

Sunnyside RNG

Traffic Impact Analysis

Sunnyside, WA

July 10, 2023

Prepared by:



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3611 S. Zintel Way
Kennewick, Washington 99337

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Prepared by:
Spencer Montgomery
Travis Marden, PE



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3611 S. Zintel Way
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TRANSPORTATION IMPACT STUDY CHECKLIST

Project Name: Sunnyside RNG

City Reference Code: _____

Provided?

☒ Yes

No Appx A Page No.

Study Required Comment: Jacob Prilucik (WSDOT) email

Date: Dec 22, 2022

☒ Yes

No Cover

BACKGROUND INFORMATION

Washington PE Stamp and Signature

☒ Yes

No 1, 17

INTRODUCTION AND SUMMARY

☒ Yes

No 3-4

EXISTING CONDITIONS

Roadway Network - summary of roadway classifications, lanes, speeds, transit service and facilities, alternative mode service and facilities (e.g., sidewalks, bike lanes, crosswalks) and description of study area

☒ Yes

No 5

Analysis Periods Correct (☐ AM, ☐ Mid-day, ☐ PM ☐ Afternoon, ☐ Saturday, ☐ Sunday)

☒ Yes

No 4, 5, 7

Existing Traffic Operations (Existing LOS, traffic volumes (new counts), speeds, crash data)

☒ Yes

No 10-12

IMPACTS

Trip Generation - Daily, peak hour trips generated by site development

☒ Yes

No 14

Level of Service Analysis - projected LOS with site build out, existing, and background traffic growth

☒ Yes

No N/A

Future year 20-year analysis required for zone change or conditional use

☒ Yes

No N/A

Signal Warrant Analysis

☒ Yes

No 14-15

Turn Lane Warrant Analysis

☒ Yes

No 8

Access Spacing Standards

☒ Yes

No 8

Analysis of intersection and stopping sight distance at frontage road access point(s)

☒ Yes

No N/A

Identify safe route to school or school bus stop (Contact with school district)

☒ Yes

No N/A

Analysis of safe pedestrian/bicycle access to nearest transit stop (if within 1/2 mile of project site)

☒ Yes

No N/A

Identify accessibility to public transit

☒ Yes

No N/A

Account for planned roadway improvements at future build year ☐ and 20-year horizon

☒ Yes

No 14-15

MITIGATION

Identify need for right/left turn lanes, storage capacity and length

☒ Yes

No 15

Identify possible corrections of any LOS deficiencies

☒ Yes

No N/A

Identify any access deficiencies (including transit/pedestrian/bicycle connections)

☒ Yes

No N/A

Identify any TDM measures

☒ Yes

No 2

FIGURES

Vicinity Map

☒ Yes

No Appx D

Site Plan

☒ Yes

No 6

Existing peak hour turn movement volumes (counts conducted within previous 12 months)

☒ Yes

No 12

Trip Distribution (%) including Added Project Peak Hour Traffic Volumes (see sample)

☒ Yes

No N/A

Approved Projects Peak Hour Traffic Volumes (see sample)

☒ Yes

No N/A

Programmed transportation improvements and transportation mitigation outlined in study

☒ Yes

No 7

TABLES

Intersection Performance Existing Conditions

☒ Yes

No 10

Project Trip Generation

☒ Yes

No 14

Intersection Level of Service

☒ Yes

No

OTHER

Technical appendix - sufficient material to convey complete understanding of traffic issues (e.g. HCM or similar analyses, trip generation calculations, signal warrant analyses, turn lane warrant analyses, queuing calculations, signal timing sheets, traffic counts, etc.)

Completed By: Travis Marden

Date: July 10, 2023



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Appendices

Appendix A: Washington State Department of Transportation e-mail on TIA Scope

Appendix B: Collision History 2020 - 2022

Appendix C: Traffic Volumes

Appendix D: Highway Capacity Software Level of Service Worksheets

Appendix E: Midvale Industrial Park and RNG Site

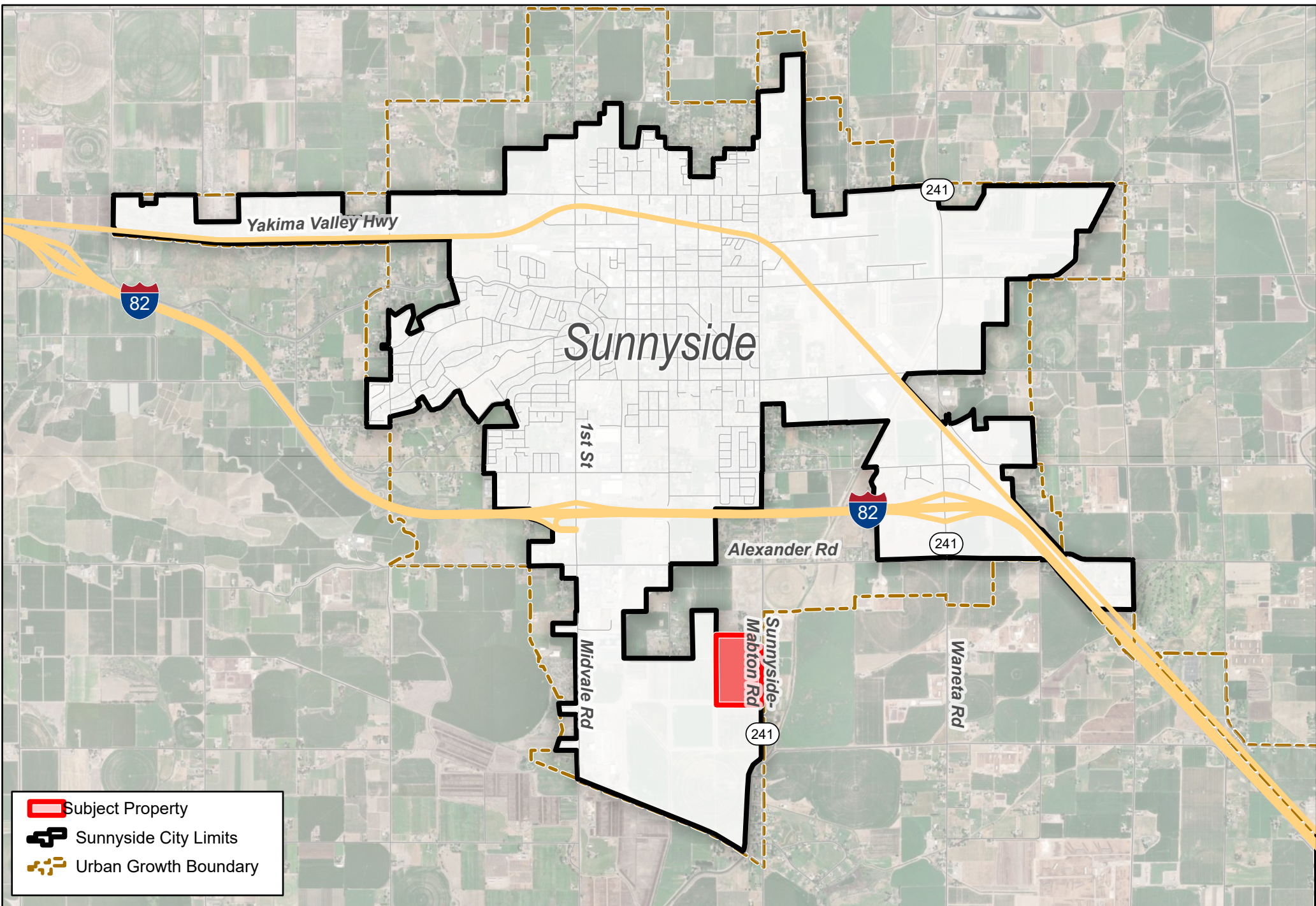
Appendix F: Turn Lane Analysis Guidance

Introduction

The Sunnyside RNG facility is planned to be part of the Port of Sunnyside Midvale Industrial Park situated west of SR 241 (Sunnyside-Mabton Road) and south of Alexander Road. It is anticipated to be one of the first facilities within the Midvale Industrial Park, occupying approximately 49 acres of the nearly 500 acres. A Vicinity Map is shown in Figure 1. The initial access to the Midvale Industrial Park will be a new north-south roadway accessing Alexander Road approximately one-quarter mile west of SR 241.

The City of Sunnyside and the Washington State Department of Transportation (WSDOT) have requested an analysis of traffic operations at five existing intersections during the PM peak hour with the proposed Sunnyside RNG facility in place: Midvale Road/I-82 westbound ramps, Midvale Road/I-82 eastbound ramps, Alexander Road/Midvale Road, Alexander Road/SR 241/Sunnyside-Mabton Road and Alexander Road/Waneta Road, as well as the proposed site access to Alexander Road. WSDOT also indicated that if the proposed development adds 10 or more trips to the I-82 Exit 69 (SR 241/Waneta Road) interchange then a pro-rata share contribution towards a planned roundabout at that location will be requested. See WSDOT e-mail on the Traffic Impact Analysis Scope in Appendix A.

This report describes existing conditions in the vicinity of the proposed project as well as the anticipated future conditions and a description of the methodology used.



 Subject Property

 Sunnyside City Limits

 Urban Growth Boundary

Existing Conditions

Land Use

The study area in the vicinity of the proposed RNG site is primarily rural in nature with fields and farms and undeveloped land. Approximately one-half mile to the west on Alexander Road are some industrial land uses associated with agricultural services and processing. One-quarter mile to the north of Alexander Road is I-82, north of which is the majority of the City of Sunnyside including the concentration of the population of the city.

Roadway Characteristics

The study area is served primarily by two lane collector and arterial roadways without sidewalks. Table 1 summarizes several features of roadways in the study area.

Table 1. Study Area Roadway Characteristics

Roadway Segment	Functional Classification	Number of Lanes	Roadway Width (ft)	Speed Limit (MPH)	Presence of Curb, Gutter, Sidewalk
Alexander Road (SR 241 between Sunnyside-Mabton Rd and Waneta Rd)	Major Collector west of Waneta	2	~34'	40 w/Midvale	only sidewalk approximately 240' on south side for one business gravel
	Minor Collector east of Waneta Rd		20'	35 e/Midvale for 2100' 50 to Waneta 25 e/of Waneta	
Midvale Road	Minor Arterial north of Alexander Rd	3	~56'	35	both sides have curb, gutter and sidewalk from 480' north of Alexander Road to >1 mile to the south
	Minor Collector south of Alexander Rd	2	38'	40	
Sunnyside-Mabton Road (SR 241 south of Alexander Rd)	Minor Arterial north of I-82	2	~36'	35	none
	Major Collector south of I-82	2	~36'	55	
Waneta Road (SR 241 north of Alexander Rd)	Minor Arterial north of Alexander Rd	2	38'	40	none
	Minor Collector south of Alexander Rd		26'	40	
I-82	Interstate Freeway	4	48'	70	none

There are no traffic signals in the study area, all intersections are controlled by stop signs. Each of the five existing study intersections are described below.

Midvale Road/I-82 westbound ramps – the westbound approach is stop controlled and has exclusive left and right turn lanes. The north-south directions are uncontrolled with the northbound providing an exclusive left turn lane and the southbound providing a right turn taper to go westbound on I-82 .

Midvale Road/I-82 eastbound ramps –this is a three-legged intersection with the west leg being stop controlled and serving as both the eastbound off-ramp as well as the eastbound on-ramp which loops to go east. There is an exclusive northbound left turn lane.

Midvale Road/Alexander Road – This is a 4-legged intersection with the east-west directions being stop controlled. The north-south approaches have exclusive left turn lanes. There are flashing yellow lights for the north-south direction and flashing red lights for the east-west directions. The poles for these lights appear as though they are primed and ready for traffic signal heads to be installed when warrants are met.

Alexander Road/Sunnyside-Mabton Road/SR241 – This is a 4-legged 4-way stop controlled intersection with single lane approaches. Each approach has a flashing red light with the stop signs. The east and south legs are SR 241.

Alexander Road/Waneta Road – This is a 4-legged 4-way stop controlled intersection with single lane approaches. Each approach has a flashing red light with the stop signs. The north and west legs are SR 241. The east leg is gravel not far from the intersection.

It is important to note that there are very few sidewalks and no bicycle lanes provided in the study area for pedestrians and alternative modes of travel. No transit service is provided in the study area.

Collision History

Collision history was researched for the last three years of available data in the study area. The following summary is provided, with detailed data provided in Appendix B:

- A total of 22 collisions were reported at study intersections, including:
 - 3 at Midvale Rd/I-82 westbound ramps
 - 2 at Midvale Rd/I-82 eastbound ramps
 - 10 at Midvale Rd/Alexander Rd/Emerald Rd
 - 6 at Alexander Rd/Sunnyside-Mabton Road
 - 1 at Alexander Rd/Waneta Rd
- There were no fatalities or serious injury collisions.
- There were four suspected minor injury collisions, two at Alexander Rd/Sunnyside-Mabton Road and two at Midvale Rd/Alexander Rd
- Three collisions resulted in possible injuries, all at Midvale/Alexander
- Half of the 22 collisions involved a vehicle entering at an angle.

Intersection collision rates per million entering vehicles at study intersections range from 0.23 to 1.34 with all but the intersection of Midvale Road/Alexander Road being well below 1.0 collisions per MEV. Calculations are included in Appendix B.

At the intersection of Midvale Rd/Alexander Road 60% of the collisions involved an eastbound vehicle. This could be due to it having the highest delay. As will be discussed below, the 2028 No-Build scenario

will need an exclusive left turn lane, or a traffic signal, for the eastbound approach, which could help to off-set some of the delay and reduce collisions at this intersection.

Traffic Volumes

PM peak period turning movement counts were collected from 4:00 to 6:00 PM at the five study intersections on January 26, 2023. The PM peak hour occurred between 4:00 – 5:00 at study intersections one and five or from 4:15 – 5:15 PM at the intersections two, three and four. Turning movement volumes, traffic control, and lane configurations at the study intersections are shown in Figure 2. Raw data for traffic counts is included in Appendix C.

Traffic Operations

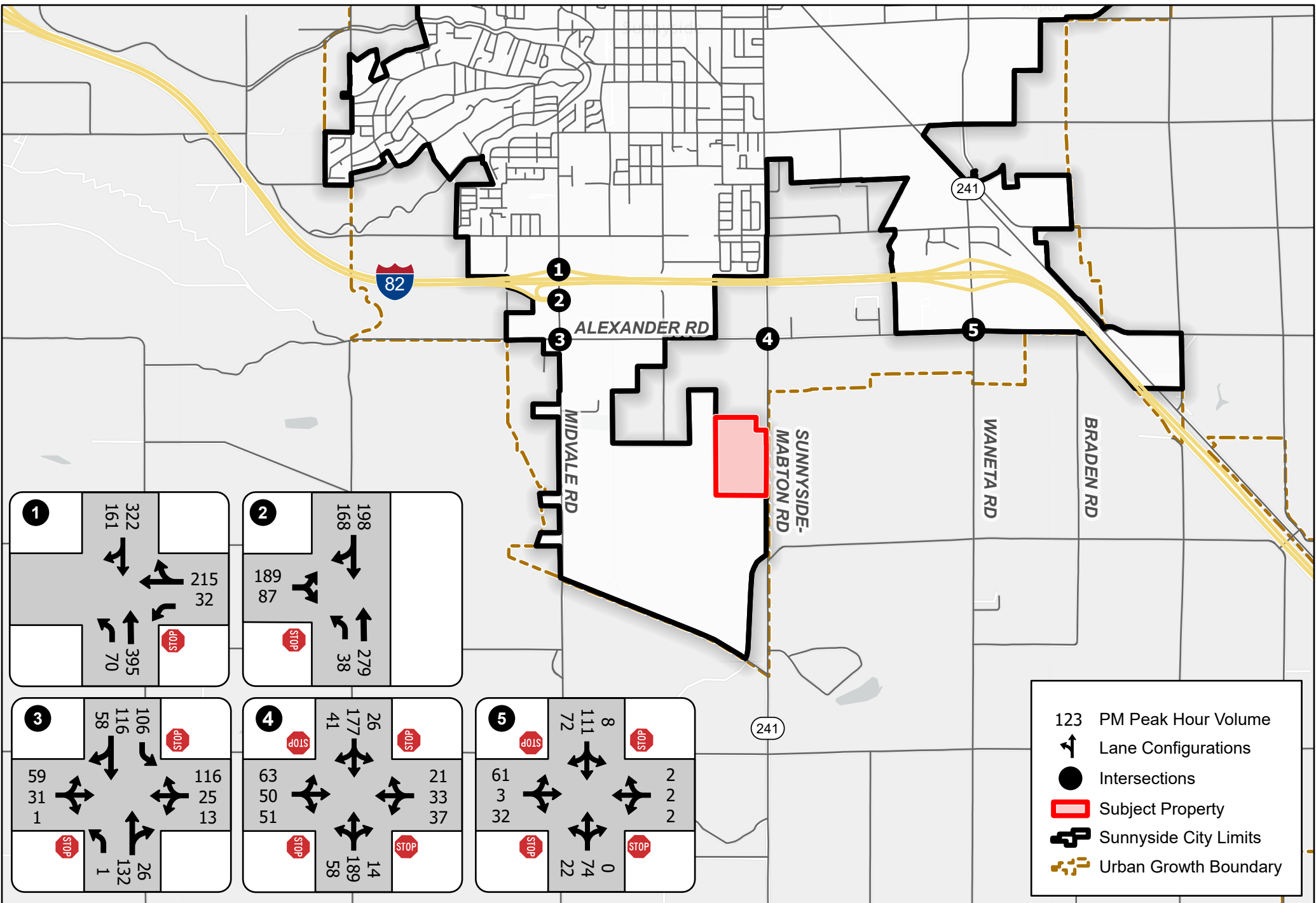
The analysis of Level-of-Service (LOS) is a means of quantitatively describing the quality of operational conditions of a roadway segment or intersection and the perception by motorists and passengers. Service levels are identified by letter designation, A – F, with LOS “A” representing the best operating conditions and LOS “F” the worst. Each LOS represents a range of operating conditions and one or more Measures Of Effectiveness (MOE’s) are used to quantify the LOS of a roadway element. For intersections the MOE used is average control delay in seconds per vehicle. While there are several methodologies for estimating the LOS of intersections, the most commonly used is presented in the Highway Capacity Manual and is the methodology used in this study (HCM 6th Edition). The Highway Capacity Manual LOS criteria for intersections are summarized in Table 2.

