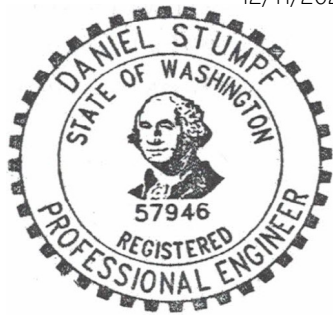




**lancaster
mobley**

12/11/2023



Vineyard Vista Subdivision

Transportation Impact
Study

La Center, Washington

Date:

December 11, 2023

Prepared for:

Mason Wolfe

Wolfe Project Management LLC

Prepared by:

Daniel Stumpf, PE

Table of Contents

Executive Summary	4
Project Description	5
Introduction	5
Location Description	5
Vicinity Streets	6
Study Intersections	7
Site Trips	9
Trip Generation	9
Trip Distribution	9
Traffic Volumes	12
Existing Conditions	12
Background Conditions	12
Volume Growth	12
In-Process Data	12
Buildout Conditions	13
Safety Analysis	17
Crash History Review	17
Sight Distance Evaluation	18
Methodology	18
Field Measurements	19
<i>Site Access at NE North Fork Avenue</i>	19
<i>Site Access at E 24th Circle</i>	19
Analysis Summary	19
Warrant Analysis	20
Left-Turn Lane Warrants	20
Preliminary Traffic Signal Warrants	20
Operational Analysis	21
Intersection Capacity Analysis	21
Performance Standards	21
Delay & Capacity Analysis	21
Conclusions	23

Appendices

Appendix A – Site Plan

Site Plan

Appendix B – Trip Generation and Distribution

Trip Generation

Appendix C – Traffic Volumes

Traffic Counts

In-Process Data

Appendix D – Safety Analysis

Crash History Data

Left-turn Lane Warrant Analysis

Traffic Signal Warrant Analysis

Appendix E – Operation Analysis

Level of Service Descriptions

Capacity Reports



List of Figures

Figure 1: Aerial Photo of Site Vicinity (Image from Google Earth)	6
Figure 2: Vicinity Map	8
Figure 3: Trip Distribution and Assignment	11
Figure 4: Year 2023 Existing Conditions	14
Figure 5: Year 2026 Background Conditions	15
Figure 6: Year 2026 Buildout Conditions	16

List of Tables

Table 1: Vicinity Roadway Descriptions	6
Table 2: Study Intersection Descriptions	7
Table 3: Trip Generation Summary	9
Table 4: Crash Type Summary	17
Table 5: Crash Severity and Rate Summary	18
Table 6: Intersection Capacity Analysis Summary	22



Executive Summary

1. The proposed Vineyard Vista Subdivision will include the construction of a residential subdivision located on two properties addressed at 2103/2025 NE North Fork Avenue in La Center, Washington. The project will include the construction of an 84-unit residential subdivision. Access to the site will be provided via a proposed public street connection (i.e. NE 26th Street) to NE North Fork Avenue and a second proposed public street connection (i.e. NE James Avenue) to NE 24th Circle.
2. The trip generation calculations show that the proposed development is projected to generate an additional 59 morning peak hour trips, 79 evening peak hour trips, and 792 average weekday trips.
3. No significant trends or crash patterns were identified at any of the study intersections that are indicative of safety concerns. Accordingly, no safety mitigation is recommended per the crash data analysis.
4. Provided any obstructing on-site foliage/fences near the site accesses along NE North Fork Avenue and E 24th Circle are removed or properly maintained following redevelopment of the site, adequate intersection sight distances can be made available at the proposed site accesses to allow for safe and efficient operation of each intersection. No other mitigation is necessary or recommended with regard to sight distance at the proposed access intersections.
5. Left-turn lane warrants are not projected to be met at any of the applicable study intersections along NE North Fork Avenue or Aspen Avenue. Accordingly, no new left-turn lanes are necessary or recommended at any of the study intersections as part of the proposed Vineyard Vista Subdivision project.
6. Traffic signal warrants are not projected to be met at any of the applicable study intersections, including the intersection of NW Paradise Park Road at NW La Center Road, under year 2026 conditions with the proposed development constructed. Note signal warrants were found to be met at the intersection of NW Timmen Road at NW La Center Road in the *Valley View Subdivision Transportation Impact Study*, dated September 2022, and installation of a roundabout is expected to occur regardless of whether or not the Vineyard Vista Subdivision project is constructed. Accordingly, no new traffic signals are necessary or recommended as part of the proposed development application.
7. All study intersections are currently operating acceptably per La Center standards and are projected to continue operating acceptably through the 2026 buildout year of the site. Accordingly, no operational mitigation is necessary or recommended at these study intersections.



Project Description

Introduction

The proposed Vineyard Vista Subdivision will include the construction of a residential subdivision located on two properties addressed at 2103/2025 NE North Fork Avenue in La Center, Washington. The project will include the construction of an 84-unit residential subdivision. Access to the site will be provided via a proposed public street connection (i.e. NE 26th Street) to NE North Fork Avenue and a second proposed public street connection (i.e. NE James Avenue) to NE 24th Circle.

Based on correspondence with La Center staff, the report conducts safety and capacity/level of service analyses at the following intersections:

1. Site Access at NE North Fork Avenue
2. E 18th Street at Aspen Avenue
3. W 10th Street/E Southview Heights Drive at Aspen Avenue
4. W/E 4th Street at Aspen Avenue

Additionally, a limited analysis of the following intersections will be conducted:

- A. NW Paradise Park Road at NW La Center Road
 - a. Conduct a trip distribution/assignment analysis.
 - b. Conduct a preliminary review of traffic signal warrants based on traffic volumes.
- B. NW Timmen Road at NW La Center Road
 - a. Conduct a trip distribution/assignment analysis.

The purpose of this study is to determine whether the transportation system within the vicinity of the site is capable of safely and efficiently supporting the existing and proposed uses, and to determine any mitigation that may be necessary to do so. Detailed information on traffic counts, trip generation calculations, safety analyses, and level of service calculations is included in the appendix to this report.

Location Description

The project site is located north of E 24th Circle and east of NE North Fork Avenue in La Center, Washington. The subject site is located near the north edge of City limits with a residential subdivision to the south, undeveloped/forested land to the north and east, and low-density single-family houses to the west.

The site consists of two assessor parcels (parcels 258898000 and 258903000) which encompass an approximate total of 28.75 acres. A single-family detached house, a 2,168 square foot winery building, and several ancillary structures are currently built on-site. Following redevelopment of the site, the existing house and winery building will be maintained and some of the other ancillary structures will be removed. The site is currently served by two driveways along NE North Fork Avenue.

Figure 1 presents an aerial image of the nearby vicinity with the project site outlined in yellow.



Figure 1: Aerial Photo of Site Vicinity (Image from Google Earth)

Vicinity Streets

The proposed development is expected to impact several roadways near the project site. Table 1 provides a description of each vicinity roadway.

Table 1: Vicinity Roadway Descriptions

Street Name	Jurisdiction	Functional Classification	Speed (MPH)	On-Street Parking	Curbs & Sidewalks	Bicycle Lanes
NW La Center Road	La Center	Principal Arterial	25/35/50	Not Permitted	Partial Both Sides	Partial Both Sides
NW Paradise Park Road	La Center	Major Collector	35	Not Permitted	Partial Both Sides	Partial Both Sides
NW Timmen Road	La Center	Minor Arterial	40	Not Permitted	None	None
NE North Fork Avenue	La Center	Major Collector	25/50	Not Permitted	Partial South Side	None
Aspen Avenue	La Center	Major Collector	25	Partially Permitted	Both Sides	None

Table Notes: Functional classification based on La Center Transportation Capital Facilities Plan Classification Map.

Table 1: Vicinity Roadway Descriptions (Continued)

Street Name	Jurisdiction	Functional Classification	Speed (MPH)	On-Street Parking	Curbs & Sidewalks	Bicycle Lanes
E 18th Street	La Center	Local Street	25	Permitted	Both Sides	None
W 10th Street	La Center	Minor Collector	25	Not Permitted	Both Sides	None
E Southview Heights Drive	La Center	Local Street	25	Permitted	Both Sides	None
E/W 4th Street	La Center	Minor Arterial	25	Partially Permitted	Partial Both Sides	Partial Both Sides

Table Notes: Functional classification based on La Center Transportation Capital Facilities Plan Classification Map.

Study Intersections

Based on correspondence with City of La Center staff, an analysis of five existing, nearby intersections of significance is conducted in this report. A summarized description of these study intersections is provided in Table 2.

Table 2: Study Intersection Descriptions

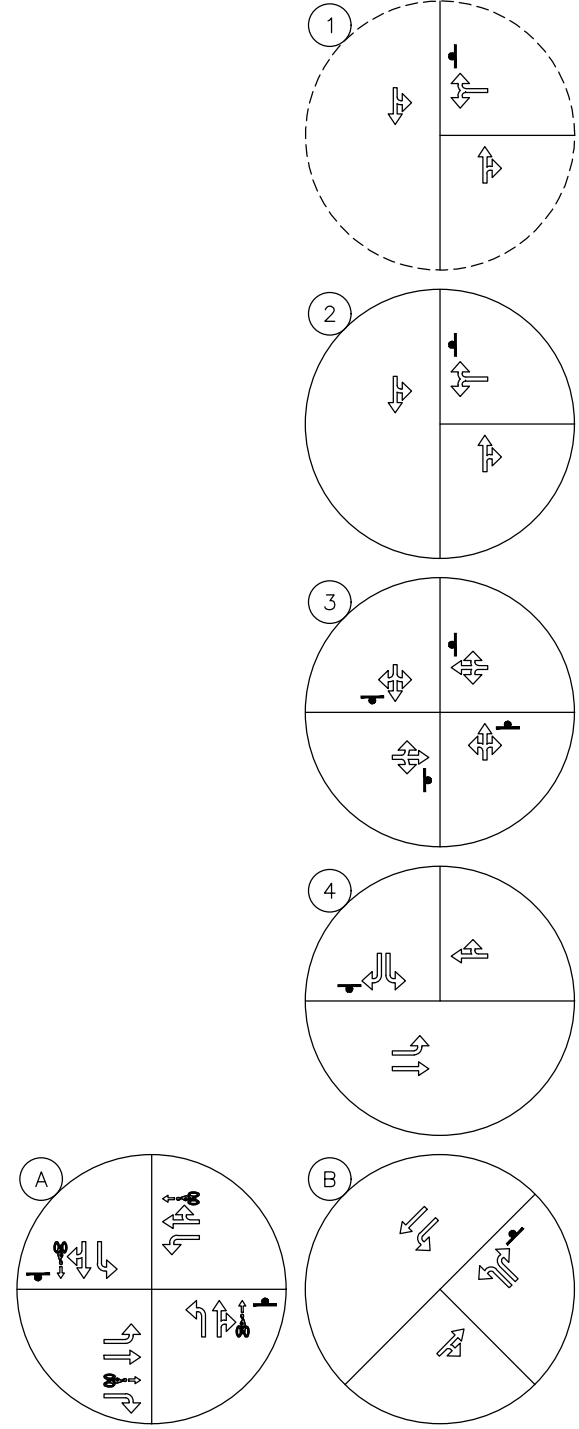
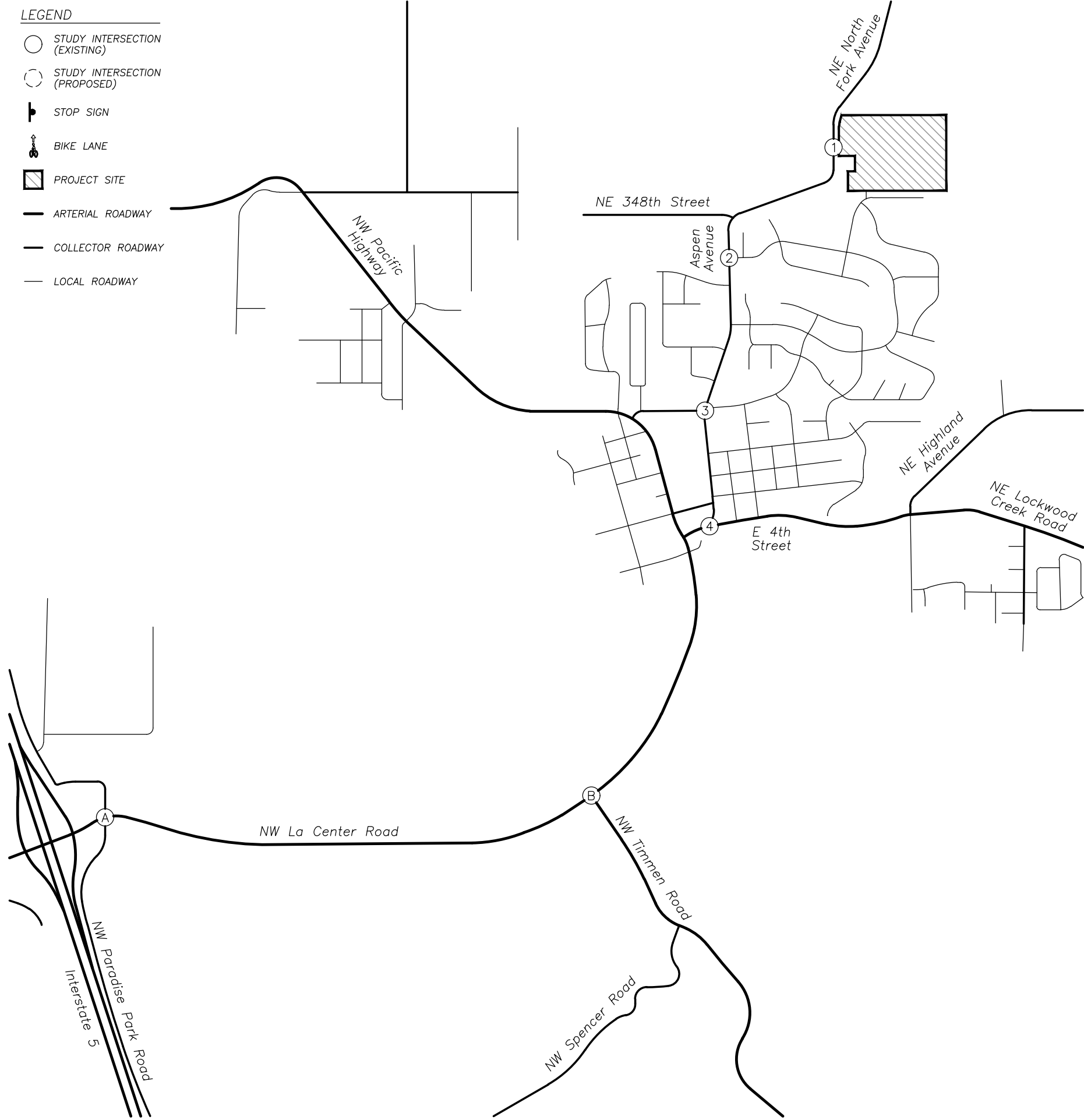
Number	Intersection	Geometry	Traffic Control	Phasing/Stopped Approaches
2	E 18th Street at Aspen Avenue	Three-Legged	Stop-Controlled	WB Stop-Controlled Approach
3	W 10th St/E Southview Heights Dr at Aspen Ave	Four-Legged	Stop-Controlled	All-Way Stop-Controlled
4	W/E 4th Street at Aspen Avenue	Three-Legged	Stop-Controlled	SB Stop-Controlled Approach
A	NW Paradise Park Road at NW La Center Road	Four-Legged	Stop-Controlled	NB/SB Stop-Controlled Approaches, EB Right-turn Yield Controlled
B	NW Timmen Road at NW La Center Road	Three-Legged	Stop-Controlled	NWB Stop-Controlled Approach

A vicinity map showing the project site, vicinity streets, and study intersection configurations are shown in Figure 2.



LEGEND

-  STUDY INTERSECTION (EXISTING)
-  STUDY INTERSECTION (PROPOSED)
-  STOP SIGN
-  BIKE LANE
-  PROJECT SITE
-  ARTERIAL ROADWAY
-  COLLECTOR ROADWAY
-  LOCAL ROADWAY



lancaster
mobley

VICINITY MAP

Site Trips

Trip Generation

The proposed development will include the construction of an 84-unit residential subdivision. To estimate the number of trips that are currently and will be generated by the proposed use, trip rates from the *Trip Generation Manual*¹ were used. Data from land use code 210, *Single-Family Detached Housing*, was used to estimate site trip generation based on the number of dwelling units.

The trip generation calculations show that the proposed development is projected to generate an additional 59 morning peak hour trips, 79 evening peak hour trips, and 792 average weekday trips. The trip generation estimates are summarized in Table 3. Detailed trip generation calculations are included as an attachment to this memorandum.

Table 3: Trip Generation Summary

ITE Code		Size/Rate	Morning Peak Hour			Evening Peak Hour			Weekday Total
			Enter	Exit	Total	Enter	Exit	Total	
Single-Family Detached Housing	210	84 units	15	44	59	50	29	79	792

Trip Distribution

The trip distribution of the proposed development was referenced from the assumed distributions utilized in both the *Stephens Hillside Farm Subdivision Transportation Impact Study (TIS)*, dated January 30, 2018, and the *Valley View Subdivision TIS*, dated September 20, 2022. The directional distribution percentages of trips to/from the project site were estimated based on the locations of likely trip destinations, locations of major transportation facilities in the site vicinity, and travel patterns at study area intersections.

The following trip distribution is projected:

- Approximately 70 percent of site trips will travel to/from the Interstate 5 interchange via NW La Center Road.
- Approximately 10 percent of site trips will travel to/from the west along NW Pacific Highway, west of W 10th Street.
- Approximately 5 percent of site trips will travel to/from the north along NE Highland Avenue, north of E 4th Street.
- Approximately 5 percent of site trips will travel to/from the east along NE Lockwood Creek Road, east of NE Highland Avenue.

¹ Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 11th Edition, 2021.

- Approximately 5 percent of site trips will travel to/from the south along NW Timmen Road, south of NW La Center Road.
- Approximately 5 percent of site trips will travel to/from locales within the immediate vicinity, specifically La Center Elementary School.

The proposed subdivision will be served by two access points: one along NE North Fork Avenue and the other along E 24th Circle. Based on the site location, estimated trip distribution, and the expected layout of site internal streets, site trips are anticipated to utilize accesses accordingly:

- Approximately 60 percent of trips will utilize the access along NE North Fork Avenue.
- Approximately 40 percent of trips will utilize the E 24th Circle access.

