Kimley»Horn

22722 29th Drive SE
Suite 100
Bothell, WA 98021
425.339.8266

Gemmer
Traffic Impact Analysis

Jurisdiction: City of Marysville

February 2022

090221304

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ATTACHMENTS

1. DEVELOPMENT IDENTIFICATION

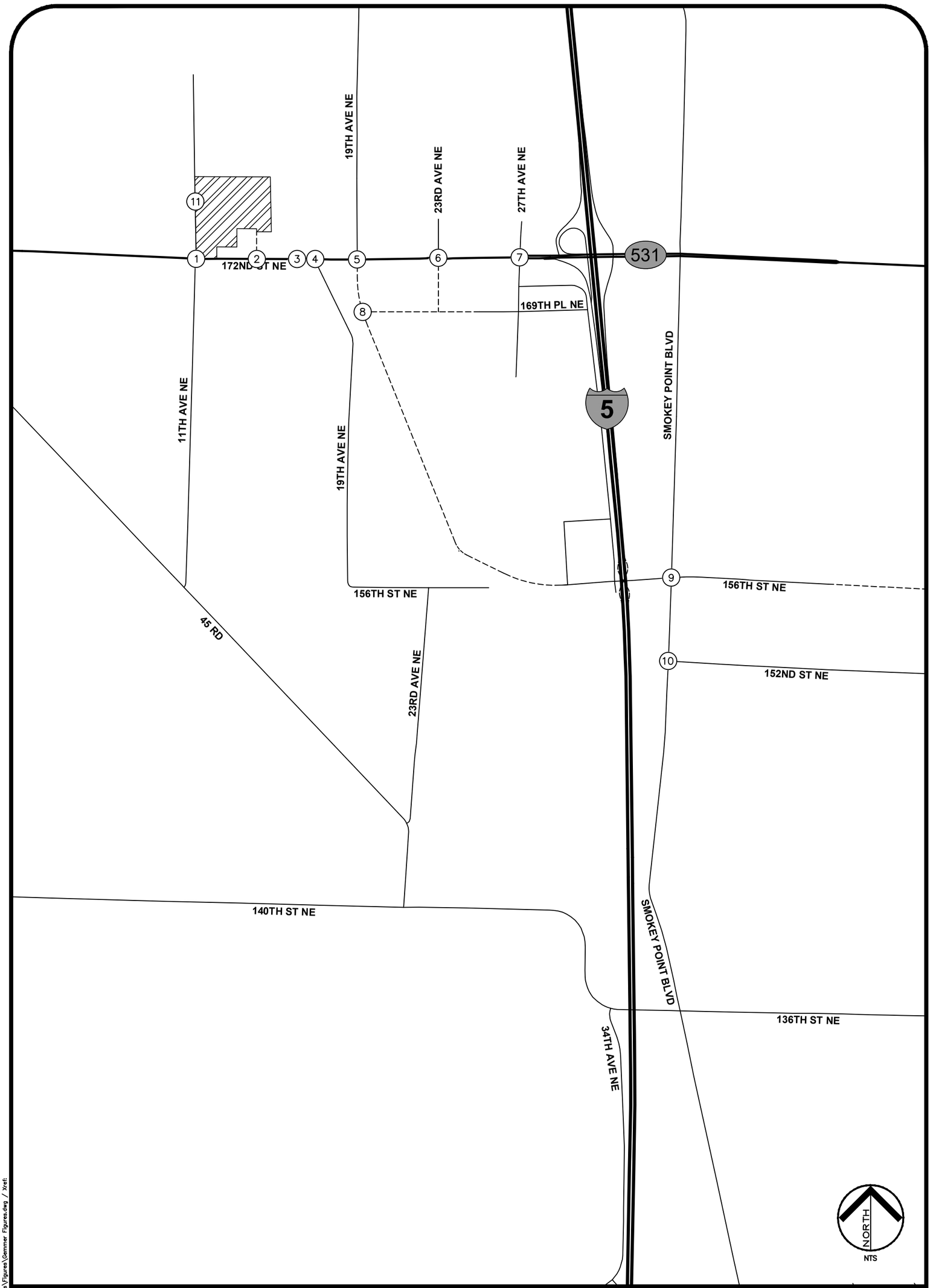
Kimley-Horn and Associates, Inc. has been retained to provide a traffic impact analysis for the proposed Gemmer development. This report is intended to provide the City of Marysville, Snohomish County, and the Washington State Department of Transportation (WSDOT) with the necessary trip generation, trip distribution and level of service information to facilitate their reviews of the development. The Gemmer development is generally located in the northeast corner of 172nd Street NE at 11th Avenue NE. A site vicinity map is included in Figure 1. The development is proposed to consist of 182 single-family residential units with 2 existing single-family residential units being removed.

Brad Lincoln, responsible for this report and traffic analysis, is a licensed professional engineer (Civil) in the State of Washington and member of the Washington State section of ITE.

2. METHODOLOGY

The analysis contained in this report is based on the City of Marysville traffic impact analysis guidelines, which requires the analysis of intersections impacted with 25 or more PM peak-hour trips. The trip generation calculations are based on average trip generation rates published in the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 11th Edition (2021)*. The trip distribution is based on the approved distributions provided by the City of Marysville for the *Lakewood S/O 172nd St NE* area since these distributions resulted in higher impacts to the 172nd Street NE corridor than the *Lakewood N/O 172nd St NE* area. The trip generation, trip distribution and scope of analysis was identified during the scoping process for the development.

The level of service analysis at the study intersections has been performed in accordance with the *Highway Capacity Manual* (HCM) *6th Edition*. Congestion is generally measured in terms of level of service (LOS). Road facilities and intersections are rated between LOS A and LOS F, with LOS A being free flow and LOS F being forced flow or over-capacity conditions. A summary of the level of service criteria is included in Table 1.



GEMMER

CITY OF MARYSVILLE

LEGEND

DEVELOPMENT SITE

STUDY INTERSECTION

FIGURE 1

SITE VICINITY MAP

Kimley»Horn

Date: February 14, 2022 - 9:58am / User: Saruna.Forler
Path: K:\SNO_TPTO\2021\21-3041\Full Analysis\Figures\Gemmer Figures.dwg / Xref:

Table 1: Level of Service Criteria

Level of Service[1]	Expected Delay	Intersection Control Delay (Seconds per Vehicle)	
		Unsignalized Intersections	Signalized Intersections
A	Little/No Delay	≤10	≤10
B	Short Delays	>10 and ≤15	>10 and ≤20
C	Average Delays	>15 and ≤25	>20 and ≤35
D	Long Delays	>25 and ≤35	>35 and ≤55
E	Very Long Delays	>35 and ≤50	>55 and ≤80
F	Extreme Delays[2]	>50	>80

The level of service at two-way stop-controlled intersections is based on the average delay for the stop approach with the highest delay. The level of service at all-way stop-controlled intersections, roundabouts, and signalized intersections is based on the average delay for all vehicles. The level of service analysis has been performed utilizing the *Synchro 11.1, Build 1* software for signalized and stop-controlled intersections. The level of service analysis for roundabout intersection has been performed using the *Sidra Version 9.0.1.9664* software. The City of Marysville identifies acceptable level of service as LOS E for stop-controlled and signalized intersections along the 172nd Street NE and Smokey Point Boulevard corridors. WSDOT has a level of service threshold of LOS E for I-5 intersections, based on the *Development Services Manual, Appendix 29*.

3. TRIP GENERATION

The trip generation calculations for the Gemmer development are based on data published by the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual, 11th Edition (2021).* The average trip generation rates for ITE Land Use Code 210, Single-Family Detached Housing, were used for the trip generation calculations. The trip generation calculations have been performed for 180 new single-family residential units based on the 182 units that are proposed and the credit for the 2 existing single-family units that will be removed. The trip generation of the Gemmer development are summarized in Table 2.

[1] **Source:** *Highway Capacity Manual 6th Edition*.

LOS A: Free-flow traffic conditions, with minimal delay to stopped vehicles (no vehicle is delayed longer than one cycle at signalized intersection).
LOS B: Generally stable traffic flow conditions.
LOS C: Occasional back-ups may develop, but delay to vehicles is short term and still tolerable.
LOS D: During short periods of the peak hour, delays to approaching vehicles may be substantial but are tolerable during times of less demand (i.e. vehicles delayed one cycle or less at signal).
LOS E: Intersections operate at or near capacity, with long queues developing on all approaches and long delays.
LOS F: Jammed conditions on all approaches with excessively long delays and vehicles unable to move at times.

[2] When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in the intersection.

Table 2: Trip Generation Summary

180 New Single-Family Residential Units	Average Daily Trips			AM Peak-Hour Trips			PM Peak-Hour Trips		
	Inbound	Outbound	Total	Inbound	Outbound	Total	Inbound	Outbound	Total
Generation Rate	9.43 trips per unit			0.70 trips per unit			0.94 trips per unit		
Splits	50%	50%	100%	24%	76%	100%	63%	37%	100%
Trips	848.70	848.70	1,697.40	32.76	93.24	126.00	106.60	62.60	169.20

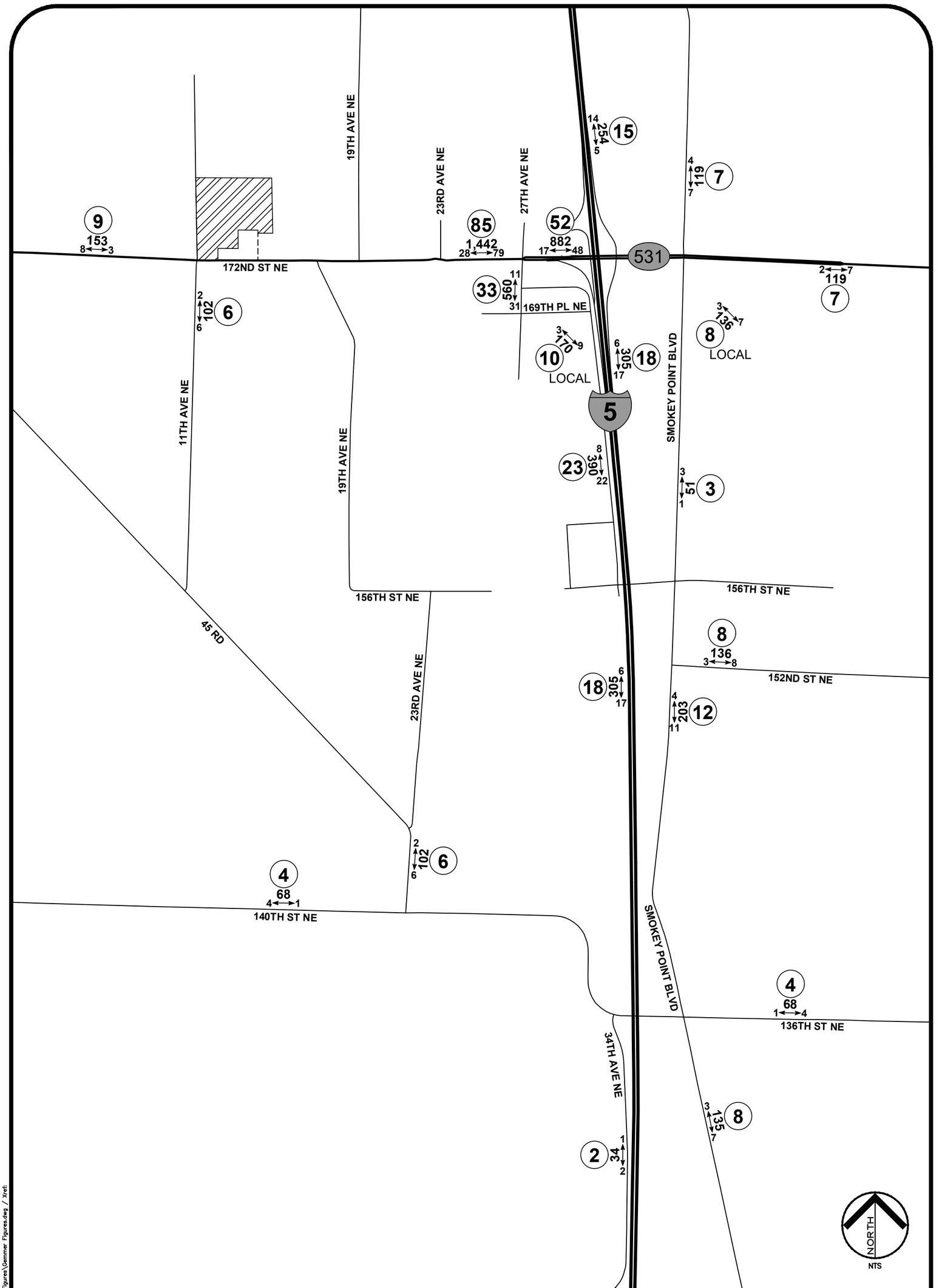
The Gemmer development is anticipated to generate approximately 1,697 average daily trips with 126 AM peak-hour trips and 169 PM peak-hour trips.

4. TRIP DISTRIBUTION

The trip distribution for the Gemmer development is based on distributions provided by the City of Marysville for new developments in the site vicinity based on the *Lakewood S/O 172nd St NE* distributions. The Gemmer development site is technically located on the north side of 172nd Street NE, but the *Lakewood S/O 172nd St NE* distributions shows a higher impact to the 172nd Street NE corridor east of the site than the *Lakewood N/O 172nd St NE* distributions. The *Lakewood S/O 172nd St NE* distributions have therefore been utilized for this site to represent a conservatively high estimate of impacts by the Gemmer development to the 172nd Street NE corridor east of the site. The existing trip distribution has been utilized for the evaluated for the 2025 Opening Year conditions. The horizon trip distribution accounts for connections between 172nd Street NE and 156th Street NE and the Interstate-5 interchange with 156th Street NE. The horizon year trip distribution has been used for the 2031 Horizon Year conditions.

4.1 2025 Opening Year

The opening year trip distribution is based on the existing roadway network. It is anticipated that 52% of the trips generated by the development will travel along 172nd Street NE west of the site to and from the Interstate-5 interchange. Approximately 33% of trips generated by the development will travel to and from the south along 27th Avenue NE, ten percent local at the retail area and twenty-three percent along Twin Lake Avenue. The remaining 15% of the trips generated by the development will be split between trips travel to and from the west along 172nd Street NE, nine percent, and trips travel to and from the south along 11th Avenue NE, six percent. Detailed trip distributions are shown in Figure 2 and Figure 3 for the weekday AM and PM peak-hours, respectively.



GEMMER

CITY OF MARYSVILLE

LEGEND

AWDT / AM ↔ PEAK — NEW DAILY TRAFFIC / NEW PEAK-HOUR TRIPS

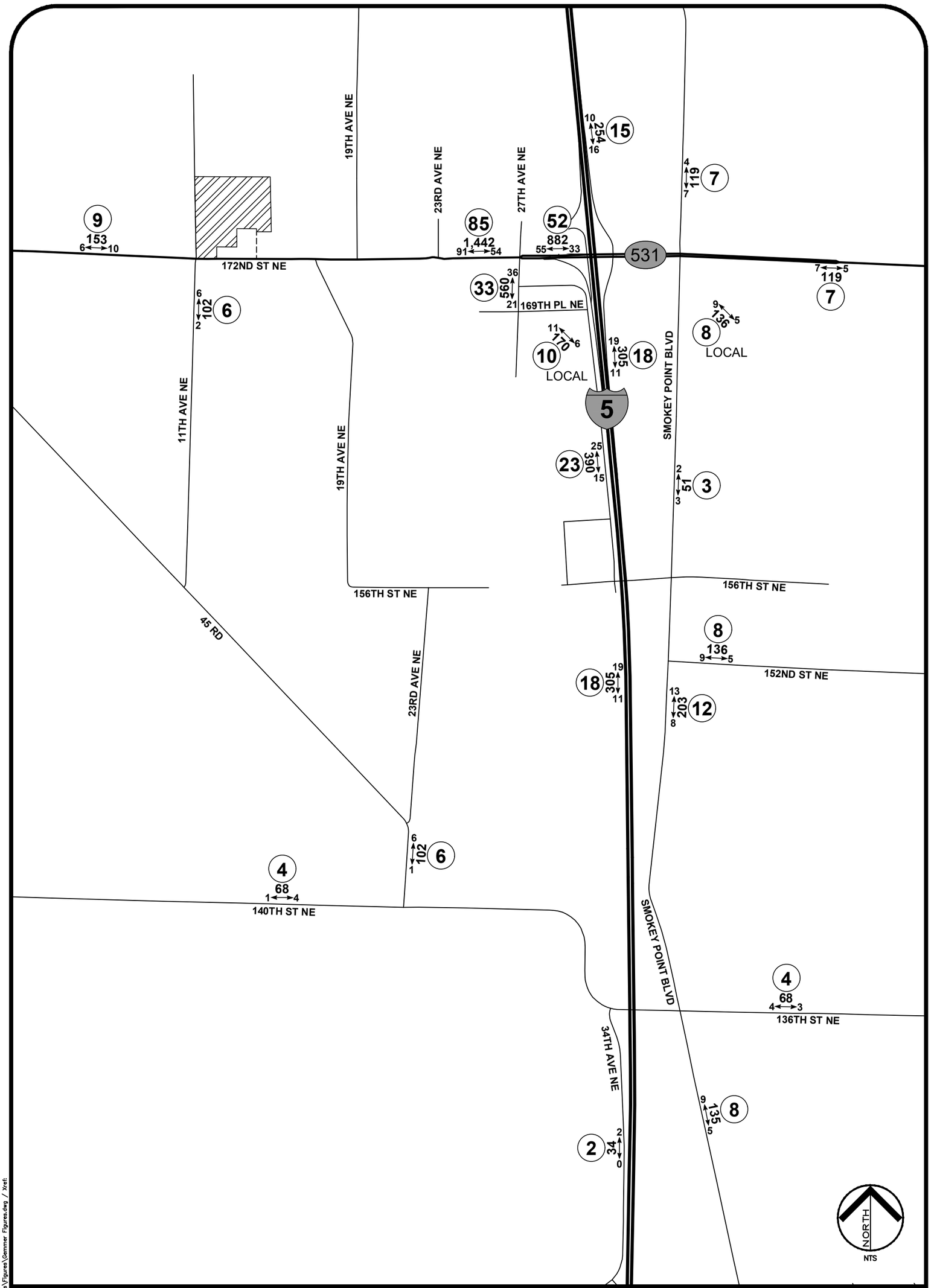
(XX) — TRIP DISTRIBUTION %

FIGURE 2

2025 OPENING YEAR
TRIP DISTRIBUTION
WEEKDAY AM PEAK-HOUR

Kimley»Horn

Date: February 14, 2022 – 10:32am / User: Saruna.Forler
Path: K:\SNO_TPTO\2021\21-3044\Full Analysis\Figures\Gemmer Figures.dwg / Xref:



GEMMER

CITY OF MARYSVILLE

LEGEND

AWDT / PM ↔ PEAK — NEW DAILY TRAFFIC / NEW PEAK-HOUR TRIPS

(XX) — TRIP DISTRIBUTION %

FIGURE 3

2025 OPENING YEAR
TRIP DISTRIBUTION
WEEKDAY PM PEAK-HOUR

Kimley»Horn

Date: February 14, 2022 – 10:50am / User: Saruna.Fanler
Path: K:\SNO_TPTO\2021\21-3041\Full Analysis\Figures\Gemmer Figures.dwg / Xref:

4.2 2031 Horizon Year

The horizon year distribution considers future roadway improvements, particularly new roadways between 172nd Street NE and 156th Street NE and a full Interstate-5 interchange with 156th Street NE. These new roadways and the Interstate-5 interchange are anticipated to cause trips to divert from 172nd Street NE to the new north-south roadways. The trip distribution shows 33% of the trips utilizing the new connection between 172nd Street NE and 156th Street NE, which accounts for the twenty-three percent of the trips that are anticipated to use the Twin Lakes Boulevard and ten percent of the trips traveling to and from the south along Interstate-5 under the 2025 opening year distribution. The 2031 horizon year trip distributions for the weekday AM and PM peak-hours are shown in Figure 4 and Figure 5, respectively.

4.3 Snohomish County Key Intersection Impacts

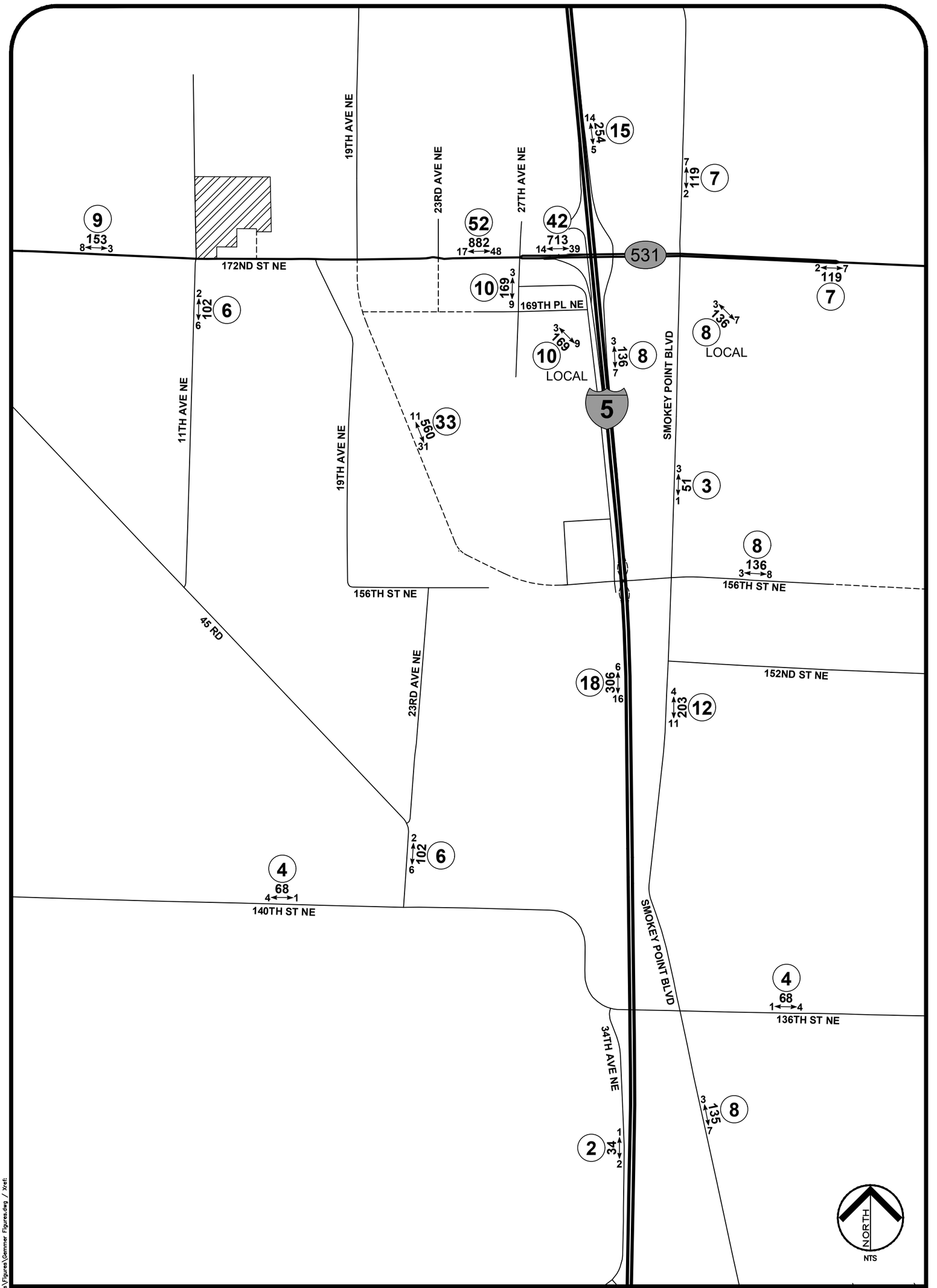
The interlocal agreement between the City of Marysville and Snohomish County requires detailed development trip turning movement data at Snohomish County key intersections impacted with three or more directional trips on an approach or departure. The trips generated by the Gemmer development will impact 4 key intersections during the weekday AM and PM peak-hours. The turning movement volumes at the key intersections are shown in graphical and tabular form in the attachments.

5. INTERSECTION LEVEL OF SERVICE ANALYSIS

The City of Marysville typically requires analysis at intersections impacted with 25 peak-hour trips. Intersection analysis has been performed at the following intersections:

1. 172nd Street NE at 11th Avenue NE – Two-Way Stop-Control
2. 172nd Street NE at School/Gas Station Access – Two-Way Stop-Control
3. 172nd Street NE at 16th Drive NE – Two-Way Stop-Control
4. 172nd Street NE at 19th Drive NE – Two-Way Stop-Control
5. 172nd Street NE at 19th Avenue NE – Two-Way Stop-Control
6. 172nd Street NE at 23rd Avenue NE – Roundabout
7. 172nd Street NE at 27th Avenue NE – Signal
8. 169th Street NE at 19th Avenue NE – Two-Way Stop-Control (2025 horizon year)
9. 156th Street NE at Smokey Point Boulevard – Signal
10. 152nd Street NE at Smokey Point Boulevard – Signal
11. Site Access at 11th Avenue NE – Two-Way Stop-Control (future with development)

The study intersections have been analyzed for the 2022 existing conditions, the 2025 Opening Year conditions, and the 2031 Horizon Year conditions during the weekday PM peak- hour. The 2031 Horizon Year accounts for a 6-year period beyond the opening date, which is anticipated to occur in 2025. The study intersection locations are shown in Figure 1.



GEMMER

CITY OF MARYSVILLE

LEGEND

AWDT / AM ↔ PEAK — NEW DAILY TRAFFIC / NEW PEAK-HOUR TRIPS

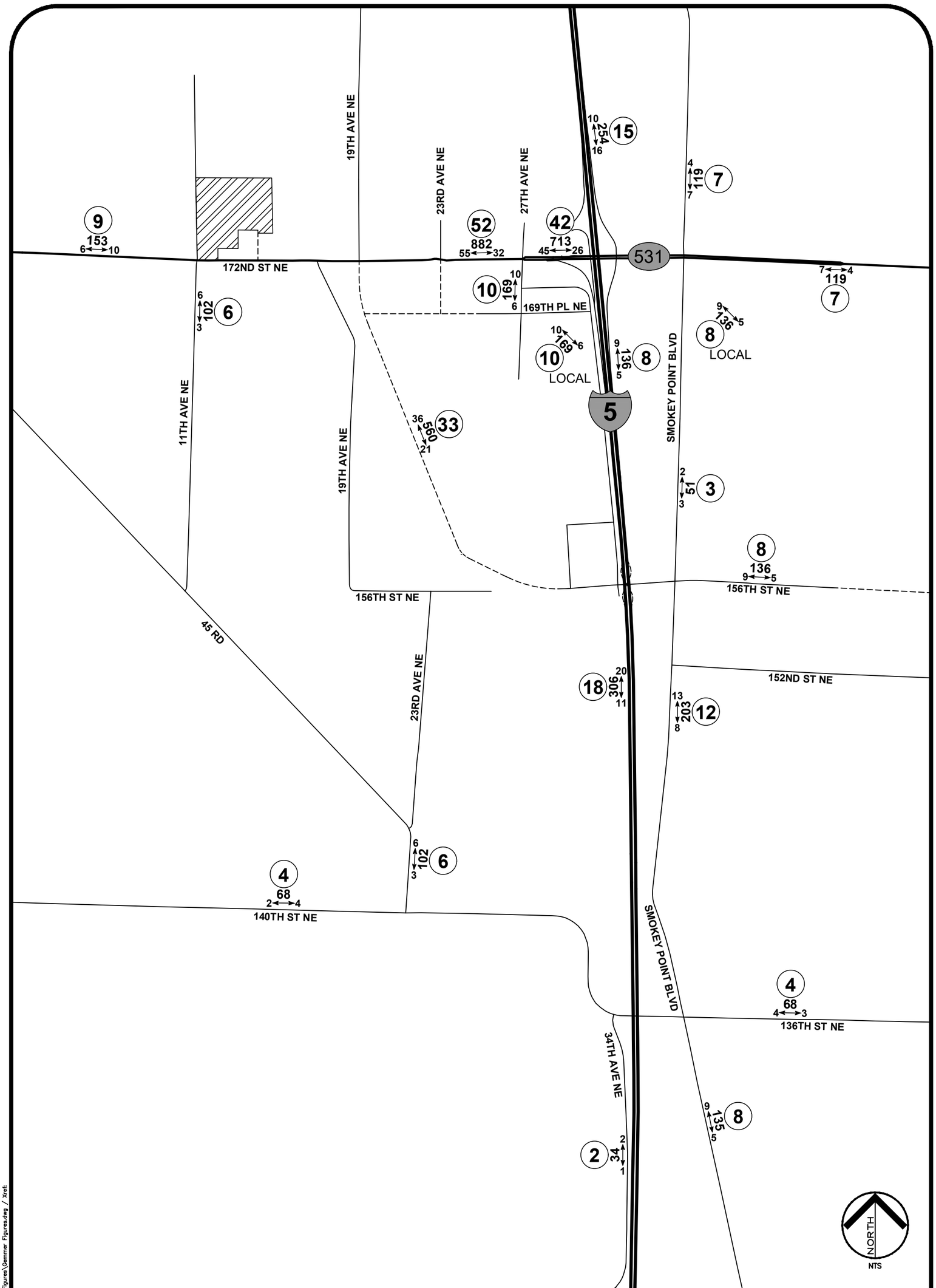
(XX) — TRIP DISTRIBUTION %

FIGURE 4

2031 HORIZON YEAR
TRIP DISTRIBUTION
WEEKDAY AM PEAK-HOUR

Kimley»Horn

Date: February 14, 2022 – 10:48am / User: Saruna.Fanler
Path: K:\SNO_TPTO\2021\21-3041\Full Analysis\Figures\Gemmer Figures.dwg / Xref:



GEMMER

CITY OF MARYSVILLE

LEGEND

AWDT / PM ↔ PEAK — NEW DAILY TRAFFIC / NEW PEAK-HOUR TRIPS

(XX) — TRIP DISTRIBUTION %

FIGURE 5

2031 HORIZON YEAR
TRIP DISTRIBUTION
WEEKDAY PM PEAK-HOUR

Kimley»Horn

Date: February 14, 2022 – 11:06am / User: Saruna.Farler
Path: K:\SNO_TPTO\2021\21-3041\Full Analysis\Figures\Gemmer Figures.dwg / Xref:

5.1 Turning Movement Calculations

The 2022 existing weekday PM peak-hour (occurring between 4:00 and 6:00 PM) turning movements at the study intersections were collected by the independent count firm Traffic Data Gathering (TDG) in January 2022.

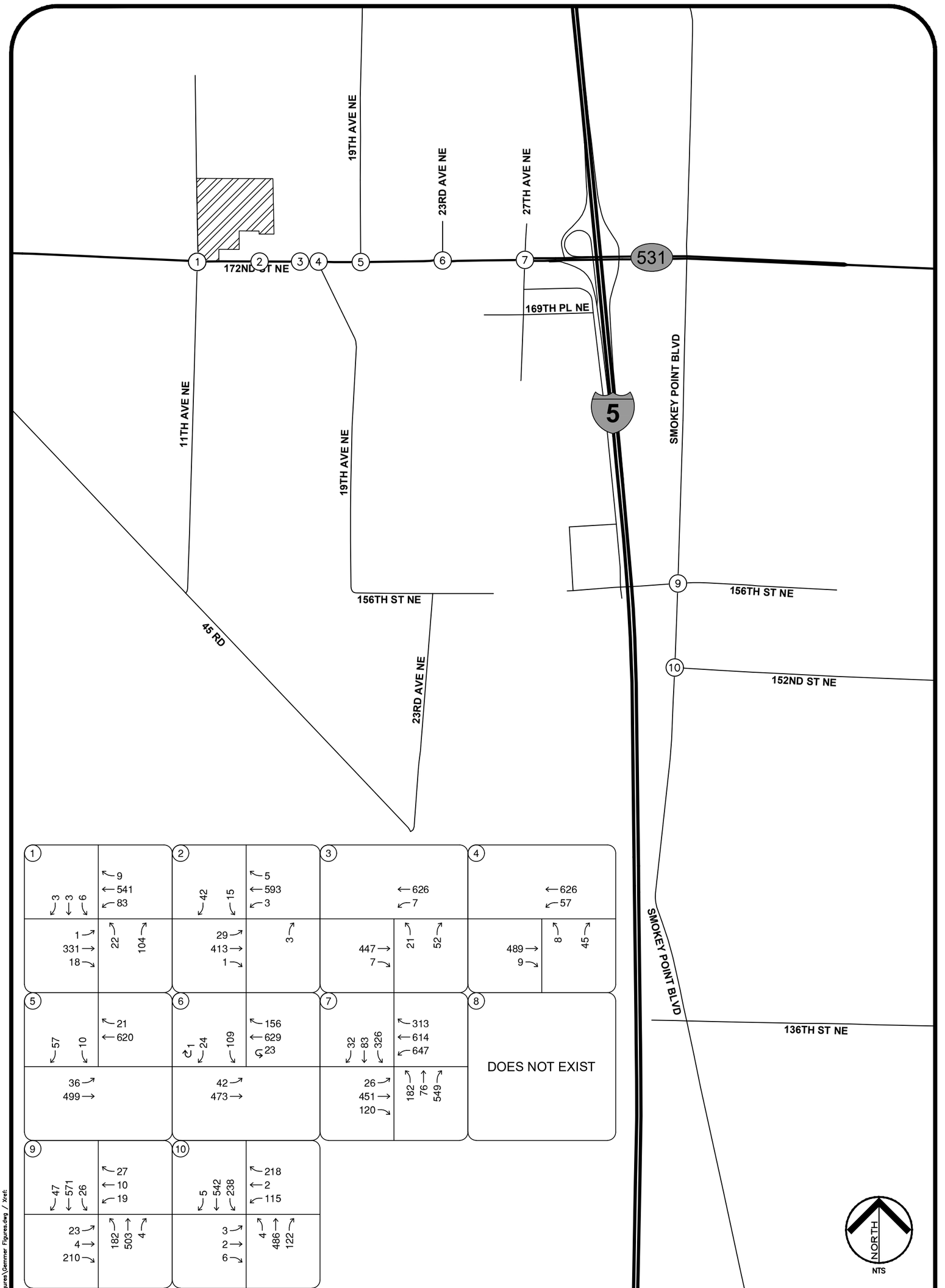
The 2025 and 2031 baseline turning movements at the study intersections have been calculated by applying a 3% annually compounding growth rate to the existing turning movements. The 2031 horizon year turning movement calculations also include a 25% diversion for east-west trips, based on direction from City of Marysville staff, to account for the connections between 172nd Street NE and 156th Street NE. The east-west diversion has been calculated based on east-west through trips at the intersection of 172nd Street NE at 19th Avenue NE.

The 2025 and 2031 future with development turning movements at the study intersections have been calculated by adding the trips generated by the development to the 2025 and 2031 baseline turning movements. The turning movement calculations, including detailed distributions of the trips generated by the development, are shown in the attachments. The following figures identify the turning movements for each scenario:

- Figure 6: 2022 Existing Turning Movements
- Figure 7: 2025 Baseline Turning Movements
- Figure 8: 2025 Opening Year Turning Movements
- Figure 9: 2031 Baseline Turning Movements
- Figure 10: 2031 Horizon Year Turning Movements

5.2 2025 Opening Year Level of Service Calculations

The level of service calculations have been performed utilizing the existing channelization, existing intersection control, heavy vehicle factors, and peak-hour factors from the turning movement counts. The parameters have been used for the existing and 2025 opening year conditions. The intersection level of service analysis for the existing and 2025 opening year conditions is summarized in Table 3.



GEMMER

CITY OF MARYSVILLE

LEGEND

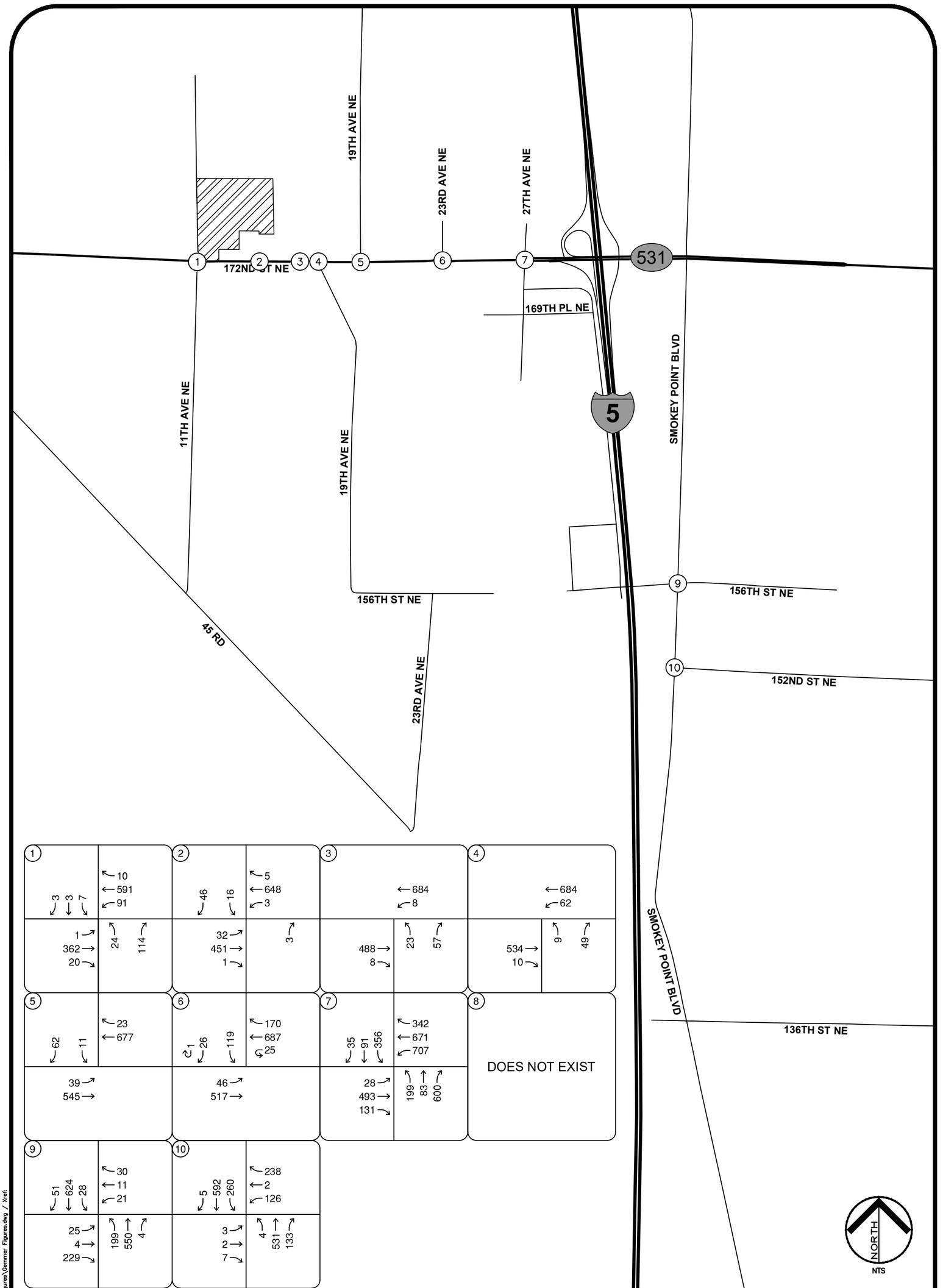
XXX → PM PEAK-HOUR TURNING MOVEMENTVOLUME

FIGURE 6

2022 EXISTING TURNING MOVEMENTS PM PEAK-HOUR

Kimley»Horn

Date: February 14, 2022 – 11:27am / User: Saruna.Farler
Path: K:\SNO_TPTO\2021\21-3041\Full Analysis\Figures\Gemmer Figures.dwg / Xref:



GEMMER

CITY OF MARYSVILLE

LEGEND

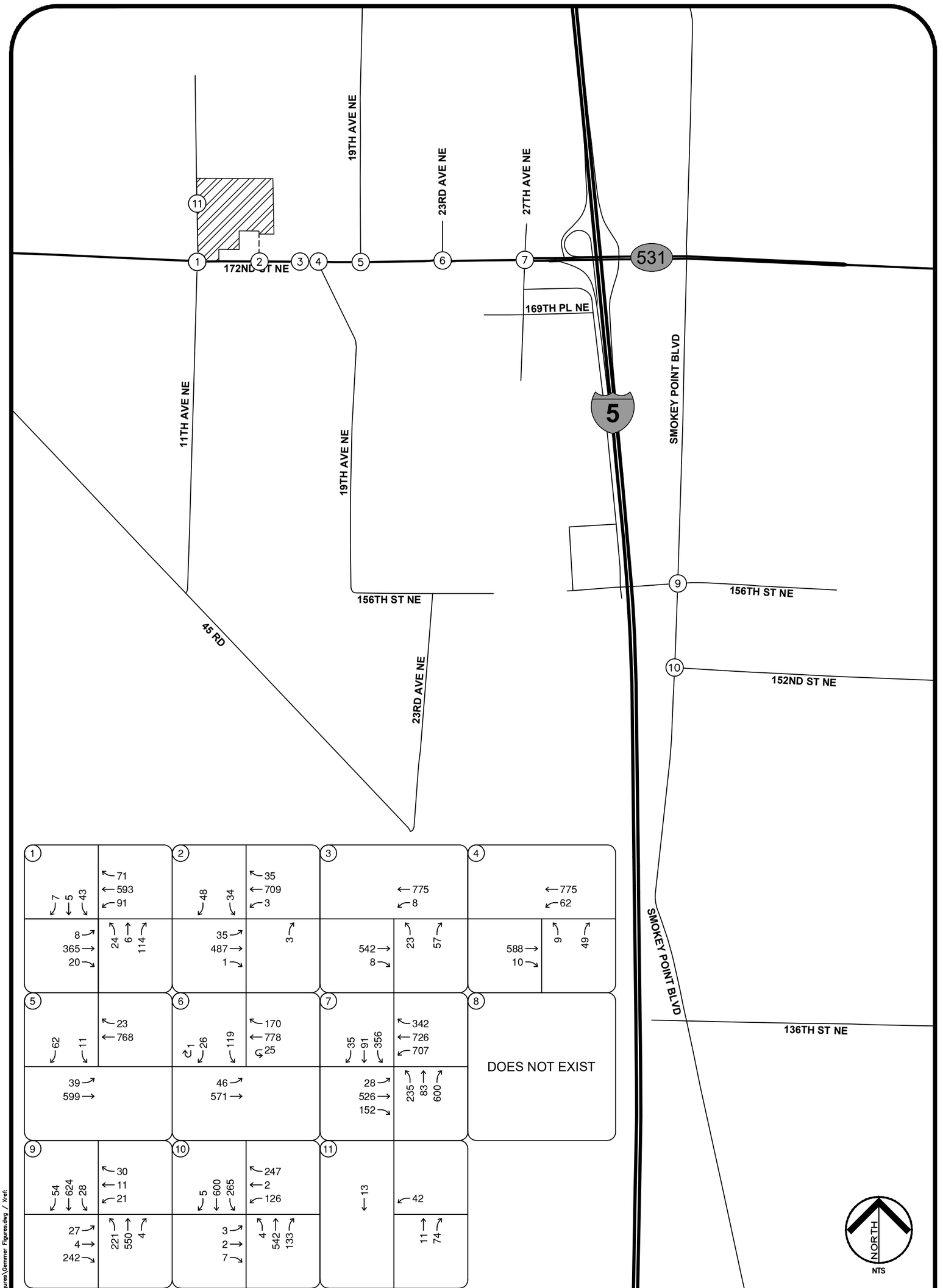
XXX → PM PEAK-HOUR TURNING MOVEMENTVOLUME