Table 2. Level of Service Criteria for Intersections

Level of Service (LOS)	Average Control Delay (seconds/vehicle)	
	Signalized Intersections	Unsignalized Intersections
A	< =10	< =10
B	>10 - < 20	>10 - < 15
C	>20 - < 35	>15 - < 25
D	>35 - < 55	>25 - < 35
E	>55 - < 80	>35 - < 50
F	>80	>50

Source: *Highway Capacity Manual 6th Edition*, Transportation Research Board, National Research Council, Washington, D.C., 2017.

For unsignalized intersections “delay” is based on the availability of gaps in the major street to allow minor street movements to occur. The methodology prioritizes each movement at an unsignalized intersection consistent with rules that govern right-of-way for drivers. In other words, major street through and right turn traffic has absolute priority over all other movements. Major street left turns must yield to opposing through traffic and right turns. Minor street through traffic and right turns yield to major street higher priority movements, and the minor street left turns have the lowest priority and must yield to all other movements. As traffic volumes increase, the availability of gaps will decrease and greater delay tends to result in driver frustration and anxiety, loss of time, unnecessary fuel consumption, and contributes to unnecessary air pollution. The City of Sunnyside has adopted the standard for Level of Service as LOS “C” for intersections, meaning the overall intersection LOS must be “C” or better.



The Highway Capacity Software was used to evaluate the study intersections using the lane configurations and the traffic volumes shown in Figure 2.

The results of the analysis are shown in Table 3 and indicate that all study intersections currently function with acceptable Levels of Service “C” or better during the PM peak hour. The Highway Capacity Software results are included in Appendix D

Table 3. Summary of Existing (2023) Level of Service and Delay

Intersection	Overall Intersection	Worst Approach Delay (seconds)/ Level of Service
I-82 Westbound ramps/Midvale	*	EB—14.5/B
I-82 Eastbound ramps/Midvale	*	WB—18.9/C
Midvale/Alexander	*	EB—20.8/C
Alexander/SR241/Sunnyside-Mabton Rd	10.9/B	NB—11.5/B
Alexander/SR241/Waneta Rd	8.4/A	EB—8.5/A

LEGEND

13.9/B Delay and Level of Service using existing Lane Configuration

* Uncontrolled movements (major street through) not provided for overall intersection analysis for Two-Way Stop Controlled intersections

NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound

Future Conditions

This section will describe future traffic conditions without the proposed development as well as future traffic volumes and traffic operations with the proposed development.

2028 No-Build Conditions

To estimate future conditions in year 2028 without the proposed development the existing PM peak hour traffic volumes shown in Figure 2 were increased by 2% per year to represent background growth. The resulting traffic volumes are shown in Figure 3.

Traffic operational or capacity analysis was repeated similar to existing conditions, with the results summarized in Table 4. Capacity worksheets are also included in Appendix D. The results of the analysis indicate increases in delay at all of the study intersections, ranging from 0.2 seconds of average vehicle delay to 4.3 seconds of delay at the Midvale Rd/Alexander Rd intersection. This increase in delay to 25.1 seconds of average vehicle delay at the Midvale/Alexander intersection causes the LOS to fall to “D” which is below the City of Sunnyside standard of “C”. It was determined that the addition of an eastbound exclusive left turn lane would provide acceptable LOS of “C” at that intersection.

Table 4. Summary of 2028 No-Build Level of Service and Delay

Intersection	Overall Intersection	Worst Approach Delay (seconds)/ Level of Service
I-82 Westbound ramps/Midvale	*	WB—16.1/C
I-82 Eastbound ramps/Midvale	*	EB—23.1/C
Midvale/Alexander	*	EB—25.1/D
	*	EB—21.4/C (1)
Alexander/SR241/Sunnyside-Mabton Rd	11.9/B	NB—12.7/B
Alexander/SR241/Waneta Rd	8.6/A	EB—8.7/A

LEGEND

13.9/B Delay and Level of Service using existing Lane Configuration

* Uncontrolled movements (major street through) not provided for overall intersection analysis for Two-Way Stop Controlled intersections

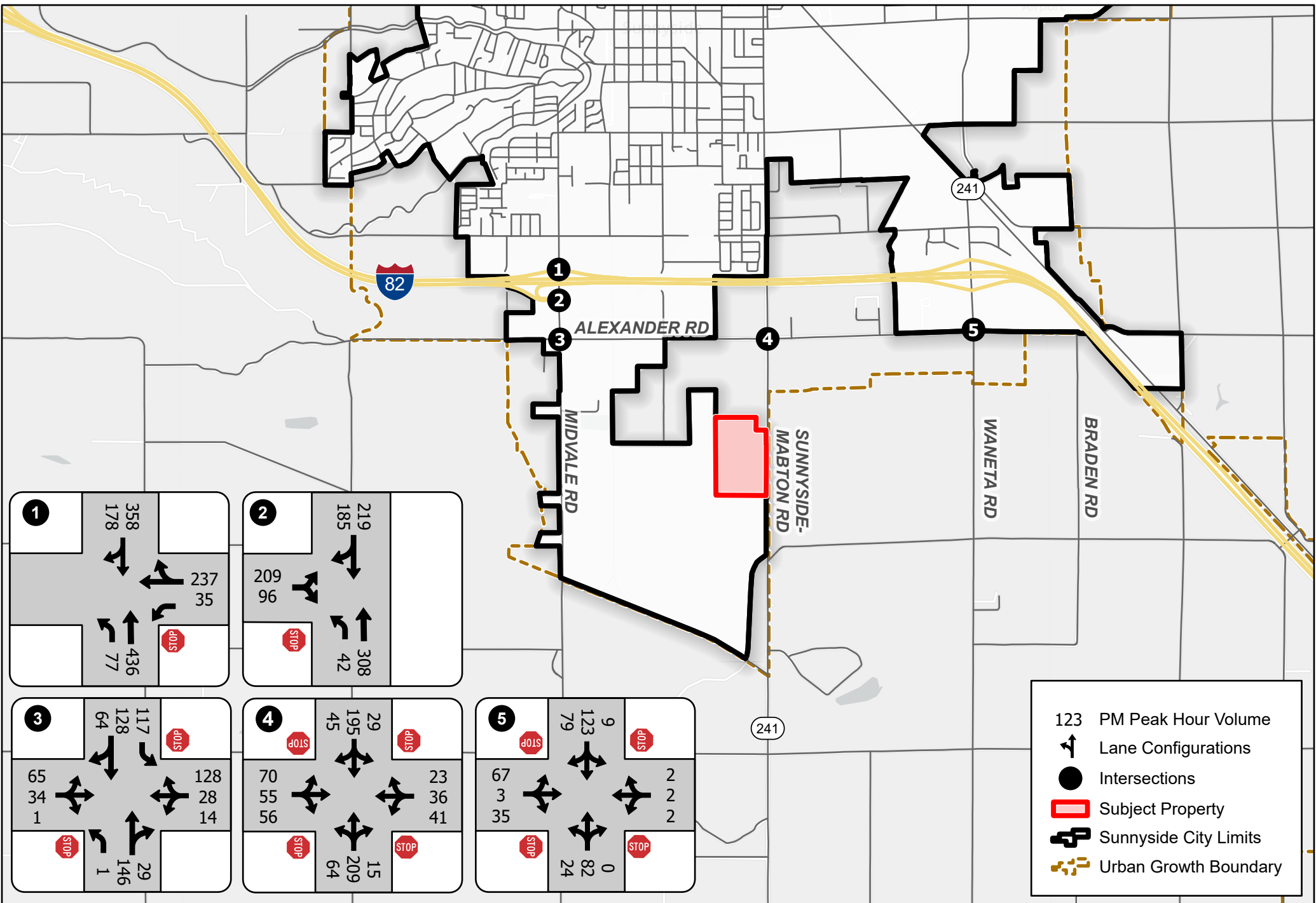
NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound

Intersection does not meet LOS Standard

(1) Assumes installation of exclusive eastbound left turn lane

Proposed Sunnyside RNG

The proposed development is situated on approximately 49 acres of the 511 acres of the Midvale Industrial Park. As shown in the Preliminary Plat in Appendix E, access to the site will be a temporary culdesac which connects to Alexander Road approximately one-quarter mile west of Sunnyside-Mabton Road. Other future accesses to the park are envisioned on SR 241 south of Alexander Road and will be evaluated when more is known of potential developments in the Park. The proposed access to Alexander Road of one-quarter mile exceeds the recommended AASHTO access spacing and stopping sight distance. The RNG facility will bring dairy farm waste and agricultural farm residue to the facility for conversion to natural gas.



Trip Generation and Trip Distribution

The Institute of Traffic Engineers *Trip Generation Manual 11th Edition* was used to quantify the new trips anticipated to be generated by the proposed development. This publication is the standard across the country and is comprised of the results of many national surveys for many land use types and provides trip generation rates and statistics for all-day, AM and PM peak hour conditions as well as other time periods for some land uses. The Sunnyside RNG anticipates having 35 employees, with 12 truck drivers and the majority of the other employees working day shift and a small evening shift. The anticipated trip generation for the Sunnyside RNG, assuming 35 employees is summarized in Table 5.

Table 5. Trip Generation

Measure	Average Weekday	AM Peak Hour	PM Peak Hour
Average Trip Generation Rate per unit*	2.91	0.44	0.42
Percent In	50%	86%	20%
Percent Out	50%	14%	80%
Total Trips(1)	102	15	15
Trips Inbound	51	13	3
Trips Outbound	51	2	12

Land Use: ITE Code) Industrial Park (130)