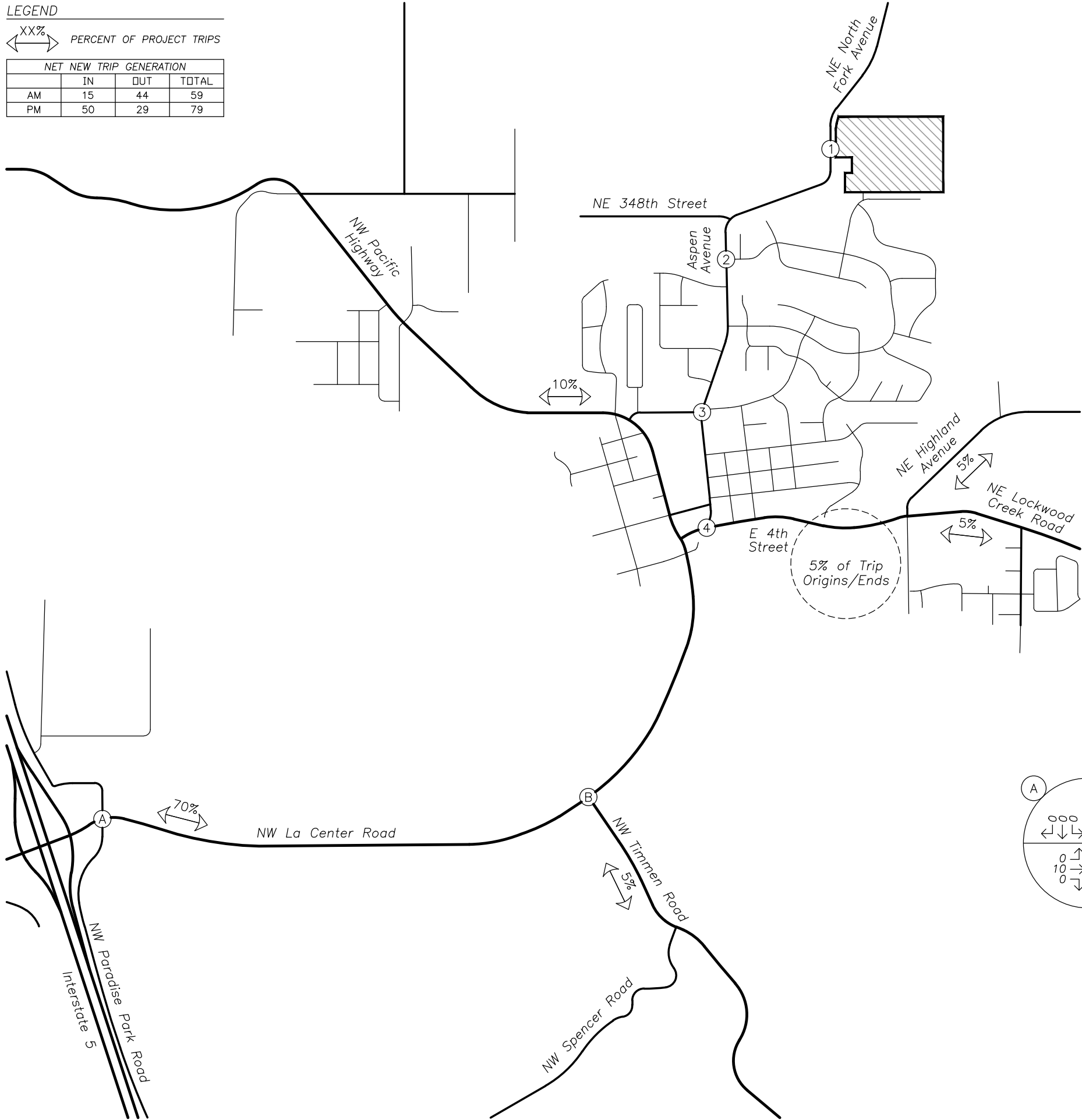
Per the *Valley View Subdivision Transportation Impact Study* (TIS), dated September 2022, the intersection of NW Timmen Road at NW La Center Road was projected to operate at LOS F under year 2024 conditions and traffic signal warrants were projected to be met. According to the City of La Center's Transportation Capital Facilities Plan, dated July 25, 2018, and based on correspondence with City staff, the intersection will be reconstructed as a roundabout, noting the intersection improvement project is Traffic Impact Fee (TIF) eligible. Once reconstructed as a roundabout, the 2022 TIS indicated the intersection will operate at level of service B with average control delays of approximately 12-14 seconds during the morning and evening peak hours under 2024 conditions. This being the case and based on correspondence with City staff, only a trip assignment analysis of the intersection was determined as necessary to report the impacts of the proposed development.

The trip distribution and assignment for the site trips generated during the morning and evening peak hours are shown in Figure 3.

LEGEND

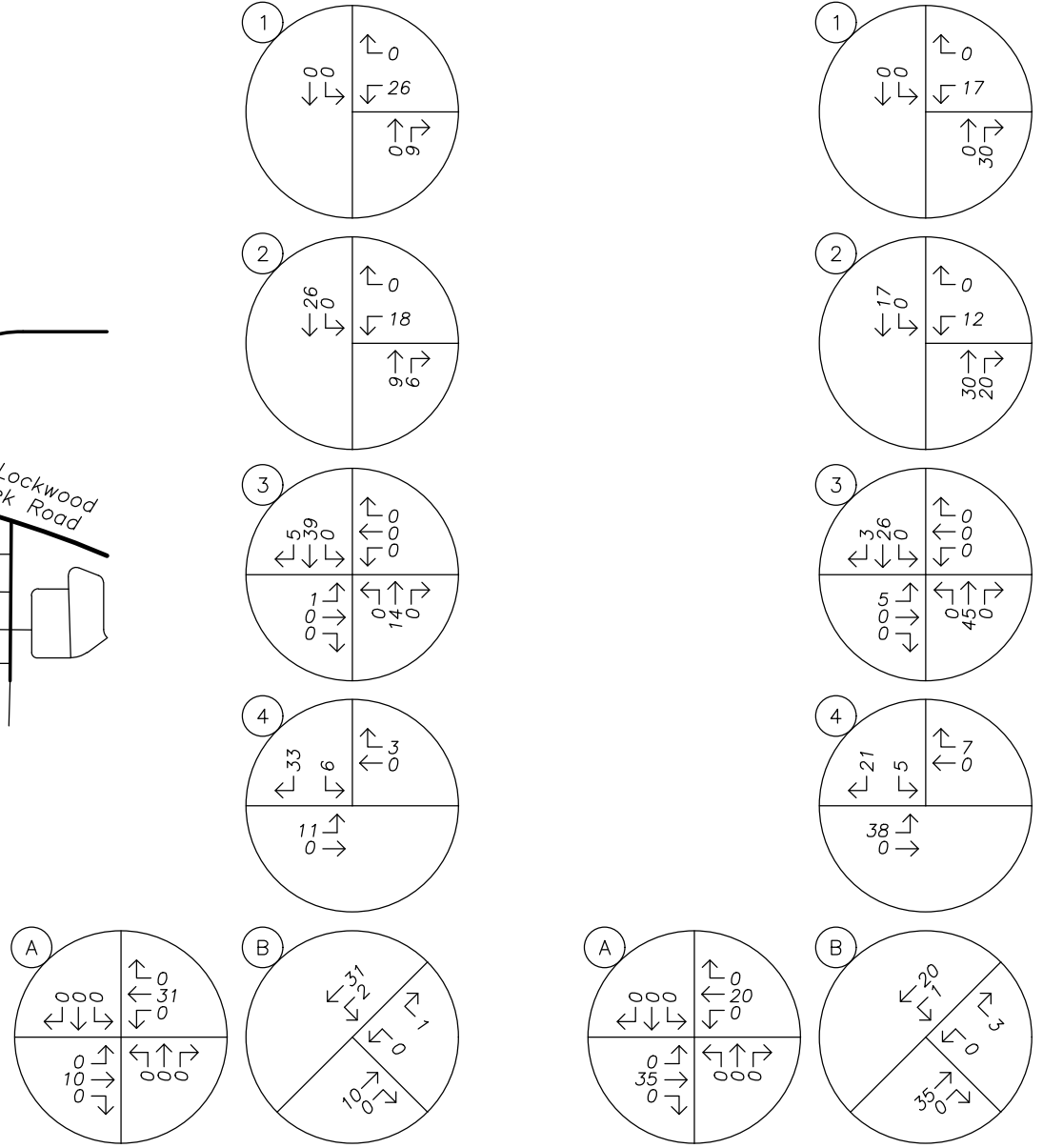
XX% PERCENT OF PROJECT TRIPS

NET NEW TRIP GENERATION			
	IN	OUT	TOTAL
AM	15	44	59
PM	50	29	79



AM PEAK HOUR

PM PEAK HOUR



No Scale



SITE TRIP DISTRIBUTION & ASSIGNMENT

Proposed Development Plan - Site Trips

AM & PM Peak Hours

Traffic Volumes

Existing Conditions

Traffic counts were conducted at the study intersections on Thursday, April 11, 2023, from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM. Data was used from each intersection's respective morning and evening peak hours. To estimate major-street traffic volumes at the site access intersection with NE North Fork Avenue, volumes were balanced with the intersection of E 18th Street at Aspen Avenue.

Figure 4 shows the year 2023 existing traffic volumes at the study intersections during the morning and evening peak hours.

Background Conditions

Volume Growth

To provide analysis of the impact of the proposed development on the nearby transportation facilities, an estimate of future traffic volumes is required. In order to approximate the future year 2026 traffic volumes at the study intersections, a compounded growth rate of two percent per year for an assumed buildout condition of three years was applied to the year 2023 existing traffic volumes.

In-Process Data

In addition to the traffic volume growth described above, there are several in-process developments that are currently approved/proposed for construction within the site vicinity that are expected to impact nearby study intersections. The in-process developments include the following:

- Asa's View Subdivision – 0 percent constructed.
- Highland Terrace Subdivision (aka Riverside Estates) – Approximately 80 percent of houses constructed, 100 percent of apartment units constructed.
- Lockwood Meadows Subdivision – 0 percent constructed.
- Stephen Hillside Farm Subdivision – 0 percent constructed.
- Valley View Subdivision – 0 percent constructed.

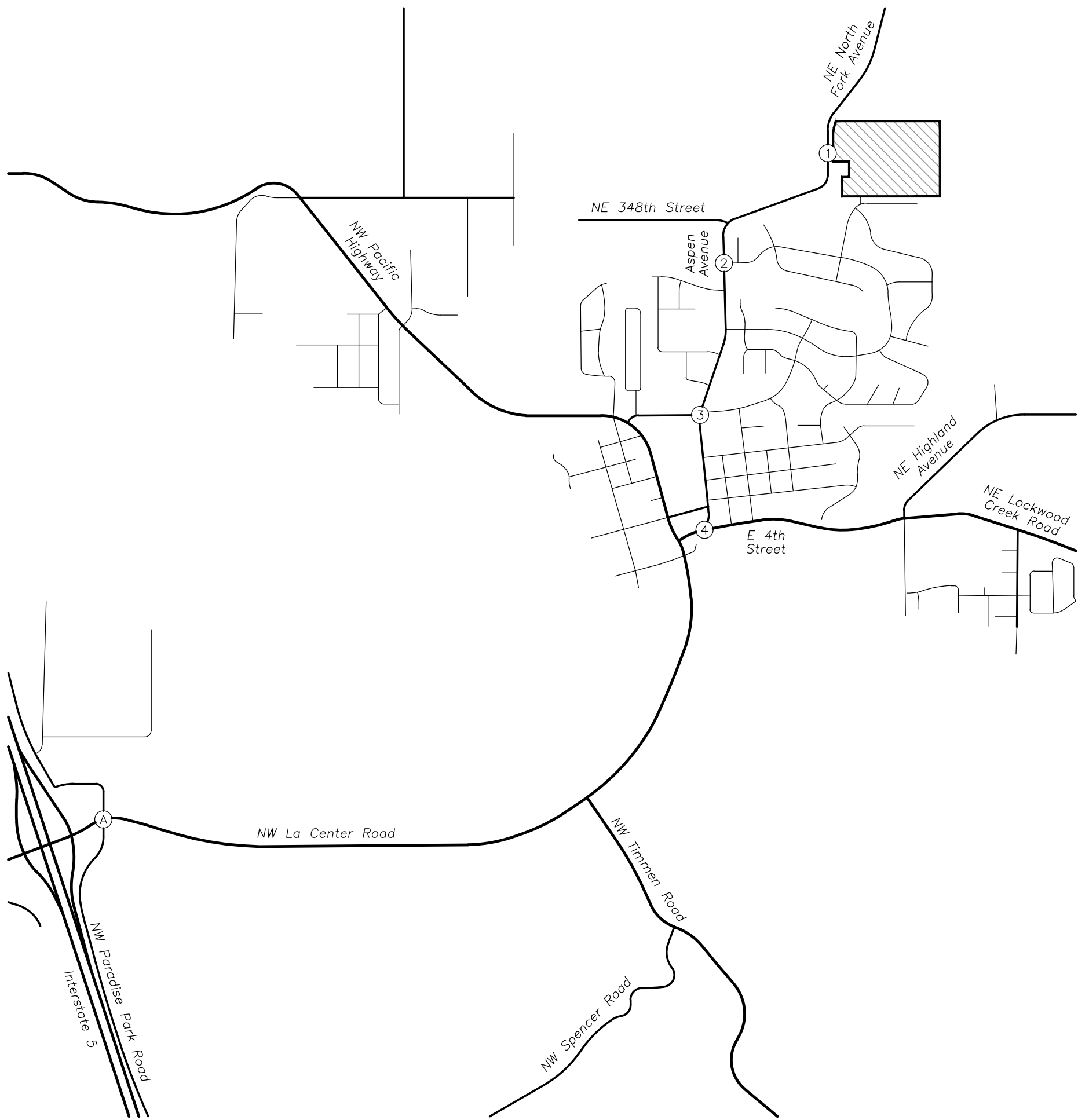
The in-process developments are not currently/fully contributing trips to the transportation system but may potentially be by the assumed 2026 buildout year of the site. Additional trips corresponding to each in-process development were added to the existing year traffic volumes in addition to the three years of traffic growth at each of the applicable study intersections. To maintain a conservative analysis of operation at the study intersections, all in-process developments were assumed to be constructed by year 2026. Figure A in the technical appendix shows the in-process development trips at the study intersections during the morning and evening peak hours.

Figure 5 shows the projected year 2026 background traffic volumes at the study intersections during the morning and evening peak hours.

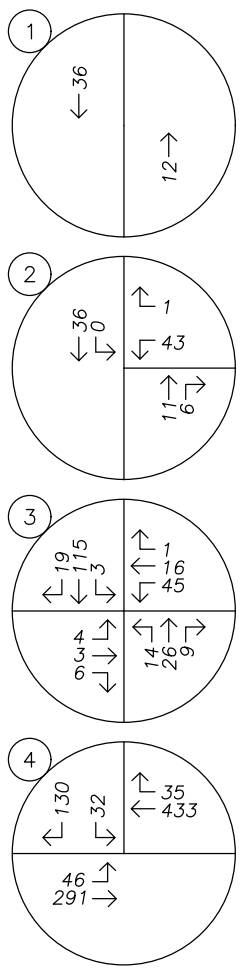
Buildout Conditions

The net new peak hour trips calculated to be generated by the proposed development, as described earlier within the *Site Trips* section, were added to the projected year 2026 background traffic volumes to obtain the expected 2026 site buildout volumes.

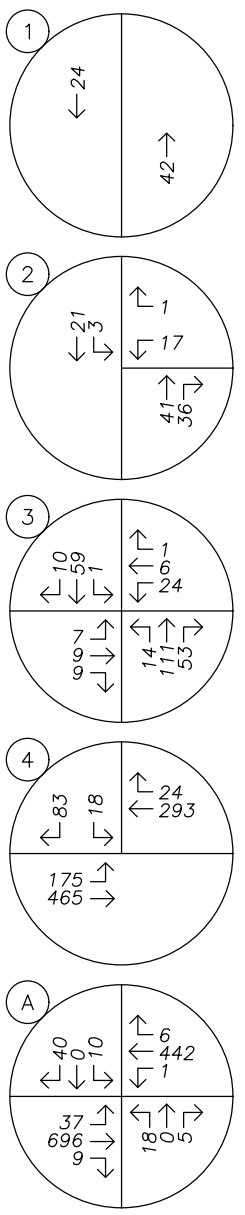
Figure 6 show the year 2026 buildout traffic volumes at the study intersections during the morning and evening peak hours.



AM PEAK HOUR



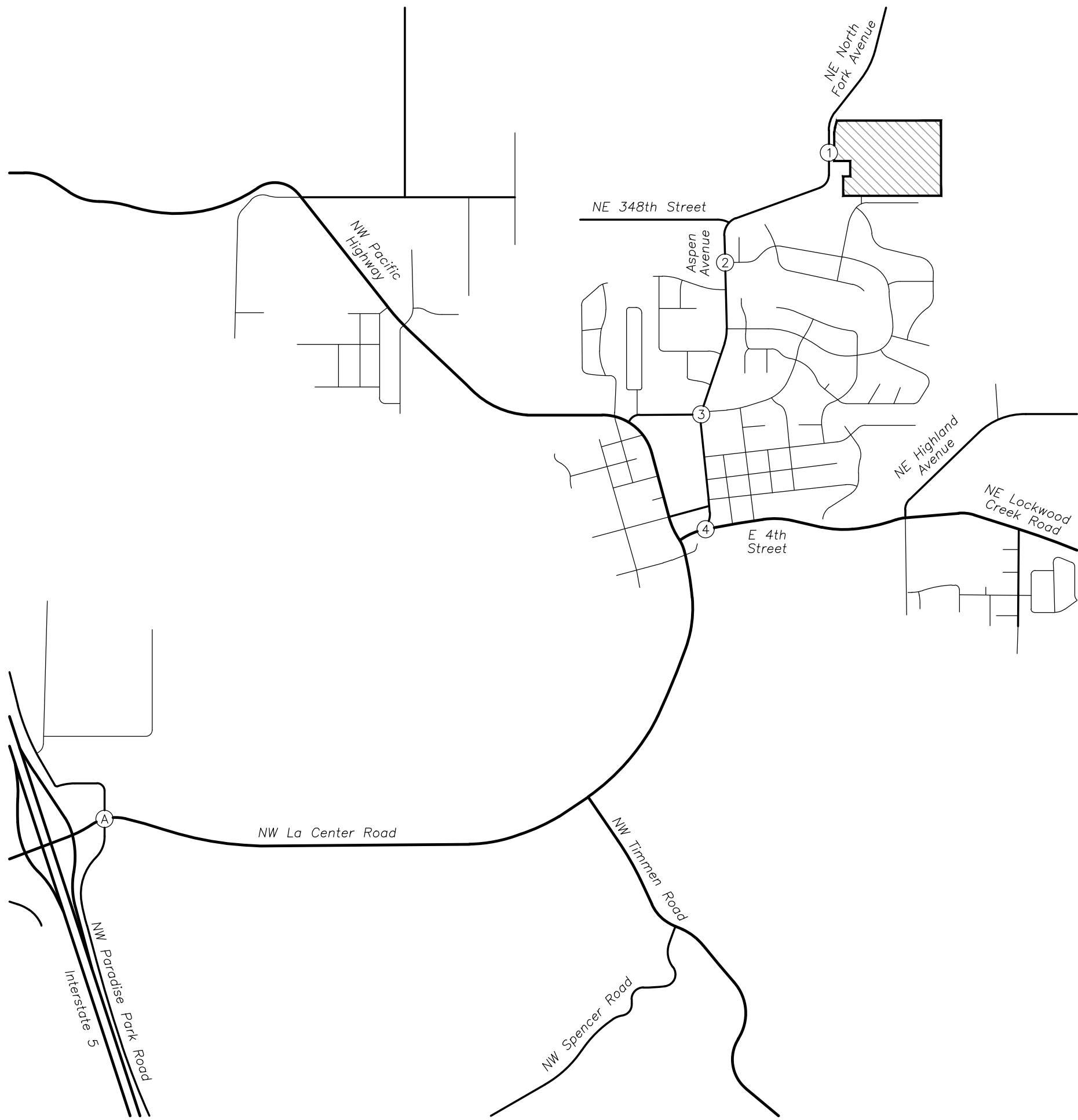
PM PEAK HOUR



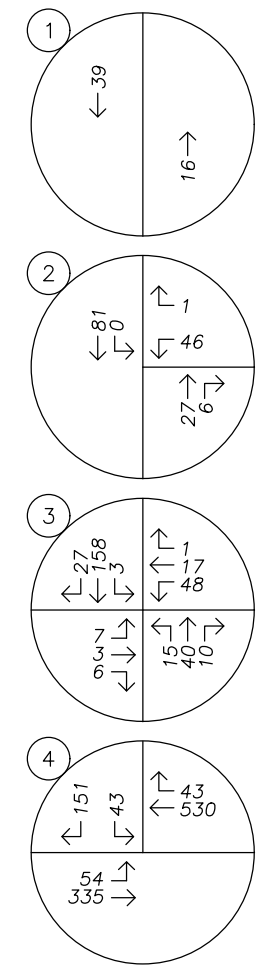
No Scale



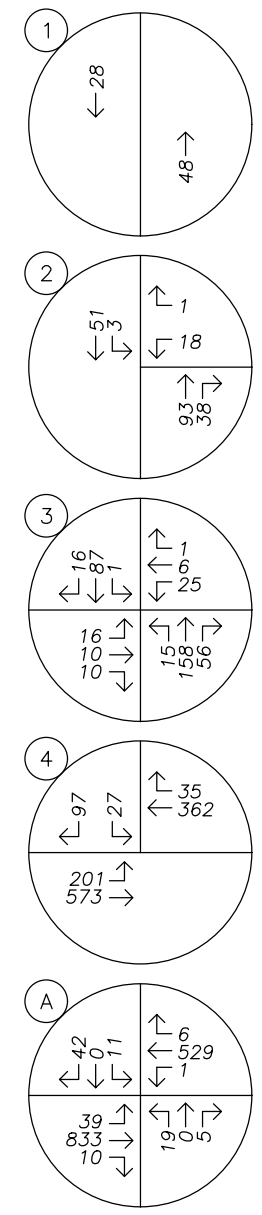
TRAFFIC VOLUMES
 Year 2023 Existing Conditions
 AM & PM Peak Hours