FIGURE 7

2025 BASELINE
TURNING MOVEMENTS
PM PEAK-HOUR

Kimley»Horn

Date: February 14, 2022 – 11:28am / User: Saruna.Farler
Path: K:\SNO_TPTO\2021\21-3041\Full Analysis\Figures\Gemmer Figures.dwg / Xref:



GEMMER

CITY OF MARYSVILLE

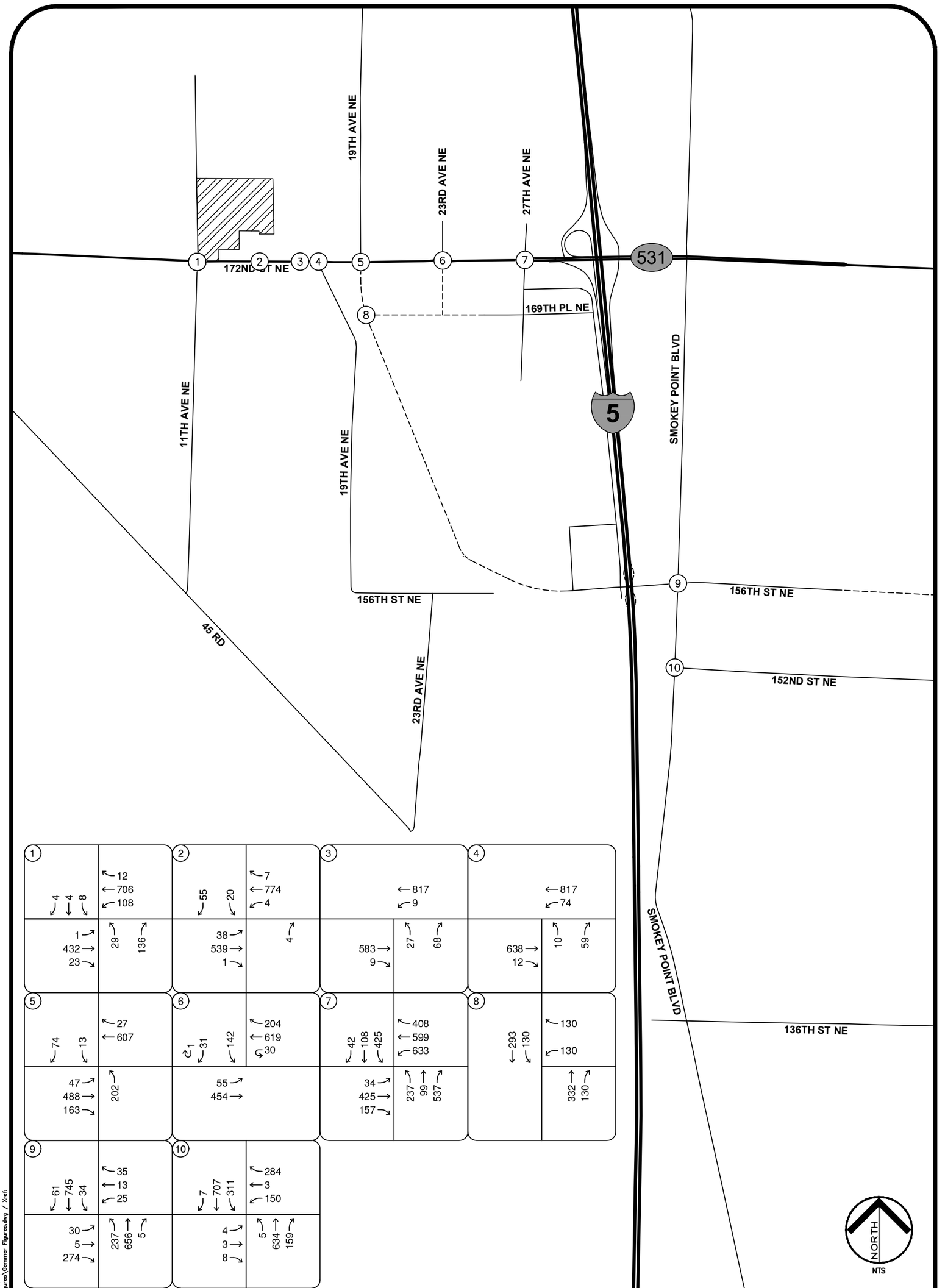
LEGEND

XXX → PM PEAK-HOUR TURNING MOVEMENTVOLUME

FIGURE 8

2025 OPENING YEAR
TURNING MOVEMENTS
PM PEAK-HOUR

Kimley»Horn



GEMMER

CITY OF MARYSVILLE

LEGEND

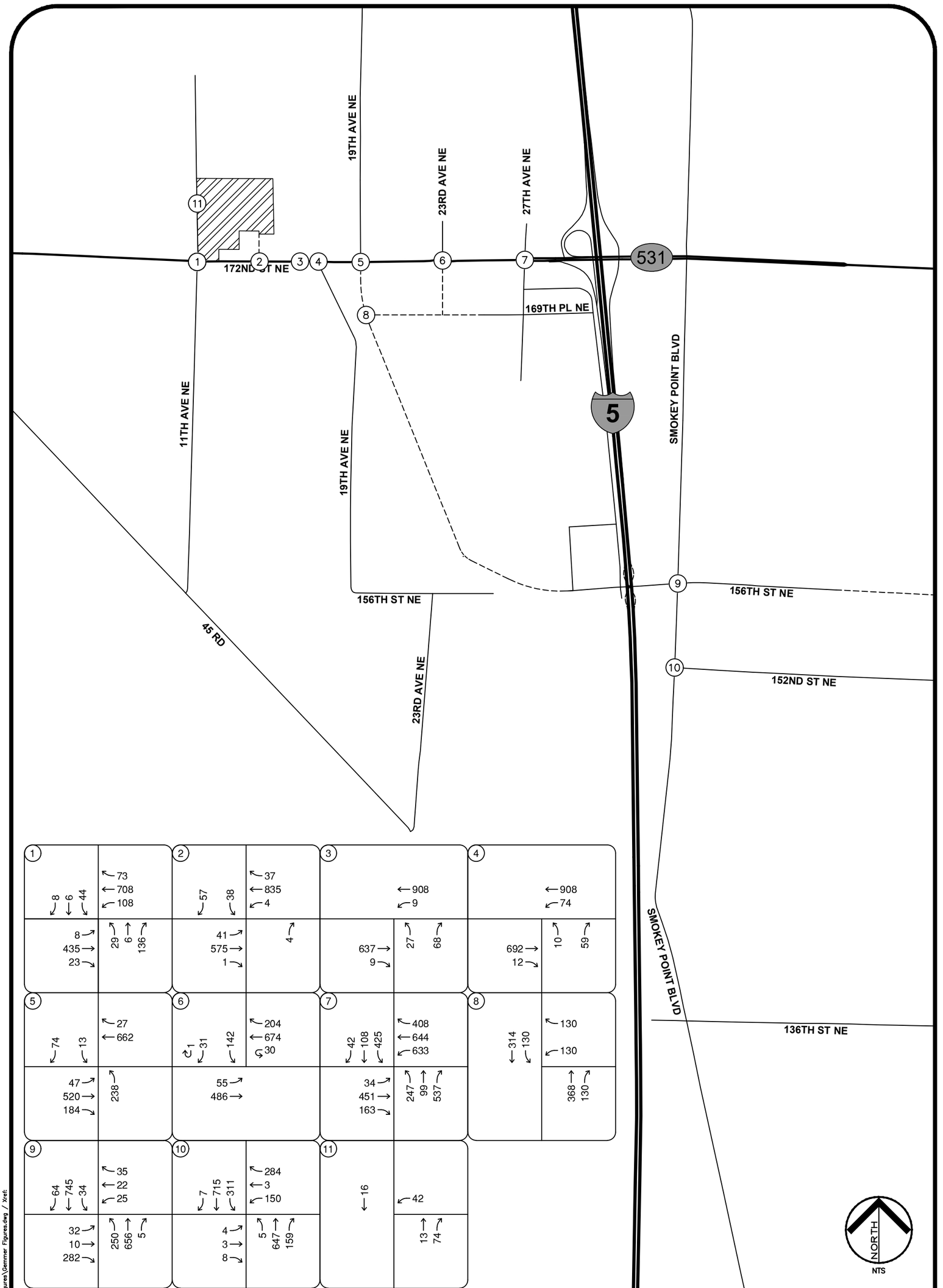
XXX → PM PEAK-HOUR TURNING MOVEMENTVOLUME

FIGURE 9

2031 BASELINE
TURNING MOVEMENTS
PM PEAK-HOUR

Kimley»Horn

Date: February 14, 2022 - 11:30am / User: Saruna.Farler
Path: K:\SNO_TPTO\2021\21-3041\Full Analysis\Figures\Gemmer Figures.dwg / Xref:



GEMMER

CITY OF MARYSVILLE

LEGEND

XXX → PM PEAK-HOUR TURNING MOVEMENTVOLUME

FIGURE 10

2031 HORIZON YEAR
TURNING MOVEMENTS
PM PEAK-HOUR

Kimley»Horn

Date: February 14, 2022 - 11:31am / User: Sarunas.Forler
Path: K:\SNO_TPTO\2021\21-3044\Full Analysis\Figures\Gemmer Figures.dwg / Xref:

Table 3: Level of Service Summary – 2025 Opening Year Conditions

Intersection	Control	2022 Existing Conditions		2025 Baseline Conditions		2025 Opening Year Conditions	
		LOS	Delay	LOS	Delay	LOS	Delay
1. 172nd Street NE at 11th Avenue NE	Two-Way Stop-Control	D	27.8 sec	D	34.0 sec	F	81.3 sec
2. 172nd Street NE at School/Gas Access	Two-Way Stop-Control	C	15.3 sec	C	16.6 sec	C	21.0 sec
3. 172nd Street NE at 16th Place NE	Two-Way Stop-Control	B	13.9 sec	B	14.9 sec	C	16.1 sec
4. 172nd Street NE at 19th Place NE	Two-Way Stop-Control	C	16.1 sec	C	18.2 sec	C	20.9 sec
5. 172nd Street NE at 19th Avenue NE	Two-Way Stop-Control	C	16.8 sec	C	18.8 sec	C	22.0 sec
6. 172nd Street NE at 23rd Avenue NE	Roundabout	A	5.2 sec	A	5.5 sec	A	5.6 sec
7. 172nd Street NE at 27th Avenue NE	Signal	D	47.2 sec	D	52.1 sec	E	56.9 sec
8. 169th Street NE at 19th Avenue NE	Two-Way Stop-Control	---	---	---	---	---	---
9. 156th Street NE at Smokey Point Boulevard	Signal	B	13.3 sec	B	13.9 sec	B	14.0 sec
10. 152nd Street NE at Smokey Point Boulevard	Signal	B	12.4 sec	B	13.0 sec	B	13.2 sec
11. Site Access at 11th Avenue NE	Two-Way Stop-Control	---	---	---	---	A	9.0 sec

The 2025 opening year analysis shows that the majority of the study intersections will operate at acceptable levels of service under the 2025 baseline and 2025 opening year analysis. The exception is the intersection of 172nd Street NE at 11th Avenue NE. The intersection is anticipated to operate at LOS F with the Gemmer development. Improvements for this intersection are discussed later in this report. The level of service calculations are included in the attachments.

5.3 2031 Horizon Year Level of Service Calculations

The 2031 horizon year level of service calculations account for the planned improvements along 172nd Street NE that are identified in the City of Marysville *Lakewood Neighborhood Master Plan (2017)*. These improvements include:

- 3-lane section between 11th Avenue NE and 19th Avenue NE
- 5-lane section east of 19th Avenue NE
- 19th Avenue NE connection between 172nd Street NE and 156th Street NE
- 169th Street NE connection east of 19th Avenue NE
- Interstate-5 interchange with 156th Street NE
- Roundabouts at major intersections along the 172nd Street NE corridor

The intersection level of service for the existing and 2031 horizon year conditions is summarized in Table 4.

Table 4: Level of Service Summary – 2031 Horizon Year Conditions

Intersection	Control	2022 Existing Conditions		2031 Baseline Conditions		2031 Horizon Year Conditions	
		LOS	Delay	LOS	Delay	LOS	Delay
1. 172nd Street NE at 11th Avenue NE	Two-Way Stop-Control	D	27.8 sec	F	54.3 sec	F	229.9 sec
2. 172nd Street NE at School/Gas Access	Two-Way Stop-Control	C	15.3 sec	D	32.5 sec	D	27.9 sec
3. 172nd Street NE at 16th Place NE	Two-Way Stop-Control	B	13.9 sec	C	17.6 sec	C	19.4 sec
4. 172nd Street NE at 19th Place NE	Two-Way Stop-Control	C	16.1 sec	C	24.8 sec	D	30.5 sec
5. 172nd Street NE at 19th Avenue NE	Two-Way Stop-Control	C	16.8 sec	F	>500 sec	F	>500 sec
6. 172nd Street NE at 23rd Avenue NE	Roundabout	A	5.2 sec	A	5.9 sec	A	5.9 sec
7. 172nd Street NE at 27th Avenue NE	Signal	D	47.2 sec	D	51.9 sec	D	54.0 sec
8. 169th Street NE at 19th Avenue NE	Two-Way Stop-Control	---	---	D	23.1 sec	D	25.2 sec
9. 156th Street NE at Smokey Point Boulevard	Signal	B	13.3 sec	B	14.9 sec	B	16.0 sec
10. 152nd Street NE at Smokey Point Boulevard	Signal	B	12.4 sec	B	15.0 sec	B	15.2 sec
11. Site Access at 11th Avenue NE	Two-Way Stop-Control	---	---	---	---	A	9.1 sec

The level of service analysis for the 2031 horizon year conditions shows that the majority of study intersections are anticipated to operate at acceptable levels of service with the Gemmer development and the planned improvements. There are two intersections, 172nd Street NE at 11th Avenue NE and 19th Avenue NE, that are anticipated to operate at LOS F under the 2031 baseline conditions, regardless of whether the Gemmer development is constructed. Improvements for these intersections are discussed in more detail later in this report. The level of service calculations are included in the attachments.

5.4 Intersection Level of Service Calculations with Improvements

5.4.1. 2025 Opening Year Conditions

The intersection of 172nd Street NE at 11th Avenue NE is currently a two-way stop-controlled intersection and is anticipated to operate at LOS F under the 2025 opening year conditions, 2031 baseline conditions, and 2031 horizon year conditions. The intersection is identified in the City of Marysville *Lakewood Neighborhood Master Plan (2017)* as a roundabout. However, the west side of the intersection is within Snohomish County and there is likely not sufficient right of way for a roundabout. The intersection has therefore also been analyzed as a signalized intersection with a simple 2-phase signal. The 2025 opening year analysis with improvements is summarized in Table 5.

Table 5: Level of Service Summary with Improvements – 2025 Opening Year Conditions

Intersection	Control	2022 Existing Conditions		2025 Baseline Conditions		2025 Opening Year Conditions	
		LOS	Delay	LOS	Delay	LOS	Delay
1. 172nd Street NE at 11th Avenue NE	Two-Way Stop-Control	D	27.8 sec	D	34.0 sec	F	81.3 sec
	Signal	---	---	---	---	A	8.8 sec
	Roundabout	---	---	---	---	A	3.3 sec

The analysis shows that a signal or roundabout improvement would allow the intersection of 172nd Street NE at 11th Avenue NE operate at acceptable LOS A under the 2025 opening year conditions. The roundabout is identified in the City of Marysville *Lakewood Neighborhood Master Plan (2017)*; however, a signal should be an acceptable alternative if there is not adequate right of way along the west side of the intersection. The improvement for this intersection should be a condition of the Gemmer development since the trips generated by the development will cause the intersection to change from acceptable LOS D to failing LOS F. These improvements and any potential credit for these improvements are discussed later in this report.

5.4.2. 2031 Horizon Year Conditions

The intersection of 172nd Street NE at 11th Avenue NE will continue to operate at deficient LOS F under the 2031 horizon year conditions. Additionally, the intersection of 172nd Street NE at 19th Avenue NE will become a 4-leg intersection with the extension between 172nd Street NE and 156th Street NE. This intersection is planned to be improved to a roundabout. However, there may not be sufficient right of way along the south side of the intersection. The intersection has therefore also been analyzed as a signalized intersection. The level of service analysis for the 2031 horizon year conditions with improvements is summarized in Table 6.

Table 6: Level of Service Summary with Improvements – 2031 Horizon Year Conditions

Intersection	Control	2022 Existing Conditions		2031 Baseline Conditions		2031 Horizon Year Conditions	
		LOS	Delay	LOS	Delay	LOS	Delay
1. 172nd Street NE at 11th Avenue NE	Two-Way Stop-Control	D	27.8 sec	F	54.3 sec	F	229.9 sec
	Signal	---	---	A	8.7 sec	A	9.7 sec
	Roundabout	---	---	A	2.9 sec	A	3.4 sec
5. 172nd Street NE at 19th Avenue NE	Two-Way Stop-Control	C	16.8 sec	F	>500 sec	F	>500 sec
	Signal	---	---	B	16.1 sec	B	18.5 sec
	Roundabout	---	---	A	5.9 sec	A	5.9 sec

The level of service analysis shows that the intersection of 172nd Street NE at 19th Avenue NE will operate at acceptable levels of service with either a signal or a roundabout. Neither of these improvements should be a condition of the Gemmer development since the trips generated by the development do not cause the intersection to go from an acceptable level of service to a deficient level of service. The mitigation fees discussed later in this report should sufficiently mitigate the impacts of the Gemmer development on the intersection of 172nd Street NE at 11th Avenue NE. The level of service calculations are included in the attachments.

6. ACCESS ANALYSIS

The Gemmer development is proposed to construct one new access to 11th Avenue NE and utilize the existing gas station access to 172nd Street NE. The new access to 11th Avenue NE is anticipated to operate at LOS A under the 203a horizon year conditions as a two-way stop-controlled intersection without any additional channelization. The site access to 11th Avenue NE will also have adequate sight distance in both directions. Additional roadway improvements other than standard frontage improvements should not be required along the 11th Avenue NE frontage.

7. TRAFFIC MITIGATION FEES

The City of Marysville has an interlocal agreement with Snohomish County that provides for the payment of traffic mitigation fees to Snohomish County for City of Marysville developments. The City of Marysville also has an understanding with WSDOT for the payment of traffic mitigation fees.

7.1 City of Marysville

The City of Marysville traffic mitigation fees have been calculated using the residential rate of $6,300 per unit. The Gemmer development is proposed to include 180 new residential units based on 182 units proposed and 2 existing units being removed. These units will result in traffic mitigation fees of $1,134,000.00.

It is important to note that this mitigation fee does not include any credits for frontage improvements along 172nd Street NE or credits for any other roadway or intersection improvements completed as part of the development that are creditable to the City of Marysville traffic mitigation fees.

7.2 Snohomish County

The City of Marysville and Snohomish County have an interlocal agreement that provides for the payment of traffic mitigation for impacts to Snohomish County roadways by City of Marysville developments. Traffic mitigation fees are based on predetermined area impacts or impacts to actual improvement projects. There is only one Snohomish County improvement project identified in the Snohomish County *Transportation Needs Report* that is anticipated to be impacted 3 directional PM peak-hour trips generated by the Gemmer development. This improvement is the intersection of 140th Street NE at 23rd Avenue NE. This intersection is anticipated to be impacted by 102 weekday daily trips (Figure 3 and Figure 5). The current Snohomish County fee for developments located in the City of Marysville is $157 per daily trip. The impact of 102 average daily trips therefore results in a Snohomish County traffic mitigation fee of $16,014.00.

7.3 Washington State Department of Transportation

There are two major WSDOT improvements in the site vicinity that are impacted by trips generated by the Gemmer development. These improvements are the 172nd Street NE/SR-531 corridor improvements and the 156th Street NE interchange with Interstate-5. Both of these improvements are identified as funded as part of the Connecting Washington legislation. Payment of WSDOT traffic mitigation fees should therefore not be a condition of the Gemmer development.

8. CONCLUSIONS

The Gemmer development is proposed to consist of 182 single-family residential units. There are 2 existing single-family residential units on the site that will be removed and are creditable to the Gemmer development. The 180new single-family residential units of the development are anticipated to generate approximately 1,697 new average daily trips with 126 new AM peak-hour trips and 169 new PM peak-hour trips.

The intersections that have been analyzed as part of this report are all anticipated to operate at acceptable levels of service under the 2025 opening year and 2031 horizon year conditions with the exception of 172nd Street NE at 11th Avenue NE and 172nd Street NE at 19th Avenue NE. The intersection of 172nd Street NE at 11th Avenue NE will operate at LOS A as either a signalized intersection or a roundabout. There is not anticipated to be sufficient right of way on the west side of the intersection for a roundabout. The Gemmer development should therefore only be conditioned to provide the signal improvement. The intersection of 172nd Street NE at 19th Avenue NE is anticipated to operate at LOS F regardless of the Gemmer development. There may not be sufficient right of way for the planned roundabout, but the intersection is anticipated to operate at acceptable LOS B or better as either a signal or a roundabout.

The development will have City of Marysville traffic mitigation fees of $1,134,000.00 and Snohomish County traffic mitigation fees of $16,014.00. WSDOT traffic mitigation fees should not be required for the Gemmer development since the major WSDOT improvements in the site vicinity are identified as funded under the Connecting Washington legislation. It is important to note that the City of Marysville fees do not include any credit for frontage improvements along 172nd Street NE, which should be creditable towards the City of Marysville fees, or credit for any other intersection or roadway improvements completed as part of the development.

Site Plan

A PORTION OF SECTION 19, TOWNSHIP 31 NORTH, RANGE 5 EAST, W.M.

Scale: 1"=100'

PROJECT INFORMATION

Tax Parcel Numbers	310519-004-009-00, 310519-004-011-00
Total Area	1,290,592 sf (29.63 ac)
GPP Designation	-
Existing Zoning	R-6.5 Single Family High
Existing Land Use	910 Undeveloped (Vacant) Land
Proposed Land Use	Single Family Dwelling Units
Number of Lots	182
Average Lot Size	3,930
Smallest Lot	3,514
Net Lot Density	7.68 du/net acre

LOCAL SERVICES

Sewage Disposal:	City Of Marysville
Water District:	City Of Marysville
School District:	Lakewood School District 306
Fire District:	Marysville
Post Office:	City Of Marysville
Electric:	Snohomish County PUD
Phone:	Frontier Communications
Cable:	Comcast
Gas:	

CONTACT PERSON

Land Technologies Inc.
Merle Ash
18820 3rd Ave. NE
Arlington, WA 98223
360.652.9727
merle@landtechway.com

ENGINEER

Land Technologies, Inc.
Tyler Foster, P.E.
18820 3rd Ave. NE
Arlington, WA 98223
360.652.9727
Tyler@landtechway.com

SURVEYOR

North Peak Associates LLC
Richard Van Mourik
17270 Woodinville Redmond Rd NE Ste 705
Woodinville, WA 98072
206.601.4682

SITE ADDRESS

1125 & 1507 172nd St NE
Marysville, WA 98271

APPLICANT

Robinett Brothers, LLC
2825 Colby Ave, Ste 304
Everett, WA 98201
425.259.9000

CERTIFIED EROSION CONTROL SPECIALIST

-
-
-
-

OWNER

Bradley K. Gemmer & Myron F. Gemmer
1507 - 172nd St NE
Marysville, WA 98271
-

LAND TECHNOLOGIES
18820 Third Avenue, N.E.
Arlington, WA 98223
360-652-9727

MAKING A "WAY" OUT OF "NO WAY"

PROJECT LEAD: Merle
CHECKED BY: Tyler
DRAWN BY: -
APPLICATION DATE: -
SITE APPROVAL: -
REVISION DATE: -
LDA APPROVAL: -
AS-BUILT: -

Lakewood PRD
1125 & 1507 172nd St NE, Arlington, WA 98223
A PORTION OF SECTION 19, TOWNSHIP 31 NORTH, RANGE 5 EAST, W.M.

COVER SHEET

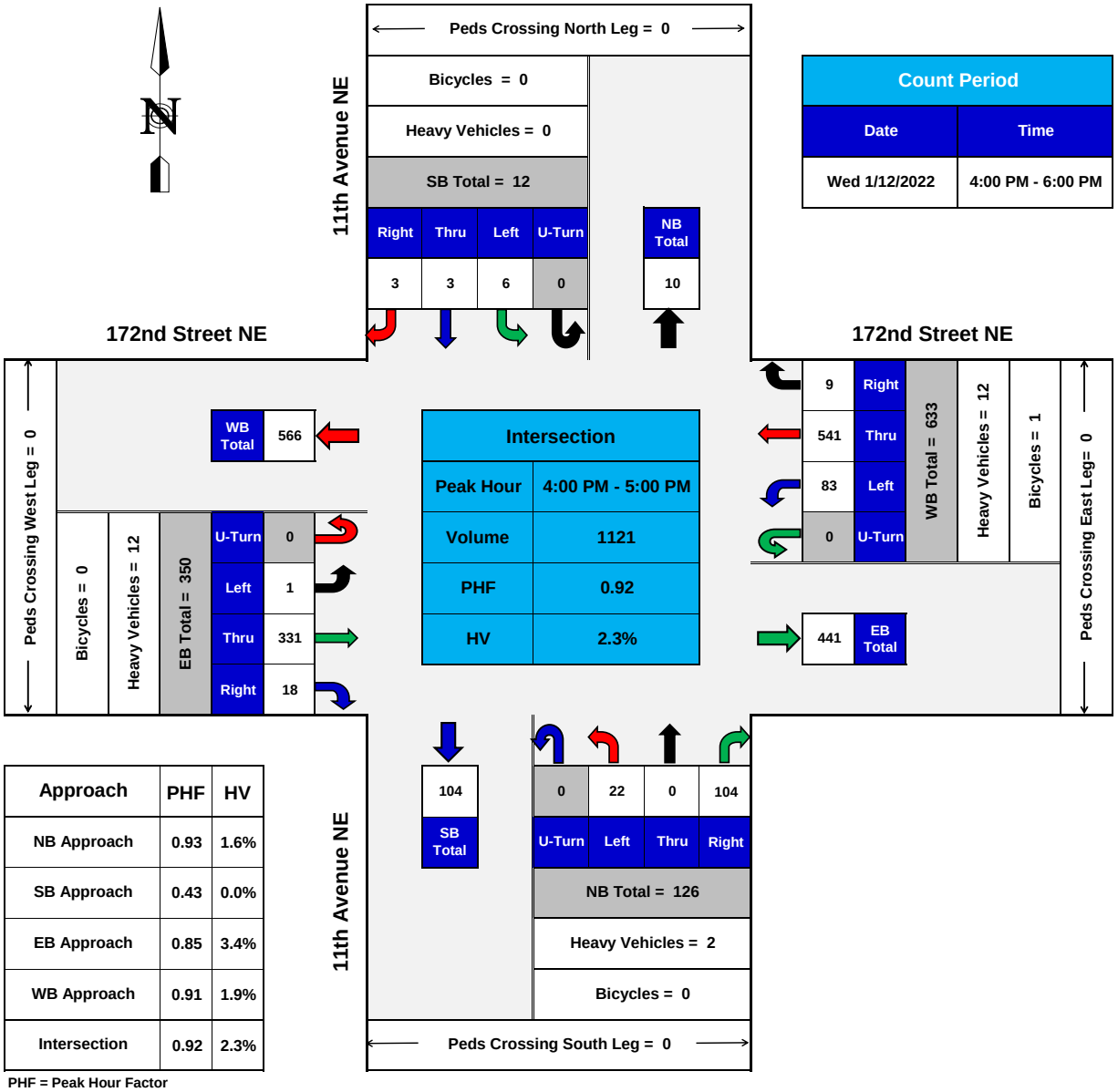
Robinett Brothers, LLC
2825 Colby Ave, Ste 304, Everett, WA 98201

P1 SHEET of P5
24x36
PreA21-050
20-xxxxxx LDA

Count Data

172nd Street NE @ 11th Avenue NE

Arlington, WA



Approach	PHF	HV
NB Approach	0.93	1.6%
SB Approach	0.43	0.0%
EB Approach	0.85	3.4%
WB Approach	0.91	1.9%
Intersection	0.92	2.3%

PHF = Peak Hour Factor
HV = Heavy Vehicles

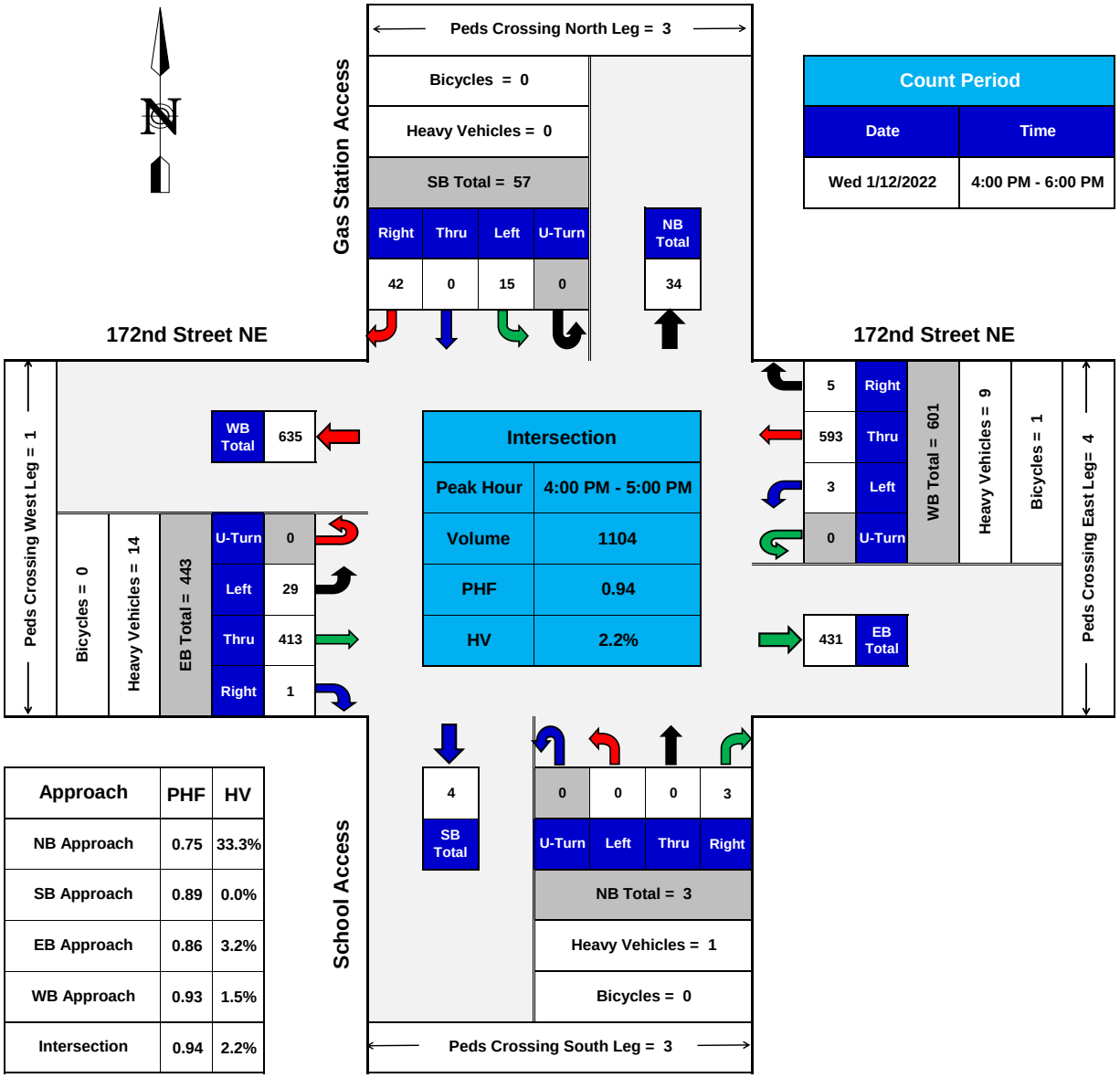
TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

TRAFFIC DATA GATHERING

172nd Street NE @ School/Gas Station Access

Arlington, WA



Approach	PHF	HV
NB Approach	0.75	33.3%
SB Approach	0.89	0.0%
EB Approach	0.86	3.2%
WB Approach	0.93	1.5%
Intersection	0.94	2.2%

PHF = Peak Hour Factor
HV = Heavy Vehicles

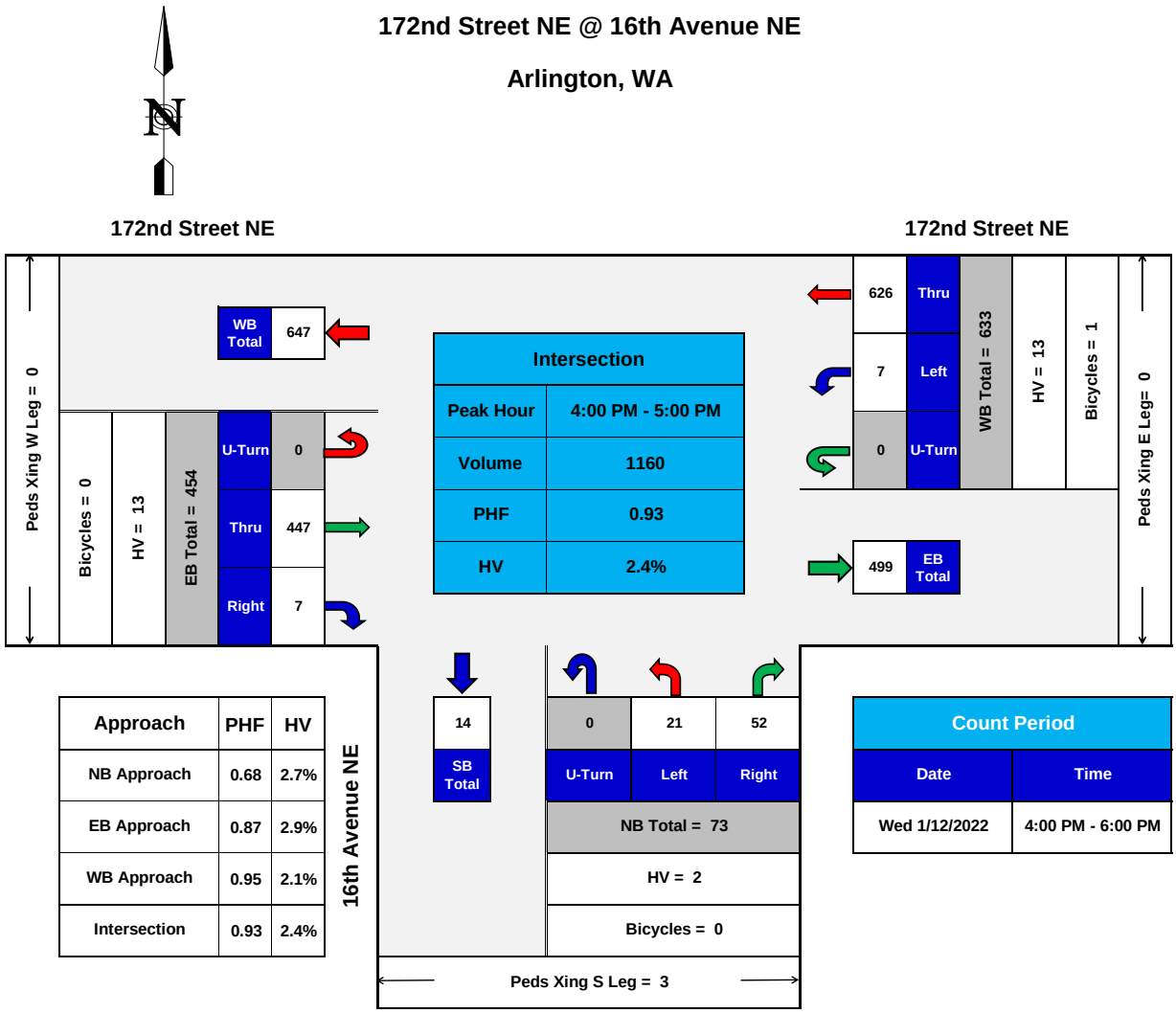
TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

TRAFFIC DATA GATHERING

172nd Street NE @ 16th Avenue NE

Arlington, WA



Approach	PHF	HV
NB Approach	0.68	2.7%
EB Approach	0.87	2.9%
WB Approach	0.95	2.1%
Intersection	0.93	2.4%

PHF = Peak Hour Factor
HV = Heavy Vehicles

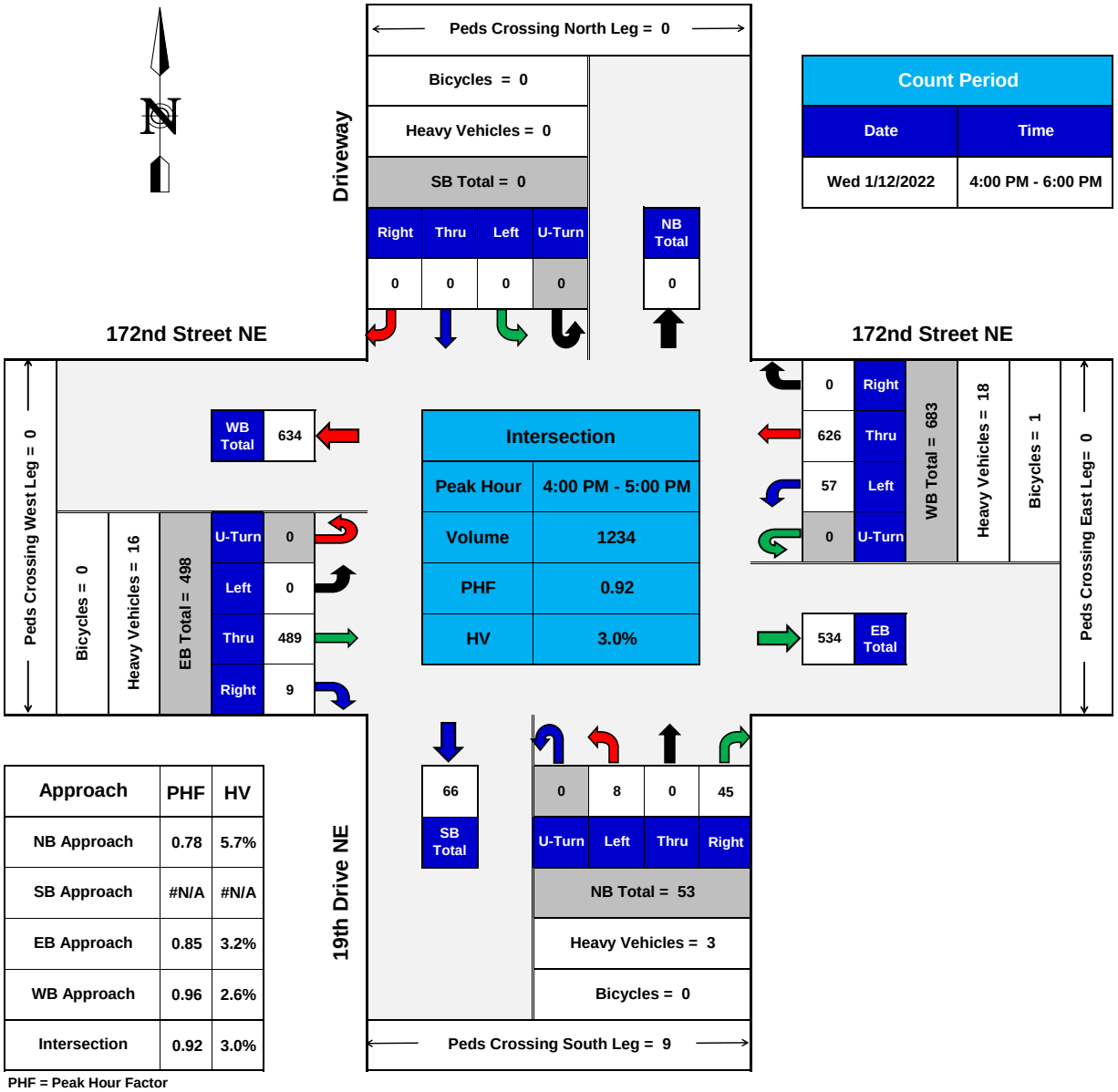
TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

TRAFFIC DATA GATHERING

172nd Street NE @ 19th Drive NE

Arlington, WA



Approach	PHF	HV
NB Approach	0.78	5.7%
SB Approach	#N/A	#N/A
EB Approach	0.85	3.2%
WB Approach	0.96	2.6%
Intersection	0.92	3.0%

PHF = Peak Hour Factor
HV = Heavy Vehicles

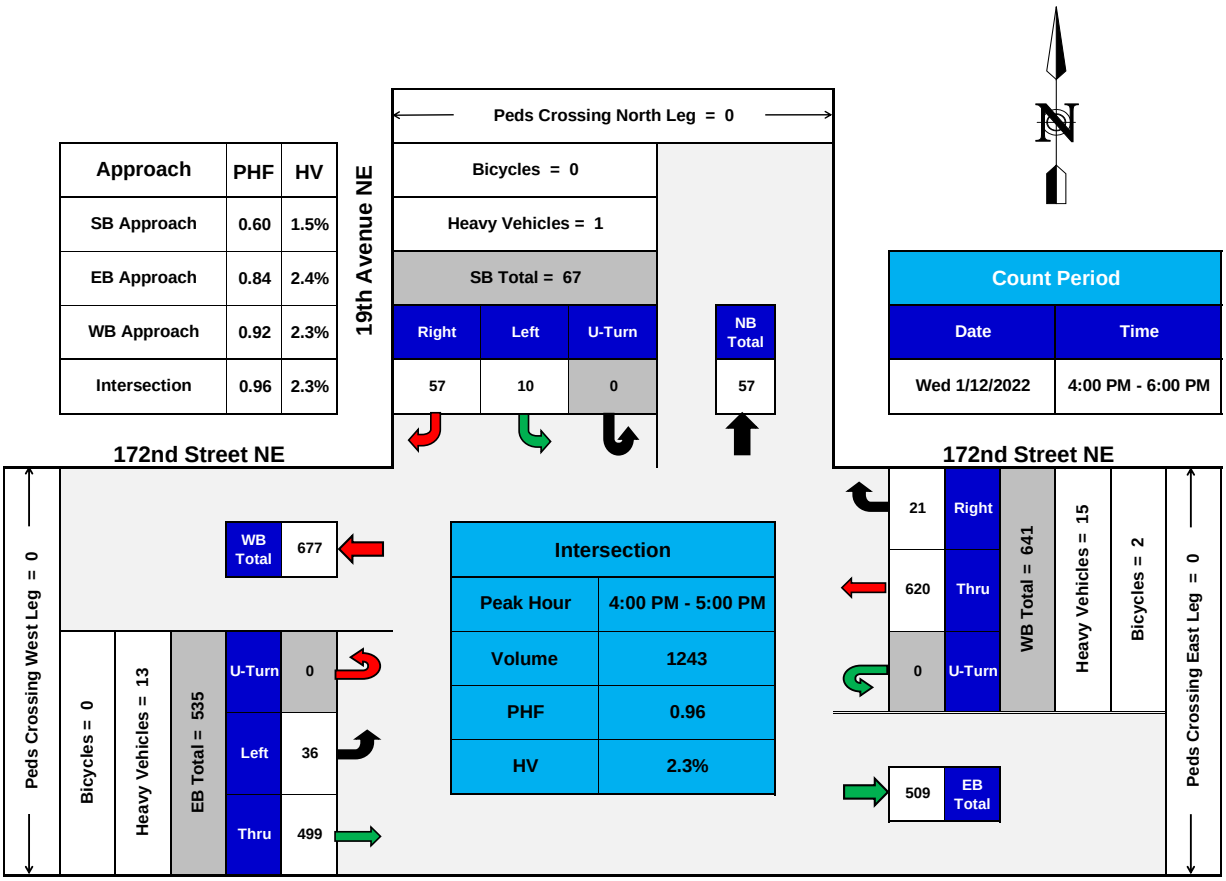
TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

