Traffic Impact Analysis

Mid I-5 Industrial Park
Kelso, WA

Prepared For:
Trammell Crow Portland Development, Inc.

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CONSULTING SERVICES

Traffic Impact Analysis

Project Information

Project:	Mid I-5 Industrial Park
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Reviewing Agency

Jurisdiction:	Kelso, Washington

Project Representative

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Signature

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned, whose seal, as a professional engineer licensed to practice as such, is affixed below.

Prepared by Ryan Shea, PTP, Senior Transportation Planner

07/01/2022

Approved by Eric Johnston, PE, Principal

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Executive Summary

Trammell Crow Portland Development, Inc. (Trammell Crow) is proposing to construct a 1,406,885 square foot industrial facility in the southwest quadrant of the I-5/SR 432 interchange in Kelso, Washington.

The proposed project site has previously been studied as a large commercial development. As a part of that development significant offsite mitigation was identified for the I-5 and SR 432 interchange. Much of that mitigation has been constructed, including additional channelization at the Talley Way at Coweeman Park Drive and SR 432 eastbound ramps at Talley Way intersections. Traffic signal control was also identified at both intersections, and the signal mast arms have already been constructed.

This report has been prepared to provide the traffic analysis and project information for the City of Kelso and the Washington State Department of Transportation (WSDOT) in reviewing the development proposal. Based on a Traffic Scoping report prepared for this project dated May 2022 and subsequent comments received from WSDOT, we have identified the need to evaluate existing and forecasted operations at the following intersections:

- SR 432 westbound ramps at 3rd Avenue
- SR 432 eastbound ramps at 3rd Avenue
- Talley Way at Coweeman Park Drive
- SR 432 westbound ramps at Coweeman Park Drive
- SR 432 eastbound ramps at Talley Way
- SR 432 at Kelso Drive

Operational analysis has been prepared for existing 2022 PM peak hour conditions, as well as PM peak hour conditions for the project's opening (2024) and horizon year (2029) with and without completion of the development.

Project Summary

At full occupancy, the project is estimated to generate approximately 1,716 new trips ends during the PM peak hour. Access to the industrial facility will be via an internal roadway system that connects to a short extension of Talley Way immediately south of the SR 432 eastbound ramp terminal.

Operational Results

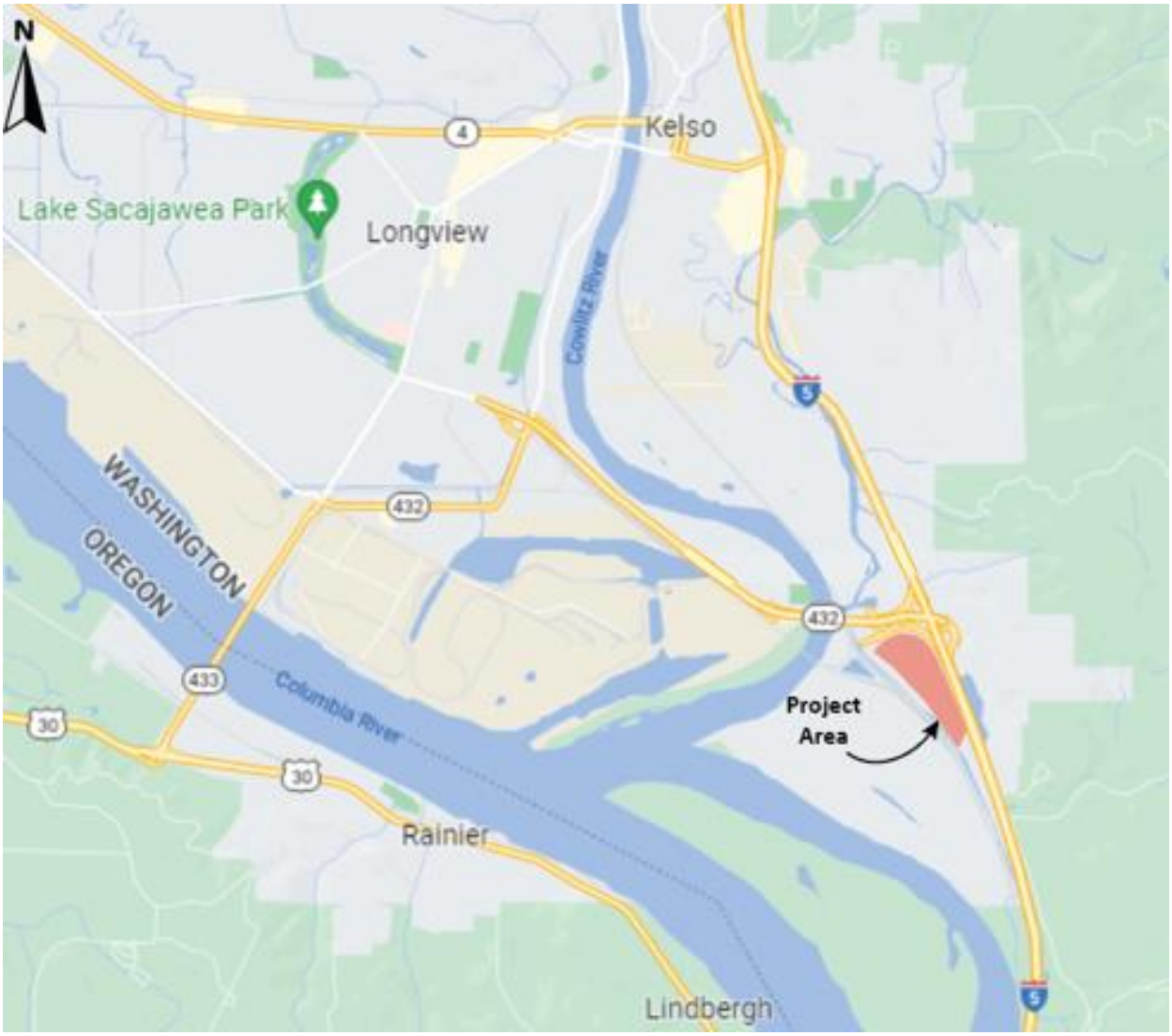
An intersection evaluation of the study area for the existing 2022, projected 2024 with and without the project traffic and projected 2029 with and without project was performed. With the completed traffic signal improvements at the I-5/SR 432 interchange all of the study intersections are projected to operate within the identified level of service standard with the exception of the SR 432 EB Off-Ramp at 3rd Avenue intersection. The minor street left-turn movement currently operates at LOS E and projected to operate at LOS F after completion of the project. A peak hour traffic signal warrant was evaluated for this intersection and a traffic signal is not warranted. There is an existing unused travel lane on 3rd Avenue, which is currently hatched for no vehicle entry. If this lane were made available for refuge such that the eastbound left-turning vehicles could use it to make a two-stage movement onto 3rd Avenue, the intersection would operate at LOS D or better for all scenarios.

1 Introduction

1.1 Project Overview

Trammell Crow is proposing to construct a 1,406,885 square foot industrial facility in the southwest quadrant of the I-5/SR 432 interchange in Kelso, Washington. This Traffic Impact Analysis has been prepared to document the expected traffic-related impacts for the proposed development. **Figure 1** below illustrates the site vicinity and the transportation network serving the project area.

Figure 1. Site Vicinity Map



1.2 Study Context

1.2.1 Previous Project Site Development

The proposed project site has previously been studied as a large commercial development. The project was studied in 2008 and revised in 2010. The revised project included 725,000 square feet of retail

space, which was projected to generate over 50,000 daily trips and approximately 4.375 PM peak hour trips. As a part of that development significant offsite mitigation was identified for the I-5 and SR 432 interchange, which was paid for and constructed in 2010. Much of that mitigation has been constructed, including additional channelization at the Talley Way at Coweeman Park Drive and SR 432 eastbound ramps at Talley Way intersections. Traffic signal control was also identified at both intersections, and the signal mast arms have already been constructed.

1.2.2 Proposed Development

This report has been prepared to provide the traffic analysis and project information for the City of Kelso and the Washington State Department of Transportation (WSDOT) in reviewing the development proposal. A Traffic Scoping Letter was prepared for this project dated May 2022 and is provided in **Appendix A**. Based on the Traffic Scoping Letter and subsequent comments received from WSDOT, we have identified the need to evaluate existing and forecasted operations at the following intersections:

- SR 432 westbound ramps at 3rd Avenue
- SR 432 eastbound ramps at 3rd Avenue
- Talley Way at Coweeman Park Drive
- SR 432 westbound ramps at Coweeman Park Drive
- SR 432 eastbound ramps at Talley Way
- SR 432 at Kelso Drive

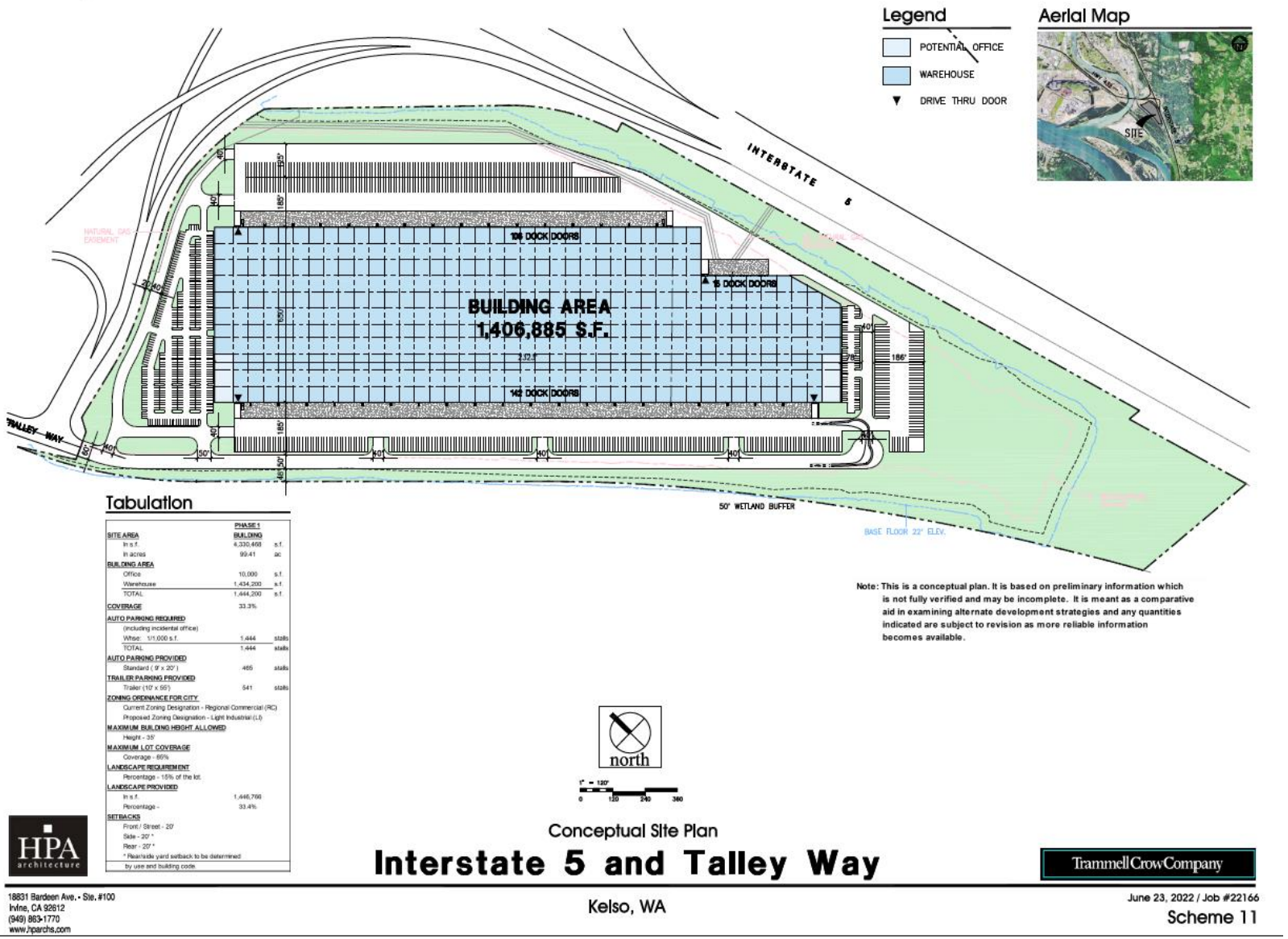
Operational analysis has been prepared for existing 2022 PM peak hour conditions, as well as PM peak hour conditions for the project's opening (2024) and horizon year (2029) with and without completion of the development.

2 Project Description

2.1 Development Proposal

Trammell Crow is proposing to construct a 1,406,885 square foot industrial facility in the southwest quadrant of the I-5/SR 432 interchange in Kelso, Washington. Access to the industrial facility will be via an internal roadway system that connects to a short extension of Talley Way immediately south of the SR 432 eastbound ramp terminal. The extension of Talley Way that currently exists on the site will be removed and internal circulation will be configured as illustrated in the project site plan in **Figure 2**. The project has an opening year of 2024 and is expected to be constructed in a single phase.

Figure 2. Preliminary Site Plan



3 Existing Conditions Summary

3.1 Area Land Uses

The *Mid I-5 Industrial Park* site is currently undeveloped and is surrounded on all sides by transportation facilities or wetlands. Interstate 5 lies to the east of the property and SR 432 to the north, both of which are major transportation corridors. The BNSF rail mainline and Longview Wye lies to the west. There are existing wetlands to the south.

To the north of the immediate site vicinity along Coweeman Park Drive there is a regional park-and-ride lot, a car dealership, a tractor supply company, and various other light industrial uses. Further to the north lies the Kelso industrial corridor situated along both sides of Talley Way. The Southwest Washington Regional airport, a general aviation facility, is also located in this corridor. To the east of I-5 and south of the SR 432 interchange there is an RV dealership. There is no other development in the vicinity of the interchange due to the steep slopes and rapid changes in topography that exist.

3.2 Roadway Inventory

3.2.1 Interstate 5

Interstate 5 (I-5), which bisects the City of Kelso, is a six-lane interstate freeway providing north/south access from southern California to the Canadian border and is the primary freeway serving the west coast of the United States. Through the study area freeway has a speed limit of 70 mph. Immediately north of the project site, access to I-5 is provided through a freeway-to-freeway interchange with State Route (SR) 432. This interchange was reconstructed in 2010 and accommodates both the freeway-to-freeway connections to/from the north, south and west, but also incorporates two ramps that connect directly with Talley Way.

3.2.2 State Route (SR) 432/3rd Avenue

This state highway connects destinations in the Cities of Longview and Kelso to the I-5 corridor and provides critical access to the industrial corridors in both communities. Between I-5 and the 3rd Avenue interchange, SR 432 is classified in the *Metropolitan Transportation Plan* and by WSDOT as an "Other Freeway/Expressway and has two travel lanes in each direction with limited access. The highway turns south at 3rd Avenue and then west onto Industrial Way where it continues through the developed area to the west side of the City of Longview. This portion of the highway is classified as an "Other Principal Arterial, Urban". Along 3rd Avenue, the road has two travel lanes in each direction in most locations, narrowing to a single northbound through lane at the 3rd Avenue/SR 432 interchange. There are no bicycle or pedestrian facilities along the freeway segment of the highway or on 3rd Avenue. The freeway portion of the highway is posted for 55 mph speeds, while 3rd Avenue is posted for 35 mph speeds.

3.2.3 Talley Way

Talley Way is a north/south roadway that connects the SR 432 corridor to the Kelso industrial area and to the east side of the city via Colorado Street and 13th Avenue. Through the SR 432 interchange area, Talley Way has two travel lanes in each direction, narrowing to a single lane in each direction north of the interchange. In the vicinity of the interchange there is a sidewalk/pathway and widened shoulder on

the east side of the street, and a widened shoulder with no pedestrian facilities on the west side. The street is posted for 35 mph speeds.

3.2.4 3rd Avenue/SR 411

North of its intersection with SR 432, 3rd Avenue is a north/south Minor Arterial roadway that is also designated as SR 411 or the Westside Highway. This roadway connects the SR 432 industrial corridor with office and commercial destinations in the City of Longview. North of the interchange, 3rd Avenue has a single travel lane in each direction with a continuous two-way left turn lane. There are generally no bicycle or pedestrian facilities along this corridor. The street has a posted speed limit of 35 mph.

3.2.5 Kelso Drive

Kelso Drive is a north/south Minor Arterial that runs parallel to and immediately east of I-5, connecting the east side of the City of Kelso with rural residential areas to the south. In the vicinity of the I-5/SR 432 interchange, Kelso Drive has no shoulders or separated bicycle/pedestrian facilities. The street has a posted speed limit of 35 mph.

A summary of the intersection channelization and control type for each of the study intersections is provided in **Figure 3.**

3.3 Traffic Volume Data

Quality Counts, a transportation data collection service, provided PM peak period turning movement counts at six intersections. The counts were conducted on May 17, 2022 between 4:00 pm and 6:00 pm for the evening peak period. The following locations were counted:

- SR 432 westbound ramps at 3rd Avenue
- SR 432 eastbound ramps at 3rd Avenue
- Talley Way at Coweeman Park Drive
- SR 432 westbound ramps at Coweeman Park Drive
- SR 432 eastbound ramps at Talley Way
- SR 432 at Kelso Drive

Figure 4 shows the 2022 PM peak hour traffic volumes for the study intersections. The original turning movement count diagrams are provided in **Appendix B**.

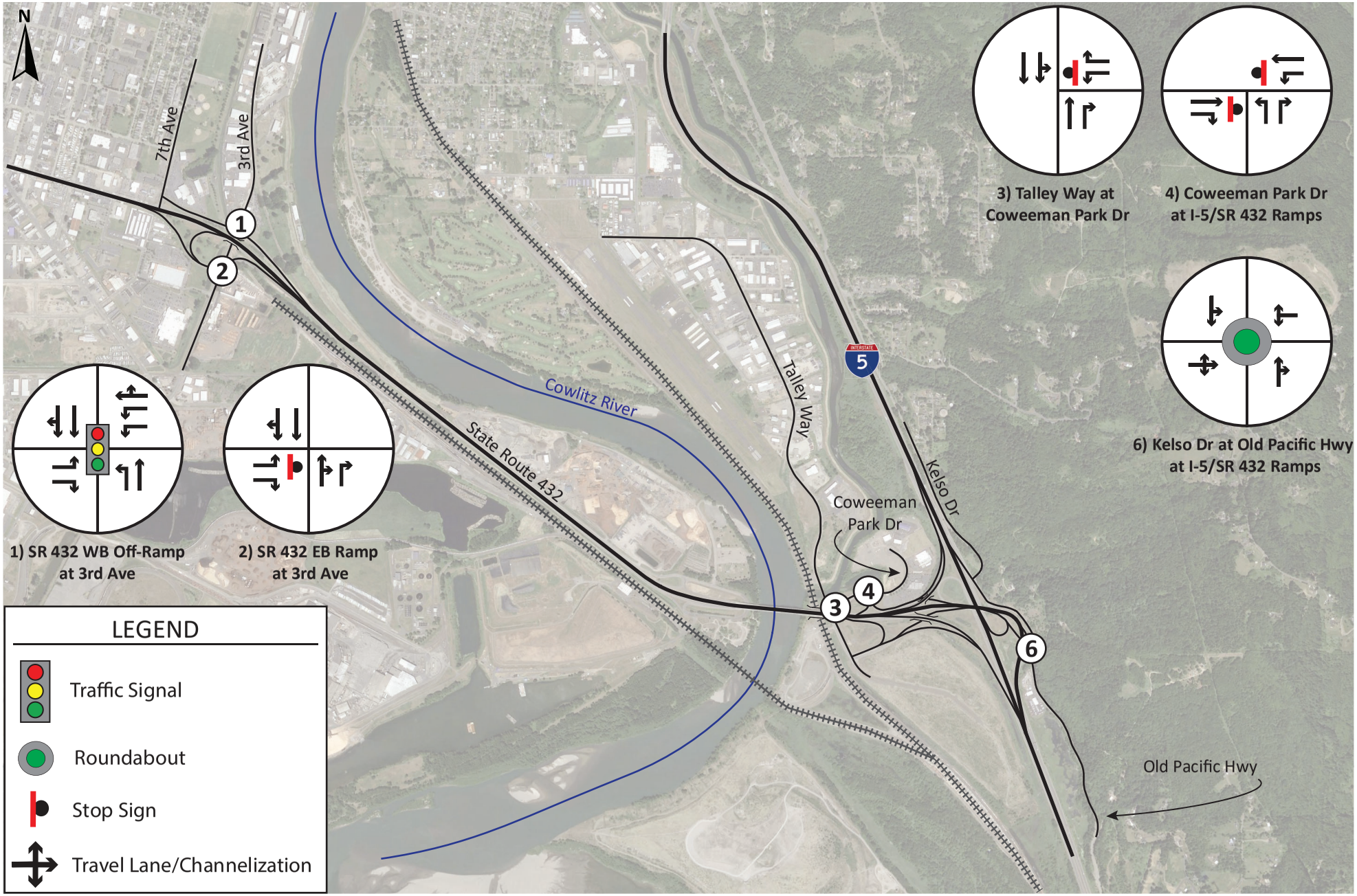


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Figure 3
Existing Channelization and Intersection Control

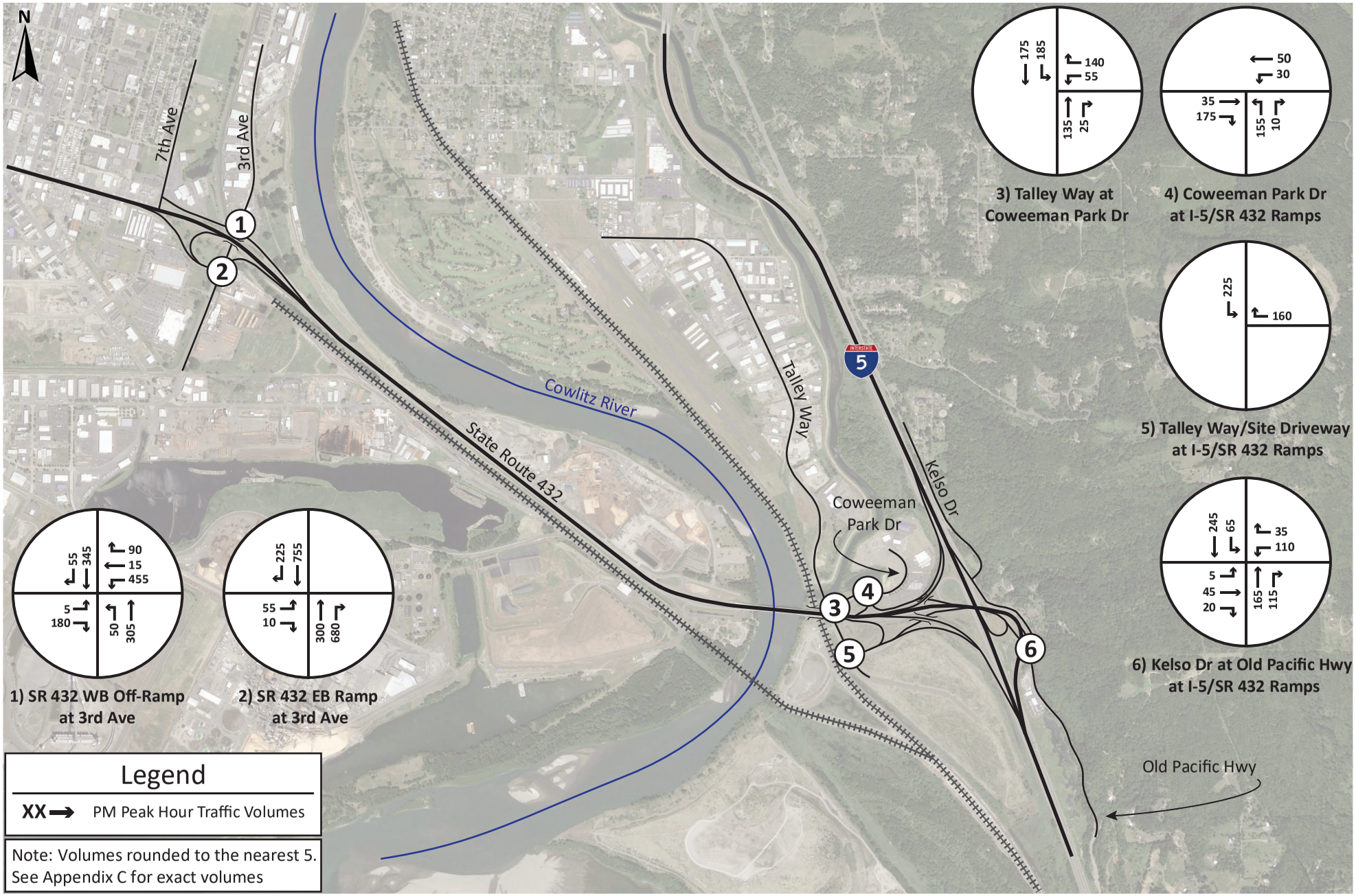

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Figure 4
Existing 2022 PM Peak Hour
Traffic Volumes

3.4 Crash History

The Washington Department of Transportation provides crash data for study area roadways. The data was collected over the five-year span between January 1, 2017 and December 31, 2021 and reviewed for the study area intersections. The total crashes by severity are provided in **Table 1**.