AM PEAK HOUR

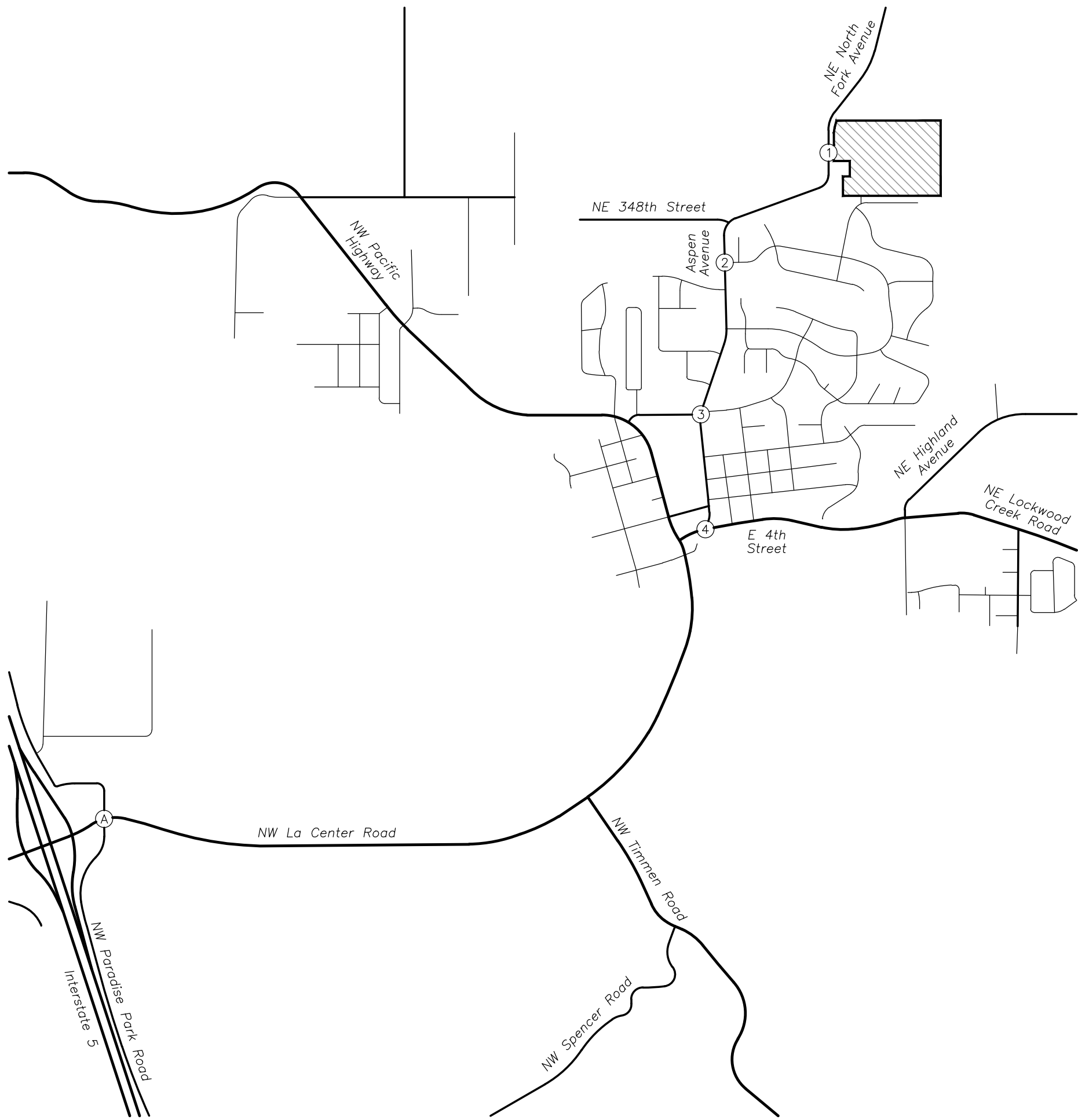


PM PEAK HOUR

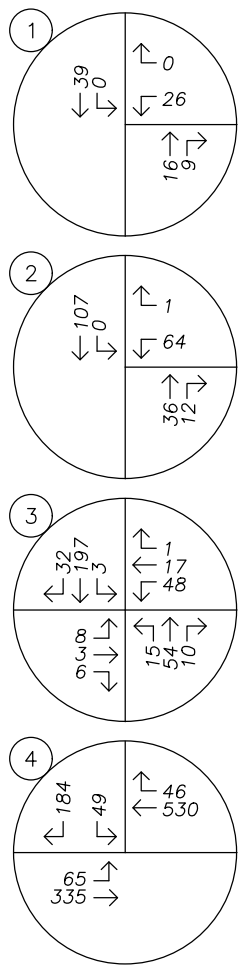


TRAFFIC VOLUMES
Year 2026 Background Conditions
AM & PM Peak Hours

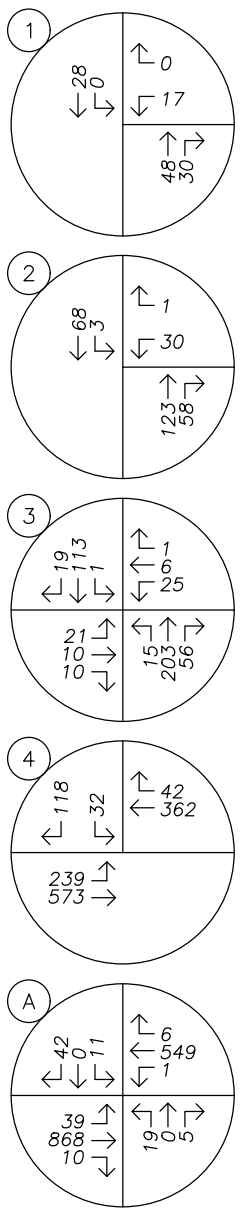
Figure 5
Vineyard Vista Subdivision
12/11/2023



AM PEAK HOUR



PM PEAK HOUR



No Scale



TRAFFIC VOLUMES
Year 2026 Buildout Conditions
AM & PM Peak Hours

Safety Analysis

Crash History Review

Using data obtained from the Washington Department of Transportation (WSDOT) Crash Data and Reporting Branch, a review of the most recent available five years of crash history (January 2017 to December 2021) at the study intersections was performed. The crash data was evaluated based on the number of crashes, the type of collisions, the severity of the collisions, and the resulting crash rate for the intersection.

Crash rates provide the ability to compare safety risks at different intersections by accounting for both the number of crashes that have occurred during the study period and the number of vehicles that typically travel through the intersection. Crash rates were calculated using the common assumption that traffic counted during the evening peak hour represents approximately 10 percent of the annual average daily traffic (AADT) at the intersection. Crash rates in excess of 1.00 crashes per million entering vehicles (CMEV) may be indicative of design deficiencies and therefore require a need for further investigation and possible mitigation.

With regard to crash severity, WSDOT classifies crashes in the following categories:

- *No Apparent Injury (NA);*
- *Possible Injury (P);*
- *Suspected Minor Injury (SM);*
- *Suspected Serious Injury (SS); and*
- *Fatality or Fatal Injury.*

Table 4 provides a summary of crash types while Table 5 summarizes crash severities and rates for each of the applicable study intersections. Crash data is included in the technical appendix to this report.

Table 4: Crash Type Summary

Number	Intersection	Crash Type							Total
		Rear End	Turn	Angle	Fixed Object	Side swipe	Ped/Bike	Other	
2	E 18th Street at Aspen Avenue	0	0	0	0	0	0	0	0
3	W 10th St/E Southview Heights Dr at Aspen Ave	0	0	1	0	0	0	0	1
4	W/E 4th Street at Aspen Avenue	0	0	0	0	0	0	0	0



Table 5: Crash Severity and Rate Summary

Number	Intersection	Crash Severity					Total Crashes	AADT	Crash Rate
		NA	P	SM	SS	Fatal			
2	E 18th Street at Aspen Avenue	0	0	0	0	0	0	1,190	0.00
3	W 10th St/E Southview Heights Dr at Aspen Ave	1	0	0	0	0	1	3,040	0.18
4	W/E 4th Street at Aspen Avenue	0	0	0	0	0	0	10,600	0.00

Table Notes: **BOLDED** text indicates a crash rate in excess of 1.00 CMEV.

Based on a review of available crash data, no significant trends or crash patterns were identified at any of the study intersections that are indicative of safety concerns. Accordingly, no safety mitigation is recommended per the crash data analysis.

Sight Distance Evaluation

Methodology

Intersection sight distances were measured for the proposed site access intersection approaches along NE North Fork Avenue and E 24th Circle and evaluated in accordance with the standards established in *A Policy of Geometric Design of Highways and Streets*². According to AASHTO, the driver's eye is assumed to be approximately 15 feet (14.5 feet specifically) from the near edge of the nearest travel lane (or traveled way) of the intersecting street and at a height of 3.5 feet above the minor-street approach pavement. The vehicle driver's eye-height along the major-street approach is assumed to be 3.5 feet above the cross-street pavement.

Per the AASHTO manual, intersection sight distance is an operation measure intended to provide sufficient line of sight along the major-street so that a driver could turn from the minor-street approach without impeding traffic flow. Conversely, stopping sight distance is considered the minimum requirement to ensure safe operation of an intersection. This is the distance that allows an oncoming driver to see a hazard on the roadway, react, and come to a complete stop, if necessary, to avoid a collision.

² American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets*, 6th Edition, 2011.

Field Measurements

Based on posted speeds of 25 mph along the applicable segments of NE North Fork Avenue and E 24th Circle, the minimum recommended intersection sight distances include the following:

- Site Access at NE North Fork Avenue
 - 280 feet to the north for left turning site egress vehicles.
 - 240 feet to the south for right turning site egress vehicles.
- Site Access at E 24th Circle
 - 280 feet to the west for left-turning site egress vehicles.
 - 240 feet to the east for right-turning site egress vehicles.

Site Access at NE North Fork Avenue

Due to on-site foliage near the access, sight distances were measured approximately 13 feet behind the edge of the roadway rather than the standard 15 feet behind the edge of the traveled way. However, no other obstructions were noted either on-site or along the roadway which would reduce sight distances to less than those measured in the field if measurements had been conducted at the standard 15-foot distance.

Provided any obstructing on-site foliage near the access is removed or properly maintained following redevelopment of the site, sight distance to the north was measured to be in excess of 300 feet while sight distance to the south was measured to be approximately 250 feet. Therefore, adequate intersection sight distances to the north and south of the proposed site access can be made available to allow for safe and efficient operation along NE North Fork Avenue.

Site Access at E 24th Circle

Due to an on-site fence near the access, sight distances were measured near the edge of the roadway rather than the standard 15 feet behind the edge of the traveled way. However, no other obstructions were noted either on-site or along the roadway which would reduce sight distances to less than those measured in the field if measurements had been conducted at the standard 15-foot distance.

Provided the obstructing portions of the fence near the access are removed following redevelopment of the site, sight distances to the east and west were measured to be in excess of 300 feet. Therefore, adequate intersection sight distances at the proposed site access can be made available to allow for safe and efficient operation along E 24th Circle.

Analysis Summary

Provided any obstructing on-site foliage/fences near the site accesses along NE North Fork Avenue and E 24th Circle are removed or properly maintained following redevelopment of the site, adequate intersection sight distances can be made available at the proposed site accesses to allow for safe and efficient operation of each intersection. No other mitigation is necessary or recommended with regard to sight distance at the proposed access intersections.

Warrant Analysis

Left-turn lane and preliminary traffic signal warrants were examined for the study intersections where such treatments would be applicable.

Left-Turn Lane Warrants

A left-turn refuge lane is primarily a safety consideration for the major-street, removing left-turning vehicles from the through traffic stream. The left-turn lane warrants used were developed from the *National Cooperative Highway Research Project's (NCHRP) Report 457*. Turn lane warrants were evaluated based on the number of advancing and opposing vehicles as well as the number of turning vehicles, the travel speed, and the number of through lanes.

Warrants were evaluated at study intersections where left-turn lanes are not currently provided or planned for installation. Left-turn lane warrants are not projected to be met at any of the applicable study intersections along NE North Fork Avenue or Aspen Avenue. Accordingly, no new left-turn lanes are necessary or recommended at any of the study intersections as part of the proposed Vineyard Vista Subdivision project.

Preliminary Traffic Signal Warrants

Preliminary traffic signal warrants were examined for the unsignalized study intersections where a traffic signal is currently not planned to determine whether the installation of a new traffic signal will be warranted at the intersections by the 2026 site buildout year. Based on the preliminary analysis following a review of Warrant 1 in the *Manual on Uniform Traffic Control Devices*, or MUTCD, traffic signal warrants are not projected to be met at any of the applicable study intersections, including the intersection of NW Paradise Park Road at NW La Center Road, under year 2026 background conditions without the proposed development constructed.

Note signal warrants were found to be met at the intersection of NW Timmen Road at NW La Center Road in the *Valley View Subdivision Transportation Impact Study*, dated September 2022, and installation of a roundabout is expected to occur regardless of whether or not the Vineyard Vista Subdivision project is constructed. Accordingly, no new traffic signals are necessary or recommended as part of the proposed development application.

Operational Analysis

Intersection Capacity Analysis

A capacity and delay analysis were conducted for each of the study intersections per the unsignalized intersection analysis methodologies in the *Highway Capacity Manual* (HCM)³. Intersections are generally evaluated based on the average control delay experienced by vehicles and are assigned a grade according to their operation. The level of service (LOS) of an intersection can range from LOS A, which indicates very little or no delay experienced by vehicles, to LOS F, which indicates a high degree of congestion and delay. The volume-to-capacity (v/c) ratio is a measure that compares the traffic volumes (demand) against the available capacity of an intersection.

Performance Standards

Per the *La Center Transportation Capital Facilities Plan* (2018), the following minimum operation standards apply at intersections under City jurisdiction:

- Signalized intersections, as a whole, are required to operate at LOS D or better with a v/c ratio of 0.95 or less during the highest one-hour period of an average weekday.
- Unsignalized intersections are required to operate at LOS E or better for all movements during the highest one-hour period of an average weekday.

Delay & Capacity Analysis

Methodologies described in the *WSDOT Synchro & SimTraffic Protocol – August 2018*, were utilized in the preparation of the intersection capacity analysis. Of specific consideration, peak hour factors (PHF) were applied in accordance with these standards as follows:

- For the 2023 existing traffic conditions, PHFs of at least 0.80 were used unless the recorded count data indicated a PHF greater than 0.80.
- For the 2026 future traffic conditions, PHFs were increased to 0.92 if the recorded PHFs from the 2023 count data were less than 0.90. For intersection PHFs recorded as equal to or greater than 0.90, these PHFs were increased to 1.00.

The LOS, delay, and v/c results of the capacity analysis are shown in Table 6 for the morning and evening peak hours. Detailed calculations as well as tables showing the relationship between delay and LOS are included in the appendix to this report.

³ Transportation Research Board, *Highway Capacity Manual 6th Edition*, 2016.

Table 6: Intersection Capacity Analysis Summary

Analysis Scenario	AM Peak Hour			PM Peak Hour		
	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c
1. Site Access at NE North Fork Avenue						
2026 Buildout Conditions	A	9	0.03	A	9	0.02
2. E 18th Street at Aspen Avenue						
2023 Existing Conditions	A	9	0.06	A	9	0.02
2026 Background Conditions	A	9	0.06	A	10	0.03
2026 Buildout Conditions	A	10	0.09	B	10	0.05
3. W 10th Street/E Southview Heights Drive at Aspen Avenue						
2023 Existing Conditions	A	8	0.20	A	8	0.21
2026 Background Conditions	A	8	0.24	A	8	0.26
2026 Buildout Conditions	A	9	0.29	A	9	0.32
4. W/E 4th Street at Aspen Avenue						
2023 Existing Conditions	C	23	0.31	D	28	0.15
2026 Background Conditions	D	25	0.33	E	39	0.20
2026 Buildout Conditions	D	27	0.40	E	49	0.28

Table Notes: **BOLDED** text indicates intersection operation above jurisdictional standards.

Based on the results of the operational analysis, all study intersections are currently operating acceptably per La Center standards and are projected to continue operating acceptably through the 2026 buildout year of the site. Accordingly, no operational mitigation is necessary or recommended at these study intersections.



Conclusions

No significant trends or crash patterns were identified at any of the study intersections that are indicative of safety concerns. Accordingly, no safety mitigation is recommended per the crash data analysis.

Provided any obstructing on-site foliage/fences near the site accesses along NE North Fork Avenue and E 24th Circle are removed or properly maintained following redevelopment of the site, adequate intersection sight distances can be made available at the proposed site accesses to allow for safe and efficient operation of each intersection. No other mitigation is necessary or recommended with regard to sight distance at the proposed access intersections.

Left-turn lane warrants are not projected to be met at any of the applicable study intersections along NE North Fork Avenue or Aspen Avenue. Accordingly, no new left-turn lanes are necessary or recommended at any of the study intersections as part of the proposed Vineyard Vista Subdivision project.