TRAFFIC DATA GATHERING

172nd Street NE @ 19th Avenue NE

Arlington, WA



PHF = Peak Hour Factor
HV = Heavy Vehicles

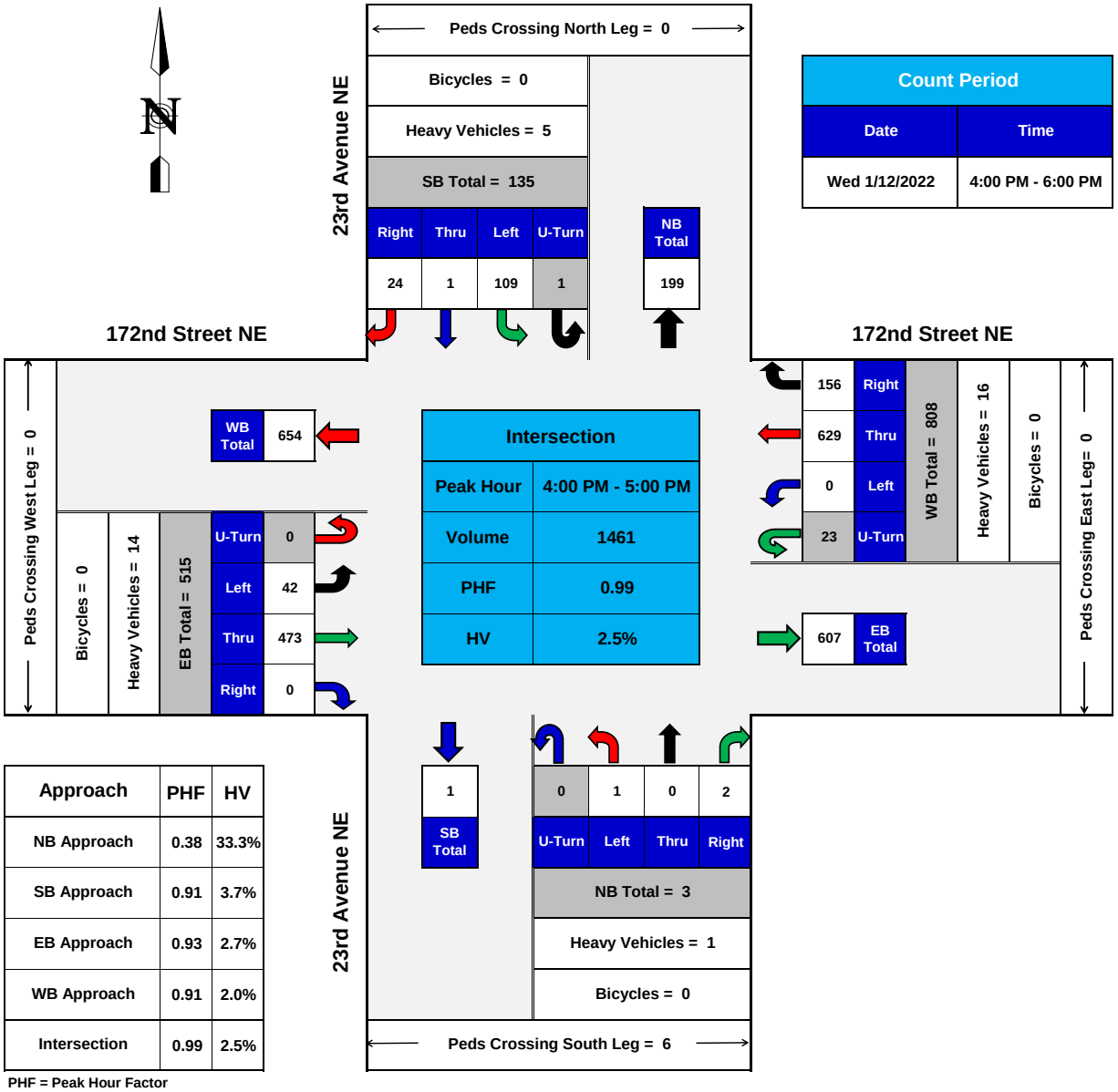
TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

TRAFFIC DATA GATHERING

172nd Street NE @ 23rd Avenue NE

Arlington, WA



Count Period	
Date	Time
Wed 1/12/2022	4:00 PM - 6:00 PM

Approach	PHF	HV
NB Approach	0.38	33.3%
SB Approach	0.91	3.7%
EB Approach	0.93	2.7%
WB Approach	0.91	2.0%
Intersection	0.99	2.5%

PHF = Peak Hour Factor
HV = Heavy Vehicles

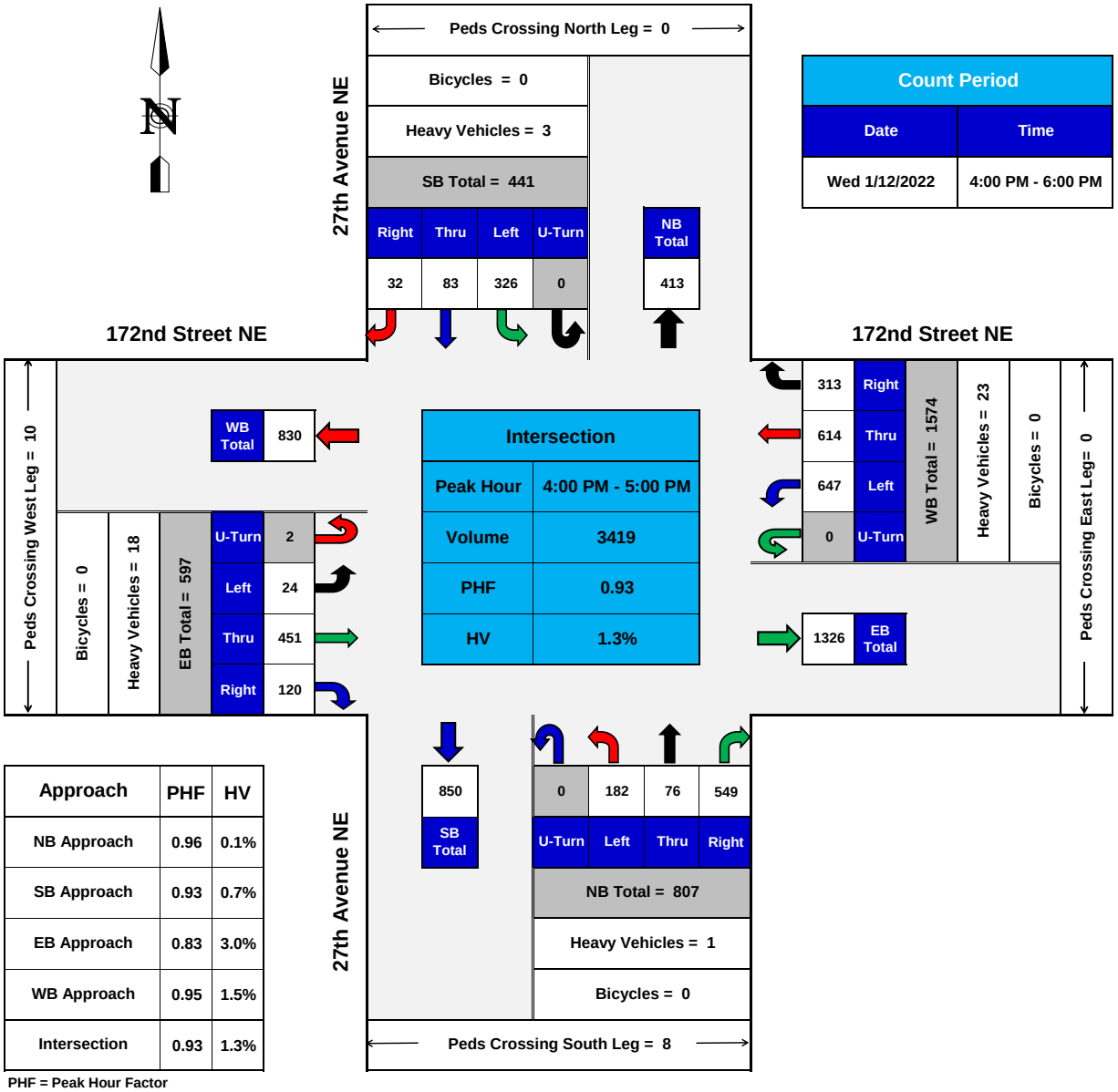
TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

TRAFFIC DATA GATHERING

172nd Street NE @ 27th Avenue NE

Arlington, WA



Count Period	
Date	Time
Wed 1/12/2022	4:00 PM - 6:00 PM

Approach	PHF	HV
NB Approach	0.96	0.1%
SB Approach	0.93	0.7%
EB Approach	0.83	3.0%
WB Approach	0.95	1.5%
Intersection	0.93	1.3%

PHF = Peak Hour Factor
HV = Heavy Vehicles

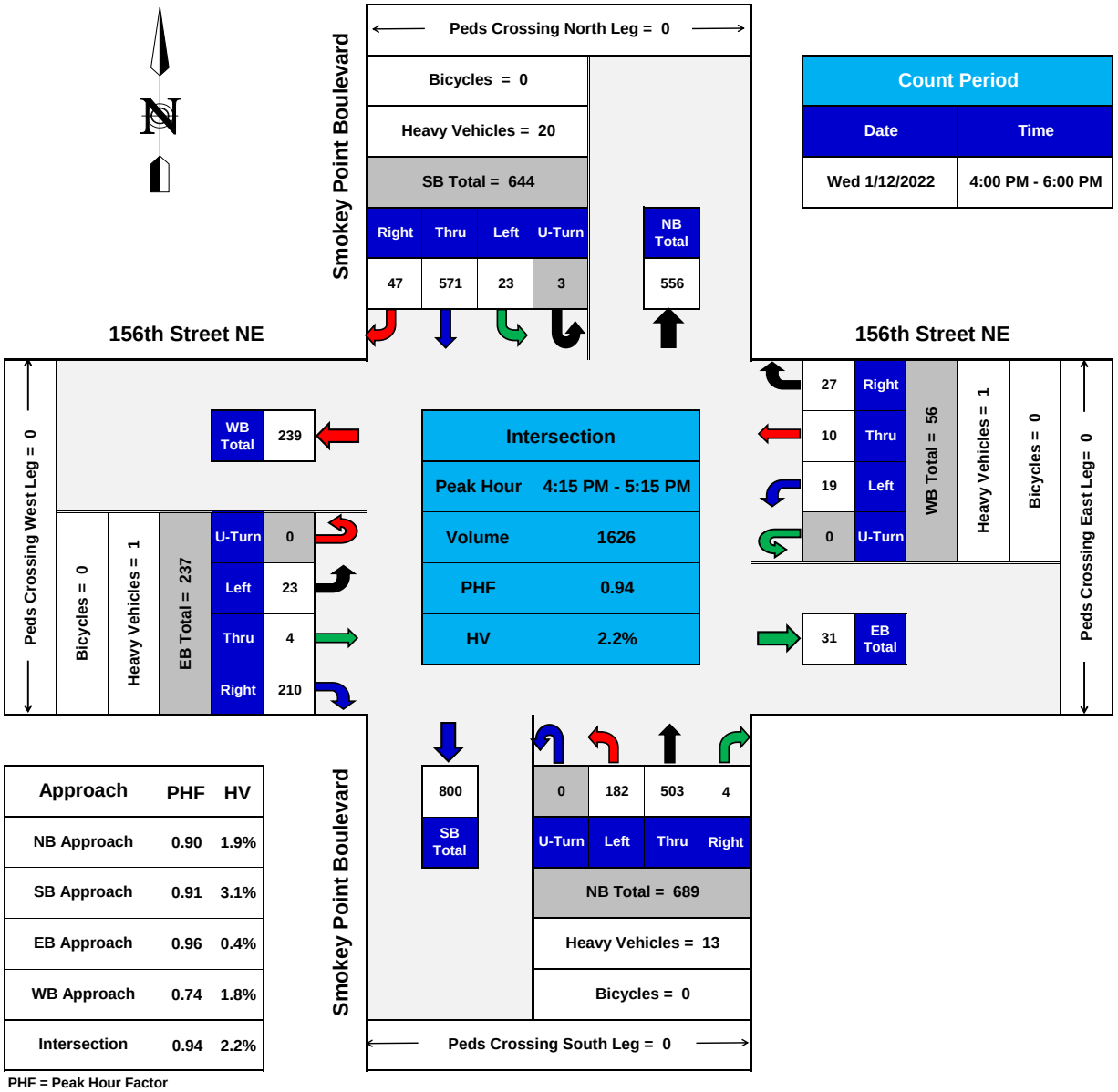
TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

DTG TRAFFIC DATA GATHERING

156th Street NE @ Smokey Point Boulevard

Arlington, WA



Approach	PHF	HV
NB Approach	0.90	1.9%
SB Approach	0.91	3.1%
EB Approach	0.96	0.4%
WB Approach	0.74	1.8%
Intersection	0.94	2.2%

PHF = Peak Hour Factor
HV = Heavy Vehicles

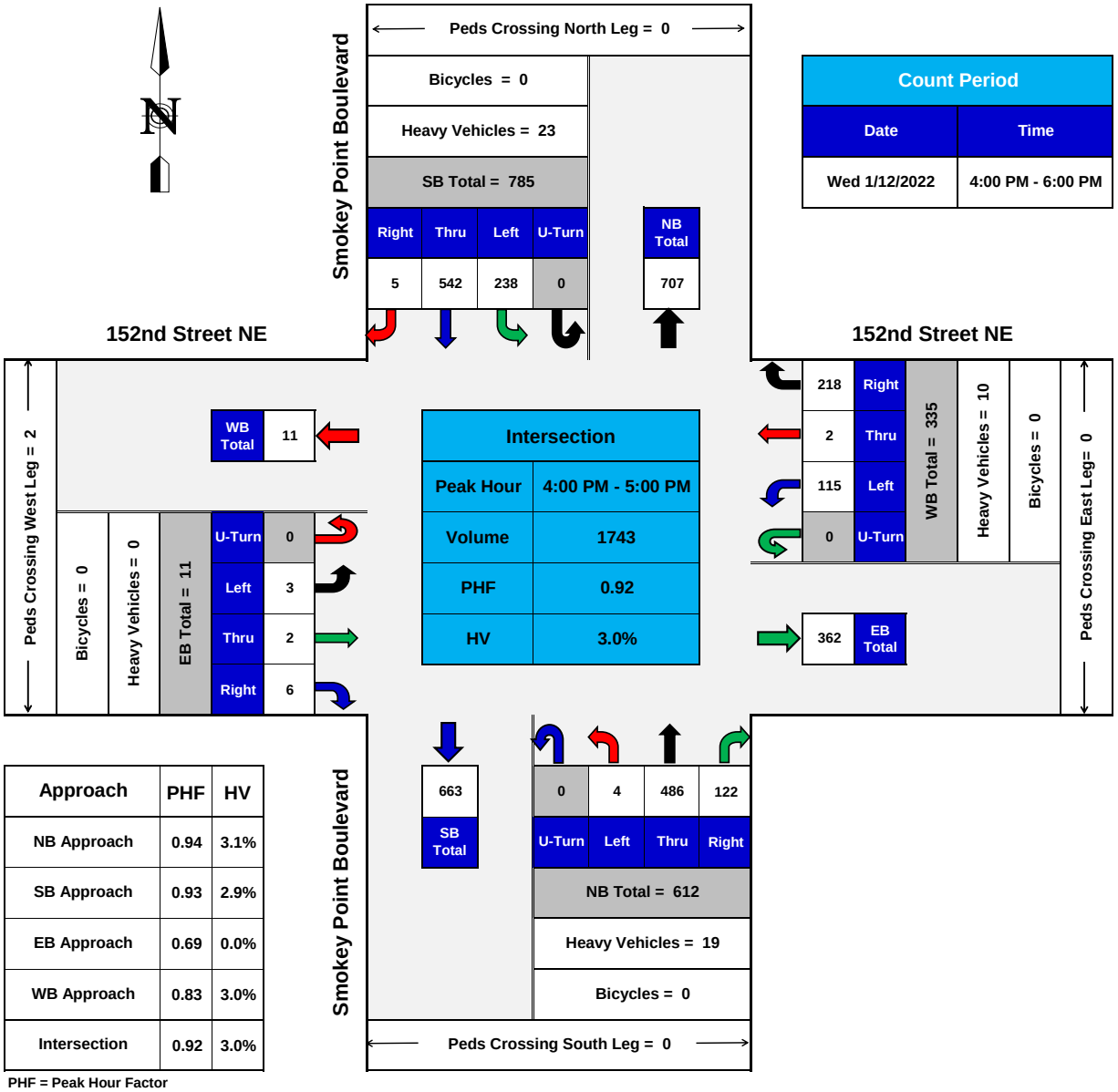
TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

TRAFFIC DATA GATHERING

152nd Street NE @ Smokey Point Boulevard

Arlington, WA



Approach	PHF	HV
NB Approach	0.94	3.1%
SB Approach	0.93	2.9%
EB Approach	0.69	0.0%
WB Approach	0.83	3.0%
Intersection	0.92	3.0%

PHF = Peak Hour Factor
HV = Heavy Vehicles

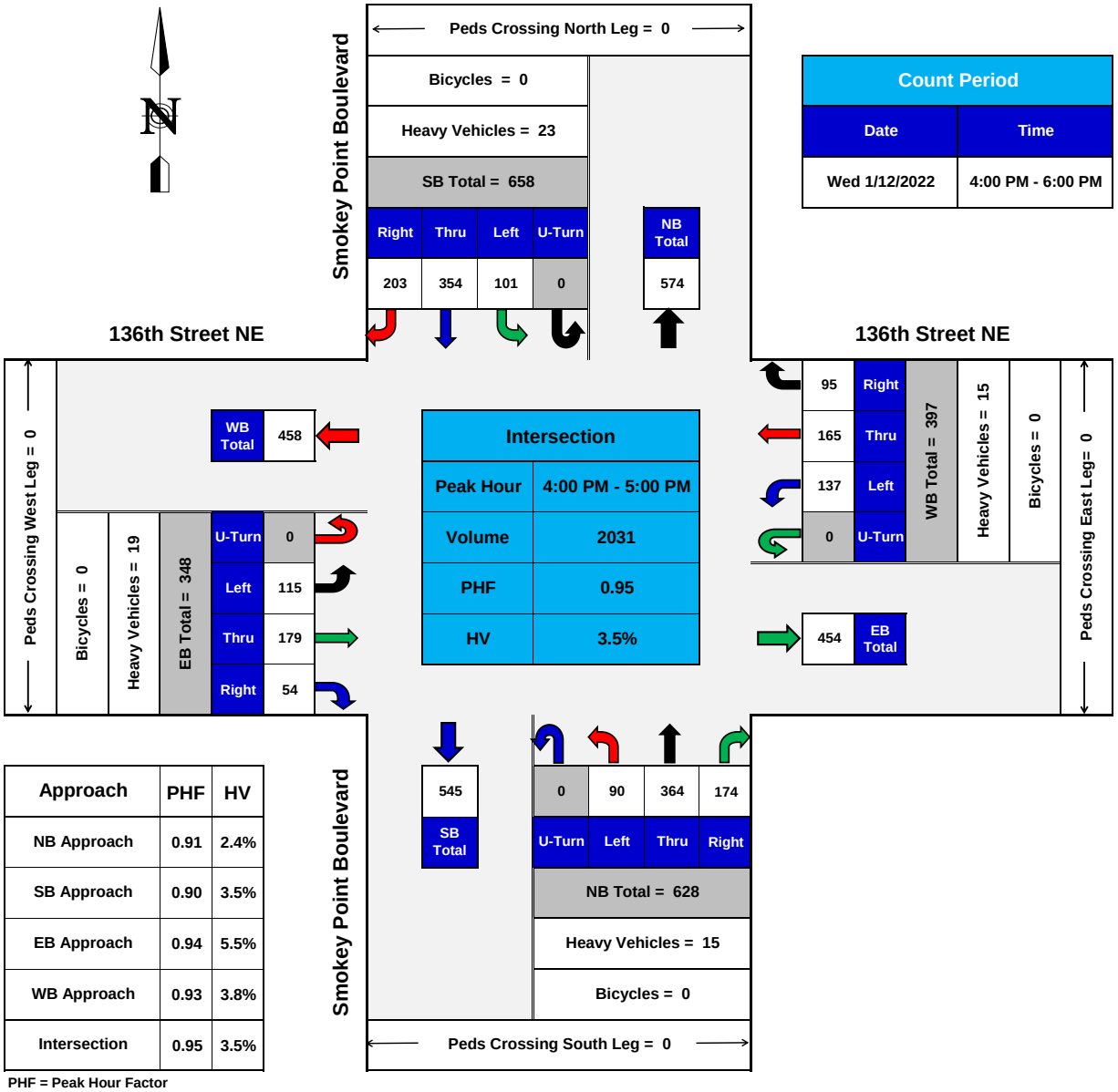
TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

TRAFFIC DATA GATHERING

136th Street NE @ Smokey Point Boulevard

Arlington, WA



Approach	PHF	HV
NB Approach	0.91	2.4%
SB Approach	0.90	3.5%
EB Approach	0.94	5.5%
WB Approach	0.93	3.8%
Intersection	0.95	3.5%

PHF = Peak Hour Factor
HV = Heavy Vehicles

TURNING MOVEMENTS DIAGRAM

PEAK HOUR SUMMARY

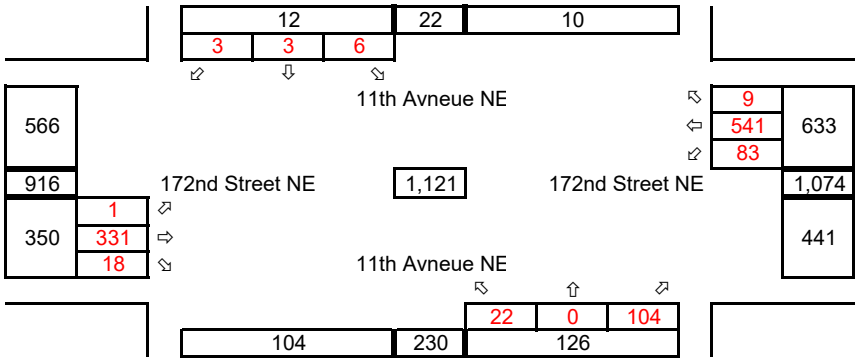
DTG TRAFFIC DATA GATHERING

Weekday PM Peak-Hour Turning Movement Calculations

Synchro ID: 1
Existing
Average Weekday
PM Peak-Hour

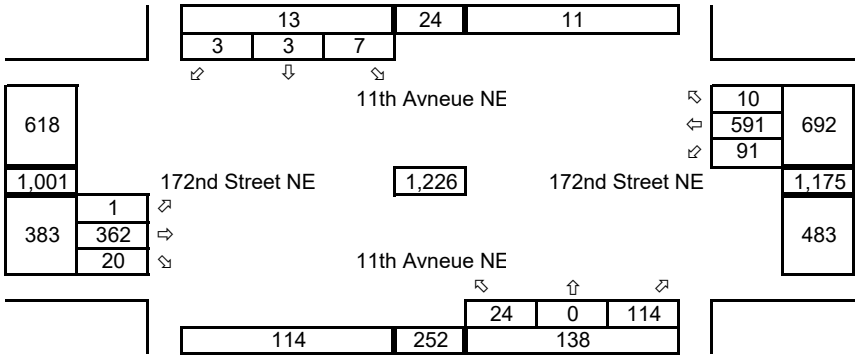
Year: **1/12/2022**

Data Source: **TDG**

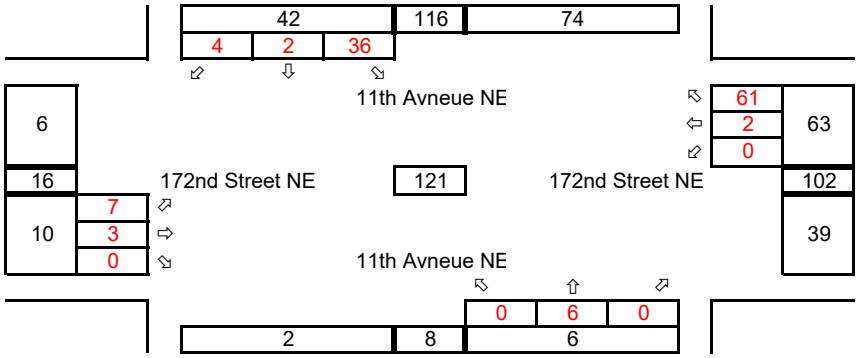


Future without Development
Average Weekday
PM Peak Hour

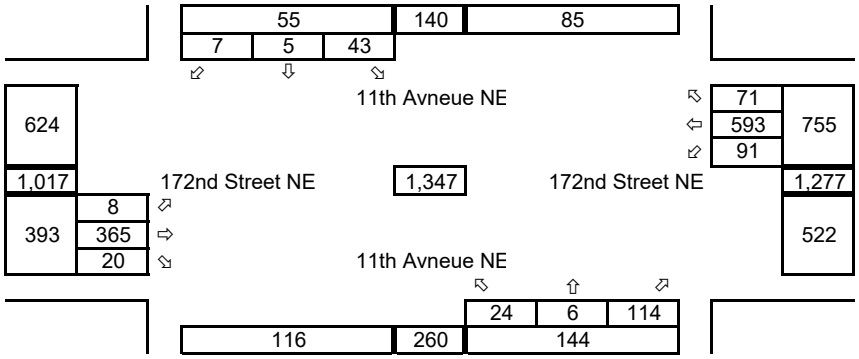
Year: 2025
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak Hour



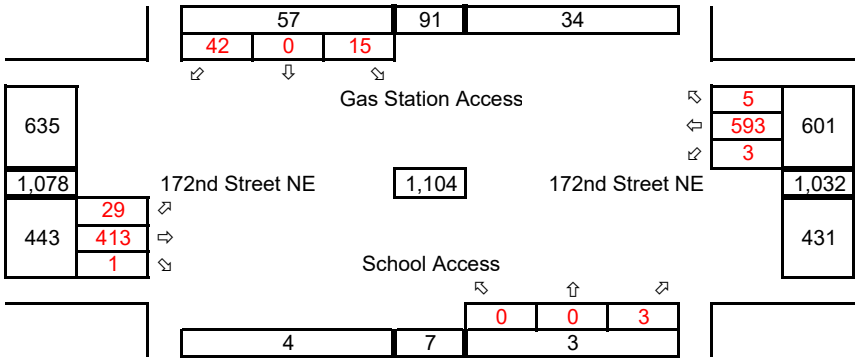
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 2
Existing
Average Weekday
PM Peak-Hour

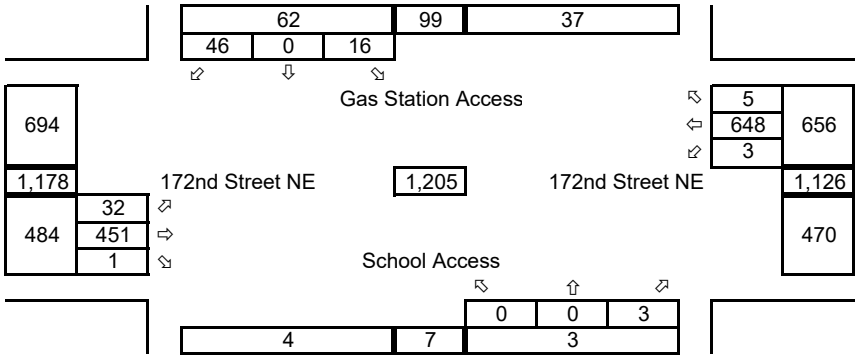
Year: **1/12/2022**

Data Source: **TDG**

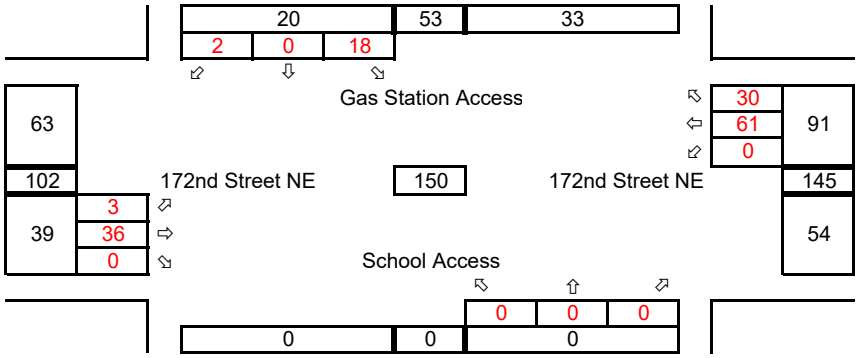


Future without Development
Average Weekday
PM Peak Hour

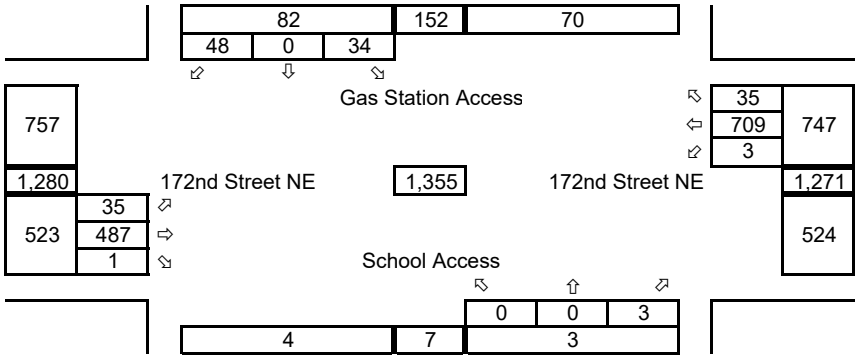
Year: 2025
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak Hour



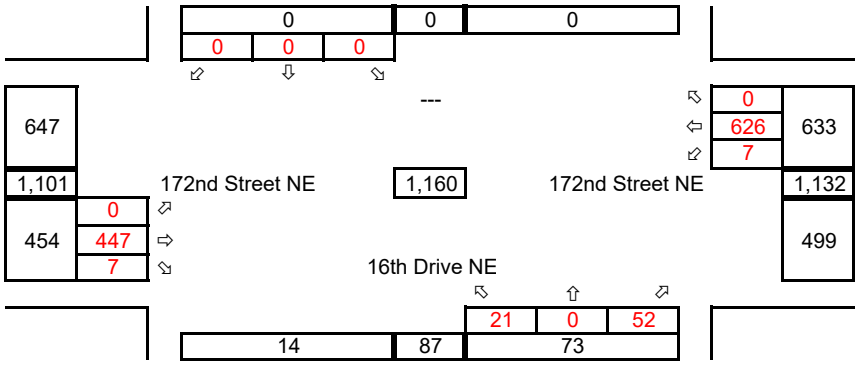
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 3
Existing
Average Weekday
PM Peak-Hour

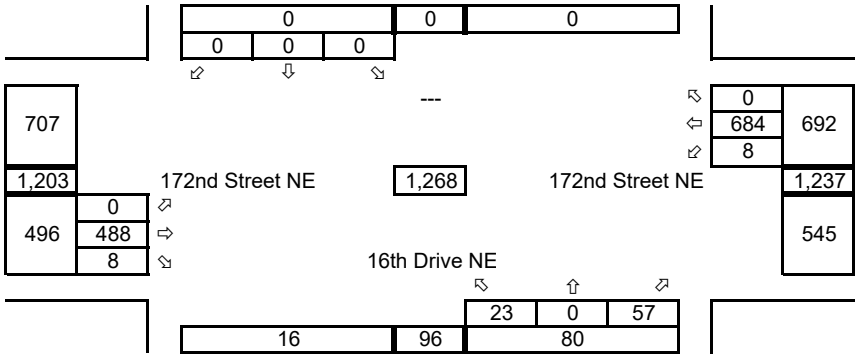
Year: **1/12/2022**

Data Source: **TDG**

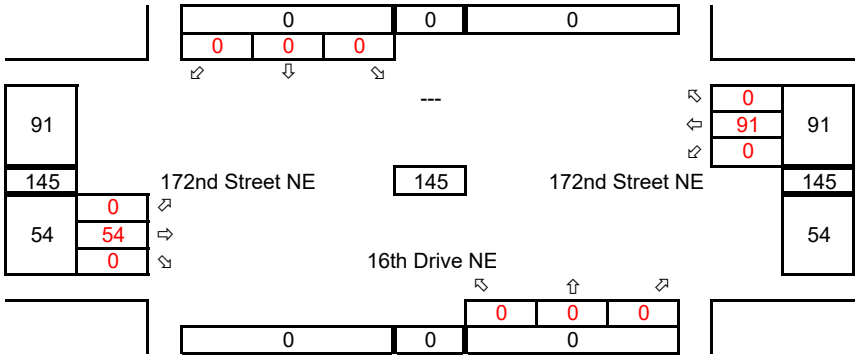


Future without Development
Average Weekday
PM Peak Hour

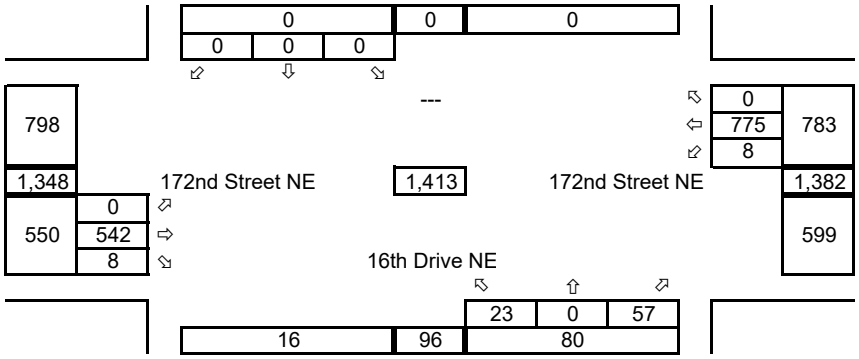
Year: 2025
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak Hour



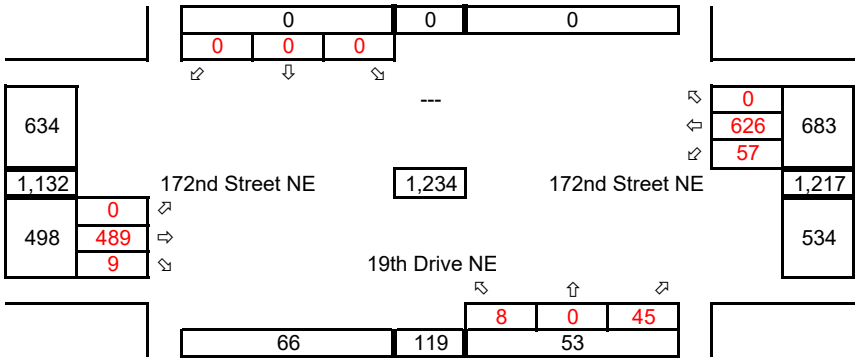
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 4
Existing
Average Weekday
PM Peak-Hour

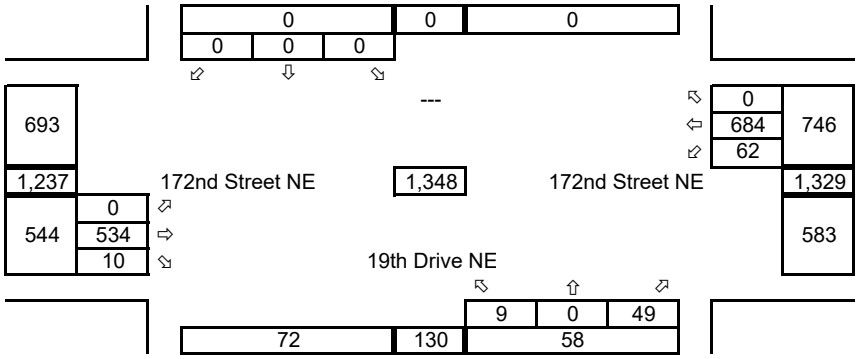
Year: **1/12/2022**

Data Source: **TDG**

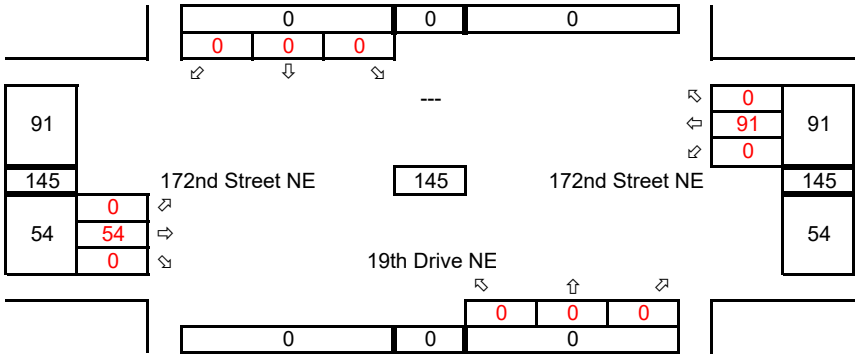


Future without Development
Average Weekday
PM Peak Hour

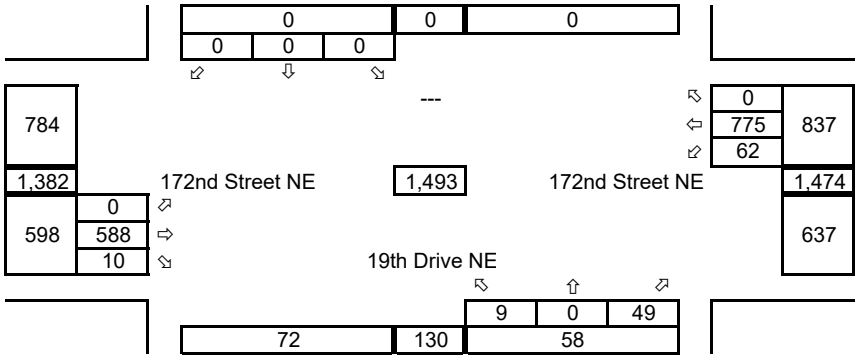
Year: 2025
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak Hour



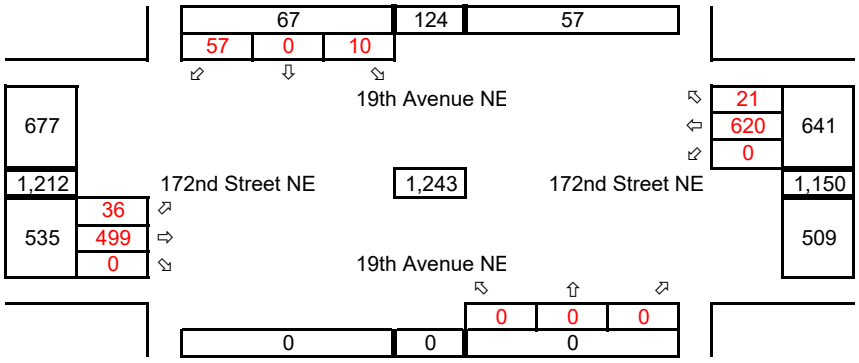
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 5
Existing
Average Weekday
PM Peak-Hour

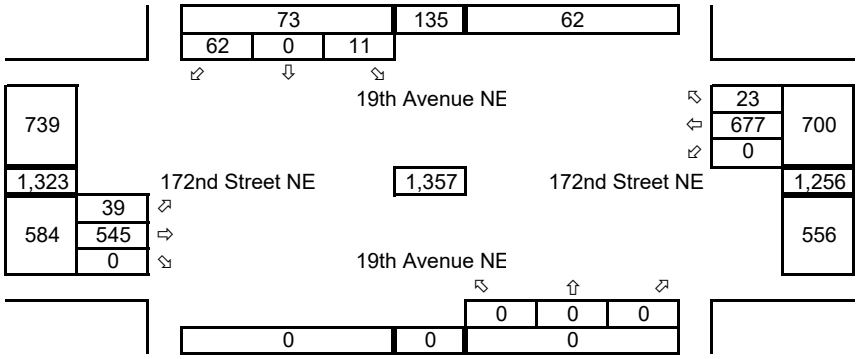
Year: **1/12/2022**

Data Source: **TDG**

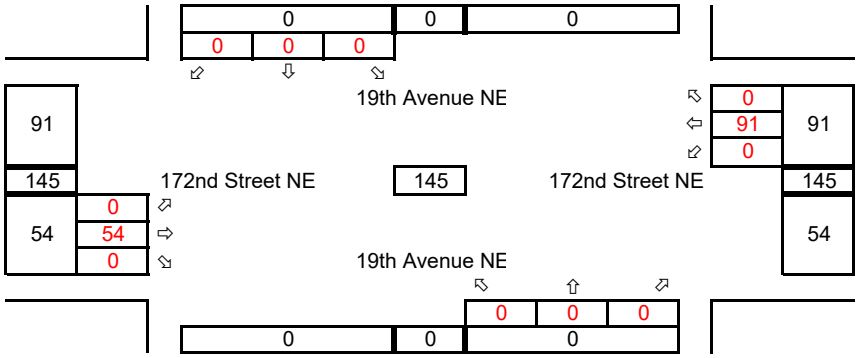


Future without Development
Average Weekday
PM Peak Hour

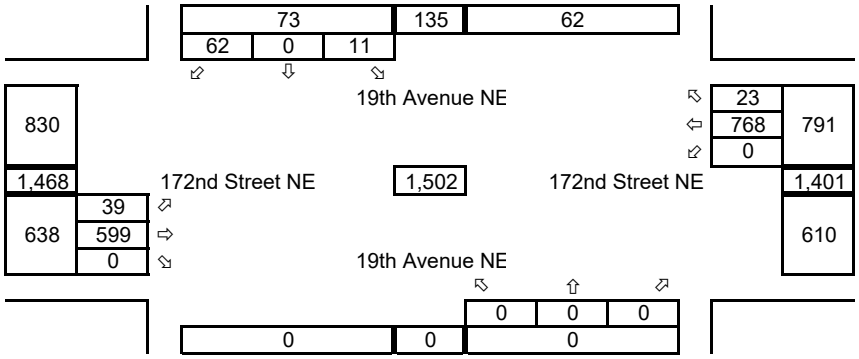
Year: 2025
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak Hour



Future with Development
Average Weekday
PM Peak Hour



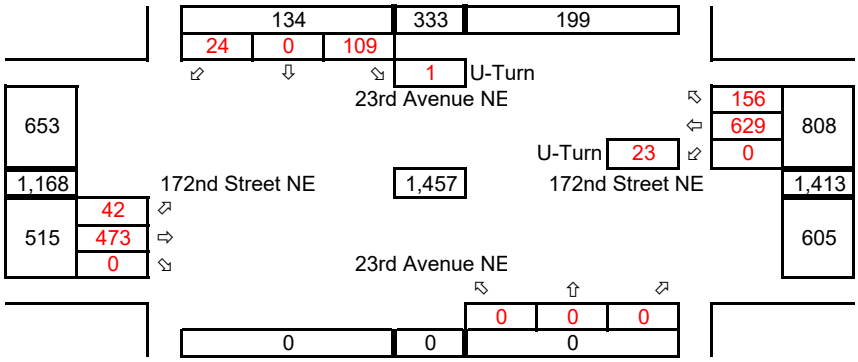
Synchro ID: 6

Existing
Average Weekday
PM Peak-Hour

Year: **1/12/2022**

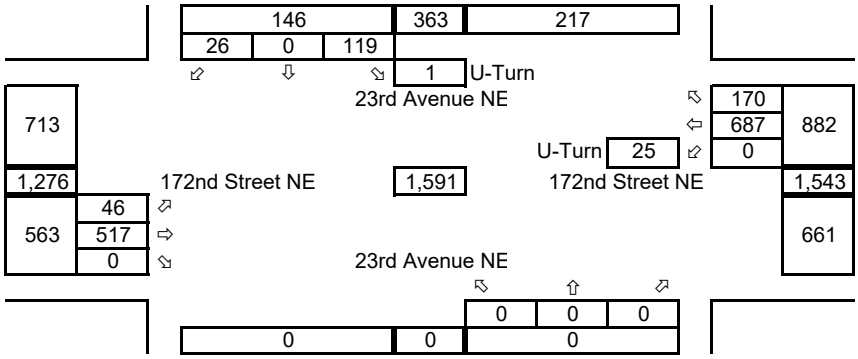
Data Source: **TDG**

The existing volume on the south leg is construction traffic and has not been included in the existing analysis.

