
Maximum Green (s)	15.5	21.4		12.1	18.0	6.5	12.1	32.0	12.1	6.5	26.4	15.5
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	None	Max	None	None	Max	None
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	14.0	11.6		12.9	8.3	16.7	9.7	32.4	49.8	6.3	31.7	51.4
Actuated g/C Ratio	0.18	0.15		0.17	0.11	0.22	0.13	0.42	0.65	0.08	0.41	0.67
v/c Ratio	0.70	0.14		0.35	0.35	0.50	0.49	0.59	0.04	0.37	0.37	0.28
Control Delay	37.0	22.7		34.7	38.3	15.8	40.4	20.4	1.0	43.4	20.0	1.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.0	22.7		34.7	38.3	15.8	40.4	20.4	1.0	43.4	20.0	1.8
LOS	D	C		C	D	B	D	C	A	D	C	A
Approach Delay		35.8			24.7			21.7			14.9	
Approach LOS		D			C			C			B	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 76.7

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 22.3

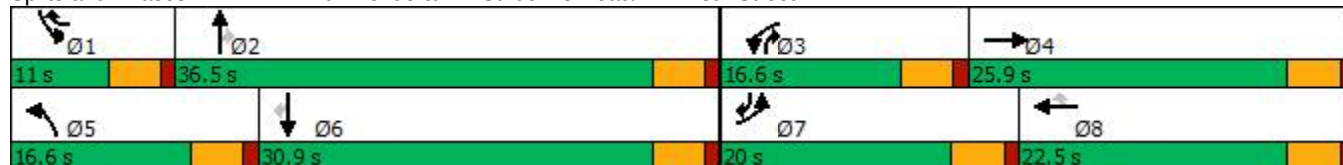
Intersection LOS: C

Intersection Capacity Utilization 61.8%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street



Queues

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

06/08/2021



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	445	38	101	67	217	111	883	46	54	545	329
v/c Ratio	0.70	0.14	0.35	0.35	0.50	0.49	0.59	0.04	0.37	0.37	0.28
Control Delay	37.0	22.7	34.7	38.3	15.8	40.4	20.4	1.0	43.4	20.0	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.0	22.7	34.7	38.3	15.8	40.4	20.4	1.0	43.4	20.0	1.8
Queue Length 50th (ft)	107	11	48	32	37	53	181	0	26	108	0
Queue Length 95th (ft)	162	37	97	70	97	104	257	7	63	167	34
Internal Link Dist (ft)		779		798			589			638	
Turn Bay Length (ft)	240		200		70	260		140	250		540
Base Capacity (vph)	709	513	329	425	434	285	1509	1103	151	1463	1175
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.07	0.31	0.16	0.50	0.39	0.59	0.04	0.36	0.37	0.28

Intersection Summary

HCM 6th Signalized Intersection Summary

1: NE 72nd Avenue & NE St. Johns Road/NE 113th Street

06/08/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	445	25	13	101	67	217	111	883	46	54	545	329
Future Volume (veh/h)	445	25	13	101	67	217	111	883	46	54	545	329
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1885	1885	1811	1811	1811	1885	1885	1885	1870	1870	1870
Adj Flow Rate, veh/h	445	25	13	101	67	217	111	883	46	54	545	329
Peak Hour 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
Percent Heavy Veh, %	1	1	1	6	6	6	1	1	1	2	2	2
Cap, veh/h	546	286	149	129	295	318	143	1458	770	78	1321	837
Arrive On Green	0.16	0.24	0.24	0.07	0.16	0.16	0.08	0.41	0.41	0.04	0.37	0.37
Sat Flow, veh/h	3483	1168	608	1725	1811	1535	1795	3582	1598	1781	3554	1585
Grp Volume(v), veh/h	445	0	38	101	67	217	111	883	46	54	545	329
Grp Sat Flow(s),veh/h/ln	1742	0	1776	1725	1811	1535	1795	1791	1598	1781	1777	1585
Q Serve(g_s), s	9.7	0.0	1.3	4.5	2.5	10.3	4.8	15.2	1.2	2.3	8.9	9.7
Cycle Q Clear(g_c), s	9.7	0.0	1.3	4.5	2.5	10.3	4.8	15.2	1.2	2.3	8.9	9.7
Prop In Lane	1.00		0.34	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	546	0	435	129	295	318	143	1458	770	78	1321	837
V/C Ratio(X)	0.82	0.00	0.09	0.78	0.23	0.68	0.78	0.61	0.06	0.69	0.41	0.39
Avail Cap(c_a), veh/h	687	0	484	266	415	419	276	1458	770	147	1321	837
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.0	0.0	22.9	35.7	28.6	28.8	35.5	18.3	10.9	37.0	18.3	11.0
Incr Delay (d2), s/veh	6.1	0.0	0.1	9.8	0.4	2.9	8.7	1.9	0.1	10.2	1.0	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.0	0.5	2.2	1.1	4.0	2.3	5.9	0.4	1.2	3.4	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.1	0.0	23.0	45.5	29.0	31.7	44.2	20.2	11.0	47.2	19.3	12.4
LnGrp LOS	D	A	C	D	C	C	D	C	B	D	B	B
Approach Vol, veh/h	483			385			1040			928		
Approach Delay, s/veh	36.9			34.8			22.4			18.5		
Approach LOS	D			C			C			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.0	36.5	10.4	23.7	10.8	33.7	16.8	17.3				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	6.5	32.0	12.1	21.4	12.1	26.4	15.5	18.0				
Max Q Clear Time (g_c+l1), s	4.3	17.2	6.5	3.3	6.8	11.7	11.7	12.3				
Green Ext Time (p_c), s	0.0	5.0	0.1	0.1	0.1	3.9	0.6	0.5				
Intersection Summary												
HCM 6th Ctrl Delay	25.3											
HCM 6th LOS	C											