Table 1. Existing Crash Severity By Intersection

Intersection	Fatal	Serious Injury	Minor Injury	Possible Injury	Property Damage Only	Total
SR 432 WB ramps at 3rd Avenue	0	0	2	9	13	24
SR 432 EB ramps at 3rd Avenue	0	0	0	0	6	6
Talley Way at Coweeman Park Drive	0	0	0	0	0	0
SR 432 WB ramps at Coweeman Park Drive	0	0	0	0	0	0
SR 432 EB ramps at Talley Way	0	0	0	0	1	1
SR 432 at Kelso Drive	0	0	2	4	11	17
Total Crashes	**0**	**0**	**4**	**13**	**31**	**48**

Overall, approximately 65 percent of all the reported crashes were classified as property damage only (with no apparent injury). There were no fatal or serious injury crashes reported.

4 Project Traffic Characteristics

The project-related characteristics having the most effect on area traffic conditions are peak hour trip generation and the directional distribution of traffic volumes on the surrounding roadway network.

4.1 Site-Generated Traffic Volumes

Vehicle trip generation was estimated using the trip generation rates contained in the 11th edition of the Trip Generation Manual by the *Institute of Transportation Engineers (ITE)*. The land-use category High-Cube Fulfillment Center Warehouse – Sort (land use code 155) was used.

4.1.1 Primary Traffic

A project such as a major industrial facility tends to attract a large amount of traffic from people making a trip specifically to this site. This traffic is known as "primary" trips and would be new to the existing roadway system.

4.1.2 Non-Primary Traffic

Some developments may also attract traffic from people already driving on area roadways. These trips are not new trips added to the local roadways (primary trips) but represent "non-primary" trips according to the following definitions:

- Pass-by trips are trips made as an intermediate stop from an origin to a primary destination (i.e., stopping to shop on the way home from work) by vehicles passing directly by the project driveway. No pass-by trips are assumed for this development.
- Diverted Trips are similar to pass-by trips, except diverted trips require a diversion from their original route onto another roadway to reach the site. These trips are not technically new trips but are new to the roadways in the immediate vicinity of a project.

To provide a conservative analysis it is assumed that all site trips will be primary trips. No pass-by trips are expected due to the location of the site at the end of Talley Way. A minor amount of diverted trips may occur but this is likely to be incidental. Therefore, the presence of diverted trip is not included in the trip analysis documented in this report.

The AM peak hour, PM peak hour, and Daily trip generation rates are presented in **Table 2.**

Table 2. Project Trip Generation Rates

Peak Period	Unit	Trip Rate	Enter %	Exit %
AM peak hour of Adjacent Street	KSF	0.87[1]	81%	19%
PM peak hour of Adjacent Street	KSF	1.20[1]	39%	61%
Daily	KSF	6.44[1]	50%	50%

1. Average rate was used
KSF means 1,000 square feet.

The total trip generation expected from this project is calculated by applying the unit measure for each land use category to the appropriate trip generation rate. The trip generation for the proposed project is shown in **Table 3** below.

Table 3. Project Trip Generation

Peak Period	Size	Total Trips	Enter	Exit
AM peak hour of Adjacent Street	1,406.885	1,224	991	233
PM peak hour of Adjacent Street	1,406.885	1,688	658	1,030
Daily	1,406.885	9,060	4,530	4,530

The complete project trip generation calculations are included in **Appendix C**.

4.2 Site Traffic Distribution and Assignment

The site traffic distribution and assignment showing the sum of all PM peak hour project-related vehicle trips is provided on **Figure 5.** The trip distribution patterns identified in this figure are based on output from the regional travel demand model that was developed and maintained by the Cowlitz-Wahkiakum Council of Governments. A select zone loading from TAZ 477 was obtained from the model which assumes that the zone will be developed to accommodate an industrial land use.

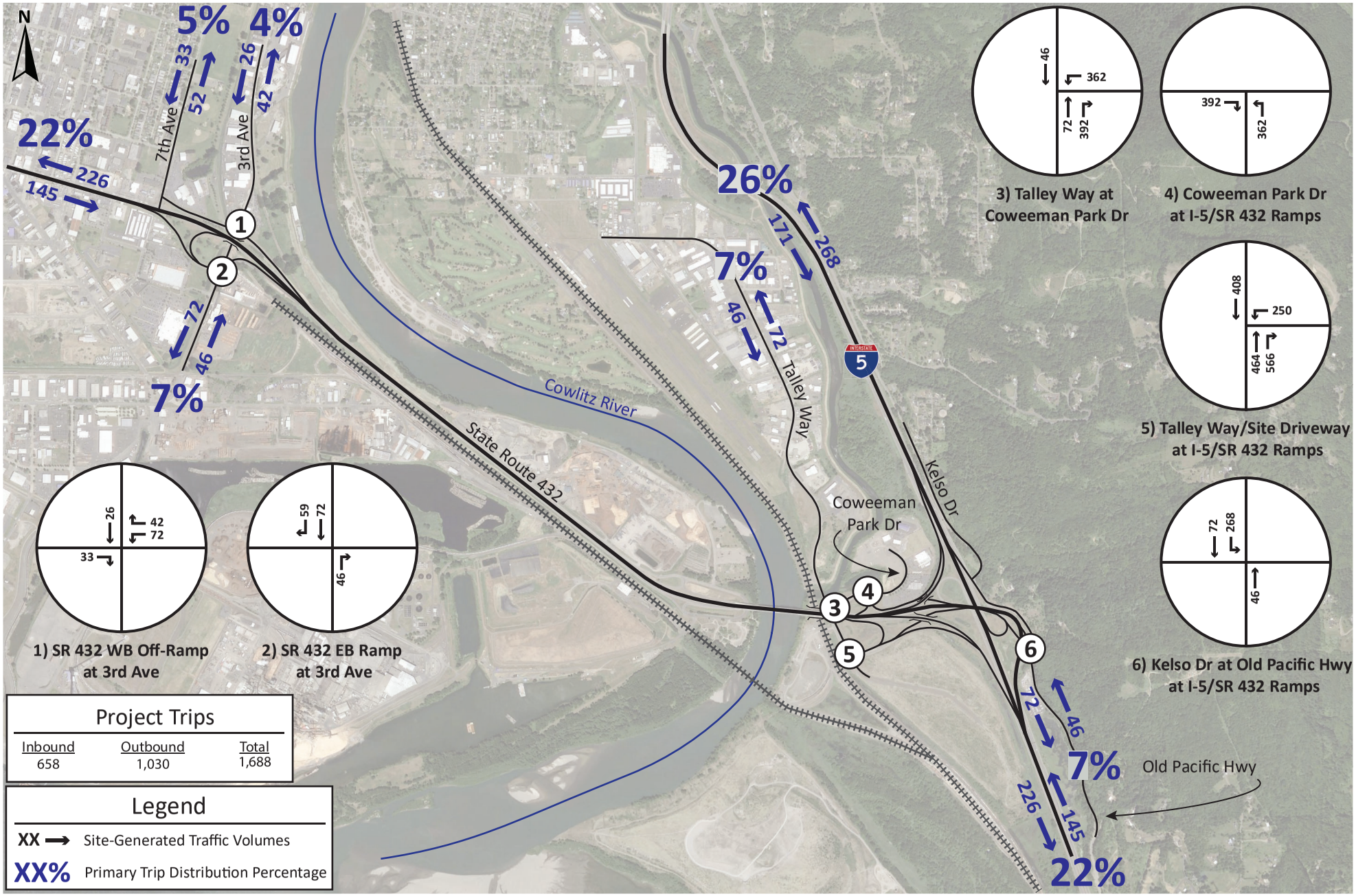

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Figure 5
Site-Generated Traffic Volumes
PM Peak Hour

5 Future Traffic Conditions

5.1 Roadway Network Improvements

There is one pending roadway improvement project of significance in the study area. This project builds on the Talley Way road alignment and bridge improvement study conducted in 2009, and advances preliminary engineering for the preferred concept. The project would involve reconstruction of a portion of Talley Way to a three-lane cross-section between 13th Avenue and the Coweeman River Bridge just north of the interchange with SR 432. The Coweeman River Bridge would also be replaced. The project is included in the 2022-25 WSDOT State Transportation Improvement Program. Preliminary engineering is scheduled for 2023 and 2024, with construction expected to occur I 2025.

5.2 Future Traffic Volumes

Traffic volume forecasts were prepared for PM peak hour conditions for the 2024 opening year and the 2029 planning horizon year. The future traffic volume forecast includes non-specific background traffic growth, and estimated traffic generated by the proposed *Mid I-5 Industrial Park* project.

For the non-specific background traffic growth, a 1.0 percent annual growth rate (non-compounded) was used. This growth rate was taken a review of traffic volume history in the vicinity of the I-5/SR 432 interchange and along SR 432 which was made available from WSDOT.

The projected 2024 year of opening PM peak hour traffic volumes without the *Mid I-5 Industrial Park* project are shown on **Figure 6**, while volumes with the project are shown on **Figure 7.** The projected 2029 horizon year PM peak hour traffic volumes without the *Mid I-5 Industrial Park* project are presented in **Figure 8**, while PM peak hour volumes with the *Mid I-5 Industrial Park* project are illustrated in **Figure 9**.

The traffic volume calculations for the study intersections are included in **Appendix C**.

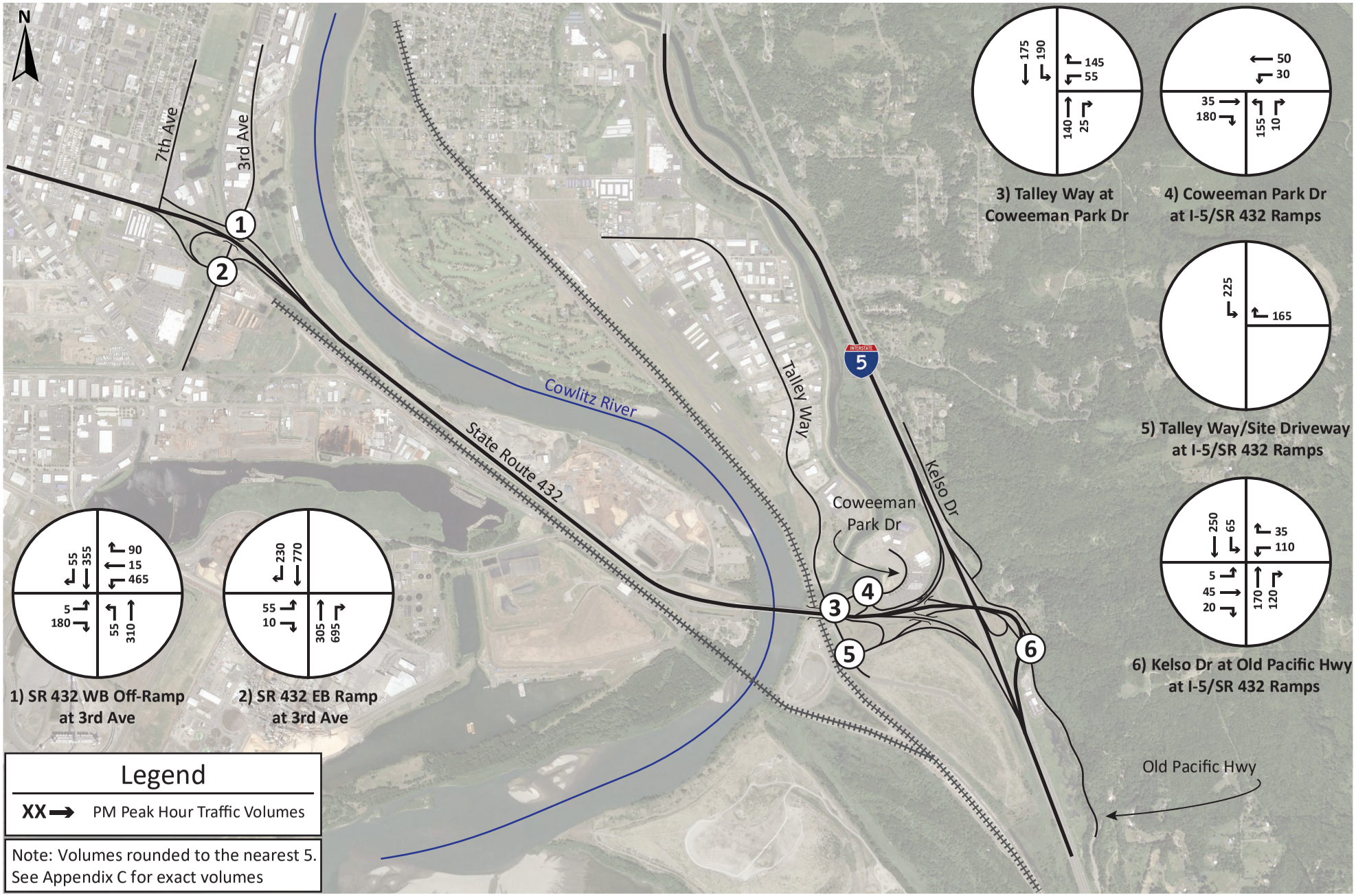

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Figure 6
Projected 2024 PM Peak Hour
Traffic Volumes Without Project

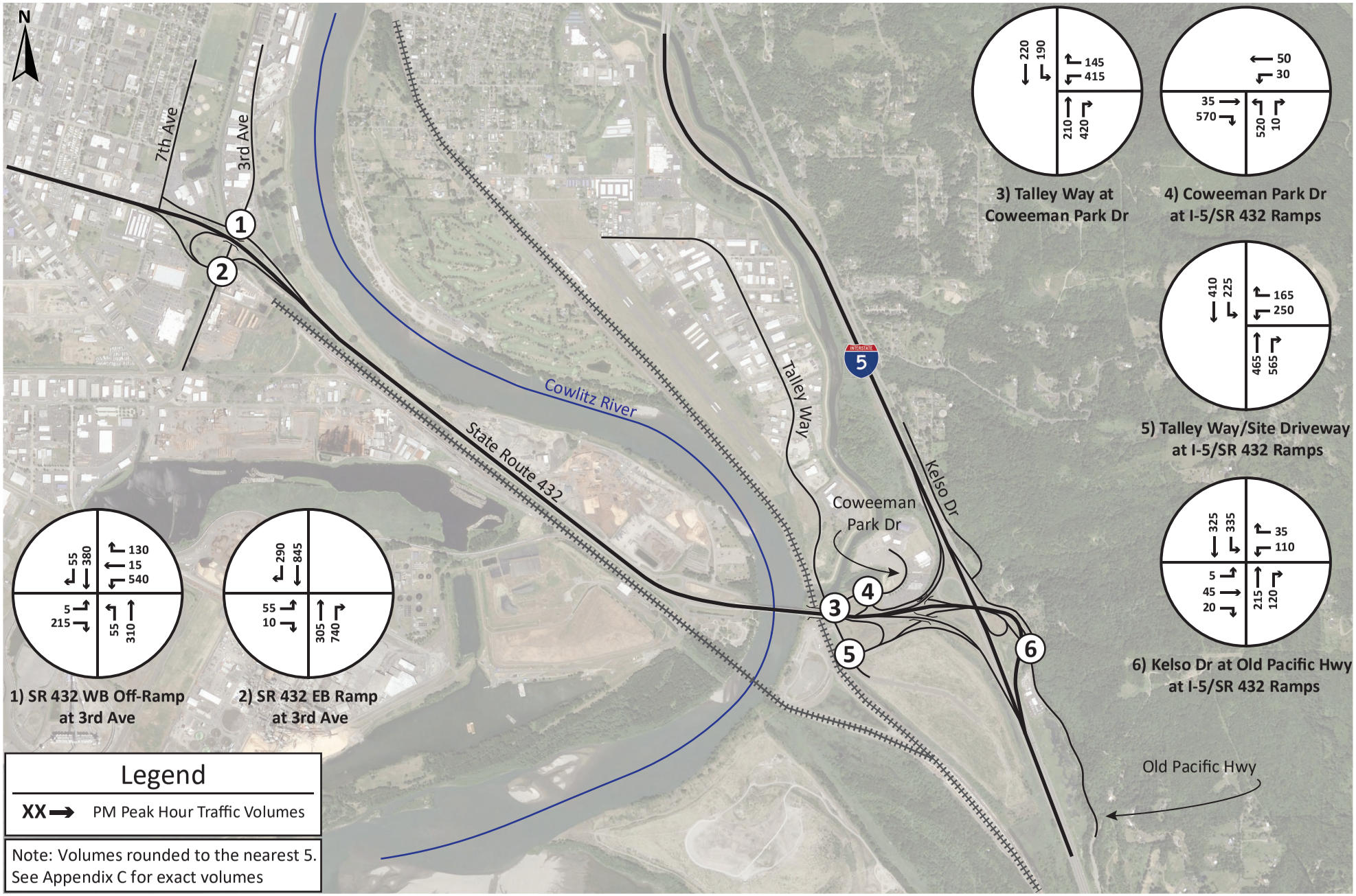

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Figure 7
Projected 2024 PM Peak Hour
Traffic Volumes With Project

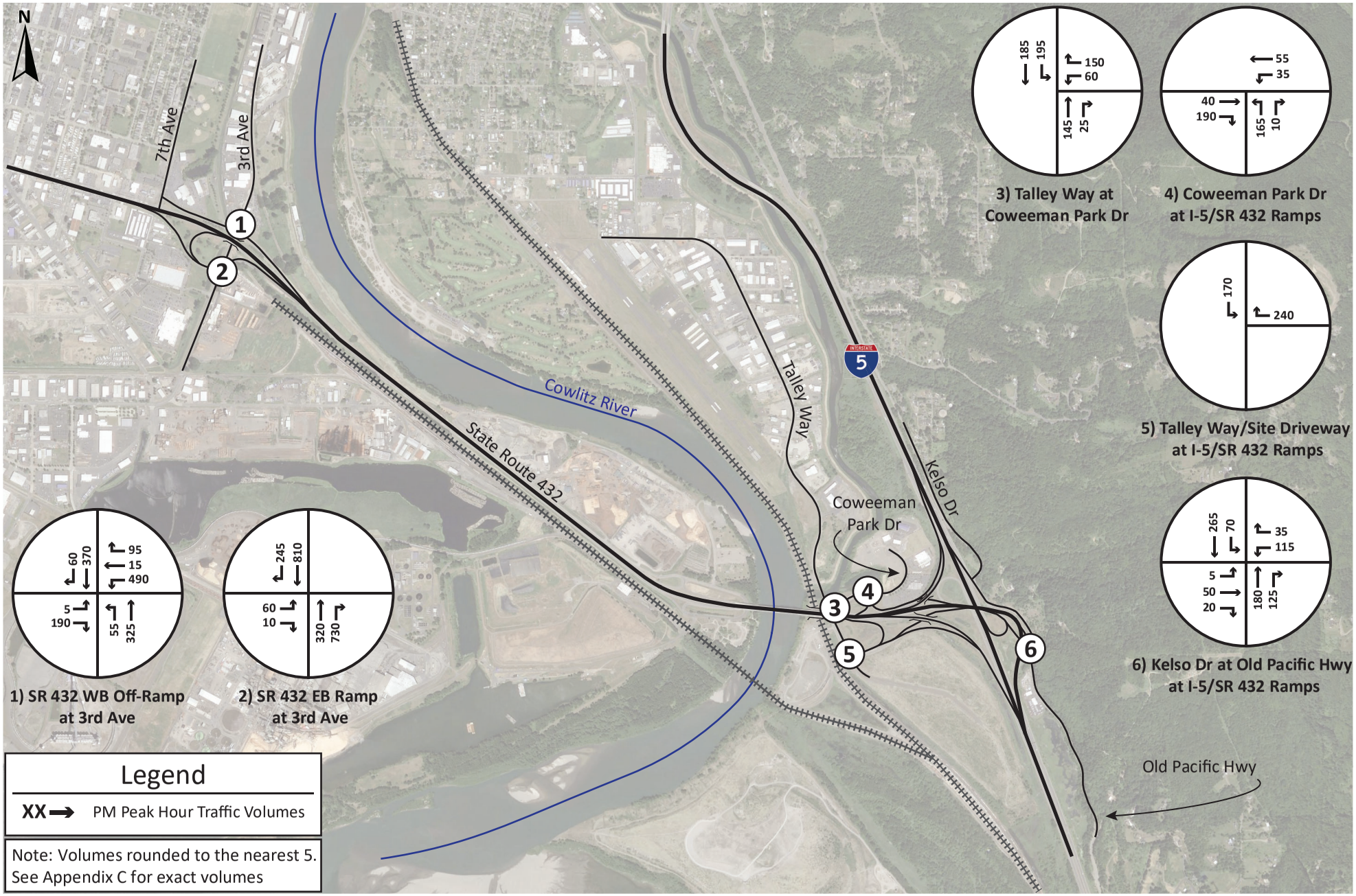

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Figure 8
Projected 2029 PM Peak Hour
Traffic Volumes Without Project