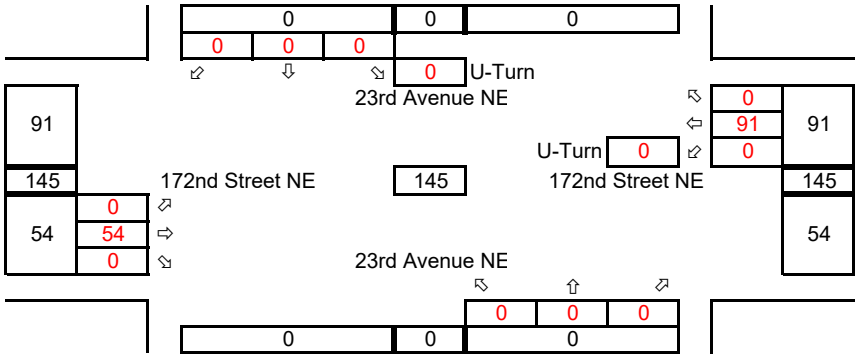


Future without Development
Average Weekday
PM Peak Hour

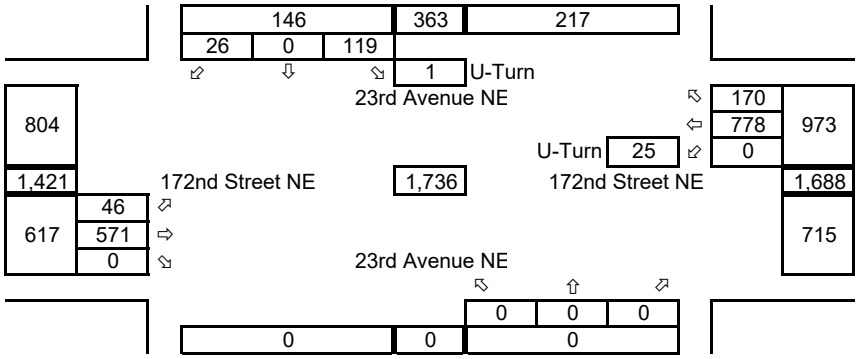
Year: 2025
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak Hour



Future with Development
Average Weekday
PM Peak Hour

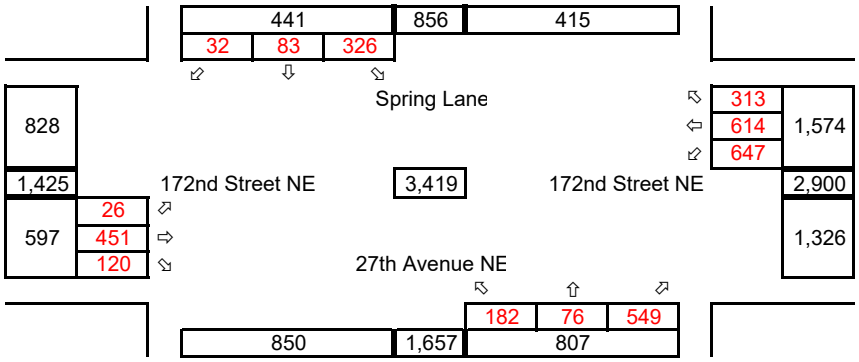


Synchro ID: 7

Existing
Average Weekday
PM Peak-Hour

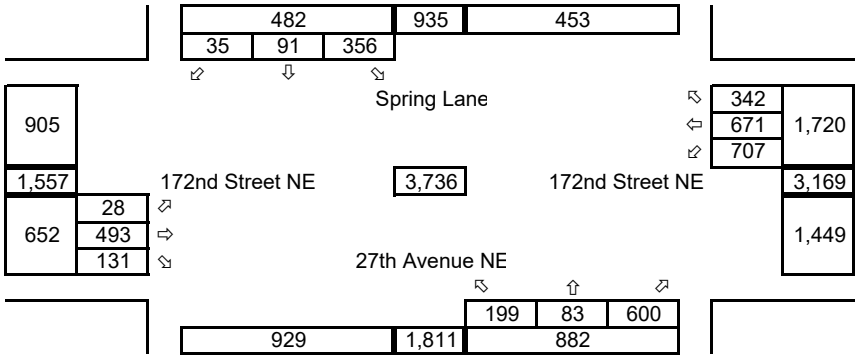
Year: **1/12/2022**

Data Source: **TDG**

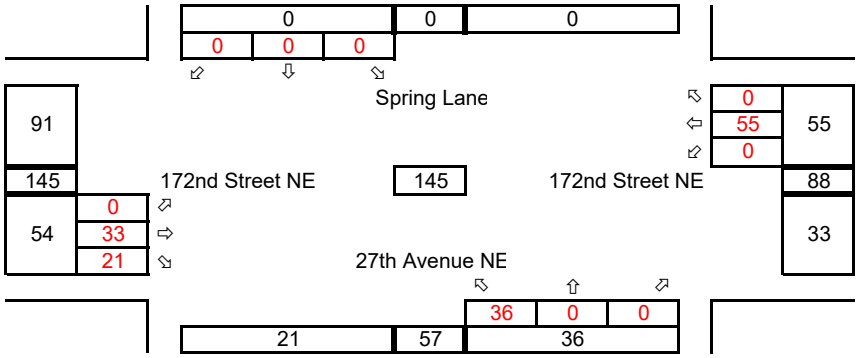


Future without Development
Average Weekday
PM Peak Hour

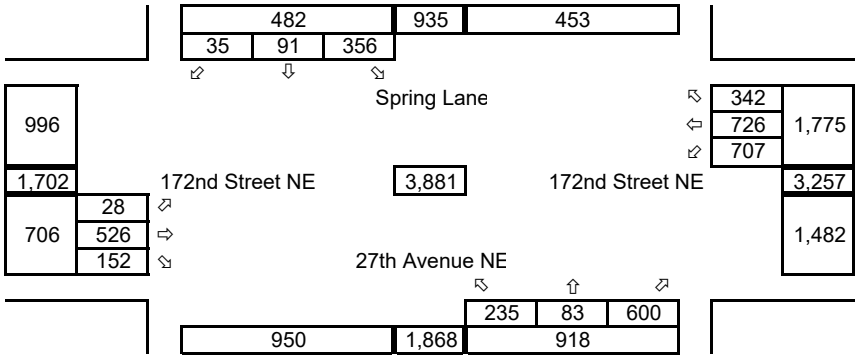
Year: 2025
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak Hour



Future with Development
Average Weekday
PM Peak Hour

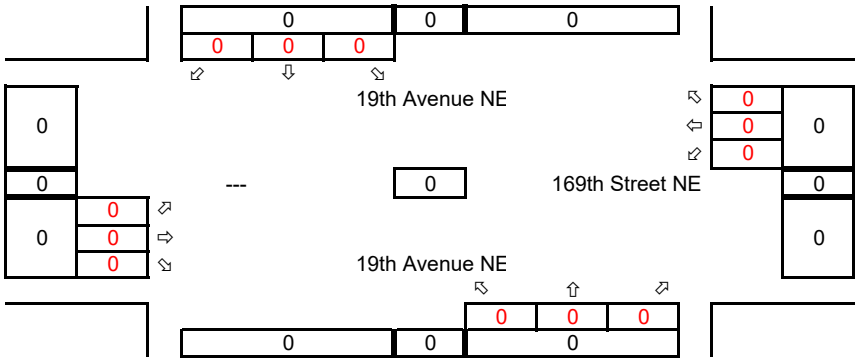


Synchro ID: 8
Existing
Average Weekday
PM Peak-Hour

Year: **1/12/2022**

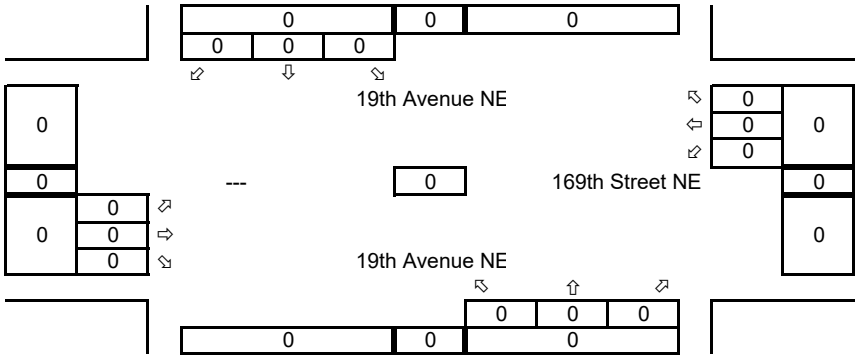
Data Source: **TDG**

This intersection does not currently exist. Volumes are an estimate for analysis purposes.

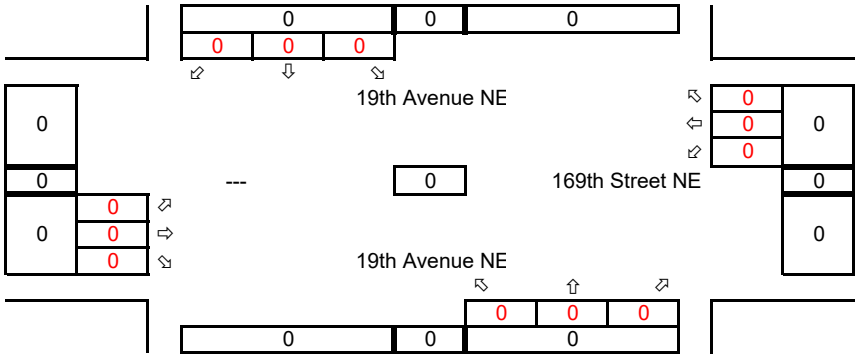


Future without Development
Average Weekday
PM Peak Hour

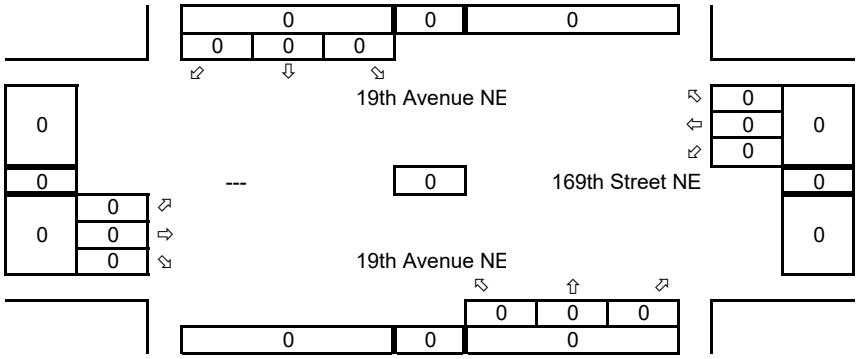
Year: 2025
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak Hour



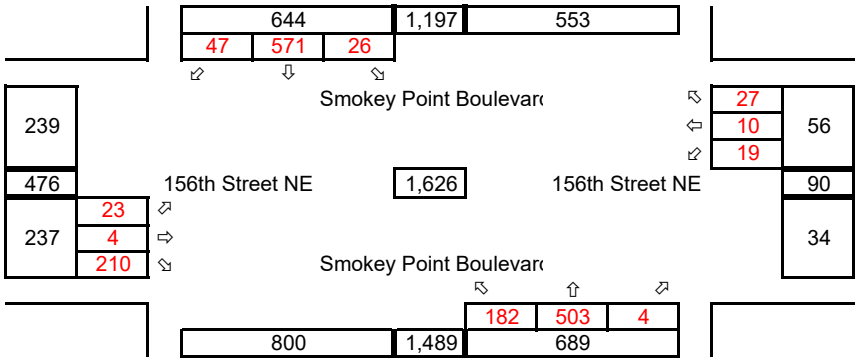
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 9
Existing
Average Weekday
PM Peak-Hour

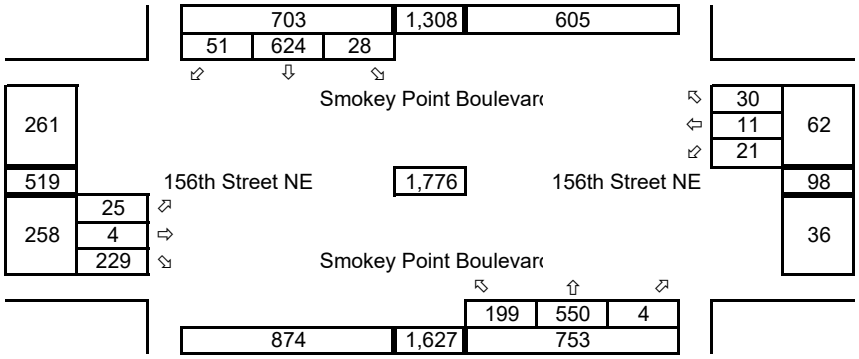
Year: **1/12/2022**

Data Source: **TDG**

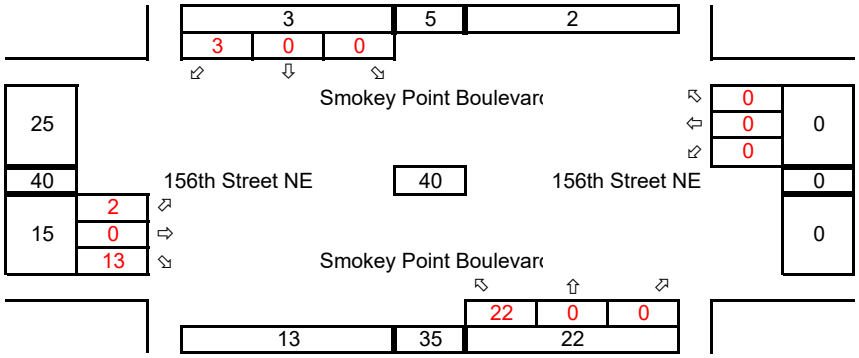


Future without Development
Average Weekday
PM Peak Hour

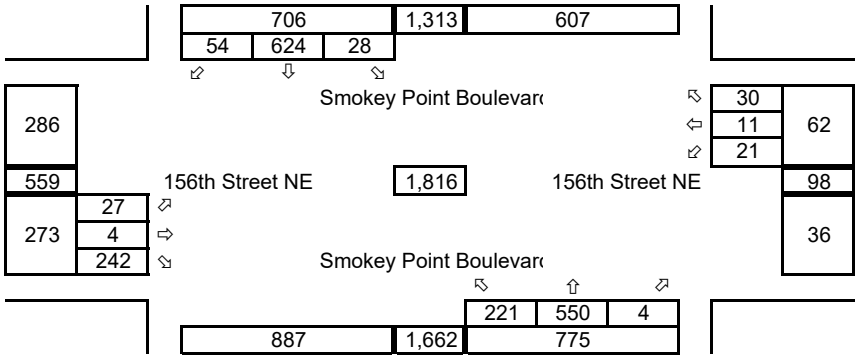
Year: 2025
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak Hour



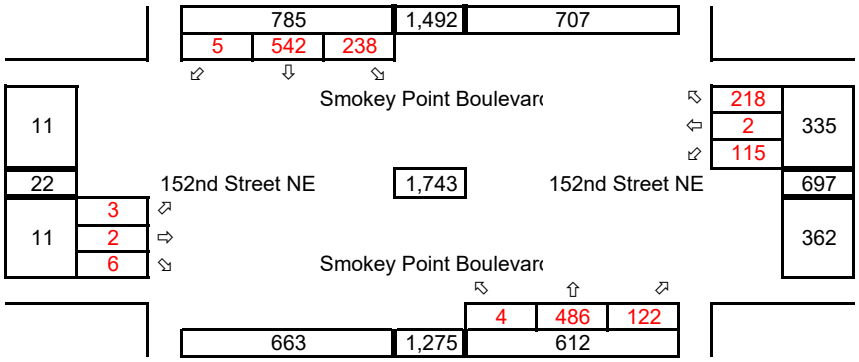
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 10
Existing
Average Weekday
PM Peak-Hour

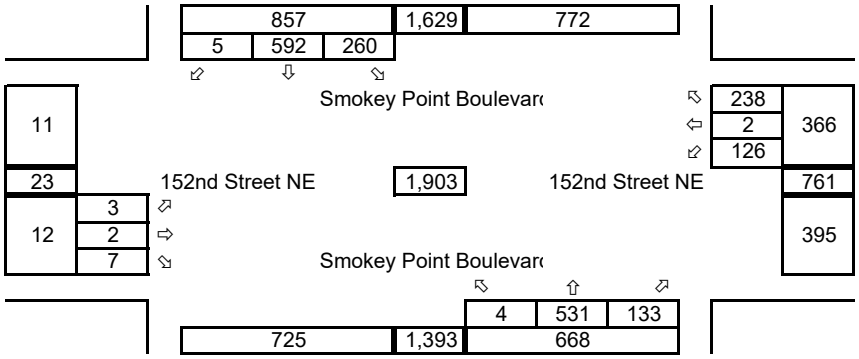
Year: **1/12/2022**

Data Source: **TDG**

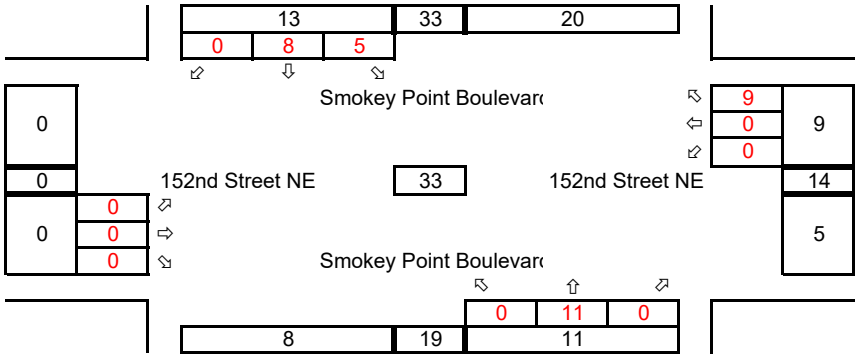


Future without Development
Average Weekday
PM Peak Hour

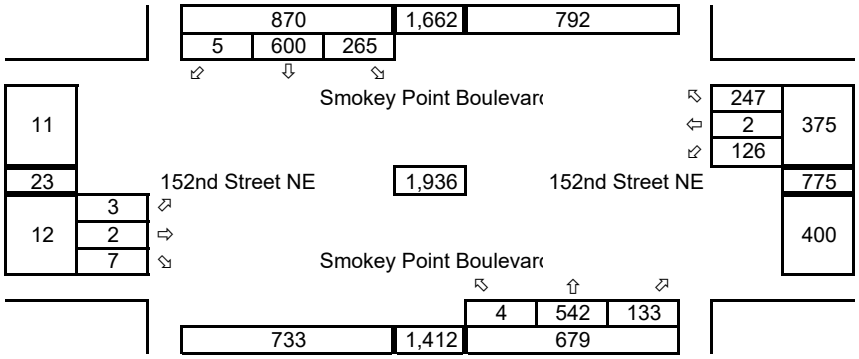
Year: 2025
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak Hour



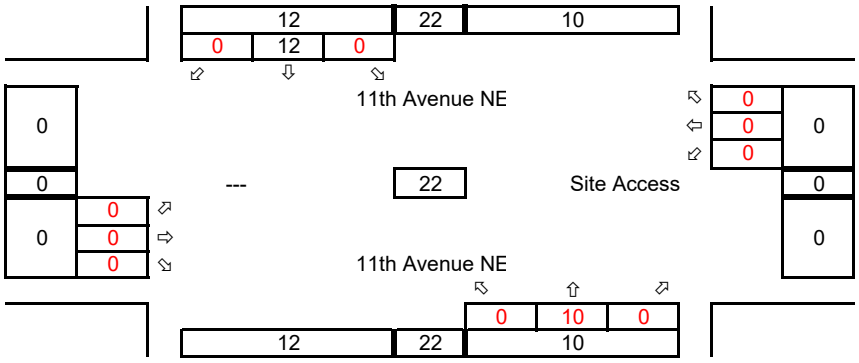
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 11
Existing
Average Weekday
PM Peak-Hour

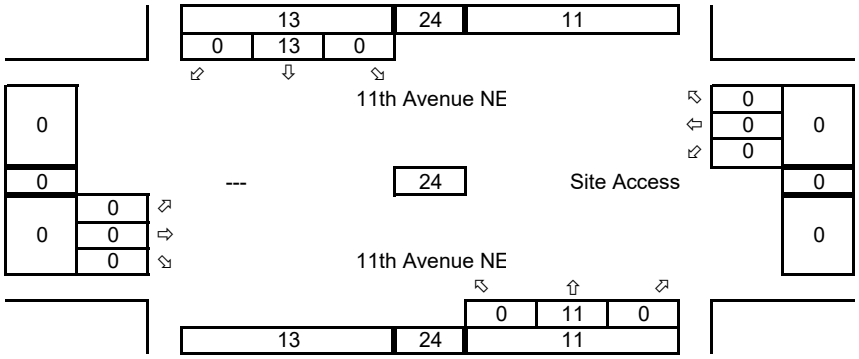
Year: **1/12/2022**

Data Source: **TDG**

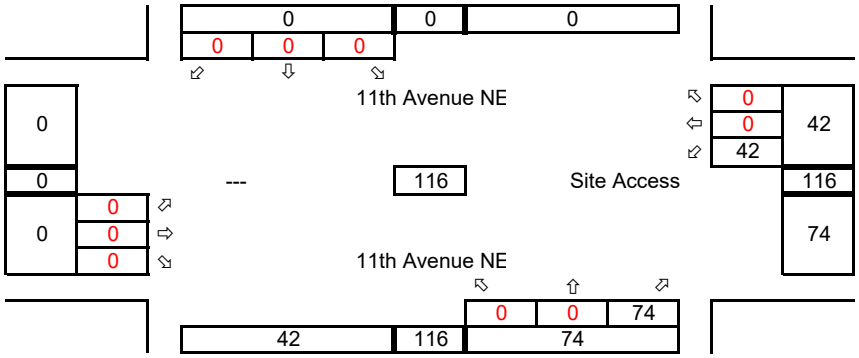


Future without Development
Average Weekday
PM Peak Hour

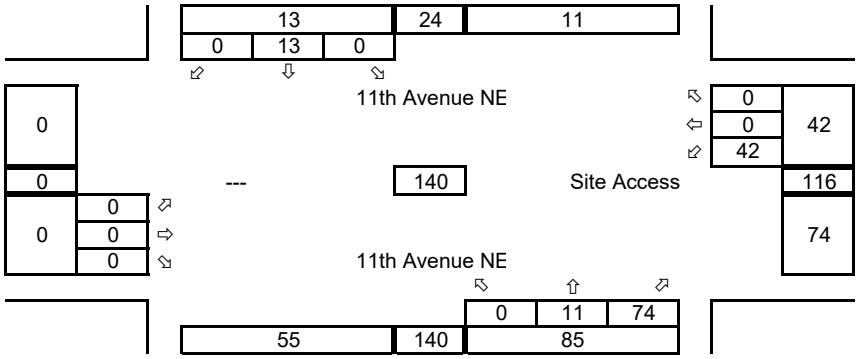
Year: 2025
Growth Rate = 3.0%
Years of Growth = 3
Total Growth = 1.0927



Total Development Trips
Average Weekday
PM Peak Hour



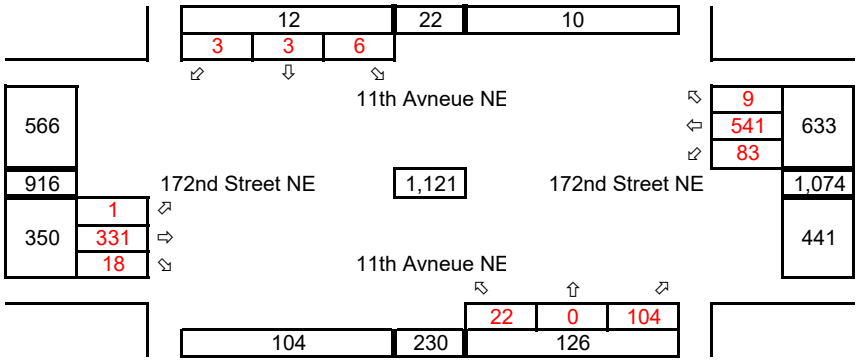
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 1
Existing
Average Weekday
PM Peak-Hour

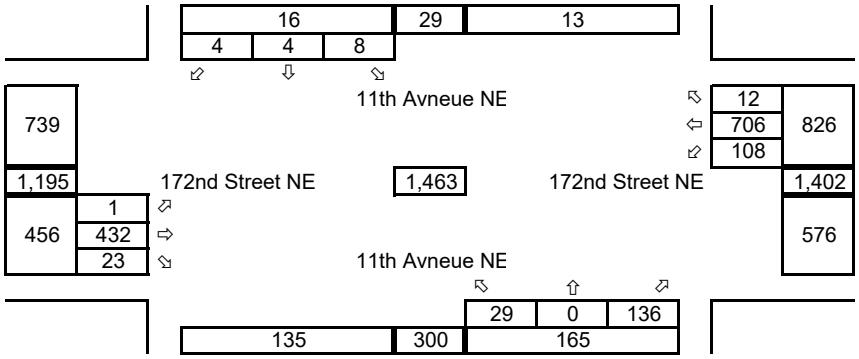
Year: **1/12/2022**

Data Source: **TDG**

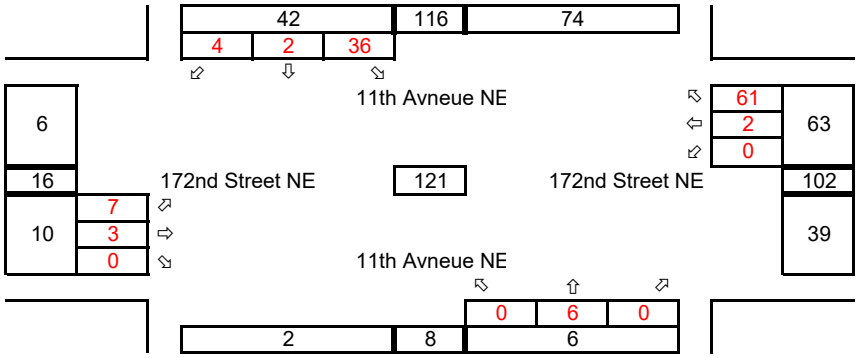


Future without Development
Average Weekday
PM Peak Hour

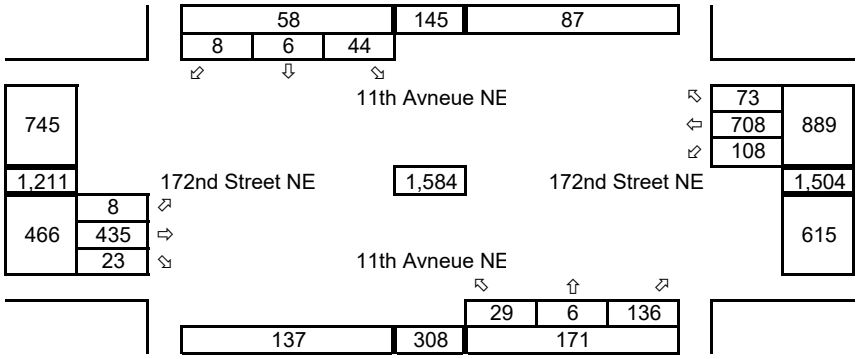
Year: 2031
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Average Weekday
PM Peak Hour



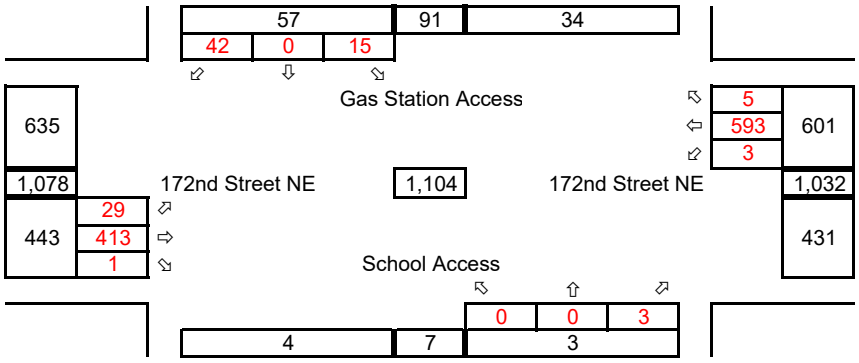
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 2
Existing
Average Weekday
PM Peak-Hour

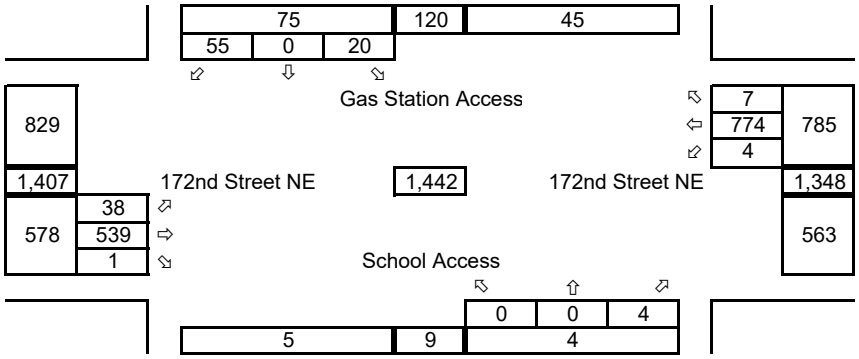
Year: **1/12/2022**

Data Source: **TDG**

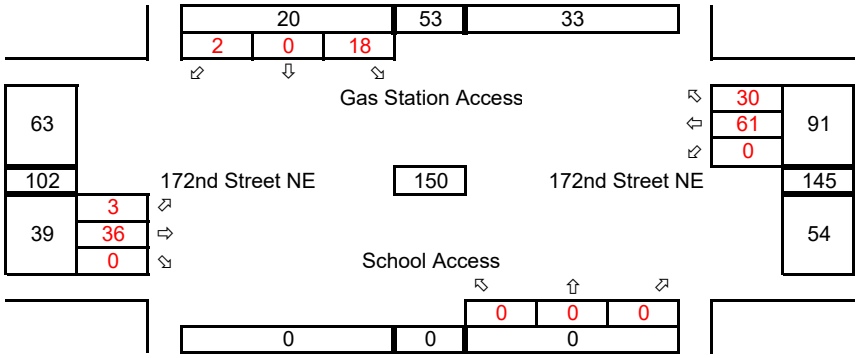


Future without Development
Average Weekday
PM Peak Hour

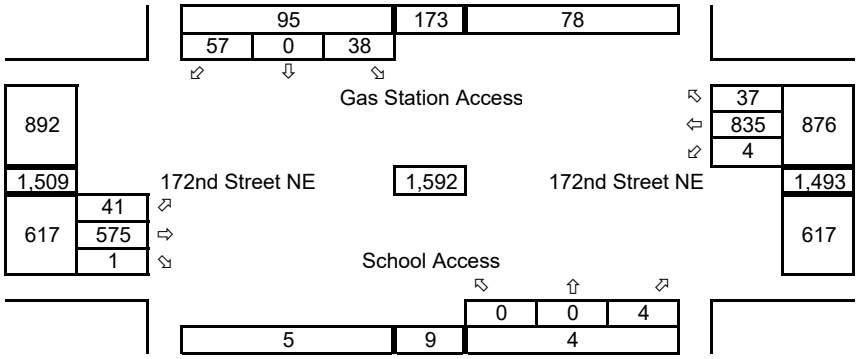
Year: 2031
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Average Weekday
PM Peak Hour



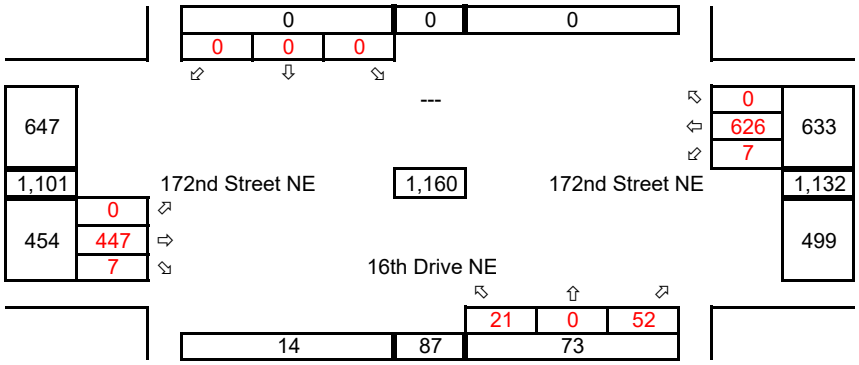
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 3
Existing
Average Weekday
PM Peak-Hour

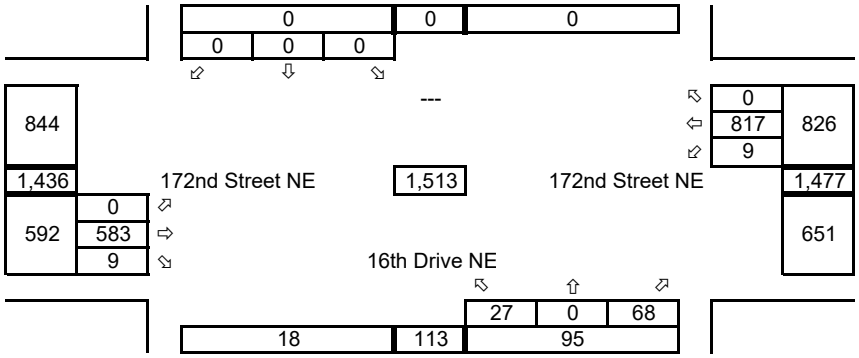
Year: **1/12/2022**

Data Source: **TDG**

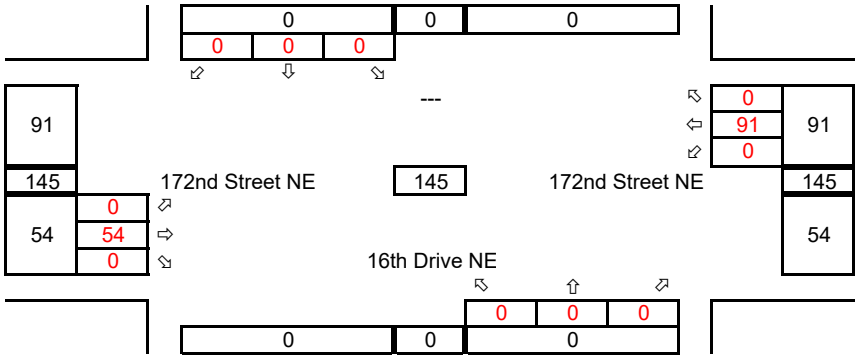


Future without Development
Average Weekday
PM Peak Hour

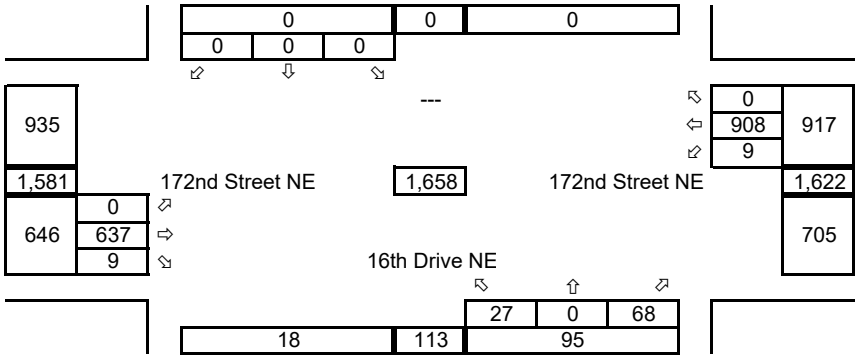
Year: 2031
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Average Weekday
PM Peak Hour



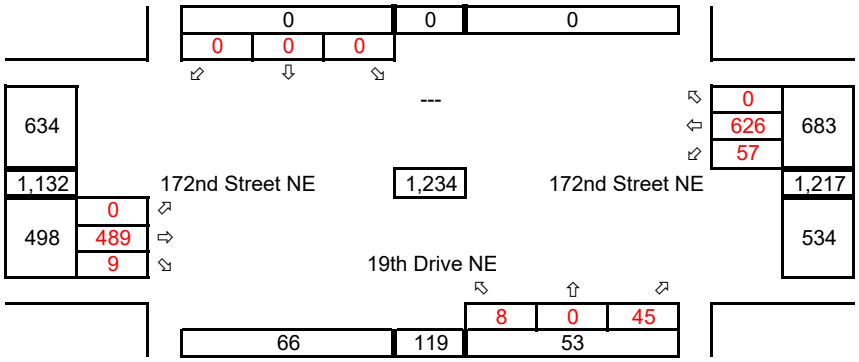
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 4
Existing
Average Weekday
PM Peak-Hour

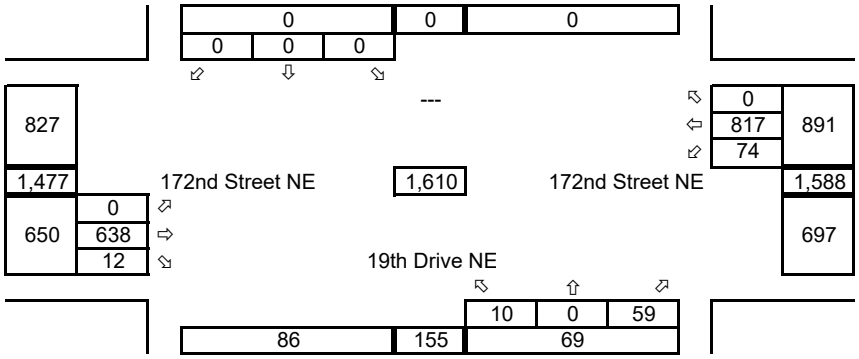
Year: **1/12/2022**

Data Source: **TDG**

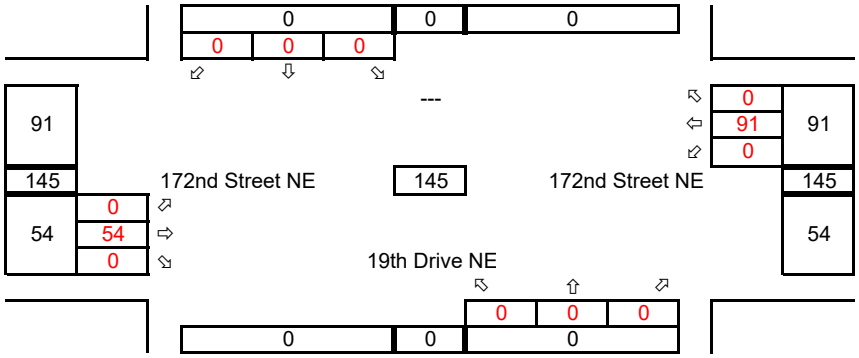


Future without Development
Average Weekday
PM Peak Hour

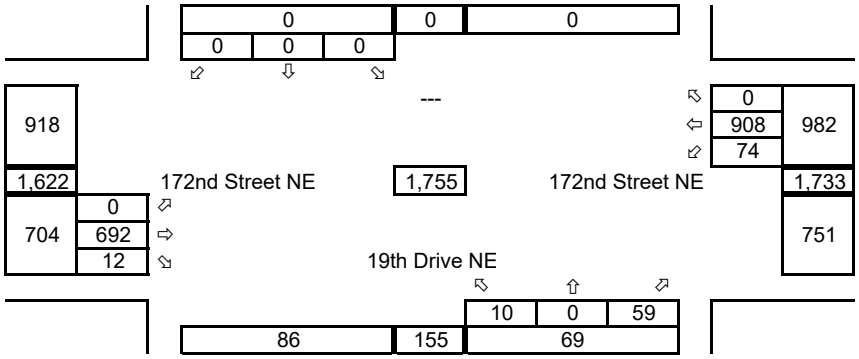
Year: 2031
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Average Weekday
PM Peak Hour



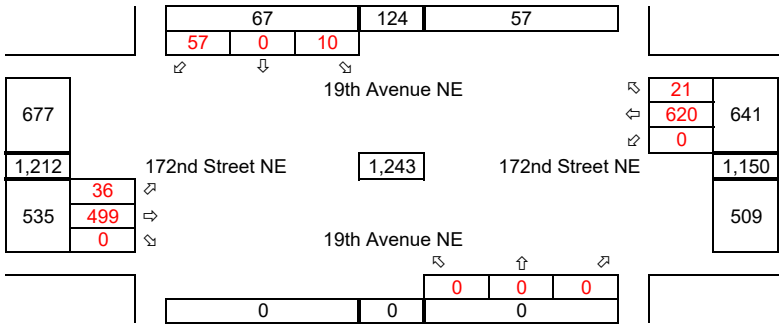
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 5
Existing
Average Weekday
PM Peak-Hour

Year: **1/12/2022**

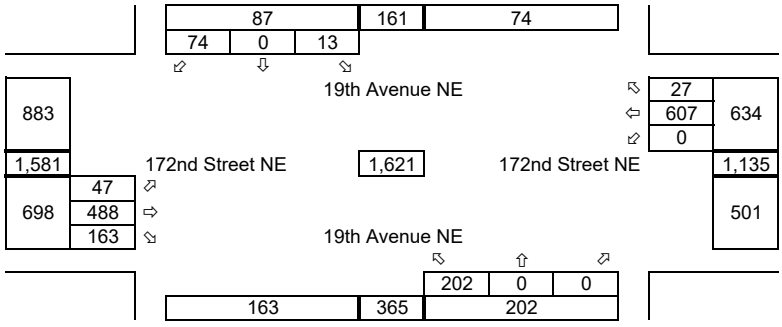
Data Source: **TDG**



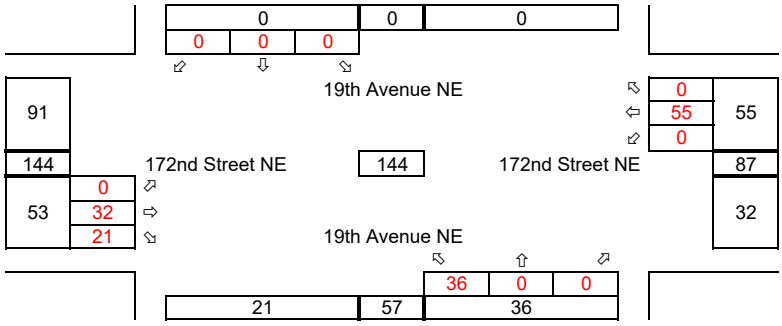
Future without Development
Average Weekday
PM Peak Hour

Year: 2031
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048

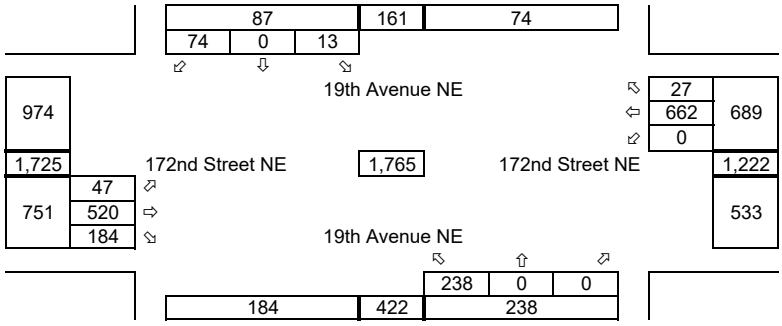
Includes adustment for the future connections



Total Development Trips
Average Weekday
PM Peak Hour

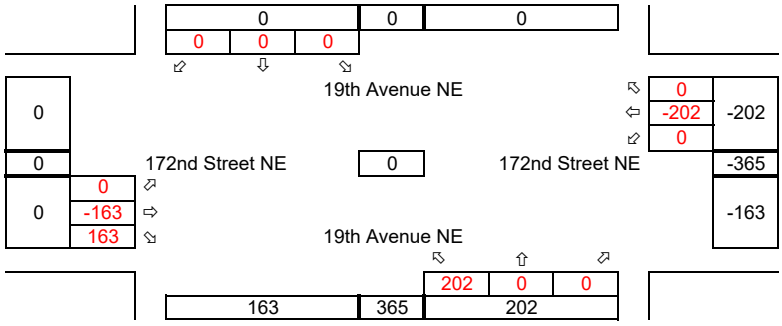


Future with Development
Average Weekday
PM Peak Hour



Future Connection Adjustment
Average Weekday
PM Peak Hour

Reduction: 25%



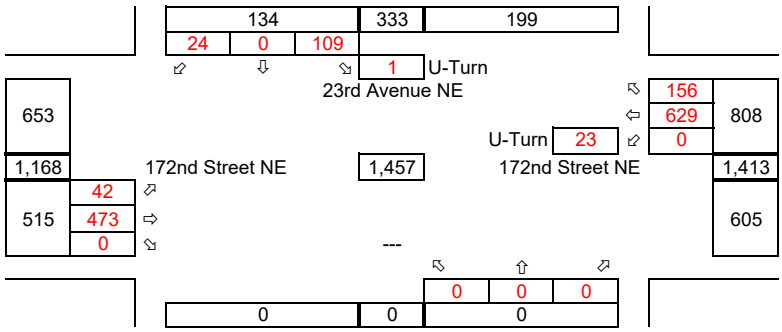
Synchro ID: 6

Existing
Average Weekday
PM Peak-Hour

Year: **1/12/2022**

Data Source: **TDG**

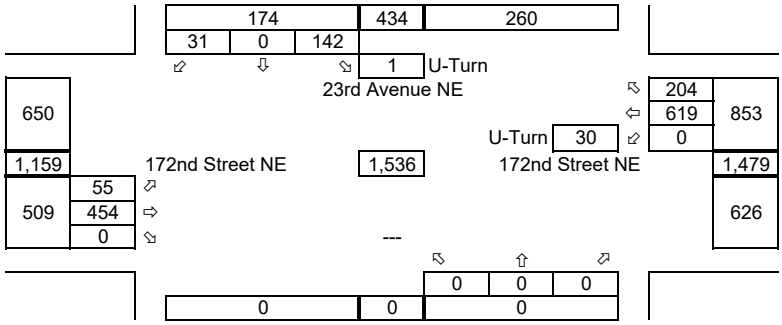
The existing volume on the south leg is construction traffic and has not been included in the existing analysis.