Traffic signal warrants are not projected to be met at any of the applicable study intersections, including the intersection of NW Paradise Park Road at NW La Center Road, under year 2026 conditions with the proposed development constructed. Note signal warrants were found to be met at the intersection of NW Timmen Road at NW La Center Road in the *Valley View Subdivision Transportation Impact Study*, dated September 2022, and installation of a roundabout is expected to occur regardless of whether or not the Vineyard Vista Subdivision project is constructed. Accordingly, no new traffic signals are necessary or recommended as part of the proposed development application.

All study intersections are currently operating acceptably per La Center standards and are projected to continue operating acceptably through the 2026 buildout year of the site. Accordingly, no operational mitigation is necessary or recommended at these study intersections.

Appendix A – Site Plan

Site Plan



Appendix B – Trip Generation and Distribution

Trip Generation





TRIP GENERATION CALCULATIONS
Source: Trip Generation Manual, 11th Edition
Proposed Conditions

Land Use: Single-Family Detached Housing
Land Use Code: 210
Land Use Subcategory: All Sites
Setting/Location: General Urban/Suburban
Variable: Dwelling Units
Trip Type: Vehicle
Variable Quantity: **84**

AM PEAK HOUR

Trip Rate: 0.7

	Enter	Exit	Total
Directional Split	25%	75%	
Trip Ends	15	44	59

PM PEAK HOUR

Trip Rate: 0.94

	Enter	Exit	Total
Directional Split	63%	37%	
Trip Ends	50	29	79

WEEKDAY

Trip Rate: 9.43

	Enter	Exit	Total
Directional Split	50%	50%	
Trip Ends	396	396	792

SATURDAY

Trip Rate: 9.48

	Enter	Exit	Total
Directional Split	50%	50%	
Trip Ends	398	398	796

Appendix C – Traffic Volumes

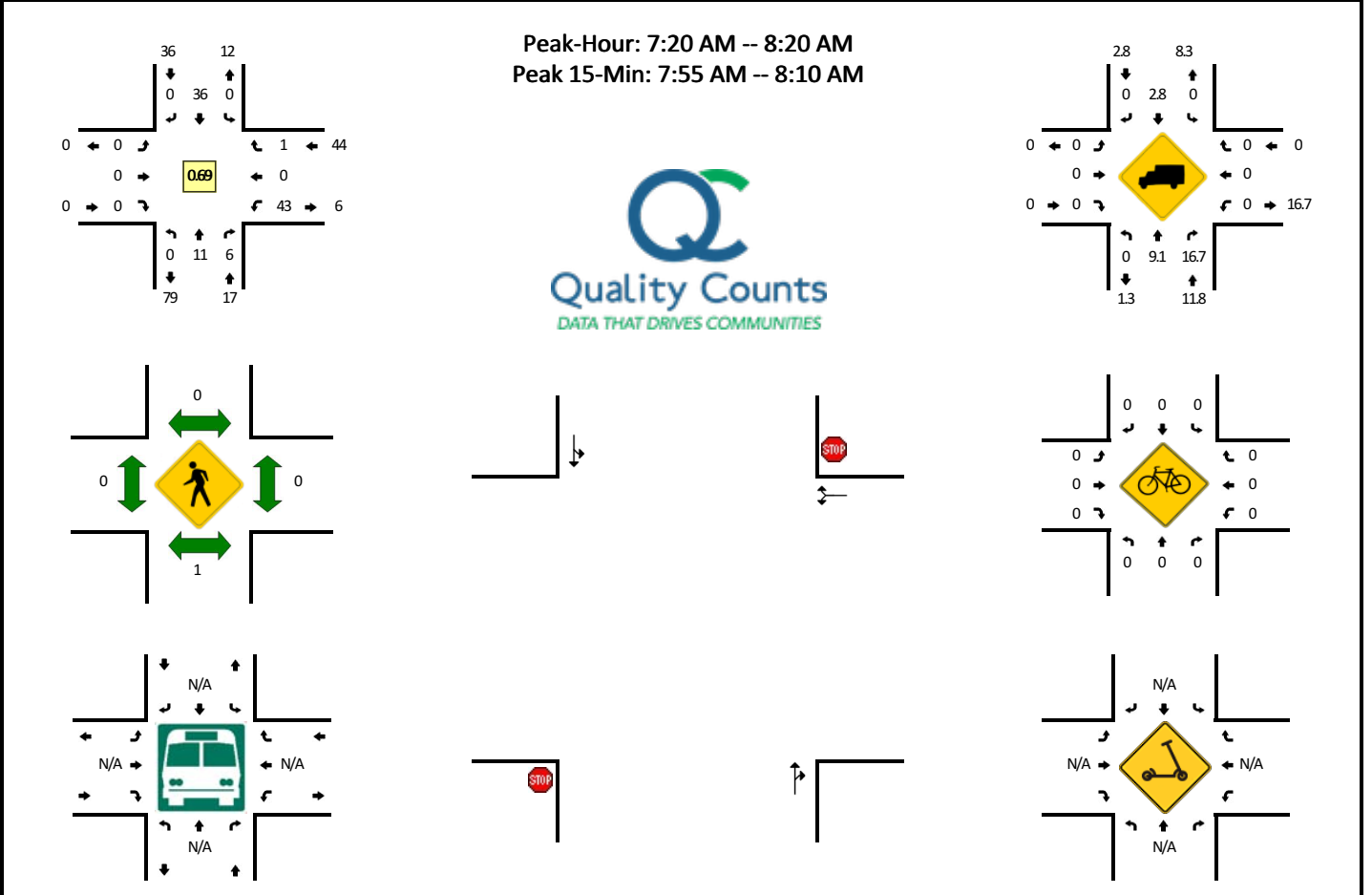
Traffic Counts

In-Process Data



LOCATION: Aspen Ave -- E 18th St
CITY/STATE: La Center, WA

QC JOB #: 16153701
DATE: Tue, Apr 11 2023

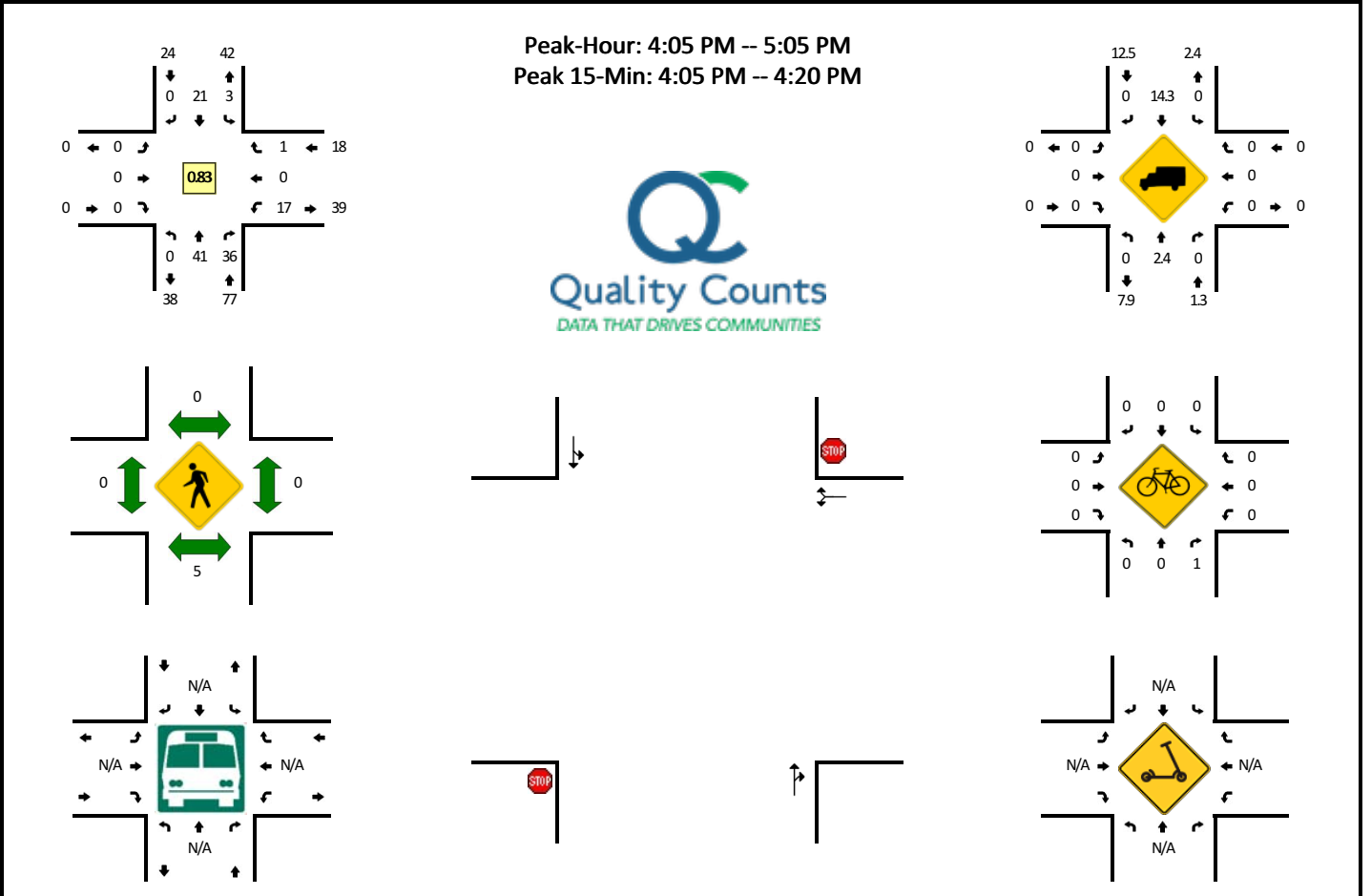


5-Min Count Period Beginning At	Aspen Ave (Northbound)				Aspen Ave (Southbound)				E 18th St (Eastbound)				E 18th St (Westbound)				Total	Hourly Totals	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
7:00 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	4	0	0	0	7	
7:05 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
7:10 AM	0	1	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	5	
7:15 AM	0	0	0	0	0	6	0	0	0	0	0	0	0	1	0	0	0	7	
7:20 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	0	6	
7:25 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	5	0	0	0	8	
7:30 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	3	0	0	0	5	
7:35 AM	0	0	1	0	0	4	0	0	0	0	0	0	0	3	0	1	0	9	
7:40 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	
7:45 AM	0	0	2	0	0	6	0	0	0	0	0	0	0	1	0	0	0	9	
7:50 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	0	0	4	
7:55 AM	0	0	1	0	0	6	0	0	0	0	0	0	0	6	0	0	0	13	76
8:00 AM	0	1	1	0	0	2	0	0	0	0	0	0	0	7	0	0	0	11	80
8:05 AM	0	2	1	0	0	4	0	0	0	0	0	0	0	4	0	0	0	11	90
8:10 AM	0	3	0	0	0	1	0	0	0	0	0	0	0	4	0	0	0	8	93
8:15 AM	0	5	0	0	0	2	0	0	0	0	0	0	0	4	0	0	0	11	97
8:20 AM	0	2	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4	95
8:25 AM	0	2	1	0	0	1	0	0	0	0	0	0	0	3	0	0	0	7	94
8:30 AM	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	4	93
8:35 AM	0	2	1	0	0	4	0	0	0	0	0	0	0	1	0	0	0	8	92
8:40 AM	0	0	2	0	0	3	0	0	0	0	0	0	0	2	0	0	0	7	97
8:45 AM	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	3	91
8:50 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3	90
8:55 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	3	80
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total		
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
All Vehicles	0	12	12	0	0	48	0	0	0	0	0	0	0	68	0	0	0	140	
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Buses																			
Pedestrians		4				0					0				0			4	
Bicycles	0	0	0		0	0	0			0	0	0		0	0	0		0	
Scoters																			

Comments:

LOCATION: Aspen Ave -- E 18th St
CITY/STATE: La Center, WA

QC JOB #: 16153702
DATE: Tue, Apr 11 2023

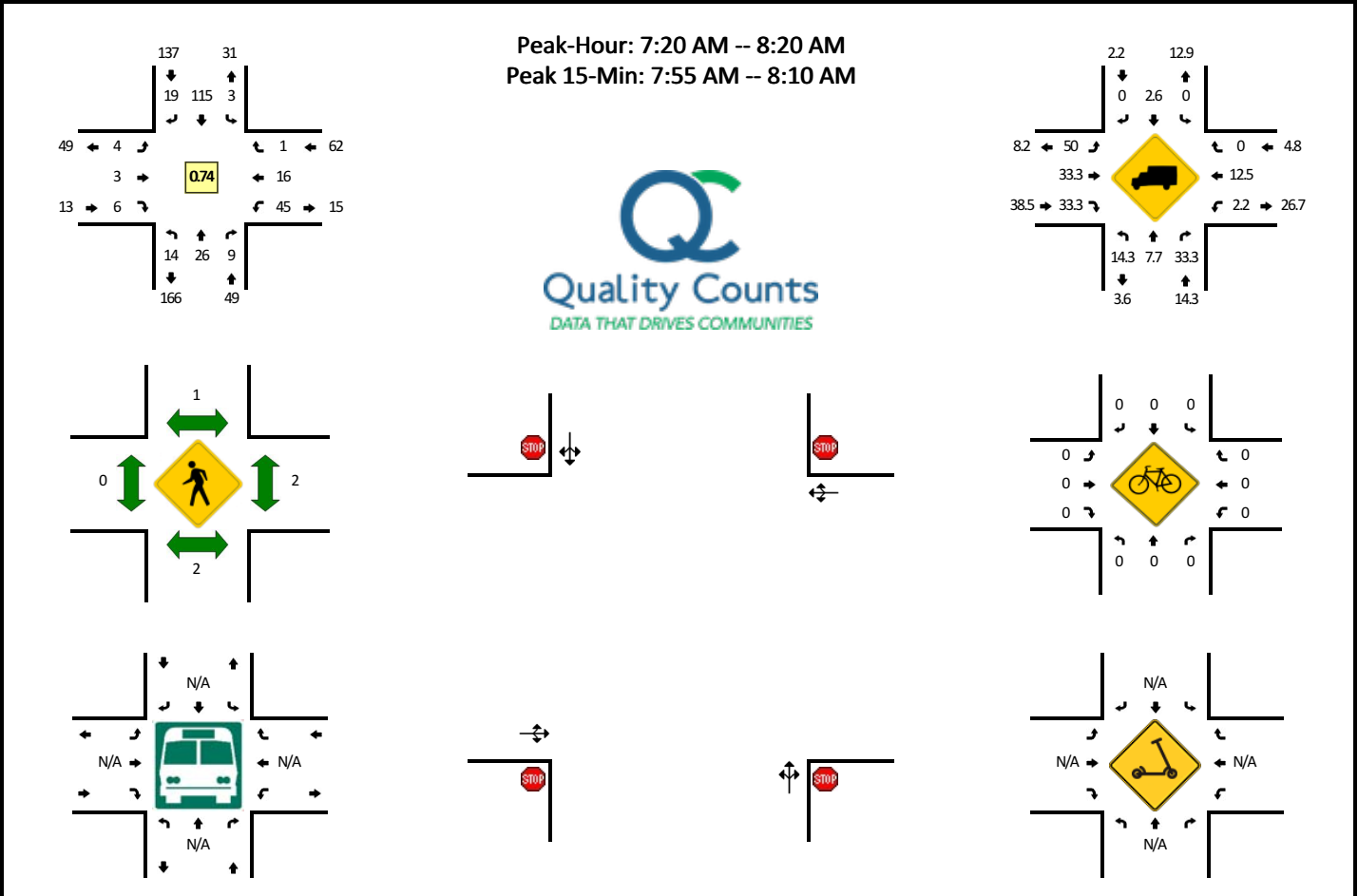


5-Min Count Period Beginning At	Aspen Ave (Northbound)				Aspen Ave (Southbound)				E 18th St (Eastbound)				E 18th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	5	
4:05 PM	0	3	4	0	0	2	0	0	0	0	0	0	1	0	0	0	10	
4:10 PM	0	4	3	0	0	2	0	0	0	0	0	0	2	0	0	0	11	
4:15 PM	0	10	1	0	1	2	0	0	0	0	0	0	1	0	0	0	15	
4:20 PM	0	2	2	0	0	3	0	0	0	0	0	0	2	0	0	0	9	
4:25 PM	0	1	0	0	0	1	0	0	0	0	0	0	2	0	0	0	4	
4:30 PM	0	4	6	0	2	1	0	0	0	0	0	0	0	0	0	0	13	
4:35 PM	0	3	5	0	0	2	0	0	0	0	0	0	1	0	0	0	11	
4:40 PM	0	5	3	0	0	1	0	0	0	0	0	0	1	0	0	0	10	
4:45 PM	0	1	1	0	0	2	0	0	0	0	0	0	1	0	1	0	6	
4:50 PM	0	1	6	0	0	3	0	0	0	0	0	0	2	0	0	0	12	
4:55 PM	0	3	3	0	0	1	0	0	0	0	0	0	0	0	0	0	7	113
5:00 PM	0	4	2	0	0	1	0	0	0	0	0	0	4	0	0	0	11	119
5:05 PM	0	1	5	0	0	0	0	0	0	0	0	0	1	0	0	0	7	116
5:10 PM	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	3	108
5:15 PM	0	4	6	0	0	1	0	0	0	0	0	0	0	0	0	0	11	104
5:20 PM	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	5	100
5:25 PM	0	2	3	0	0	4	0	0	0	0	0	0	0	0	0	0	9	105
5:30 PM	0	2	1	0	0	3	0	0	0	0	0	0	2	0	0	0	8	100
5:35 PM	0	4	3	0	0	1	0	0	0	0	0	0	4	0	0	0	12	101
5:40 PM	0	0	4	0	0	1	0	0	0	0	0	0	2	0	1	0	8	99
5:45 PM	0	0	2	0	0	2	0	0	0	0	0	0	3	0	0	0	7	100
5:50 PM	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4	92
5:55 PM	0	4	3	0	0	2	0	0	0	0	0	0	0	0	0	0	9	94
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	68	32	0	4	24	0	0	0	0	0	0	16	0	0	0	144	
Heavy Trucks	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
Buses																	0	
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scoters																	0	

Comments:

LOCATION: Aspen Ave -- W 10th St/E Southview Heights Dr
CITY/STATE: La Center, WA