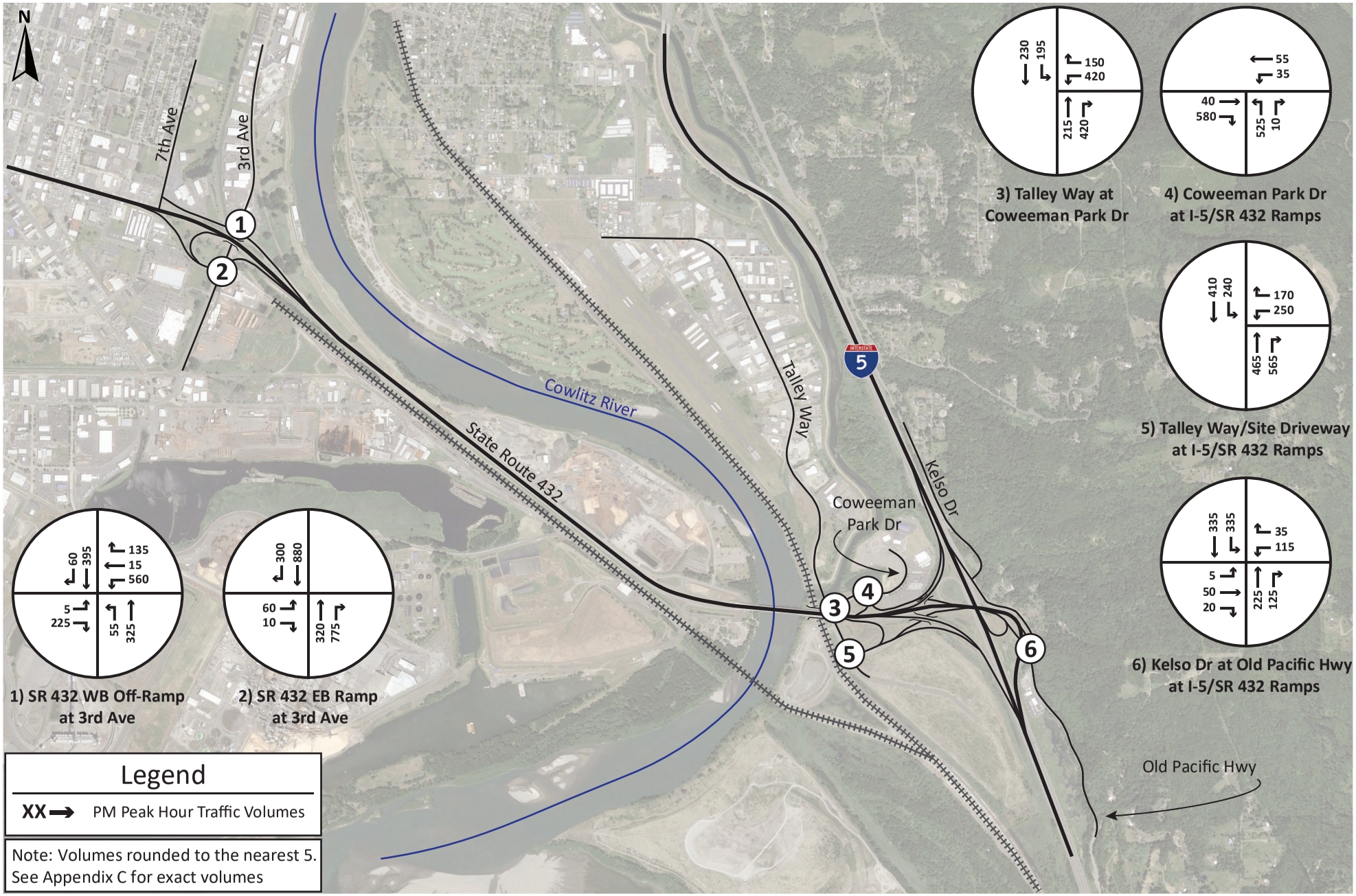

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Figure 9
Projected 2029 PM Peak Hour
Traffic Volumes With Project

6 Traffic Operations Analysis

Traffic analyses were conducted to identify any deficiencies within the study area for the PM peak hour in the 2022 base year, the 2023 project opening year, and the 2029 horizon year.

6.1 Methodology and Levels of Service

The acknowledged source for determining overall capacity for arterial segments and independent intersections is the current edition of the *Highway Capacity Manual* (HCM) published by the Transportation Research Board (TRB).

Intersection analysis was performed using the Synchro software package (Version 11) for signalized or stop-controlled intersections. The Sidra software package (Version 9.2) was used to evaluate roundabout intersections. These software packages implement the methods of the 6th Edition HCM. Analysis conducted using these software programs was consistent the relevant WSDOT protocols.

Operations analysis results are described in terms of Level of Service (LOS). LOS is a qualitative term describing operating conditions a driver will experience while traveling on a street or highway during a specific time interval. LOS ranges from A (very little delay) to F (long delays and congestion).

For intersections under minor street stop-control, the LOS of the most difficult movement (typically the minor street left-turn) represents the intersection Level of Service for purposes of assessing potential impacts. For traffic signals, the intersection average delay is used to assess potential impacts. **Table 4** shows the Level of Service criteria for stop- or roundabout-controlled intersections and signalized intersections.

Table 4. Level of Service Criteria for Intersections

Level of Service	Signalized Intersection Average Control Delay (seconds/vehicle)	Stop-Controlled or Roundabout Intersection Average Control Delay (seconds/vehicle)
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

Based on information from the WSDOT Geospatial Open Data Portal, Level of Service (LOS) D was identified as the preferred standard for the roadways and intersections in the study area. This is supported by the finding in the Cowlitz-Wahkiakum Council of Governments (CWCOGs) Metropolitan Transportation Plan which defines “recurring congestion” as LOS E or F.

6.2 Intersection Analysis

Based on the existing and forecasted volumes illustrated in previous graphics, traffic operations analysis was conducted at the six study area intersections. Analysis was conducted for the following scenarios:

- Existing 2022 traffic volumes

- Projected 2024 opening year traffic volumes with and without the *Mid I-5 Industrial Park* project
- Projected 2029 horizon year traffic volumes with and without the *Mid I-5 Industrial Park* project

The operational analysis results of the study intersections for the PM peak hour are provided in **Table 5** for existing 2022 and opening year 2024 conditions. **Table 6** shows PM peak hour analysis results for the 2029 horizon year. The LOS analysis worksheets are included in **Appendix D**. A discussion of existing and expected future year operations at each intersection is presented following the tables.

Table 5. Existing (2022) and Opening Year (2024) PM Peak Hour Intersection Level of Service

						Projected 2024			
				Base Year 2022		Without Project		With Project	
	Intersection	Control Type	LOS Standard	LOS (delay)	Worst V/C Ratio	LOS (delay)	Worst V/C Ratio	LOS (delay)	Worst V/C Ratio
1	SR 432 WB ramps at 3rd Avenue	Signal	D[1]	B (14.4)	0.70	B (14.6)	0.70	B (15.9)	0.74
2	SR 432 EB ramps at 3rd Avenue	TWSC[2]	D[1]	E (44.4)	0.46	E (47.0)	0.48	F (62.7)	0.57
3	Talley Way at Coweeman Park Drive	TWSC[2]	D	C (20.1)	0.22	C (20.7)	0.23	-	-
			D[1]	--	--	--	--	A (8.2)	0.63
4	SR 432 WB ramps at Coweeman Park Drive[4]	TWSC[2]	D[1]	A (5.9)	N/A	A (5.4)	N/A	B (11.7)	N/A
5	SR 432 EB ramps at Talley Way	No Control	D[1]	N/A	N/A	N/A	N/A	--	--
		Signal	D[1]	--	--	--	--	B (13.6)	0.82
6	SR 432 at Kelso Drive	RBT[3]	D[1]	A (5.8)	0.26	A (5.8)	0.26	A (7.5)	0.55

1. WSDOT standard, source Geospatial Open Data Portal
2. Two-Way Stop-Control
3. Roundabout
4. SimTraffic LOS Result

Table 6. Horizon Year (2029) PM Peak Hour Intersection Level of Service

Intersection		Control Type	LOS Standard	Projected 2029			
				Without Project		With Project	
				LOS (delay)	Worst V/C Ratio	LOS (delay)	Worst V/C Ratio
1	SR 432 WB ramps at 3rd Avenue	Signal	D[1]	B (14.9)	0.71	B (16.4)	0.75
2	SR 432 EB ramps at 3rd Avenue	TWSC[2]	D[1]	F (60.5)	0.58	F (83.8)	0.68
3	Talley Way at Coweeman Park Drive	TWSC[2]	D[1]	C (22.1)	0.26	--	--
		Signal	D[1]	--	--	A (8.3)	0.63
4	SR 432 WB ramps at Coweeman Park Drive[4]	TWSC[2]	D[1]	A (6.1)	N/A	B (13.1)	N/A
5	SR 432 EB ramps at Talley Way	No Control	D[1]	N/A	N/A	--	--
		Signal	D[1]	--	--	B (14.2)	0.82
6	SR 432 at Kelso Drive	RBT[3]	D[1]	A (5.9)	0.28	A (7.5)	0.56

1. WSDOT standard, source Geospatial Open Data Portal
2. Two-Way Stop-Control
3. Roundabout
4. SimTraffic LOS Result

6.2.1 SR 432 Westbound Off-Ramp/Tennant Way Frontage at 3rd Avenue

This is a four-legged intersection which currently operates under traffic signal-control. Left turn lanes are provided in the west, north and east directions. Immediately west of the intersection the westbound off-ramp from SR 432 becomes the Tennant Way Frontage Road which provides local access to 7th Avenue and a business/residential area. No sidewalks, crosswalks or other pedestrian facilities are provided in the vicinity of the intersection.

In the 2022 PM peak hour, the intersection operates at LOS B with 14.4 seconds of average delay per vehicle. For the 2024 opening year without the *Mid I-5 Industrial Park* project, the intersection is projected to operate at LOS B, with 14.6 seconds of average delay. With the addition of project traffic, the intersection is projected to remain at LOS B, with 15.9 seconds of average delay.

In the 2029 horizon year, the intersection is expected to operate at LOS B with 14.9 seconds of average delay without the project, and remain at LOS B with 16.4 seconds of delay with the project.

6.2.2 SR 432 Eastbound Ramps at 3rd Avenue

The off-ramp from eastbound SR 432 is stop sign-controlled at the intersection with 3rd Avenue. A single lane is provided which widens slightly at the intersection to accommodate a limited number of right turn vehicles. An eastbound on-ramp is provided for traffic heading south on 3rd Avenue which is adjacent to the off-ramp. Access to eastbound SR 432 from northbound 3rd Avenue is provided by a dedicated right turn slip lane. Only a single northbound through lane is provided at this point as opposed to the two southbound lanes.

In the 2022 PM peak hour, the stop-controlled intersection operates at LOS E with 44.4 seconds of average delay per vehicle for the eastbound left-turn movement. For the 2024 opening year without the *Mid I-5 Industrial Park* project, the intersection is projected to operate at LOS E with 47.0 seconds of average delay for the worst movement. With the addition of project traffic, the intersection is projected to operate at LOS F, with 62.7 seconds of average delay.

In the 2029 horizon year, the intersection is expected to operate at LOS F with 60.5 seconds of average delay without the project, and at LOS F with 83.8 seconds of delay with the project.

3rd Avenue currently has four lanes of roadway width north of the eastbound ramps and through the SR 432 interchange with two southbound lanes, one northbound lane, and the fourth lane a hatched-out space that converts to a northbound left-turn lane at the SR 432 Westbound Off-Ramp/Tennant Way Frontage at 3rd Avenue intersection. However, this lane could be made accessible as a refuge space for the eastbound left-turn movement at the SR 432 eastbound off-ramp to make a two-stage left-turn movement onto 3rd Avenue. With that restriping implemented, the intersection would improve to LOS D or better for all volume scenarios.

6.2.3 Talley Way at Coweeman Park Drive

This is a tee-intersection which currently operates under stop sign-control on Coweeman Park Drive and provides a crosswalk on the east leg where sidewalks or a pedestrian pathway currently exist. When the intersection was reconstructed in 2010, it was anticipated that a major commercial development would be built on the site currently proposed for the *Mid I-5 Industrial Park*. Accordingly, the intersection was built to include two westbound left turn lanes to channel traffic from westbound SR 432/I-5 to the site (one of which is currently closed pending the addition of traffic from future project area development). Two receiving lanes are available on Talley Way to carry traffic south towards the project site. The intersection also includes a single westbound right turn lane, and single northbound through and right turn lanes. Traffic signal poles and mast arms have been constructed at this intersection but no signal heads or other electrical equipment is currently in place. It is expected that these will be installed in the future as traffic volumes warrant. The intersection analysis assumes this intersection will operate under traffic signal control for the 2024 and 2029 with project volume scenarios

In the 2022 PM peak hour, the intersection operates at LOS C with 20.1 seconds of average delay. For the 2024 opening year without the *Mid I-5 Industrial Park* project, the intersection is projected to operate at LOS C, with 20.7 seconds of average delay. With the addition of project traffic and traffic signal control, the intersection is projected to operate at LOS A, with 8.2 seconds of average delay.

In the 2029 horizon year, the intersection is expected to operate at LOS C with 22.1 seconds of average delay without the project, and at LOS A with 8.3 seconds of delay with the project and traffic signal control.

6.2.4 SR 432 Westbound Ramps at Coweeman Park Drive

This is a tee intersection that currently operates under stop sign- control for the east/west movements on Coweeman Park Drive. The SR 432 westbound off-ramp is a free-flowing movement. There is a sidewalk along the north side of this street but no crosswalks.

In the 2022 PM peak hour, the intersection operates at LOS A with 5.9 seconds of average delay. For the 2024 opening year without the *Mid I-5 Industrial Park* project, the intersection is projected to operate at

LOS A, with 5.4 seconds of average delay. With the addition of project traffic, the intersection is projected to remain at LOS B, with 11.7 seconds of average delay.

In the 2029 horizon year, the intersection is expected to operate at LOS A with 6.1 seconds of average delay without the project, and at LOS B with 13.1 seconds of delay with the project.

6.2.5 SR 432 Eastbound Ramps at Talley Way

This intersection was also designed and built as part of the 2010 reconstruction of the I-5/SR 432 interchange. The intersection has two westbound left turn lanes to channel traffic from eastbound SR 432 to the project site. A single westbound right turn lane is also provided. Two travel lanes are provided in the southbound direction heading towards the project site. However, since Talley Way is currently closed to the south of this intersection and no on-site development has occurred, the southbound lanes function as a curved roadway leading to northbound and southbound I-5. There is currently no traffic control at this intersection.

With the addition of project traffic, the intersection will be modified to operate with three approach legs. Two southbound through lanes will be provided into the site as will two westbound left turn lanes. Two northbound lanes have been assumed, along with traffic signal control. In the 2024 opening year PM peak hour, the intersection is projected to operate at LOS B with 13.6 seconds of average delay. In the 2029 horizon year, the intersection is expected to operate at LOS B with 14.2 seconds of average delay

6.2.6 SR 432 at Kelso Drive

This is a four-legged roundabout intersection that serves off-ramp traffic from I-5 northbound, connecting the freeway to Kelso Drive. As of 2022, this intersection currently operates at LOS A with 5.8 seconds of average delay. For the 2024 opening year without the *Mid I-5 Industrial Park* project, the intersection is projected to remain at LOS A, with 5.8 seconds of average delay. With the addition of project traffic, the intersection is projected to remain at LOS A, with 7.5 seconds of average delay.

In the 2029 horizon year, the intersection is expected to operate at LOS A with 5.9 seconds of average delay without the project, and at LOS A with 7.5 seconds of delay with the project.

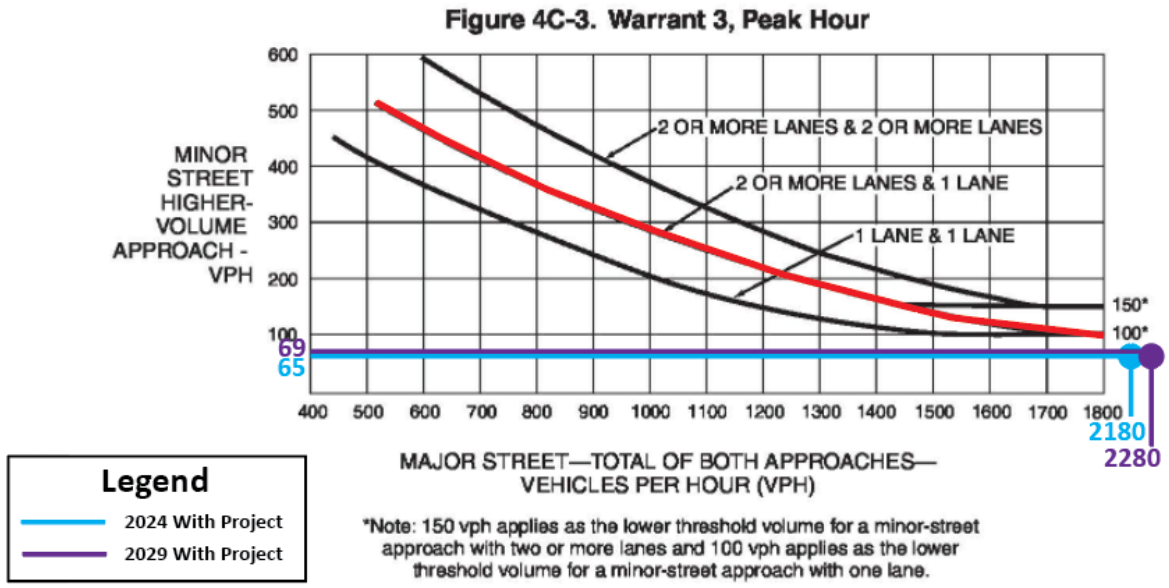
6.3 Signal Warrant Analysis

Due to the operational performance of the SR 432 EB Off-Ramp at 3rd Avenue intersection, a traffic signal warrant was prepared for the PM peak hour to determine if traffic signal control is appropriate. Given the existing traffic signal infrastructure that was built for the previous planned commercial development at the intersections of SR 432 EB Off-Ramp at 3rd Avenue, Talley Way at Coweeman Park Drive, and Talley Way/Site Driveway at I-5/SR 432 Ramps, traffic signal warrant analysis were completed to verify that upon completion of the proposed project they are warranted. The peak hour warrants results for each intersection are described below.

6.3.1 SR 432 EB Off-Ramp at 3rd Avenue Peak Hour Signal Warrant

The major street volume is the sum of northbound and southbound approaches on 3rd Avenue which provide two travel lanes and the minor street volume is the eastbound approach on SR 432 Off-Ramp, which provides a single lane. The intersection does not meet the volume warrant for the 2024 or 2029 horizon years. The peak hour warrant is provided in **Figure 10**.

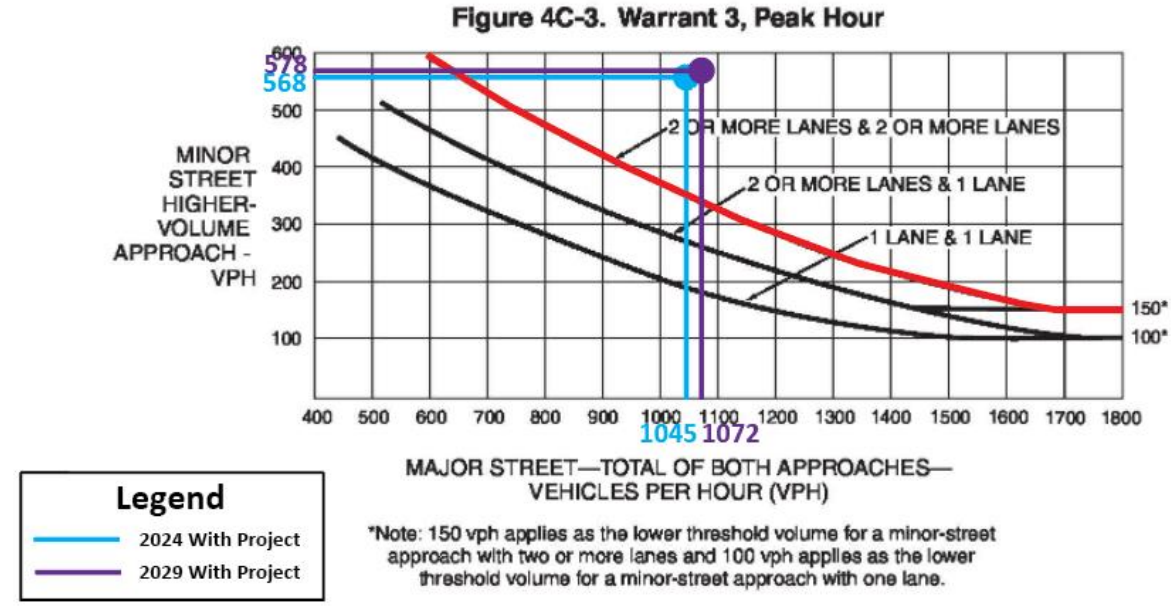
Figure 10. SR 432 EB Off-Ramp and 3rd Avenue Peak Hour Signal Warrant



6.3.2 Talley Way at Coweeman Park Drive Peak Hour Signal Warrant

The major street volume is the sum of northbound and southbound approaches on Talley Way which provide two travel lanes and the minor street volume is the westbound approach on Coweeman Park Drive, which also provides two or more travel lanes. The intersection meets the volume warrant for both the 2024 and 2029 horizon years. The peak hour warrant is provided in **Figure 11**.