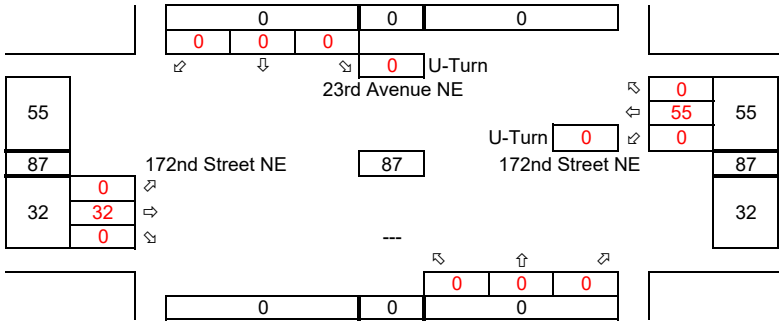
Future without Development
Average Weekday
PM Peak Hour

Year: 2031
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048

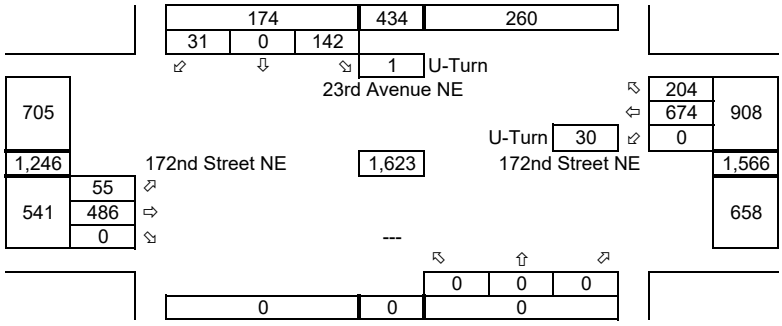
Includes adustment for the future connections



Total Development Trips
Average Weekday
PM Peak Hour

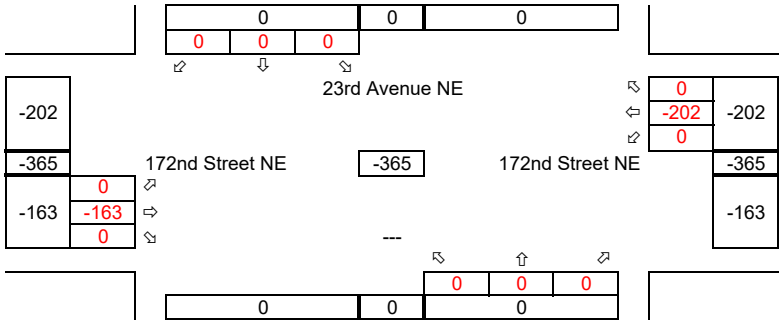


Future with Development
Average Weekday
PM Peak Hour



Future Connection Adjustment
Average Weekday
PM Peak Hour

Reduction: 25%



Synchro ID: 7

Existing
Average Weekday
PM Peak-Hour

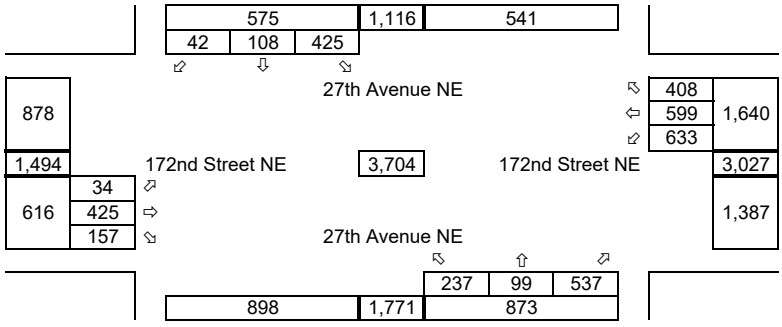
Year: **1/12/2022**

Data Source: **TDG**

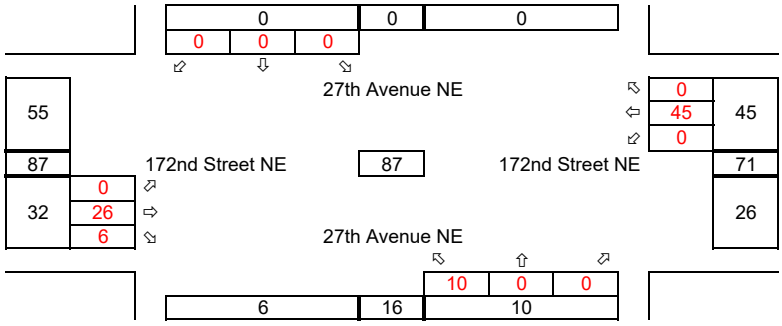
Future without Development
Average Weekday
PM Peak Hour

Year: 2031
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048

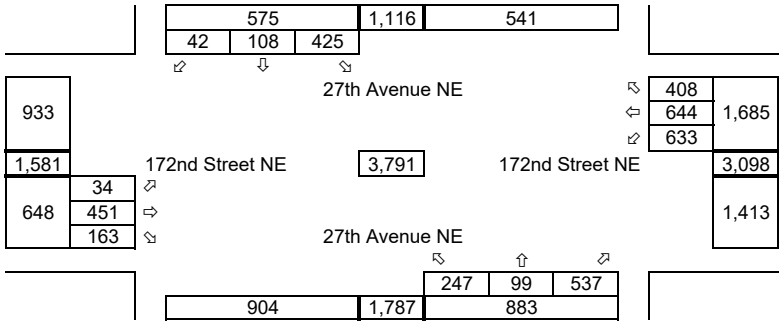
Includes adustment for the future connections



Total Development Trips
Average Weekday
PM Peak Hour



Future with Development
Average Weekday
PM Peak Hour



Future Connection Adjustment
Average Weekday
PM Peak Hour

Reduction: 25%

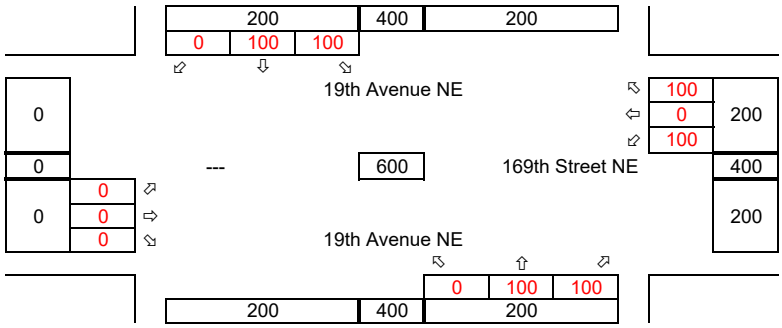
Synchro ID: 8

Existing
Average Weekday
PM Peak-Hour

Year: **1/12/2022**

Data Source: **TDG**

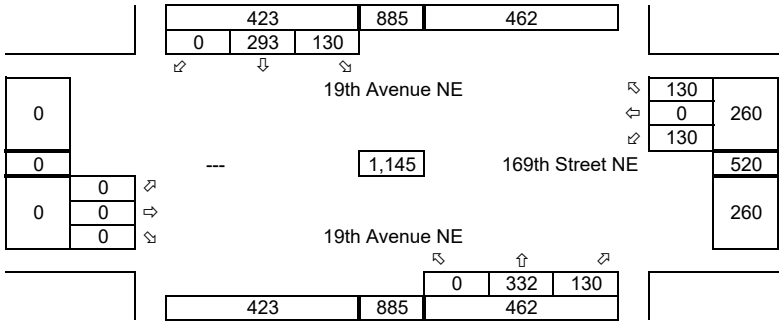
This intersection does not currently exist. Volumes are an estimate for analysis purposes.



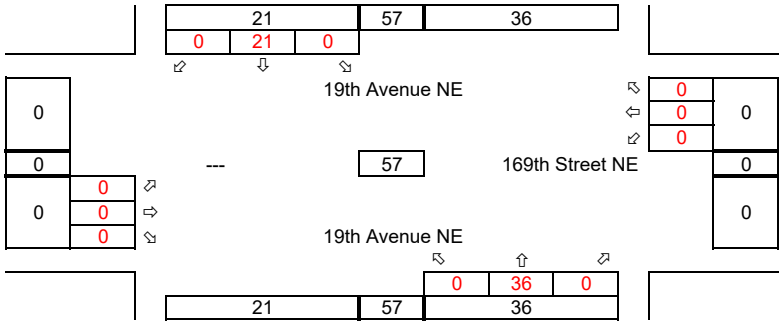
Future without Development
Average Weekday
PM Peak Hour

Year: 2031
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048

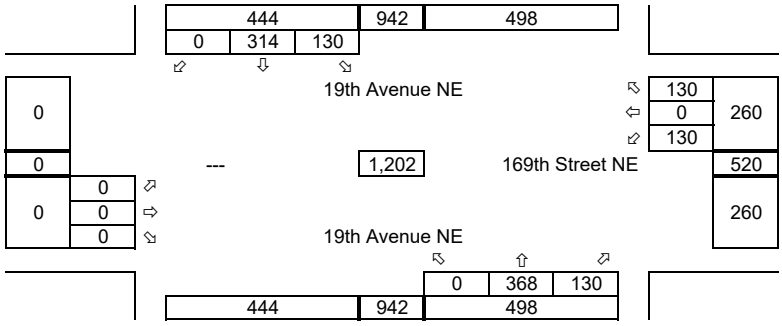
Includes adustment for the future connections



Total Development Trips
Average Weekday
PM Peak Hour

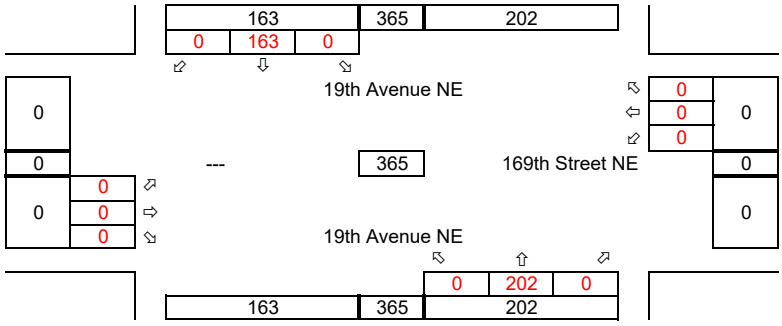


Future with Development
Average Weekday
PM Peak Hour



Future Connection Adjustment
Average Weekday
PM Peak Hour

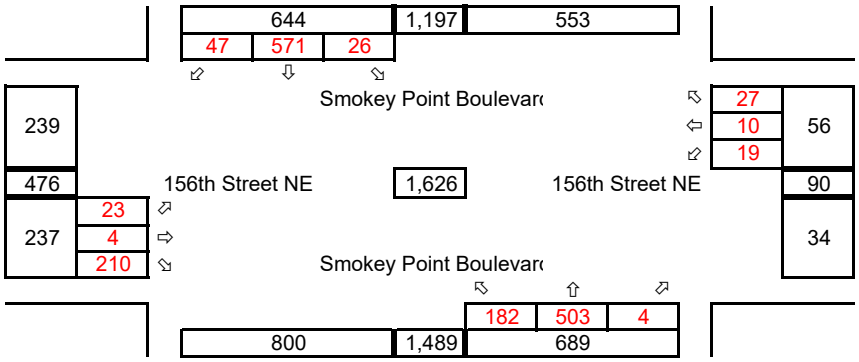
Reduction: 25%



Synchro ID: 9
Existing
Average Weekday
PM Peak-Hour

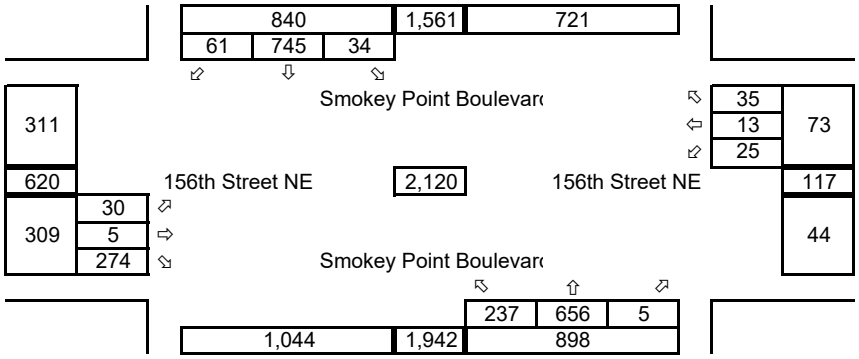
Year: **1/12/2022**

Data Source: **TDG**

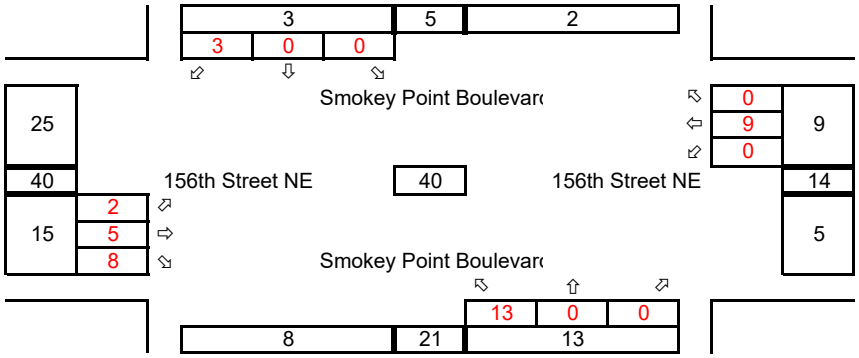


Future without Development
Average Weekday
PM Peak Hour

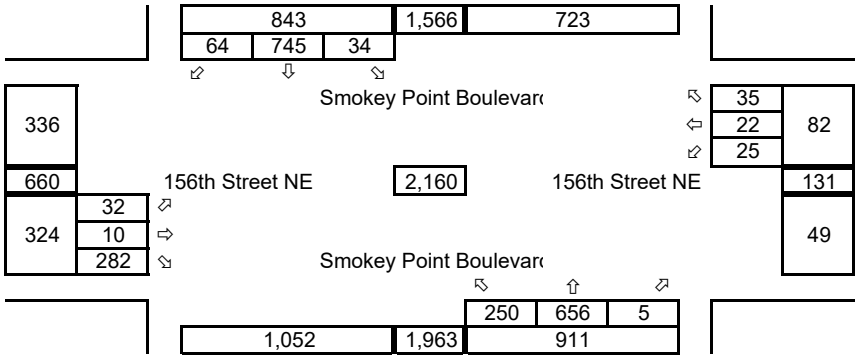
Year: 2031
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Average Weekday
PM Peak Hour



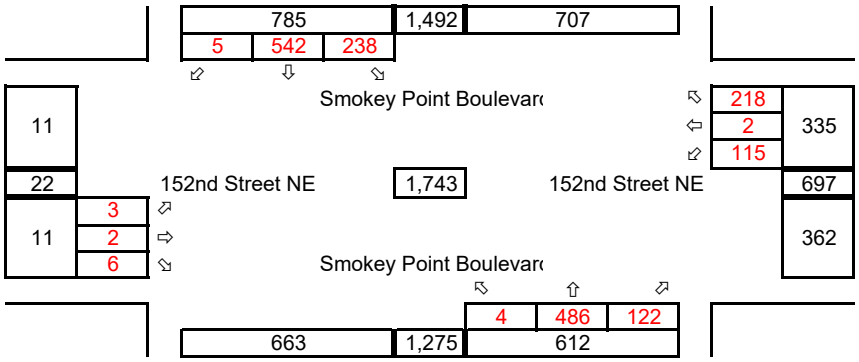
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 10
Existing
Average Weekday
PM Peak-Hour

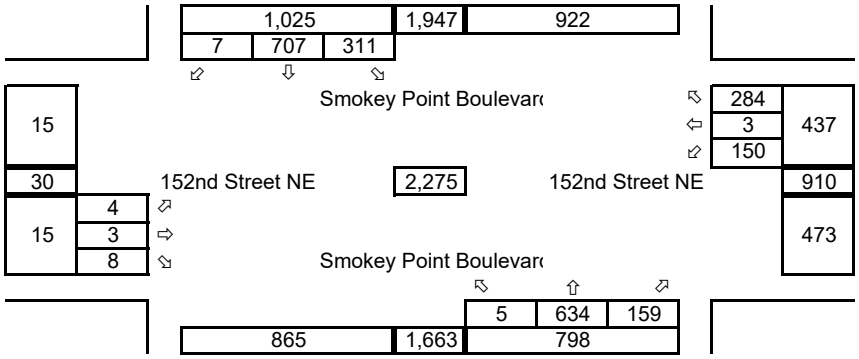
Year: **1/12/2022**

Data Source: **TDG**

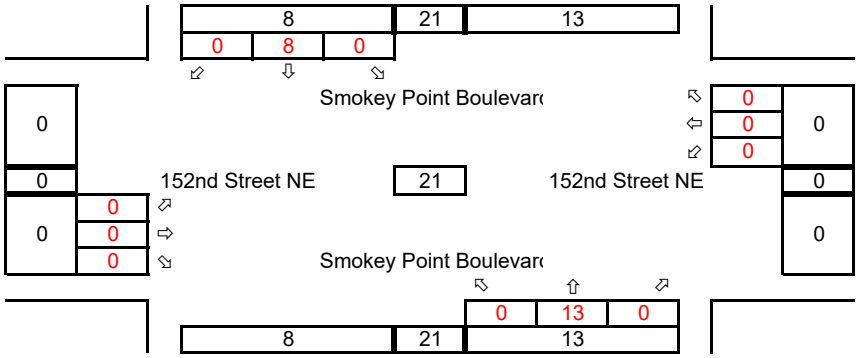


Future without Development
Average Weekday
PM Peak Hour

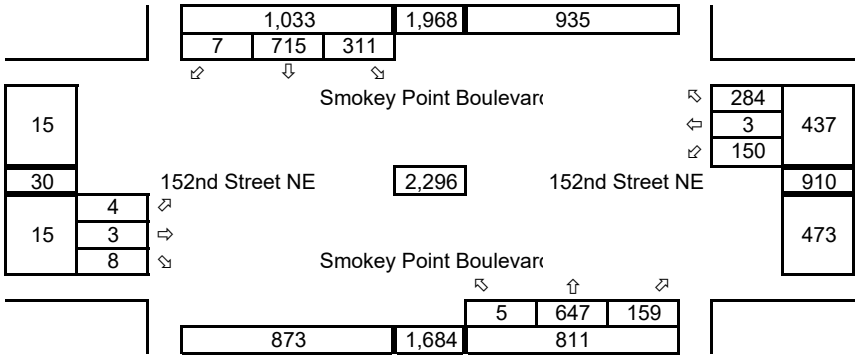
Year: 2031
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Average Weekday
PM Peak Hour



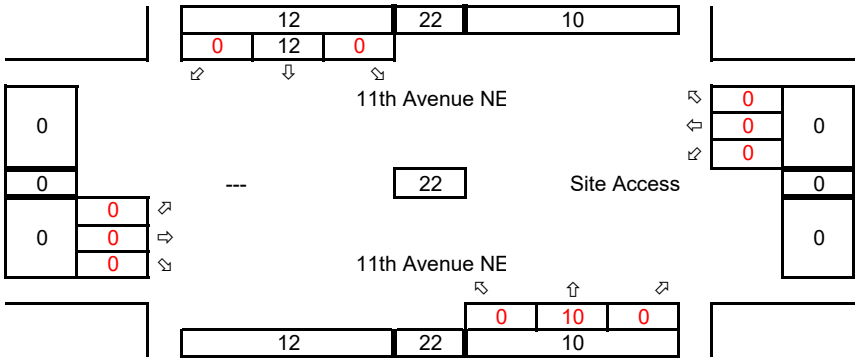
Future with Development
Average Weekday
PM Peak Hour



Synchro ID: 11
Existing
Average Weekday
PM Peak-Hour

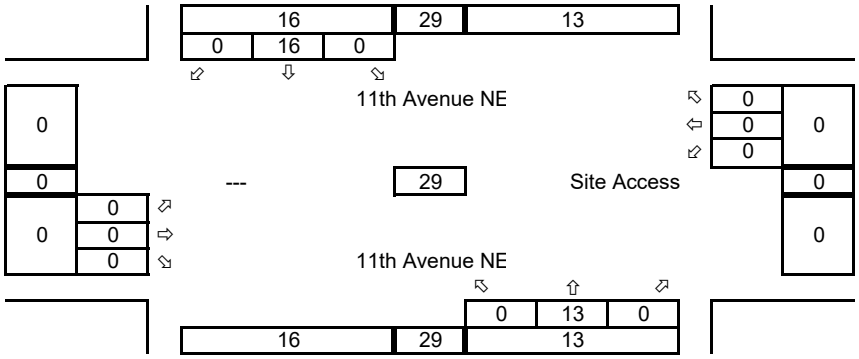
Year: **1/12/2022**

Data Source: **TDG**

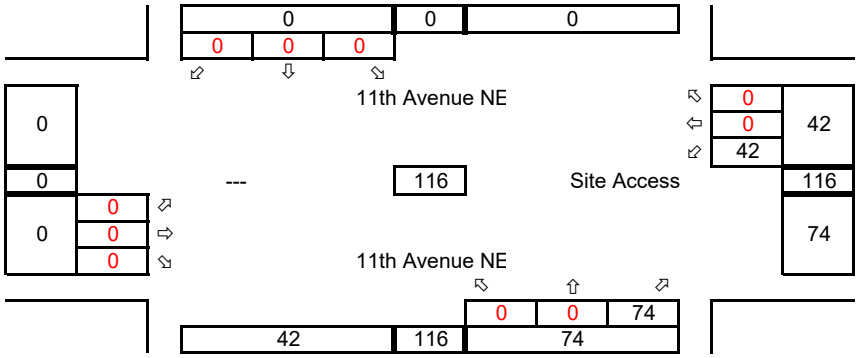


Future without Development
Average Weekday
PM Peak Hour

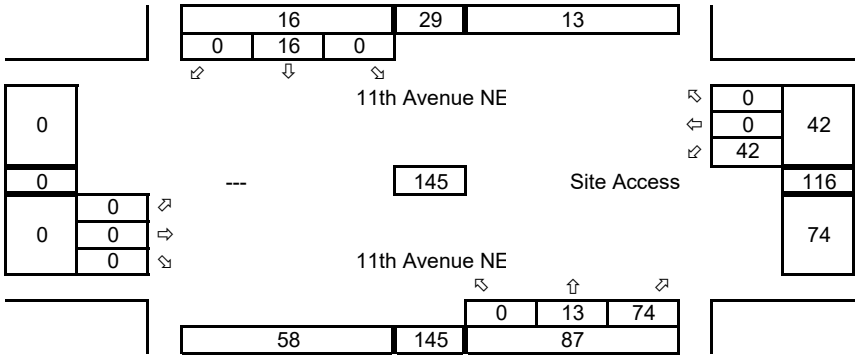
Year: 2031
Growth Rate = 3.0%
Years of Growth = 9
Total Growth = 1.3048



Total Development Trips
Average Weekday
PM Peak Hour



Future with Development
Average Weekday
PM Peak Hour



Weekday PM Peak-Hour Level of Service Calculations

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↰	↑			↕			↕	
Traffic Vol, veh/h	1	331	18	83	541	9	22	0	104	6	3	3
Future Vol, veh/h	1	331	18	83	541	9	22	0	104	6	3	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	115	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	360	20	90	588	10	24	0	113	7	3	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	598	0	0	380	0	0	1148	1150	370	1202	1155	593
Stage 1	-	-	-	-	-	-	372	372	-	773	773	-
Stage 2	-	-	-	-	-	-	776	778	-	429	382	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	979	-	-	1178	-	-	176	198	676	161	197	506
Stage 1	-	-	-	-	-	-	648	619	-	392	409	-
Stage 2	-	-	-	-	-	-	390	407	-	604	613	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	979	-	-	1178	-	-	162	183	676	126	182	506
Mov Cap-2 Maneuver	-	-	-	-	-	-	162	183	-	126	182	-
Stage 1	-	-	-	-	-	-	647	618	-	392	378	-
Stage 2	-	-	-	-	-	-	355	376	-	502	612	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.1	17	27.8
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	435	979	-	-	1178	-	-	171
HCM Lane V/C Ratio	0.315	0.001	-	-	0.077	-	-	0.076
HCM Control Delay (s)	17	8.7	0	-	8.3	-	-	27.8
HCM Lane LOS	C	A	A	-	A	-	-	D
HCM 95th %tile Q(veh)	1.3	0	-	-	0.2	-	-	0.2

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	29	413	1	3	593	5	0	0	3	15	0	42
Future Vol, veh/h	29	413	1	3	593	5	0	0	3	15	0	42
Conflicting Peds, #/hr	3	0	3	3	0	3	1	0	4	4	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	31	439	1	3	631	5	0	0	3	16	0	45

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	639	0	0	443	0	0	1168	1150	447	1150	1148	638
Stage 1	-	-	-	-	-	-	505	505	-	643	643	-
Stage 2	-	-	-	-	-	-	663	645	-	507	505	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	945	-	-	1117	-	-	170	198	612	175	199	477
Stage 1	-	-	-	-	-	-	549	540	-	462	468	-
Stage 2	-	-	-	-	-	-	450	467	-	548	540	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	942	-	-	1114	-	-	149	190	608	168	191	475
Mov Cap-2 Maneuver	-	-	-	-	-	-	265	301	-	295	310	-
Stage 1	-	-	-	-	-	-	529	521	-	445	465	-
Stage 2	-	-	-	-	-	-	406	464	-	525	521	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0	11	15.3
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	608	942	-	-	1114	-	-	409
HCM Lane V/C Ratio	0.005	0.033	-	-	0.003	-	-	0.148
HCM Control Delay (s)	11	9	-	-	8.2	-	-	15.3
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.5

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	447	7	7	626	21	52
Future Vol, veh/h	447	7	7	626	21	52
Conflicting Peds, #/hr	0	3	3	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	85	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	481	8	8	673	23	56

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	492	0	1177	488
Stage 1	-	-	-	-	488	-
Stage 2	-	-	-	-	689	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1071	-	211	580
Stage 1	-	-	-	-	617	-
Stage 2	-	-	-	-	498	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1068	-	209	578
Mov Cap-2 Maneuver	-	-	-	-	344	-
Stage 1	-	-	-	-	615	-
Stage 2	-	-	-	-	495	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	13.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	483	-	-	1068	-
HCM Lane V/C Ratio	0.163	-	-	0.007	-
HCM Control Delay (s)	13.9	-	-	8.4	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.6	-	-	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	489	9	57	626	8	45
Future Vol, veh/h	489	9	57	626	8	45
Conflicting Peds, #/hr	0	9	9	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	532	10	62	680	9	49

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	551	0	1350	546
Stage 1	-	-	-	-	546	-
Stage 2	-	-	-	-	804	-
Critical Hdwy	-	-	4.13	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.227	-	3.527	3.327
Pot Cap-1 Maneuver	-	-	1014	-	165	536
Stage 1	-	-	-	-	578	-
Stage 2	-	-	-	-	439	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1005	-	147	531
Mov Cap-2 Maneuver	-	-	-	-	147	-
Stage 1	-	-	-	-	573	-
Stage 2	-	-	-	-	396	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	16.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	381	-	-	1005	-
HCM Lane V/C Ratio	0.151	-	-	0.062	-
HCM Control Delay (s)	16.1	-	-	8.8	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0.2	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	36	499	620	21	10	57
Future Vol, veh/h	36	499	620	21	10	57
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	520	646	22	10	59

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	668	0	-	0	1253	657
Stage 1	-	-	-	-	657	-
Stage 2	-	-	-	-	596	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	922	-	-	-	190	465
Stage 1	-	-	-	-	516	-
Stage 2	-	-	-	-	550	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	922	-	-	-	179	465
Mov Cap-2 Maneuver	-	-	-	-	179	-
Stage 1	-	-	-	-	486	-
Stage 2	-	-	-	-	550	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	16.8
HCM LOS			C

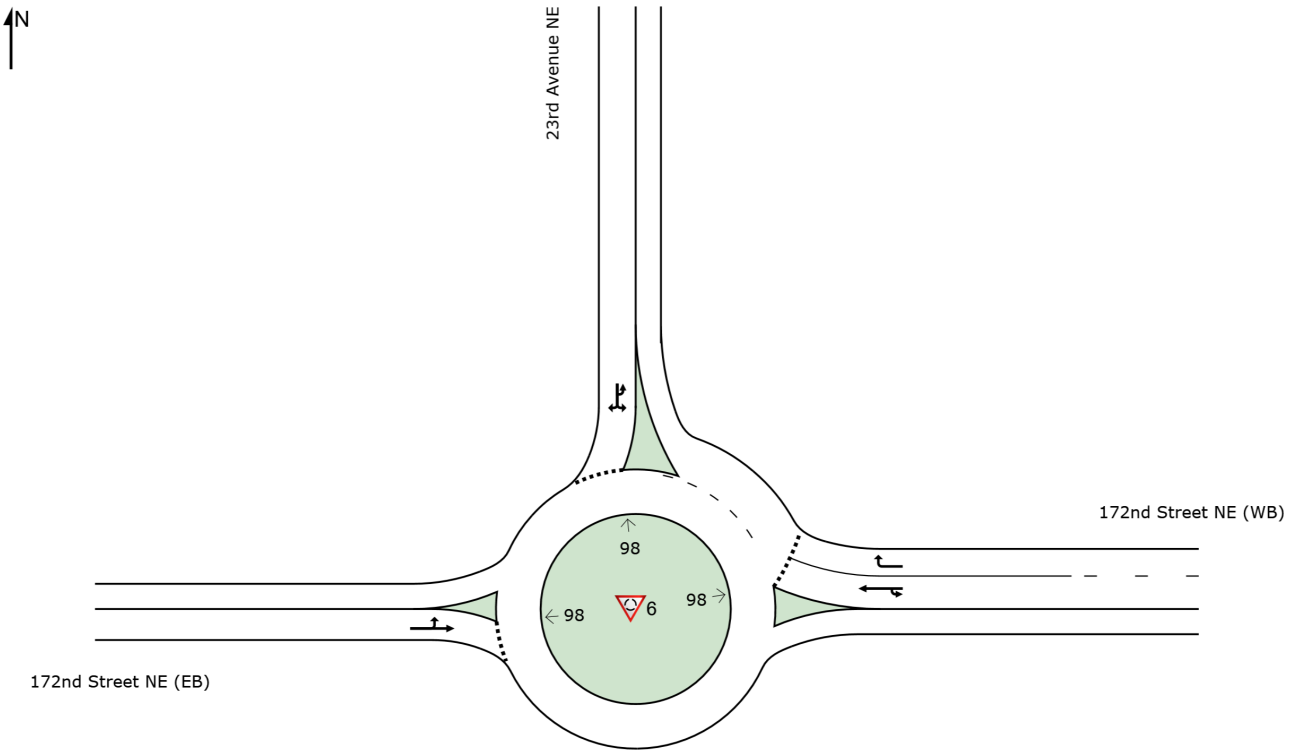
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	922	-	-	-	375
HCM Lane V/C Ratio	0.041	-	-	-	0.186
HCM Control Delay (s)	9.1	0	-	-	16.8
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7

SITE LAYOUT

Site: 6 [2022 Existing Conditions (Site Folder: 6: 172nd St NE at 23rd Ave NE)]

PM Peak-Hour
Site Category: 172nd St NE at 11th Ave NE
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Organisation: KIMLEY-HORN & ASSOCIATES INC | Licence: NETWORK / Enterprise | Created: Saturday, February 12, 2022 2:17:24 PM
Project: K:\2021\21-304\Full Analysis\Sidra\Preliminary Analysis\#8.sip9

MOVEMENT SUMMARY

Site: 6 [2022 Existing Conditions (Site Folder: 6: 172nd St NE at 23rd Ave NE)]

PM Peak-Hour
Site Category: 172nd St NE at 11th Ave NE
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: 172nd Street NE (WB)														
1u	U	23	3.0	23	3.0	0.411	12.3	LOS B	2.7	69.3	0.19	0.39	0.19	38.3
6	T1	629	3.0	635	3.0	0.411	4.0	LOS A	2.7	69.3	0.19	0.39	0.19	37.3
16	R2	156	3.0	158	3.0	0.141	4.4	LOS A	0.7	16.7	0.17	0.47	0.17	36.1
Approach		808	3.0	816	3.0	0.411	4.3	LOS A	2.7	69.3	0.18	0.41	0.18	37.1
North: 23rd Avenue NE														
7u	U	1	3.0	1	3.0	0.136	14.5	LOS B	0.6	15.9	0.53	0.74	0.53	35.0
7	L2	109	3.0	110	3.0	0.136	12.1	LOS B	0.6	15.9	0.53	0.74	0.53	34.2
14	R2	24	3.0	24	3.0	0.136	6.3	LOS A	0.6	15.9	0.53	0.74	0.53	33.2
Approach		134	3.0	135	3.0	0.136	11.1	LOS B	0.6	15.9	0.53	0.74	0.53	34.0
West: 172nd Street NE (EB)														
5	L2	42	3.0	42	3.0	0.410	10.4	LOS B	2.5	65.2	0.36	0.47	0.36	36.6
2	T1	473	3.0	478	3.0	0.410	4.6	LOS A	2.5	65.2	0.36	0.47	0.36	36.5
Approach		515	3.0	520	3.0	0.410	5.0	LOS A	2.5	65.2	0.36	0.47	0.36	36.5
All Vehicles		1457	3.0	1472	3.0	0.411	5.2	LOS A	2.7	69.3	0.28	0.46	0.28	36.6

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

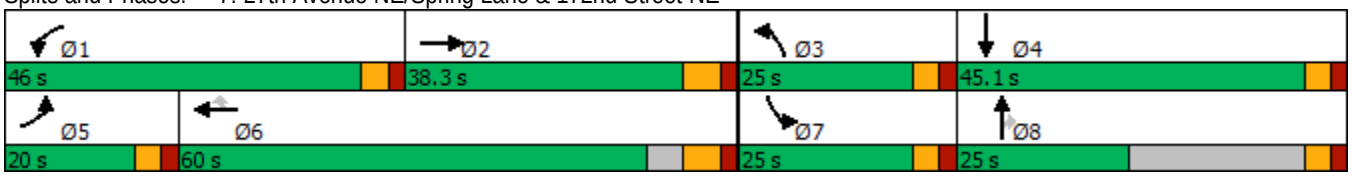
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	451	120	647	614	313	182	76	549	326	83	32
Future Volume (vph)	26	451	120	647	614	313	182	76	549	326	83	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		375	400		200	150		0	175		175
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor		1.00		0.99			0.99				0.99	
Frt		0.968				0.850			0.850		0.959	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3443	0	3467	3574	1599	1787	1881	1599	3467	1792	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1787	3443	0	3439	3574	1599	1770	1881	1599	3467	1792	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20				326			468		12	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1325			609			730			589	
Travel Time (s)		30.1			13.8			16.6			13.4	
Confl. Peds. (#/hr)			8	8			10					10
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	614	0	696	660	337	196	82	590	351	123	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Detector Phase	5	2		1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0		3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	9.5	38.3		9.5	38.3	38.3	9.5	23.1	23.1	9.5	45.1	
Total Split (s)	20.0	38.3		46.0	60.0	60.0	25.0	25.0	25.0	25.0	45.1	
Total Split (%)	13.0%	24.8%		29.8%	38.9%	38.9%	16.2%	16.2%	16.2%	16.2%	29.2%	
Maximum Green (s)	15.0	32.0		41.0	53.7	53.7	20.0	19.9	19.9	20.0	40.0	
Yellow Time (s)	3.0	4.3		3.0	4.3	4.3	3.0	3.1	3.1	3.0	3.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.3		5.0	6.3	6.3	5.0	5.1	5.1	5.0	5.1	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0	2.5	3.0	3.0	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0					7.0	
Flash Dont Walk (s)		25.0			25.0	25.0					33.0	
Pedestrian Calls (#/hr)		0			0	0					0	
Act Effct Green (s)	7.3	28.9		33.1	59.4	59.4	18.5	40.8	40.8	18.0	40.3	
Actuated g/C Ratio	0.05	0.20		0.23	0.42	0.42	0.13	0.29	0.29	0.13	0.28	
v/c Ratio	0.31	0.86		0.86	0.44	0.39	0.84	0.15	0.74	0.80	0.24	
Control Delay	77.2	66.5		64.8	31.6	4.8	91.5	42.2	17.1	75.8	39.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	77.2	66.5		64.8	31.6	4.8	91.5	42.2	17.1	75.8	39.4	
LOS	E	E		E	C	A	F	D	B	E	D	
Approach Delay		66.9			39.9			36.3			66.3	
Approach LOS		E			D			D			E	
Queue Length 50th (ft)	27	288		334	244	6	185	60	105	169	83	
Queue Length 95th (ft)	63	#383		409	311	70	#335	113	285	#238	149	
Internal Link Dist (ft)		1245			529			650			509	
Turn Bay Length (ft)	195			400		200	150			175		
Base Capacity (vph)	189	795		1006	1535	872	253	538	792	490	516	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.15	0.77		0.69	0.43	0.39	0.77	0.15	0.74	0.72	0.24	

Intersection Summary

Area Type: Other
Cycle Length: 154.4
Actuated Cycle Length: 142.4
Natural Cycle: 135
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 47.2 Intersection LOS: D
Intersection Capacity Utilization 84.3% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: 27th Avenue NE/Spring Lane & 172nd Street NE