QC JOB #: 16153703
DATE: Tue, Apr 11 2023

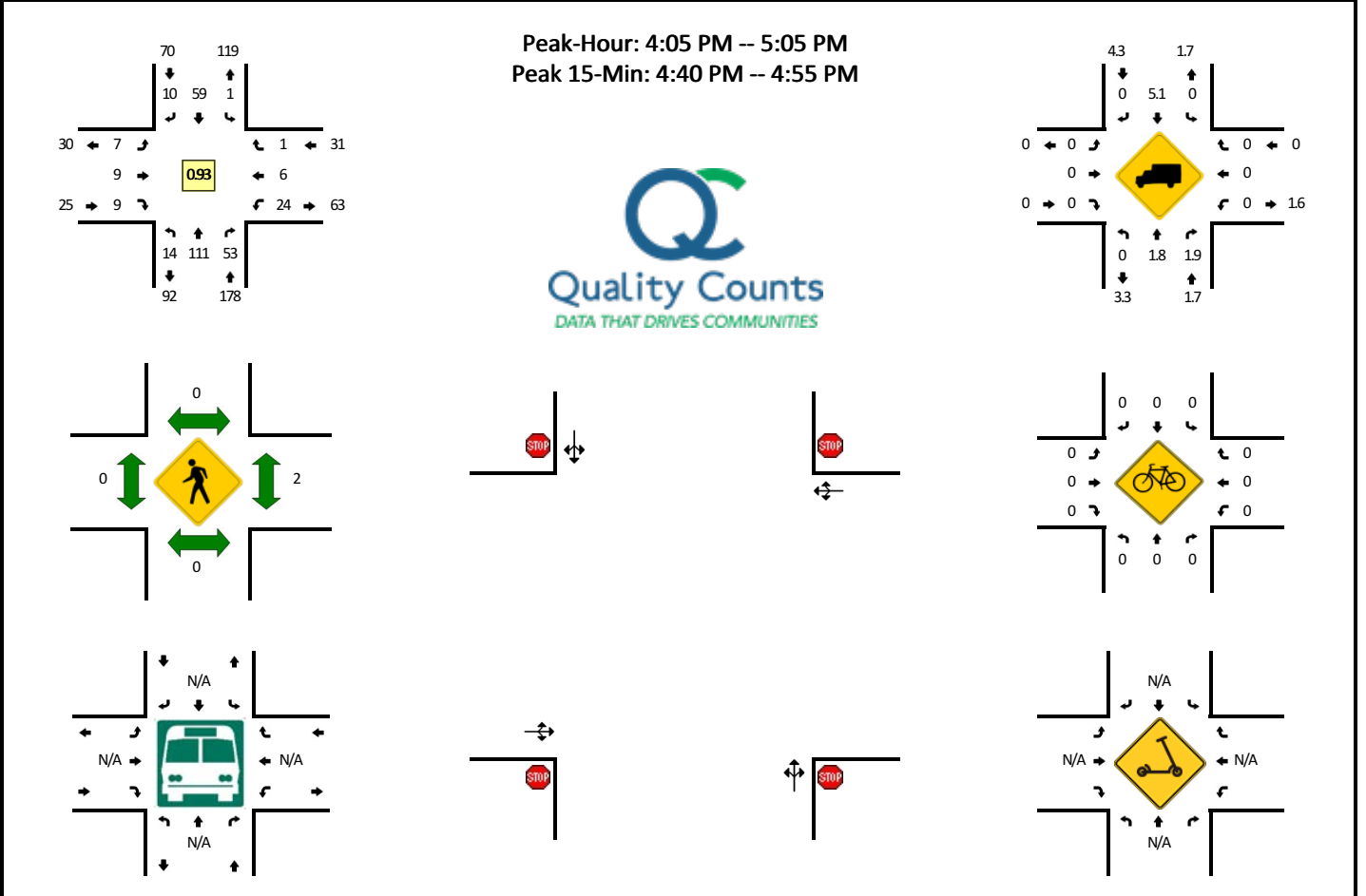


5-Min Count Period Beginning At	Aspen Ave (Northbound)				Aspen Ave (Southbound)				W 10th St/E Southview Heights Dr (Eastbound)				W 10th St/E Southview Heights Dr (Westbound)				Total	Hourly Totals	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
7:00 AM	3	1	0	0	0	8	2	0	0	0	0	0	5	1	0	0	20		
7:05 AM	1	3	1	0	0	1	0	0	0	0	1	0	0	3	1	0	0	11	
7:10 AM	1	3	1	0	0	4	0	0	0	0	1	0	0	4	0	0	0	14	
7:15 AM	0	0	0	0	0	8	0	0	0	0	0	0	0	5	2	0	0	15	
7:20 AM	1	0	0	0	0	13	0	0	0	0	0	0	0	6	0	0	0	20	
7:25 AM	0	1	1	0	0	6	3	0	0	0	0	0	0	5	0	0	0	16	
7:30 AM	1	1	1	0	0	7	2	0	0	0	1	0	0	2	1	0	0	16	
7:35 AM	1	0	1	0	1	12	1	0	1	1	0	1	0	4	0	0	0	22	
7:40 AM	1	2	2	0	0	3	1	0	1	0	1	0	0	3	0	0	0	14	
7:45 AM	2	1	1	0	1	13	2	0	0	0	0	0	0	2	1	0	0	23	
7:50 AM	0	0	0	0	0	8	1	0	0	0	0	1	0	7	4	0	0	21	
7:55 AM	1	3	1	0	1	15	4	0	0	1	1	0	0	1	4	0	0	32	224
8:00 AM	3	7	1	0	0	13	2	0	0	0	0	1	0	2	3	0	0	32	236
8:05 AM	0	3	0	0	0	13	0	0	0	0	1	1	0	5	1	0	0	24	249
8:10 AM	3	5	1	0	0	7	2	0	0	0	0	0	0	2	0	0	0	20	255
8:15 AM	1	3	0	0	0	5	1	0	0	2	0	0	0	6	2	1	0	21	261
8:20 AM	0	8	0	0	0	2	1	0	0	0	0	1	0	4	0	0	0	16	257
8:25 AM	2	3	0	0	0	4	0	0	0	0	0	0	0	6	1	0	0	16	257
8:30 AM	2	3	0	0	0	6	0	0	0	0	1	1	0	1	0	0	0	14	255
8:35 AM	0	7	2	0	0	7	0	0	0	0	0	0	0	1	0	0	0	17	250
8:40 AM	2	3	1	0	0	6	0	0	0	0	0	0	0	1	0	0	0	13	249
8:45 AM	2	1	1	0	0	4	0	0	1	0	5	0	0	1	1	0	0	16	242
8:50 AM	5	0	0	0	0	4	1	0	0	0	0	4	0	0	0	0	0	14	235
8:55 AM	1	3	0	0	0	4	0	0	0	0	0	2	0	3	1	0	0	14	217
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total		
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
All Vehicles	16	52	8	0	4	164	24	0	0	8	12	0	32	32	0	0	352		
Heavy Trucks	4	0	0		0	4	0		0	4	4		4	4	0		24		
Buses																			
Pedestrians		4				0				0				0			4		
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0		
Scoters																			

Comments:

LOCATION: Aspen Ave -- W 10th St/E Southview Heights Dr
CITY/STATE: La Center, WA

QC JOB #: 16153704
DATE: Tue, Apr 11 2023

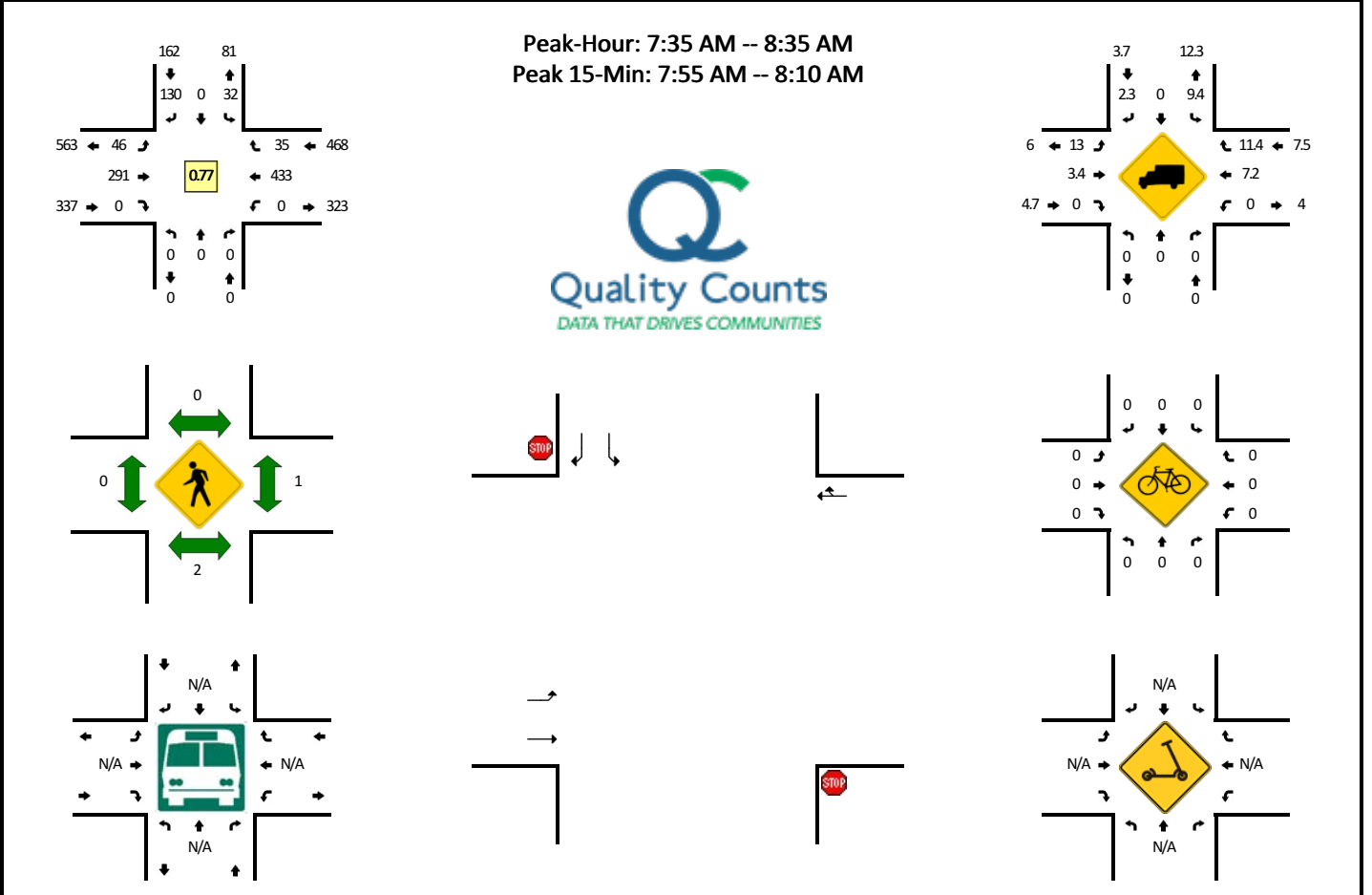


5-Min Count Period Beginning At	Aspen Ave (Northbound)				Aspen Ave (Southbound)				W 10th St/E Southview Heights Dr (Eastbound)				W 10th St/E Southview Heights Dr (Westbound)				Total	Hourly Totals	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
4:00 PM	0	11	3	0	0	1	0	0	0	0	0	0	2	2	0	0	19		
4:05 PM	1	12	3	0	0	7	0	0	0	0	2	0	0	4	0	0	0	29	
4:10 PM	1	14	3	0	0	6	1	0	0	2	1	0	0	2	1	0	0	31	
4:15 PM	1	6	2	0	1	6	1	0	0	0	0	1	0	3	0	0	0	21	
4:20 PM	1	5	5	0	0	7	1	0	0	0	0	0	0	1	1	0	0	21	
4:25 PM	2	8	8	0	0	4	0	0	0	0	0	1	0	2	0	0	0	25	
4:30 PM	0	12	4	0	0	1	1	0	0	1	1	2	0	1	0	0	0	23	
4:35 PM	0	11	5	0	0	6	2	0	0	1	1	1	0	1	1	0	0	29	
4:40 PM	1	6	5	0	0	5	1	0	0	0	1	1	0	2	0	0	0	22	
4:45 PM	3	6	3	0	0	5	1	0	0	2	2	0	0	1	2	0	0	25	
4:50 PM	1	12	8	0	0	6	1	0	0	0	1	1	0	3	1	1	0	35	
4:55 PM	2	8	4	0	0	1	0	0	0	0	0	1	0	4	0	0	0	20	300
5:00 PM	1	11	3	0	0	5	1	0	0	1	0	1	0	0	0	0	0	23	304
5:05 PM	2	4	5	0	0	4	0	0	0	1	1	0	0	1	1	0	0	19	294
5:10 PM	2	6	4	0	0	3	0	0	0	2	0	2	0	3	1	0	0	23	286
5:15 PM	2	10	1	0	0	1	0	0	0	1	0	1	0	1	0	1	0	18	283
5:20 PM	2	6	5	0	0	1	1	0	0	0	2	1	0	0	3	1	0	22	284
5:25 PM	1	8	4	0	0	6	1	0	0	0	0	0	0	3	2	0	0	25	284
5:30 PM	3	5	5	0	0	5	3	0	0	1	2	0	0	3	0	0	0	27	288
5:35 PM	3	10	4	0	0	5	2	0	0	1	1	1	0	2	1	0	0	30	289
5:40 PM	0	6	5	0	0	4	0	0	0	2	1	1	0	1	0	0	0	20	287
5:45 PM	0	4	4	0	1	2	2	0	0	0	1	2	0	2	1	1	0	20	282
5:50 PM	3	7	2	0	1	3	0	0	0	0	1	1	0	0	0	0	0	18	265
5:55 PM	0	9	5	0	0	3	0	0	0	1	1	0	0	3	0	0	0	22	267
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total		
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
All Vehicles	20	96	64	0	0	64	12	0	8	16	8	0	24	12	4	0	328		
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Buses																			
Pedestrians		0				0				0				0			0		
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0		
Scoters																			

Comments:

LOCATION: Aspen Ave -- W/E 4th St
CITY/STATE: La Center, WA

QC JOB #: 16153705
DATE: Tue, Apr 11 2023

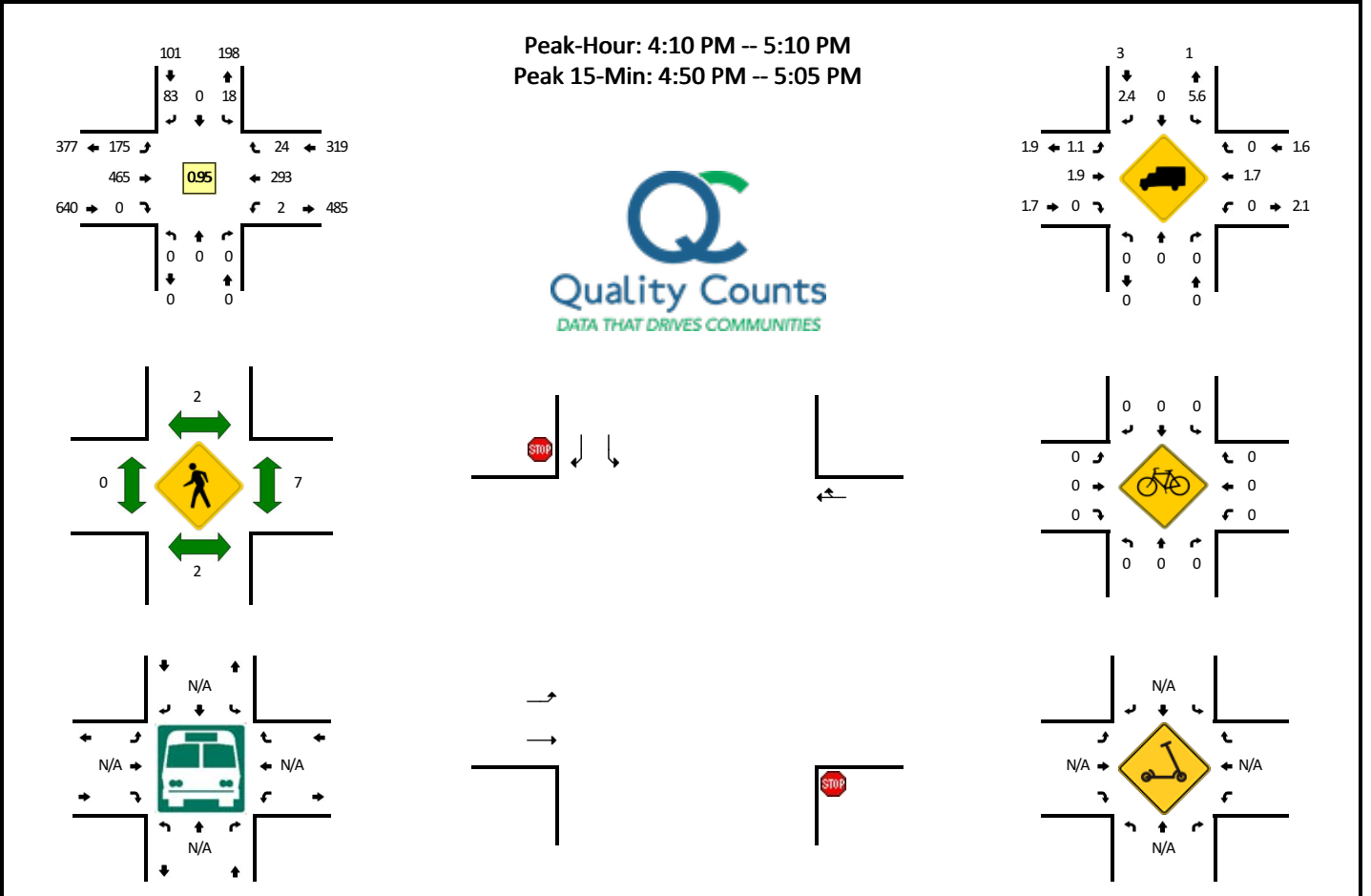


5-Min Count Period Beginning At	Aspen Ave (Northbound)				Aspen Ave (Southbound)				W/E 4th St (Eastbound)				W/E 4th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	1	0	9	0	2	11	0	0	0	21	1	0	45	
7:05 AM	0	0	0	0	0	0	11	0	2	9	0	0	0	28	1	0	51	
7:10 AM	0	0	0	0	0	0	5	0	5	10	0	0	0	20	0	0	40	
7:15 AM	0	0	0	0	3	0	10	0	1	12	0	0	0	24	0	0	50	
7:20 AM	0	0	0	0	0	0	18	0	1	12	0	0	0	27	2	0	60	
7:25 AM	0	0	0	0	1	0	14	0	2	18	0	0	0	18	0	0	53	
7:30 AM	0	0	0	0	1	0	8	0	2	11	0	0	0	28	1	0	51	
7:35 AM	0	0	0	0	1	0	19	0	3	19	0	0	0	29	0	0	71	
7:40 AM	0	0	0	0	2	0	9	0	3	20	0	0	0	27	3	0	64	
7:45 AM	0	0	0	0	4	0	14	0	0	29	0	0	0	25	2	0	74	
7:50 AM	0	0	0	0	3	0	8	0	3	32	0	0	0	32	0	0	78	
7:55 AM	0	0	0	0	7	0	7	0	5	52	0	0	0	35	1	0	107	744
8:00 AM	0	0	0	0	5	0	15	0	3	40	0	0	0	37	9	0	109	808
8:05 AM	0	0	0	0	5	0	9	0	5	35	0	0	0	44	1	0	99	856
8:10 AM	0	0	0	0	1	0	13	0	3	14	0	0	0	50	8	0	89	905
8:15 AM	0	0	0	0	2	0	9	0	3	12	0	0	0	65	3	0	94	949
8:20 AM	0	0	0	0	1	0	9	0	10	9	0	0	0	45	2	0	76	965
8:25 AM	0	0	0	0	1	0	8	0	3	16	0	0	0	21	4	0	53	965
8:30 AM	0	0	0	0	0	0	10	0	5	13	0	0	0	23	2	0	53	967
8:35 AM	0	0	0	0	2	0	8	0	10	16	0	0	0	23	0	0	59	955
8:40 AM	0	0	0	0	1	0	6	0	8	15	0	0	0	28	0	0	58	949
8:45 AM	0	0	0	0	0	0	3	0	4	6	0	0	0	19	0	0	32	907
8:50 AM	0	0	0	0	0	0	12	0	5	14	0	0	0	23	0	0	54	883
8:55 AM	0	0	0	0	1	0	8	0	6	13	0	0	0	23	1	0	52	828
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	0	0	0	68	0	124	0	52	508	0	0	0	464	44	0	1260	
Heavy Trucks	0	0	0	0	4	0	0	0	8	4	0	0	0	12	4	0	32	
Buses																		
Pedestrians		4				0				0				4			8	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scoters																		