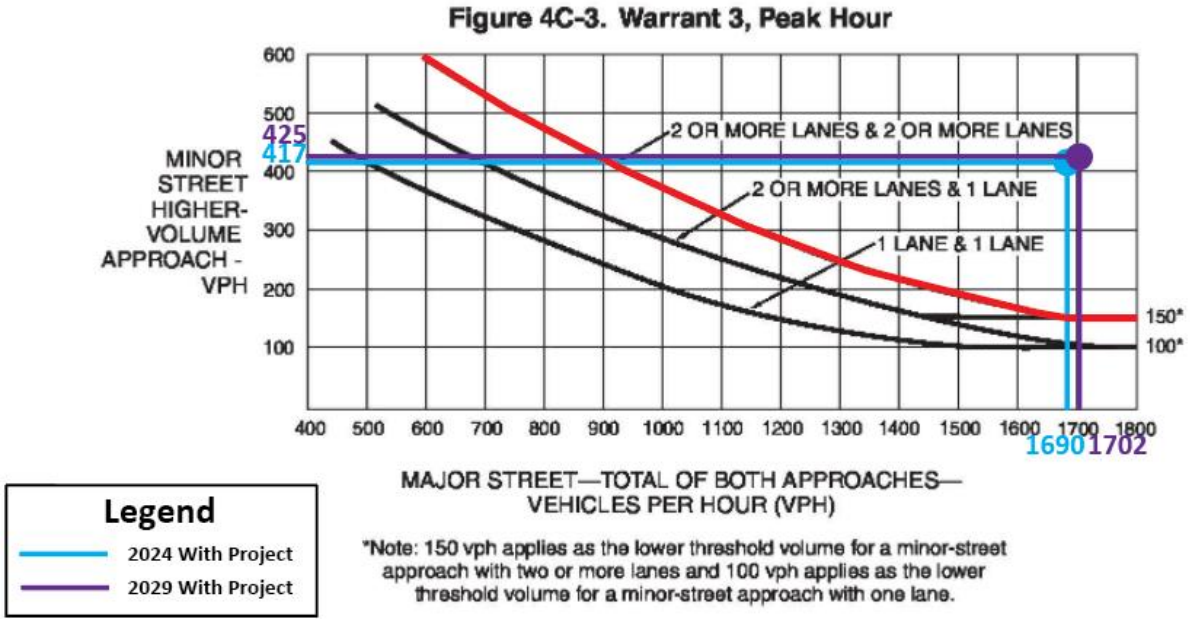
Figure 11. Talley Way and Coweeman Park Drive Peak Hour Signal Warrant



6.3.3 Talley Way/Site Driveway at I-5/SR 432 Ramps Peak Hour Signal Warrant

The major street volume is the sum of northbound and southbound approaches on Talley Way which provide two or more travel lanes and the minor street volume is the westbound approach on I-5/SR 432 Ramps, which also provides two or more travel lanes. The intersection meets the volume warrant for both the 2024 and 2029 horizon years. The peak hour warrant is provided in **Figure 12**.

Figure 12. Talley Way/Site Driveway and I-5/SR 432 Ramps Peak Hour Signal Warrant



7 Summary And Mitigation

Trammell Crow is proposing to construct a 1,406,885 square foot industrial facility in the southwest quadrant of the I-5/SR 432 interchange in Kelso, Washington. Access to the industrial facility will be via an internal roadway system that connects to a short extension of Talley Way immediately south of the SR 432 eastbound ramp terminal. The extension of Talley Way that currently exists on the site will be removed and internal circulation will be configured as illustrated in the project site plan.

At full occupancy, the project is estimated to generate approximately 1,688 new trips ends during the PM peak hour. This report has been prepared to provide the traffic analysis and project-information for the City of Kelso and the Washington State Department of Transportation (WSDOT) to use in the environmental review of the project.

An intersection evaluation of the study area for the existing 2022, projected 2024 with and without the project traffic and projected 2029 with and without project was performed. With the completed traffic signal improvements at the I-5/SR 432 interchange all of the study intersections are projected to operate within the identified level of service standard with the exception of the SR 432 EB Off-Ramp at 3rd Avenue intersection. The minor street left-turn movement currently operates at LOS E and projected to operate at LOS F after completion of the project. A peak hour traffic signal warrant was evaluated for this intersection and a traffic signal is not warranted. There is an existing unused travel lane on 3rd Avenue, which is currently hatched for no vehicle entry. If this lane were made available for refuge such that the eastbound left-turning vehicles could use it to make a two-stage movement onto 3rd Avenue, the intersection would operate at LOS D or better for all scenarios. This intersection should be monitored and, as needed, this restriping should be considered to better accommodate the existing eastbound left-turn movement.

Appendix A

Traffic Scoping Letter

SCJ ALLIANCE
CONSULTING SERVICES

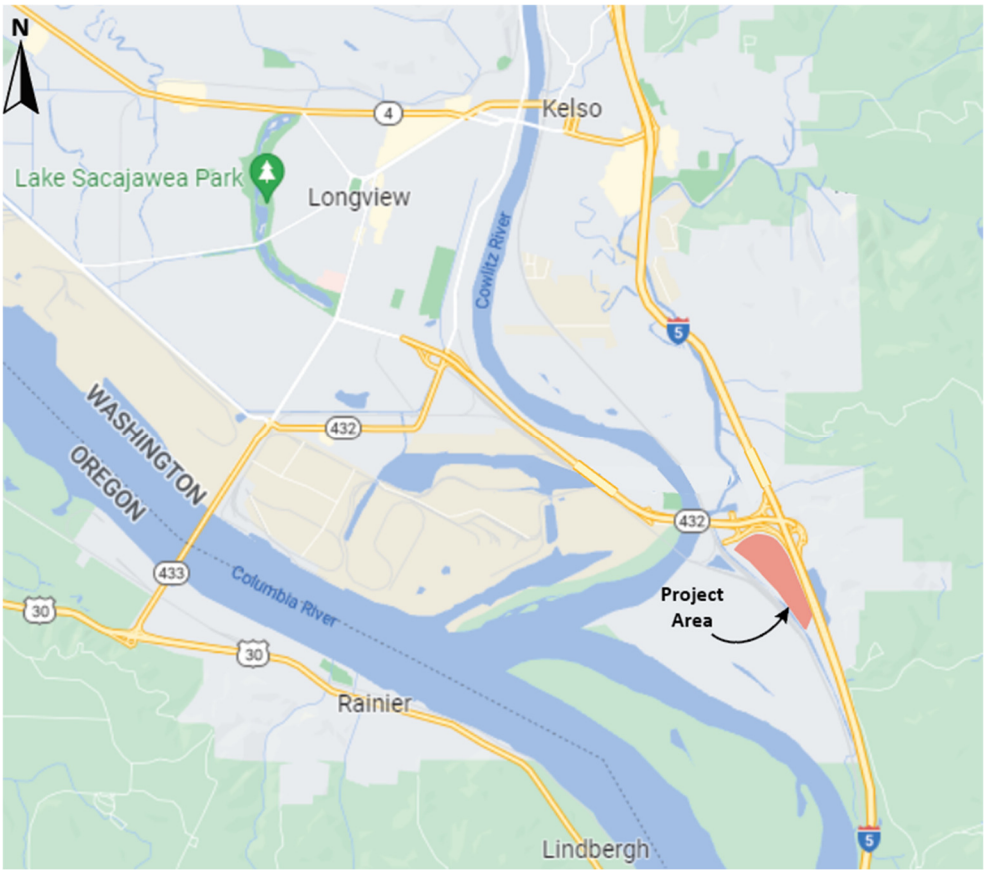
MEMORANDUM

TO:	Tom Nieswander, Trammell Crow Company
FROM:	Anne Sylvester, PTE, Senior Consultant
DATE:	May 5, 2022
PROJECT:	Kelso-Segale Development (SCJ # 22-000124)
SUBJECT:	Traffic Scoping Letter

Introduction

Trammell Crow is proposing to construct a 1,429,611 square foot warehouse in the southwest quadrant of the I-5/SR 432 interchange in Kelso, Washington. This Traffic Scoping Report has been prepared to document the expected trip generation and distribution for the proposed development. The site vicinity is shown below.

Figure 1. Project Vicinity



Project Description

The proposed project will consist of a warehouse facility estimated to include one large building or several smaller buildings totaling 1,429,611 square feet. The site is currently vacant and is served by the SR 432/Talley Way interchange and a roadway built through the site that was originally intended to serve a large retail commercial establishment proposed for construction in 2010. It is expected that the site will be developed in a single phase to be opened in early 2024. The existing roadway on the site will be removed and replaced with a perimeter roadway system. A preliminary site plan for the project is attached to the report.

Access to the project will be provided by an internal, private circulation system which will join Talley Way east of the eastbound ramp termini intersection with SR 432. The east and westbound ramp termini intersections provide regional access to the project site from both SR 432 and I-5.

Project Trip Generation

Vehicle trip generation was estimated using the trip generation rates contained in the 11th edition of the Trip Generation Manual by the *Institute of Transportation Engineers (ITE)*. The land-use category High-Cube Fulfillment Center Warehouse – Sort (land use code 155) was used.

Primary Traffic

A project such as a major warehouse facility tends to attract a large amount of traffic from people making a trip specifically to this site. This traffic is known as “primary” trips and would be new to the existing roadway system.

Non-Primary Traffic

Some developments may also attract traffic from people already driving on area roadways. These trips are not new trips added to the local roadways (primary trips) but represent “non-primary” trips according to the following definitions:

> Pass-by trips are trips made as an intermediate stop from an origin to a primary destination (i.e., stopping to shop on the way home from work) by vehicles passing directly by the project driveway. No pass-by trips are assumed for this development.
>
> Diverted Trips are similar to pass-by trips, except diverted trips require a diversion from their original route onto another roadway to reach the site. These trips are not technically new trips but are new to the roadways in the immediate vicinity of a project.

To provide a conservative analysis it is assumed that all site trips will be primary trips. No pass-by trips are expected due to the location of the site at the end of Talley Way. A minor amount of diverted trips may occur but this is likely to be incidental. Therefore, the presence of diverted trip is not included in the trip analysis documented in this report.

The AM peak hour, PM peak hour, and Daily trip generation rates are presented in **Table 1**.

Table 1. Project Trip Generation Rates

Peak Period	Unit	Trip Rate	Enter %	Exit %
AM peak hour of Adjacent Street	KSF	0.87[1]	81%	19%
PM peak hour of Adjacent Street	KSF	1.20[1]	39%	61%
Daily	KSF	6.44[1]	50%	50%

1. Average rate was used
KSF means 1,000 square feet.

The total trip generation expected from this project is calculated by applying the unit measure for each land use category to the appropriate trip generation rate. The trip generation for the proposed project is shown in **Table 2** below.

Table 2. Project Trip Generation

Peak Period	Size	Total Trips	Enter	Exit
AM peak hour of Adjacent Street	1,429.61	1,244	1,008	236
PM peak hour of Adjacent Street	1,429.61	1,716	669	1,047
Daily	1,429.61	9,208	4,604	4,604

Site Traffic Distribution and Assignment

The site traffic distribution and assignment showing the sum of all PM peak hour vehicle trips is provided on **Figure 2.** The trip distribution patterns identified in this figure are based on output from the regional travel demand model that was developed and maintained by the Cowlitz-Wahkiakum Council of Governments. A select zone loading from TAZ 477 was obtained from the model which assumes that the zone will be developed to accommodate an industrial land use.

A graphic showing the trip distribution percentages and assigned trips is attached to this report as **Figure 2**.

Proposed Analysis Parameters

Based on correspondence with Washington Department of Transportation and the City of Kelso, we propose providing analysis of the following intersections for the PM peak hour conditions as part of a Traffic Impact Analysis study:

- SR 432 eastbound ramps at Talley Way
- SR 432 westbound ramps at Coweeman Park Drive
- Talley Way at Coweeman Park Drive
- SR 432 at Kelso Drive
- SR 432 eastbound ramps at 3rd Avenue
- Talley Way at Site Driveway

The analysis would be prepared for existing (2022), forecasted year of opening (2024) and forecasted year of opening plus five (2029) conditions with and without project completion. The analysis would include evaluation of intersection level of service and queuing and would identify turn lane and/or traffic control requirements.

Thank you for reviewing the enclosed materials. We have prepared this information for your review in anticipation of a traffic scoping discussion to finalize the requirements of a Traffic Impact Analysis for the development.

If you have any questions or comments about the enclosed information, please contact me at (360) 352-1465, Ext. 140.

Respectfully,
SCJ Alliance

Anne Sylvester, PTE
Senior Consultant

Enclosures: Preliminary Site Plan
Figure 2
CWCOG Travel Demand Model Output

N:\Projects\0994 Gibbs & Olson\22-000124 Segale Property\04-Deliverables\03-Traffic Scoping\Letter\2022-0505 Kelso-Segale Warehouse Scoping Letter.docx

CAUTION: IF THIS SHEET IS NOT 30"X42", IT IS A REDUCED PRINT

Legend

- POTENTIAL OFFICE
- WAREHOUSE
- ▼ DRIVE THRU DOOR

Aerial Map

Tabulation

SITE AREA	
In s.f.	4,330,468 s.f.
In acres	99.41 ac
BUILDING AREA	
Office	10,000 s.f.
Warehouse	1,419,610 s.f.
TOTAL	1,429,610 s.f.
COVERAGE	33.0%
AUTO PARKING REQUIRED	
To be verified	
AUTO PARKING PROVIDED	
Standard (9' x 20')	449 stalls
TRAILER PARKING PROVIDED	
Trailer (10' x 55')	1,008 stalls
ZONING ORDINANCE FOR CITY	
Current Zoning Designation - Regional Commercial (RC)	
Proposed Zoning Designation - Light Industrial (LI)	

MAXIMUM BUILDING HEIGHT ALLOWED	
Height - 35'	
MAXIMUM LOT COVERAGE	
Coverage - 85%	
LANDSCAPE REQUIREMENT	
Percentage - 15% of the lot.	
LANDSCAPE PROVIDED	
In s.f.	1,192,563 s.f.
Percentage -	27.5%
SETBACKS	
Front / Street - 20'	
Side - 20' *	
Rear - 20' *	
* Rear/side yard setback to be determined by use and building code.	

Note: This is a conceptual plan. It is based on preliminary information which is not fully verified and may be incomplete. It is meant as a comparative aid in examining alternate development strategies and any quantities indicated are subject to revision as more reliable information becomes available.

north

1" = 120'

0 120 240 360

Conceptual Site Plan

Interstate 5 and Talley Way

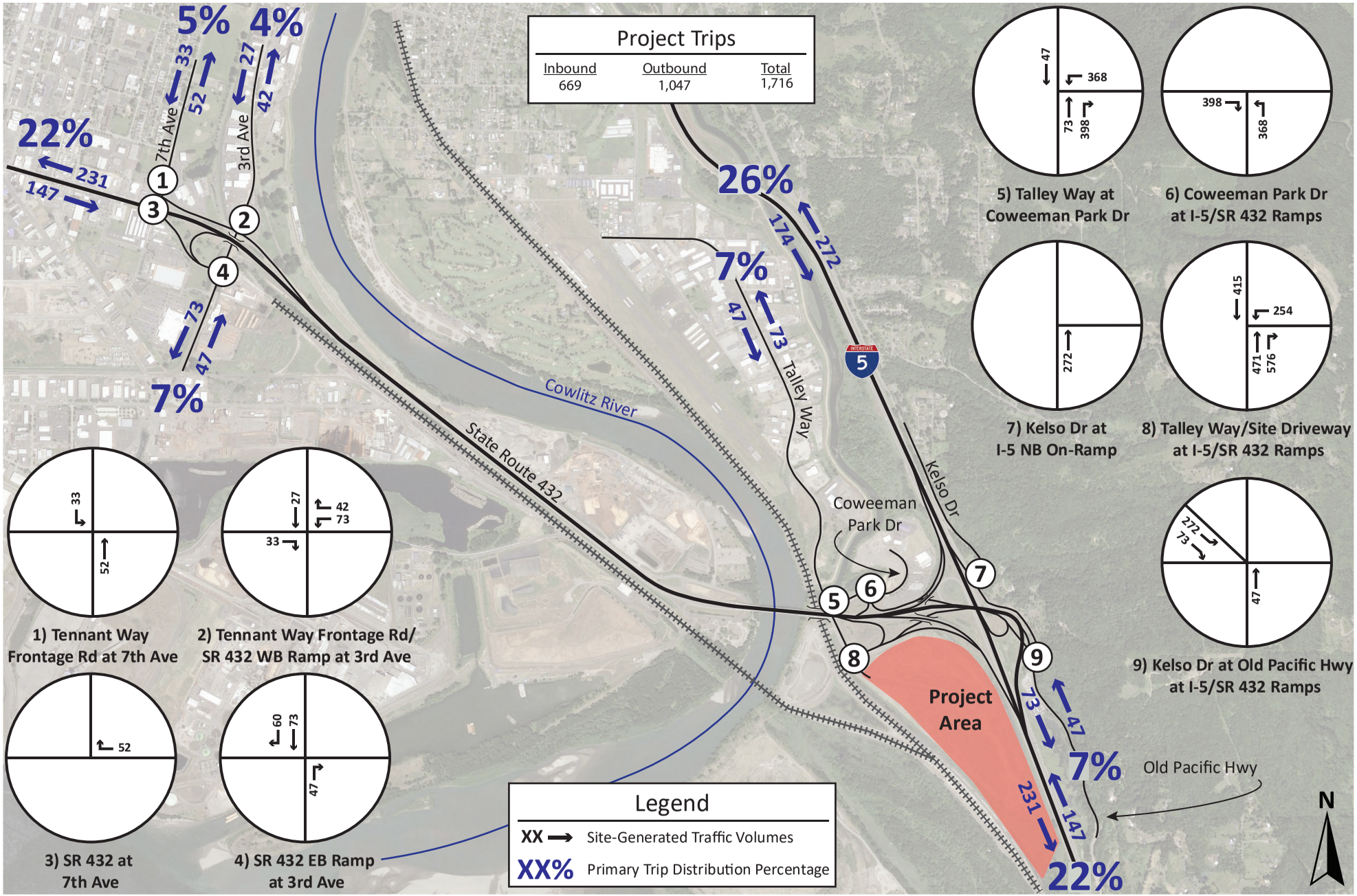
Kelso, WA

HPA architecture
18831 Bardeen Ave. - Ste. #100
Irvine, CA 92612
(949) 863-1770
www.hparchs.com

Trammell Crow Company

March 7, 2022 / Job #22166

Scheme 1



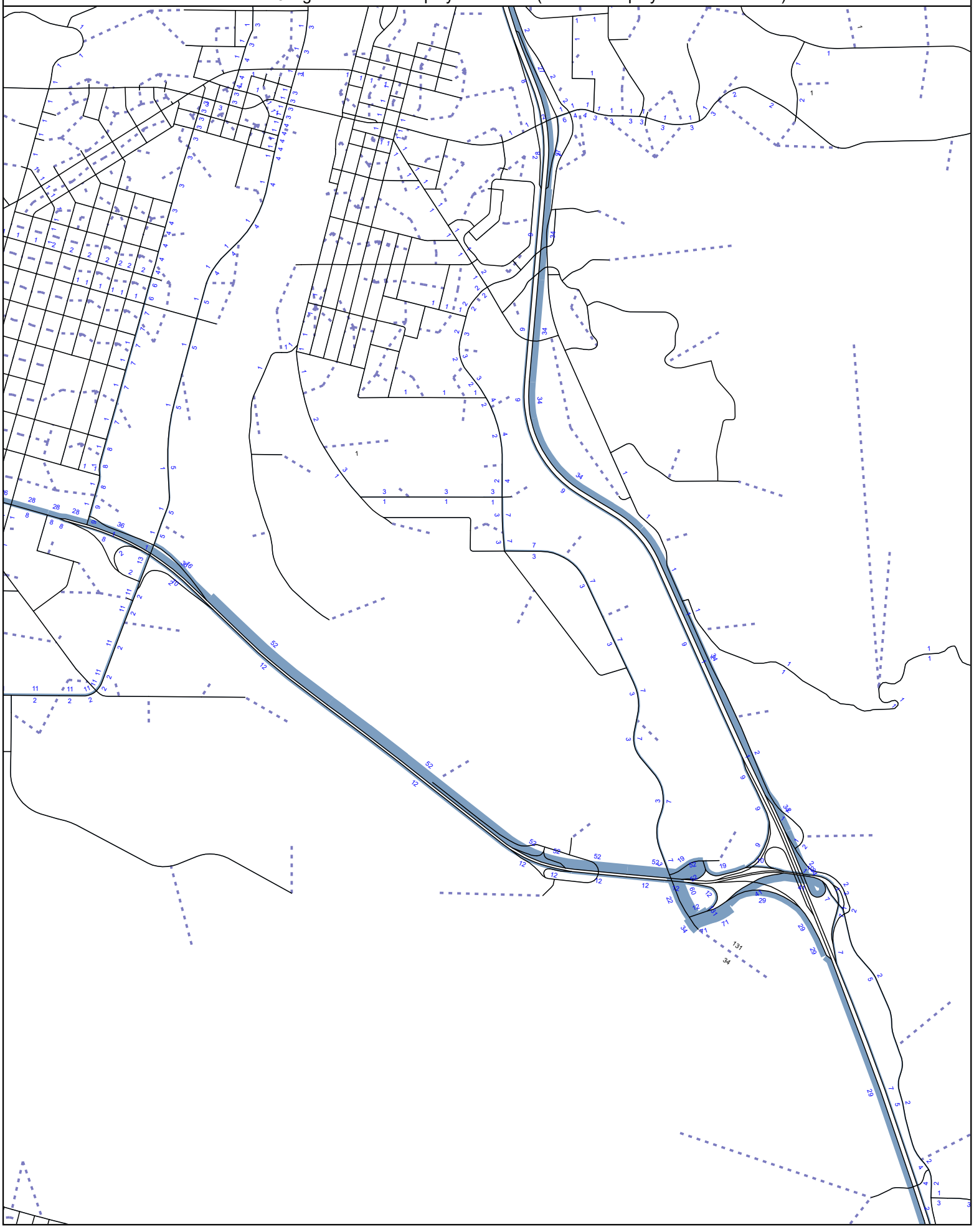
SCJ ALLIANCE
CONSULTING SERVICES

Kelso-Segale
Traffic Scoping Letter
Kelso, Washington

Figure 2
Site-Generated Traffic Volumes
PM Peak Hour

CWCOG 2025 PM Peak Hour Volumes - Select Zone TAZ 477

Assumes 725 Light Industrial Employees in TAZ (no other employees or residential)