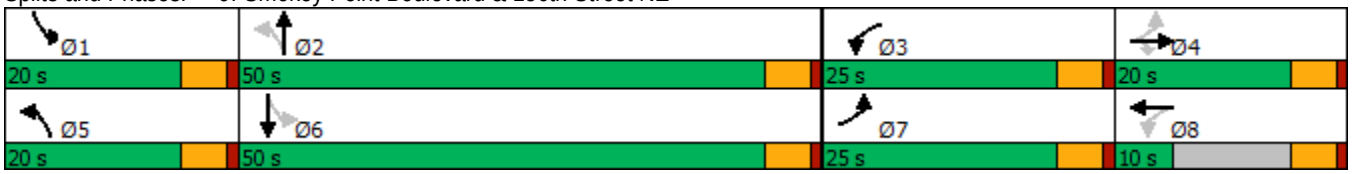
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	4	210	19	10	27	182	503	4	26	571	47
Future Volume (vph)	23	4	210	19	10	27	182	503	4	26	571	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	200		0	250		0	200		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.891			0.999			0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1660	0	1770	3536	0	1770	3500	0
Flt Permitted	0.641			0.755			0.257			0.451		
Satd. Flow (perm)	1194	1863	1583	1406	1660	0	479	3536	0	840	3500	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			223		29			1			9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1704			1283			1384			4766	
Travel Time (s)		38.7			29.2			31.5			108.3	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	4	223	20	40	0	194	539	0	28	657	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	10.0		7.0	10.0	
Minimum Split (s)	12.0	25.0	25.0	12.0	25.0		12.0	25.0		12.0	25.0	
Total Split (s)	25.0	20.0	20.0	25.0	10.0		20.0	50.0		20.0	50.0	
Total Split (%)	21.7%	17.4%	17.4%	21.7%	8.7%		17.4%	43.5%		17.4%	43.5%	
Maximum Green (s)	20.0	15.0	15.0	20.0	5.0		15.0	45.0		15.0	45.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	3.5		2.0	3.5	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	
Flash Dont Walk (s)		13.0	13.0		13.0			13.0			13.0	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	10.7	9.7	9.7	9.8	7.7		33.9	30.2		25.7	18.2	
Actuated g/C Ratio	0.19	0.17	0.17	0.18	0.14		0.61	0.54		0.46	0.32	
v/c Ratio	0.08	0.01	0.49	0.07	0.16		0.37	0.28		0.06	0.57	
Control Delay	20.3	25.0	8.7	20.3	16.9		7.8	10.0		6.9	18.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.3	25.0	8.7	20.3	16.9		7.8	10.0		6.9	18.7	
LOS	C	C	A	C	B		A	A		A	B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		10.1			18.1			9.4			18.2	
Approach LOS		B			B			A			B	
Queue Length 50th (ft)	6	1	0	5	3		17	25		2	75	
Queue Length 95th (ft)	26	10	60	23	32		71	127		15	188	
Internal Link Dist (ft)		1624			1203			1304			4686	
Turn Bay Length (ft)	150		150	200			250			200		
Base Capacity (vph)	682	543	619	684	494		659	2956		760	2927	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.04	0.01	0.36	0.03	0.08		0.29	0.18		0.04	0.22	

Intersection Summary

Area Type: Other
Cycle Length: 115
Actuated Cycle Length: 56
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 13.3 Intersection LOS: B
Intersection Capacity Utilization 48.6% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 9: Smokey Point Boulevard & 156th Street NE



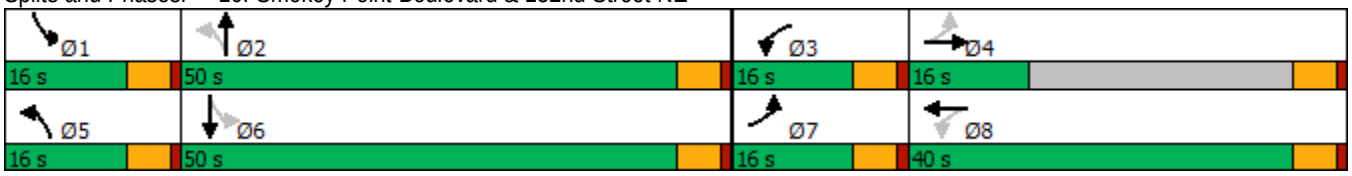
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	2	6	115	2	218	4	486	122	238	542	5
Future Volume (vph)	3	2	6	115	2	218	4	486	122	238	542	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0	125		0	150		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				1.00	
Frt		0.883			0.851			0.970			0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1629	0	1752	1570	0	1752	3400	0	1752	3501	0
Flt Permitted				0.571			0.428			0.257		
Satd. Flow (perm)	1845	1629	0	1053	1570	0	788	3400	0	474	3501	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			237			29			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		209			5141			1452			1384	
Travel Time (s)		4.8			116.8			33.0			31.5	
Confl. Peds. (#/hr)							2					2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	9	0	125	239	0	4	661	0	259	594	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	7.0		4.0	7.0	
Minimum Split (s)	9.5	27.0		11.5	26.0		9.5	24.0		9.5	26.0	
Total Split (s)	16.0	16.0		16.0	40.0		16.0	50.0		16.0	50.0	
Total Split (%)	13.1%	13.1%		13.1%	32.8%		13.1%	41.0%		13.1%	41.0%	
Maximum Green (s)	11.0	11.0		11.0	35.0		11.0	45.0		11.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.5	2.5		2.5	2.5	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		15.0			14.0			12.0			14.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	5.6	5.0		9.2	7.6		20.7	15.4		29.5	28.1	
Actuated g/C Ratio	0.11	0.10		0.19	0.16		0.42	0.31		0.60	0.57	
v/c Ratio	0.01	0.05		0.41	0.54		0.01	0.61		0.50	0.30	
Control Delay	19.0	18.9		22.5	9.3		6.5	17.1		9.1	7.8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.0	18.9		22.5	9.3		6.5	17.1		9.1	7.8	
LOS	B	B		C	A		A	B		A	A	
Approach Delay		18.9			13.8			17.0			8.2	
Approach LOS		B			B			B			A	
Queue Length 50th (ft)	1	1		30	1		0	71		24	30	
Queue Length 95th (ft)	6	14		79	58		4	170		93	134	
Internal Link Dist (ft)		129			5061			1372			1304	
Turn Bay Length (ft)	50			125			150			200		
Base Capacity (vph)	444	1223		444	1236		660	3078		586	3167	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.01	0.01		0.28	0.19		0.01	0.21		0.44	0.19	

Intersection Summary

Area Type: Other
Cycle Length: 122
Actuated Cycle Length: 49
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 12.4 Intersection LOS: B
Intersection Capacity Utilization 56.6% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 10: Smokey Point Boulevard & 152nd Street NE



Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	362	20	91	591	10	24	0	114	7	3	3
Future Vol, veh/h	1	362	20	91	591	10	24	0	114	7	3	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	115	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	393	22	99	642	11	26	0	124	8	3	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	653	0	0	415	0	0	1255	1257	404	1314	1263	648
Stage 1	-	-	-	-	-	-	406	406	-	846	846	-
Stage 2	-	-	-	-	-	-	849	851	-	468	417	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	934	-	-	1144	-	-	148	171	647	135	170	470
Stage 1	-	-	-	-	-	-	622	598	-	357	378	-
Stage 2	-	-	-	-	-	-	356	376	-	575	591	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	934	-	-	1144	-	-	135	156	647	102	155	470
Mov Cap-2 Maneuver	-	-	-	-	-	-	135	156	-	102	155	-
Stage 1	-	-	-	-	-	-	621	597	-	357	345	-
Stage 2	-	-	-	-	-	-	320	343	-	464	590	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.1	19.9	34
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	390	934	-	-	1144	-	-	138
HCM Lane V/C Ratio	0.385	0.001	-	-	0.086	-	-	0.102
HCM Control Delay (s)	19.9	8.9	0	-	8.4	-	-	34
HCM Lane LOS	C	A	A	-	A	-	-	D
HCM 95th %tile Q(veh)	1.8	0	-	-	0.3	-	-	0.3

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	32	451	1	3	648	5	0	0	3	16	0	46
Future Vol, veh/h	32	451	1	3	648	5	0	0	3	16	0	46
Conflicting Peds, #/hr	3	0	3	3	0	3	1	0	4	4	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	34	480	1	3	689	5	0	0	3	17	0	49

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	697	0	0	484	0	0	1275	1255	488	1255	1253	696
Stage 1	-	-	-	-	-	-	552	552	-	701	701	-
Stage 2	-	-	-	-	-	-	723	703	-	554	552	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	899	-	-	1079	-	-	144	172	580	148	172	442
Stage 1	-	-	-	-	-	-	518	515	-	429	441	-
Stage 2	-	-	-	-	-	-	417	440	-	517	515	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	896	-	-	1076	-	-	124	164	576	142	164	440
Mov Cap-2 Maneuver	-	-	-	-	-	-	236	276	-	268	286	-
Stage 1	-	-	-	-	-	-	497	494	-	411	438	-
Stage 2	-	-	-	-	-	-	369	437	-	493	494	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0	11.3	16.6
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	576	896	-	-	1076	-	-	377
HCM Lane V/C Ratio	0.006	0.038	-	-	0.003	-	-	0.175
HCM Control Delay (s)	11.3	9.2	-	-	8.4	-	-	16.6
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.6

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	488	8	8	684	23	57
Future Vol, veh/h	488	8	8	684	23	57
Conflicting Peds, #/hr	0	3	3	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	85	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	525	9	9	735	25	61

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	537	0	1286	533
Stage 1	-	-	-	-	533	-
Stage 2	-	-	-	-	753	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1031	-	181	547
Stage 1	-	-	-	-	588	-
Stage 2	-	-	-	-	465	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1028	-	179	545
Mov Cap-2 Maneuver	-	-	-	-	315	-
Stage 1	-	-	-	-	586	-
Stage 2	-	-	-	-	461	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	14.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	450	-	-	1028	-
HCM Lane V/C Ratio	0.191	-	-	0.008	-
HCM Control Delay (s)	14.9	-	-	8.5	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.7	-	-	0	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	534	10	62	684	9	49
Future Vol, veh/h	534	10	62	684	9	49
Conflicting Peds, #/hr	0	9	9	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	580	11	67	743	10	53

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	600	0	1472	595
Stage 1	-	-	-	-	595	-
Stage 2	-	-	-	-	877	-
Critical Hdwy	-	-	4.13	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.227	-	3.527	3.327
Pot Cap-1 Maneuver	-	-	972	-	139	502
Stage 1	-	-	-	-	549	-
Stage 2	-	-	-	-	405	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	964	-	121	498
Mov Cap-2 Maneuver	-	-	-	-	121	-
Stage 1	-	-	-	-	544	-
Stage 2	-	-	-	-	357	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	18.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	336	-	-	964	-
HCM Lane V/C Ratio	0.188	-	-	0.07	-
HCM Control Delay (s)	18.2	-	-	9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0.2	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	39	545	677	23	11	62
Future Vol, veh/h	39	545	677	23	11	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	568	705	24	11	65

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	729	0	-	0	1367	717
Stage 1	-	-	-	-	717	-
Stage 2	-	-	-	-	650	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	875	-	-	-	162	430
Stage 1	-	-	-	-	484	-
Stage 2	-	-	-	-	520	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	875	-	-	-	151	430
Mov Cap-2 Maneuver	-	-	-	-	151	-
Stage 1	-	-	-	-	451	-
Stage 2	-	-	-	-	520	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	18.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	875	-	-	-	336
HCM Lane V/C Ratio	0.046	-	-	-	0.226
HCM Control Delay (s)	9.3	0	-	-	18.8
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.9

MOVEMENT SUMMARY

Site: 6 [2025 Baseline Conditions (Site Folder: 6: 172nd St NE at 23rd Ave NE)]

PM Peak-Hour
Site Category: 172nd St NE at 11th Ave NE
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: 172nd Street NE (WB)														
1u	U	25	3.0	25	3.0	0.448	12.6	LOS B	3.8	96.6	0.25	0.38	0.25	38.4
6	T1	687	3.0	694	3.0	0.448	4.0	LOS A	3.8	96.6	0.25	0.38	0.25	37.2
16	R2	170	3.0	172	3.0	0.153	4.3	LOS A	0.9	22.4	0.21	0.45	0.21	36.2
Approach		882	3.0	891	3.0	0.448	4.3	LOS A	3.8	96.6	0.24	0.40	0.24	37.1
North: 23rd Avenue NE														
7u	U	1	3.0	1	3.0	0.187	16.9	LOS B	1.2	29.8	0.73	0.80	0.73	34.0
7	L2	119	3.0	120	3.0	0.187	14.4	LOS B	1.2	29.8	0.73	0.80	0.73	33.2
14	R2	26	3.0	26	3.0	0.187	8.4	LOS A	1.2	29.8	0.73	0.80	0.73	32.2
Approach		146	3.0	147	3.0	0.187	13.3	LOS B	1.2	29.8	0.73	0.80	0.73	33.0
West: 172nd Street NE (EB)														
5	L2	46	3.0	46	3.0	0.463	10.9	LOS B	3.8	96.0	0.49	0.49	0.49	36.4
2	T1	517	3.0	522	3.0	0.463	4.8	LOS A	3.8	96.0	0.49	0.49	0.49	36.3
Approach		563	3.0	569	3.0	0.463	5.3	LOS A	3.8	96.0	0.49	0.49	0.49	36.3
All Vehicles		1591	3.0	1607	3.0	0.463	5.5	LOS A	3.8	96.6	0.38	0.47	0.38	36.4

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: KIMLEY-HORN & ASSOCIATES INC | Licence: NETWORK / Enterprise | Processed: Saturday, February 12, 2022 2:16:36 PM
Project: K:\2021\21-304\Full Analysis\Sidra\Preliminary Analysis\#8.sip9

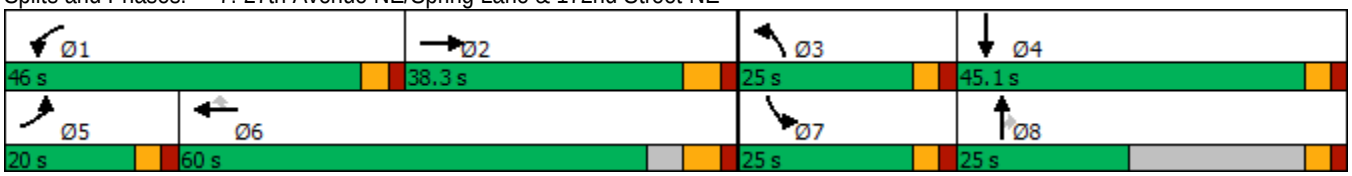
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	493	131	707	671	342	199	83	600	356	91	35
Future Volume (vph)	28	493	131	707	671	342	199	83	600	356	91	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		375	400		200	150		0	175		175
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor		1.00		0.99			0.99				0.99	
Frt		0.968				0.850			0.850		0.958	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3443	0	3467	3574	1599	1787	1881	1599	3467	1790	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1787	3443	0	3441	3574	1599	1770	1881	1599	3467	1790	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20				325			462		12	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1325			609			730			589	
Travel Time (s)		30.1			13.8			16.6			13.4	
Confl. Peds. (#/hr)			8	8			10					10
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	30	671	0	760	722	368	214	89	645	383	136	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Detector Phase	5	2		1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0		3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	9.5	38.3		9.5	38.3	38.3	9.5	23.1	23.1	9.5	45.1	
Total Split (s)	20.0	38.3		46.0	60.0	60.0	25.0	25.0	25.0	25.0	45.1	
Total Split (%)	13.0%	24.8%		29.8%	38.9%	38.9%	16.2%	16.2%	16.2%	16.2%	29.2%	
Maximum Green (s)	15.0	32.0		41.0	53.7	53.7	20.0	19.9	19.9	20.0	40.0	
Yellow Time (s)	3.0	4.3		3.0	4.3	4.3	3.0	3.1	3.1	3.0	3.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.3		5.0	6.3	6.3	5.0	5.1	5.1	5.0	5.1	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0	2.5	3.0	3.0	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0					7.0	
Flash Dont Walk (s)		25.0			25.0	25.0					33.0	
Pedestrian Calls (#/hr)		0			0	0					0	
Act Effct Green (s)	7.5	31.0		36.1	64.1	64.1	19.5	40.6	40.6	19.0	40.1	
Actuated g/C Ratio	0.05	0.21		0.24	0.43	0.43	0.13	0.27	0.27	0.13	0.27	
v/c Ratio	0.33	0.91		0.90	0.47	0.42	0.91	0.17	0.83	0.86	0.28	
Control Delay	79.5	73.5		68.9	32.0	6.3	103.3	44.1	25.0	83.2	42.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	
Total Delay	79.5	73.5		68.9	32.0	6.5	103.3	44.1	25.0	83.2	42.0	
LOS	E	E		E	C	A	F	D	C	F	D	
Approach Delay		73.7			42.1			44.5			72.4	
Approach LOS		E			D			D			E	
Queue Length 50th (ft)	29	333		374	273	25	211	68	192	192	97	
Queue Length 95th (ft)	67	#458		454	345	101	#379	121	#406	#279	164	
Internal Link Dist (ft)		1245			529			650			509	
Turn Bay Length (ft)	195			400		200	150			175		
Base Capacity (vph)	181	761		961	1546	876	241	515	773	469	493	
Starvation Cap Reductn	0	0		0	0	117	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.17	0.88		0.79	0.47	0.48	0.89	0.17	0.83	0.82	0.28	

Intersection Summary

Area Type: Other
Cycle Length: 154.4
Actuated Cycle Length: 148.2
Natural Cycle: 135
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 52.1 Intersection LOS: D
Intersection Capacity Utilization 102.4% ICU Level of Service G
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: 27th Avenue NE/Spring Lane & 172nd Street NE



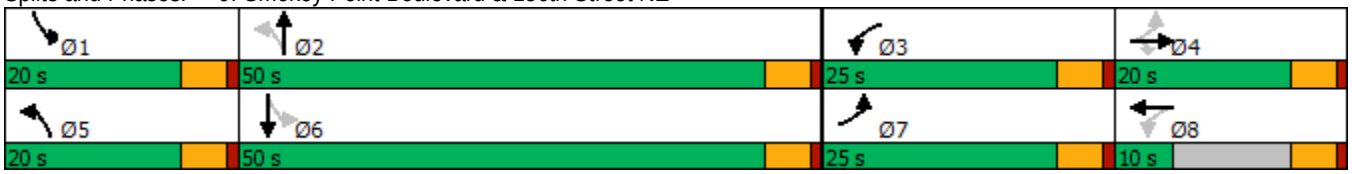
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	4	229	21	11	30	199	550	4	28	624	51
Future Volume (vph)	25	4	229	21	11	30	199	550	4	28	624	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	200		0	250		0	200		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.891			0.999			0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1660	0	1770	3536	0	1770	3500	0
Flt Permitted	0.728			0.755			0.236			0.430		
Satd. Flow (perm)	1356	1863	1583	1406	1660	0	440	3536	0	801	3500	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			244		32			1			9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1704			1283			1384			4766	
Travel Time (s)		38.7			29.2			31.5			108.3	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	4	244	22	44	0	212	589	0	30	718	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	10.0		7.0	10.0	
Minimum Split (s)	12.0	25.0	25.0	12.0	25.0		12.0	25.0		12.0	25.0	
Total Split (s)	25.0	20.0	20.0	25.0	10.0		20.0	50.0		20.0	50.0	
Total Split (%)	21.7%	17.4%	17.4%	21.7%	8.7%		17.4%	43.5%		17.4%	43.5%	
Maximum Green (s)	20.0	15.0	15.0	20.0	5.0		15.0	45.0		15.0	45.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	3.5		2.0	3.5	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	
Flash Dont Walk (s)		13.0	13.0		13.0			13.0			13.0	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	10.3	8.2	8.2	10.3	8.2		37.0	33.3		28.0	20.5	
Actuated g/C Ratio	0.17	0.14	0.14	0.17	0.14		0.62	0.56		0.47	0.34	
v/c Ratio	0.09	0.02	0.57	0.08	0.17		0.41	0.30		0.06	0.60	
Control Delay	22.0	29.8	10.9	21.9	17.1		8.3	10.0		7.0	19.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.0	29.8	10.9	21.9	17.1		8.3	10.0		7.0	19.2	
LOS	C	C	B	C	B		A	B		A	B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		12.3			18.7			9.5			18.7	
Approach LOS		B			B			A			B	
Queue Length 50th (ft)	8	1	0	6	3		18	28		2	91	
Queue Length 95th (ft)	30	11	64	26	35		79	142		16	210	
Internal Link Dist (ft)		1624			1203			1304			4686	
Turn Bay Length (ft)	150		150	200			250			200		
Base Capacity (vph)	648	502	605	649	470		631	2800		737	2773	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.04	0.01	0.40	0.03	0.09		0.34	0.21		0.04	0.26	

Intersection Summary

Area Type: Other
Cycle Length: 115
Actuated Cycle Length: 59.6
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 13.9 Intersection LOS: B
Intersection Capacity Utilization 51.4% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 9: Smokey Point Boulevard & 156th Street NE



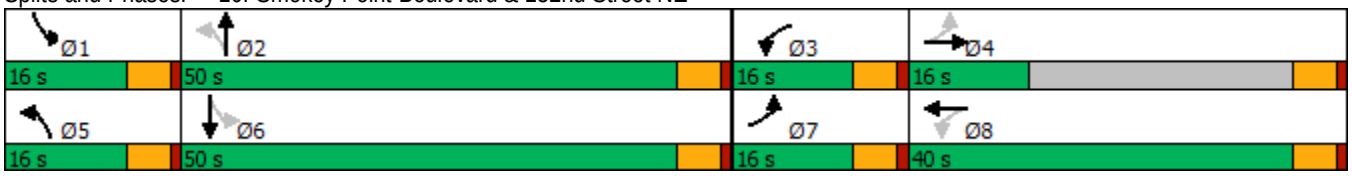
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	2	7	126	2	238	4	531	133	260	592	5
Future Volume (vph)	3	2	7	126	2	238	4	531	133	260	592	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0	125		0	150		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				1.00	
Frt		0.880			0.851			0.970			0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1623	0	1752	1570	0	1752	3400	0	1752	3501	0
Flt Permitted				0.690			0.406			0.229		
Satd. Flow (perm)	1845	1623	0	1273	1570	0	748	3400	0	422	3501	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			259			29			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		209			5141			1452			1384	
Travel Time (s)		4.8			116.8			33.0			31.5	
Confl. Peds. (#/hr)							2					2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	10	0	137	261	0	4	722	0	283	648	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	7.0		4.0	7.0	
Minimum Split (s)	9.5	27.0		11.5	26.0		9.5	24.0		9.5	26.0	
Total Split (s)	16.0	16.0		16.0	40.0		16.0	50.0		16.0	50.0	
Total Split (%)	13.1%	13.1%		13.1%	32.8%		13.1%	41.0%		13.1%	41.0%	
Maximum Green (s)	11.0	11.0		11.0	35.0		11.0	45.0		11.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.5	2.5		2.5	2.5	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		15.0			14.0			12.0			14.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	5.6	4.9		9.7	8.2		22.5	17.3		33.0	31.5	
Actuated g/C Ratio	0.11	0.09		0.18	0.15		0.42	0.33		0.62	0.59	
v/c Ratio	0.02	0.06		0.45	0.56		0.01	0.64		0.54	0.31	
Control Delay	20.7	19.7		24.9	9.5		6.2	18.1		9.6	7.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.7	19.7		24.9	9.5		6.2	18.1		9.6	7.7	
LOS	C	B		C	A		A	B		A	A	
Approach Delay		19.9			14.8			18.1			8.3	
Approach LOS		B			B			B			A	
Queue Length 50th (ft)	1	1		38	1		0	88		28	35	
Queue Length 95th (ft)	7	15		91	61		4	187		103	146	
Internal Link Dist (ft)		129			5061			1372			1304	
Turn Bay Length (ft)	50			125			150			200		
Base Capacity (vph)	406	1115		414	1158		620	2941		548	3024	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.01	0.01		0.33	0.23		0.01	0.25		0.52	0.21	

Intersection Summary

Area Type: Other
Cycle Length: 122
Actuated Cycle Length: 53.1
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 13.0 Intersection LOS: B
Intersection Capacity Utilization 60.7% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 10: Smokey Point Boulevard & 152nd Street NE



Intersection												
Int Delay, s/veh	6.5											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↰	↑			↕			↕	
Traffic Vol, veh/h	8	365	20	91	593	71	24	6	114	43	5	7
Future Vol, veh/h	8	365	20	91	593	71	24	6	114	43	5	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	115	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	397	22	99	645	77	26	7	124	47	5	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	722	0	0	419	0	0	1314	1346	408	1374	1319	684
Stage 1	-	-	-	-	-	-	426	426	-	882	882	-
Stage 2	-	-	-	-	-	-	888	920	-	492	437	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	880	-	-	1140	-	-	135	151	643	123	157	449
Stage 1	-	-	-	-	-	-	606	586	-	341	364	-
Stage 2	-	-	-	-	-	-	338	350	-	558	579	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	880	-	-	1140	-	-	119	136	643	88	141	449
Mov Cap-2 Maneuver	-	-	-	-	-	-	119	136	-	88	141	-
Stage 1	-	-	-	-	-	-	598	578	-	337	332	-
Stage 2	-	-	-	-	-	-	298	320	-	440	571	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1	24.3	81.3
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	340	880	-	-	1140	-	-	102
HCM Lane V/C Ratio	0.46	0.01	-	-	0.087	-	-	0.586
HCM Control Delay (s)	24.3	9.1	0	-	8.5	-	-	81.3
HCM Lane LOS	C	A	A	-	A	-	-	F
HCM 95th %tile Q(veh)	2.3	0	-	-	0.3	-	-	2.8

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	487	1	3	709	35	0	0	3	34	0	48
Future Vol, veh/h	35	487	1	3	709	35	0	0	3	34	0	48
Conflicting Peds, #/hr	3	0	3	3	0	3	1	0	4	4	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	37	518	1	3	754	37	0	0	3	36	0	51

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	794	0	0	522	0	0	1401	1396	526	1380	1378	777
Stage 1	-	-	-	-	-	-	596	596	-	782	782	-
Stage 2	-	-	-	-	-	-	805	800	-	598	596	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	827	-	-	1044	-	-	118	141	552	122	145	397
Stage 1	-	-	-	-	-	-	490	492	-	387	405	-
Stage 2	-	-	-	-	-	-	376	397	-	489	492	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	825	-	-	1041	-	-	99	133	548	116	137	395
Mov Cap-2 Maneuver	-	-	-	-	-	-	205	244	-	239	259	-
Stage 1	-	-	-	-	-	-	466	468	-	368	403	-
Stage 2	-	-	-	-	-	-	326	395	-	463	468	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0	11.6	21
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	548	825	-	-	1041	-	-	311
HCM Lane V/C Ratio	0.006	0.045	-	-	0.003	-	-	0.28
HCM Control Delay (s)	11.6	9.6	-	-	8.5	-	-	21
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	1.1

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	542	8	8	775	23	57
Future Vol, veh/h	542	8	8	775	23	57
Conflicting Peds, #/hr	0	3	3	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	85	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	583	9	9	833	25	61

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	595	0	1442	591
Stage 1	-	-	-	-	591	-
Stage 2	-	-	-	-	851	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	981	-	146	507
Stage 1	-	-	-	-	553	-
Stage 2	-	-	-	-	419	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	978	-	144	506
Mov Cap-2 Maneuver	-	-	-	-	280	-
Stage 1	-	-	-	-	551	-
Stage 2	-	-	-	-	415	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	16.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	411	-	-	978	-
HCM Lane V/C Ratio	0.209	-	-	0.009	-
HCM Control Delay (s)	16.1	-	-	8.7	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.8	-	-	0	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	588	10	62	775	9	49
Future Vol, veh/h	588	10	62	775	9	49
Conflicting Peds, #/hr	0	9	9	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	639	11	67	842	10	53

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	659	0	1630	654
Stage 1	-	-	-	-	654	-
Stage 2	-	-	-	-	976	-
Critical Hdwy	-	-	4.13	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.227	-	3.527	3.327
Pot Cap-1 Maneuver	-	-	924	-	111	465
Stage 1	-	-	-	-	515	-
Stage 2	-	-	-	-	364	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	916	-	95	461
Mov Cap-2 Maneuver	-	-	-	-	95	-
Stage 1	-	-	-	-	510	-
Stage 2	-	-	-	-	314	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	20.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	289	-	-	916	-
HCM Lane V/C Ratio	0.218	-	-	0.074	-
HCM Control Delay (s)	20.9	-	-	9.2	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0.2	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	39	599	768	23	11	62
Future Vol, veh/h	39	599	768	23	11	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	624	800	24	11	65

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	824	0	-	0	1518	812
Stage 1	-	-	-	-	812	-
Stage 2	-	-	-	-	706	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	806	-	-	-	131	379
Stage 1	-	-	-	-	437	-
Stage 2	-	-	-	-	489	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	806	-	-	-	121	379
Mov Cap-2 Maneuver	-	-	-	-	121	-
Stage 1	-	-	-	-	403	-
Stage 2	-	-	-	-	489	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	22
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	806	-	-	-	287
HCM Lane V/C Ratio	0.05	-	-	-	0.265
HCM Control Delay (s)	9.7	0	-	-	22
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	1

MOVEMENT SUMMARY

Site: 6 [2025 Opening Year Conditions (Site Folder: 6: 172nd St NE at 23rd Ave NE)]

PM Peak-Hour
Site Category: 172nd St NE at 11th Ave NE
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: 172nd Street NE (WB)														
1u	U	25	3.0	25	3.0	0.513	12.5	LOS B	4.8	122.7	0.28	0.39	0.28	37.9
6	T1	778	3.0	786	3.0	0.513	4.2	LOS A	4.8	122.7	0.28	0.39	0.28	36.9
16	R2	170	3.0	172	3.0	0.156	4.4	LOS A	0.9	23.1	0.22	0.46	0.22	36.1
Approach		973	3.0	983	3.0	0.513	4.4	LOS A	4.8	122.7	0.27	0.41	0.27	36.8
North: 23rd Avenue NE														
7u	U	1	3.0	1	3.0	0.210	17.9	LOS B	1.4	34.7	0.79	0.84	0.79	33.3
7	L2	119	3.0	120	3.0	0.210	15.5	LOS B	1.4	34.7	0.79	0.84	0.79	32.6
14	R2	26	3.0	26	3.0	0.210	9.6	LOS A	1.4	34.7	0.79	0.84	0.79	31.7
Approach		146	3.0	147	3.0	0.210	14.4	LOS B	1.4	34.7	0.79	0.84	0.79	32.4
West: 172nd Street NE (EB)														
5	L2	46	3.0	46	3.0	0.516	10.9	LOS B	4.5	114.8	0.53	0.51	0.53	36.0
2	T1	571	3.0	577	3.0	0.516	5.1	LOS A	4.5	114.8	0.53	0.51	0.53	36.0
Approach		617	3.0	623	3.0	0.516	5.5	LOS A	4.5	114.8	0.53	0.51	0.53	36.0
All Vehicles		1736	3.0	1754	3.0	0.516	5.6	LOS A	4.8	122.7	0.40	0.48	0.40	36.1

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	526	152	707	726	342	235	83	600	356	91	35
Future Volume (vph)	28	526	152	707	726	342	235	83	600	356	91	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		375	400		200	150		0	175		175
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor		0.99		0.99			0.99				0.99	
Frt		0.966				0.850			0.850		0.958	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3435	0	3467	3574	1599	1787	1881	1599	3467	1790	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1787	3435	0	3443	3574	1599	1770	1881	1599	3467	1790	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22				301			459		12	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1325			609			730			589	
Travel Time (s)		30.1			13.8			16.6			13.4	
Confl. Peds. (#/hr)			8	8			10					10
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	30	729	0	760	781	368	253	89	645	383	136	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Detector Phase	5	2		1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0		3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	9.5	38.3		9.5	38.3	38.3	9.5	23.1	23.1	9.5	45.1	
Total Split (s)	20.0	38.3		46.0	60.0	60.0	25.0	25.0	25.0	25.0	45.1	
Total Split (%)	13.0%	24.8%		29.8%	38.9%	38.9%	16.2%	16.2%	16.2%	16.2%	29.2%	
Maximum Green (s)	15.0	32.0		41.0	53.7	53.7	20.0	19.9	19.9	20.0	40.0	
Yellow Time (s)	3.0	4.3		3.0	4.3	4.3	3.0	3.1	3.1	3.0	3.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.3		5.0	6.3	6.3	5.0	5.1	5.1	5.0	5.1	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0	2.5	3.0	3.0	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0					7.0	
Flash Dont Walk (s)		25.0			25.0	25.0					33.0	
Pedestrian Calls (#/hr)		0			0	0					0	
Act Effct Green (s)	7.5	32.0		36.4	65.3	65.3	20.0	41.0	41.0	19.1	40.0	
Actuated g/C Ratio	0.05	0.21		0.24	0.44	0.44	0.13	0.27	0.27	0.13	0.27	
v/c Ratio	0.34	0.97		0.90	0.50	0.42	1.06	0.17	0.84	0.87	0.28	
Control Delay	79.7	82.7		70.1	32.8	7.8	135.7	44.2	25.6	84.4	42.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.5	0.2	0.0	0.0	0.0	0.0	0.0	
Total Delay	79.7	82.7		70.1	33.3	8.0	135.7	44.2	25.6	84.4	42.3	
LOS	E	F		E	C	A	F	D	C	F	D	
Approach Delay		82.5			43.1			55.5			73.4	
Approach LOS		F			D			E			E	
Queue Length 50th (ft)	29	370		374	302	40	~275	68	196	192	97	
Queue Length 95th (ft)	67	#524		454	378	123	#471	121	#415	#279	164	
Internal Link Dist (ft)		1245			529			650			509	
Turn Bay Length (ft)	195			400		200	150			175		
Base Capacity (vph)	178	751		949	1556	866	238	514	770	463	486	
Starvation Cap Reductn	0	0		0	360	117	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.17	0.97		0.80	0.65	0.49	1.06	0.17	0.84	0.83	0.28	

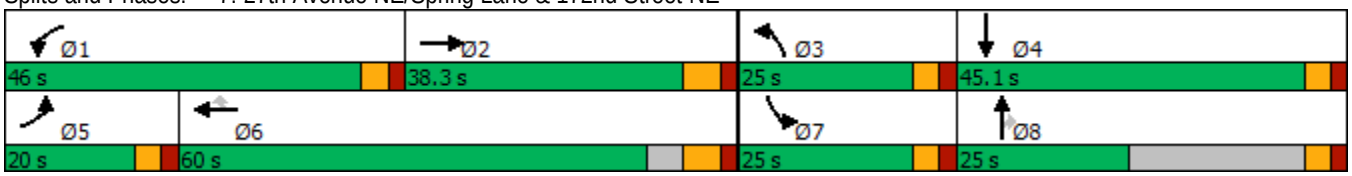
Intersection Summary

Area Type: Other
Cycle Length: 154.4
Actuated Cycle Length: 149.9
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.06
Intersection Signal Delay: 56.9 Intersection LOS: E
Intersection Capacity Utilization 105.6% ICU Level of Service G
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: 27th Avenue NE/Spring Lane & 172nd Street NE



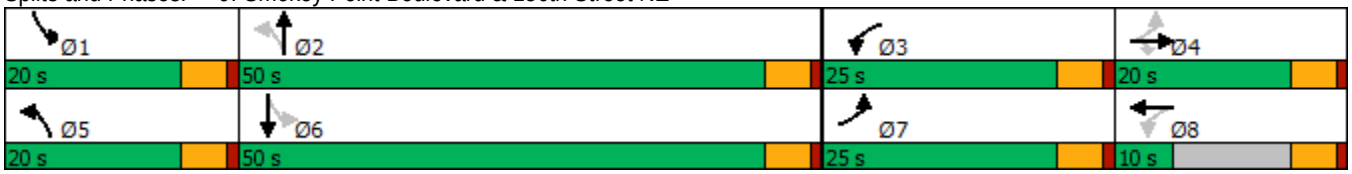
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	4	242	21	11	30	221	550	4	28	624	54
Future Volume (vph)	27	4	242	21	11	30	221	550	4	28	624	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	200		0	250		0	200		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.891			0.999			0.988	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1660	0	1770	3536	0	1770	3497	0
Flt Permitted	0.728			0.755			0.233			0.430		
Satd. Flow (perm)	1356	1863	1583	1406	1660	0	434	3536	0	801	3497	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			257		32			1			9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1704			1283			1384			4766	
Travel Time (s)		38.7			29.2			31.5			108.3	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	4	257	22	44	0	235	589	0	30	721	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	10.0		7.0	10.0	
Minimum Split (s)	12.0	25.0	25.0	12.0	25.0		12.0	25.0		12.0	25.0	
Total Split (s)	25.0	20.0	20.0	25.0	10.0		20.0	50.0		20.0	50.0	
Total Split (%)	21.7%	17.4%	17.4%	21.7%	8.7%		17.4%	43.5%		17.4%	43.5%	
Maximum Green (s)	20.0	15.0	15.0	20.0	5.0		15.0	45.0		15.0	45.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	3.5		2.0	3.5	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	
Flash Dont Walk (s)		13.0	13.0		13.0			13.0			13.0	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	10.4	8.2	8.2	10.4	8.2		38.0	34.3		28.2	20.7	
Actuated g/C Ratio	0.17	0.14	0.14	0.17	0.14		0.63	0.57		0.46	0.34	
v/c Ratio	0.10	0.02	0.59	0.08	0.17		0.44	0.29		0.06	0.60	
Control Delay	22.5	30.0	11.1	22.3	17.3		8.6	9.9		7.1	19.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.5	30.0	11.1	22.3	17.3		8.6	9.9		7.1	19.6	
LOS	C	C	B	C	B		A	A		A	B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		12.5			19.0			9.5			19.1	
Approach LOS		B			B			A			B	
Queue Length 50th (ft)	9	1	0	7	4		21	28		2	94	
Queue Length 95th (ft)	31	11	65	26	35		88	142		16	212	
Internal Link Dist (ft)		1624			1203			1304			4686	
Turn Bay Length (ft)	150		150	200			250			200		
Base Capacity (vph)	637	492	607	637	462		625	2758		731	2730	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.05	0.01	0.42	0.03	0.10		0.38	0.21		0.04	0.26	

Intersection Summary

Area Type: Other
Cycle Length: 115
Actuated Cycle Length: 60.7
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 14.0 Intersection LOS: B
Intersection Capacity Utilization 52.3% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 9: Smokey Point Boulevard & 156th Street NE



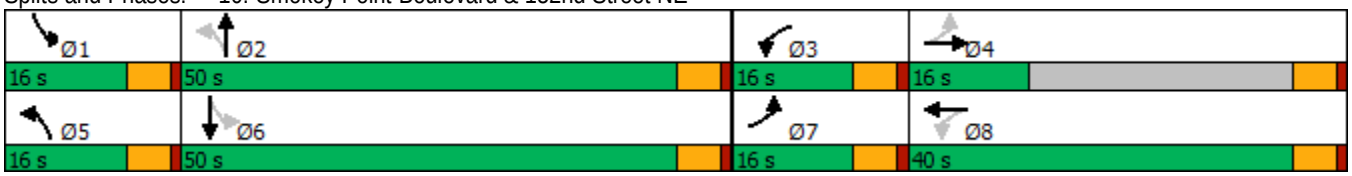
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	2	7	126	2	247	4	542	133	265	600	5
Future Volume (vph)	3	2	7	126	2	247	4	542	133	265	600	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0	125		0	150		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				1.00	
Frt		0.880			0.851			0.970			0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1623	0	1752	1570	0	1752	3400	0	1752	3501	0
Flt Permitted				0.690			0.402			0.223		
Satd. Flow (perm)	1845	1623	0	1273	1570	0	740	3400	0	411	3501	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			268			28			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		209			5141			1452			1384	
Travel Time (s)		4.8			116.8			33.0			31.5	
Confl. Peds. (#/hr)							2					2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	10	0	137	270	0	4	734	0	288	657	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	7.0		4.0	7.0	
Minimum Split (s)	9.5	27.0		11.5	26.0		9.5	24.0		9.5	26.0	
Total Split (s)	16.0	16.0		16.0	40.0		16.0	50.0		16.0	50.0	
Total Split (%)	13.1%	13.1%		13.1%	32.8%		13.1%	41.0%		13.1%	41.0%	
Maximum Green (s)	11.0	11.0		11.0	35.0		11.0	45.0		11.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.5	2.5		2.5	2.5	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		15.0			14.0			12.0			14.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	5.7	4.9		9.7	8.3		22.8	17.5		33.5	32.0	
Actuated g/C Ratio	0.11	0.09		0.18	0.15		0.43	0.33		0.62	0.60	
v/c Ratio	0.02	0.06		0.45	0.58		0.01	0.65		0.55	0.31	
Control Delay	21.0	19.8		25.2	9.6		6.2	18.4		10.1	7.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	21.0	19.8		25.2	9.6		6.2	18.4		10.1	7.6	
LOS	C	B		C	A		A	B		B	A	
Approach Delay		20.1			14.9			18.3			8.4	
Approach LOS		C			B			B			A	
Queue Length 50th (ft)	1	1		38	1		0	92		29	35	
Queue Length 95th (ft)	7	15		92	62		4	191		#111	149	
Internal Link Dist (ft)		129			5061			1372			1304	
Turn Bay Length (ft)	50			125			150			200		
Base Capacity (vph)	401	1102		409	1150		614	2919		542	3001	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.01	0.01		0.33	0.23		0.01	0.25		0.53	0.22	

Intersection Summary

Area Type: Other
Cycle Length: 122
Actuated Cycle Length: 53.6
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.65
Intersection Signal Delay: 13.2 Intersection LOS: B
Intersection Capacity Utilization 61.8% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Smokey Point Boulevard & 152nd Street NE



Intersection	
Int Delay, s/veh	2.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	42	0	11	74	0	13
Future Vol, veh/h	42	0	11	74	0	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	46	0	12	80	0	14

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	66	52	0	0	92	0
Stage 1	52	-	-	-	-	-
Stage 2	14	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	939	1016	-	-	1503	-
Stage 1	970	-	-	-	-	-
Stage 2	1009	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	939	1016	-	-	1503	-
Mov Cap-2 Maneuver	939	-	-	-	-	-
Stage 1	970	-	-	-	-	-
Stage 2	1009	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	939	1503	-
HCM Lane V/C Ratio	-	-	0.049	-	-
HCM Control Delay (s)	-	-	9	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection												
Int Delay, s/veh	5.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↰	↑			↕			↕	
Traffic Vol, veh/h	1	432	23	108	706	12	29	0	136	8	4	4
Future Vol, veh/h	1	432	23	108	706	12	29	0	136	8	4	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	115	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	470	25	117	767	13	32	0	148	9	4	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	780	0	0	495	0	0	1497	1499	483	1567	1505	774
Stage 1	-	-	-	-	-	-	485	485	-	1008	1008	-
Stage 2	-	-	-	-	-	-	1012	1014	-	559	497	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	837	-	-	1069	-	-	101	122	584	90	121	398
Stage 1	-	-	-	-	-	-	563	552	-	290	318	-
Stage 2	-	-	-	-	-	-	288	316	-	513	545	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	837	-	-	1069	-	-	89	108	584	61	108	398
Mov Cap-2 Maneuver	-	-	-	-	-	-	89	108	-	61	108	-
Stage 1	-	-	-	-	-	-	562	551	-	289	283	-
Stage 2	-	-	-	-	-	-	250	282	-	382	544	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.1	34.4	54.3
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	295	837	-	-	1069	-	-	90
HCM Lane V/C Ratio	0.608	0.001	-	-	0.11	-	-	0.193
HCM Control Delay (s)	34.4	9.3	0	-	8.8	-	-	54.3
HCM Lane LOS	D	A	A	-	A	-	-	F
HCM 95th %tile Q(veh)	3.7	0	-	-	0.4	-	-	0.7