Comments:

LOCATION: Aspen Ave -- W/E 4th St
CITY/STATE: La Center, WA

QC JOB #: 16153706
DATE: Tue, Apr 11 2023

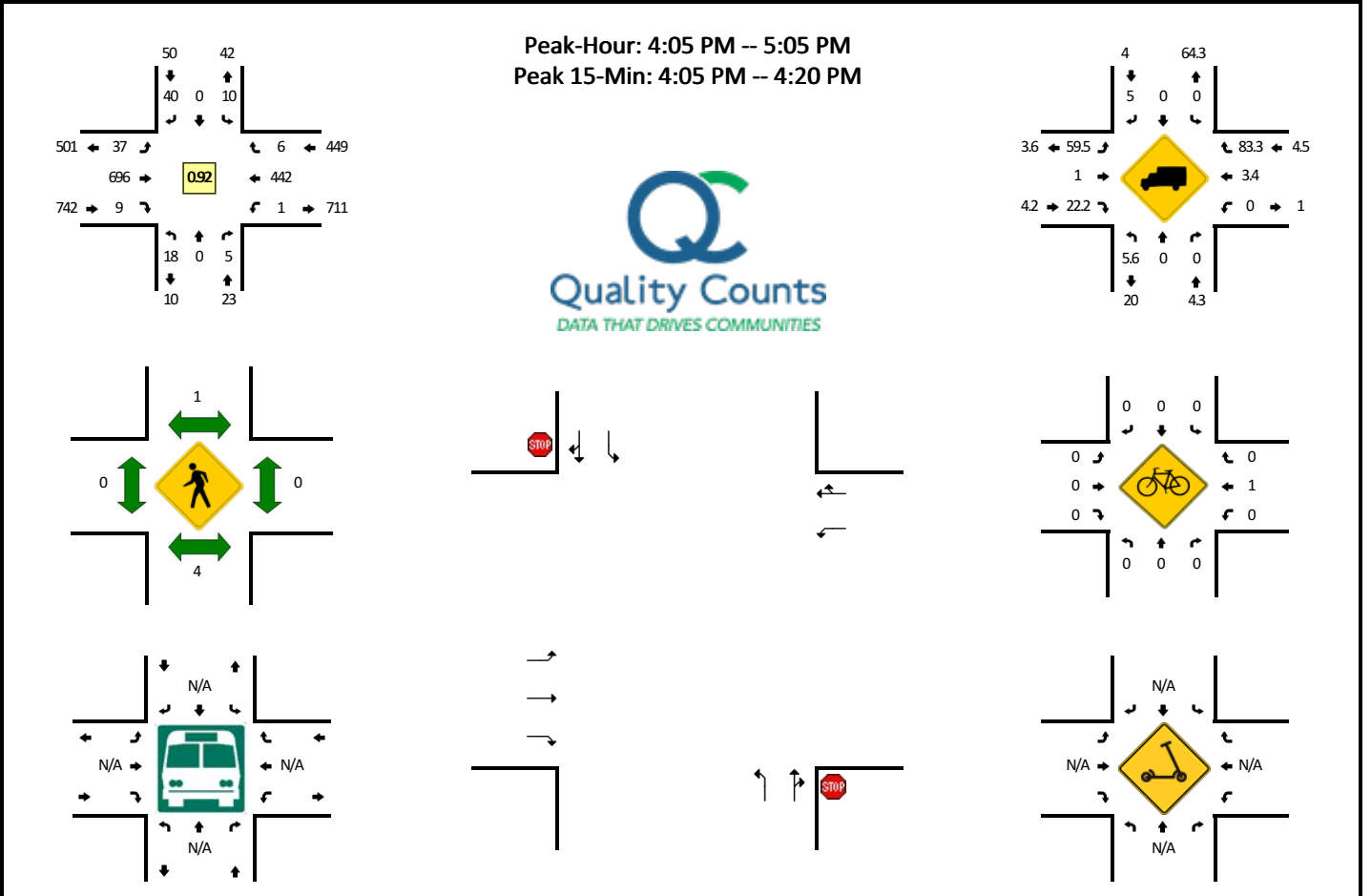


5-Min Count Period Beginning At	Aspen Ave (Northbound)				Aspen Ave (Southbound)				W/E 4th St (Eastbound)				W/E 4th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	3	0	12	29	0	0	0	28	2	0	74	
4:05 PM	0	0	0	0	4	0	8	0	12	30	0	0	0	27	2	0	83	
4:10 PM	0	0	0	0	0	0	9	0	20	29	0	0	0	25	6	0	89	
4:15 PM	0	0	0	0	2	0	5	0	8	33	0	0	0	30	2	1	81	
4:20 PM	0	0	0	0	1	0	11	0	10	33	0	0	0	22	1	1	79	
4:25 PM	0	0	0	0	2	0	9	0	12	42	0	0	0	21	3	0	89	
4:30 PM	0	0	0	0	1	0	3	0	17	37	0	0	0	22	2	0	82	
4:35 PM	0	0	0	0	2	0	7	0	20	49	0	0	0	29	0	0	107	
4:40 PM	0	0	0	0	4	0	5	0	11	40	0	0	0	24	1	0	85	
4:45 PM	0	0	0	0	0	0	5	0	11	32	0	0	0	26	2	0	76	
4:50 PM	0	0	0	0	1	0	10	0	21	50	0	0	0	19	1	0	102	
4:55 PM	0	0	0	0	3	0	2	0	19	38	0	1	0	20	1	0	84	1031
5:00 PM	0	0	0	0	1	0	8	0	14	39	0	0	0	29	2	0	93	1050
5:05 PM	0	0	0	0	1	0	9	0	11	43	0	0	0	26	3	0	93	1060
5:10 PM	0	0	0	0	1	0	6	0	13	49	0	0	0	19	1	0	89	1060
5:15 PM	0	0	0	0	0	0	2	0	16	35	0	0	0	20	1	0	74	1053
5:20 PM	0	0	0	0	0	0	2	0	11	45	0	0	0	22	4	0	84	1058
5:25 PM	0	0	0	0	0	0	5	0	13	47	0	0	0	21	1	0	87	1056
5:30 PM	0	0	0	0	1	0	7	0	13	42	0	0	0	21	0	0	84	1058
5:35 PM	0	0	0	0	0	0	8	0	15	32	0	0	0	19	1	0	75	1026
5:40 PM	0	0	0	0	0	0	8	0	11	39	0	0	0	21	2	0	81	1022
5:45 PM	0	0	0	0	1	0	2	0	14	46	0	0	0	11	1	0	75	1021
5:50 PM	0	0	0	0	1	0	7	0	12	38	0	0	0	17	1	0	76	995
5:55 PM	0	0	0	0	1	0	2	0	14	37	0	0	0	16	2	0	72	983
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	0	0	0	20	0	80	0	216	508	0	4	0	272	16	0	1116	
Heavy Trucks	0	0	0	0	0	0	4	0	4	4	0	0	0	0	0	0	12	
Buses																		
Pedestrians		0				0				0				24			24	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scoters																		

Comments:

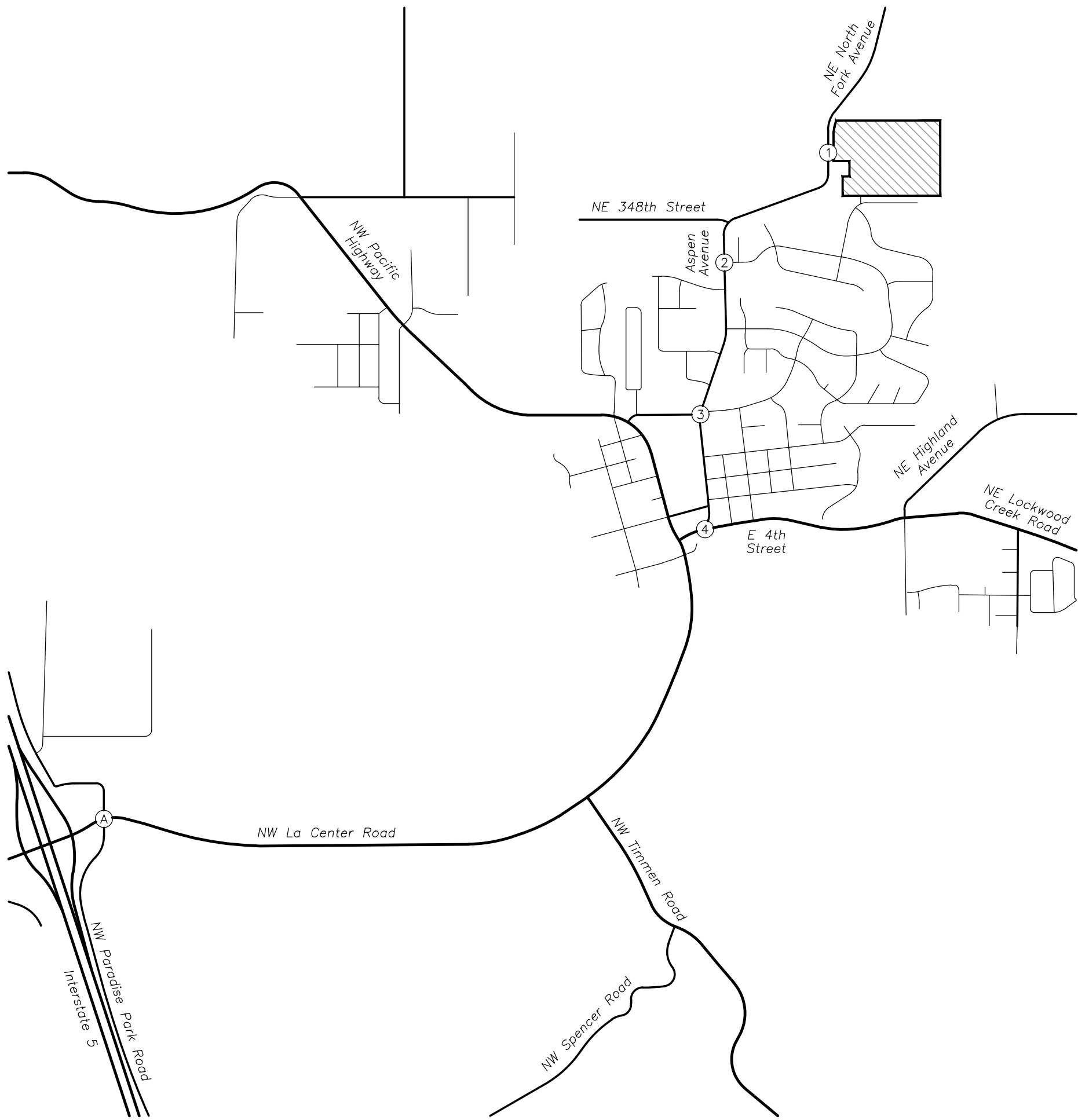
LOCATION: NW Paradise Park Rd -- NW LaCenter Rd
CITY/STATE: La Center, WA

QC JOB #: 16153707
DATE: Tue, Apr 11 2023

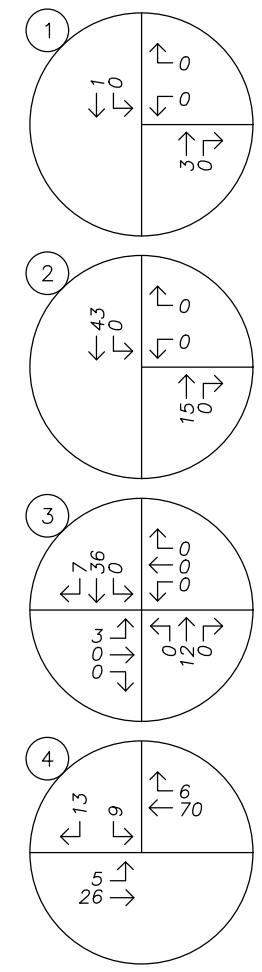


5-Min Count Period Beginning At	NW Paradise Park Rd (Northbound)				NW Paradise Park Rd (Southbound)				NW LaCenter Rd (Eastbound)				NW LaCenter Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	1	0	0	0	4	0	1	0	6	42	0	0	0	33	2	0	89	
4:05 PM	3	0	1	0	2	0	5	0	3	61	2	0	0	39	1	0	117	
4:10 PM	2	0	0	0	0	0	4	0	6	59	1	0	0	45	1	0	118	
4:15 PM	2	0	0	0	0	0	7	0	3	53	0	0	0	44	0	0	109	
4:20 PM	0	0	1	0	0	0	3	0	1	60	0	0	0	46	1	0	112	
4:25 PM	1	0	0	0	2	0	5	0	7	50	0	0	0	39	1	0	105	
4:30 PM	0	0	1	0	0	0	4	0	6	61	1	0	1	26	0	0	100	
4:35 PM	0	0	0	0	1	0	0	0	2	58	0	0	0	39	1	0	101	
4:40 PM	1	0	0	0	3	0	2	0	3	47	2	1	0	42	1	0	102	
4:45 PM	4	0	0	0	0	0	4	0	4	76	0	0	0	27	0	0	115	
4:50 PM	4	0	1	0	1	0	3	0	1	66	2	0	0	29	0	0	107	
4:55 PM	0	0	1	0	1	0	1	0	0	45	0	0	0	31	0	0	79	1254
5:00 PM	1	0	0	0	0	0	2	0	0	60	1	0	0	35	0	0	99	1264
5:05 PM	1	0	0	0	0	0	1	0	2	59	1	0	0	39	0	0	103	1250
5:10 PM	0	0	0	0	1	1	1	0	6	61	1	0	0	31	1	0	103	1235
5:15 PM	2	0	1	0	1	0	2	0	1	67	0	0	0	25	1	0	100	1226
5:20 PM	1	0	0	0	0	0	1	0	0	62	0	1	1	32	0	0	98	1212
5:25 PM	0	0	0	0	0	0	3	0	3	59	2	0	0	33	0	0	100	1207
5:30 PM	3	0	0	0	0	0	2	0	1	58	0	1	0	28	0	0	93	1200
5:35 PM	1	0	0	0	0	0	0	0	2	53	0	0	0	35	0	0	91	1190
5:40 PM	0	0	0	0	1	0	4	0	1	52	1	0	0	29	0	0	88	1176
5:45 PM	0	0	0	0	2	0	2	0	2	54	1	1	1	29	0	0	92	1153
5:50 PM	1	0	0	0	1	0	1	0	2	59	0	0	0	20	0	0	84	1130
5:55 PM	1	0	0	0	0	0	0	0	1	49	3	0	0	21	0	0	75	1126
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	28	0	4	0	8	0	64	0	48	692	12	0	0	512	8	0	1376	
Heavy Trucks	4	0	0	0	0	0	0	0	24	4	4	0	0	36	8	0	80	
Buses																		
Pedestrians		4				0				0				0			4	
Bicycles	0	0	0		0	0	0		0	0	0		0	4	0		4	
Scoters																		

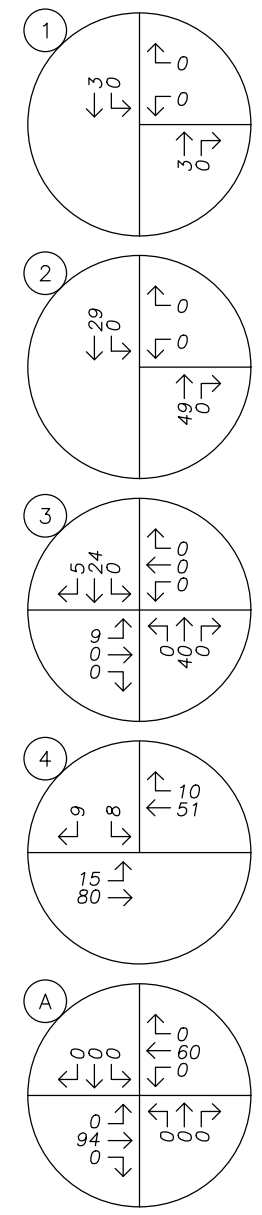
Comments:



AM PEAK HOUR



PM PEAK HOUR



No Scale



TRAFFIC VOLUMES
In-Process Development Trips
AM & PM Peak Hours

Appendix D – Safety Analysis

Crash History Data

Left-turn Lane Warrant Analysis

Traffic Signal Warrant Analysis



OFFICER REPORTED CRASHES THAT OCCURRED at OR in the vicinity of MULTIPLE INTERSECTIONS IN THE CITY OF LA CENTER

CITY STREETS

4th St @ Aspen Ave - No Reported Crashes

10th St / Southview Heights Dr @ Aspen Ave

18th Ave @ Aspen Ave / North Fork Ave - No Reported Crashes

Crashes Unrelated to Study Intersection

01/01/2017 - 12/31/2021 See 2nd tab below for road info

Under 23 U.S. Code § 148 and 23 U.S. Code § 407, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

JURISDICTION	COUNTY	CITY	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	MILEPOST	A / B	SR ONLY HISTORY/ SUSPENSE	REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FATAL	# VEH	# PEDES	# BIKES	VEHICLE 1 TYPE	VEHICLE 2 TYPE	JUNCTION RELATIONSHIP	WEATHER	ROADWAY SURFACE CONDITION
City Street	Clark	La Center	E SOUTHVIEW HEIGHTS DR	0	ASPEN AVE							No	E809821	06/18/2018	23:15	No Apparent Injury	0	0	2	0	0	Pickup, Panel Truck or Vanette under 10,000 lb	Passenger Car	At Intersection and Related	Clear or Partly Cloudy	Dry

OFFICER REPORTED CRASHES THAT OCCURRED at OR in the vicinity of MULTIPLE INTERSECTIONS IN THE CITY OF LA CENTER

CITY STREETS

4th St @ Aspen Ave - No Reported Crashes

10th St / Southview Heights Dr @ Aspen Ave

18th Ave @ Aspen Ave / North Fork Ave - No Reported Crashes

Crashes Unrelated to Study Intersection

01/01/2017 - 12/31/2021 See 2nd tab below for road info

Under 23 U.S. Code § 148 and 23 U.S. Code § 407, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

LIGHTING CONDITION	FIRST COLLISION TYPE / OBJECT STRUCK	VEHICLE 1 ACTION	VEHICLE 2 ACTION	VEHICLE 1 COMPASS DIRECTION FROM	VEHICLE 1 COMPASS DIRECTION TO	VEHICLE 2 COMPASS DIRECTION FROM	VEHICLE 2 COMPASS DIRECTION TO	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 2 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 3 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 2)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 2 (UNIT 2)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 3 (UNIT 2)	FIRST IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)	WA STATE PLANE SOUTH - X 2010 - FORWARD	WA STATE PLANE SOUTH - Y 2010 - FORWARD
Dark-Street Lights On	Entering at angle	Going Straight Ahead	Going Straight Ahead	West	East	South	North	None			Inattention			Lane of Primary Trafficway	1087245.89	201910.65