Appendix B

Traffic Count Data

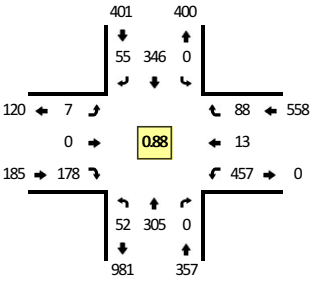
Type of peak hour being reported: Intersection Peak

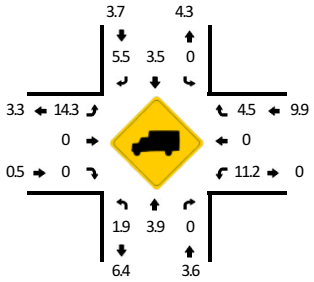
Method for determining peak hour: Total Entering Volume

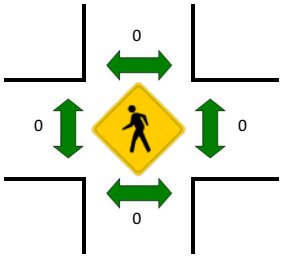
LOCATION: 3rd Ave -- Tennant Wy Frontage Rd/SR 432 WB Ramp
CITY/STATE: Longview, WA

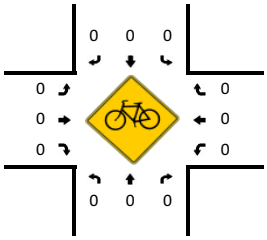
QC JOB #: 15822902
DATE: Tue, May 17 2022

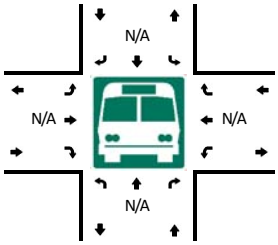
Peak-Hour: 4:20 PM -- 5:20 PM
Peak 15-Min: 5:05 PM -- 5:20 PM

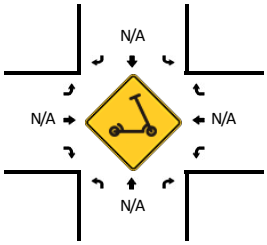












5-Min Count Period Beginning At	3rd Ave (Northbound)				3rd Ave (Southbound)				Tennant Wy Frontage Rd/SR 432 WB Ramp (Eastbound)				Tennant Wy Frontage Rd/SR 432 WB Ramp (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	4	21	0	0	0	24	3	0	3	0	12	0	41	0	5	0	113	
4:05 PM	6	48	0	0	0	35	4	0	3	0	13	0	38	0	8	0	155	
4:10 PM	9	18	0	0	0	25	7	0	3	0	10	0	50	1	8	0	131	
4:15 PM	3	28	0	0	0	28	2	0	2	0	8	0	27	1	7	0	106	
4:20 PM	4	30	0	0	0	27	3	0	0	0	13	0	38	1	8	0	124	
4:25 PM	6	14	0	0	0	20	1	0	0	0	17	0	39	0	11	0	108	
4:30 PM	2	41	0	0	0	43	5	0	1	0	12	0	46	3	8	0	161	
4:35 PM	2	31	0	0	0	30	9	0	1	0	16	0	47	0	6	0	142	
4:40 PM	1	26	0	0	0	27	1	0	0	0	7	0	40	3	7	0	112	
4:45 PM	4	14	0	0	0	23	5	0	0	0	9	0	38	0	9	0	102	
4:50 PM	5	7	0	0	0	25	1	0	1	0	9	0	31	1	9	0	89	
4:55 PM	1	29	0	0	0	30	3	0	0	0	16	0	40	1	4	0	124	1467
5:00 PM	1	24	0	0	0	20	6	0	1	0	19	0	32	1	9	0	113	1467
5:05 PM	7	24	0	0	0	40	9	0	1	0	22	0	35	0	7	0	145	1457
5:10 PM	11	32	0	0	0	29	5	0	0	0	18	0	28	2	7	0	132	1458
5:15 PM	8	33	0	0	0	32	7	0	2	0	20	0	43	1	3	0	149	1501
5:20 PM	4	20	0	0	0	22	3	0	0	0	13	0	34	2	7	0	105	1482
5:25 PM	1	24	0	0	0	28	4	0	2	0	10	0	43	3	4	0	119	1493
5:30 PM	3	21	0	0	0	22	1	0	3	0	15	0	50	0	4	0	119	1451
5:35 PM	2	24	0	0	0	23	1	0	1	0	18	0	25	0	12	0	106	1415
5:40 PM	1	21	0	0	0	16	5	0	0	0	15	0	30	0	2	0	90	1393
5:45 PM	1	22	0	0	0	29	1	0	0	0	6	0	32	0	3	0	94	1385
5:50 PM	3	21	0	0	0	31	2	0	0	0	10	0	31	2	5	0	105	1401
5:55 PM	3	13	0	0	0	24	2	0	0	0	5	0	28	0	5	0	80	1357

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	104	356	0	0	0	404	84	0	12	0	240	0	424	12	68	0	1704
Heavy Trucks	4	8	0		0	12	4		0	0	0		40	0	4		72
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 5/24/2022 3:19 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

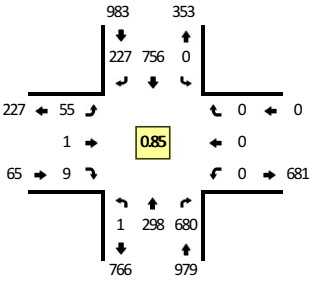
Type of peak hour being reported: Intersection Peak

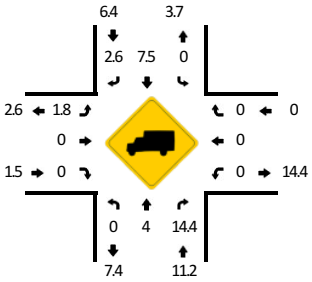
Method for determining peak hour: Total Entering Volume

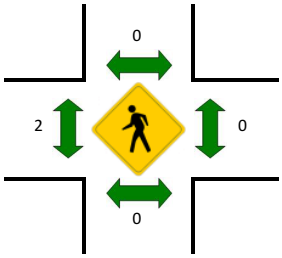
LOCATION: 3rd Ave -- SR 432 EB Ramps
CITY/STATE: Longview, WA

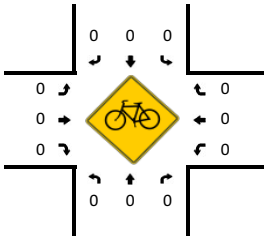
QC JOB #: 15822904
DATE: Tue, May 17 2022

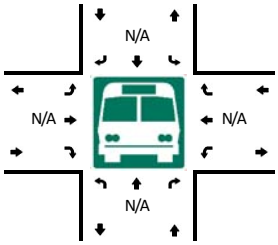
Peak-Hour: 4:20 PM -- 5:20 PM
Peak 15-Min: 5:05 PM -- 5:20 PM

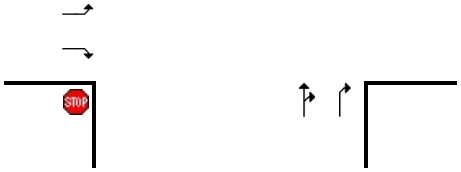


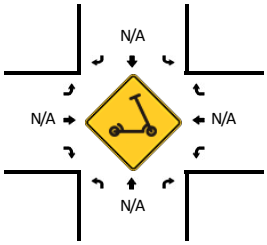












5-Min Count Period Beginning At	3rd Ave (Northbound)				3rd Ave (Southbound)				SR 432 EB Ramps (Eastbound)				SR 432 EB Ramps (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	26	52	0	0	63	9	0	2	0	0	0	0	0	0	0	152	
4:05 PM	0	44	68	0	0	62	19	0	6	0	0	0	0	0	0	0	199	
4:10 PM	0	27	56	0	0	77	16	0	2	0	1	0	0	0	0	0	179	
4:15 PM	0	31	72	0	1	46	14	0	1	0	1	0	0	0	0	0	166	
4:20 PM	0	28	58	0	0	59	21	0	2	0	0	0	0	0	0	0	168	
4:25 PM	0	17	52	0	0	62	17	0	6	0	0	0	0	0	0	0	154	
4:30 PM	0	35	59	0	0	83	14	0	6	0	5	0	0	0	0	0	202	
4:35 PM	0	19	59	0	0	75	23	0	6	0	0	0	0	0	0	0	182	
4:40 PM	0	26	72	0	0	63	8	0	8	0	0	0	0	0	0	0	177	
4:45 PM	0	15	24	0	0	61	14	0	3	0	0	0	0	0	0	0	117	
4:50 PM	0	4	0	0	0	48	14	0	7	0	0	0	0	0	0	0	73	
4:55 PM	0	28	63	0	0	67	16	0	2	1	0	0	0	0	0	0	177	1946
5:00 PM	0	20	83	0	0	50	23	0	6	0	1	0	0	0	0	0	183	1977
5:05 PM	0	27	53	0	0	63	30	0	3	0	2	0	0	0	0	0	178	1956
5:10 PM	0	42	79	0	0	54	21	0	1	0	1	0	0	0	0	0	198	1975
5:15 PM	0	37	78	1	0	71	26	0	5	0	0	0	0	0	0	0	218	2027
5:20 PM	0	18	42	0	0	56	13	0	6	0	1	0	0	0	0	0	136	1995
5:25 PM	0	23	42	0	1	67	13	0	2	0	0	0	0	0	0	0	148	1989
5:30 PM	0	24	65	0	0	72	15	0	2	0	0	0	0	0	0	0	178	1965
5:35 PM	0	21	36	0	0	44	18	0	4	0	0	0	0	0	0	0	123	1906
5:40 PM	0	17	51	0	0	49	14	0	3	0	1	0	0	0	0	0	135	1864
5:45 PM	0	20	63	0	0	54	14	0	4	0	1	0	0	0	0	0	156	1903
5:50 PM	0	16	36	0	0	57	12	0	7	0	0	0	0	0	0	0	128	1958
5:55 PM	0	13	47	0	0	49	9	0	4	0	4	0	0	0	0	0	126	1907

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	424	840	4	0	752	308	0	36	0	12	0	0	0	0	0	2376
Heavy Trucks	0	8	96		0	52	0		4	0	0		0	0	0		160
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

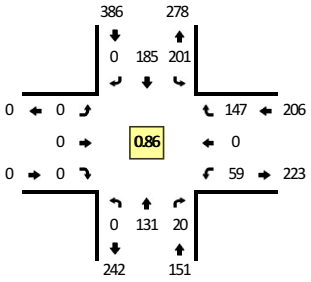
Report generated on 5/24/2022 3:20 PM

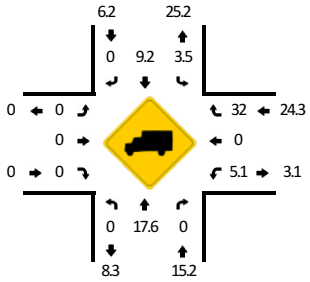
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

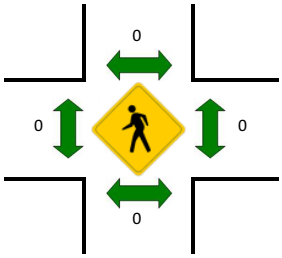
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

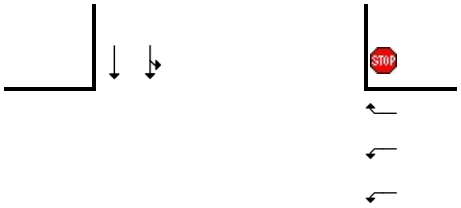
LOCATION: Talley Wy -- Coweeman Park Dr | **QC JOB #:** 15822905
CITY/STATE: Kelso, WA | **DATE:** Tue, May 17 2022

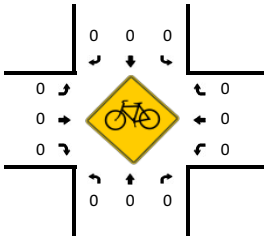
Peak-Hour: 4:05 PM -- 5:05 PM
Peak 15-Min: 4:25 PM -- 4:40 PM

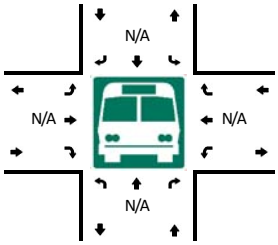


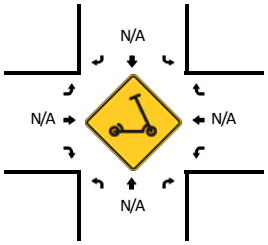












5-Min Count Period Beginning At	Talley Wy (Northbound)				Talley Wy (Southbound)				Coweeman Park Dr (Eastbound)				Coweeman Park Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	12	2	0	9	10	0	0	0	0	0	0	5	0	19	1	58	
4:05 PM	0	7	2	0	27	20	0	0	0	0	0	0	5	0	13	0	74	
4:10 PM	0	12	0	0	11	20	0	0	0	0	0	0	10	0	6	0	59	
4:15 PM	0	12	1	0	16	11	0	0	0	0	0	0	4	0	21	0	65	
4:20 PM	0	15	3	0	16	8	0	0	0	0	0	0	7	0	13	0	62	
4:25 PM	0	8	1	0	15	19	0	0	0	0	0	0	3	0	14	0	60	
4:30 PM	0	10	2	0	22	29	0	0	0	0	0	0	3	0	13	1	80	
4:35 PM	0	14	2	0	19	22	0	0	0	0	0	0	4	0	13	1	75	
4:40 PM	0	12	0	0	21	11	0	0	0	0	0	0	5	0	10	0	59	
4:45 PM	0	16	4	0	18	14	0	0	0	0	0	0	4	0	12	0	68	
4:50 PM	0	4	1	0	11	10	0	0	0	0	0	0	3	0	10	0	39	
4:55 PM	0	6	2	0	9	12	0	0	0	0	0	0	3	0	9	0	41	740
5:00 PM	0	15	2	0	16	9	0	0	0	0	0	0	6	0	13	0	61	743
5:05 PM	0	8	1	0	9	9	0	0	0	0	0	0	7	0	13	0	47	716
5:10 PM	0	15	2	0	13	17	0	0	0	0	0	0	7	0	14	0	68	725
5:15 PM	0	12	5	0	15	13	0	0	0	0	0	0	2	0	8	0	55	715
5:20 PM	0	10	0	0	17	13	0	0	0	0	0	0	6	0	12	0	58	711
5:25 PM	0	9	3	0	12	12	0	0	0	0	0	0	5	0	7	0	48	699
5:30 PM	0	10	2	0	10	9	0	0	0	0	0	0	8	0	10	0	49	668
5:35 PM	0	10	0	0	11	7	0	0	0	0	0	0	3	0	8	0	39	632
5:40 PM	0	2	2	0	9	10	0	0	0	0	0	0	3	0	11	0	37	610
5:45 PM	0	9	2	0	8	9	0	0	0	0	0	0	5	0	4	0	37	579
5:50 PM	0	8	1	0	5	9	0	0	0	0	0	0	0	0	8	0	31	571
5:55 PM	0	5	1	0	6	4	0	0	0	0	0	0	2	0	3	0	21	551

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	128	20	0	224	280	0	0	0	0	0	0	40	0	160	8	860
Heavy Trucks	0	32	0		4	20	0		0	0	0		0	0	36		92
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

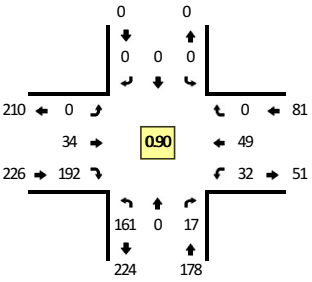
Comments:

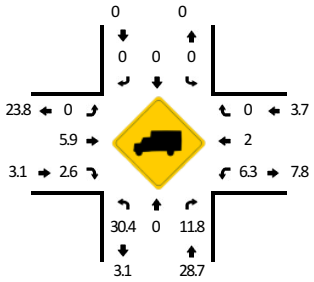
Report generated on 5/24/2022 3:20 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

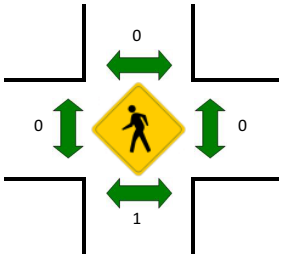
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

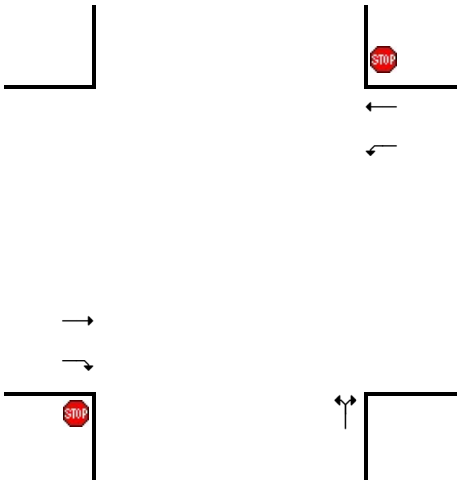
LOCATION: I-5/SR 432 Ramps -- Coweeman Park Dr | **QC JOB #:** 15822906
CITY/STATE: Kelso, WA | **DATE:** Tue, May 17 2022

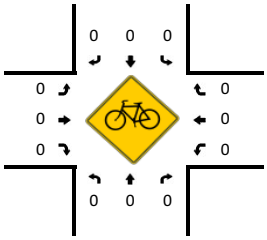
Peak-Hour: 4:05 PM -- 5:05 PM
Peak 15-Min: 4:05 PM -- 4:20 PM

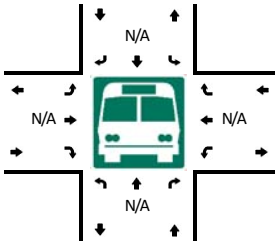


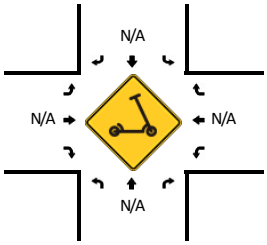












5-Min Count Period Beginning At	I-5/SR 432 Ramps (Northbound)				I-5/SR 432 Ramps (Southbound)				Coweeman Park Dr (Eastbound)				Coweeman Park Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	19	0	0	0	0	0	0	0	0	1	12	0	2	4	0	0	38	
4:05 PM	15	0	0	0	0	0	0	0	0	3	25	0	1	3	0	0	47	
4:10 PM	12	0	4	0	0	0	0	0	0	2	10	0	2	5	0	0	35	
4:15 PM	19	0	5	0	0	0	0	0	0	3	16	0	3	7	0	0	53	
4:20 PM	16	0	1	0	0	0	0	0	0	5	14	0	2	5	0	0	43	
4:25 PM	17	0	1	0	0	0	0	0	0	1	13	0	1	1	0	0	34	
4:30 PM	11	0	1	0	0	0	0	0	0	4	23	0	2	3	0	0	44	
4:35 PM	13	0	1	0	0	0	0	0	0	2	19	0	4	4	0	0	43	
4:40 PM	11	0	1	0	0	0	0	0	0	2	20	0	3	5	0	0	42	
4:45 PM	16	0	0	0	0	0	0	0	0	7	16	0	3	2	0	0	44	
4:50 PM	9	0	0	0	0	0	0	0	0	1	11	0	7	2	0	0	30	
4:55 PM	11	0	0	0	0	0	0	0	0	3	7	0	3	4	0	0	28	481
5:00 PM	11	0	3	0	0	0	0	0	0	1	18	0	1	8	0	0	42	485
5:05 PM	15	0	0	0	0	0	0	0	0	1	8	0	4	10	0	0	38	476
5:10 PM	14	0	1	0	0	0	0	0	0	2	13	0	1	3	0	0	34	475
5:15 PM	9	0	1	0	0	0	0	0	0	7	14	0	0	3	0	0	34	456
5:20 PM	13	0	2	0	0	0	0	0	0	0	16	0	3	4	0	0	38	451
5:25 PM	10	0	1	0	0	0	0	0	0	3	12	0	0	3	0	0	29	446
5:30 PM	13	0	0	0	0	0	0	0	0	2	10	0	1	4	0	0	30	432
5:35 PM	10	0	2	0	0	0	0	0	0	0	12	0	0	2	0	0	26	415
5:40 PM	10	0	0	0	0	0	0	0	0	2	9	0	2	3	0	0	26	399
5:45 PM	8	0	1	0	0	0	0	0	0	3	7	0	1	1	0	0	21	376
5:50 PM	8	0	4	0	0	0	0	0	0	0	5	0	3	0	0	0	20	366
5:55 PM	4	0	2	0	0	0	0	0	0	1	7	0	1	1	0	0	16	354

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	184	0	36	0	0	0	0	0	0	32	204	0	24	60	0	0	540
Heavy Trucks	56	0	4		0	0	0		0	4	4		0	0	0		68
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

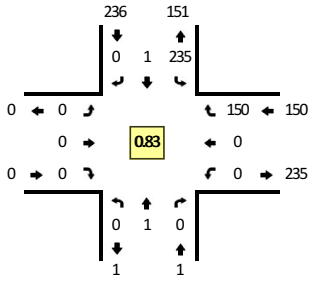
Comments:

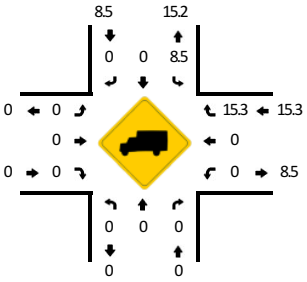
Report generated on 5/24/2022 3:20 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

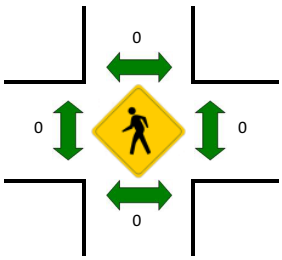
LOCATION: Talley Wy -- I-5/SR 432 Ramps | **QC JOB #:** 15822908
CITY/STATE: Kelso, WA | **DATE:** Tue, May 17 2022

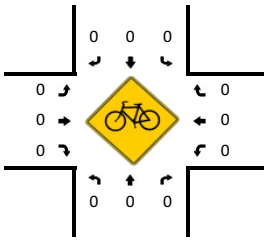
Peak-Hour: 4:05 PM -- 5:05 PM
Peak 15-Min: 4:30 PM -- 4:45 PM