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	539	1	4	774	7	0	0	4	20	0	55
Future Vol, veh/h	38	539	1	4	774	7	0	0	4	20	0	55
Conflicting Peds, #/hr	3	0	3	3	0	3	1	0	4	4	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	40	573	1	4	823	7	0	0	4	21	0	59

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	833	0	0	577	0	0	1522	1498	581	1498	1495	831
Stage 1	-	-	-	-	-	-	657	657	-	838	838	-
Stage 2	-	-	-	-	-	-	865	841	-	660	657	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	800	-	-	996	-	-	97	122	514	101	123	370
Stage 1	-	-	-	-	-	-	454	462	-	361	382	-
Stage 2	-	-	-	-	-	-	348	380	-	452	462	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	798	-	-	993	-	-	78	115	511	95	116	369
Mov Cap-2 Maneuver	-	-	-	-	-	-	78	115	-	95	116	-
Stage 1	-	-	-	-	-	-	430	438	-	342	379	-
Stage 2	-	-	-	-	-	-	291	377	-	424	438	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0	12.1	32.5
HCM LOS			B	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	511	798	-	-	993	-	-	209
HCM Lane V/C Ratio	0.008	0.051	-	-	0.004	-	-	0.382
HCM Control Delay (s)	12.1	9.8	-	-	8.6	-	-	32.5
HCM Lane LOS	B	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0	0.2	-	-	0	-	-	1.7

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	583	9	9	817	27	68
Future Vol, veh/h	583	9	9	817	27	68
Conflicting Peds, #/hr	0	3	3	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	85	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	627	10	10	878	29	73

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	640	0	1533	635
Stage 1	-	-	-	-	635	-
Stage 2	-	-	-	-	898	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	944	-	128	478
Stage 1	-	-	-	-	528	-
Stage 2	-	-	-	-	398	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	941	-	126	477
Mov Cap-2 Maneuver	-	-	-	-	261	-
Stage 1	-	-	-	-	526	-
Stage 2	-	-	-	-	394	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	17.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	386	-	-	941	-
HCM Lane V/C Ratio	0.265	-	-	0.01	-
HCM Control Delay (s)	17.6	-	-	8.9	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	1	-	-	0	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	638	12	74	817	10	59
Future Vol, veh/h	638	12	74	817	10	59
Conflicting Peds, #/hr	0	9	9	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	693	13	80	888	11	64

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	715	0	1757	709
Stage 1	-	-	-	-	709	-
Stage 2	-	-	-	-	1048	-
Critical Hdwy	-	-	4.13	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.227	-	3.527	3.327
Pot Cap-1 Maneuver	-	-	881	-	93	432
Stage 1	-	-	-	-	486	-
Stage 2	-	-	-	-	336	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	873	-	76	428
Mov Cap-2 Maneuver	-	-	-	-	76	-
Stage 1	-	-	-	-	482	-
Stage 2	-	-	-	-	275	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	24.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	256	-	-	873	-
HCM Lane V/C Ratio	0.293	-	-	0.092	-
HCM Control Delay (s)	24.8	-	-	9.5	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.2	-	-	0.3	-

Intersection

Int Delay, s/veh 78.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	47	488	163	0	607	27	202	0	0	13	0	74
Future Vol, veh/h	47	488	163	0	607	27	202	0	0	13	0	74
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	0	100	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	508	170	0	632	28	210	0	0	14	0	77

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	660	0	0	678	0	0	1376	1351	593	1323	1408	632
Stage 1	-	-	-	-	-	-	691	691	-	632	632	-
Stage 2	-	-	-	-	-	-	685	660	-	691	776	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	928	-	-	914	-	-	~ 122	150	506	133	139	480
Stage 1	-	-	-	-	-	-	435	446	-	468	474	-
Stage 2	-	-	-	-	-	-	438	460	-	435	407	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	928	-	-	914	-	-	~ 98	142	506	128	132	480
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 98	142	-	128	132	-
Stage 1	-	-	-	-	-	-	412	422	-	443	474	-
Stage 2	-	-	-	-	-	-	368	460	-	412	385	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0	$ 619.4	17.3
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	98	-	928	-	-	914	-	-	128	480
HCM Lane V/C Ratio	2.147	-	0.053	-	-	-	-	-	0.106	0.161
HCM Control Delay (s)	$ 619.4	0	9.1	-	-	0	-	-	36.4	13.9
HCM Lane LOS	F	A	A	-	-	A	-	-	E	B
HCM 95th %tile Q(veh)	18.4	-	0.2	-	-	0	-	-	0.3	0.6

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

MOVEMENT SUMMARY

Site: 6 [2031 Baseline Conditions (Site Folder: 6: 172nd St NE at 23rd Ave NE)]

PM Peak-Hour
Site Category: 172nd St NE at 11th Ave NE
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: 172nd Street NE (WB)														
1u	U	30	3.0	30	3.0	0.417	12.5	LOS B	3.4	86.3	0.27	0.40	0.27	37.9
6	T1	619	3.0	625	3.0	0.417	4.2	LOS A	3.4	86.3	0.27	0.40	0.27	36.9
16	R2	204	3.0	206	3.0	0.178	4.5	LOS A	1.0	26.9	0.24	0.46	0.24	36.0
Approach		853	3.0	862	3.0	0.417	4.5	LOS A	3.4	86.3	0.26	0.42	0.26	36.7
North: 23rd Avenue NE														
7u	U	1	3.0	1	3.0	0.215	16.3	LOS B	1.3	34.1	0.71	0.80	0.71	34.0
7	L2	142	3.0	143	3.0	0.215	13.9	LOS B	1.3	34.1	0.71	0.80	0.71	33.3
14	R2	31	3.0	31	3.0	0.215	8.0	LOS A	1.3	34.1	0.71	0.80	0.71	32.4
Approach		174	3.0	176	3.0	0.215	12.9	LOS B	1.3	34.1	0.71	0.80	0.71	33.1
West: 172nd Street NE (EB)														
5	L2	55	3.0	56	3.0	0.435	11.0	LOS B	3.3	85.4	0.51	0.53	0.51	36.0
2	T1	454	3.0	459	3.0	0.435	5.1	LOS A	3.3	85.4	0.51	0.53	0.51	36.0
Approach		509	3.0	514	3.0	0.435	5.7	LOS A	3.3	85.4	0.51	0.53	0.51	36.0
All Vehicles		1536	3.0	1552	3.0	0.435	5.9	LOS A	3.4	86.3	0.39	0.50	0.39	36.0

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: KIMLEY-HORN & ASSOCIATES INC | Licence: NETWORK / Enterprise | Processed: Saturday, February 12, 2022 2:16:37 PM
Project: K:\2021\21-304\Full Analysis\Sidra\Preliminary Analysis\#8.sip9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	425	157	633	599	408	237	99	537	425	108	42
Future Volume (vph)	34	425	157	633	599	408	237	99	537	425	108	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		375	400		200	150		0	175		175
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor		0.99		0.99			0.99				0.99	
Frt		0.960				0.850			0.850		0.958	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3410	0	3467	3574	1599	1787	1881	1599	3467	1790	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1787	3410	0	3439	3574	1599	1771	1881	1599	3467	1790	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31				435			467		12	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1325			609			730			589	
Travel Time (s)		30.1			13.8			16.6			13.4	
Confl. Peds. (#/hr)			8	8			10					10
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	626	0	681	644	439	255	106	577	457	161	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Detector Phase	5	2		1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0		3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	9.5	38.3		9.5	38.3	38.3	9.5	23.1	23.1	9.5	45.1	
Total Split (s)	20.0	38.3		46.0	60.0	60.0	25.0	25.0	25.0	25.0	45.1	
Total Split (%)	13.0%	24.8%		29.8%	38.9%	38.9%	16.2%	16.2%	16.2%	16.2%	29.2%	
Maximum Green (s)	15.0	32.0		41.0	53.7	53.7	20.0	19.9	19.9	20.0	40.0	
Yellow Time (s)	3.0	4.3		3.0	4.3	4.3	3.0	3.1	3.1	3.0	3.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.3		5.0	6.3	6.3	5.0	5.1	5.1	5.0	5.1	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0	2.5	3.0	3.0	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0					7.0	
Flash Dont Walk (s)		25.0			25.0	25.0					33.0	
Pedestrian Calls (#/hr)		0			0	0					0	
Act Effct Green (s)	7.9	29.5		32.8	56.6	56.6	20.1	40.2	40.2	20.1	40.2	
Actuated g/C Ratio	0.05	0.20		0.23	0.39	0.39	0.14	0.28	0.28	0.14	0.28	
v/c Ratio	0.38	0.87		0.86	0.46	0.49	1.02	0.20	0.74	0.95	0.32	
Control Delay	78.6	66.2		65.7	34.1	4.7	123.8	43.1	16.2	90.9	41.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	
Total Delay	78.6	66.2		65.7	34.1	4.9	123.8	43.1	16.2	90.9	41.7	
LOS	E	E		E	C	A	F	D	B	F	D	
Approach Delay		66.9			39.0			48.5			78.1	
Approach LOS		E			D			D			E	
Queue Length 50th (ft)	35	288		325	239	2	~264	79	90	227	114	
Queue Length 95th (ft)	77	#401		398	306	73	#477	140	263	#365	194	
Internal Link Dist (ft)		1245			529			650			509	
Turn Bay Length (ft)	195			400		200	150			175		
Base Capacity (vph)	186	784		991	1469	913	249	524	782	483	507	
Starvation Cap Reductn	0	0		0	0	84	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.20	0.80		0.69	0.44	0.53	1.02	0.20	0.74	0.95	0.32	

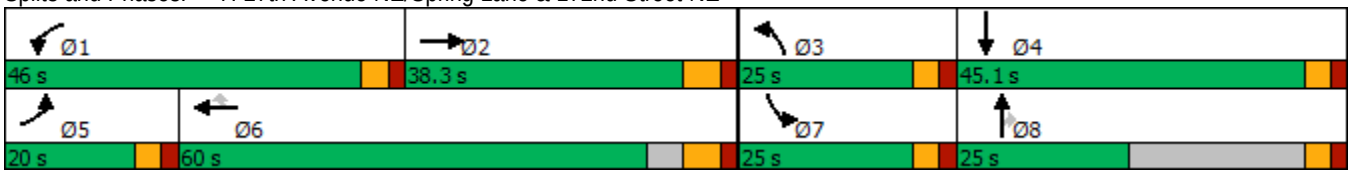
Intersection Summary

Area Type: Other
Cycle Length: 154.4
Actuated Cycle Length: 144
Natural Cycle: 135
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 51.9 Intersection LOS: D
Intersection Capacity Utilization 101.6% ICU Level of Service G
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: 27th Avenue NE/Spring Lane & 172nd Street NE



Intersection	
Int Delay, s/veh	6.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	130	130	332	130	130	293
Future Vol, veh/h	130	130	332	130	130	293
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	135	135	346	135	135	305

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	989	414	0	0	481	0
Stage 1	414	-	-	-	-	-
Stage 2	575	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	274	638	-	-	1082	-
Stage 1	667	-	-	-	-	-
Stage 2	563	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	240	638	-	-	1082	-
Mov Cap-2 Maneuver	364	-	-	-	-	-
Stage 1	667	-	-	-	-	-
Stage 2	493	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	23.1	0	2.7
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	464	1082	-
HCM Lane V/C Ratio	-	-	0.584	0.125	-
HCM Control Delay (s)	-	-	23.1	8.8	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	3.7	0.4	-

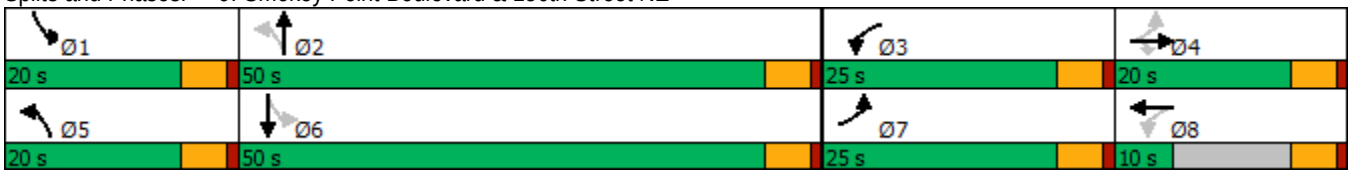
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	5	274	25	13	35	237	656	5	34	745	61
Future Volume (vph)	30	5	274	25	13	35	237	656	5	34	745	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	200		0	250		0	200		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.891			0.999			0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1660	0	1770	3536	0	1770	3500	0
Flt Permitted	0.715			0.754			0.186			0.384		
Satd. Flow (perm)	1332	1863	1583	1405	1660	0	346	3536	0	715	3500	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			291		37			1			9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1704			1283			1384			4766	
Travel Time (s)		38.7			29.2			31.5			108.3	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	5	291	27	51	0	252	703	0	36	858	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	10.0		7.0	10.0	
Minimum Split (s)	12.0	25.0	25.0	12.0	25.0		12.0	25.0		12.0	25.0	
Total Split (s)	25.0	20.0	20.0	25.0	10.0		20.0	50.0		20.0	50.0	
Total Split (%)	21.7%	17.4%	17.4%	21.7%	8.7%		17.4%	43.5%		17.4%	43.5%	
Maximum Green (s)	20.0	15.0	15.0	20.0	5.0		15.0	45.0		15.0	45.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	3.5		2.0	3.5	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	
Flash Dont Walk (s)		13.0	13.0		13.0			13.0			13.0	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	10.8	8.6	8.6	10.6	8.5		43.5	37.1		33.0	25.5	
Actuated g/C Ratio	0.16	0.13	0.13	0.16	0.13		0.65	0.56		0.50	0.38	
v/c Ratio	0.12	0.02	0.64	0.10	0.21		0.51	0.36		0.08	0.64	
Control Delay	25.6	33.0	11.9	25.5	18.5		10.2	10.9		6.9	19.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	25.6	33.0	11.9	25.5	18.5		10.2	10.9		6.9	19.7	
LOS	C	C	B	C	B		B	B		A	B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		13.5			20.9			10.7			19.2	
Approach LOS		B			C			B			B	
Queue Length 50th (ft)	11	2	0	9	5		22	73		3	116	
Queue Length 95th (ft)	37	13	74	33	41		108	177		19	266	
Internal Link Dist (ft)		1624			1203			1304			4686	
Turn Bay Length (ft)	150		150	200			250			200		
Base Capacity (vph)	589	451	604	589	430		571	2587		698	2549	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.05	0.01	0.48	0.05	0.12		0.44	0.27		0.05	0.34	

Intersection Summary

Area Type: Other
Cycle Length: 115
Actuated Cycle Length: 66.5
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 14.9 Intersection LOS: B
Intersection Capacity Utilization 57.8% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 9: Smokey Point Boulevard & 156th Street NE



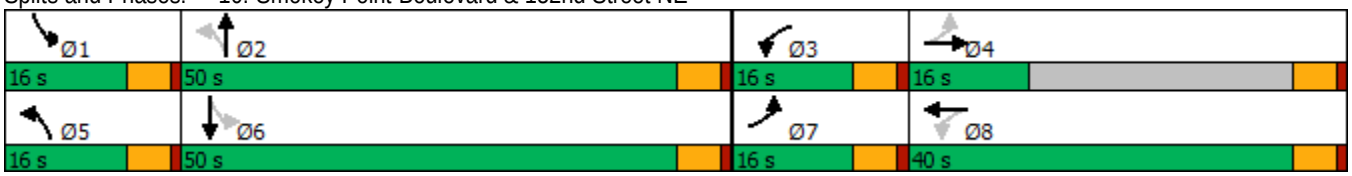
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	3	8	150	3	284	5	634	159	311	707	7
Future Volume (vph)	4	3	8	150	3	284	5	634	159	311	707	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0	125		0	150		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				1.00	
Frt		0.887			0.851			0.970			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1636	0	1752	1570	0	1752	3400	0	1752	3497	0
Flt Permitted				0.645			0.358			0.182		
Satd. Flow (perm)	1845	1636	0	1190	1570	0	660	3400	0	336	3497	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			309			29			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		209			5141			1452			1384	
Travel Time (s)		4.8			116.8			33.0			31.5	
Confl. Peds. (#/hr)							2					2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	12	0	163	312	0	5	862	0	338	776	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	7.0		4.0	7.0	
Minimum Split (s)	9.5	27.0		11.5	26.0		9.5	24.0		9.5	26.0	
Total Split (s)	16.0	16.0		16.0	40.0		16.0	50.0		16.0	50.0	
Total Split (%)	13.1%	13.1%		13.1%	32.8%		13.1%	41.0%		13.1%	41.0%	
Maximum Green (s)	11.0	11.0		11.0	35.0		11.0	45.0		11.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.5	2.5		2.5	2.5	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		15.0			14.0			12.0			14.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	6.0	5.3		11.0	9.5		27.3	21.9		38.6	37.1	
Actuated g/C Ratio	0.10	0.09		0.18	0.16		0.46	0.36		0.64	0.62	
v/c Ratio	0.02	0.08		0.54	0.61		0.01	0.68		0.70	0.36	
Control Delay	24.0	21.6		29.8	9.9		6.4	18.9		18.8	8.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.0	21.6		29.8	9.9		6.4	18.9		18.8	8.0	
LOS	C	C		C	A		A	B		B	A	
Approach Delay		22.2			16.7			18.9			11.3	
Approach LOS		C			B			B			B	
Queue Length 50th (ft)	1	1		51	1		1	118		39	48	
Queue Length 95th (ft)	9	18		117	71		5	240		#232	188	
Internal Link Dist (ft)		129			5061			1372			1304	
Turn Bay Length (ft)	50			125			150			200		
Base Capacity (vph)	369	997		371	1074		575	2660		486	2730	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.01	0.01		0.44	0.29		0.01	0.32		0.70	0.28	

Intersection Summary

Area Type: Other
Cycle Length: 122
Actuated Cycle Length: 60
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 15.0 Intersection LOS: B
Intersection Capacity Utilization 70.1% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Smokey Point Boulevard & 152nd Street NE



Intersection												
Int Delay, s/veh	14.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↰	↑			↕			↕	
Traffic Vol, veh/h	8	435	23	108	708	73	29	6	136	44	6	8
Future Vol, veh/h	8	435	23	108	708	73	29	6	136	44	6	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	115	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	473	25	117	770	79	32	7	148	48	7	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	849	0	0	498	0	0	1556	1587	486	1625	1560	810
Stage 1	-	-	-	-	-	-	504	504	-	1044	1044	-
Stage 2	-	-	-	-	-	-	1052	1083	-	581	516	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	789	-	-	1066	-	-	92	108	581	82	112	380
Stage 1	-	-	-	-	-	-	550	541	-	277	306	-
Stage 2	-	-	-	-	-	-	274	293	-	499	534	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	789	-	-	1066	-	-	77	95	581	52	98	380
Mov Cap-2 Maneuver	-	-	-	-	-	-	77	95	-	52	98	-
Stage 1	-	-	-	-	-	-	541	532	-	273	272	-
Stage 2	-	-	-	-	-	-	233	261	-	362	525	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1.1	50	229.9
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	254	789	-	-	1066	-	-	62
HCM Lane V/C Ratio	0.732	0.011	-	-	0.11	-	-	1.017
HCM Control Delay (s)	50	9.6	0	-	8.8	-	-	229.9
HCM Lane LOS	F	A	A	-	A	-	-	F
HCM 95th %tile Q(veh)	5.1	0	-	-	0.4	-	-	4.9

Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	41	575	1	4	835	37	0	0	4	38	0	57
Future Vol, veh/h	41	575	1	4	835	37	0	0	4	38	0	57
Conflicting Peds, #/hr	3	0	3	3	0	3	1	0	4	4	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	50	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	44	612	1	4	888	39	0	0	4	40	0	61

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	930	0	0	616	0	0	1651	1642	620	1626	1623	912
Stage 1	-	-	-	-	-	-	704	704	-	919	919	-
Stage 2	-	-	-	-	-	-	947	938	-	707	704	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	736	-	-	964	-	-	79	100	488	82	103	332
Stage 1	-	-	-	-	-	-	428	440	-	325	350	-
Stage 2	-	-	-	-	-	-	314	343	-	426	440	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	734	-	-	961	-	-	61	93	485	77	96	331
Mov Cap-2 Maneuver	-	-	-	-	-	-	151	198	-	191	215	-
Stage 1	-	-	-	-	-	-	401	412	-	305	348	-
Stage 2	-	-	-	-	-	-	255	341	-	395	412	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0	12.5	27.9
HCM LOS			B	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	485	734	-	-	961	-	-	256
HCM Lane V/C Ratio	0.009	0.059	-	-	0.004	-	-	0.395
HCM Control Delay (s)	12.5	10.2	-	-	8.8	-	-	27.9
HCM Lane LOS	B	B	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0	0.2	-	-	0	-	-	1.8

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	637	9	9	908	27	68
Future Vol, veh/h	637	9	9	908	27	68
Conflicting Peds, #/hr	0	3	3	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	85	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	685	10	10	976	29	73

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	698	0	1689	693
Stage 1	-	-	-	-	693	-
Stage 2	-	-	-	-	996	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	898	-	103	443
Stage 1	-	-	-	-	496	-
Stage 2	-	-	-	-	357	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	895	-	102	442
Mov Cap-2 Maneuver	-	-	-	-	233	-
Stage 1	-	-	-	-	495	-
Stage 2	-	-	-	-	353	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	19.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	352	-	-	895	-
HCM Lane V/C Ratio	0.29	-	-	0.011	-
HCM Control Delay (s)	19.4	-	-	9.1	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	1.2	-	-	0	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	692	12	74	908	10	59
Future Vol, veh/h	692	12	74	908	10	59
Conflicting Peds, #/hr	0	9	9	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	752	13	80	987	11	64

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	774	0	1915	768
Stage 1	-	-	-	-	768	-
Stage 2	-	-	-	-	1147	-
Critical Hdwy	-	-	4.13	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.227	-	3.527	3.327
Pot Cap-1 Maneuver	-	-	837	-	74	400
Stage 1	-	-	-	-	456	-
Stage 2	-	-	-	-	301	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	830	-	58	397
Mov Cap-2 Maneuver	-	-	-	-	58	-
Stage 1	-	-	-	-	452	-
Stage 2	-	-	-	-	237	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	30.5
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	215	-	-	830	-
HCM Lane V/C Ratio	0.349	-	-	0.097	-
HCM Control Delay (s)	30.5	-	-	9.8	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	1.5	-	-	0.3	-

Intersection

Int Delay, s/veh 138.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	47	520	184	0	662	27	238	0	0	13	0	74
Future Vol, veh/h	47	520	184	0	662	27	238	0	0	13	0	74
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	0	100	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	542	192	0	690	28	248	0	0	14	0	77

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	718	0	0	734	0	0	1479	1454	638	1426	1522	690
Stage 1	-	-	-	-	-	-	736	736	-	690	690	-
Stage 2	-	-	-	-	-	-	743	718	-	736	832	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	883	-	-	871	-	-	~ 104	130	477	113	118	445
Stage 1	-	-	-	-	-	-	411	425	-	435	446	-
Stage 2	-	-	-	-	-	-	407	433	-	411	384	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	883	-	-	871	-	-	~ 82	123	477	108	112	445
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 82	123	-	108	112	-
Stage 1	-	-	-	-	-	-	388	402	-	411	446	-
Stage 2	-	-	-	-	-	-	336	433	-	388	363	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0	$ 1020.9	19
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	82	-	883	-	-	871	-	-	108	445
HCM Lane V/C Ratio	3.023	-	0.055	-	-	-	-	-	0.125	0.173
HCM Control Delay (s)	$ 1020.9	0	9.3	-	-	0	-	-	43.1	14.8
HCM Lane LOS	F	A	A	-	-	A	-	-	E	B
HCM 95th %tile Q(veh)	24.5	-	0.2	-	-	0	-	-	0.4	0.6

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

MOVEMENT SUMMARY

Site: 6 [2031 Horizon Year Conditions (Site Folder: 6: 172nd St NE at 23rd Ave NE)]

PM Peak-Hour
Site Category: 172nd St NE at 11th Ave NE
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: 172nd Street NE (WB)														
1u	U	30	3.0	30	3.0	0.453	12.5	LOS B	3.9	98.8	0.28	0.40	0.28	37.9
6	T1	674	3.0	681	3.0	0.453	4.2	LOS A	3.9	98.8	0.28	0.40	0.28	36.9
16	R2	204	3.0	206	3.0	0.182	4.5	LOS A	1.1	27.6	0.24	0.46	0.24	36.0
Approach		908	3.0	917	3.0	0.453	4.5	LOS A	3.9	98.8	0.27	0.42	0.27	36.7
North: 23rd Avenue NE														
7u	U	1	3.0	1	3.0	0.228	16.9	LOS B	1.4	36.8	0.75	0.82	0.75	33.8
7	L2	142	3.0	143	3.0	0.228	14.4	LOS B	1.4	36.8	0.75	0.82	0.75	33.0
14	R2	31	3.0	31	3.0	0.228	8.6	LOS A	1.4	36.8	0.75	0.82	0.75	32.1
Approach		174	3.0	176	3.0	0.228	13.4	LOS B	1.4	36.8	0.75	0.82	0.75	32.9
West: 172nd Street NE (EB)														
5	L2	55	3.0	56	3.0	0.463	11.0	LOS B	3.7	94.4	0.53	0.53	0.53	36.0
2	T1	486	3.0	491	3.0	0.463	5.2	LOS A	3.7	94.4	0.53	0.53	0.53	35.9
Approach		541	3.0	546	3.0	0.463	5.8	LOS A	3.7	94.4	0.53	0.53	0.53	35.9
All Vehicles		1623	3.0	1639	3.0	0.463	5.9	LOS A	3.9	98.8	0.41	0.50	0.41	36.0

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	451	163	633	644	408	247	99	537	425	108	42
Future Volume (vph)	34	451	163	633	644	408	247	99	537	425	108	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	195		375	400		200	150		0	175		175
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Ped Bike Factor		0.99		0.99			0.99				0.99	
Frt		0.960				0.850			0.850		0.958	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3410	0	3467	3574	1599	1787	1881	1599	3467	1790	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1787	3410	0	3440	3574	1599	1771	1881	1599	3467	1790	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30				405			463		12	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1325			609			730			589	
Travel Time (s)		30.1			13.8			16.6			13.4	
Confl. Peds. (#/hr)			8	8			10					10
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	660	0	681	692	439	266	106	577	457	161	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Detector Phase	5	2		1	6	6	3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	3.0	7.0		3.0	7.0	7.0	3.0	5.0	5.0	3.0	5.0	
Minimum Split (s)	9.5	38.3		9.5	38.3	38.3	9.5	23.1	23.1	9.5	45.1	
Total Split (s)	20.0	38.3		46.0	60.0	60.0	25.0	25.0	25.0	25.0	45.1	
Total Split (%)	13.0%	24.8%		29.8%	38.9%	38.9%	16.2%	16.2%	16.2%	16.2%	29.2%	
Maximum Green (s)	15.0	32.0		41.0	53.7	53.7	20.0	19.9	19.9	20.0	40.0	
Yellow Time (s)	3.0	4.3		3.0	4.3	4.3	3.0	3.1	3.1	3.0	3.1	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	6.3		5.0	6.3	6.3	5.0	5.1	5.1	5.0	5.1	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	2.5	3.0		2.5	3.0	3.0	2.5	3.0	3.0	2.5	3.0	
Recall Mode	None	None		None	None	None	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0					7.0	
Flash Dont Walk (s)		25.0			25.0	25.0					33.0	
Pedestrian Calls (#/hr)		0			0	0					0	
Act Effct Green (s)	7.9	30.4		32.9	57.6	57.6	20.1	40.1	40.1	20.1	40.1	
Actuated g/C Ratio	0.05	0.21		0.23	0.40	0.40	0.14	0.28	0.28	0.14	0.28	
v/c Ratio	0.38	0.89		0.87	0.49	0.50	1.08	0.20	0.74	0.95	0.32	
Control Delay	78.9	68.8		66.2	34.5	6.1	137.1	43.3	16.7	93.0	42.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	
Total Delay	78.9	68.8		66.2	34.5	6.3	137.1	43.3	16.7	93.0	42.0	
LOS	E	E		E	C	A	F	D	B	F	D	
Approach Delay		69.4			39.6			53.4			79.7	
Approach LOS		E			D			D			E	
Queue Length 50th (ft)	35	309		325	261	20	~286	79	95	227	114	
Queue Length 95th (ft)	77	#441		398	332	102	#502	140	269	#365	194	
Internal Link Dist (ft)		1245			529			650			509	
Turn Bay Length (ft)	195			400		200	150			175		
Base Capacity (vph)	185	778		983	1457	892	247	520	777	479	503	
Starvation Cap Reductn	0	0		0	0	85	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.20	0.85		0.69	0.47	0.54	1.08	0.20	0.74	0.95	0.32	

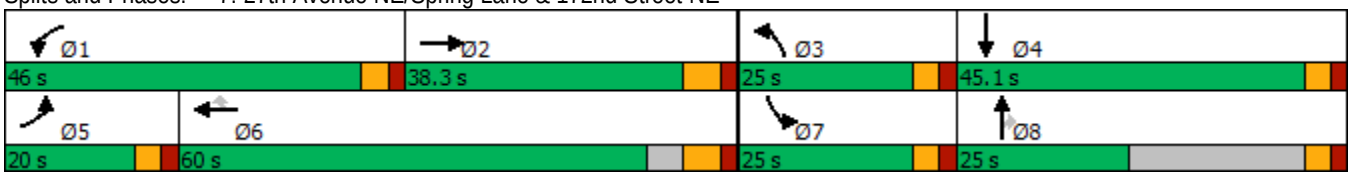
Intersection Summary

Area Type: Other
Cycle Length: 154.4
Actuated Cycle Length: 145
Natural Cycle: 145
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.08
Intersection Signal Delay: 54.0 Intersection LOS: D
Intersection Capacity Utilization 102.9% ICU Level of Service G
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: 27th Avenue NE/Spring Lane & 172nd Street NE



Intersection	
Int Delay, s/veh	6.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	130	130	368	130	130	314
Future Vol, veh/h	130	130	368	130	130	314
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	135	135	383	135	135	327

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1048	451	0	0	518	0
Stage 1	451	-	-	-	-	-
Stage 2	597	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	252	608	-	-	1048	-
Stage 1	642	-	-	-	-	-
Stage 2	550	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	219	608	-	-	1048	-
Mov Cap-2 Maneuver	347	-	-	-	-	-
Stage 1	642	-	-	-	-	-
Stage 2	479	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	25.2	0	2.6
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	442	1048	-
HCM Lane V/C Ratio	-	-	0.613	0.129	-
HCM Control Delay (s)	-	-	25.2	8.9	-
HCM Lane LOS	-	-	D	A	-
HCM 95th %tile Q(veh)	-	-	4	0.4	-

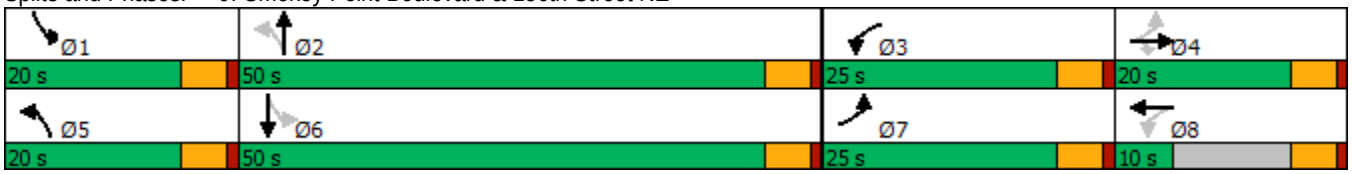
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	10	282	25	22	35	250	656	5	34	745	64
Future Volume (vph)	32	10	282	25	22	35	250	656	5	34	745	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	200		0	250		0	200		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.907			0.999			0.988	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1690	0	1770	3536	0	1770	3497	0
Flt Permitted	0.616			0.750			0.177			0.384		
Satd. Flow (perm)	1147	1863	1583	1397	1690	0	330	3536	0	715	3497	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			300		37			1			9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1704			1283			1384			4766	
Travel Time (s)		38.7			29.2			31.5			108.3	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	11	300	27	60	0	266	703	0	36	861	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	10.0		7.0	10.0	
Minimum Split (s)	12.0	25.0	25.0	12.0	25.0		12.0	25.0		12.0	25.0	
Total Split (s)	25.0	20.0	20.0	25.0	10.0		20.0	50.0		20.0	50.0	
Total Split (%)	21.7%	17.4%	17.4%	21.7%	8.7%		17.4%	43.5%		17.4%	43.5%	
Maximum Green (s)	20.0	15.0	15.0	20.0	5.0		15.0	45.0		15.0	45.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	3.5		2.0	3.5	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	
Flash Dont Walk (s)		13.0	13.0		13.0			13.0			13.0	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	12.9	10.6	10.6	11.7	8.1		44.1	37.9		33.1	25.6	
Actuated g/C Ratio	0.19	0.15	0.15	0.17	0.12		0.64	0.55		0.48	0.37	
v/c Ratio	0.12	0.04	0.60	0.10	0.26		0.55	0.36		0.08	0.66	
Control Delay	25.1	32.6	10.6	25.0	21.5		12.6	11.9		7.4	21.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	25.1	32.6	10.6	25.0	21.5		12.6	11.9		7.4	21.4	
LOS	C	C	B	C	C		B	B		A	C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		12.7			22.6			12.1			20.9	
Approach LOS		B			C			B			C	
Queue Length 50th (ft)	12	4	0	9	10		46	105		5	162	
Queue Length 95th (ft)	39	22	74	33	48		126	178		19	268	
Internal Link Dist (ft)		1624			1203			1304			4686	
Turn Bay Length (ft)	150		150	200			250			200		
Base Capacity (vph)	562	443	605	565	420		544	2479		672	2439	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.06	0.02	0.50	0.05	0.14		0.49	0.28		0.05	0.35	

Intersection Summary

Area Type: Other
Cycle Length: 115
Actuated Cycle Length: 69.2
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 16.0 Intersection LOS: B
Intersection Capacity Utilization 58.4% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 9: Smokey Point Boulevard & 156th Street NE



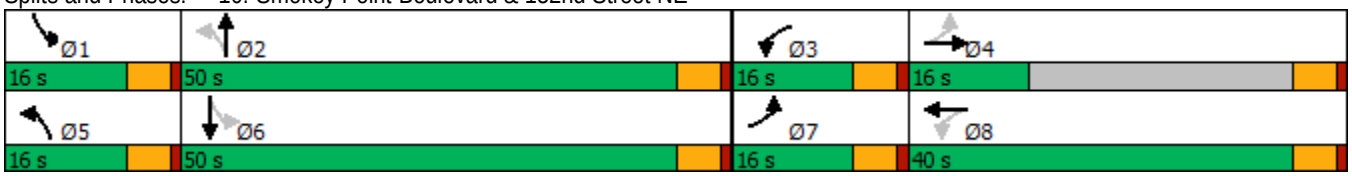
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	3	8	150	3	284	5	647	159	311	715	7
Future Volume (vph)	4	3	8	150	3	284	5	647	159	311	715	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0	125		0	150		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				1.00	
Frt		0.887			0.851			0.970			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1636	0	1752	1570	0	1752	3400	0	1752	3497	0
Flt Permitted				0.645			0.355			0.178		
Satd. Flow (perm)	1845	1636	0	1190	1570	0	654	3400	0	328	3497	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			309			28			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		209			5141			1452			1384	
Travel Time (s)		4.8			116.8			33.0			31.5	
Confl. Peds. (#/hr)							2					2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	12	0	163	312	0	5	876	0	338	785	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	7.0		4.0	7.0	
Minimum Split (s)	9.5	27.0		11.5	26.0		9.5	24.0		9.5	26.0	
Total Split (s)	16.0	16.0		16.0	40.0		16.0	50.0		16.0	50.0	
Total Split (%)	13.1%	13.1%		13.1%	32.8%		13.1%	41.0%		13.1%	41.0%	
Maximum Green (s)	11.0	11.0		11.0	35.0		11.0	45.0		11.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.5	2.5		2.5	2.5	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		15.0			14.0			12.0			14.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	6.0	5.3		11.0	9.5		27.6	22.3		38.9	37.4	
Actuated g/C Ratio	0.10	0.09		0.18	0.16		0.46	0.37		0.65	0.62	
v/c Ratio	0.02	0.08		0.54	0.62		0.01	0.69		0.70	0.36	
Control Delay	24.2	21.8		30.2	10.0		6.2	19.0		19.4	7.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.2	21.8		30.2	10.0		6.2	19.0		19.4	7.9	
LOS	C	C		C	A		A	B		B	A	
Approach Delay		22.4			16.9			18.9			11.4	
Approach LOS		C			B			B			B	
Queue Length 50th (ft)	1	1		51	1		1	121		41	48	
Queue Length 95th (ft)	9	18		118	71		5	245		#236	191	
Internal Link Dist (ft)		129			5061			1372			1304	
Turn Bay Length (ft)	50			125			150			200		
Base Capacity (vph)	367	991		369	1070		574	2645		482	2715	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.01	0.01		0.44	0.29		0.01	0.33		0.70	0.29	

Intersection Summary

Area Type: Other
Cycle Length: 122
Actuated Cycle Length: 60.3
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 15.2 Intersection LOS: B
Intersection Capacity Utilization 70.4% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 10: Smokey Point Boulevard & 152nd Street NE



Intersection	
Int Delay, s/veh	2.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	42	0	13	74	0	16
Future Vol, veh/h	42	0	13	74	0	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	46	0	14	80	0	17

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	71	54	0	0	94	0
Stage 1	54	-	-	-	-	-
Stage 2	17	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	933	1013	-	-	1500	-
Stage 1	969	-	-	-	-	-
Stage 2	1006	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	933	1013	-	-	1500	-
Mov Cap-2 Maneuver	933	-	-	-	-	-
Stage 1	969	-	-	-	-	-
Stage 2	1006	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.1	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	933	1500	-
HCM Lane V/C Ratio	-	-	0.049	-	-
HCM Control Delay (s)	-	-	9.1	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Weekday PM Peak-Hour Level of Service Calculations with Improvements

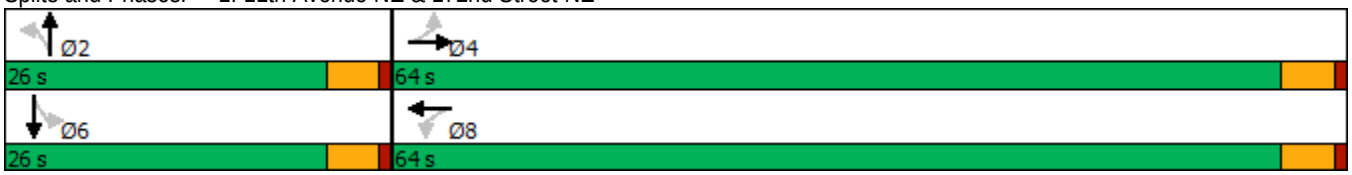
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	365	20	91	593	71	24	6	114	43	5	7
Future Volume (vph)	8	365	20	91	593	71	24	6	114	43	5	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	115		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor					1.00							
Frt		0.993			0.984			0.893			0.982	
Flt Protected		0.999		0.950				0.992			0.962	
Satd. Flow (prot)	0	1848	0	1770	1829	0	0	1650	0	0	1760	0
Flt Permitted		0.986		0.558				0.935			0.785	
Satd. Flow (perm)	0	1824	0	1039	1829	0	0	1555	0	0	1436	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			14			124			8	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		971			711			1145			471	
Travel Time (s)		22.1			16.2			26.0			10.7	
Confl. Bikes (#/hr)						1						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	428	0	99	722	0	0	157	0	0	60	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	64.0	64.0		64.0	64.0		26.0	26.0		26.0	26.0	
Total Split (%)	71.1%	71.1%		71.1%	71.1%		28.9%	28.9%		28.9%	28.9%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)		4.5		4.5	4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		22.1		22.1	22.1			7.7			7.7	
Actuated g/C Ratio		0.56		0.56	0.56			0.20			0.20	
v/c Ratio		0.42		0.17	0.70			0.39			0.21	
Control Delay		6.0		4.8	10.1			9.6			16.7	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		6.0		4.8	10.1			9.6			16.7	
LOS		A		A	B			A			B	
Approach Delay		6.0			9.5			9.6			16.7	
Approach LOS		A			A			A			B	
Queue Length 50th (ft)		39		8	81			6			9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		94		26	199			51			42	
Internal Link Dist (ft)		891			631			1065			391	
Turn Bay Length (ft)				115								
Base Capacity (vph)		1824		1039	1829			958			840	
Starvation Cap Reductn		0		0	0			0			0	
Spillback Cap Reductn		0		0	0			0			0	
Storage Cap Reductn		0		0	0			0			0	
Reduced v/c Ratio		0.23		0.10	0.39			0.16			0.07	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 39.3
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 8.8 Intersection LOS: A
Intersection Capacity Utilization 75.2% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: 11th Avenue NE & 172nd Street NE



MOVEMENT SUMMARY

Site: 1 [2025 Opening Year Conditions (Site Folder: 1: 172nd St NE at 11th Ave NE)]

PM Peak-Hour
Site Category: 172nd St NE at 11th Ave NE
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: 11th Avenue NE (NB)														
3	L2	24	2.0	26	2.0	0.190	8.8	LOS A	1.1	27.6	0.62	0.68	0.62	10.1
8	T1	6	2.0	7	2.0	0.190	4.6	LOS A	1.1	27.6	0.62	0.68	0.62	10.4
18	R2	114	2.0	124	2.0	0.190	4.0	LOS A	1.1	27.6	0.62	0.68	0.62	10.3
Approach		144	2.0	157	2.0	0.190	4.8	LOS A	1.1	27.6	0.62	0.68	0.62	10.2
East: 172nd Street NE (WB)														
1	L2	91	2.0	99	2.0	0.678	6.5	LOS A	8.6	218.6	0.41	0.42	0.41	16.4
6	T1	593	2.0	645	2.0	0.678	2.3	LOS A	8.6	218.6	0.41	0.42	0.41	17.0
16	R2	71	2.0	77	2.0	0.678	1.7	LOS A	8.6	218.6	0.41	0.42	0.41	16.8
Approach		755	2.0	821	2.0	0.678	2.7	LOS A	8.6	218.6	0.41	0.42	0.41	16.9
North: 11th Avenue NE (SB)														
7	L2	43	2.0	47	2.0	0.099	11.4	LOS B	0.6	14.8	0.75	0.81	0.75	9.4
4	T1	5	2.0	5	2.0	0.099	7.2	LOS A	0.6	14.8	0.75	0.81	0.75	9.5
14	R2	7	2.0	8	2.0	0.099	6.6	LOS A	0.6	14.8	0.75	0.81	0.75	9.5
Approach		55	2.0	60	2.0	0.099	10.4	LOS B	0.6	14.8	0.75	0.81	0.75	9.4
West: 172nd Street NE (EB)														
5	L2	8	2.0	9	2.0	0.393	7.1	LOS A	2.7	67.6	0.45	0.48	0.45	16.5
2	T1	365	2.0	397	2.0	0.393	2.9	LOS A	2.7	67.6	0.45	0.48	0.45	17.1
12	R2	20	2.0	22	2.0	0.393	2.3	LOS A	2.7	67.6	0.45	0.48	0.45	16.9
Approach		393	2.0	427	2.0	0.393	2.9	LOS A	2.7	67.6	0.45	0.48	0.45	17.1
All Vehicles		1347	2.0	1464	2.0	0.678	3.3	LOS A	8.6	218.6	0.45	0.48	0.45	15.5