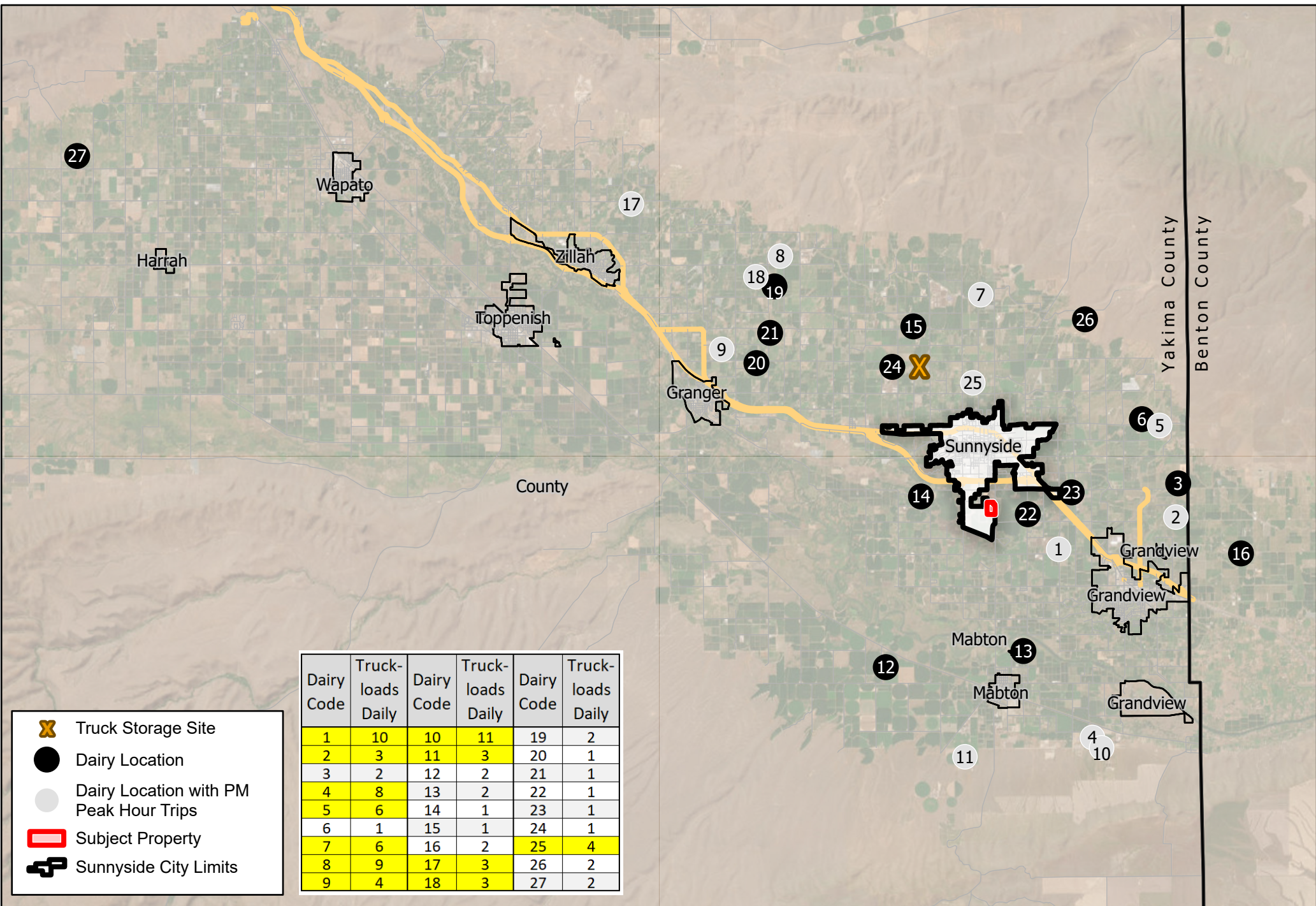
Independent Variable: Employees

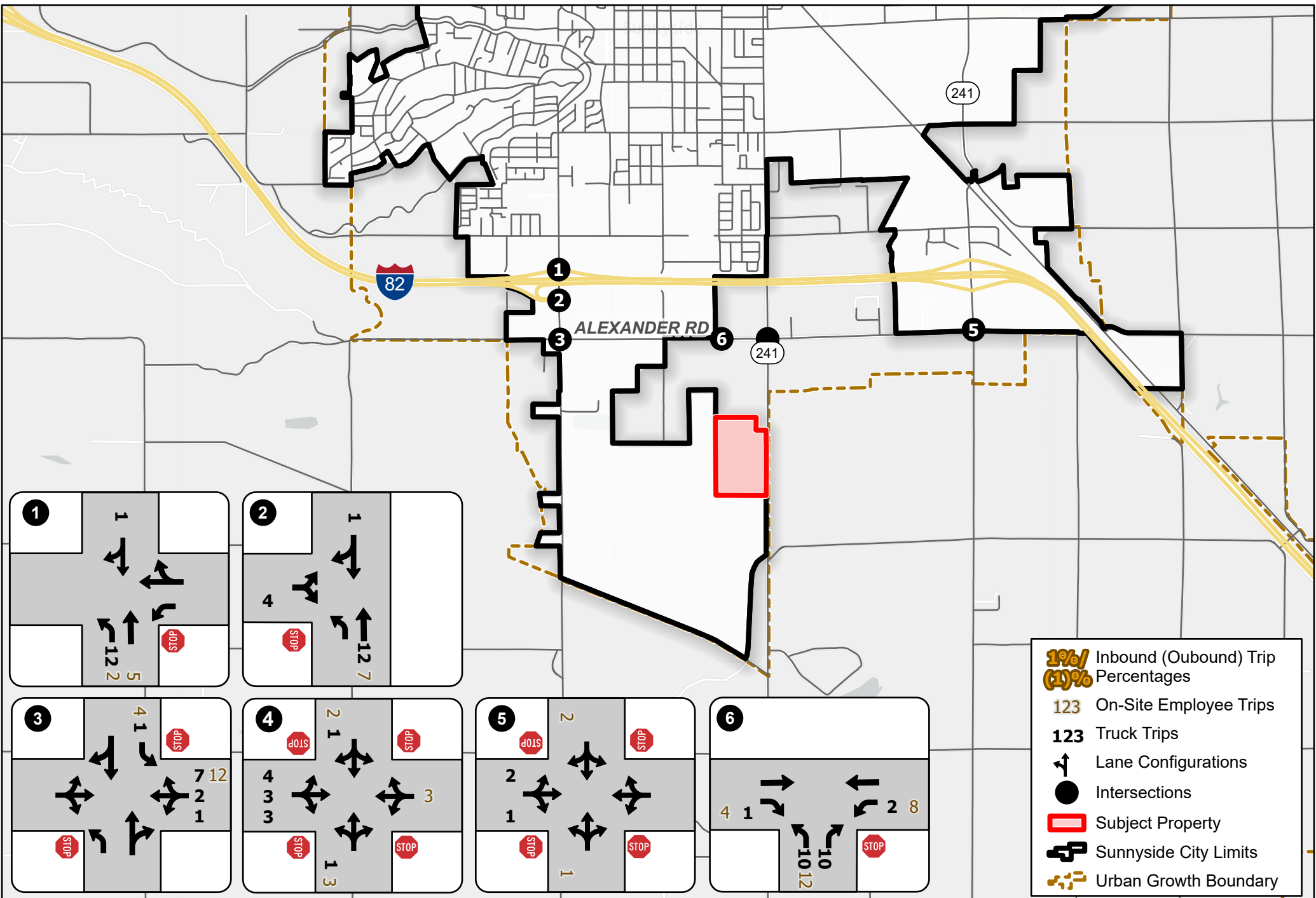
Number of Units: 35

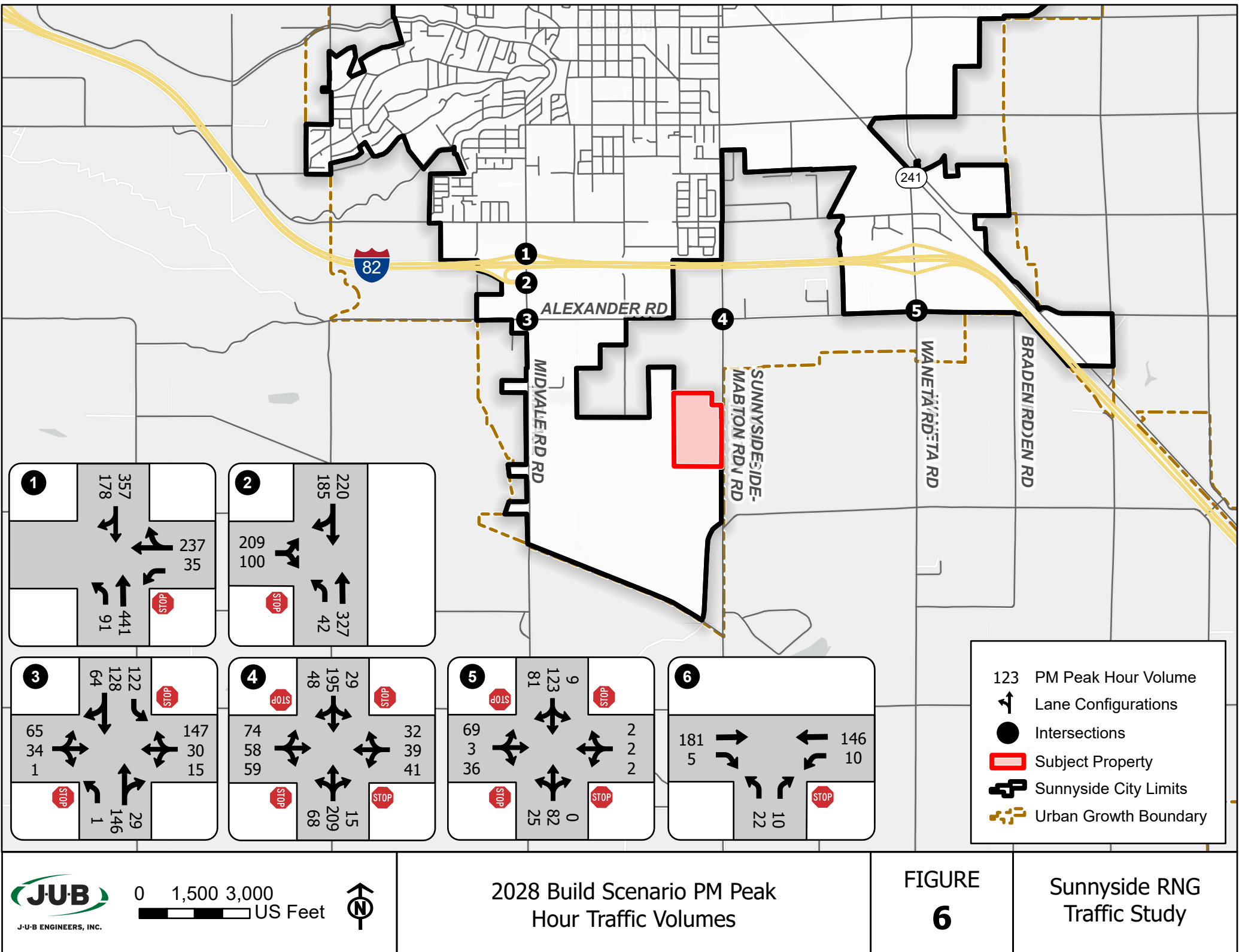
(1) Compare to paragraph below

Given that the Sunnyside RNG facility will be a bit unique with several deliveries of dairy farm waste throughout the day, a comparison was made of the potential trip generation. This methodology assumes that during the PM peak hour each of the 12 trucks would make an inbound delivery of the farm waste and make an outbound trip as well to an anticipated truck storage facility situated on Lester Road north of Sunnyside, via Alexander Road, Midvale Road and I-82 west. For the purposes of this analysis, these truck trips are anticipated to serve the 27 dairy farms shown in Figure 4, with the PM peak hour trips forecast to come from the highlighted sites with the most daily truck loads. The remaining 23 employees were assumed to make trips consistent with the travel patterns at the study intersections, with 20 employees outbound and three employees inbound for the evening shift. This total number of inbound and outbound trips amounts to 47 (15 inbound and 32 outbound), which is more than the ITE Trip Generation Manual and was felt to be a conservatively high estimate and was used for the analysis later in this study.

The estimated trip distribution percentages for the on-site employees and the resulting site generated traffic volumes for both on-site employees as well as the trucks are shown in Figure 5. Site generated trips shown in Figure 5 were added to the 2028 No-Build volumes shown in Figure 3 to estimate the 2028 Build scenario traffic volumes shown in Figure 6. Of note here is that the site generated trips on Waneta Road to/from the I-82 interchange amount to a total of four, which is less than the threshold identified by WSDOT to need to contribute to planned future improvements at the eastbound ramps at that interchange.







Traffic Operations

A capacity analysis using the Highway Capacity Software was also performed at the study intersections as well as at the RNG site access to Alexander Road for the 2028-Build Scenario. The resulting delay and Level of Service (LOS) for the PM peak hour is shown in Table 6, with capacity worksheets included in Appendix D. As with the No-Build Scenario, Level of Service is anticipated to be acceptable LOS at all study intersections except the intersection of Midvale Rd/Alexander Road which will be LOS “D” for the eastbound approach. To mitigate for this deficiency an exclusive eastbound left turn lane would need to be constructed, or as mentioned above, the installation of a traffic signal appears to have been set up using the existing poles for the flashing lights.

Table 6. Summary of 2028 Build PM Peak Hour Delay and Level of Service

Intersection	Overall Intersection	Worst Approach Delay (seconds)/ Level of Service
I-82 Westbound ramps/Midvale	*	WB--16.3/C
I-82 Eastbound ramps/Midvale	*	EB--24.2/C
Midvale/Alexander	*	EB--27.3/D
	*	EB--23.0/C (1)
Alexander/SR241/Sunnyside-Mabton Rd	12.4/B	NB--13.3/B
Alexander/SR241/Waneta Rd	8.7/A	EB--8.9/A
Alexander Road/RNG Site Access	*	NB--11.1/B

LEGEND

13.9/B Delay and Level of Service using existing Lane Configuration

* Uncontrolled movements (major street through) not provided for overall intersection analysis for Two-Way Stop Controlled intersections

NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound

Intersection does not meet LOS Standard

(1) Assumes installation of exclusive eastbound left turn lane

Left Turn Lane Analysis

Left-turn lanes provide storage, separate from the major street through lanes, for left-turning vehicles waiting for a gap in opposing traffic at an unsignalized intersection. Left turn lanes can reduce delays and the potential for crashes involving left turning vehicles. In addition, they can allow deceleration clear of the through traffic lanes.

The 2028 Build Scenario traffic volumes shown in Figure 6 were evaluated for the need for left turn lanes using the National Cooperative Highway Research Program (NCHRP) Report 279 *Intersection Channelization Design Guide*, included in Appendix F. The existing lane configurations shown in Figure 2 identify that there are already major street left turn lanes on Midvale Road for intersections #1 - #3, and intersections #4 and #5 are stop control and thus would not need left turn lanes for safety purposes. An evaluation for a major street left turn lane on Alexander Road at the RNG site access indicates that there

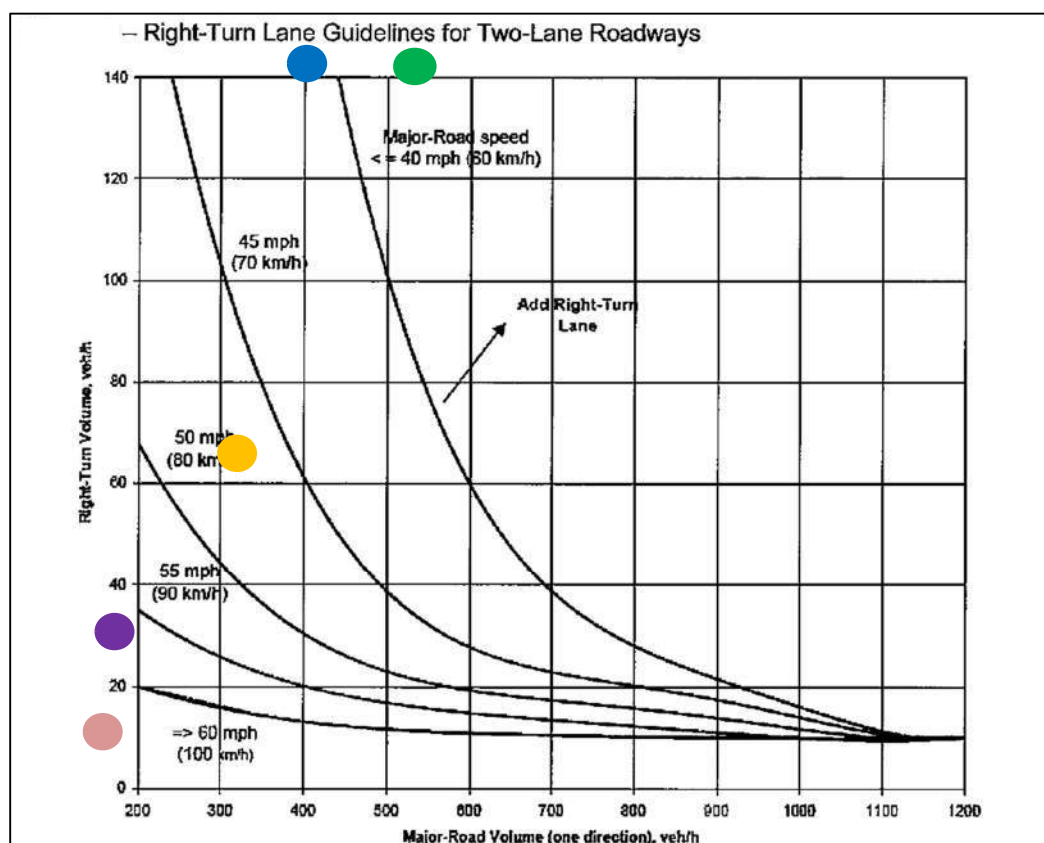
are forecast to be only 10 westbound left turns with 186 eastbound vehicles. These plotted volumes at less than 7% of the advancing westbound volume are well to the left of the trend lines that would indicate the need for a left turn lane into the site. This exhibit is included in Appendix F.

Right Turn Lane Analysis

Right-turn movements influence intersection capacity even though there is no conflict between right-turning vehicles and opposing traffic. Right-turn lanes might be needed to maintain efficient intersection operation, or to reduce friction between vehicles slowing down and those continuing straight.

The 2028 Build Scenario traffic volumes shown in Figure 6 were evaluated for the need for right turn lanes using the figure below “Right-Turn Lane Guidelines for Two-Lane Roadways” developed from NCHRP Reports 279 and 457. Examination of Figure 6 shows the following right turn volumes at study intersections at the plotted point on the graph below:

- southbound right turn at Midvale/I-82 WB ramps (178,535) ●
- southbound right turn at Midvale/I-82 EB ramps (185,.405) ●
- southbound right turn at Midvale/Alexander 64, 314) ●
- northbound right turn at Midvale/Alexander (29, 185) ●
- eastbound right turn at RNG site access/Alexander (5, 186) ●



As the graphic above shows, with a speed limit of 35 MPH on Midvale Road north of Alexander Road the guidelines indicate that a southbound right turn lane is warranted on Midvale Road at the I-82 westbound ramps intersection. This movement currently has a right turn taper to facilitate traffic slowing down to turn right onto I-82. The southbound right turn volume at this intersection is one-third of the total volume, meaning that travelers on this road are likely to know that a significant portion of the traffic may be slowing down. The intersection does not need a right turn lane for capacity purposes.

Mitigation

The additional traffic added by the proposed development will add some delay at each study intersection. The intersection of Midvale Rd/Alexander Rd will be LOS "D" with development, similar to the 2028 No-Build scenario. The mitigation to achieve acceptable LOS at this intersection is to either add an exclusive eastbound left turn lane, or install traffic signal heads on the existing poles being used for the flashing lights. The Sunnyside RNG is forecast to comprise 2.55% of the traffic at the intersection in the 2028 Build Scenario.

Based on the trip generation and trip distribution assumptions of this study, only four vehicles are anticipated to be added to Waneta Road north of Alexander Road that would pass through the intersection of Waneta Road/I-82 eastbound ramps. This is less than the 10 vehicle threshold identified by WSDOT to need to contribute to planned improvements at that intersection.

Summary and Recommendations

The Sunnyside RNG is a proposed 49 acre industrial site that will make up approximately 10% of the Port of Sunnyside Midvale Industrial Park in the City of Sunnyside, Washington. The initial access to the park will be to Alexander Road approximately one-quarter mile west of Sunnyside-Mabton Road.

This Traffic Impact Analysis was prepared at the request of the City of Sunnyside to ensure that acceptable Levels of Service can be provided at five study intersections on Midvale Road and Alexander Road. The City of Sunnyside's LOS standard for intersections is "C".

Study area roadway network consists of two lane rural roads with the exception of Midvale Road which has a continuous two-way left turn lane. Traffic volumes were collected in the spring of 2023 at the five study intersections. All five study intersections currently function with acceptable LOS. However, by year 2028 forecast background traffic growth will cause the intersection of Midvale Road/Alexander Road to fall to LOS "D" and require the construction of an exclusive eastbound left turn lane or installation of traffic signal heads on the existing poles being used for the flashing lights.

Collision history for the three most recent years of available data reveals that only 22 collisions occurred at the five study intersections, resulting in four suspected minor injuries and three possible injuries.

The proposed Sunnyside RNG facility will have dairy waste trucked from Yakima Valley dairies to the site for conversion to natural gas. Assuming that each of 12 trucks makes an inbound and outbound trip to the site and that 20 daytime workers depart and 3 evening shift workers arrive during the PM peak hour, it is anticipated to generate approximately 47 PM peak hour trips (15 inbound and 32 outbound).

The additional traffic added by the proposed development will add some delay at each study intersection. The intersection of Midvale Rd/Alexander Rd will be LOS "D" with development, similar to the 2028 No-Build scenario. The mitigation to achieve acceptable LOS at this intersection is to add an exclusive eastbound left turn lane, or install traffic signal heads on the existing poles. The Sunnyside RNG is forecast to comprise 2.55% of the traffic at the intersection in the 2028 Build Scenario.

The site generated trips on Waneta Road to/from the I-82 interchange amount to a total of four, which is less than the threshold identified by WSDOT to need to contribute to planned future improvements at the eastbound ramps at that interchange.

For safety purposes, left turn lane analysis was performed as well at the site entrance. No left turn lane is warranted based on the forecast traffic volumes. All other intersections have left turn lanes for major street movements or are 4-Way stop controlled. A right turn lane analysis was also performed for the intersections on Midvale Road as well as at the site entrance. Forecast volumes indicate that a southbound right turn lane should be considered on Midvale Road at the I-82 westbound ramps. However, this movement currently is served well by a right turn taper which facilitates traffic slowing down to turn right onto I-82. The southbound right turn volume at this intersection is one-third of the total volume, meaning that travelers on this road are likely to know that a significant portion of the traffic may be slowing down. The intersection does not need a right turn lane for capacity purposes.