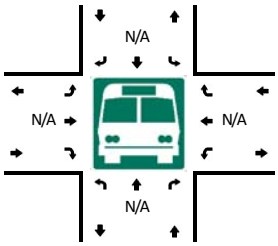


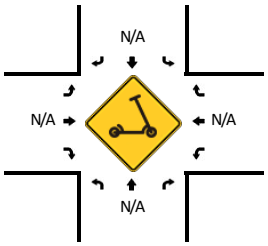


Quality Counts
DATA THAT DRIVES COMMUNITIES









5-Min Count Period Beginning At	Talley Wy (Northbound)				Talley Wy (Southbound)				I-5/SR 432 Ramps (Eastbound)				I-5/SR 432 Ramps (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	17	0	0	0	0	0	0	0	0	0	14	0	31	
4:05 PM	0	0	0	0	22	1	0	0	0	0	0	0	0	0	8	0	31	
4:10 PM	0	0	0	0	28	0	0	0	0	0	0	0	0	0	12	0	40	
4:15 PM	0	0	0	0	16	0	0	0	0	0	0	0	0	0	15	0	31	
4:20 PM	0	0	0	0	14	0	0	0	0	0	0	0	0	0	16	0	30	
4:25 PM	0	1	0	0	19	0	0	0	0	0	0	0	0	0	8	0	28	
4:30 PM	0	0	0	0	34	0	0	0	0	0	0	0	0	0	13	0	47	
4:35 PM	0	0	0	0	25	0	0	0	0	0	0	0	0	0	16	0	41	
4:40 PM	0	0	0	0	16	0	0	0	0	0	0	0	0	0	13	0	29	
4:45 PM	0	0	0	0	18	0	0	0	0	0	0	0	0	0	19	0	37	
4:50 PM	0	0	0	0	13	0	0	0	0	0	0	0	0	0	6	0	19	
4:55 PM	0	0	0	0	15	0	0	0	0	0	0	0	0	0	7	0	22	386
5:00 PM	0	0	0	0	15	0	0	0	0	0	0	0	0	0	17	0	32	387
5:05 PM	0	0	0	0	17	0	0	0	0	0	0	0	0	0	9	0	26	382
5:10 PM	0	0	0	0	21	0	0	0	0	0	0	0	0	0	17	0	38	380
5:15 PM	0	0	0	0	16	0	0	0	0	0	0	0	0	0	19	0	35	384
5:20 PM	0	0	0	0	19	0	0	0	0	0	0	0	0	0	7	0	26	380
5:25 PM	0	0	0	0	17	0	0	1	0	0	0	0	0	0	12	0	30	382
5:30 PM	0	0	0	0	16	0	0	0	0	0	0	0	0	0	12	0	28	363
5:35 PM	0	0	0	0	10	0	0	0	0	0	0	0	0	0	10	0	20	342
5:40 PM	0	0	0	0	13	0	0	0	0	0	0	0	0	0	5	0	18	331
5:45 PM	0	0	0	0	14	0	0	0	0	0	0	0	0	0	11	0	25	319
5:50 PM	0	0	0	0	7	0	0	1	0	0	0	0	0	0	9	0	17	317
5:55 PM	0	0	0	0	7	0	0	0	0	0	0	0	0	0	4	0	11	306

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	300	0	0	0	0	0	0	0	0	0	168	0	468
Heavy Trucks	0	0	0		12	0	0		0	0	0		0	0	36		48
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 5/24/2022 3:20 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

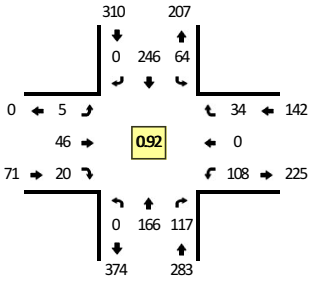
Type of peak hour being reported: Intersection Peak

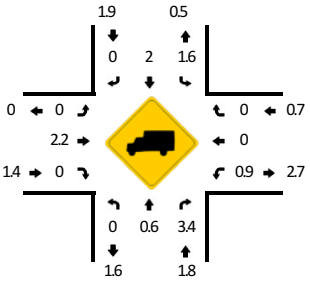
Method for determining peak hour: Total Entering Volume

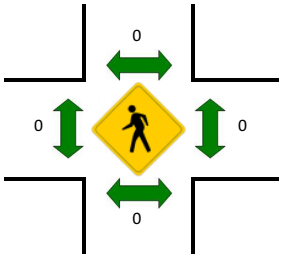
LOCATION: Old Pacific Hwy S/SR 432 Ramps -- I-5 Off-Ramps/Kelso Dr
CITY/STATE: Kelso, WA

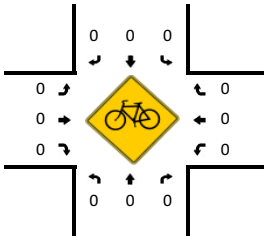
QC JOB #: 15822909
DATE: Tue, May 17 2022

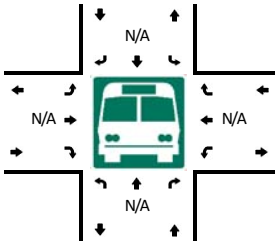
Peak-Hour: 4:20 PM -- 5:20 PM
Peak 15-Min: 4:25 PM -- 4:40 PM

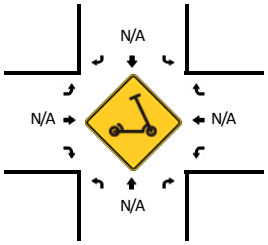












5-Min Count Period Beginning At	Old Pacific Hwy S/SR 432 Ramps (Northbound)				Old Pacific Hwy S/SR 432 Ramps (Southbound)				I-5 Off-Ramps/Kelso Dr (Eastbound)				I-5 Off-Ramps/Kelso Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	11	10	0	1	20	0	0	0	2	1	0	6	0	2	0	53	
4:05 PM	0	6	12	0	6	22	0	0	0	6	1	0	6	0	5	0	64	
4:10 PM	0	11	10	0	4	23	0	0	0	4	1	0	11	0	1	0	65	
4:15 PM	0	7	9	0	6	21	0	2	0	1	1	0	7	0	6	0	60	
4:20 PM	0	16	12	0	1	24	0	0	0	6	3	0	6	0	3	0	71	
4:25 PM	0	20	13	0	2	20	0	0	0	8	0	0	5	0	7	0	75	
4:30 PM	0	20	4	0	4	23	0	0	1	2	2	0	11	0	2	0	69	
4:35 PM	0	12	11	0	5	23	0	0	1	6	4	0	8	0	5	0	75	
4:40 PM	0	13	11	0	8	17	0	0	1	3	1	0	13	0	2	0	69	
4:45 PM	0	9	12	0	6	17	0	0	1	4	1	0	12	0	1	0	63	
4:50 PM	0	15	17	0	1	15	0	0	1	4	3	0	7	0	2	0	65	
4:55 PM	0	10	7	0	2	14	0	0	0	3	1	0	10	0	4	0	51	780
5:00 PM	0	15	11	0	6	20	0	1	0	1	1	0	9	0	1	0	65	792
5:05 PM	0	11	4	0	13	29	0	0	0	4	2	0	9	0	0	0	72	800
5:10 PM	0	10	8	0	7	22	0	1	0	2	1	0	9	0	4	0	64	799
5:15 PM	0	15	7	0	7	22	0	0	0	3	1	0	9	0	3	0	67	806
5:20 PM	0	16	11	0	3	15	0	1	0	2	2	0	11	0	3	0	64	799
5:25 PM	0	15	8	0	6	18	0	1	0	1	0	0	6	0	6	0	61	785
5:30 PM	0	6	10	0	3	18	0	0	1	3	4	0	3	0	2	0	50	766
5:35 PM	0	13	8	0	4	16	0	0	0	3	2	0	8	0	2	0	56	747
5:40 PM	0	16	7	0	4	24	0	1	0	1	1	0	4	0	4	0	62	740
5:45 PM	0	6	7	0	4	13	0	0	1	2	2	0	2	0	3	0	40	717
5:50 PM	0	17	11	0	1	17	0	1	1	0	1	0	7	0	6	0	62	714
5:55 PM	0	10	2	0	4	13	0	0	0	0	0	0	4	0	3	0	36	699

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	208	112	0	44	264	0	0	8	64	24	0	96	0	56	0	876
Heavy Trucks	0	0	8		0	8	0		0	0	0		0	0	0		16
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 5/24/2022 3:20 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Appendix C

Traffic Volume Worksheets

SCJ ALLIANCE
CONSULTING SERVICES

Mid I-5 Industrial Park

Trip Generation

PM Peak Hour Trip Generation

Site Plan Description	LUC	ITE Description	Variable	Value	Trip Rate	Distribution		Total Trips		
						In	Out	In	Out	Total
Industrial Facililty	155	High Cube Fulfillment Center Warehouse - Sort	KSF	1406.885	1.20	39%	61%	658	1,030	1,688
Project Total										

AM Peak Hour Trip Generation

Site Plan Description	LUC	ITE Description	Variable	Value	Trip Rate	Distribution		Total Trips		
						In	Out	In	Out	Total
Industrial Facililty	155	High Cube Fulfillment Center Warehouse - Sort	KSF	1406.885	0.87	81%	19%	991	233	1,224
Project Total										

Daily Trip Generation

Site Plan Description	LUC	ITE Description	Variable	Value	Trip Rate	Distribution		Total Trips		
						In	Out	In	Out	Total
Industrial Facililty	155	High Cube Fulfillment Center Warehouse - Sort	KSF	1406.885	6.44	50%	50%	4,530	4,530	9,060
Project Total										

SCJ ALLIANCE
CONSULTING SERVICES

Mid I-5 Industrial Park

PM Peak Hour Volumes

Growth Rate: 1%

Intersection	Movement		Existing 2022 Counts	Background 2024 Growth	Baseline 2024 Volumes	Site Generated Volumes	Projected 2024 Volumes	Background 2029 Growth	Baseline 2029 Volumes	Projected 2029 Volumes
		L	7	0	7	0	7	0	7	7
	EB	T	0	0	0	0	0	0	0	0
		R	178	4	182	33	215	9	191	224
1		L	457	9	466	72	538	23	489	561
SR 432 WB Off-Ramp	WB	T	13	0	13	0	13	1	14	14
3rd Avenue		R	88	2	90	42	132	4	94	136
		L	52	1	53	0	53	3	56	56
TMC Date: 5/17/2022	NB	T	305	6	311	0	311	16	327	327
		R	0	0	0	0	0	0	0	0
4:20 - 5:20 PM		L	0	0	0	0	0	0	0	0
PHF: 0.88	SB	T	346	7	353	26	379	18	371	397
		R	55	1	56	0	56	3	59	59
			1,501			173	1,704			
		L	55	1	56	0	56	3	59	59
	EB	T	1	0	1	0	1	0	1	1
		R	9	0	9	0	9	0	10	10
2		L	0	0	0	0	0	0	0	0
SR 432 EB Ramp	WB	T	0	0	0	0	0	0	0	0
3rd Avenue		R	0	0	0	0	0	0	0	0
		L	1	0	1	0	1	0	1	1
TMC Date: 5/17/2022	NB	T	298	6	304	0	304	15	319	319
		R	680	14	694	46	740	35	728	774
4:20 - 5:20 PM		L	0	0	0	0	0	0	0	0
PHF: 0.85	SB	T	756	15	771	72	843	39	810	882
		R	227	5	232	59	291	12	243	302
			2,027		2,068	177	2,245			
		L	0	0	0	0	0	0	0	0
	EB	T	0	0	0	0	0	0	0	0
		R	0	0	0	0	0	0	0	0
3		L	54	1	55	362	417	3	58	420
Talley Way	WB	T	0	0	0	0	0	0	0	0
Coweeman Park Drive		R	142	3	145	0	145	7	152	152
		L	0	0	0	0	0	0	0	0
TMC Date: 5/17/2022	NB	T	135	3	138	72	210	7	145	217
		R	25	1	26	392	418	1	27	419
4:20 - 5:20 PM		L	184	4	188	0	188	9	197	197
PHF: 0.83	SB	T	173	3	176	46	222	9	185	231
		R	0	0	0	0	0	0	0	0
			713		727	872	1,599			
		L	0	0	0	0	0	0	0	0
	EB	T	36	1	37	0	37	2	39	39
		R	176	4	180	392	572	9	188	580
4		L	31	1	32	0	32	2	33	33
I-5/SR 432 Ramps	WB	T	50	1	51	0	51	3	54	54
Coweeman Park Drive		R	0	0	0	0	0	0	0	0
		L	153	3	156	362	518	8	164	526
TMC Date: 5/17/2022	NB	T	0	0	0	0	0	0	0	0
		R	10	0	10	0	10	1	11	11
4:20 - 5:20 PM		L	0	0	0	0	0	0	0	0
PHF: 0.88	SB	T	0	0	0	0	0	0	0	0
		R	0	0	0	0	0	0	0	0
			456		465	754	1,219			

Mid I-5 Industrial Park

PM Peak Hour Volumes

Growth Rate: 1%

Intersection	Movement		Existing 2022 Counts	Background 2024 Growth	Baseline 2024 Volumes	Site Generated Volumes	Projected 2024 Volumes	Background 2029 Growth	Baseline 2029 Volumes	Projected 2029 Volumes
		L	**0**	0	**0**	**0**	**0**	0	**0**	**0**
	EB	T	**0**	0	**0**	**0**	**0**	0	**0**	**0**
		R	**0**	0	**0**	**0**	**0**	0	**0**	**0**
5		L	**0**	0	**0**	**250**	**250**	0	**0**	**250**
Talley Way/Site Driveway	WB	T	**0**	0	**0**	**0**	**0**	0	**0**	**0**
I-5/SR 432 Ramps		R	**160**	3	**163**	**0**	**163**	8	**171**	**171**
		L	**0**	0	**0**	**0**	**0**	0	**0**	**0**
TMC Date: 5/17/2022	NB	T	**1**	0	**1**	**464**	**465**	0	**1**	**465**
		R	**0**	0	**0**	**566**	**566**	0	**0**	**566**
4:20 - 5:20 PM		L	**223**	4	**227**	**0**	**227**	11	**239**	**239**
PHF: 0.82	SB	T	**0**	0	**0**	**408**	**408**	0	**0**	**408**
		R	**0**	0	**0**	**0**	**0**	0	**0**	**0**
			384		**392**	**1,688**	**2,080**			
		L	**5**	0	**5**	**0**	**5**	0	**5**	**5**
	EB	T	**46**	1	**47**	**0**	**47**	2	**49**	**49**
		R	**20**	0	**20**	**0**	**20**	1	**21**	**21**
6		L	**108**	2	**110**	**0**	**110**	6	**116**	**116**
Kelso Drive/Old Pacific Highway	WB	T	**0**	0	**0**	**0**	**0**	0	**0**	**0**
I-5/SR 432 Ramps		R	**34**	1	**35**	**0**	**35**	2	**36**	**36**
		L	**0**	0	**0**	**0**	**0**	0	**0**	**0**
TMC Date: 5/17/2022	NB	T	**166**	3	**169**	**46**	**215**	8	**178**	**224**
		R	**117**	2	**119**	**0**	**119**	6	**125**	**125**
4:20 - 5:20 PM		L	**64**	1	**65**	**268**	**333**	3	**69**	**337**
PHF: 0.95	SB	T	**246**	5	**251**	**72**	**323**	13	**263**	**335**
		R	**0**	0	**0**	**0**	**0**	0	**0**	**0**
			806		**822**	**386**	**1,208**			

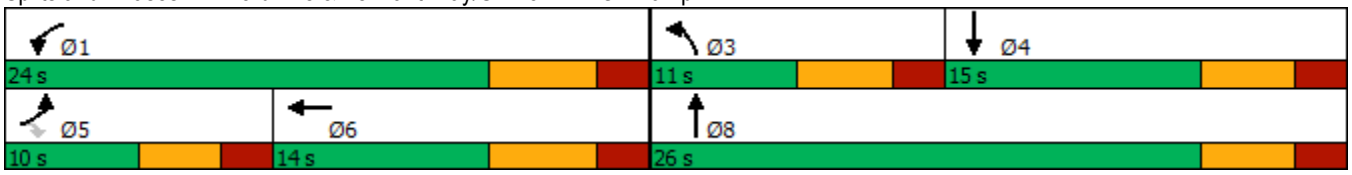
Appendix D

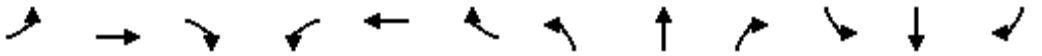
Operational Analysis Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	180	455	15	90	50	305	0	0	345	55
Future Volume (vph)	5	0	180	455	15	90	50	305	0	0	345	55
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0		75	550		625	275		0	0		0
Storage Lanes	1		1	2		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		318			873			684			482	
Travel Time (s)		7.2			19.8			15.5			11.0	
Turn Type	Prot		Perm	Prot	NA		Prot	NA			NA	
Protected Phases	5			1	6		3	8			4	
Permitted Phases			5									
Detector Phase	5		5	1	6		3	8			4	
Switch Phase												
Minimum Initial (s)	5.0		5.0	7.0	5.0		5.0	5.0			5.0	
Minimum Split (s)	10.0		10.0	13.0	11.0		10.5	10.5			10.5	
Total Split (s)	10.0		10.0	24.0	14.0		11.0	26.0			15.0	
Total Split (%)	20.0%		20.0%	48.0%	28.0%		22.0%	52.0%			30.0%	
Maximum Green (s)	5.0		5.0	18.0	8.0		5.5	20.5			9.5	
Yellow Time (s)	3.0		3.0	4.0	4.0		3.5	3.5			3.5	
All-Red Time (s)	2.0		2.0	2.0	2.0		2.0	2.0			2.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	5.0		5.0	6.0	6.0		5.5	5.5			5.5	
Lead/Lag	Lead		Lead		Lag		Lead				Lag	
Lead-Lag Optimize?	Yes		Yes		Yes		Yes				Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	
Recall Mode	None		None	None	None		None	Min			Min	

Intersection Summary	
Area Type:	Other
Cycle Length: 50	
Actuated Cycle Length: 39.9	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 1: 3rd Ave & Tennant Way/SR 432 WB Off Ramp





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	180	455	15	90	50	305	0	0	345	55
Future Volume (veh/h)	5	0	180	455	15	90	50	305	0	0	345	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1559	0	1750	1600	1750	1695	1723	1695	0	0	1695	1668
Adj Flow Rate, veh/h	6	0	6	517	17	102	57	347	0	0	392	62
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	14	0	0	11	0	4	2	4	0	0	4	6
Cap, veh/h	12	0	0	743	29	175	98	699	0	0	569	89
Arrive On Green	0.01	0.00	0.00	0.25	0.13	0.13	0.06	0.41	0.00	0.00	0.20	0.20
Sat Flow, veh/h	1485	6		2956	217	1300	1641	1695	0	0	2874	438
Grp Volume(v), veh/h	6	47.1		517	0	119	57	347	0	0	225	229
Grp Sat Flow(s),veh/h/ln	1485	D		1478	0	1516	1641	1695	0	0	1611	1617
Q Serve(g_s), s	0.1			5.9	0.0	2.7	1.3	5.6	0.0	0.0	4.8	4.9
Cycle Q Clear(g_c), s	0.1			5.9	0.0	2.7	1.3	5.6	0.0	0.0	4.8	4.9
Prop In Lane	1.00			1.00		0.86	1.00		0.00	0.00		0.27
Lane Grp Cap(c), veh/h	12			743	0	204	98	699	0	0	329	330
V/C Ratio(X)	0.50			0.70	0.00	0.58	0.58	0.50	0.00	0.00	0.68	0.69
Avail Cap(c_a), veh/h	200			1435	0	327	243	937	0	0	413	414
HCM Platoon Ratio	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00			1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	18.3			12.6	0.0	15.1	17.0	8.1	0.0	0.0	13.7	13.7
Incr Delay (d2), s/veh	28.8			1.2	0.0	2.6	5.3	0.5	0.0	0.0	3.3	3.6
Initial Q Delay(d3),s/veh	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1			1.6	0.0	0.9	0.5	1.5	0.0	0.0	1.7	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.1			13.8	0.0	17.7	22.3	8.6	0.0	0.0	17.0	17.3
LnGrp LOS	D			B	A	B	C	A	A	A	B	B
Approach Vol, veh/h					636			404			454	
Approach Delay, s/veh					14.5			10.5			17.1	
Approach LOS					B			B			B	

Timer - Assigned Phs	1		3	4	5	6		8				
Phs Duration (G+Y+Rc), s	15.3		7.7	13.1	5.3	11.0		20.8				
Change Period (Y+Rc), s	6.0		5.5	5.5	5.0	6.0		5.5				
Max Green Setting (Gmax), s	18.0		5.5	9.5	5.0	8.0		20.5				
Max Q Clear Time (g_c+I1), s	7.9		3.3	6.9	2.1	4.7		7.6				
Green Ext Time (p_c), s	1.5		0.0	0.7	0.0	0.2		1.7				

Intersection Summary												
HCM 6th Ctrl Delay			14.4									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	55	10	0	300	755	225
Future Vol, veh/h	55	10	0	300	755	225
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	0	0	4	8	3
Mvmt Flow	65	12	0	353	888	265

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1374	577	-	0	-	0
Stage 1	1021	-	-	-	-	-
Stage 2	353	-	-	-	-	-
Critical Hdwy	6.63	6.9	-	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.3	-	-	-	-
Pot Cap-1 Maneuver	148	465	0	-	-	-
Stage 1	309	-	0	-	-	-
Stage 2	710	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	148	465	-	-	-	-
Mov Cap-2 Maneuver	148	-	-	-	-	-
Stage 1	309	-	-	-	-	-
Stage 2	710	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	44.4	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	165	-	-
HCM Lane V/C Ratio	-	0.463	-	-
HCM Control Delay (s)	-	44.4	-	-
HCM Lane LOS	-	E	-	-
HCM 95th %tile Q(veh)	-	2.2	-	-

Intersection	
Int Delay, s/veh	5.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	55	140	135	25	185	175
Future Vol, veh/h	55	140	135	25	185	175
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	5	32	18	0	9	4
Mvmt Flow	66	169	163	30	223	211