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: KIMLEY-HORN & ASSOCIATES INC | Licence: NETWORK / Enterprise | Processed: Saturday, February 12, 2022 2:16:34 PM
Project: K:\2021\21-304\Full Analysis\Sidra\Preliminary Analysis\#8.sip9

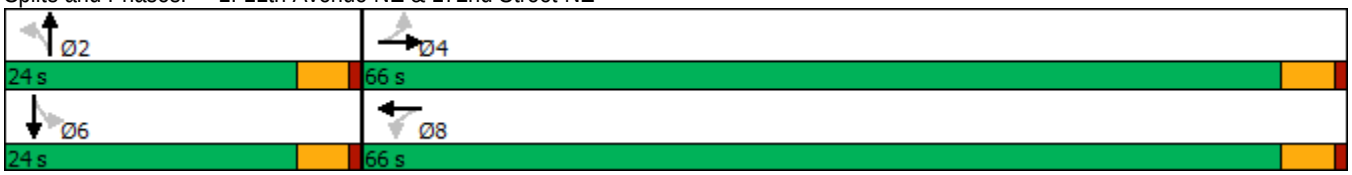
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	432	23	108	706	12	29	0	136	8	4	4
Future Volume (vph)	1	432	23	108	706	12	29	0	136	8	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	115		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor					1.00							
Frt		0.993			0.997			0.889			0.968	
Flt Protected				0.950				0.991			0.974	
Satd. Flow (prot)	0	1850	0	1770	1857	0	0	1641	0	0	1756	0
Flt Permitted		0.999		0.514				0.936			0.869	
Satd. Flow (perm)	0	1848	0	957	1857	0	0	1550	0	0	1567	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			2			148			4	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		971			711			1145			391	
Travel Time (s)		22.1			16.2			26.0			8.9	
Confl. Bikes (#/hr)						1						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	496	0	117	780	0	0	180	0	0	17	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Total Split (%)	73.3%	73.3%		73.3%	73.3%		26.7%	26.7%		26.7%	26.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)		4.5		4.5	4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		24.3		24.3	24.3			7.5			7.5	
Actuated g/C Ratio		0.58		0.58	0.58			0.18			0.18	
v/c Ratio		0.46		0.21	0.72			0.45			0.06	
Control Delay		6.1		4.9	10.3			10.3			16.9	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		6.1		4.9	10.3			10.3			16.9	
LOS		A		A	B			B			B	
Approach Delay		6.1			9.6			10.3			16.9	
Approach LOS		A			A			B			B	
Queue Length 50th (ft)		44		9	88			6			2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		116		31	235			57			19	
Internal Link Dist (ft)		891			631			1065			311	
Turn Bay Length (ft)				115								
Base Capacity (vph)		1839		952	1848			860			798	
Starvation Cap Reductn		0		0	0			0			0	
Spillback Cap Reductn		0		0	0			0			0	
Storage Cap Reductn		0		0	0			0			0	
Reduced v/c Ratio		0.27		0.12	0.42			0.21			0.02	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 41.6
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 8.7 Intersection LOS: A
Intersection Capacity Utilization 83.6% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 1: 11th Avenue NE & 172nd Street NE



MOVEMENT SUMMARY

Site: 1 [2031 Baseline Conditions (Site Folder: 1: 172nd St NE at 11th Ave NE)]

PM Peak-Hour
Site Category: 172nd St NE at 11th Ave NE
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: 11th Avenue NE (NB)														
3	L2	29	2.0	32	2.0	0.196	8.5	LOS A	1.2	29.8	0.62	0.67	0.62	10.3
8	T1	1	2.0	1	2.0	0.196	4.3	LOS A	1.2	29.8	0.62	0.67	0.62	10.7
18	R2	136	2.0	148	2.0	0.196	3.7	LOS A	1.2	29.8	0.62	0.67	0.62	10.5
Approach		166	2.0	180	2.0	0.196	4.6	LOS A	1.2	29.8	0.62	0.67	0.62	10.5
East: 172nd Street NE (WB)														
1	L2	108	2.0	117	2.0	0.667	6.3	LOS A	8.7	220.2	0.35	0.40	0.35	16.9
6	T1	706	2.0	767	2.0	0.667	2.1	LOS A	8.7	220.2	0.35	0.40	0.35	17.5
16	R2	12	2.0	13	2.0	0.667	1.5	LOS A	8.7	220.2	0.35	0.40	0.35	17.3
Approach		826	2.0	898	2.0	0.667	2.6	LOS A	8.7	220.2	0.35	0.40	0.35	17.4
North: 11th Avenue NE (SB)														
7	L2	8	2.0	9	2.0	0.028	12.1	LOS B	0.2	4.5	0.79	0.71	0.79	8.6
4	T1	4	2.0	4	2.0	0.028	7.9	LOS A	0.2	4.5	0.79	0.71	0.79	8.8
14	R2	4	2.0	4	2.0	0.028	7.2	LOS A	0.2	4.5	0.79	0.71	0.79	8.7
Approach		16	2.0	17	2.0	0.028	9.8	LOS A	0.2	4.5	0.79	0.71	0.79	8.7
West: 172nd Street NE (EB)														
5	L2	1	2.0	1	2.0	0.401	6.7	LOS A	2.8	72.2	0.41	0.44	0.41	17.0
2	T1	432	2.0	470	2.0	0.401	2.6	LOS A	2.8	72.2	0.41	0.44	0.41	17.7
12	R2	23	2.0	25	2.0	0.401	1.9	LOS A	2.8	72.2	0.41	0.44	0.41	17.4
Approach		456	2.0	496	2.0	0.401	2.5	LOS A	2.8	72.2	0.41	0.44	0.41	17.7
All Vehicles		1464	2.0	1591	2.0	0.667	2.9	LOS A	8.7	220.2	0.40	0.45	0.40	16.4

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: KIMLEY-HORN & ASSOCIATES INC | Licence: NETWORK / Enterprise | Processed: Saturday, February 12, 2022 2:16:35 PM
Project: K:\2021\21-304\Full Analysis\Sidra\Preliminary Analysis\#8.sip9

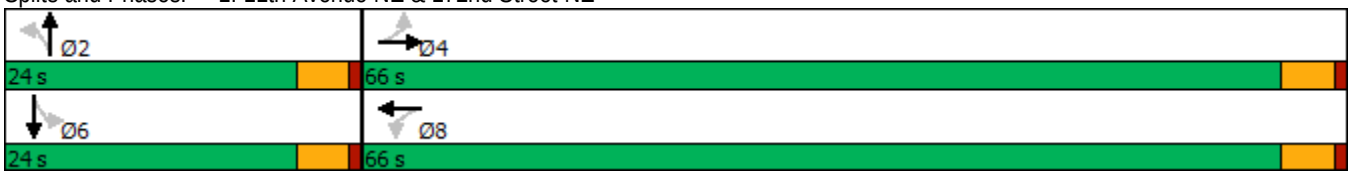
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	435	23	108	708	73	29	6	136	44	6	8
Future Volume (vph)	8	435	23	108	708	73	29	6	136	44	6	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	115		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor					1.00							
Frt		0.993			0.986			0.893			0.981	
Flt Protected		0.999		0.950				0.992			0.964	
Satd. Flow (prot)	0	1848	0	1770	1833	0	0	1650	0	0	1762	0
Flt Permitted		0.986		0.500				0.931			0.680	
Satd. Flow (perm)	0	1824	0	931	1833	0	0	1549	0	0	1243	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			13			148			8	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		971			711			1145			391	
Travel Time (s)		22.1			16.2			26.0			8.9	
Confl. Bikes (#/hr)						1						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	507	0	117	849	0	0	187	0	0	64	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Total Split (%)	73.3%	73.3%		73.3%	73.3%		26.7%	26.7%		26.7%	26.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)		4.5		4.5	4.5			4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		28.9		28.9	28.9			8.5			8.5	
Actuated g/C Ratio		0.61		0.61	0.61			0.18			0.18	
v/c Ratio		0.45		0.21	0.75			0.47			0.28	
Control Delay		6.0		4.9	11.2			11.7			22.4	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		6.0		4.9	11.2			11.7			22.4	
LOS		A		A	B			B			C	
Approach Delay		6.0			10.5			11.7			22.4	
Approach LOS		A			B			B			C	
Queue Length 50th (ft)		51		10	115			8			12	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		127		33	290			67			55	
Internal Link Dist (ft)		891			631			1065			311	
Turn Bay Length (ft)				115								
Base Capacity (vph)		1768		902	1777			781			565	
Starvation Cap Reductn		0		0	0			0			0	
Spillback Cap Reductn		0		0	0			0			0	
Storage Cap Reductn		0		0	0			0			0	
Reduced v/c Ratio		0.29		0.13	0.48			0.24			0.11	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 47.3
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 9.7 Intersection LOS: A
Intersection Capacity Utilization 88.5% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 1: 11th Avenue NE & 172nd Street NE



MOVEMENT SUMMARY

Site: 1 [2031 Horizon Year Conditions (Site Folder: 1: 172nd St NE at 11th Ave NE)]

PM Peak-Hour
Site Category: 172nd St NE at 11th Ave NE
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: 11th Avenue NE (NB)														
3	L2	29	2.0	32	2.0	0.212	8.9	LOS A	1.3	33.0	0.66	0.70	0.66	9.9
8	T1	6	2.0	7	2.0	0.212	4.7	LOS A	1.3	33.0	0.66	0.70	0.66	10.2
18	R2	136	2.0	148	2.0	0.212	4.1	LOS A	1.3	33.0	0.66	0.70	0.66	10.1
Approach		171	2.0	186	2.0	0.212	5.0	LOS A	1.3	33.0	0.66	0.70	0.66	10.0
East: 172nd Street NE (WB)														
1	L2	108	2.0	117	2.0	0.727	6.5	LOS A	10.5	266.4	0.46	0.42	0.46	16.0
6	T1	708	2.0	770	2.0	0.727	2.3	LOS A	10.5	266.4	0.46	0.42	0.46	16.6
16	R2	73	2.0	79	2.0	0.727	1.7	LOS A	10.5	266.4	0.46	0.42	0.46	16.4
Approach		889	2.0	966	2.0	0.727	2.8	LOS A	10.5	266.4	0.46	0.42	0.46	16.5
North: 11th Avenue NE (SB)														
7	L2	44	2.0	48	2.0	0.108	12.5	LOS B	0.7	18.1	0.84	0.82	0.84	8.7
4	T1	6	2.0	7	2.0	0.108	8.3	LOS A	0.7	18.1	0.84	0.82	0.84	8.8
14	R2	8	2.0	9	2.0	0.108	7.7	LOS A	0.7	18.1	0.84	0.82	0.84	8.7
Approach		58	2.0	63	2.0	0.108	11.4	LOS B	0.7	18.1	0.84	0.82	0.84	8.7
West: 172nd Street NE (EB)														
5	L2	8	2.0	9	2.0	0.425	7.1	LOS A	3.0	77.3	0.47	0.49	0.47	16.3
2	T1	435	2.0	473	2.0	0.425	2.9	LOS A	3.0	77.3	0.47	0.49	0.47	16.9
12	R2	23	2.0	25	2.0	0.425	2.2	LOS A	3.0	77.3	0.47	0.49	0.47	16.7
Approach		466	2.0	507	2.0	0.425	2.9	LOS A	3.0	77.3	0.47	0.49	0.47	16.9
All Vehicles		1584	2.0	1722	2.0	0.727	3.4	LOS A	10.5	266.4	0.50	0.49	0.50	15.2

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: KIMLEY-HORN & ASSOCIATES INC | Licence: NETWORK / Enterprise | Processed: Saturday, February 12, 2022 2:16:35 PM
Project: K:\2021\21-304\Full Analysis\Sidra\Preliminary Analysis\#8.sip9

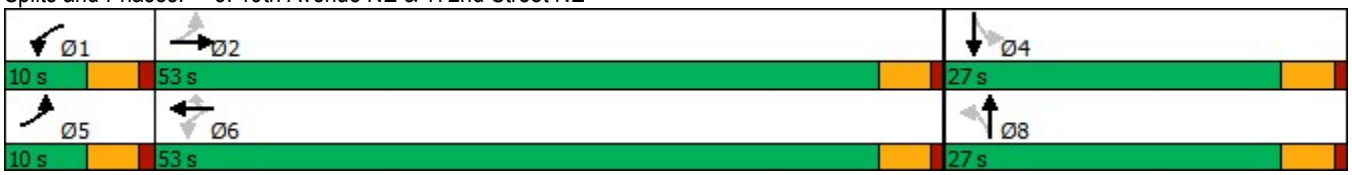
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	488	163	0	607	27	202	0	0	13	0	74
Future Volume (vph)	47	488	163	0	607	27	202	0	0	13	0	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	100		0	0		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						0.98						
Frt		0.962				0.850					0.850	
Flt Protected	0.950						0.950			0.950		
Satd. Flow (prot)	1770	1792	0	1863	1863	1583	1770	1863	0	1770	1583	0
Flt Permitted	0.201						0.707			0.757		
Satd. Flow (perm)	374	1792	0	1863	1863	1549	1317	1863	0	1410	1583	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29				73					323	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		679			1326			769			1304	
Travel Time (s)		15.4			30.1			17.5			29.6	
Confl. Bikes (#/hr)						2						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	678	0	0	632	28	210	0	0	14	77	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm			Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	5	2		1	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	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	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	10.0	53.0		10.0	53.0	53.0	27.0	27.0		27.0	27.0	
Total Split (%)	11.1%	58.9%		11.1%	58.9%	58.9%	30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						
Recall Mode	None	None		None	None	None	Min	Min		Min	Min	
Act Effct Green (s)	32.3	32.3			27.6	27.6	15.2			15.2	15.2	
Actuated g/C Ratio	0.56	0.56			0.48	0.48	0.26			0.26	0.26	
v/c Ratio	0.14	0.67			0.72	0.04	0.61			0.04	0.12	
Control Delay	6.4	11.9			18.6	0.1	31.7			22.3	0.4	
Queue Delay	0.0	0.0			0.0	0.0	0.0			0.0	0.0	
Total Delay	6.4	11.9			18.6	0.1	31.7			22.3	0.4	
LOS	A	B			B	A	C			C	A	
Approach Delay		11.5			17.8			31.7			3.7	
Approach LOS		B			B			C			A	
Queue Length 50th (ft)	6	130			187	0	71			4	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	21	280			352	1	177			21	0	
Internal Link Dist (ft)		599			1246			689			1224	
Turn Bay Length (ft)	100						100					
Base Capacity (vph)	362	1467			1490	1254	597			639	894	
Starvation Cap Reductn	0	0			0	0	0			0	0	
Spillback Cap Reductn	0	0			0	0	0			0	0	
Storage Cap Reductn	0	0			0	0	0			0	0	
Reduced v/c Ratio	0.14	0.46			0.42	0.02	0.35			0.02	0.09	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 58.1
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 16.1 Intersection LOS: B
Intersection Capacity Utilization 64.4% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 5: 19th Avenue NE & 172nd Street NE



MOVEMENT SUMMARY

Site: 6 [2031 Baseline Conditions (Site Folder: 6: 172nd St NE at 23rd Ave NE)]

PM Peak-Hour
Site Category: 172nd St NE at 11th Ave NE
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: 172nd Street NE (WB)														
1u	U	30	3.0	30	3.0	0.417	12.5	LOS B	3.4	86.3	0.27	0.40	0.27	37.9
6	T1	619	3.0	625	3.0	0.417	4.2	LOS A	3.4	86.3	0.27	0.40	0.27	36.9
16	R2	204	3.0	206	3.0	0.178	4.5	LOS A	1.0	26.9	0.24	0.46	0.24	36.0
Approach		853	3.0	862	3.0	0.417	4.5	LOS A	3.4	86.3	0.26	0.42	0.26	36.7
North: 23rd Avenue NE														
7u	U	1	3.0	1	3.0	0.215	16.3	LOS B	1.3	34.1	0.71	0.80	0.71	34.0
7	L2	142	3.0	143	3.0	0.215	13.9	LOS B	1.3	34.1	0.71	0.80	0.71	33.3
14	R2	31	3.0	31	3.0	0.215	8.0	LOS A	1.3	34.1	0.71	0.80	0.71	32.4
Approach		174	3.0	176	3.0	0.215	12.9	LOS B	1.3	34.1	0.71	0.80	0.71	33.1
West: 172nd Street NE (EB)														
5	L2	55	3.0	56	3.0	0.435	11.0	LOS B	3.3	85.4	0.51	0.53	0.51	36.0
2	T1	454	3.0	459	3.0	0.435	5.1	LOS A	3.3	85.4	0.51	0.53	0.51	36.0
Approach		509	3.0	514	3.0	0.435	5.7	LOS A	3.3	85.4	0.51	0.53	0.51	36.0
All Vehicles		1536	3.0	1552	3.0	0.435	5.9	LOS A	3.4	86.3	0.39	0.50	0.39	36.0

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

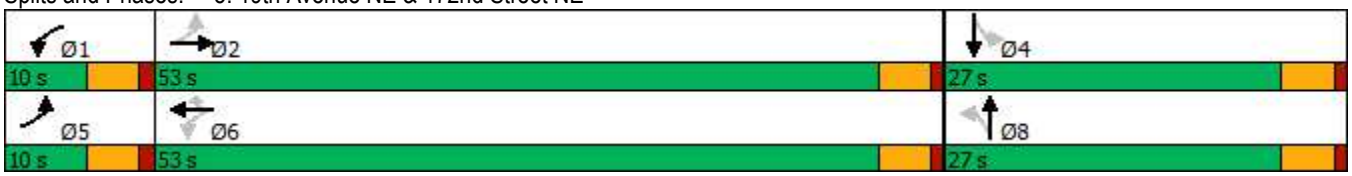
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	520	184	0	662	27	238	0	0	13	0	74
Future Volume (vph)	47	520	184	0	662	27	238	0	0	13	0	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	100		0	0		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						0.98						
Frt		0.961				0.850					0.850	
Flt Protected	0.950						0.950			0.950		
Satd. Flow (prot)	1770	1790	0	1863	1863	1583	1770	1863	0	1770	1583	0
Flt Permitted	0.169						0.707			0.757		
Satd. Flow (perm)	315	1790	0	1863	1863	1549	1317	1863	0	1410	1583	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31				73					294	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		679			1326			769			1304	
Travel Time (s)		15.4			30.1			17.5			29.6	
Confl. Bikes (#/hr)						2						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	734	0	0	690	28	248	0	0	14	77	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm			Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	5	2		1	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	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	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	10.0	53.0		10.0	53.0	53.0	27.0	27.0		27.0	27.0	
Total Split (%)	11.1%	58.9%		11.1%	58.9%	58.9%	30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						
Recall Mode	None	None		None	None	None	Min	Min		Min	Min	
Act Effct Green (s)	36.7	36.7			31.9	31.9	17.8			17.8	17.8	
Actuated g/C Ratio	0.57	0.57			0.49	0.49	0.27			0.27	0.27	
v/c Ratio	0.15	0.71			0.75	0.04	0.69			0.04	0.12	
Control Delay	7.0	13.7			20.5	0.1	36.9			23.8	0.4	
Queue Delay	0.0	0.0			0.0	0.0	0.0			0.0	0.0	
Total Delay	7.0	13.7			20.5	0.1	36.9			23.8	0.4	
LOS	A	B			C	A	D			C	A	
Approach Delay		13.2			19.7			36.9			4.0	
Approach LOS		B			B			D			A	
Queue Length 50th (ft)	8	182			245	0	98			5	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	21	317			400	1	#247			21	0	
Internal Link Dist (ft)		599			1246			689			1224	
Turn Bay Length (ft)	100						100					
Base Capacity (vph)	318	1417			1420	1198	520			556	803	
Starvation Cap Reductn	0	0			0	0	0			0	0	
Spillback Cap Reductn	0	0			0	0	0			0	0	
Storage Cap Reductn	0	0			0	0	0			0	0	
Reduced v/c Ratio	0.15	0.52			0.49	0.02	0.48			0.03	0.10	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 64.8
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 18.5 Intersection LOS: B
Intersection Capacity Utilization 66.4% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: 19th Avenue NE & 172nd Street NE



MOVEMENT SUMMARY

Site: 6 [2031 Horizon Year Conditions (Site Folder: 6: 172nd St NE at 23rd Ave NE)]

PM Peak-Hour
Site Category: 172nd St NE at 11th Ave NE
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: 172nd Street NE (WB)														
1u	U	30	3.0	30	3.0	0.453	12.5	LOS B	3.9	98.8	0.28	0.40	0.28	37.9
6	T1	674	3.0	681	3.0	0.453	4.2	LOS A	3.9	98.8	0.28	0.40	0.28	36.9
16	R2	204	3.0	206	3.0	0.182	4.5	LOS A	1.1	27.6	0.24	0.46	0.24	36.0
Approach		908	3.0	917	3.0	0.453	4.5	LOS A	3.9	98.8	0.27	0.42	0.27	36.7
North: 23rd Avenue NE														
7u	U	1	3.0	1	3.0	0.228	16.9	LOS B	1.4	36.8	0.75	0.82	0.75	33.8
7	L2	142	3.0	143	3.0	0.228	14.4	LOS B	1.4	36.8	0.75	0.82	0.75	33.0
14	R2	31	3.0	31	3.0	0.228	8.6	LOS A	1.4	36.8	0.75	0.82	0.75	32.1
Approach		174	3.0	176	3.0	0.228	13.4	LOS B	1.4	36.8	0.75	0.82	0.75	32.9
West: 172nd Street NE (EB)														
5	L2	55	3.0	56	3.0	0.463	11.0	LOS B	3.7	94.4	0.53	0.53	0.53	36.0
2	T1	486	3.0	491	3.0	0.463	5.2	LOS A	3.7	94.4	0.53	0.53	0.53	35.9
Approach		541	3.0	546	3.0	0.463	5.8	LOS A	3.7	94.4	0.53	0.53	0.53	35.9
All Vehicles		1623	3.0	1639	3.0	0.463	5.9	LOS A	3.9	98.8	0.41	0.50	0.41	36.0

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: KIMLEY-HORN & ASSOCIATES INC | Licence: NETWORK / Enterprise | Processed: Saturday, February 12, 2022 2:16:38 PM
Project: K:\2021\21-304\Full Analysis\Sidra\Preliminary Analysis\#8.sip9

WSDOT Exhibit C List

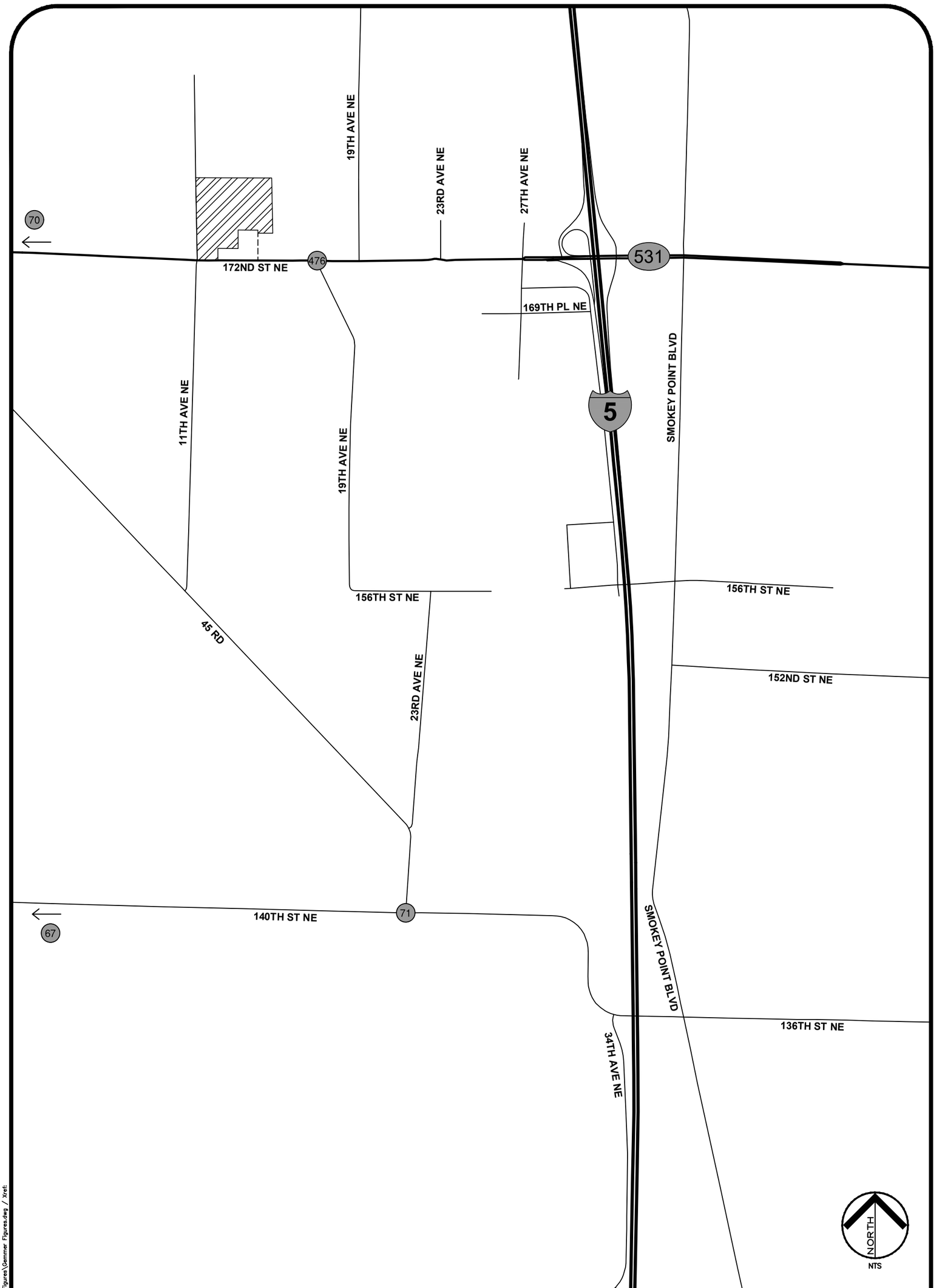
LIST OF PROGRAMED
WSDOT PROJECTS IN
SNOHOMISH COUNTY
AS OF Nov. 2008

County ID#	TSA	SR	MP1	MP2	Title/Description	Design/ Construction year	Total Cost (M)	TOTAL CAPA-CITY (ADT)	PRESENT VOLUME	RESERVE CAPACITY (ADT)	TRUE CONTRI-BUTION PER ADT	50% TRIP END DEDUCTION	TAX DEDUCTION	Proportionate Share Per Development Generated ADT
DOT-11	D	5	186.42	186.42	128th ST SW Interchange - Construct Loop Ramps / HOV Bypass	2014	$13.30	99,000	65,000	34,000	$391.18	$195.15	$40.98	$154.17
DOT-01	A	5	205.85	205.85	172nd Street NE (SR 531) Interchange improvements, SB loop ramp, bridge widening	2009	$41.00	90,000	34,900	55,100	$744.10	$372.05	$63.25	$308.80
DOT-30	E	9	1.66	4.04	212th Street SE to 176th Street SE, widen to 5 lanes	2011	$80.80	54,000	21,000	33,000	2,448.48	$1,224.24	$183.64	$1,040.60
DOT-56	B	9	16.48	17.49	Lundeen Parkway to SR-92, Widen to 4 lanes & RT-LT lanes	2009	$38.90	54,000	24,000	30,000	$1,296.67	$648.34	$123.18	$525.16
DOT-37	B	9	17.96	17.96	SR-9 at 60th Street NE, add LT & RT lanes at Tee intersection	2011	$2.95	54,000	36,000	18,000	$163.89	$81.95	$13.91	$67.94
DOT-22	A	9	18.88	19.46	SR 9/SR 528 Intersection improvements, Signal & Channelization	2010	$17.13	54,000	36,000	18,000	$951.67	$475.83	$80.89	$394.94
DOT-57	A	9	20.51	20.59	SR-9/84th Street NE intersection improvements, LT & RT lanes	2011	$17.13	54,000	12,000	42,000	$407.88	$203.93	$55.06	$148.87
DOT-58	A	9	26.00	26.09	SR-9/SR-531/172nd St. NE intersection improvement, Roundabout	2011	$15.60	54,000	11,000	43,000	$362.80	$181.40	$45.87	$135.53
DOT-33	B	92	1.46	1.46	SR-92 at 113th Avenue NE, Roundabout	2009	$2.36	54,000	19,600	34,000	$68.60	$34.30	$6.52	$27.78
DOT-31	B	92	1.73	1.73	SR-92 at Callow/Grade Road, turn lanes to SR-92	2009	$1.90	54,000	19,600	34,400	$55.24	$27.62	$5.25	$22.37
DOT-46	C	203	22.36	22.38	SR-203 at North High Rock/Tualco Roads, Re-align cross street for I/S and add LT & RT lanes on SR-203	2009	$3.34	18,000	13,000	5,000	$688.00	$344.00	$73.48	$270.52
DOT-36	C	203	23.01	23.01	Ben Howard Rd channelization, LT lanes on SR-203	2009	$1.07	54,000	13,000	41,000	$26.10	$13.05	$2.87	$10.18
DOT-16	E	522	13.82	16.61	Paradise Lake Road I/C, Stage 3, new interchange	2010	$27.95	81,000	48,000	33,000	$847.03	$423.52	$63.53	$359.99
DOT-17	E	522	16.80	20.41	Paradise Lake Road to Snohomish River, Bridge, Stage 2, widen to 4 lanes	2009	$33.48	80,000	21,900	58,100	$576.25	$288.13	$43.22	$244.91
DOT-28	C	522	20.50	24.68	Snohomish River Bridge to SR 2, widen to 4 lanes	2010	$171.98	80,000	20,000	60,000	$2,866.33	$1,433.17	$315.30	$1,117.87

LIST OF PROGRAMED
WSDOT PROJECTS IN
SNOHOMISH COUNTY
AS OF Nov. 2008

County ID#	TSA	SR	MP1	MP2	Title/Description	Design/ Construction year	Total Cost (M)	TOTAL CAPA-CITY (ADT)	PRESENT VOLUME	RESERVE CAPACITY (ADT)	TRUE CONTRI-BUTION PER ADT	50% TRIP END DEDUCTION	TAX DEDUCTION	Proportionate Share Per Development Generated ADT
DOT-19	F	524	5.87	9.50	24th Avenue SE to I-405, widen to 5 Lanes	2012	$33.34	54,000	15,300	38,700	$861.50	$430.75	$77.54	$353.21
DOT-20	F	524	5.87	9.50	I-405 to Royal Ann Road, widen to 5 Lanes	2011	$71.06	54,000	15,300	38,700	$1,836.18	$918.09	$165.26	$752.83
DOT-60	E	524	6.79	6.79	Larch Way intersection, LT lanes, signal	2009	$2.59	54,000	15,300	38,700	$66.93	$33.47	$5.02	$28.45
DOT-59	D	525	6.25	6.25	SR-525/88th St. SW intersection improvements, NBRT, NBLT & SBLT	2011	$3.70	25,700	17,000	8,700	$425.29	$212.64	$89.31	$123.33
DOT-49	A	530	17.30	17.30	SR-530 at Old 99, Roundabout	2011	$8.00	18,000	10,000	8,000	$1,000.00	$500.00	$85.00	$415.00
DOT-62	A	530	19.71	19.71	211th Place NE, Intersection Roundabout	2011	$6.10	24,000	15,000	9,000	$677.78	$338.89	$57.61	$281.28
DOT-52	A	531	1.95	2.25	SR-531/Jct. Freestad Road Intersection, LT lanes	2011	$1.55	18,000	7,900	10,100	$140.14	$70.07	$11.92	$58.15
DOT-05	A	531	7.00	8.59	43rd Ave. NE to 67th Ave. NE, NE, Widen to 5 lanes (Arlington)	2014	$20.78	54,000	11,000	43,000	$483.14	$241.57	$41.07	$200.50
DOT-53	A	532	5.25	5.90	270th St. NW Vic. To 72nd Ave. NW, EB Climbing Lane, intersection improvements & signal.	2009	$19.00	54,000	16,000	38,000	500	$250.00	$28.75	$221.25
DOT-54	A	532	6.45	9.79	64th Ave. NW to 12th Ave. NW, Climbing lane & LT Lanes	2010	$22.40	54,000	17,000	37,000	$605.41	$302.70	$33.75	$268.95
					TAX DEDUCTIONS									
					TSA A = 17%									
					TSA B = 19%									
					TSA C = 22%									
					TSA D = 21%									
					TSA E = 15%									
					TSA F = 18%									

Snohomish County Key Intersections



GEMMER

CITY OF MARYSVILLE

LEGEND

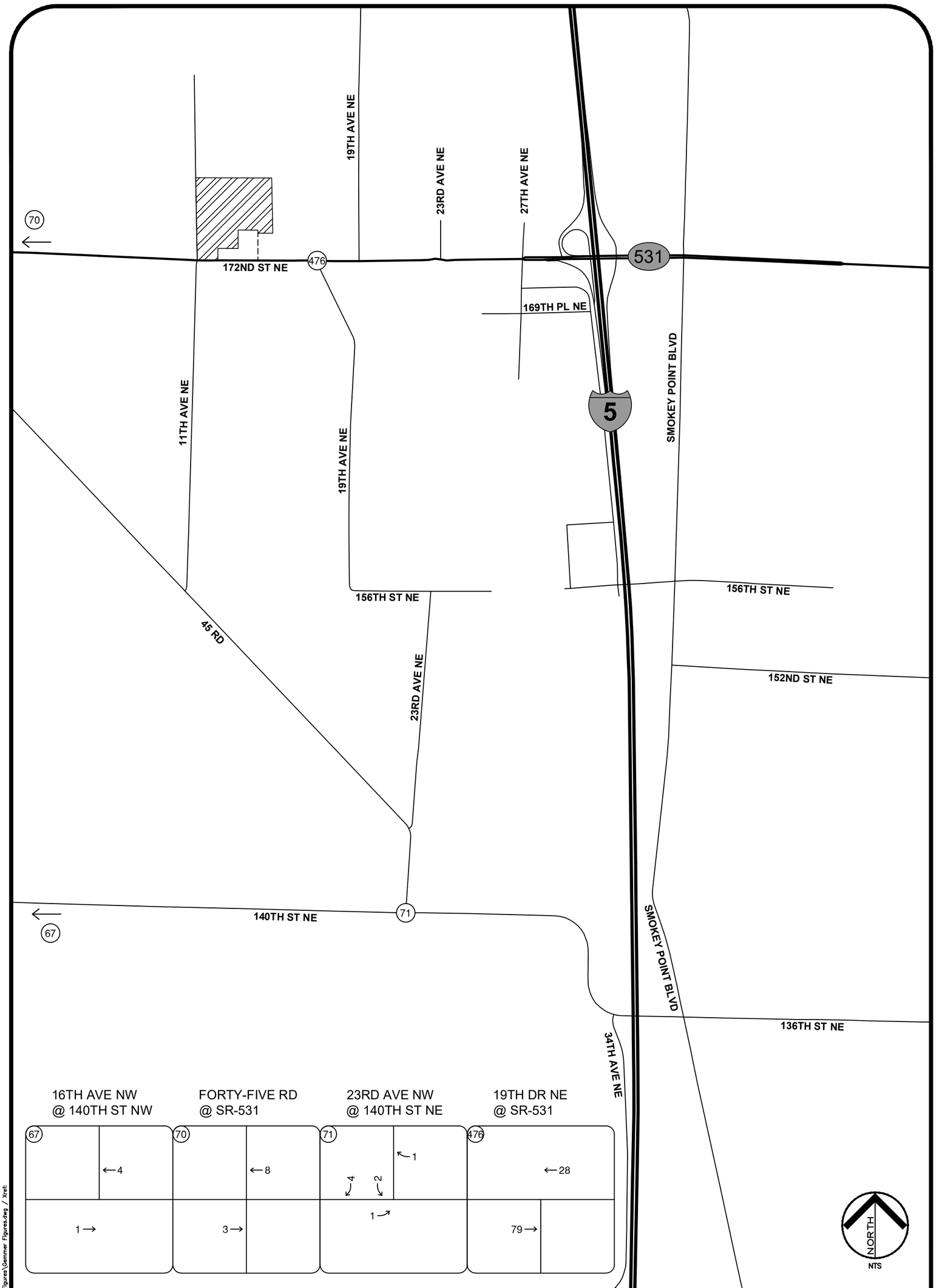
(X) SNOHOMISH COUNTY KEY INTERSECTION

FIGURE A

SNOHOMISH COUNTY KEY INTERSECTION MAP

Kimley»Horn

Date: February 14, 2022 – 11:49am / User: Saruna.Farler
Path: K:\SNO_TPTO\2021\21-3041\Full Analysis\Figures\Gemmer Figures.dwg / Xref:



GEMMER

CITY OF MARYSVILLE

LEGEND

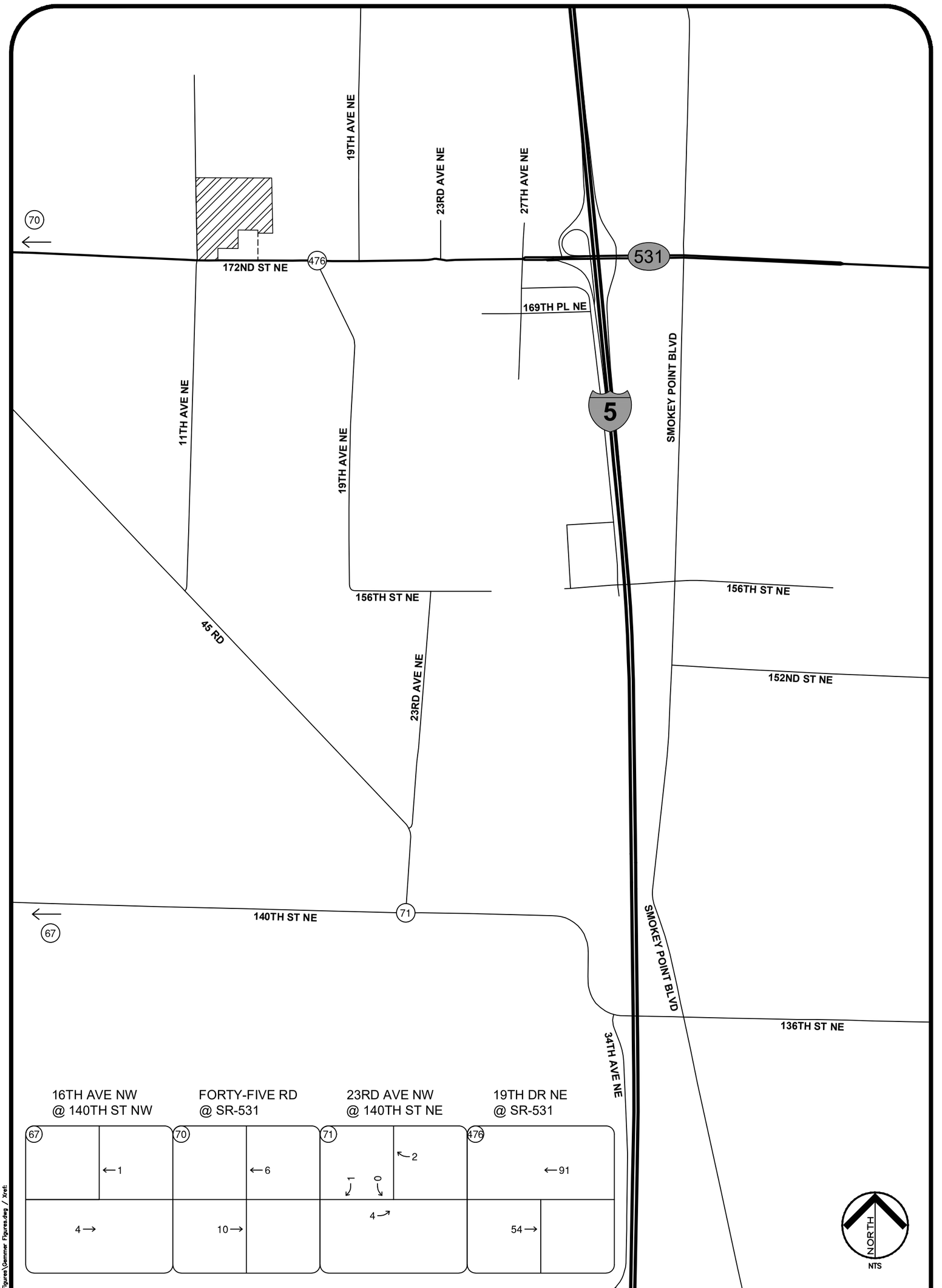
XXX → OPENING YEAR AM PEAK-HOUR TURNING MOVEMENT VOLUME

FIGURE B

SNOHOMISH COUNTY
KEY INTERSECTION
VOLUMES
AM PEAK-HOUR

Kimley»Horn

Date: February 14, 2022 – 11:50am / User: Saranda.Forler
Path: K:\SNO_TPTO\2021\21-3041\Full Analysis\Figures\Gemmer Figures.dwg / Xref:



GEMMER

CITY OF MARYSVILLE

LEGEND

XXX→ OPENING YEAR PM PEAK-HOUR TURNING MOVEMENT VOLUME

FIGURE C

SNOHOMISH COUNTY
KEY INTERSECTION
VOLUMES
PM PEAK-HOUR

Kimley»Horn

Date: February 14, 2022 – 11:59am / User: Saruna.Forler
Path: K:\SNO_TPTO\2021\21-3041\Full Analysis\Figures\Gemmer Figures.dwg / Xref:

Table A: AM Peak-Hour Key Intersection Volumes

Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#67: 16th Ave NW at 140th St NW	0	1	0	0	4	0	0	0	0	0	0	0
#70: Forty-Five Rd at SR-531	0	3	0	0	8	0	0	0	0	0	0	0
#71: 23rd Ave NE at 140th St NE	1	0	0	0	0	1	0	0	0	2	0	4
#476: 19th Dr NE at SR-531	0	79	0	0	28	0	0	0	0	0	0	0

Table B: PM Peak-Hour Key Intersection Volumes

Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
#67: 16th Ave NW at 140th St NW	0	4	0	0	1	0	0	0	0	0	0	0
#70: Forty-Five Rd at SR-531	0	10	0	0	6	0	0	0	0	0	0	0
#71: 23rd Ave NE at 140th St NE	4	0	0	0	0	2	0	0	0	0	0	1
#476: 19th Dr NE at SR-531	0	54	0	0	91	0	0	0	0	0	0	0