The development should construct all roadways to city standards with respect to roadway width, curb, gutter and sidewalks, intersection sight distance, etc.

Appendix A

Washington State Department of Transportation e-mail on TIA Scope

Spencer Montgomery

From: Prilucik, Jacob <PrilucJ@wsdot.wa.gov>
Sent: Thursday, December 22, 2022 10:34 AM
To: Spencer Montgomery; Stephanie Ray
Cc: Shane Fisher; Travis Marden
Subject: RE: [EXTERNAL] FW: Sunnyside RNG TIA

External Email - This Message originated from outside J-U-B ENGINEERS, Inc.

Spencer,
Please include the I-82 Exit 67 (Midvale) ramp terminals. I don't anticipate any impacts; however, I don't have turning movement counts to verify that. If trip distribution shows 10 or more PM Peak trips to the Exit 69 (Waneta/SR 241) interchange, WSDOT will request a pro-rata contribution towards the city's planned roundabout at the Exit 67 ramp terminal.

Jacob Prilucik
Office: (509) 577-1635 – prilucj@wsdot.wa.gov
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From: Spencer Montgomery <smontgomery@JUB.com>
Sent: Wednesday, December 21, 2022 2:20 PM
To: Prilucik, Jacob <PrilucJ@wsdot.wa.gov>; Stephanie Ray <sray@hlacivil.com>
Cc: Shane Fisher <sfisher@sunnyside-wa.gov>; Travis Marden <tmarden@jub.com>
Subject: [EXTERNAL] FW: Sunnyside RNG TIA

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Greetings, I hope you are enjoying this Christmas season.

I need your input on items to be evaluated for a Traffic Impact Analysis for the project described below. I understand you are aware of this development, there is information below from the project engineer. I've seen numbers of approximately 170 daily truck trips and 34 employee trips. About a year ago we had looked at a different site off Yakima Valley Highway and at the time had forecast 40 truck trips and 18 employee trips during the PM peak hour. Things may have changed slightly, and we'll confirm that when we get started. My question for you all is: if we are in the range of 60 – 75 PM peak hour trips accessing Alexander Road west of SH 241, what intersections need to be evaluated as part of the TIA? I would expect that we should do the following:

- new road intersection at Alexander Road
- Alexander Road/SR 241 ¼ mile to the east
- Alexander Road/Midvale Road ¾ mile to the west.

Do you see the need to evaluate any other intersections? Are there any other specific issues that need to be evaluated? I assume the PM peak would be adequate?

Thank you!

SPENCER MONTGOMERY

Transportation Planner/Project Manager

J-U-B ENGINEERS, Inc.

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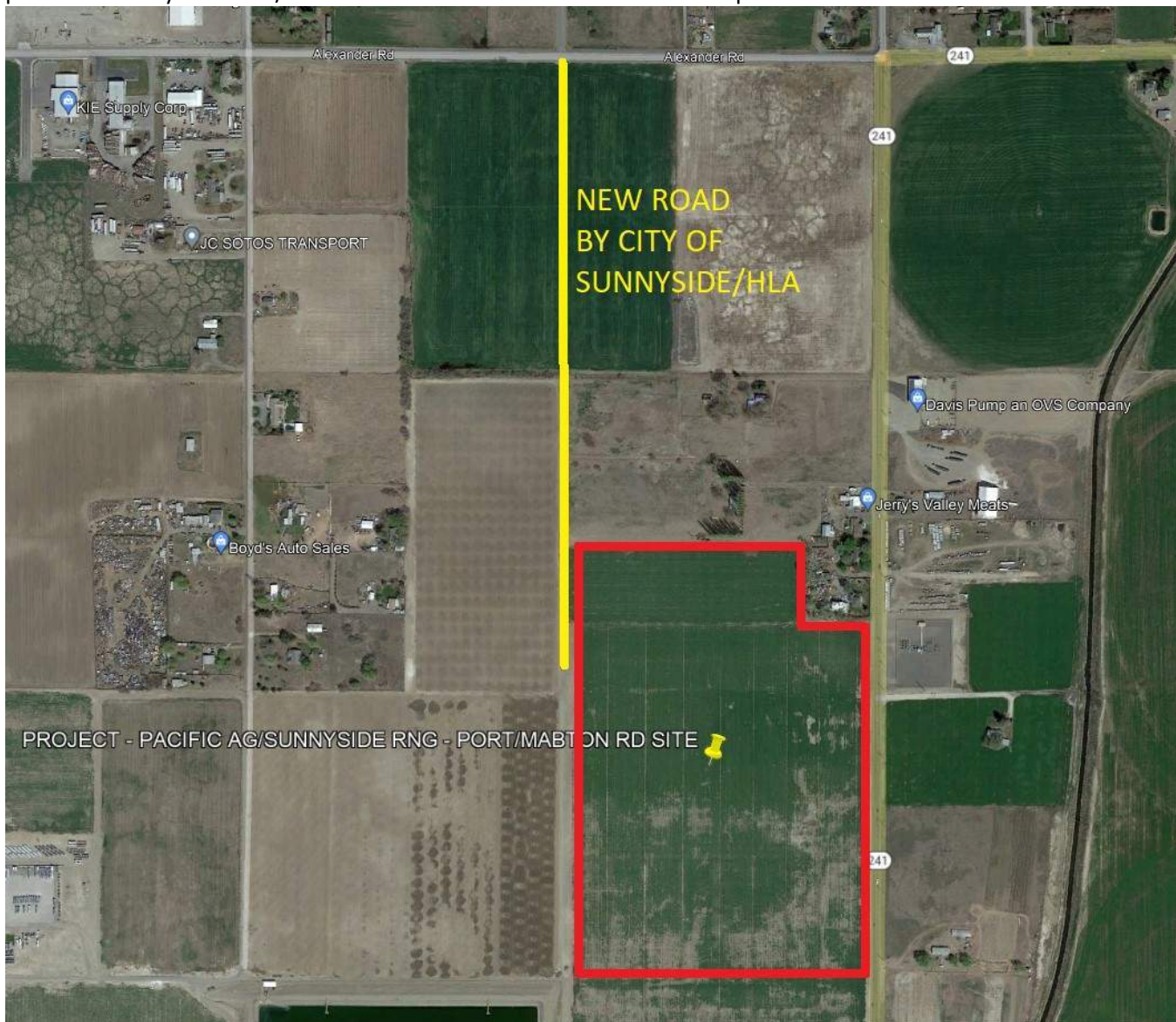
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OTHER J-U-B COMPANIES

From: Paul Inwards <pinwards@jub.com>
Sent: Tuesday, November 22, 2022 9:35 AM
To: Spencer Montgomery <smontgomery@JUB.com>
Cc: Travis Marden <tmarden@jub.com>
Subject: Sunnyside RNG TIA

Spencer,

When you have time, I need to coordinate scope/fee (and any questions on scope) for a Traffic Impact Analysis required for the Sunnyside Renewable Natural Gas (RNG) facility we are beginning design of. The ~50-acre site is located in the Port of Sunnyside's Midvale Industrial Park, generally located south of Alexander Road and west of the Sunnyside-Mabton Road (SR 241). The City will be constructing a new north-south road from Alexander south to the site that will provide the only access to/from the site until the rest of the industrial park is built out.



I believe they have indicated about 100 trucks per day, but we can confirm the traffic numbers with the client prior to the TIA calc's. The client, Pacific Ag Renewables (PAR) hauls cattle waste and crop residue (straw, corn stalks, etc.) from area farms/dairies and runs it through digesters to produce methane that is purified and injected into the natural gas main that runs through the site. Trucks leaving the site also haul the used digestate solids and liquids back to the dairies/farms for disposal. The City of Sunnyside has indicated both City (and/or their consultant HLA) and WSDOT will be reviewing the TIA and warned that WSDOT has a long lead time for their review, so we need to get started soon. Attached is a site plan to get you up to speed on the general layout and location, and I can walk you through the intended circulation. HLA indicated they/City do not have any current traffic counts to provide, so we'll need to collect any data required. Let me know any questions you have on scope. Thanks,

PAUL S. INWARDS, P.E. (WA, ID, OR, AZ, TX)
Senior Project Engineer

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Appendix B

Collision Data 2020 – 2022 and Accident Rates

Summary of Collision History in Sunnyside RNG Study Area 2020 - 2022

COUNTY	JURISDICTION	CITY	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	MILEPOST	REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FAT	# VEH	# PED	# BIKE	JUNCTION RELATIONSHIP	FIRST COLLISION TYPE / OBJECT STRUCK	VEHICLE 1 ACTION	VEHICLE 2 ACTION	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 1)	VEHICLE 1 COMPASS DIRECTION FROM	VEHICLE 1 COMPASS DIRECTION TO	VEHICLE 2 COMPASS DIRECTION FROM	VEHICLE 2 COMPASS DIRECTION TO	WA STATE PLANE SOUTH - X 2010 - FORWARD	WA STATE PLANE SOUTH - Y 2010 - FORWARD
Yakima	State Route	Sunnyside	082R106728		WB ramps	0.34	EC93132	10/11/2022	18:44	No Apparent Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end	Starting in Traffic Lane	Stopped at Signal or Stop Sign	Lost in Thought / Day Dreaming	East	West	West	Vehicle Stopped	1761674.87	355402.86
Yakima	State Route	Sunnyside	082R106728		WB ramps	0.33	EC90465	09/28/2022	17:43	No Apparent Injury	0	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped at Signal or Stop Sign	Follow Too Closely	East	West	Vehicle Stopped	Vehicle Stopped	1761713.96	355397.20
Yakima	State Route	Sunnyside	082S106644		WB ramps	0.00	EB27962	05/04/2021	08:53	No Apparent Injury	0	0	1	0	0	At Intersection and Related	Vehicle overturned	Making Left Turn		Exceeding Reas. Safe Speed	South	West			1761674.43	355411.75
Yakima	State Route	Sunnyside	082LX06693		EB ramps	0.14	EC87533	09/22/2022	18:16	No Apparent Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	Improper Turn/Merge	South	West	North	South	1761671.64	354649.85
Yakima	State Route	Sunnyside	082LX06693		EB ramps	0.15	EB33702	05/23/2021	01:16	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Entering at angle	Making Left Turn	Going Straight Ahead	Under Influence of Alcohol	West	North	South	North	1761689.27	354630.50
Yakima	City Street	Sunnyside	ALEXANDER RD		MIDVALE RD		EC25952	02/26/2022	08:50	Suspected Minor Injury	1	0	2	0	0	At Intersection and Related	Entering at angle	Going Straight Ahead	Going Straight Ahead	Did Not Grant RW to Vehicle	West	East	North	South	1761683.08	353626.36
Yakima	City Street	Sunnyside	ALEXANDER RD	0	MIDVALE RD		EC25956	02/24/2022	07:35	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Entering at angle	Making Right Turn	Stopped at Signal or Stop Sign	None	South	East	West	North	1761762.37	353627.56
Yakima	City Street	Sunnyside	EMERALD RD	9498	MIDVALE RD		EC17705	01/31/2022	15:01	No Apparent Injury	0	0	2	0	0	At Intersection and Related	From same direction - all others	Backing	Stopped at Signal or Stop Sign	Improper Backing	Vehicle Backed Up	Vehicle Backed Up	Vehicle Stopped	Vehicle Stopped	1761683.08	353626.36
Yakima	City Street	Sunnyside	ALEXANDER RD		MIDVALE RD		EB53600	07/24/2021	12:45	No Apparent Injury	0	0	2	0	0	At Intersection and Not Related	From same direction - both going straight - both moving - rear-end	Going Straight Ahead	Going Straight Ahead	Disregard Traffic Sign and Signals	East	West	East	West	1761683.08	353626.36
Yakima	City Street	Sunnyside	ALEXANDER RD		MIDVALE RD		EB40483	06/14/2021	14:18	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Entering at angle	Making Left Turn	Going Straight Ahead	Did Not Grant RW to Vehicle	East	South	North	South	1761683.08	353626.36
Yakima	City Street	Sunnyside	MIDVALE RD	398	EMERALD RD		EB25544	04/23/2021	21:58	Suspected Minor Injury	1	0	2	0	0	At Intersection and Related	Entering at angle	Going Straight Ahead	Going Straight Ahead	Under Influence of Alcohol	East	West	North	South	1761683.08	353626.36
Yakima	City Street	Sunnyside	MIDVALE RD	398	EMERALD RD		EB17547	03/20/2021	12:20	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Entering at angle	Going Straight Ahead	Going Straight Ahead	Did Not Grant RW to Vehicle	West	East	South	North	1761683.08	353626.36
Yakima	City Street	Sunnyside	MIDVALE RD	0	ALEXANDER RD		EA34903	05/18/2020	09:52	Possible Injury	1	0	2	0	0	At Intersection and Related	Entering at angle	Starting in Traffic Lane	Going Straight Ahead	Disregard Traffic Sign and Signals	West	East	North	South	1761682.72	353625.71
Yakima	City Street	Sunnyside	MIDVALE RD	0	ALEXANDER RD		EA12824	01/31/2020	17:22	Possible Injury	2	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one straight	Making Left Turn	Going Straight Ahead	Unknown Distraction	North	East	South	North	1761682.72	353625.71
Yakima	City Street	Sunnyside	MIDVALE RD	0	EMERALD RD		EA10006	01/25/2020	14:29	Possible Injury	1	0	2	0	0	At Intersection and Related	Entering at angle	Making Left Turn	Going Straight Ahead	Did Not Grant RW to Vehicle	West	North	South	North	1761682.72	353625.71
Yakima	State Route		241		Alex/S-M Hwy	6.24	EC31645	03/18/2022	15:14	Suspected Minor Injury	2	0	2	0	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end	Overtaking and Passing	Stopped at Signal or Stop Sign	Improper Passing	South	North	Vehicle Stopped	Vehicle Stopped	1767024.10	353594.31
Yakima	State Route		241		Alex/S-M Hwy	6.25	EC07374	12/31/2021	09:13	Suspected Minor Injury	1	0	2	0	0	At Intersection and Related	Entering at angle	Slowing	Slowing	Exceeding Reas. Safe Speed	North	South	West	East	1767025.62	353624.53
Yakima	State Route		241		Alex/S-M Hwy	6.25	EB07154	02/12/2021	13:59	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Entering at angle	Going Straight Ahead	Making Left Turn	Exceeding Reas. Safe Speed	North	South	West	North	1767020.52	353629.47
Yakima	State Route		241		Alex/S-M Hwy	6.25	EA72263	10/08/2020	00:00	Unknown	0	0	1	0	0	At Intersection and Related	Wood Sign Post	Going Straight Ahead		Unknown Distraction	West	East			1767020.81	353629.18
Yakima	State Route		241		Alex/S-M Hwy	6.25	EA59656	08/31/2020	04:18	No Apparent Injury	0	0	2	0	0	At Intersection and Related	Entering at angle	Making Left Turn	Going Straight Ahead	Did Not Grant RW to Vehicle	North	East	West	East	1767026.05	353624.11
Yakima	State Route		241		Alex/S-M Hwy	6.24	EA53651	08/07/2020	11:23	No Apparent Injury	0	0	2	0	0	Intersection Related but Not at Inter	From same direction - both going straight - both moving - rear-end	Going Straight Ahead	Slowing	Follow Too Closely	South	North	South	North	1767020.5	353599.48
Yakima	State Route		241		Alex/Waneta	7.25	EA33374	05/11/2020	16:37	No Apparent Injury	0	0	2	0	0	At Intersection and Related	From opposite direction - one left turn - one right turn	Making Right Turn	Making Left Turn	Did Not Grant RW to Vehicle	North	West	South	West	1772300.99	353796.39
Yakima	City Street	Sunnyside	ALEXANDER RD	728	S MCLEAN RD		EC87904	09/26/2022	15:48	No Apparent Injury	0	0	1	0	0	At Intersection and Related	Other Objects	Going Straight Ahead		Overcorrecting / Oversteering	East	South			1764361.50	353632.99
Yakima	City Street	Sunnyside	ALEXANDER RD	728	N MCLEAN RD		EB93542	11/09/2021	07:25	No Apparent Injury	0	0	2	0	0	At Intersection and Related	From same direction - one left turn - one straight	Overtaking and Passing	Making Left Turn	Improper Passing	West	East	West	North	1764361.50	353632.99

Collision Rate Calculations at Midvale Road/I-82 westbound ramps

Ra = System Wide Average Accident Rate 0.6
 K = Statistical Constant 1.645

Average Daily Vehicles Entering Intersection
 (Estimated, PM peak hour * 10)

Northbound	4650
Southbound	4830
Eastbound	0
Westbound	2470

M = Millions of Vehicles for a three year period = 13.08525

Critical Accident Rate (RC) = $Ra + K * (Ra/M)^{.5} - 1 / (2 * M)$ 0.9140386

Number of Accidents	3
Number of Years	3

Actual Accident Rate (per Million Entering Vehicles) 0.2292658

Collision Rate Calculations at Midvale Road/I-82 eastbound ramps

Ra = System Wide Average Accident Rate 0.6
 K = Statistical Constant 1.645

Average Daily Vehicles Entering Intersection
 (Estimated, PM peak hour * 10)