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	715	163	0	0	193	0
Stage 1	163	-	-	-	-	-
Stage 2	552	-	-	-	-	-
Critical Hdwy	6.675	6.68	-	-	4.235	-
Critical Hdwy Stg 1	5.475	-	-	-	-	-
Critical Hdwy Stg 2	5.875	-	-	-	-	-
Follow-up Hdwy	3.5475	3.604	-	-	2.2855	-
Pot Cap-1 Maneuver	376	800	-	-	1334	-
Stage 1	857	-	-	-	-	-
Stage 2	534	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	305	800	-	-	1334	-
Mov Cap-2 Maneuver	305	-	-	-	-	-
Stage 1	857	-	-	-	-	-
Stage 2	433	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.4	0	4.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	305	800	1334	-
HCM Lane V/C Ratio	-	-	0.217	0.211	0.167	-
HCM Control Delay (s)	-	-	20.1	10.7	8.2	0.3
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.8	0.8	0.6	-

4: I-5/SR 432 Ramps & Coweeman Park Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.0	4.0	0.2	0.2	3.8	0.5
Total Del/Veh (s)	4.5	1.5	4.7	5.9	0.3	0.6	2.1

MOVEMENT SUMMARY

Site: 6 [Existing 2022 (Site Folder: General)]

I-5 NB Ramps/SR 432 Ramps at Old Pacific Hwy
PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Old Pacific Hwy														
8	T1	165	1.0	179	1.0	0.234	4.3	LOS A	1.2	30.5	0.29	0.45	0.29	37.2
18	R2	115	3.0	125	3.0	0.234	4.4	LOS A	1.2	30.5	0.29	0.45	0.29	36.0
Approach		280	1.8	304	1.8	0.234	4.4	LOS A	1.2	30.5	0.29	0.45	0.29	36.7
East: WB Kelso Dr														
1	L2	110	1.0	120	1.0	0.126	10.4	LOS B	0.6	15.1	0.32	0.62	0.32	35.0
16	R2	35	0.0	38	0.0	0.126	4.5	LOS A	0.6	15.1	0.32	0.62	0.32	33.9
Approach		145	0.8	158	0.8	0.126	9.0	LOS A	0.6	15.1	0.32	0.62	0.32	34.7
North: SB SR 432 Ramps														
7	L2	65	2.0	71	2.0	0.259	10.3	LOS B	1.4	35.8	0.30	0.48	0.30	36.6
4	T1	245	2.0	266	2.0	0.259	4.3	LOS A	1.4	35.8	0.30	0.48	0.30	36.5
Approach		310	2.0	337	2.0	0.259	5.6	LOS A	1.4	35.8	0.30	0.48	0.30	36.5
West: NB I-5 Off-Ramp														
5	L2	5	0.0	5	0.0	0.073	11.5	LOS B	0.4	9.0	0.50	0.57	0.50	36.4
2	T1	45	2.0	49	2.0	0.073	5.7	LOS A	0.4	9.0	0.50	0.57	0.50	36.3
12	R2	20	0.0	22	0.0	0.073	5.6	LOS A	0.4	9.0	0.50	0.57	0.50	35.2
Approach		70	1.3	76	1.3	0.073	6.1	LOS A	0.4	9.0	0.50	0.57	0.50	36.0
All Vehicles		805	1.7	875	1.7	0.259	5.8	LOS A	1.4	35.8	0.32	0.50	0.32	36.2

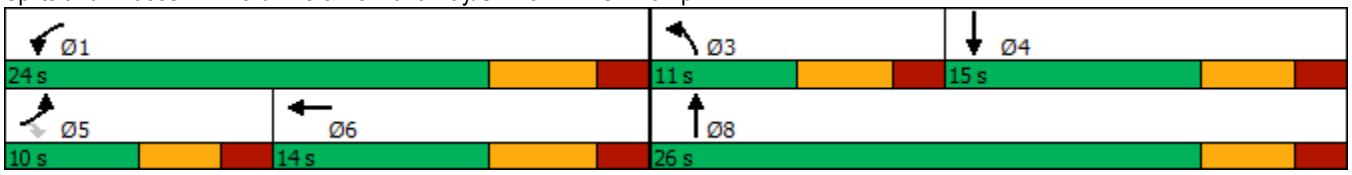
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection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

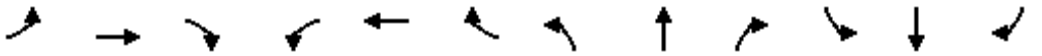
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	180	465	15	90	55	310	0	0	355	55
Future Volume (vph)	5	0	180	465	15	90	55	310	0	0	355	55
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0		75	550		625	275		0	0		0
Storage Lanes	1		1	2		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		318			873			684			482	
Travel Time (s)		7.2			19.8			15.5			11.0	
Turn Type	Prot		Perm	Prot	NA		Prot	NA			NA	
Protected Phases	5			1	6		3	8			4	
Permitted Phases			5									
Detector Phase	5		5	1	6		3	8			4	
Switch Phase												
Minimum Initial (s)	5.0		5.0	7.0	5.0		5.0	5.0			5.0	
Minimum Split (s)	10.0		10.0	13.0	11.0		10.5	10.5			10.5	
Total Split (s)	10.0		10.0	24.0	14.0		11.0	26.0			15.0	
Total Split (%)	20.0%		20.0%	48.0%	28.0%		22.0%	52.0%			30.0%	
Maximum Green (s)	5.0		5.0	18.0	8.0		5.5	20.5			9.5	
Yellow Time (s)	3.0		3.0	4.0	4.0		3.5	3.5			3.5	
All-Red Time (s)	2.0		2.0	2.0	2.0		2.0	2.0			2.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	5.0		5.0	6.0	6.0		5.5	5.5			5.5	
Lead/Lag	Lead		Lead		Lag		Lead				Lag	
Lead-Lag Optimize?	Yes		Yes		Yes		Yes				Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	
Recall Mode	None		None	None	None		None	Min			Min	

Intersection Summary

Area Type: Other
Cycle Length: 50
Actuated Cycle Length: 41.4
Natural Cycle: 55
Control Type: Actuated-Uncoordinated

Splits and Phases: 1: 3rd Ave & Tennant Way/SR 432 WB Off Ramp





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	180	465	15	90	55	310	0	0	355	55
Future Volume (veh/h)	5	0	180	465	15	90	55	310	0	0	355	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1559	0	1750	1600	1750	1695	1723	1695	0	0	1695	1668
Adj Flow Rate, veh/h	6	0	6	528	17	102	62	352	0	0	403	62
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	14	0	0	11	0	4	2	4	0	0	4	6
Cap, veh/h	12	0	0	753	29	174	104	707	0	0	578	88
Arrive On Green	0.01	0.00	0.00	0.25	0.13	0.13	0.06	0.42	0.00	0.00	0.21	0.21
Sat Flow, veh/h	1485	6		2956	217	1300	1641	1695	0	0	2886	428
Grp Volume(v), veh/h	6	47.2		528	0	119	62	352	0	0	230	235
Grp Sat Flow(s),veh/h/ln	1485	D		1478	0	1516	1641	1695	0	0	1611	1618
Q Serve(g_s), s	0.2			6.1	0.0	2.8	1.4	5.7	0.0	0.0	5.0	5.0
Cycle Q Clear(g_c), s	0.2			6.1	0.0	2.8	1.4	5.7	0.0	0.0	5.0	5.0
Prop In Lane	1.00			1.00		0.86	1.00		0.00	0.00		0.26
Lane Grp Cap(c), veh/h	12			753	0	203	104	707	0	0	332	334
V/C Ratio(X)	0.50			0.70	0.00	0.59	0.60	0.50	0.00	0.00	0.69	0.70
Avail Cap(c_a), veh/h	199			1423	0	324	241	930	0	0	409	411
HCM Platoon Ratio	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00			1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	18.5			12.6	0.0	15.2	17.0	8.0	0.0	0.0	13.7	13.8
Incr Delay (d2), s/veh	28.8			1.2	0.0	2.7	5.3	0.5	0.0	0.0	3.8	4.0
Initial Q Delay(d3),s/veh	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1			1.7	0.0	0.9	0.6	1.5	0.0	0.0	1.8	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.2			13.8	0.0	17.9	22.4	8.6	0.0	0.0	17.5	17.8
LnGrp LOS	D			B	A	B	C	A	A	A	B	B
Approach Vol, veh/h					647			414			465	
Approach Delay, s/veh					14.6			10.6			17.7	
Approach LOS					B			B			B	

Timer - Assigned Phs	1		3	4	5	6		8				
Phs Duration (G+Y+Rc), s	15.5		7.9	13.2	5.3	11.0		21.1				
Change Period (Y+Rc), s	6.0		5.5	5.5	5.0	6.0		5.5				
Max Green Setting (Gmax), s	18.0		5.5	9.5	5.0	8.0		20.5				
Max Q Clear Time (g_c+I1), s	8.1		3.4	7.0	2.2	4.8		7.7				
Green Ext Time (p_c), s	1.5		0.0	0.7	0.0	0.2		1.7				

Intersection Summary												
HCM 6th Ctrl Delay			14.6									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	55	10	0	305	770	230
Future Vol, veh/h	55	10	0	305	770	230
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	0	0	4	8	3
Mvmt Flow	65	12	0	359	906	271

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1401	589	-	0	-	0
Stage 1	1042	-	-	-	-	-
Stage 2	359	-	-	-	-	-
Critical Hdwy	6.63	6.9	-	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.3	-	-	-	-
Pot Cap-1 Maneuver	142	457	0	-	-	-
Stage 1	302	-	0	-	-	-
Stage 2	706	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	142	457	-	-	-	-
Mov Cap-2 Maneuver	142	-	-	-	-	-
Stage 1	302	-	-	-	-	-
Stage 2	706	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	47	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	159	-	-
HCM Lane V/C Ratio	-	0.481	-	-
HCM Control Delay (s)	-	47	-	-
HCM Lane LOS	-	E	-	-
HCM 95th %tile Q(veh)	-	2.3	-	-

Intersection	
Int Delay, s/veh	5.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	55	145	140	25	190	175
Future Vol, veh/h	55	145	140	25	190	175
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	5	32	18	0	9	4
Mvmt Flow	66	175	169	30	229	211

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	733	169	0	0	199	0
Stage 1	169	-	-	-	-	-
Stage 2	564	-	-	-	-	-
Critical Hdwy	6.675	6.68	-	-	4.235	-
Critical Hdwy Stg 1	5.475	-	-	-	-	-
Critical Hdwy Stg 2	5.875	-	-	-	-	-
Follow-up Hdwy	3.5475	3.604	-	-	2.2855	-
Pot Cap-1 Maneuver	366	794	-	-	1327	-
Stage 1	852	-	-	-	-	-
Stage 2	527	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	295	794	-	-	1327	-
Mov Cap-2 Maneuver	295	-	-	-	-	-
Stage 1	852	-	-	-	-	-
Stage 2	424	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.5	0	4.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	295	794	1327	-
HCM Lane V/C Ratio	-	-	0.225	0.22	0.173	-
HCM Control Delay (s)	-	-	20.7	10.8	8.3	0.3
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.8	0.8	0.6	-

4: I-5/SR 432 Ramps & Coweeman Park Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.0	4.1	0.2	0.2	3.6	0.4
Total Del/Veh (s)	4.5	1.4	4.8	5.4	0.3	0.7	2.0

MOVEMENT SUMMARY

Site: 6 [Projected 2024 Without Project (Site Folder: General)]

I-5 NB Ramps/SR 432 Ramps at Old Pacific Hwy
PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

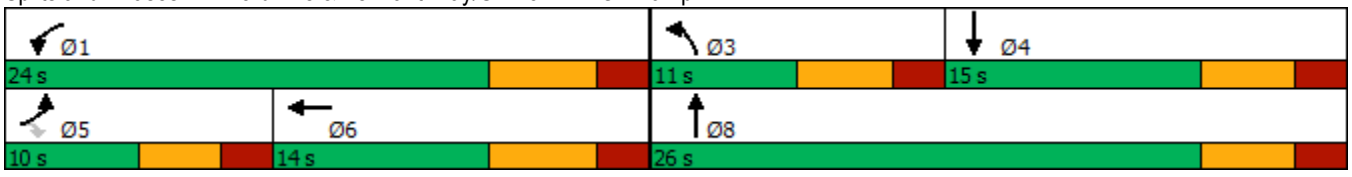
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Old Pacific Hwy														
8	T1	170	1.0	185	1.0	0.242	4.3	LOS A	1.3	31.9	0.29	0.45	0.29	37.2
18	R2	120	3.0	130	3.0	0.242	4.4	LOS A	1.3	31.9	0.29	0.45	0.29	36.0
Approach		290	1.8	315	1.8	0.242	4.4	LOS A	1.3	31.9	0.29	0.45	0.29	36.7
East: WB Kelso Dr														
1	L2	110	1.0	120	1.0	0.126	10.5	LOS B	0.6	15.2	0.33	0.62	0.33	35.0
16	R2	35	0.0	38	0.0	0.126	4.6	LOS A	0.6	15.2	0.33	0.62	0.33	33.9
Approach		145	0.8	158	0.8	0.126	9.0	LOS A	0.6	15.2	0.33	0.62	0.33	34.7
North: SB SR 432 Ramps														
7	L2	65	2.0	71	2.0	0.263	10.3	LOS B	1.4	36.6	0.30	0.48	0.30	36.6
4	T1	250	2.0	272	2.0	0.263	4.3	LOS A	1.4	36.6	0.30	0.48	0.30	36.5
Approach		315	2.0	342	2.0	0.263	5.6	LOS A	1.4	36.6	0.30	0.48	0.30	36.5
West: NB I-5 Off-Ramp														
5	L2	5	0.0	5	0.0	0.073	11.6	LOS B	0.4	9.1	0.50	0.57	0.50	36.4
2	T1	45	2.0	49	2.0	0.073	5.7	LOS A	0.4	9.1	0.50	0.57	0.50	36.3
12	R2	20	0.0	22	0.0	0.073	5.7	LOS A	0.4	9.1	0.50	0.57	0.50	35.2
Approach		70	1.3	76	1.3	0.073	6.1	LOS A	0.4	9.1	0.50	0.57	0.50	36.0
All Vehicles		820	1.7	891	1.7	0.263	5.8	LOS A	1.4	36.6	0.32	0.50	0.32	36.2

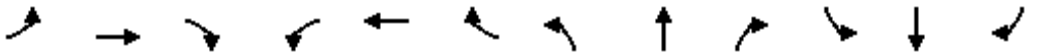
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection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

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	215	540	15	130	55	310	0	0	380	55
Future Volume (vph)	5	0	215	540	15	130	55	310	0	0	380	55
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0		75	550		625	275		0	0		0
Storage Lanes	1		1	2		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		318			873			684			482	
Travel Time (s)		7.2			19.8			15.5			11.0	
Turn Type	Prot		Perm	Prot	NA		Prot	NA			NA	
Protected Phases	5			1	6		3	8			4	
Permitted Phases			5									
Detector Phase	5		5	1	6		3	8			4	
Switch Phase												
Minimum Initial (s)	5.0		5.0	7.0	5.0		5.0	5.0			5.0	
Minimum Split (s)	10.0		10.0	13.0	11.0		10.5	10.5			10.5	
Total Split (s)	10.0		10.0	24.0	14.0		11.0	26.0			15.0	
Total Split (%)	20.0%		20.0%	48.0%	28.0%		22.0%	52.0%			30.0%	
Maximum Green (s)	5.0		5.0	18.0	8.0		5.5	20.5			9.5	
Yellow Time (s)	3.0		3.0	4.0	4.0		3.5	3.5			3.5	
All-Red Time (s)	2.0		2.0	2.0	2.0		2.0	2.0			2.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	5.0		5.0	6.0	6.0		5.5	5.5			5.5	
Lead/Lag	Lead		Lead		Lag		Lead				Lag	
Lead-Lag Optimize?	Yes		Yes		Yes		Yes				Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	
Recall Mode	None		None	None	None		None	Min			Min	

Intersection Summary	
Area Type:	Other
Cycle Length: 50	
Actuated Cycle Length: 42.8	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 1: 3rd Ave & Tennant Way/SR 432 WB Off Ramp





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	215	540	15	130	55	310	0	0	380	55
Future Volume (veh/h)	5	0	215	540	15	130	55	310	0	0	380	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1559	0	1750	1600	1750	1695	1723	1695	0	0	1695	1668
Adj Flow Rate, veh/h	6	0	17	614	17	148	62	352	0	0	432	62
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	14	0	0	11	0	4	2	4	0	0	4	6
Cap, veh/h	12	0	0	832	25	214	103	699	0	0	592	84
Arrive On Green	0.01	0.00	0.00	0.28	0.16	0.16	0.06	0.41	0.00	0.00	0.21	0.21
Sat Flow, veh/h	1485	6		2956	155	1351	1641	1695	0	0	2914	404
Grp Volume(v), veh/h	6	48.2		614	0	165	62	352	0	0	245	249
Grp Sat Flow(s),veh/h/ln	1485	D		1478	0	1507	1641	1695	0	0	1611	1623
Q Serve(g_s), s	0.2			7.4	0.0	4.1	1.4	6.0	0.0	0.0	5.6	5.6
Cycle Q Clear(g_c), s	0.2			7.4	0.0	4.1	1.4	6.0	0.0	0.0	5.6	5.6
Prop In Lane	1.00			1.00		0.90	1.00		0.00	0.00		0.25
Lane Grp Cap(c), veh/h	12			832	0	239	103	699	0	0	337	339
V/C Ratio(X)	0.50			0.74	0.00	0.69	0.60	0.50	0.00	0.00	0.73	0.73
Avail Cap(c_a), veh/h	190			1358	0	308	230	887	0	0	391	394
HCM Platoon Ratio	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00			1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	19.3			12.8	0.0	15.6	17.9	8.5	0.0	0.0	14.4	14.5
Incr Delay (d2), s/veh	28.9			1.3	0.0	4.5	5.6	0.6	0.0	0.0	5.6	5.9
Initial Q Delay(d3),s/veh	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1			2.1	0.0	1.5	0.6	1.7	0.0	0.0	2.2	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.2			14.1	0.0	20.0	23.5	9.1	0.0	0.0	20.1	20.4
LnGrp LOS	D			B	A	C	C	A	A	A	C	C
Approach Vol, veh/h					779			414			494	
Approach Delay, s/veh					15.3			11.3			20.2	
Approach LOS					B			B			C	

Timer - Assigned Phs	1		3	4	5	6		8				
Phs Duration (G+Y+Rc), s	17.0		8.0	13.7	5.3	12.2		21.6				
Change Period (Y+Rc), s	6.0		5.5	5.5	5.0	6.0		5.5				
Max Green Setting (Gmax), s	18.0		5.5	9.5	5.0	8.0		20.5				
Max Q Clear Time (g_c+I1), s	9.4		3.4	7.6	2.2	6.1		8.0				
Green Ext Time (p_c), s	1.7		0.0	0.6	0.0	0.2		1.7				

Intersection Summary			
HCM 6th Ctrl Delay		15.9	
HCM 6th LOS		B	

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	55	10	0	305	845	290
Future Vol, veh/h	55	10	0	305	845	290
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	0	0	4	8	3
Mvmt Flow	65	12	0	359	994	341

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1524	668	-	0	-	0
Stage 1	1165	-	-	-	-	-
Stage 2	359	-	-	-	-	-
Critical Hdwy	6.63	6.9	-	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.3	-	-	-	-
Pot Cap-1 Maneuver	119	405	0	-	-	-
Stage 1	260	-	0	-	-	-
Stage 2	706	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	119	405	-	-	-	-
Mov Cap-2 Maneuver	119	-	-	-	-	-
Stage 1	260	-	-	-	-	-
Stage 2	706	-	-	-	-	-

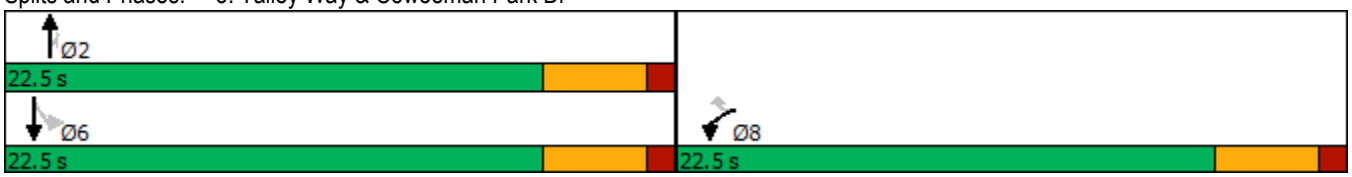
Approach	EB	NB	SB
HCM Control Delay, s	62.7	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	134	-	-
HCM Lane V/C Ratio	-	0.571	-	-
HCM Control Delay (s)	-	62.7	-	-
HCM Lane LOS	-	F	-	-
HCM 95th %tile Q(veh)	-	2.9	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	415	145	210	420	190	220
Future Volume (vph)	415	145	210	420	190	220
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	300	0		0	0	
Storage Lanes	2	1		1	0	
Taper Length (ft)	25				25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	25		25			25
Link Distance (ft)	671		855			251
Travel Time (s)	18.3		23.3			6.8
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0	18.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	Min	Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0

Intersection Summary	
Area Type:	Other
Cycle Length: 45	
Actuated Cycle Length: 33.7	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 3: Talley Way & Coweeman Park Dr



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	415	145	210	420	190	220
Future Volume (veh/h)	415	145	210	420	190	220
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1682	1313	1504	1750	1627	1695
Adj Flow Rate, veh/h	500	20	253	175	229	265
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	5	32	18	0	9	4
Cap, veh/h	799	286	675	666	529	695
Arrive On Green	0.26	0.26	0.45	0.45	0.45	0.45
Sat Flow, veh/h	3107	1113	1504	1483	676	1626
Grp Volume(v), veh/h	500	20	253	175	250	244
Grp Sat Flow(s),veh/h/ln	1554	1113	1504	1483	759	1466
Q Serve(g_s), s	4.4	0.4	3.4	2.3	6.5	3.4
Cycle Q Clear(g_c), s	4.4	0.4	3.4	2.3	9.9	3.4
Prop In Lane	1.00	1.00		1.00	0.92	
Lane Grp Cap(c), veh/h	799	286	675	666	566	658
V/C Ratio(X)	0.63	0.07	0.37	0.26	0.44	0.37
Avail Cap(c_a), veh/h	1828	655	885	873	703	862
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.1	8.6	5.6	5.3	8.6	5.6
Incr Delay (d2), s/veh	0.8	0.1	0.3	0.2	0.5	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.1	0.7	0.4	1.0	0.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.9	8.7	5.9	5.5	9.1	5.9
LnGrp LOS	B	A	A	A	A	A
Approach Vol, veh/h	520		428			494
Approach Delay, s/veh	10.8		5.7			7.6
Approach LOS	B		A			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		18.2			18.2	12.4
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		18.0			18.0	18.0
Max Q Clear Time (g_c+I1), s		5.4			11.9	6.4
Green Ext Time (p_c), s		1.8			1.8	1.6