Lanes, Volumes, Timings
2: NE 72nd Avenue & NE 110th Street

06/08/2021

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	9	1033	4	13	626
Future Volume (vph)	9	9	1033	4	13	626
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	300	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.932		0.999			
Flt Protected	0.976				0.950	
Satd. Flow (prot)	1728	0	3536	0	1736	3471
Flt Permitted	0.976				0.950	
Satd. Flow (perm)	1728	0	3536	0	1736	3471
Link Speed (mph)	25		45			45
Link Distance (ft)	318		572			669
Travel Time (s)	8.7		8.7			10.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	2%	2%	4%	4%
Adj. Flow (vph)	9	9	1033	4	13	626
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	0	1037	0	13	626
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 38.7%			ICU Level of Service A			
Analysis Period (min) 15						

HCM 6th TWSC
2: NE 72nd Avenue & NE 110th Street

06/08/2021

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	9	9	1033	4	13	626
Future Vol, veh/h	9	9	1033	4	13	626
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	2	2	4	4
Mvmt Flow	9	9	1033	4	13	626
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1374	519	0	0	1037	0
Stage 1	1035	-	-	-	-	-
Stage 2	339	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.18	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.24	-
Pot Cap-1 Maneuver	139	507	-	-	654	-
Stage 1	308	-	-	-	-	-
Stage 2	699	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	136	507	-	-	654	-
Mov Cap-2 Maneuver	136	-	-	-	-	-
Stage 1	308	-	-	-	-	-
Stage 2	685	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	23.4	0	0.2			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	214	654	-	
HCM Lane V/C Ratio	-	-	0.084	0.02	-	
HCM Control Delay (s)	-	-	23.4	10.6	-	
HCM Lane LOS	-	-	C	B	-	
HCM 95th %tile Q(veh)	-	-	0.3	0.1	-	

Lanes, Volumes, Timings

3: NE 110th Street & Project Access

06/08/2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	30	4	0	0	2
Future Volume (vph)	0	30	4	0	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected						
Satd. Flow (prot)	0	1900	1900	0	1644	0
Flt Permitted						
Satd. Flow (perm)	0	1900	1900	0	1644	0
Link Speed (mph)	25		25	25		
Link Distance (ft)	318		794	508		
Travel Time (s)	8.7		21.7	13.9		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	30	4	0	0	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	30	4	0	2	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)	0		0	12		
Link Offset(ft)	0		0	0		
Crosswalk Width(ft)	16		16	16		
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9			15	9
Sign Control	Free		Free	Stop		
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	13.3%			ICU Level of Service A		
Analysis Period (min)	15					

HCM 6th TWSC
3: NE 110th Street & Project Access

06/08/2021

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	30	4	0	0	2
Future Vol, veh/h	0	30	4	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	30	4	0	0	2
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	4	0	-	0	34	4
Stage 1	-	-	-	-	4	-
Stage 2	-	-	-	-	30	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1631	-	-	-	984	1085
Stage 1	-	-	-	-	1024	-
Stage 2	-	-	-	-	998	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1631	-	-	-	984	1085
Mov Cap-2 Maneuver	-	-	-	-	984	-
Stage 1	-	-	-	-	1024	-
Stage 2	-	-	-	-	998	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		8.3		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1631	-	-	-	1085	
HCM Lane V/C Ratio	-	-	-	-	0.002	
HCM Control Delay (s)	0	-	-	-	8.3	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0	