Northbound	3170
Southbound	3660
Eastbound	2760
Westbound	0

M = Millions of Vehicles for a three year period = 10.50105

Critical Accident Rate (RC) = $Ra + K * (Ra/M)^{.5} - 1 / (2 * M)$ 0.9455963

Number of Accidents	2
Number of Years	3

Actual Accident Rate (per Million Entering Vehicles) 0.1904571

Collision Rate Calculations at Midvale Road/Alexander/Emerald

Ra = System Wide Average Accident Rate 0.6
 K = Statistical Constant 1.645

Average Daily Vehicles Entering Intersection
 (Estimated, PM peak hour * 10)

Northbound	1590
Southbound	2800
Eastbound	910
Westbound	1540

M = Millions of Vehicles for a three year period = 7.4898

Critical Accident Rate (RC) = $Ra + K * (Ra/M)^{.5} - 1 / (2 * M)$

0.9988355

Number of Accidents	10
Number of Years	3

Actual Accident Rate (per Million Entering Vehicles)

1.3351491

Collision Rate Calculations at Alexander/Sunnyside-Mabton Rd

Ra = System Wide Average Accident Rate 0.6
 K = Statistical Constant 1.645

Average Daily Vehicles Entering Intersection
 (Estimated, PM peak hour * 10)

Northbound	2610
Southbound	2440
Eastbound	1640
Westbound	910

M = Millions of Vehicles for a three year period = 8.322

Critical Accident Rate (RC) = $Ra + K * (Ra/M)^{.5} - 1 / (2 * M)$ 0.9816186

Number of Accidents	6
Number of Years	3

Actual Accident Rate (per Million Entering Vehicles) 0.7209805

Collision Rate Calculations at Alexander/Waneta Rd

Ra = System Wide Average Accident Rate 0.6
 K = Statistical Constant 1.645

Average Daily Vehicles Entering Intersection
 (Estimated, PM peak hour * 10)

Northbound	960
Southbound	1910
Eastbound	960
Westbound	60

M = Millions of Vehicles for a three year period = 4.25955

Critical Accident Rate (RC) = $Ra + K * (Ra/M)^{.5} - 1 / (2 * M)$

1.1000068

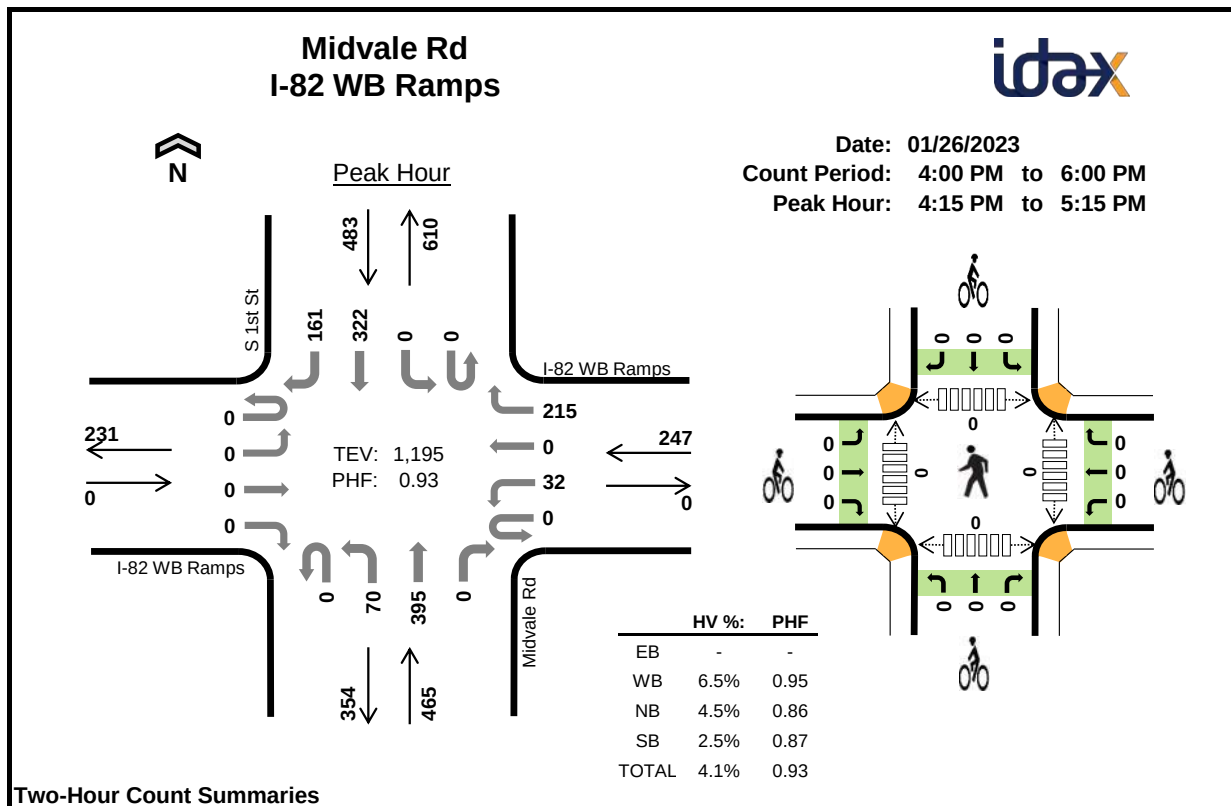
Number of Accidents	1
Number of Years	3

Actual Accident Rate (per Million Entering Vehicles)

0.2347666

Appendix C

Traffic Count Data

**Two-Hour Count Summaries**

Interval Start		I-82 WB Ramps				I-82 WB Ramps				Midvale Rd				S 1st St				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	0	0	0	0	10	2	33	0	21	88	0	0	0	98	34	286	0
4:15 PM		0	0	0	0	0	9	0	56	0	15	94	0	0	0	75	27	276	0
4:30 PM		0	0	0	0	0	14	0	49	0	26	109	0	0	0	78	45	321	0
4:45 PM		0	0	0	0	0	4	0	56	0	14	96	0	0	0	75	44	289	1,172
5:00 PM		0	0	0	0	0	5	0	54	0	15	96	0	0	0	94	45	309	1,195
5:15 PM		0	0	0	0	0	12	0	45	0	16	79	0	0	0	69	30	251	1,170
5:30 PM		0	0	0	0	0	4	0	46	0	15	84	0	0	0	52	34	235	1,084
5:45 PM		0	0	0	0	0	14	1	37	0	8	58	0	0	0	54	31	203	998
Count Total		0	0	0	0	0	72	3	376	0	130	704	0	0	0	595	290	2,170	0
Peak Hour	All	0	0	0	0	0	32	0	215	0	70	395	0	0	0	322	161	1,195	0
	HV	0	0	0	0	0	11	0	5	0	9	12	0	0	0	9	3	49	0
	HV%	-	-	-	-	-	34%	-	2%	-	13%	3%	-	-	-	3%	2%	4%	0

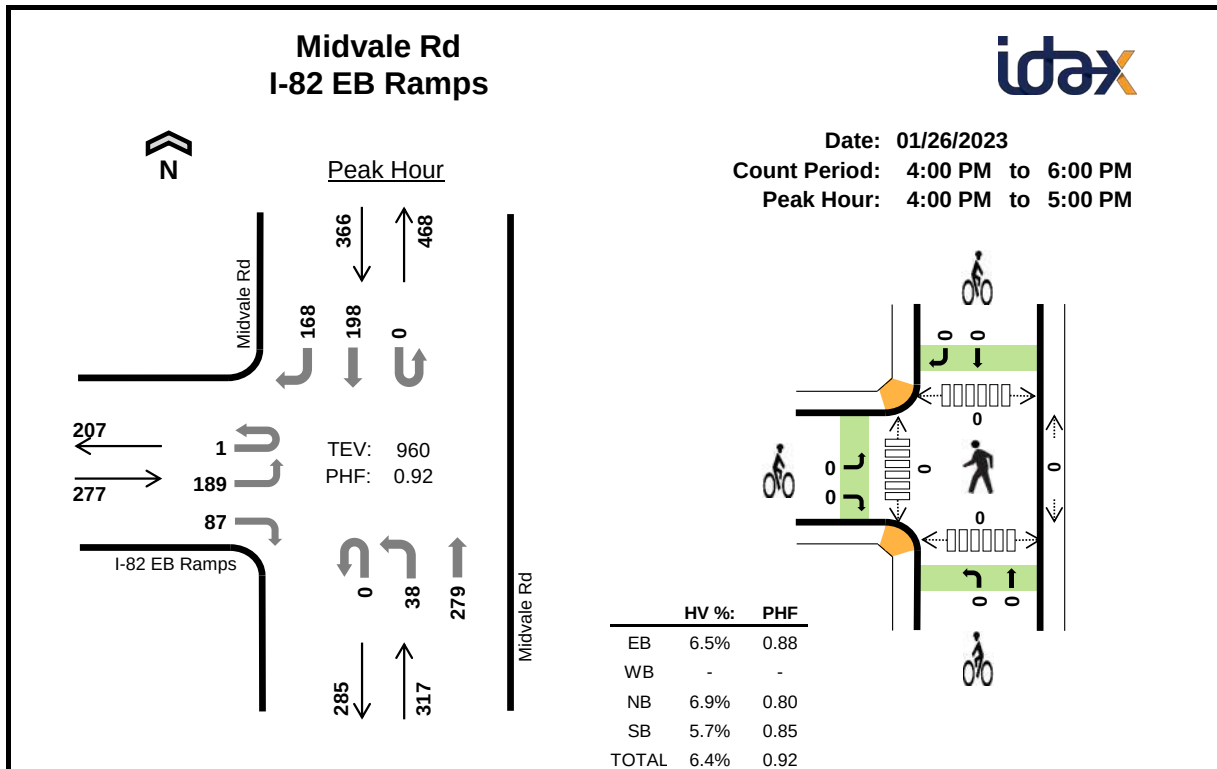
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	2	9	6	17	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	8	5	2	15	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	5	7	4	16	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	2	6	1	9	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	1	3	5	9	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	5	3	4	12	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	2	2	1	5	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	4	2	0	6	0	0	0	0	0	0	0	0	0	0
Count Total	0	29	37	23	89	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	16	21	12	49	0	0	0	0	0	0	0	0	0	0

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	I-82 WB Ramps				I-82 WB Ramps				Midvale Rd				S 1st St				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	1	1	0	0	3	6	0	0	0	5	1	17	0
4:15 PM	0	0	0	0	0	6	0	2	0	3	2	0	0	0	2	0	15	0
4:30 PM	0	0	0	0	0	4	0	1	0	2	5	0	0	0	3	1	16	0
4:45 PM	0	0	0	0	0	0	0	2	0	3	3	0	0	0	0	1	9	57
5:00 PM	0	0	0	0	0	1	0	0	0	1	2	0	0	0	4	1	9	49
5:15 PM	0	0	0	0	0	1	0	4	0	2	1	0	0	0	1	3	12	46
5:30 PM	0	0	0	0	0	2	0	0	0	1	1	0	0	0	0	1	5	35
5:45 PM	0	0	0	0	0	4	0	0	0	1	1	0	0	0	0	0	6	32
Count Total	0	0	0	0	0	19	1	9	0	16	21	0	0	0	15	8	89	0
Peak Hour	0	0	0	0	0	11	0	5	0	9	12	0	0	0	9	3	49	0

Two-Hour Count Summaries - Bikes																	
Interval Start	I-82 WB Ramps			I-82 WB Ramps			Midvale Rd			S 1st St			15-min Total	Rolling One Hour			
	Eastbound			Westbound			Northbound			Southbound							
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT					
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0			

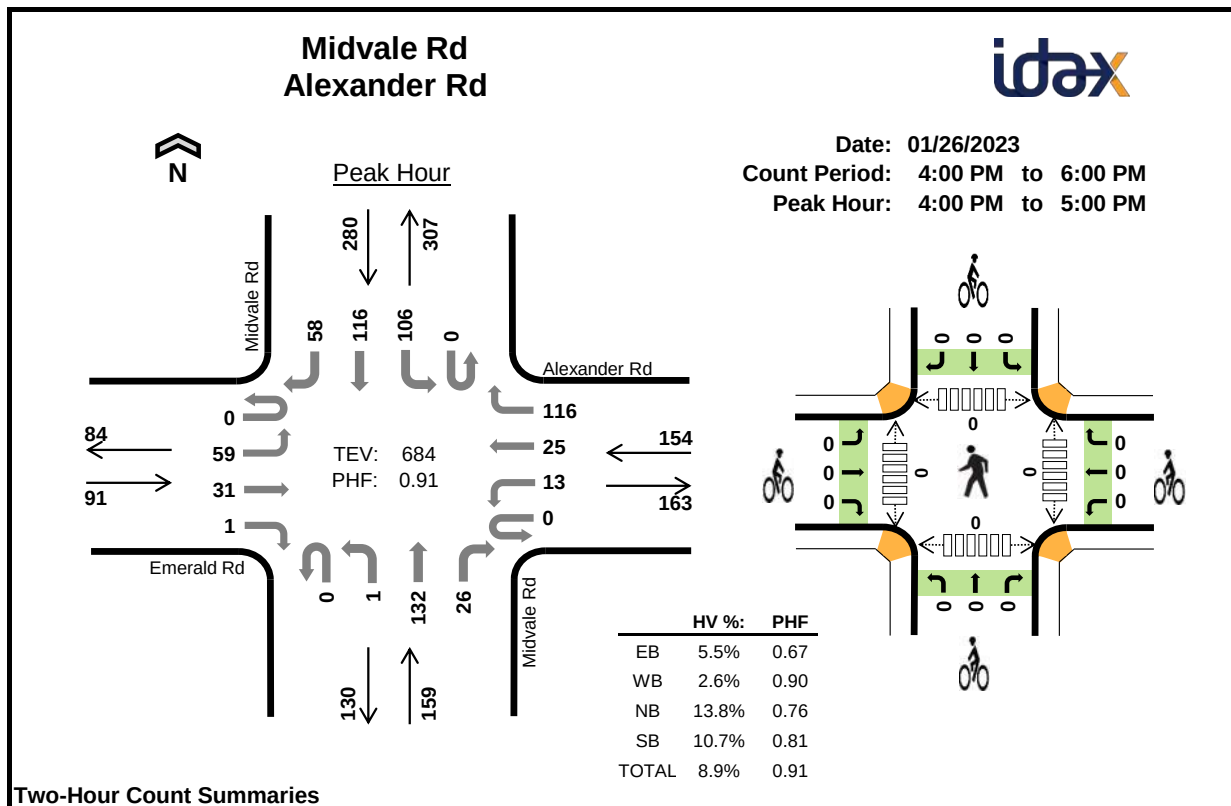
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

**Two-Hour Count Summaries**

Interval Start		I-82 EB Ramps				0				Midvale Rd				Midvale Rd				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	48	0	28	0	0	0	0	0	15	61	0	0	0	61	47	260	0
4:15 PM		0	53	0	26	0	0	0	0	0	10	61	0	0	0	49	35	234	0
4:30 PM		1	42	0	18	0	0	0	0	0	8	91	0	0	0	51	40	251	0
4:45 PM		0	46	0	15	0	0	0	0	0	5	66	0	0	0	37	46	215	960
5:00 PM		0	46	0	15	0	0	0	0	0	11	61	0	0	0	57	41	231	931
5:15 PM		1	39	0	16	0	0	0	0	0	17	58	0	0	0	50	32	213	910
5:30 PM		0	42	0	19	0	0	0	0	0	17	55	0	0	0	29	27	189	848
5:45 PM		0	24	0	17	0	0	0	0	0	8	43	0	0	0	44	23	159	792
Count Total		2	340	0	154	0	0	0	0	0	91	496	0	0	0	378	291	1,752	0
Peak Hour	All	1	189	0	87	0	0	0	0	0	38	279	0	0	0	198	168	960	0
	HV	0	5	0	13	0	0	0	0	0	3	19	0	0	0	15	6	61	0
	HV%	0%	3%	-	15%	-	-	-	-	-	8%	7%	-	-	-	8%	4%	6%	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	7	0	8	6	21	0	0	0	0	0	0	0	0	0	0
4:15 PM	5	0	6	8	19	0	0	0	0	0	0	0	0	0	0
4:30 PM	3	0	2	7	12	0	0	0	0	0	0	0	0	0	0
4:45 PM	3	0	6	0	9	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	5	5	10	0	0	0	0	0	0	0	0	0	0
5:15 PM	2	0	3	2	7	0	0	0	0	0	0	0	0	0	0
5:30 PM	5	0	4	2	11	0	0	0	0	0	0	0	0	0	0
5:45 PM	4	0	2	4	10	0	0	0	0	0	0	0	0	0	0
Count Total	29	0	36	34	99	0	0	0	0	0	0	0	0	0	0
Peak Hr	18	0	22	21	61	0	0	0	0	0	0	0	0	0	0