Left-Turn Lane Warrant Analysis



Project: Vineyard Vista Subdivision
 Intersection: 1. Site Access at NE North Fork Avenue
 Date: 11/6/2023
 Scenario: 2026 Buildout Conditions - AM Peak Hour (SB)

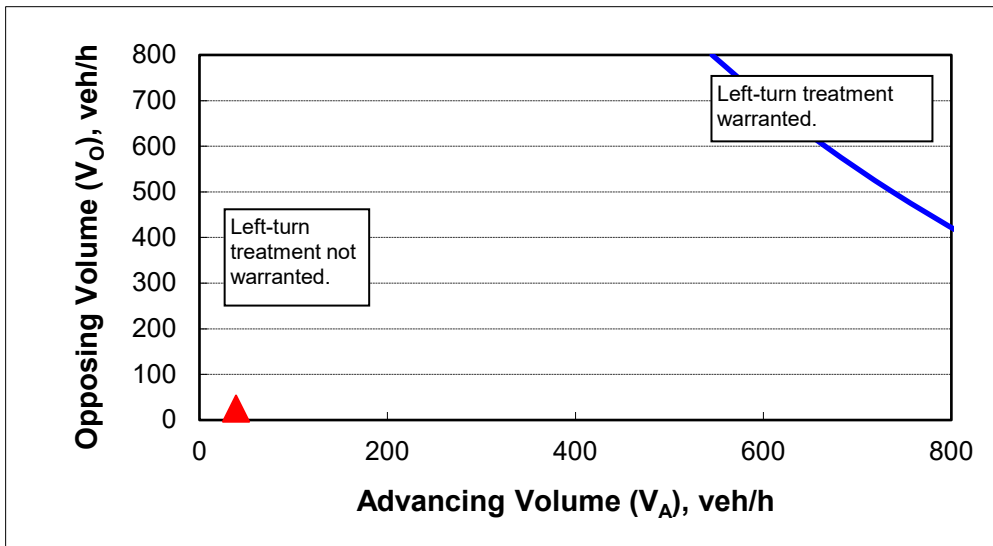
2-lane roadway (English)

INPUT

Variable	Value
85 th percentile speed, mph:	25
Percent of left-turns in advancing volume (V_A), %:	3%
Advancing volume (V_A), veh/h:	39
Opposing volume (V_O), veh/h:	25

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	1252
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis



Project: Vineyard Vista Subdivision
 Intersection: 1. Site Access at NE North Fork Avenue
 Date: 11/6/2023
 Scenario: 2026 Buildout Conditions - PM Peak Hour (SB)

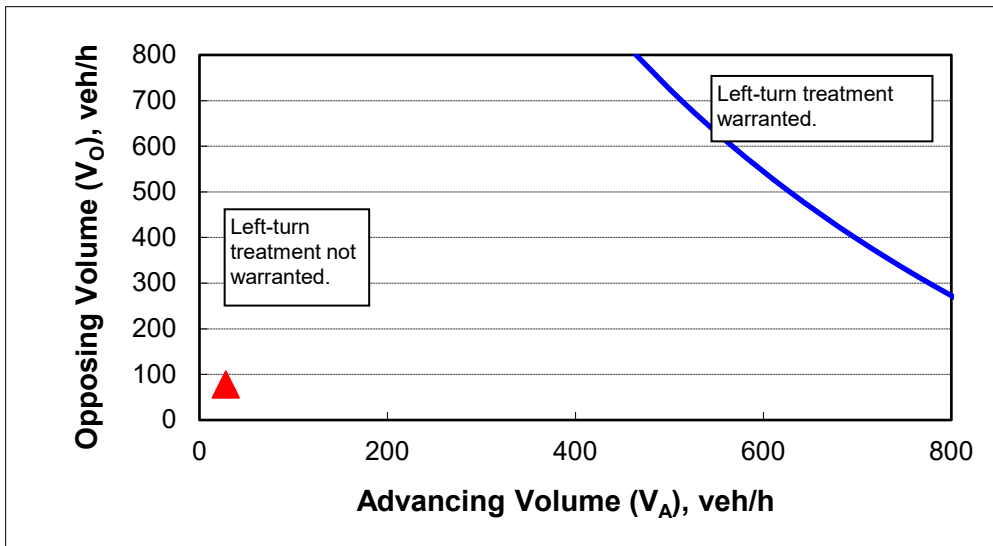
2-lane roadway (English)

INPUT

Variable	Value
85 th percentile speed, mph:	25
Percent of left-turns in advancing volume (V_A), %:	4%
Advancing volume (V_A), veh/h:	28
Opposing volume (V_O), veh/h:	78

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	1000
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis



Project: Vineyard Vista Subdivision
 Intersection: 2. E 18th Street at Aspen Avenue
 Date: 11/6/2023
 Scenario: 2026 Buildout Conditions - AM Peak Hour (SB)

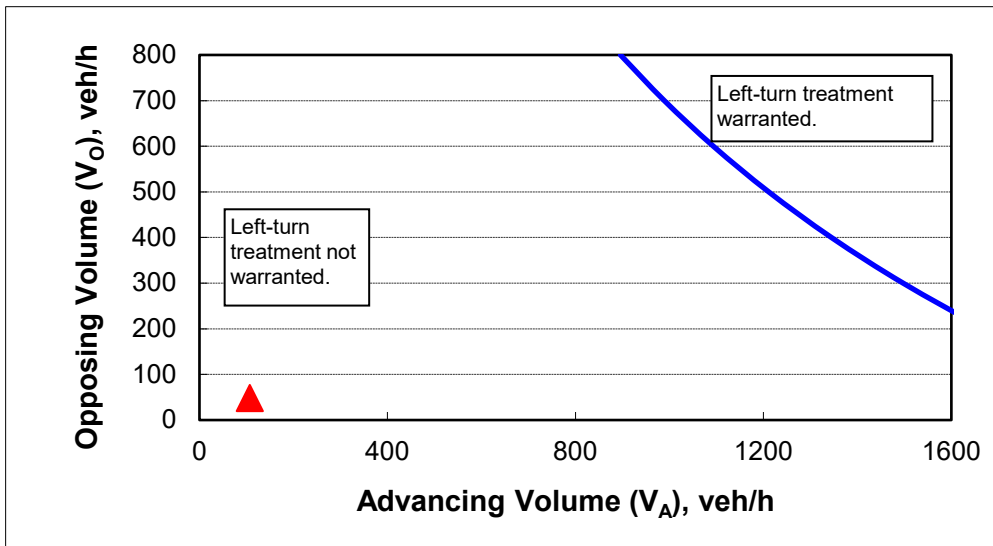
2-lane roadway (English)

INPUT

Variable	Value
85 th percentile speed, mph:	25
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	107
Opposing volume (V_O), veh/h:	48

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	2000
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis



Project: Vineyard Vista Subdivision
 Intersection: 2. E 18th Street at Aspen Avenue
 Date: 11/6/2023
 Scenario: 2026 Buildout Conditions - PM Peak Hour (SB)

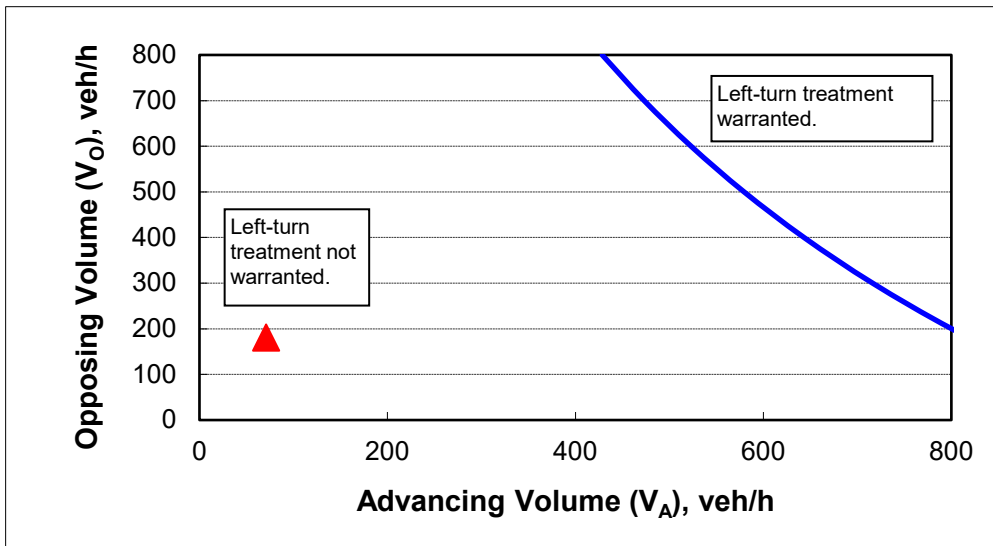
2-lane roadway (English)

INPUT

Variable	Value
85 th percentile speed, mph:	25
Percent of left-turns in advancing volume (V_A), %:	4%
Advancing volume (V_A), veh/h:	71
Opposing volume (V_O), veh/h:	181

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	818
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Traffic Signal Warrant Analysis



Project: Valley View Subdivision
 Date: 11/6/2023
 Scenario: 2026 Buildout Conditions

Major Street:	NE North Fork Avenue	Minor Street:	Site Access
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	106	PM Peak Hour Volumes:	17

Warrant Used:

<input type="checkbox"/>	100 percent of standard warrants used
<input checked="" type="checkbox"/>	70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
Major St.	Minor St.	100% Warrants	70% Warrants	100% Warrants	70% Warrants
WARRANT 1, CONDITION A					
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
<i>Condition A: Minimum Vehicular Volume</i>			
Major Street	1,060	6,200	
Minor Street*	170	1,850	No
<i>Condition B: Interruption of Continuous Traffic</i>			
Major Street	1,060	9,300	
Minor Street*	170	950	No
<i>Combination Warrant</i>			
Major Street	1,060	7,440	
Minor Street*	170	1,480	No

Note: Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis



Project: Valley View Subdivision
 Date: 11/6/2023
 Scenario: 2026 Buildout Conditions

Major Street:	Aspen Avenue	Minor Street:	E 18th Street
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	252	PM Peak Hour Volumes:	31

Warrant Used:

_____ 100 percent of standard warrants used
 X 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
<u>Major St.</u>	<u>Minor St.</u>	<u>Warrants</u>	<u>Warrants</u>	<u>Warrants</u>	<u>Warrants</u>
WARRANT 1, CONDITION A					
		100%	70%	100%	70%
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
<i>Condition A: Minimum Vehicular Volume</i>			
Major Street	2,520	6,200	
Minor Street*	310	1,850	No
<i>Condition B: Interruption of Continuous Traffic</i>			
Major Street	2,520	9,300	
Minor Street*	310	950	No
<i>Combination Warrant</i>			
Major Street	2,520	7,440	
Minor Street*	310	1,480	No

Note: Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis



Project: Valley View Subdivision
 Date: 11/6/2023
 Scenario: 2026 Buildout Conditions

Major Street:	Aspen Avenue	Minor Street:	W 10th Street
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	407	PM Peak Hour Volumes:	39

Warrant Used:

_____ 100 percent of standard warrants used
 X 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
<u>Major St.</u>	<u>Minor St.</u>	<u>Warrants</u>	<u>Warrants</u>	<u>Warrants</u>	<u>Warrants</u>
<u>WARRANT 1, CONDITION A</u>					
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
<u>WARRANT 1, CONDITION B</u>					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
<i>Warrant 1</i>			
<i>Condition A: Minimum Vehicular Volume</i>			
Major Street	4,070	6,200	
Minor Street*	390	1,850	No
<i>Condition B: Interruption of Continuous Traffic</i>			
Major Street	4,070	9,300	
Minor Street*	390	950	No
<i>Combination Warrant</i>			
Major Street	4,070	7,440	
Minor Street*	390	1,480	No

Note: Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis



Project: Valley View Subdivision
 Date: 11/6/2023
 Scenario: 2026 Buildout Conditions

Major Street:	W/E 4th Street	Minor Street:	Aspen Avenue
Number of Lanes:	2	Number of Lanes:	2
PM Peak Hour Volumes:	1216	PM Peak Hour Volumes:	121

Warrant Used:

_____ 100 percent of standard warrants used
 X 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
<u>Major St.</u>	<u>Minor St.</u>	<u>Warrants</u>	<u>Warrants</u>	<u>Warrants</u>	<u>Warrants</u>
WARRANT 1, CONDITION A					
		100%	70%	100%	70%
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
<i>Condition A: Minimum Vehicular Volume</i>			
Major Street	12,160	7,400	
Minor Street*	1,210	2,500	No
<i>Condition B: Interruption of Continuous Traffic</i>			
Major Street	12,160	11,100	
Minor Street*	1,210	1,250	No
<i>Combination Warrant</i>			
Major Street	12,160	8,880	
Minor Street*	1,210	2,000	No

Note: Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis



Project: Valley View Subdivision
 Date: 11/6/2023
 Scenario: 2026 Buildout Conditions

Major Street:	NW La Center Road	Minor Street:	NW Paradise Park Road
Number of Lanes:	2	Number of Lanes:	2
PM Peak Hour Volumes:	1473	PM Peak Hour Volumes:	43

Warrant Used:

_____ 100 percent of standard warrants used
 X 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
<u>Major St.</u>	<u>Minor St.</u>	<u>Warrants</u>	<u>Warrants</u>	<u>Warrants</u>	<u>Warrants</u>
WARRANT 1, CONDITION A					
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
<i>Condition A: Minimum Vehicular Volume</i>			
Major Street	14,730	7,400	
Minor Street*	430	2,500	No
<i>Condition B: Interruption of Continuous Traffic</i>			
Major Street	14,730	11,100	
Minor Street*	430	1,250	No
<i>Combination Warrant</i>			
Major Street	14,730	8,880	
Minor Street*	430	2,000	No

Note: Minor street right-turning traffic volumes reduced by 25%.

Appendix E – Operation Analysis

Level of Service Descriptions

Capacity Reports





Level of Service Definitions

Level of service is used to describe the quality of traffic flow. Levels of service A to C are considered good, and rural roads are usually designed for level of service C. Urban streets and signalized intersections are typically designed for level of service D. Level of service E is considered to be the limit of acceptable delay. For unsignalized intersections, level of service E is generally considered acceptable. Here is a more complete description of levels of service:

- *Level of service A:* Very low delay at intersections, with all traffic signal cycles clearing and no vehicles waiting through more than one signal cycle. On highways, low volume and high speeds, with speeds not restricted by other vehicles.
- *Level of service B:* Operating speeds beginning to be affected by other traffic; short traffic delays at intersections. Higher average intersection delay than for level of service A resulting from more vehicles stopping.
- *Level of service C:* Operating speeds and maneuverability closely controlled by other traffic; higher delays at intersections than for level of service B due to a significant number of vehicles stopping. Not all signal cycles clear the waiting vehicles. This is the recommended design standard for rural highways.
- *Level of service D:* Tolerable operating speeds; long traffic delays occur at intersections. The influence of congestion is noticeable. At traffic signals many vehicles stop, and the proportion of vehicles not stopping declines. The number of signal cycle failures, for which vehicles must wait through more than one signal cycle, are noticeable. This is typically the design level for urban signalized intersections.
- *Level of service E:* Restricted speeds, very long traffic delays at traffic signals, and traffic volumes near capacity. Flow is unstable so that any interruption, no matter how minor, will cause queues to form and service to deteriorate to level of service F. Traffic signal cycle failures are frequent occurrences. For unsignalized intersections, level of service E or better is generally considered acceptable.
- *Level of service F:* Extreme delays, resulting in long queues which may interfere with other traffic movements. There may be stoppages of long duration, and speeds may drop to zero. There may be frequent signal cycle failures. Level of service F will typically result when vehicle arrival rates are greater than capacity. It is considered unacceptable by most drivers.



Level of Service Criteria
For Signalized Intersections

Level of Service (LOS)	Control Delay per Vehicle (Seconds)
A	<10
B	10-20
C	20-35
D	35-55
E	55-80
F	>80

Level of Service Criteria
For Unsignalized Intersections

Level of Service (LOS)	Control Delay per Vehicle (Seconds)
A	<10
B	10-15
C	15-25
D	25-35
E	35-50
F	>50

HCM 6th TWSC
2: Aspen Avenue & 18th Street

05/08/2023

Intersection						
Int Delay, s/veh	4.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	43	1	11	6	0	36
Future Vol, veh/h	43	1	11	6	0	36
Conflicting Peds, #/hr	1	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	0	0	12	12	3	3
Mvmt Flow	54	1	14	8	0	45

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	64	18	0	0	22
Stage 1	18	-	-	-	-
Stage 2	46	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.13
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.227
Pot Cap-1 Maneuver	947	1066	-	-	1587
Stage 1	1010	-	-	-	-
Stage 2	982	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	946	1066	-	-	1587
Mov Cap-2 Maneuver	946	-	-	-	-
Stage 1	1010	-	-	-	-
Stage 2	981	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	948	1587
HCM Lane V/C Ratio	-	-	0.058	-
HCM Control Delay (s)	-	-	9	0
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	3	6	45	16	1	14	26	9	3	115	19
Future Vol, veh/h	4	3	6	45	16	1	14	26	9	3	115	19
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles, %	39	39	39	5	5	5	14	14	14	2	2	2
Mvmt Flow	5	4	8	56	20	1	18	33	11	4	144	24
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.1	8.2	7.9	8.2
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	29%	31%	73%	2%
Vol Thru, %	53%	23%	26%	84%
Vol Right, %	18%	46%	2%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	49	13	62	137
LT Vol	14	4	45	3
Through Vol	26	3	16	115
RT Vol	9	6	1	19
Lane Flow Rate	61	16	78	171
Geometry Grp	1	1	1	1
Degree of Util (X)	0.076	0.022	0.1	0.193
Departure Headway (Hd)	4.491	4.96	4.658	4.064
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	802	725	773	868
Service Time	2.495	2.964	2.66	2.16
HCM Lane V/C Ratio	0.076	0.022	0.101	0.197
HCM Control Delay	7.9	8.1	8.2	8.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.1	0.3	0.7

HCM 6th TWSC
4: 4th Street & Aspen Avenue

05/08/2023

Intersection						
Int Delay, s/veh	3.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑	↘		↙	↘
Traffic Vol, veh/h	46	291	433	35	32	130
Future Vol, veh/h	46	291	433	35	32	130
Conflicting Peds, #/hr	0	0	0	0	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	55	-	-	-	70	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	5	5	8	8	4	4
Mvmt Flow	58	364	541	44	40	163

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	585	0	-	0	1044
Stage 1	-	-	-	-	563
Stage 2	-	-	-	-	481
Critical Hdwy	4.15	-	-	-	6.44
Critical Hdwy Stg 1	-	-	-	-	5.44
Critical Hdwy Stg 2	-	-	-	-	5.44
Follow-up Hdwy	2.245	-	-	-	3.536
Pot Cap-1 Maneuver	975	-	-	-	251
Stage 1	-	-	-	-	566
Stage 2	-	-	-	-	618
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	975	-	-	-	236
Mov Cap-2 Maneuver	-	-	-	-	236
Stage 1	-	-	-	-	533
Stage 2	-	-	-	-	618