**Two-Hour Count Summaries**

Interval Start		Emerald Rd				Alexander Rd				Midvale Rd				Midvale Rd				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
	4:00 PM	0	9	6	0	0	2	7	22	0	0	44	8	0	32	39	15	184	0
	4:15 PM	0	11	10	0	0	6	8	29	0	0	26	8	0	28	26	18	170	0
	4:30 PM	0	26	8	0	0	3	4	35	0	1	37	6	0	22	28	17	187	0
	4:45 PM	0	13	7	1	0	2	6	30	0	0	25	4	0	24	23	8	143	684
	5:00 PM	0	12	2	1	0	4	4	25	0	1	36	6	0	29	27	18	165	665
	5:15 PM	0	21	3	0	0	3	7	16	0	0	39	4	0	20	30	14	157	652
	5:30 PM	0	11	1	1	0	2	1	27	0	0	28	3	0	23	22	4	123	588
	5:45 PM	0	8	4	0	0	1	4	24	0	0	18	8	0	36	13	11	127	572
Count Total		0	111	41	3	0	23	41	208	0	2	253	47	0	214	208	105	1,256	0
Peak Hour	All	0	59	31	1	0	13	25	116	0	1	132	26	0	106	116	58	684	0
	HV	0	1	4	0	0	0	0	4	0	0	15	7	0	7	19	4	61	0
	HV%	-	2%	13%	0%	-	0%	0%	3%	-	0%	11%	27%	-	7%	16%	7%	9%	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	2	1	6	10	19	0	0	0	0	0	0	0	0	0	0
4:15 PM	2	1	6	12	21	0	0	0	0	0	0	0	0	0	0
4:30 PM	1	0	4	7	12	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	2	6	1	9	0	0	0	0	0	0	0	0	0	0
5:00 PM	1	1	3	4	9	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	3	3	6	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	1	2	5	8	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	1	1	9	11	0	0	0	0	0	0	0	0	0	0
Count Total	6	7	31	51	95	0	0	0	0	0	0	0	0	0	0
Peak Hour	5	4	22	30	61	0	0	0	0	0	0	0	0	0	0

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Emerald Rd				Alexander Rd				Midvale Rd				Midvale Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	2	0	0	0	0	1	0	0	5	1	0	4	6	0	19	0
4:15 PM	0	1	1	0	0	0	0	1	0	0	3	3	0	1	7	4	21	0
4:30 PM	0	0	1	0	0	0	0	0	0	0	3	1	0	1	6	0	12	0
4:45 PM	0	0	0	0	0	0	0	2	0	0	4	2	0	1	0	0	9	61
5:00 PM	0	1	0	0	0	0	0	1	0	0	3	0	0	1	3	0	9	51
5:15 PM	0	0	0	0	0	0	0	0	0	0	3	0	0	2	1	0	6	36
5:30 PM	0	0	0	0	0	0	0	1	0	0	2	0	0	2	3	0	8	32
5:45 PM	0	0	0	0	0	1	0	0	0	0	1	0	0	6	3	0	11	34
Count Total	0	2	4	0	0	1	0	6	0	0	24	7	0	18	29	4	95	0
Peak Hour	0	1	4	0	0	0	0	4	0	0	15	7	0	7	19	4	61	0

Two-Hour Count Summaries - Bikes																		
Interval Start	Emerald Rd			Alexander Rd			Midvale Rd			Midvale Rd			15-min Total	Rolling One Hour				
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0				

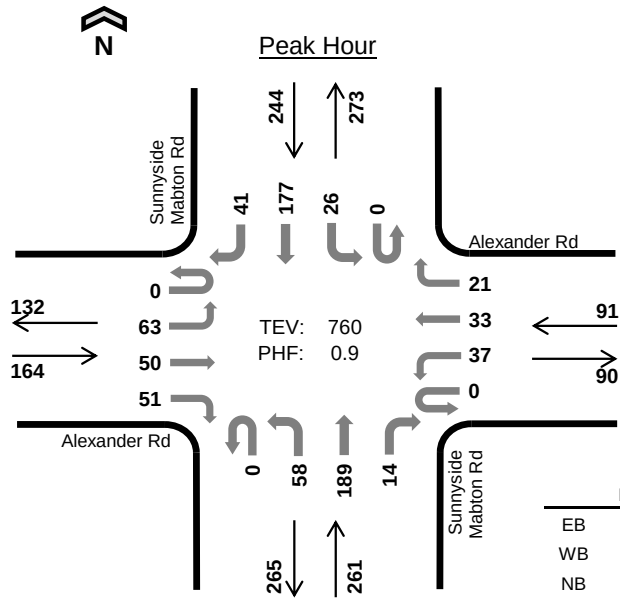
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	I-82 EB Ramps				0				Midvale Rd				Midvale Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	2	0	5	0	0	0	0	0	2	6	0	0	0	2	4	21	0
4:15 PM	0	1	0	4	0	0	0	0	0	0	6	0	0	0	8	0	19	0
4:30 PM	0	1	0	2	0	0	0	0	0	0	2	0	0	0	5	2	12	0
4:45 PM	0	1	0	2	0	0	0	0	0	1	5	0	0	0	0	0	9	61
5:00 PM	0	0	0	0	0	0	0	0	0	2	3	0	0	0	4	1	10	50
5:15 PM	0	0	0	2	0	0	0	0	0	1	2	0	0	0	1	1	7	38
5:30 PM	0	1	0	4	0	0	0	0	0	1	3	0	0	0	2	0	11	37
5:45 PM	0	1	0	3	0	0	0	0	0	0	2	0	0	0	4	0	10	38
Count Total	0	7	0	22	0	0	0	0	0	7	29	0	0	0	26	8	99	0
Peak Hour	0	5	0	13	0	0	0	0	0	3	19	0	0	0	15	6	61	0

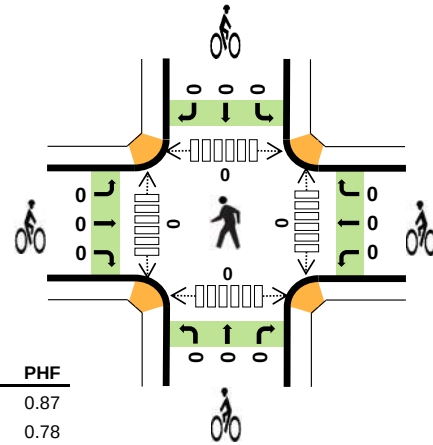
Two-Hour Count Summaries - Bikes																		
Interval Start	I-82 EB Ramps			0			Midvale Rd			Midvale Rd			15-min Total	Rolling One Hour				
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0				

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Sunnyside Mabton Rd Alexander Rd



Date: 01/26/2023
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:15 PM to 5:15 PM



	HV %:	PHF
EB	7.3%	0.87
WB	6.6%	0.78
NB	1.9%	0.86
SB	2.0%	0.77
TOTAL	3.7%	0.90

Two-Hour Count Summaries

Interval Start		Alexander Rd				Alexander Rd				Sunnyside Mabton Rd				Sunnyside Mabton Rd				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	18	15	17	0	10	6	3	0	9	39	4	0	9	43	11	184	0
4:15 PM		0	19	14	14	0	14	11	4	0	21	53	2	0	8	40	10	210	0
4:30 PM		0	20	17	9	0	9	6	7	0	14	49	1	0	6	38	8	184	0
4:45 PM		0	13	6	11	0	8	7	6	0	13	40	9	0	5	40	10	168	746
5:00 PM		0	11	13	17	0	6	9	4	0	10	47	2	0	7	59	13	198	760
5:15 PM		0	12	5	10	0	9	5	5	0	7	49	3	0	7	41	13	166	716
5:30 PM		0	11	6	5	0	7	4	8	0	11	39	4	0	3	33	6	137	669
5:45 PM		0	11	4	13	0	4	5	7	0	11	30	4	0	5	35	7	136	637
Count Total		0	115	80	96	0	67	53	44	0	96	346	29	0	50	329	78	1,383	0
Peak Hour	All	0	63	50	51	0	37	33	21	0	58	189	14	0	26	177	41	760	0
	HV	0	2	8	2	0	0	5	1	0	2	2	1	0	3	1	1	28	0
	HV%	-	3%	16%	4%	-	0%	15%	5%	-	3%	1%	7%	-	12%	1%	2%	4%	0

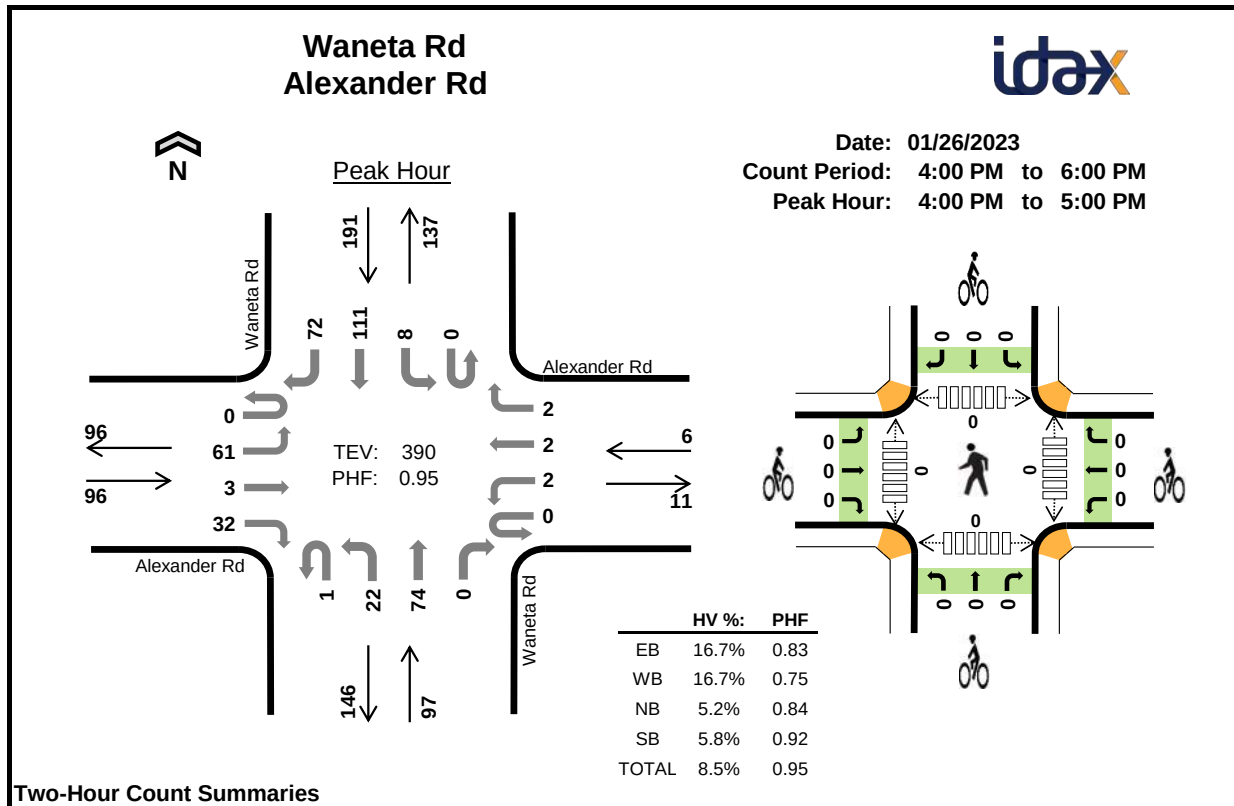
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	5	1	2	1	9	0	0	0	0	0	0	0	0	0	0
4:15 PM	7	2	2	2	13	0	0	0	0	0	0	0	0	0	0
4:30 PM	2	0	1	1	4	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	4	2	0	6	0	0	0	0	0	0	0	0	0	0
5:00 PM	3	0	0	2	5	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	1	1	1	3	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
5:45 PM	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0
Count Total	18	9	9	7	43	0	0	0	0	0	0	0	0	0	0
Peak Hour	12	6	5	5	28	0	0	0	0	0	0	0	0	0	0

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Alexander Rd				Alexander Rd				Sunnyside Mabton Rd				Sunnyside Mabton Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	2	3	0	0	0	1	0	0	0	1	1	0	1	0	0	9	0
4:15 PM	0	2	5	0	0	0	2	0	0	1	1	0	0	2	0	0	13	0
4:30 PM	0	0	2	0	0	0	0	0	0	0	1	0	0	0	1	0	4	0
4:45 PM	0	0	0	0	0	0	3	1	0	1	0	1	0	0	0	0	6	32
5:00 PM	0	0	1	2	0	0	0	0	0	0	0	0	0	1	0	1	5	28
5:15 PM	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	3	18
5:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	15
5:45 PM	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	2	11
Count Total	0	4	11	3	0	1	7	1	0	3	4	2	0	4	2	1	43	0
Peak Hour	0	2	8	2	0	0	5	1	0	2	2	1	0	3	1	1	28	0

Two-Hour Count Summaries - Bikes																		
Interval Start	Alexander Rd			Alexander Rd			Sunnyside Mabton Rd			Sunnyside Mabton Rd						15-min Total	Rolling One Hour	
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT			
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



Interval Start		Alexander Rd				Alexander Rd				Waneta Rd				Waneta Rd				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	17	2	10	0	1	0	0	1	4	19	0	0	1	26	20	101	0
4:15 PM		0	17	1	6	0	0	0	1	0	4	14	0	0	1	22	23	89	0
4:30 PM		0	13	0	7	0	1	1	0	0	5	24	0	0	2	32	12	97	0
4:45 PM		0	14	0	9	0	0	1	1	0	9	17	0	0	4	31	17	103	390
5:00 PM		0	18	0	5	0	1	0	0	0	6	20	0	0	1	31	15	97	386
5:15 PM		0	4	0	8	0	1	0	2	0	4	21	1	0	0	28	13	82	379
5:30 PM		1	8	1	2	0	0	1	0	0	6	16	0	0	0	21	14	70	352
5:45 PM		0	8	1	4	0	0	0	4	0	2	18	0	0	1	30	11	79	328
Count Total		1	99	5	51	0	4	3	8	1	40	149	1	0	10	221	125	718	0
Peak Hour	All	0	61	3	32	0	2	2	2	1	22	74	0	0	8	111	72	390	0
	HV	0	10	0	6	0	0	0	1	0	1	4	0	0	0	5	6	33	0
	HV%	-	16%	0%	19%	-	0%	0%	50%	0%	5%	5%	-	-	0%	5%	8%	8%	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	5	0	4	2	11	0	0	0	0	0	0	0	0	0	0
4:15 PM	6	0	0	3	9	0	0	0	0	0	0	0	0	0	0
4:30 PM	3	0	1	3	7	0	0	0	0	0	0	0	0	0	0
4:45 PM	2	1	0	3	6	0	0	0	0	0	0	0	0	0	0
5:00 PM	2	0	0	1	3	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Count Total	18	1	5	14	38	0	0	0	0	0	0	0	0	0	0
Peak Hour	16	1	5	11	33	0	0	0	0	0	0	0	0	0	0

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Alexander Rd				Alexander Rd				Waneta Rd				Waneta Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	2	0	3	0	0	0	0	0	1	3	0	0	0	2	0	11	0
4:15 PM	0	6	0	0	0	0	0	0	0	0	0	0	0	0	1	2	9	0
4:30 PM	0	1	0	2	0	0	0	0	0	0	1	0	0	0	2	1	7	0
4:45 PM	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	3	6	33
5:00 PM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	25
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	17
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	5
Count Total	0	12	0	6	0	0	0	1	0	1	4	0	0	0	7	7	38	0
Peak Hour	0	10	0	6	0	0	0	1	0	1	4	0	0	0	5	6	33	0

Two-Hour Count Summaries - Bikes																		
Interval Start	Alexander Rd			Alexander Rd			Waneta Rd			Waneta Rd			15-min Total	Rolling One Hour				
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0				

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Appendix D:

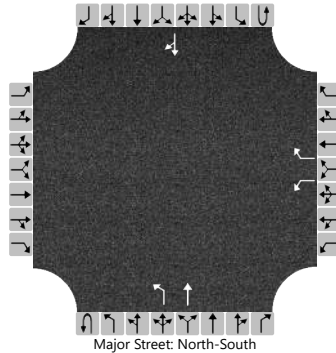
**Highway Capacity Software
Level of Service Worksheets**

HCS7 Two-Way Stop-Control Report

General Information

Analyst	Montgomery	Intersection	I-82 WB ramps/Midvale Roa
Agency/Co.	JUB Engineers	Jurisdiction	City of Sunyside
Date Performed	2/2/2023	East/West Street	I-82 westbound ramps
Analysis Year	2023	North/South Street	Midvale Road
Time Analyzed	PM Peak Hour	Peak Hour Factor	0.93
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Sunnyside RNG		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	1	1	0	0	0	1	0
Configuration						L		R		L	T					TR
Volume (veh/h)						32		215		70	395				322	161
Percent Heavy Vehicles (%)						3		3		3						
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized					No											
Median Type Storage	Left Only								1							

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2		4.1						
Critical Headway (sec)						7.13		6.23		4.13						
Base Follow-Up Headway (sec)						3.5		3.3		2.2						
Follow-Up Headway (sec)						3.53		3.33		2.23						

Delay, Queue Length, and Level of Service

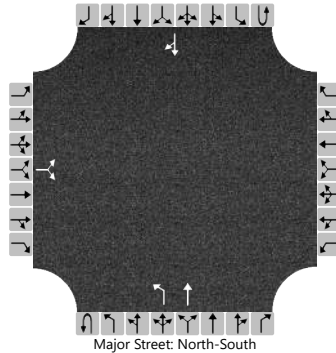
Flow Rate, v (veh/h)						34		231		75						
Capacity, c (veh/h)						318		627		1042						
v/c Ratio						0.11		0.37		0.07						
95% Queue Length, Q ₉₅ (veh)						0.4		1.7		0.2						
Control Delay (s/veh)						17.7		14.0		8.7						
Level of Service (LOS)						C		B		A						
Approach Delay (s/veh)					14.5				1.3							
Approach LOS					B											

HCS7 Two-Way Stop-Control Report

General Information

Analyst	Montgomery	Intersection	I-82 EB ramps/Midvale Rd
Agency/Co.	JUB Engineers	Jurisdiction	City of Sunnyside
Date Performed	2/2/2023	East/West Street	I-82 eastbound ramps
Analysis Year	2023	North/South Street	Midvale Road
Time Analyzed	PM Peak Hour	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Sunnyside RNG		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		189		87						38	279				198	168
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Left Only								1							

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

Delay, Queue Length, and Level of Service

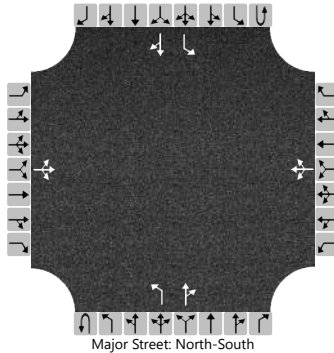
Flow Rate, v (veh/h)			300							41						
Capacity, c (veh/h)			553							1155						
v/c Ratio			0.54							0.04						
95% Queue Length, Q ₉₅ (veh)			3.2							0.1						
Control Delay (s/veh)			18.9							8.2						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)	18.9								1.0							
Approach LOS	C															

HCS7 Two-Way Stop-Control Report

General Information

Analyst	Montgomery	Intersection	Midvale/Alexander
Agency/Co.	JUB Engineers	Jurisdiction	City of Sunnyside
Date Performed	2/2/2023	East/West Street	Alexander Rd
Analysis Year	2023	North/South Street	Midvale Road
Time Analyzed	PM Peak Hour	Peak Hour Factor	0.91
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Sunnyside RNG		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	1	1	0	0	1	1	0
Configuration			LTR				LTR			L		TR		L		TR
Volume (veh/h)		59	31	1		13	25	116		1	132	26		106	116	58
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

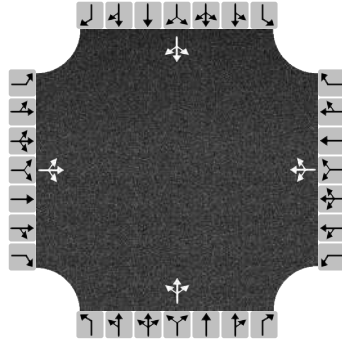
Flow Rate, v (veh/h)			100				169			1				116		
Capacity, c (veh/h)			327				667			1376				1397		
v/c Ratio			0.31				0.25			0.00				0.08		
95% Queue Length, Q ₉₅ (veh)			1.3				1.0			0.0				0.3		
Control Delay (s/veh)			20.8				12.2			7.6				7.8		
Level of Service (LOS)			C				B			A				A		
Approach Delay (s/veh)	20.8				12.2				0.0				3.0			
Approach LOS	C				B											

HCS7 All-Way Stop Control Report

General Information

Analyst	Montgomery	Intersection	Alexander/SR 241/Suny-Mab
Agency/Co.	JUB Engineers	Jurisdiction	City of Sunnyside
Date Performed	2/2/2023	East/West Street	Alexander Rd/SR 241
Analysis Year	2023	North/South Street	SR241/Sunnyside-Mabton Rd
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.93
Time Analyzed	PM Peak Hour		
Project Description	Sunnyside RNG		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	63	50	51	37	33	21	58	189	14	26	177	41
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	176			98			281			262		
Percent Heavy Vehicles	7			7			2			2		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.157			0.087			0.249			0.233		
Final Departure Headway, hd (s)	5.50			5.70			5.13			5.06		
Final Degree of Utilization, x	0.269			0.155			0.400			0.369		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	3.50			3.70			3.13			3.06		

Capacity, Delay and Level of Service

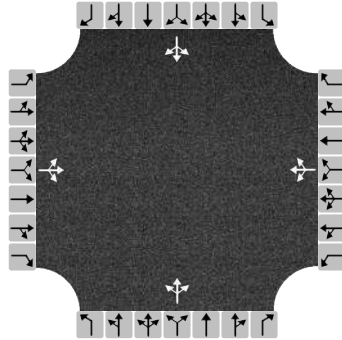
Flow Rate, v (veh/h)	176			98			281			262		
Capacity	654			631			702			711		
95% Queue Length, Q ₉₅ (veh)	1.1			0.5			1.9			1.7		
Control Delay (s/veh)	10.5			9.7			11.5			11.0		
Level of Service, LOS	B			A			B			B		
Approach Delay (s/veh)	10.5			9.7			11.5			11.0		
Approach LOS	B			A			B			B		
Intersection Delay, s/veh LOS	10.9						B					

HCS7 All-Way Stop Control Report

General Information

Analyst	Montgomery	Intersection	Alexander/SR 241/Waneta
Agency/Co.	JUB Engineers	Jurisdiction	City of Sunnyside
Date Performed	2/2/2023	East/West Street	Alexander Rd/SR 241
Analysis Year	2023	North/South Street	SR241/Waneta
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.95
Time Analyzed	PM Peak Hour		
Project Description	Sunnyside RNG		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	61	3	32	2	2	2	22	74	0	8	111	72
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	101			6			101			201		
Percent Heavy Vehicles	17			17			5			6		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.090			0.006			0.090			0.179		
Final Departure Headway, hd (s)	4.80			4.87			4.51			4.17		
Final Degree of Utilization, x	0.135			0.009			0.127			0.233		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	2.80			2.87			2.51			2.17		

Capacity, Delay and Level of Service

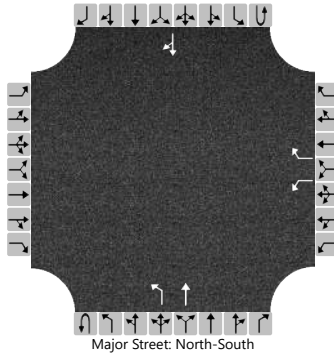
Flow Rate, v (veh/h)	101			6			101			201		
Capacity	750			739			798			863		
95% Queue Length, Q ₉₅ (veh)	0.5			0.0			0.4			0.9		
Control Delay (s/veh)	8.5			7.9			8.2			8.4		
Level of Service, LOS	A			A			A			A		
Approach Delay (s/veh)	8.5			7.9			8.2			8.4		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh LOS	8.4						A					

HCS7 Two-Way Stop-Control Report

General Information

Analyst	Montgomery	Intersection	I-82 WB ramps/Midvale Rd
Agency/Co.	JUB Engineers	Jurisdiction	City of Sunnyside
Date Performed	7/3/2023	East/West Street	I-82 westbound ramps
Analysis Year	2028	North/South Street	Midvale Road
Time Analyzed	PM Peak Hour - No-Build	Peak Hour Factor	0.93
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Sunnyside RNG		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	1	1	0	0	0	1	0
Configuration						L		R		L	T					TR
Volume (veh/h)						35		237		77	436				356	178
Percent Heavy Vehicles (%)						3		3		3						
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized					No											
Median Type Storage	Left Only								1							

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2		4.1						
Critical Headway (sec)						7.13		6.23		4.13						
Base Follow-Up Headway (sec)						3.5		3.3		2.2						
Follow-Up Headway (sec)						3.53		3.33		2.23						

Delay, Queue Length, and Level of Service

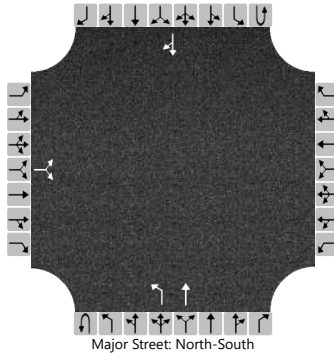
Flow Rate, v (veh/h)						38		255		83						
Capacity, c (veh/h)						285		592		994						
v/c Ratio						0.13		0.43		0.08						
95% Queue Length, Q ₉₅ (veh)						0.4		2.2		0.3						
Control Delay (s/veh)						19.5		15.6		9.0						
Level of Service (LOS)						C		C		A						
Approach Delay (s/veh)					16.1				1.3							
Approach LOS					C											

HCS7 Two-Way Stop-Control Report

General Information

Analyst	Montgomery	Intersection	I-82 EB ramps/Midvale Rd
Agency/Co.	JUB Engineers	Jurisdiction	City of Sunnyside
Date Performed	7/3/2023	East/West Street	I-82 eastbound ramps
Analysis Year	2028	North/South Street	Midvale Road
Time Analyzed	PM Peak Hour - No-Build	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Sunnyside RNG		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		209		96						42	308				219	185
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Left Only								1							

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

Delay, Queue Length, and Level of Service

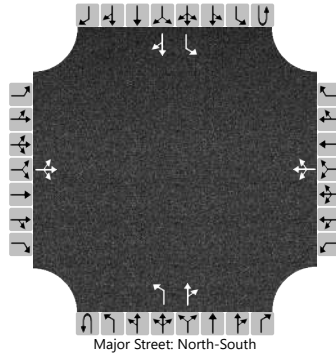
Flow Rate, v (veh/h)			332							46						
Capacity, c (veh/h)			522							1115						
v/c Ratio			0.64							0.04						
95% Queue Length, Q ₉₅ (veh)			4.4							0.1						
Control Delay (s/veh)			23.1							8.4						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)	23.1								1.0							
Approach LOS	C															

HCS7 Two-Way Stop-Control Report

General Information

Analyst	Montgomery	Intersection	Midvale/Alexander
Agency/Co.	JUB Engineers	Jurisdiction	City of Sunnyside
Date Performed	7/3/2023	East/West Street	Alexander Rd
Analysis Year	2028	North/South Street	Midvale Road
Time Analyzed	PM Peak Hour - No-Build	Peak Hour Factor	0.91
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Sunnyside RNG		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	1	1	0	0	1	1	0
Configuration			LTR				LTR			L		TR		L		TR
Volume (veh/h)		65	34	1		14	28	128		1	146	29		117	128	64
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			110				187			1				129		
Capacity, c (veh/h)			287				631			1354				1375		
v/c Ratio			0.38				0.30			0.00				0.09		
95% Queue Length, Q ₉₅ (veh)			1.7				1.2			0.0				0.3		
Control Delay (s/veh)			25.1				13.1			7.7				7.9		
Level of Service (LOS)			D				B			A				A		
Approach Delay (s/veh)	25.1				13.1				0.0				3.0			
Approach LOS	D				B											

HCS7 Two-Way Stop-Control Report

General Information

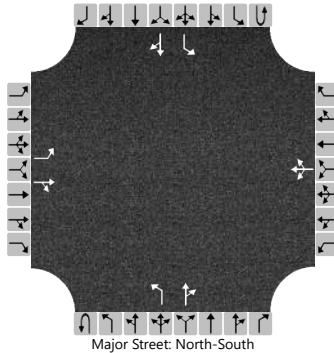
Analyst	Montgomery
Agency/Co.	JUB Engineers
Date Performed	7/3/2023
Analysis Year	2028
Time Analyzed	PM Peak Hour - No-Build
Intersection Orientation	North-South
Project Description	Sunnyside RNG

Site Information

Intersection	Midvale/Alexander
Jurisdiction	City of Sunnyside
East/West Street	Alexander Rd
North/South Street	Midvale Road
Peak Hour Factor	0.91
Analysis Time Period (hrs)	0.25

Lanes

Mitigated



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	0		0	1	0	0	1	1	0	0	1	1	0
Configuration		L		TR			LTR			L		TR		L		TR
Volume (veh/h)		65	34	1		14	28	128		1	146	29		117	128	64
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		71		38		187			1				129		
Capacity, c (veh/h)		257		367		631			1354				1375		
v/c Ratio		0.28		0.10		0.30			0.00				0.09		
95% Queue Length, Q ₉₅ (veh)		1.1		0.3		1.2			0.0				0.3		
Control Delay (s/veh)		24.3		15.9		13.1			7.7				7.9		
Level of Service (LOS)		C		C		B			A				A		
Approach Delay (s/veh)	21.4			13.1			0.0			3.0					
Approach LOS	C			B											

HCS7 All-Way Stop Control Report

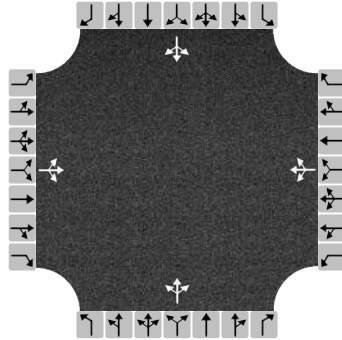
General Information

Analyst	Montgomery
Agency/Co.	JUB Engineers
Date Performed	7/3/2023
Analysis Year	2028
Analysis Time Period (hrs)	0.25
Time Analyzed	PM Peak Hour-No-Build
Project Description	Sunnyside RNG

Site Information

Intersection	Alexander/SR 241/Suny-Mab
Jurisdiction	City of Sunnyside
East/West Street	Alexander Rd/SR 241
North/South Street	SR241/Sunnyside-Mabton Rd
Peak Hour Factor	0.93

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	70	55	56	41	36	23	64	209	15	29	195	45
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	195			108			310			289		
Percent Heavy Vehicles	7			7			2			2		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.173			0.096			0.275			0.257		
Final Departure Headway, hd (s)	5.72			5.96			5.31			5.25		
Final Degree of Utilization, x	0.309			0.178			0.457			0.422		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	3.72			3.96			3.31			3.25		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	195			108			310			289		
Capacity	629			604			678			685		
95% Queue Length, Q ₉₅ (veh)	1.3			0.6			2.4			2.1		
Control Delay (s/veh)	11.3			10.2			12.7			12.0		
Level of Service, LOS	B			B			B			B		
Approach Delay (s/veh)	11.3			10.2			12.7			12.0		
Approach LOS	B			B			B			B		
Intersection Delay, s/veh LOS	11.9						B					

HCS7 All-Way Stop Control Report

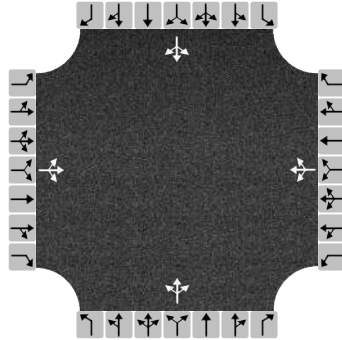
General Information

Analyst	Montgomery
Agency/Co.	JUB Engineers
Date Performed	7/3/2023
Analysis Year	2028
Analysis Time Period (hrs)	0.25
Time Analyzed	PM Peak Hour - No-Build
Project Description	Sunnyside RNG

Site Information

Intersection	Alexander/SR 241/Waneta
Jurisdiction	City of Sunnyside
East/West Street	Alexander Rd/SR 241
North/South Street	SR241/Waneta
Peak Hour Factor	0.95

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	67	3	35	2	2	2	24	82	0	9	123	79
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	111			6			112			222		
Percent Heavy Vehicles	17			17			5			6		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.098			0.006			0.099			0.197		
Final Departure Headway, hd (s)	4.88			4.96			4.57			4.22		
Final Degree of Utilization, x	0.150			0.009			0.142			0.260		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	2.88			2.96			2.57			2.22		

Capacity, Delay and Level of Service

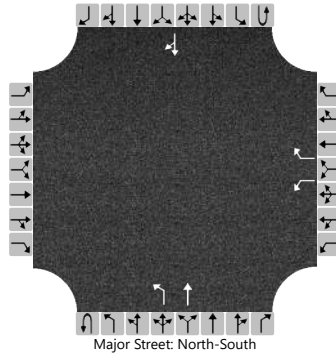
Flow Rate, v (veh/h)	111			6			112			222		
Capacity	738			725			788			854		
95% Queue Length, Q ₉₅ (veh)	0.5			0.0			0.5			1.0		
Control Delay (s/veh)	8.7			8.0			8.3			8.7		
Level of Service, LOS	A			A			A			A		
Approach Delay (s/veh)	8.7			8.0			8.3			8.7		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh LOS	8.6						A					

HCS7 Two-Way Stop-Control Report

General Information

Analyst	Montgomery	Intersection	I-82 WB ramps/Midvale Rd
Agency/Co.	JUB Engineers	Jurisdiction	City of Sunnyside
Date Performed	7/3/2023	East/West Street	I-82 westbound ramps
Analysis Year	2028	North/South Street	Midvale Road
Time Analyzed	PM Peak Hour - Build	Peak Hour Factor	0.93
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Sunnyside RNG		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	1	1	0	0	0	1	0
Configuration						L		R		L	T					TR
Volume (veh/h)						35		237		91	441				357	178
Percent Heavy Vehicles (%)						3		3		16						
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized					No											
Median Type Storage	Left Only								1							