Approach	EB	WB	SB
HCM Control Delay, s	1.2	0	16.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	975	-	-	-	236	522
HCM Lane V/C Ratio	0.059	-	-	-	0.169	0.311
HCM Control Delay (s)	8.9	-	-	-	23.3	15
HCM Lane LOS	A	-	-	-	C	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.6	1.3

HCM 6th TWSC
2: Aspen Avenue & 18th Street

05/08/2023

Intersection						
Int Delay, s/veh	1.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	17	1	41	36	3	21
Future Vol, veh/h	17	1	41	36	3	21
Conflicting Peds, #/hr	5	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	83	83	83	83	83	83
Heavy Vehicles, %	0	0	1	1	13	13
Mvmt Flow	20	1	49	43	4	25

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	109	71	0	0	92
Stage 1	71	-	-	-	-
Stage 2	38	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.23
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.317
Pot Cap-1 Maneuver	893	997	-	-	1436
Stage 1	957	-	-	-	-
Stage 2	990	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	886	997	-	-	1436
Mov Cap-2 Maneuver	886	-	-	-	-
Stage 1	957	-	-	-	-
Stage 2	982	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.1	0	0.9
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	892	1436
HCM Lane V/C Ratio	-	-	0.024	0.003
HCM Control Delay (s)	-	-	9.1	7.5
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	7	9	9	24	6	1	14	111	53	1	59	10
Future Vol, veh/h	7	9	9	24	6	1	14	111	53	1	59	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, %	0	0	0	0	0	0	2	2	2	4	4	4
Mvmt Flow	8	10	10	26	6	1	15	119	57	1	63	11
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.5	7.8	8	7.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	28%	77%	1%
Vol Thru, %	62%	36%	19%	84%
Vol Right, %	30%	36%	3%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	178	25	31	70
LT Vol	14	7	24	1
Through Vol	111	9	6	59
RT Vol	53	9	1	10
Lane Flow Rate	191	27	33	75
Geometry Grp	1	1	1	1
Degree of Util (X)	0.209	0.032	0.043	0.086
Departure Headway (Hd)	3.934	4.346	4.633	4.136
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	905	828	778	856
Service Time	1.991	2.347	2.633	2.212
HCM Lane V/C Ratio	0.211	0.033	0.042	0.088
HCM Control Delay	8	7.5	7.8	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.8	0.1	0.1	0.3

Intersection						
Int Delay, s/veh	2.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗		↘	↗
Traffic Vol, veh/h	175	465	293	24	18	83
Future Vol, veh/h	175	465	293	24	18	83
Conflicting Peds, #/hr	2	0	0	2	7	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	55	-	-	-	70	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	184	489	308	25	19	87

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	335	0	-	0	1187 323
Stage 1	-	-	-	-	323 -
Stage 2	-	-	-	-	864 -
Critical Hdwy	4.12	-	-	-	6.43 6.23
Critical Hdwy Stg 1	-	-	-	-	5.43 -
Critical Hdwy Stg 2	-	-	-	-	5.43 -
Follow-up Hdwy	2.218	-	-	-	3.527 3.327
Pot Cap-1 Maneuver	1224	-	-	-	207 716
Stage 1	-	-	-	-	732 -
Stage 2	-	-	-	-	411 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1222	-	-	-	175 715
Mov Cap-2 Maneuver	-	-	-	-	175 -
Stage 1	-	-	-	-	620 -
Stage 2	-	-	-	-	410 -

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	13.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1222	-	-	-	175	715
HCM Lane V/C Ratio	0.151	-	-	-	0.108	0.122
HCM Control Delay (s)	8.5	-	-	-	28.1	10.7
HCM Lane LOS	A	-	-	-	D	B
HCM 95th %tile Q(veh)	0.5	-	-	-	0.4	0.4

HCM 6th TWSC
2: Aspen Avenue & 18th Street

05/08/2023

Intersection						
Int Delay, s/veh	2.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	46	1	27	6	0	81
Future Vol, veh/h	46	1	27	6	0	81
Conflicting Peds, #/hr	1	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	12	12	3	3
Mvmt Flow	50	1	29	7	0	88

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	122	33	0	0	36	0
Stage 1	33	-	-	-	-	-
Stage 2	89	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.13	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.227	-
Pot Cap-1 Maneuver	878	1046	-	-	1568	-
Stage 1	995	-	-	-	-	-
Stage 2	940	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	877	1046	-	-	1568	-
Mov Cap-2 Maneuver	877	-	-	-	-	-
Stage 1	995	-	-	-	-	-
Stage 2	939	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.3	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	880	1568
HCM Lane V/C Ratio	-	-	0.058	-
HCM Control Delay (s)	-	-	9.3	0
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0

HCM 6th AWSC
 3: Aspen Avenue & 10th Street/Southview Heights Drive

05/08/2023

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	7	3	6	48	17	1	15	40	10	3	158	27
Future Vol, veh/h	7	3	6	48	17	1	15	40	10	3	158	27
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, %	39	39	39	5	5	5	14	14	14	2	2	2
Mvmt Flow	8	3	7	52	18	1	16	43	11	3	172	29
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.3	8.3	8	8.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	23%	44%	73%	2%
Vol Thru, %	62%	19%	26%	84%
Vol Right, %	15%	38%	2%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	65	16	66	188
LT Vol	15	7	48	3
Through Vol	40	3	17	158
RT Vol	10	6	1	27
Lane Flow Rate	71	17	72	204
Geometry Grp	1	1	1	1
Degree of Util (X)	0.089	0.025	0.095	0.236
Departure Headway (Hd)	4.522	5.126	4.752	4.163
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	795	700	756	868
Service Time	2.536	3.146	2.77	2.163
HCM Lane V/C Ratio	0.089	0.024	0.095	0.235
HCM Control Delay	8	8.3	8.3	8.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0.1	0.3	0.9

Intersection						
Int Delay, s/veh	3.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	54	335	530	43	43	151
Future Vol, veh/h	54	335	530	43	43	151
Conflicting Peds, #/hr	0	0	0	0	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	55	-	-	-	70	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	8	8	4	4
Mvmt Flow	59	364	576	47	47	164

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	623	0	0
Stage 1	-	-	600
Stage 2	-	-	483
Critical Hdwy	4.15	-	6.44
Critical Hdwy Stg 1	-	-	5.44
Critical Hdwy Stg 2	-	-	5.44
Follow-up Hdwy	2.245	-	3.536
Pot Cap-1 Maneuver	944	-	238
Stage 1	-	-	544
Stage 2	-	-	616
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	944	-	223
Mov Cap-2 Maneuver	-	-	223
Stage 1	-	-	510
Stage 2	-	-	616

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	17.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	944	-	-	-	223	497
HCM Lane V/C Ratio	0.062	-	-	-	0.21	0.33
HCM Control Delay (s)	9.1	-	-	-	25.4	15.8
HCM Lane LOS	A	-	-	-	D	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.8	1.4

HCM 6th TWSC
2: Aspen Avenue & 18th Street

05/08/2023

Intersection						
Int Delay, s/veh	1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	18	1	93	38	3	51
Future Vol, veh/h	18	1	93	38	3	51
Conflicting Peds, #/hr	5	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	1	1	13	13
Mvmt Flow	20	1	101	41	3	55

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	188	122	0	0	142
Stage 1	122	-	-	-	-
Stage 2	66	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.23
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.317
Pot Cap-1 Maneuver	806	935	-	-	1376
Stage 1	908	-	-	-	-
Stage 2	962	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	800	935	-	-	1376
Mov Cap-2 Maneuver	800	-	-	-	-
Stage 1	908	-	-	-	-
Stage 2	955	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	0.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	806	1376
HCM Lane V/C Ratio	-	-	0.026	0.002
HCM Control Delay (s)	-	-	9.6	7.6
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0

HCM 6th AWSC
 3: Aspen Avenue & 10th Street/Southview Heights Drive

05/08/2023

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	16	10	10	25	6	1	15	158	56	1	87	16
Future Vol, veh/h	16	10	10	25	6	1	15	158	56	1	87	16
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	0	0	0	0	0	2	2	2	4	4	4
Mvmt Flow	16	10	10	25	6	1	15	158	56	1	87	16
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.8	8	8.5	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	7%	44%	78%	1%
Vol Thru, %	69%	28%	19%	84%
Vol Right, %	24%	28%	3%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	229	36	32	104
LT Vol	15	16	25	1
Through Vol	158	10	6	87
RT Vol	56	10	1	16
Lane Flow Rate	229	36	32	104
Geometry Grp	1	1	1	1
Degree of Util (X)	0.254	0.046	0.043	0.123
Departure Headway (Hd)	3.996	4.576	4.796	4.272
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	886	786	750	844
Service Time	2.081	2.583	2.803	2.272
HCM Lane V/C Ratio	0.258	0.046	0.043	0.123
HCM Control Delay	8.5	7.8	8	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1	0.1	0.1	0.4

Intersection						
Int Delay, s/veh	3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗		↖	↗
Traffic Vol, veh/h	201	573	362	35	27	97
Future Vol, veh/h	201	573	362	35	27	97
Conflicting Peds, #/hr	2	0	0	2	7	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	55	-	-	-	70	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	201	573	362	35	27	97

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	399	0	-	0	1364 382
Stage 1	-	-	-	-	382 -
Stage 2	-	-	-	-	982 -
Critical Hdwy	4.12	-	-	-	6.43 6.23
Critical Hdwy Stg 1	-	-	-	-	5.43 -
Critical Hdwy Stg 2	-	-	-	-	5.43 -
Follow-up Hdwy	2.218	-	-	-	3.527 3.327
Pot Cap-1 Maneuver	1160	-	-	-	162 663
Stage 1	-	-	-	-	688 -
Stage 2	-	-	-	-	361 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1158	-	-	-	133 662
Mov Cap-2 Maneuver	-	-	-	-	133 -
Stage 1	-	-	-	-	567 -
Stage 2	-	-	-	-	360 -

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	17.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1158	-	-	-	133	662
HCM Lane V/C Ratio	0.174	-	-	-	0.203	0.147
HCM Control Delay (s)	8.8	-	-	-	38.8	11.4
HCM Lane LOS	A	-	-	-	E	B
HCM 95th %tile Q(veh)	0.6	-	-	-	0.7	0.5

HCM 6th TWSC
1: North Fork Avenue & Site Access

11/06/2023

Intersection						
Int Delay, s/veh	2.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	26	0	16	9	0	39
Future Vol, veh/h	26	0	16	9	0	39
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	12	12	3	3
Mvmt Flow	28	0	17	10	0	42

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	64	22	0	0	27
Stage 1	22	-	-	-	-
Stage 2	42	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.13
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.227
Pot Cap-1 Maneuver	942	1055	-	-	1580
Stage 1	1001	-	-	-	-
Stage 2	980	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	942	1055	-	-	1580
Mov Cap-2 Maneuver	942	-	-	-	-
Stage 1	1001	-	-	-	-
Stage 2	980	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	942	1580
HCM Lane V/C Ratio	-	-	0.03	-
HCM Control Delay (s)	-	-	8.9	0
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0

HCM 6th TWSC
2: Aspen Avenue & 18th Street

11/06/2023

Intersection						
Int Delay, s/veh	2.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	64	1	36	12	0	107
Future Vol, veh/h	64	1	36	12	0	107
Conflicting Peds, #/hr	1	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	12	12	3	3
Mvmt Flow	70	1	39	13	0	116

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	163	46	0	0	52	0
Stage 1	46	-	-	-	-	-
Stage 2	117	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.13	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.227	-
Pot Cap-1 Maneuver	832	1029	-	-	1548	-
Stage 1	982	-	-	-	-	-
Stage 2	913	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	831	1029	-	-	1548	-
Mov Cap-2 Maneuver	831	-	-	-	-	-
Stage 1	982	-	-	-	-	-
Stage 2	912	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.7	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	833	1548
HCM Lane V/C Ratio	-	-	0.085	-
HCM Control Delay (s)	-	-	9.7	0
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0

Intersection	
Intersection Delay, s/veh	8.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	8	3	6	48	17	1	15	54	10	3	197	32
Future Vol, veh/h	8	3	6	48	17	1	15	54	10	3	197	32
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, %	39	39	39	5	5	5	14	14	14	2	2	2
Mvmt Flow	9	3	7	52	18	1	16	59	11	3	214	35
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.5	8.5	8.2	8.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	19%	47%	73%	1%
Vol Thru, %	68%	18%	26%	85%
Vol Right, %	13%	35%	2%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	79	17	66	232
LT Vol	15	8	48	3
Through Vol	54	3	17	197
RT Vol	10	6	1	32
Lane Flow Rate	86	18	72	252
Geometry Grp	1	1	1	1
Degree of Util (X)	0.109	0.027	0.098	0.293
Departure Headway (Hd)	4.588	5.294	4.897	4.181
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	783	677	733	862
Service Time	2.605	3.317	2.917	2.194
HCM Lane V/C Ratio	0.11	0.027	0.098	0.292
HCM Control Delay	8.2	8.5	8.5	8.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.1	0.3	1.2

HCM 6th TWSC
4: 4th Street & Aspen Avenue

11/06/2023

Intersection						
Int Delay, s/veh	4.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑	↘		↙	↘
Traffic Vol, veh/h	65	335	530	46	49	184
Future Vol, veh/h	65	335	530	46	49	184
Conflicting Peds, #/hr	0	0	0	0	1	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	55	-	-	-	70	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	8	8	4	4
Mvmt Flow	71	364	576	50	53	200

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	626	0	-	0	1108 601
Stage 1	-	-	-	-	601 -
Stage 2	-	-	-	-	507 -
Critical Hdwy	4.15	-	-	-	6.44 6.24
Critical Hdwy Stg 1	-	-	-	-	5.44 -
Critical Hdwy Stg 2	-	-	-	-	5.44 -
Follow-up Hdwy	2.245	-	-	-	3.536 3.336
Pot Cap-1 Maneuver	941	-	-	-	230 497
Stage 1	-	-	-	-	544 -
Stage 2	-	-	-	-	601 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	941	-	-	-	213 497
Mov Cap-2 Maneuver	-	-	-	-	213 -
Stage 1	-	-	-	-	503 -
Stage 2	-	-	-	-	601 -

Approach	EB	WB	SB
HCM Control Delay, s	1.5	0	19.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	941	-	-	-	213	497
HCM Lane V/C Ratio	0.075	-	-	-	0.25	0.402
HCM Control Delay (s)	9.1	-	-	-	27.4	17
HCM Lane LOS	A	-	-	-	D	C
HCM 95th %tile Q(veh)	0.2	-	-	-	1	1.9

HCM 6th TWSC
1: North Fork Avenue & Site Access

11/06/2023

Intersection						
Int Delay, s/veh	1.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		T			T
Traffic Vol, veh/h	17	0	48	30	0	28
Future Vol, veh/h	17	0	48	30	0	28
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	1	1	13	13
Mvmt Flow	18	0	52	33	0	30

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	99	69	0	0	85
Stage 1	69	-	-	-	-
Stage 2	30	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.23
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.317
Pot Cap-1 Maneuver	900	994	-	-	1445
Stage 1	954	-	-	-	-
Stage 2	993	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	900	994	-	-	1445
Mov Cap-2 Maneuver	900	-	-	-	-
Stage 1	954	-	-	-	-
Stage 2	993	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	900	1445
HCM Lane V/C Ratio	-	-	0.021	-
HCM Control Delay (s/veh)	-	-	9.1	0
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q (veh)	-	-	0.1	0

HCM 6th TWSC
2: Aspen Avenue & 18th Street

11/06/2023

Intersection						
Int Delay, s/veh	1.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	1	123	58	3	68
Future Vol, veh/h	30	1	123	58	3	68
Conflicting Peds, #/hr	5	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	1	1	13	13
Mvmt Flow	33	1	134	63	3	74

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	251	166	0	0	197
Stage 1	166	-	-	-	-
Stage 2	85	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.23
Critical Hdwy Stg 1	5.4	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.317
Pot Cap-1 Maneuver	742	884	-	-	1312
Stage 1	868	-	-	-	-
Stage 2	943	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	737	884	-	-	1312
Mov Cap-2 Maneuver	737	-	-	-	-
Stage 1	868	-	-	-	-
Stage 2	936	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	10.1	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	741	1312
HCM Lane V/C Ratio	-	-	0.045	0.002
HCM Control Delay (s/veh)	-	-	10.1	7.8
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q (veh)	-	-	0.1	0

Intersection	
Intersection Delay, s/veh	8.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	21	10	10	25	6	1	15	203	56	1	113	19
Future Vol, veh/h	21	10	10	25	6	1	15	203	56	1	113	19
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	0	0	0	0	0	2	2	2	4	4	4
Mvmt Flow	21	10	10	25	6	1	15	203	56	1	113	19
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	8.1	8.2	9.1	8.2
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	5%	51%	78%	1%
Vol Thru, %	74%	24%	19%	85%
Vol Right, %	20%	24%	3%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	274	41	32	133
LT Vol	15	21	25	1
Through Vol	203	10	6	113
RT Vol	56	10	1	19
Lane Flow Rate	274	41	32	133
Geometry Grp	1	1	1	1
Degree of Util (X)	0.316	0.054	0.044	0.16
Departure Headway (Hd)	4.153	4.777	4.971	4.336
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	871	750	721	830
Service Time	2.153	2.802	2.996	2.351
HCM Lane V/C Ratio	0.315	0.055	0.044	0.16
HCM Control Delay, s/veh	9.1	8.1	8.2	8.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1.4	0.2	0.1	0.6

HCM 6th TWSC
4: 4th Street & Aspen Avenue

11/06/2023

Intersection						
Int Delay, s/veh	3.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗		↘	↗
Traffic Vol, veh/h	239	573	362	42	32	118
Future Vol, veh/h	239	573	362	42	32	118
Conflicting Peds, #/hr	2	0	0	2	7	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	55	-	-	-	70	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	3	3
Mvmt Flow	239	573	362	42	32	118

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	406	0	-	0	1443 385
Stage 1	-	-	-	-	385 -
Stage 2	-	-	-	-	1058 -
Critical Hdwy	4.12	-	-	-	6.43 6.23
Critical Hdwy Stg 1	-	-	-	-	5.43 -
Critical Hdwy Stg 2	-	-	-	-	5.43 -
Follow-up Hdwy	2.218	-	-	-	3.527 3.327
Pot Cap-1 Maneuver	1153	-	-	-	145 660
Stage 1	-	-	-	-	686 -
Stage 2	-	-	-	-	332 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1151	-	-	-	114 659
Mov Cap-2 Maneuver	-	-	-	-	114 -
Stage 1	-	-	-	-	542 -
Stage 2	-	-	-	-	331 -

Approach	EB	WB	SB
HCM Control Delay, s/v	2.6	0	19.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1151	-	-	-	114	659
HCM Lane V/C Ratio	0.208	-	-	-	0.281	0.179
HCM Control Delay (s/veh)	8.9	-	-	-	48.5	11.7
HCM Lane LOS	A	-	-	-	E	B
HCM 95th %tile Q (veh)	0.8	-	-	-	1.1	0.6