Critical and Follow-up Headways

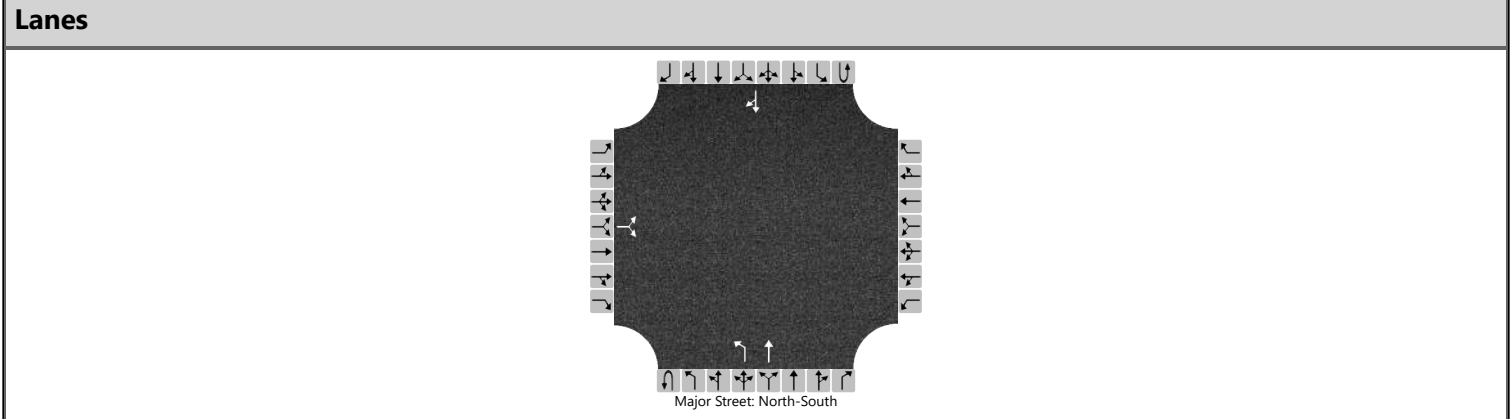
Base Critical Headway (sec)						7.1		6.2		4.1						
Critical Headway (sec)						7.13		6.23		4.26						
Base Follow-Up Headway (sec)						3.5		3.3		2.2						
Follow-Up Headway (sec)						3.53		3.33		2.34						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						38		255		98						
Capacity, c (veh/h)						269		588		932						
v/c Ratio						0.14		0.43		0.10						
95% Queue Length, Q ₉₅ (veh)						0.5		2.2		0.4						
Control Delay (s/veh)						20.6		15.7		9.3						
Level of Service (LOS)						C		C		A						
Approach Delay (s/veh)					16.3				1.6							
Approach LOS					C											

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Montgomery	Intersection	I-82 EB ramps/Midvale Rd
Agency/Co.	JUB Engineers	Jurisdiction	City of Sunnyside
Date Performed	7/3/2023	East/West Street	I-82 eastbound ramps
Analysis Year	2028	North/South Street	Midvale Road
Time Analyzed	PM Peak Hour - Build	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Sunnyside RNG		



Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume (veh/h)		209		100						42	327				220	185
Percent Heavy Vehicles (%)		3		7						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Left Only								1							

Critical and Follow-up Headways																
Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.27						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.36						2.23						

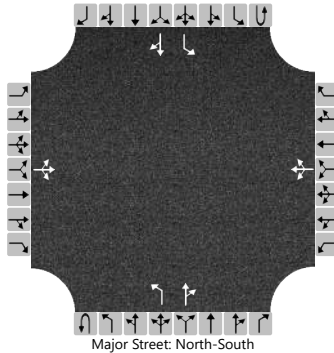
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)			336							46						
Capacity, c (veh/h)			514							1114						
v/c Ratio			0.65							0.04						
95% Queue Length, Q ₉₅ (veh)			4.7							0.1						
Control Delay (s/veh)			24.2							8.4						
Level of Service (LOS)			C							A						
Approach Delay (s/veh)	24.2								1.0							
Approach LOS	C															

HCS7 Two-Way Stop-Control Report

General Information

Analyst	Montgomery	Intersection	Midvale/Alexander
Agency/Co.	JUB Engineers	Jurisdiction	City of Sunnyside
Date Performed	7/3/2023	East/West Street	Alexander Rd
Analysis Year	2028	North/South Street	Midvale Road
Time Analyzed	PM Peak Hour - Build	Peak Hour Factor	0.91
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Sunnyside RNG		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	1	1	0	0	1	1	0
Configuration			LTR				LTR			L		TR		L		TR
Volume (veh/h)		65	34	1		15	30	147		1	146	29		122	128	64
Percent Heavy Vehicles (%)		3	3	3		3	3	11		3				7		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.31		4.13				4.17		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.40		2.23				2.26		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			110				211			1				134		
Capacity, c (veh/h)			269				625			1354				1352		
v/c Ratio			0.41				0.34			0.00				0.10		
95% Queue Length, Q ₉₅ (veh)			1.9				1.5			0.0				0.3		
Control Delay (s/veh)			27.3				13.7			7.7				8.0		
Level of Service (LOS)			D				B			A				A		
Approach Delay (s/veh)	27.3				13.7				0.0				3.1			
Approach LOS	D				B											

HCS7 Two-Way Stop-Control Report

General Information

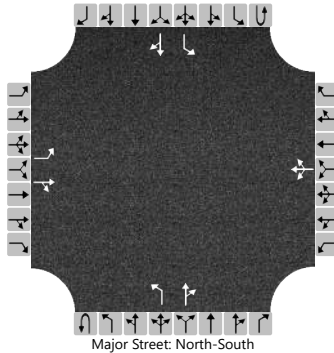
Analyst	Montgomery
Agency/Co.	JUB Engineers
Date Performed	7/3/2023
Analysis Year	2028
Time Analyzed	PM Pk Hr-Build Mitigated
Intersection Orientation	North-South
Project Description	Sunnyside RNG

Site Information

Intersection	Midvale/Alexander
Jurisdiction	City of Sunnyside
East/West Street	Alexander Rd
North/South Street	Midvale Road
Peak Hour Factor	0.91
Analysis Time Period (hrs)	0.25

Lanes

Mitigated



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	0		0	1	0	0	1	1	0	0	1	1	0
Configuration		L		TR			LTR			L		TR		L		TR
Volume (veh/h)		65	34	1		15	30	147		1	146	29		122	128	64
Percent Heavy Vehicles (%)		3	3	3		3	3	11		3				7		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.31		4.13				4.17		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.40		2.23				2.26		

Delay, Queue Length, and Level of Service

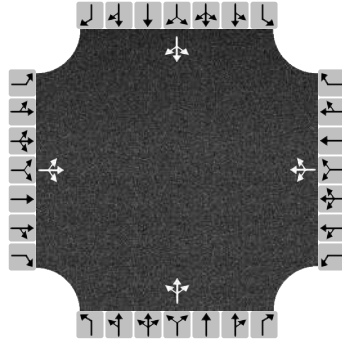
Flow Rate, v (veh/h)		71		38			211			1				134		
Capacity, c (veh/h)		237		360			625			1354				1352		
v/c Ratio		0.30		0.11			0.34			0.00				0.10		
95% Queue Length, Q ₉₅ (veh)		1.2		0.4			1.5			0.0				0.3		
Control Delay (s/veh)		26.6		16.2			13.7			7.7				8.0		
Level of Service (LOS)		D		C			B			A				A		
Approach Delay (s/veh)	23.0			13.7				0.0				3.1				
Approach LOS	C			B												

HCS7 All-Way Stop Control Report

General Information

Analyst	Montgomery	Intersection	Alexander/SR 241/Suny-Mab
Agency/Co.	JUB Engineers	Jurisdiction	City of Sunnyside
Date Performed	7/3/2023	East/West Street	Alexander Rd/SR 241
Analysis Year	2028	North/South Street	SR241/Sunnyside-Mabton Rd
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.93
Time Analyzed	PM Peak Hour-Build		
Project Description	Sunnyside RNG		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	74	58	59	41	39	32	68	209	15	29	195	48
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	205			120			314			292		
Percent Heavy Vehicles	12			8			3			3		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.183			0.107			0.279			0.260		
Final Departure Headway, hd (s)	5.90			6.03			5.45			5.39		
Final Degree of Utilization, x	0.337			0.202			0.475			0.438		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	3.90			4.03			3.45			3.39		

Capacity, Delay and Level of Service

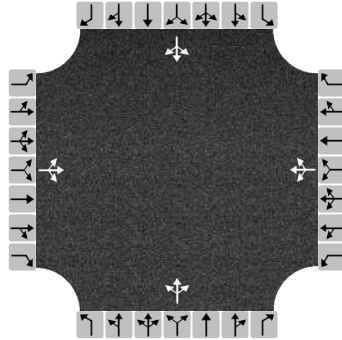
Flow Rate, v (veh/h)	205			120			314			292		
Capacity	610			597			661			668		
95% Queue Length, Q ₉₅ (veh)	1.5			0.7			2.6			2.2		
Control Delay (s/veh)	11.9			10.6			13.3			12.5		
Level of Service, LOS	B			B			B			B		
Approach Delay (s/veh)	11.9			10.6			13.3			12.5		
Approach LOS	B			B			B			B		
Intersection Delay, s/veh LOS	12.4						B					

HCS7 All-Way Stop Control Report

General Information

Analyst	Montgomery	Intersection	Alexander/SR 241/Waneta
Agency/Co.	JUB Engineers	Jurisdiction	City of Sunnyside
Date Performed	7/3/2023	East/West Street	Alexander Rd/SR 241
Analysis Year	2028	North/South Street	SR241/Waneta
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.95
Time Analyzed	PM Peak Hour - Build		
Project Description	Sunnyside RNG		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume	69	3	36	2	2	2	25	82	0	9	123	81
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	114			6			113			224		
Percent Heavy Vehicles	20			17			6			7		

Departure Headway and Service Time

Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.101			0.006			0.100			0.199		
Final Departure Headway, hd (s)	4.94			4.98			4.60			4.24		
Final Degree of Utilization, x	0.156			0.009			0.144			0.264		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	2.94			2.98			2.60			2.24		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)	114			6			113			224		
Capacity	729			723			782			848		
95% Queue Length, Q ₉₅ (veh)	0.6			0.0			0.5			1.1		
Control Delay (s/veh)	8.9			8.0			8.4			8.8		
Level of Service, LOS	A			A			A			A		
Approach Delay (s/veh)	8.9			8.0			8.4			8.8		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh LOS	8.7						A					

HCS7 Two-Way Stop-Control Report

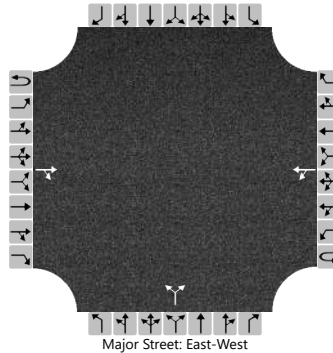
General Information

Analyst	Montgomery
Agency/Co.	JUB Engineers
Date Performed	7/3/2023
Analysis Year	2028
Time Analyzed	PM Peak Hour - Build
Intersection Orientation	East-West
Project Description	Sunnyside RNG

Site Information

Intersection	Alexander/RNG Site Access
Jurisdiction	City of Sunnyside
East/West Street	Alexander Road
North/South Street	Sunnyside RNG Site Access
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			181	5		10	146			22		10				
Percent Heavy Vehicles (%)						80				55		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Left Only								1							

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.90				6.95		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.92				4.00		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						11					36					
Capacity, c (veh/h)						1011					629					
v/c Ratio						0.01					0.06					
95% Queue Length, Q ₉₅ (veh)						0.0					0.2					
Control Delay (s/veh)						8.6					11.1					
Level of Service (LOS)						A					B					
Approach Delay (s/veh)					0.6				11.1							
Approach LOS					C				B							

Appendix E

Midvale Industrial Park Layout And Sunnyside RNG Site

Appendix F

Turn Lane Analysis Guidance

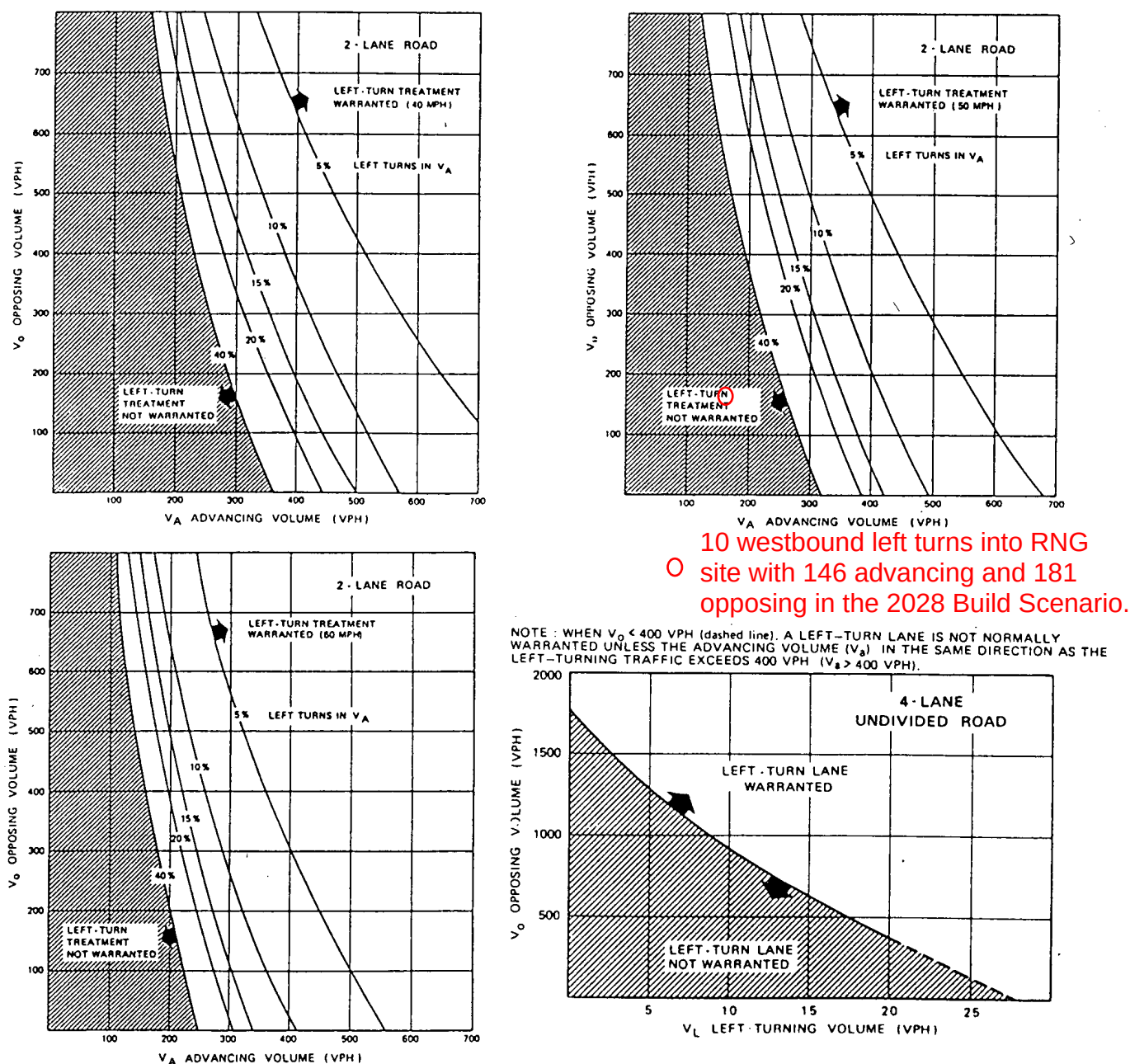


Figure 4-12. Volume warrants for left-turn lanes at unsignalized intersections. (Source: Ref. 4-7)

a partially shadowed left-turn lane, as illustrated in Figure 4-14. With partially shadowed left-turn lanes, the offset created by the approach taper does not entirely protect or “shadow” the turn lane.

Length of Lane

The left-turn lane length is among the most important design element of left-turn lanes. Its design is directly tied to the particular function of the lane, which is based on prevailing speeds,

traffic volumes, and traffic control. The design basis for length can be deceleration, storage, or a combination of both.

Left-turn lanes on high-speed highways should be designed to accommodate vehicle deceleration and braking. The channelization principle of removing slow or decelerating vehicles from through traffic applies at such locations. Figure 4-15 illustrates the functional basis for design of deceleration-based left-turn lanes according to AASHTO. The assumed “reasonable” driver behavior includes deceleration in gear for 3 sec., followed by comfortable braking completely within the turning lane. Where constraints exist and speeds are moderate, an al-