Intersection Summary	
HCM 6th Ctrl Delay	8.2
HCM 6th LOS	A

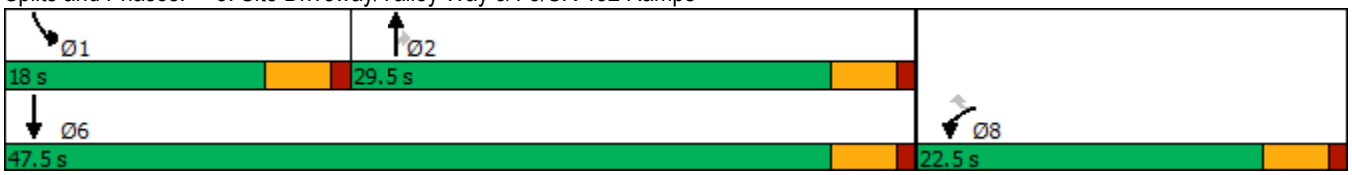
4: I-5/SR 432 Ramps & Coweeman Park Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.0	4.1	0.2	0.6	3.4	0.4
Total Del/Veh (s)	10.5	3.7	11.7	10.9	1.1	1.0	3.3

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	250	165	465	565	225	410
Future Volume (vph)	250	165	465	565	225	410
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	350	0		0	400	
Storage Lanes	2	1		1	1	
Taper Length (ft)	25				25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	30		25			30
Link Distance (ft)	557		460			855
Travel Time (s)	12.7		12.5			19.4
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5
Total Split (s)	22.5	22.5	29.5	29.5	18.0	47.5
Total Split (%)	32.1%	32.1%	42.1%	42.1%	25.7%	67.9%
Maximum Green (s)	18.0	18.0	25.0	25.0	13.5	43.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	None	Min
Walk Time (s)	7.0	7.0	7.0	7.0		7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0		11.0
Pedestrian Calls (#/hr)	0	0	0	0		0

Intersection Summary	
Area Type:	Other
Cycle Length: 70	
Actuated Cycle Length: 60.2	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 5: Site Driveway/Talley Way & I-5/SR 432 Ramps



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	250	165	465	565	225	410
Future Volume (veh/h)	250	165	465	565	225	410
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1723	1545	1723	1723	1641	1723
Adj Flow Rate, veh/h	272	21	505	201	245	446
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	15	2	2	8	2
Cap, veh/h	441	181	644	545	300	2174
Arrive On Green	0.14	0.14	0.37	0.37	0.19	0.66
Sat Flow, veh/h	3183	1310	1723	1460	1563	3359
Grp Volume(v), veh/h	272	21	505	201	245	446
Grp Sat Flow(s),veh/h/ln	1591	1310	1723	1460	1563	1637
Q Serve(g_s), s	3.7	0.6	11.8	4.6	6.9	2.4
Cycle Q Clear(g_c), s	3.7	0.6	11.8	4.6	6.9	2.4
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	441	181	644	545	300	2174
V/C Ratio(X)	0.62	0.12	0.78	0.37	0.82	0.21
Avail Cap(c_a), veh/h	1257	517	945	801	463	3087
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.5	17.2	12.7	10.4	17.7	3.0
Incr Delay (d2), s/veh	1.4	0.3	2.7	0.4	6.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.2	4.2	1.3	2.7	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	19.9	17.5	15.3	10.8	24.2	3.0
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	293		706			691
Approach Delay, s/veh	19.7		14.0			10.5
Approach LOS	B		B			B

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	13.2	21.5			34.8	10.8
Change Period (Y+Rc), s	4.5	4.5			4.5	4.5
Max Green Setting (Gmax), s	13.5	25.0			43.0	18.0
Max Q Clear Time (g_c+I1), s	8.9	13.8			4.4	5.7
Green Ext Time (p_c), s	0.3	3.2			3.3	0.8

Intersection Summary	
HCM 6th Ctrl Delay	13.6
HCM 6th LOS	B

MOVEMENT SUMMARY

Site: 6 [Projected 2024 With Project (Site Folder: General)]

I-5 NB Ramps/SR 432 Ramps at Old Pacific Hwy
PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

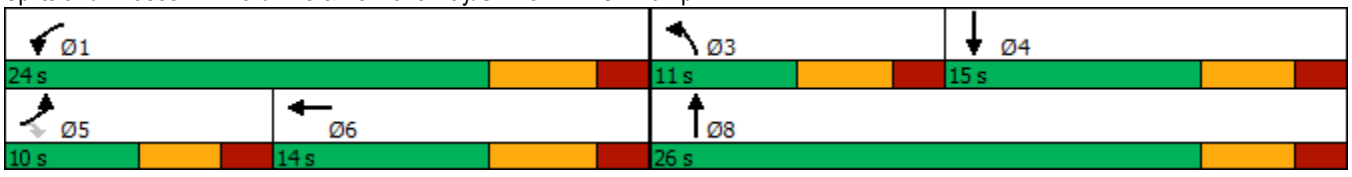
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Old Pacific Hwy														
8	T1	215	1.0	234	1.0	0.346	5.9	LOS A	2.1	53.3	0.59	0.62	0.59	36.2
18	R2	120	3.0	130	3.0	0.346	6.1	LOS A	2.1	53.3	0.59	0.62	0.59	35.0
Approach		335	1.7	364	1.7	0.346	6.0	LOS A	2.1	53.3	0.59	0.62	0.59	35.8
East: WB Kelso Dr														
1	L2	110	1.0	120	1.0	0.133	10.7	LOS B	0.7	17.5	0.40	0.63	0.40	34.8
16	R2	35	0.0	38	0.0	0.133	4.8	LOS A	0.7	17.5	0.40	0.63	0.40	33.7
Approach		145	0.8	158	0.8	0.133	9.2	LOS A	0.7	17.5	0.40	0.63	0.40	34.5
North: SB SR 432 Ramps														
7	L2	335	2.0	364	2.0	0.553	10.6	LOS B	4.4	112.6	0.43	0.57	0.43	35.4
4	T1	325	2.0	353	2.0	0.553	4.6	LOS A	4.4	112.6	0.43	0.57	0.43	35.3
Approach		660	2.0	717	2.0	0.553	7.7	LOS A	4.4	112.6	0.43	0.57	0.43	35.4
West: NB I-5 Off-Ramp														
5	L2	5	0.0	5	0.0	0.103	14.3	LOS B	0.6	16.0	0.74	0.73	0.74	35.3
2	T1	45	2.0	49	2.0	0.103	8.5	LOS A	0.6	16.0	0.74	0.73	0.74	35.2
12	R2	20	0.0	22	0.0	0.103	8.4	LOS A	0.6	16.0	0.74	0.73	0.74	34.2
Approach		70	1.3	76	1.3	0.103	8.9	LOS A	0.6	16.0	0.74	0.73	0.74	34.9
All Vehicles		1210	1.7	1315	1.7	0.553	7.5	LOS A	4.4	112.6	0.49	0.60	0.49	35.3

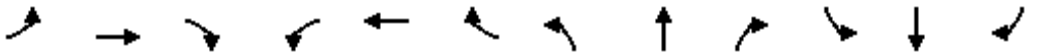
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection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

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	190	490	15	95	55	325	0	0	370	60
Future Volume (vph)	5	0	190	490	15	95	55	325	0	0	370	60
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0		75	550		625	275		0	0		0
Storage Lanes	1		1	2		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		318			873			684			482	
Travel Time (s)		7.2			19.8			15.5			11.0	
Turn Type	Prot		Perm	Prot	NA		Prot	NA			NA	
Protected Phases	5			1	6		3	8			4	
Permitted Phases			5									
Detector Phase	5		5	1	6		3	8			4	
Switch Phase												
Minimum Initial (s)	5.0		5.0	7.0	5.0		5.0	5.0			5.0	
Minimum Split (s)	10.0		10.0	13.0	11.0		10.5	10.5			10.5	
Total Split (s)	10.0		10.0	24.0	14.0		11.0	26.0			15.0	
Total Split (%)	20.0%		20.0%	48.0%	28.0%		22.0%	52.0%			30.0%	
Maximum Green (s)	5.0		5.0	18.0	8.0		5.5	20.5			9.5	
Yellow Time (s)	3.0		3.0	4.0	4.0		3.5	3.5			3.5	
All-Red Time (s)	2.0		2.0	2.0	2.0		2.0	2.0			2.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	5.0		5.0	6.0	6.0		5.5	5.5			5.5	
Lead/Lag	Lead		Lead		Lag		Lead				Lag	
Lead-Lag Optimize?	Yes		Yes		Yes		Yes				Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	
Recall Mode	None		None	None	None		None	Min			Min	

Intersection Summary	
Area Type:	Other
Cycle Length: 50	
Actuated Cycle Length: 42.7	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 1: 3rd Ave & Tennant Way/SR 432 WB Off Ramp





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	190	490	15	95	55	325	0	0	370	60
Future Volume (veh/h)	5	0	190	490	15	95	55	325	0	0	370	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1559	0	1750	1600	1750	1695	1723	1695	0	0	1695	1668
Adj Flow Rate, veh/h	6	0	11	557	17	108	62	369	0	0	420	68
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	14	0	0	11	0	4	2	4	0	0	4	6
Cap, veh/h	12	0	0	782	28	176	104	713	0	0	587	94
Arrive On Green	0.01	0.00	0.00	0.26	0.13	0.13	0.06	0.42	0.00	0.00	0.21	0.21
Sat Flow, veh/h	1485	6		2956	206	1309	1641	1695	0	0	2864	447
Grp Volume(v), veh/h	6	47.5		557	0	125	62	369	0	0	242	246
Grp Sat Flow(s),veh/h/ln	1485	D		1478	0	1514	1641	1695	0	0	1611	1615
Q Serve(g_s), s	0.2			6.5	0.0	2.9	1.4	6.1	0.0	0.0	5.3	5.3
Cycle Q Clear(g_c), s	0.2			6.5	0.0	2.9	1.4	6.1	0.0	0.0	5.3	5.3
Prop In Lane	1.00			1.00		0.86	1.00		0.00	0.00		0.28
Lane Grp Cap(c), veh/h	12			782	0	204	104	713	0	0	341	341
V/C Ratio(X)	0.50			0.71	0.00	0.61	0.60	0.52	0.00	0.00	0.71	0.72
Avail Cap(c_a), veh/h	197			1409	0	321	239	920	0	0	405	406
HCM Platoon Ratio	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00			1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	18.7			12.6	0.0	15.4	17.2	8.1	0.0	0.0	13.8	13.9
Incr Delay (d2), s/veh	28.8			1.2	0.0	3.0	5.4	0.6	0.0	0.0	4.7	5.0
Initial Q Delay(d3),s/veh	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1			1.8	0.0	1.0	0.6	1.6	0.0	0.0	2.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.5			13.8	0.0	18.4	22.6	8.7	0.0	0.0	18.5	18.8
LnGrp LOS	D			B	A	B	C	A	A	A	B	B
Approach Vol, veh/h					682			431			488	
Approach Delay, s/veh					14.6			10.7			18.6	
Approach LOS					B			B			B	

Timer - Assigned Phs	1		3	4	5	6		8				
Phs Duration (G+Y+Rc), s	16.0		7.9	13.5	5.3	11.1		21.4				
Change Period (Y+Rc), s	6.0		5.5	5.5	5.0	6.0		5.5				
Max Green Setting (Gmax), s	18.0		5.5	9.5	5.0	8.0		20.5				
Max Q Clear Time (g_c+I1), s	8.5		3.4	7.3	2.2	4.9		8.1				
Green Ext Time (p_c), s	1.6		0.0	0.6	0.0	0.2		1.8				

Intersection Summary			
HCM 6th Ctrl Delay		14.9	
HCM 6th LOS		B	

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	60	10	0	320	810	245
Future Vol, veh/h	60	10	0	320	810	245
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	0	0	4	8	3
Mvmt Flow	71	12	0	376	953	288

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1473	621	-	0	-	0
Stage 1	1097	-	-	-	-	-
Stage 2	376	-	-	-	-	-
Critical Hdwy	6.63	6.9	-	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.3	-	-	-	-
Pot Cap-1 Maneuver	128	435	0	-	-	-
Stage 1	282	-	0	-	-	-
Stage 2	693	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	128	435	-	-	-	-
Mov Cap-2 Maneuver	128	-	-	-	-	-
Stage 1	282	-	-	-	-	-
Stage 2	693	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	60.5	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	142	-	-
HCM Lane V/C Ratio	-	0.58	-	-
HCM Control Delay (s)	-	60.5	-	-
HCM Lane LOS	-	F	-	-
HCM 95th %tile Q(veh)	-	3	-	-

Intersection	
Int Delay, s/veh	6.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	60	150	145	25	195	185
Future Vol, veh/h	60	150	145	25	195	185
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	5	32	18	0	9	4
Mvmt Flow	72	181	175	30	235	223

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	757	175	0	0	205	0
Stage 1	175	-	-	-	-	-
Stage 2	582	-	-	-	-	-
Critical Hdwy	6.675	6.68	-	-	4.235	-
Critical Hdwy Stg 1	5.475	-	-	-	-	-
Critical Hdwy Stg 2	5.875	-	-	-	-	-
Follow-up Hdwy	3.5475	3.604	-	-	2.2855	-
Pot Cap-1 Maneuver	354	787	-	-	1320	-
Stage 1	847	-	-	-	-	-
Stage 2	516	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	282	787	-	-	1320	-
Mov Cap-2 Maneuver	282	-	-	-	-	-
Stage 1	847	-	-	-	-	-
Stage 2	411	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.1	0	4.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	282	787	1320	-
HCM Lane V/C Ratio	-	-	0.256	0.23	0.178	-
HCM Control Delay (s)	-	-	22.1	10.9	8.3	0.3
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	1	0.9	0.6	-

4: I-5/SR 432 Ramps & Coweeman Park Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.4	0.0	4.0	0.2	0.3	3.6	0.5
Total Del/Veh (s)	4.9	1.4	5.6	6.1	0.4	0.7	2.2

MOVEMENT SUMMARY

Site: 6 [Projected 2029 Without Project (Site Folder: General)]

I-5 NB Ramps/SR 432 Ramps at Old Pacific Hwy
PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Old Pacific Hwy														
8	T1	180	1.0	196	1.0	0.256	4.4	LOS A	1.4	34.4	0.31	0.46	0.31	37.2
18	R2	125	3.0	136	3.0	0.256	4.5	LOS A	1.4	34.4	0.31	0.46	0.31	35.9
Approach		305	1.8	332	1.8	0.256	4.4	LOS A	1.4	34.4	0.31	0.46	0.31	36.6
East: WB Kelso Dr														
1	L2	115	1.0	125	1.0	0.132	10.5	LOS B	0.6	16.1	0.34	0.62	0.34	34.9
16	R2	35	0.0	38	0.0	0.132	4.6	LOS A	0.6	16.1	0.34	0.62	0.34	33.8
Approach		150	0.8	163	0.8	0.132	9.1	LOS A	0.6	16.1	0.34	0.62	0.34	34.6
North: SB SR 432 Ramps														
7	L2	70	2.0	76	2.0	0.281	10.3	LOS B	1.6	40.0	0.31	0.49	0.31	36.5
4	T1	265	2.0	288	2.0	0.281	4.4	LOS A	1.6	40.0	0.31	0.49	0.31	36.5
Approach		335	2.0	364	2.0	0.281	5.6	LOS A	1.6	40.0	0.31	0.49	0.31	36.5
West: NB I-5 Off-Ramp														
5	L2	5	0.0	5	0.0	0.080	11.7	LOS B	0.4	10.1	0.52	0.58	0.52	36.4
2	T1	50	2.0	54	2.0	0.080	5.8	LOS A	0.4	10.1	0.52	0.58	0.52	36.2
12	R2	20	0.0	22	0.0	0.080	5.8	LOS A	0.4	10.1	0.52	0.58	0.52	35.1
Approach		75	1.3	82	1.3	0.080	6.2	LOS A	0.4	10.1	0.52	0.58	0.52	35.9
All Vehicles		865	1.7	940	1.7	0.281	5.9	LOS A	1.6	40.0	0.33	0.51	0.33	36.1

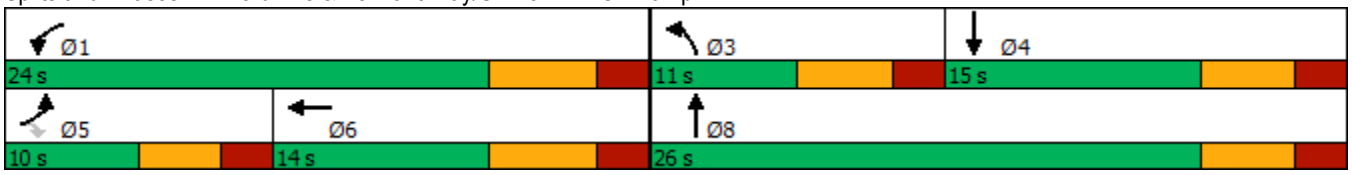
Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection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

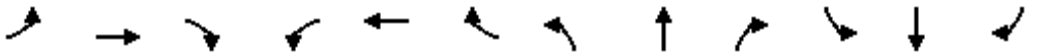
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	225	560	15	135	55	325	0	0	395	60
Future Volume (vph)	5	0	225	560	15	135	55	325	0	0	395	60
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0		75	550		625	275		0	0		0
Storage Lanes	1		1	2		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		318			873			684			482	
Travel Time (s)		7.2			19.8			15.5			11.0	
Turn Type	Prot		Perm	Prot	NA		Prot	NA			NA	
Protected Phases	5			1	6		3	8			4	
Permitted Phases			5									
Detector Phase	5		5	1	6		3	8			4	
Switch Phase												
Minimum Initial (s)	5.0		5.0	7.0	5.0		5.0	5.0			5.0	
Minimum Split (s)	10.0		10.0	13.0	11.0		10.5	10.5			10.5	
Total Split (s)	10.0		10.0	24.0	14.0		11.0	26.0			15.0	
Total Split (%)	20.0%		20.0%	48.0%	28.0%		22.0%	52.0%			30.0%	
Maximum Green (s)	5.0		5.0	18.0	8.0		5.5	20.5			9.5	
Yellow Time (s)	3.0		3.0	4.0	4.0		3.5	3.5			3.5	
All-Red Time (s)	2.0		2.0	2.0	2.0		2.0	2.0			2.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	5.0		5.0	6.0	6.0		5.5	5.5			5.5	
Lead/Lag	Lead		Lead		Lag		Lead				Lag	
Lead-Lag Optimize?	Yes		Yes		Yes		Yes				Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	
Recall Mode	None		None	None	None		None	Min			Min	

Intersection Summary

Area Type: Other
Cycle Length: 50
Actuated Cycle Length: 43
Natural Cycle: 50
Control Type: Actuated-Uncoordinated

Splits and Phases: 1: 3rd Ave & Tennant Way/SR 432 WB Off Ramp





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	225	560	15	135	55	325	0	0	395	60
Future Volume (veh/h)	5	0	225	560	15	135	55	325	0	0	395	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1559	0	1750	1600	1750	1695	1723	1695	0	0	1695	1668
Adj Flow Rate, veh/h	6	0	0	636	17	153	62	369	0	0	449	68
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	14	0	0	11	0	4	2	4	0	0	4	6
Cap, veh/h	12	0	0	852	24	218	102	703	0	0	600	90
Arrive On Green	0.01	0.00	0.00	0.29	0.16	0.16	0.06	0.41	0.00	0.00	0.21	0.21
Sat Flow, veh/h	1485	6		2956	151	1355	1641	1695	0	0	2892	423
Grp Volume(v), veh/h	6	48.5		636	0	170	62	369	0	0	257	260
Grp Sat Flow(s),veh/h/ln	1485	D		1478	0	1506	1641	1695	0	0	1611	1619
Q Serve(g_s), s	0.2			7.7	0.0	4.2	1.5	6.5	0.0	0.0	5.9	6.0
Cycle Q Clear(g_c), s	0.2			7.7	0.0	4.2	1.5	6.5	0.0	0.0	5.9	6.0
Prop In Lane	1.00			1.00		0.90	1.00		0.00	0.00		0.26
Lane Grp Cap(c), veh/h	12			852	0	242	102	703	0	0	344	346
V/C Ratio(X)	0.50			0.75	0.00	0.70	0.61	0.52	0.00	0.00	0.75	0.75
Avail Cap(c_a), veh/h	187			1342	0	304	228	877	0	0	386	388
HCM Platoon Ratio	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00			1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	19.6			12.8	0.0	15.7	18.1	8.7	0.0	0.0	14.6	14.6
Incr Delay (d2), s/veh	28.9			1.3	0.0	5.2	5.7	0.6	0.0	0.0	6.8	7.2
Initial Q Delay(d3),s/veh	0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1			2.2	0.0	1.6	0.6	1.8	0.0	0.0	2.4	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.5			14.1	0.0	20.9	23.8	9.3	0.0	0.0	21.4	21.8
LnGrp LOS	D			B	A	C	C	A	A	A	C	C
Approach Vol, veh/h					806			431			517	
Approach Delay, s/veh					15.6			11.4			21.6	
Approach LOS					B			B			C	

Timer - Assigned Phs	1		3	4	5	6		8				
Phs Duration (G+Y+Rc), s	17.4		8.0	14.0	5.3	12.4		21.9				
Change Period (Y+Rc), s	6.0		5.5	5.5	5.0	6.0		5.5				
Max Green Setting (Gmax), s	18.0		5.5	9.5	5.0	8.0		20.5				
Max Q Clear Time (g_c+I1), s	9.7		3.5	8.0	2.2	6.2		8.5				
Green Ext Time (p_c), s	1.7		0.0	0.5	0.0	0.1		1.7				

Intersection Summary			
HCM 6th Ctrl Delay		16.4	
HCM 6th LOS		B	

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	60	10	0	320	880	300
Future Vol, veh/h	60	10	0	320	880	300
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	0	0	4	8	3
Mvmt Flow	71	12	0	376	1035	353

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1588	694	-	0	-	0
Stage 1	1212	-	-	-	-	-
Stage 2	376	-	-	-	-	-
Critical Hdwy	6.63	6.9	-	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.3	-	-	-	-
Pot Cap-1 Maneuver	108	390	0	-	-	-
Stage 1	245	-	0	-	-	-
Stage 2	693	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	108	390	-	-	-	-
Mov Cap-2 Maneuver	108	-	-	-	-	-
Stage 1	245	-	-	-	-	-
Stage 2	693	-	-	-	-	-

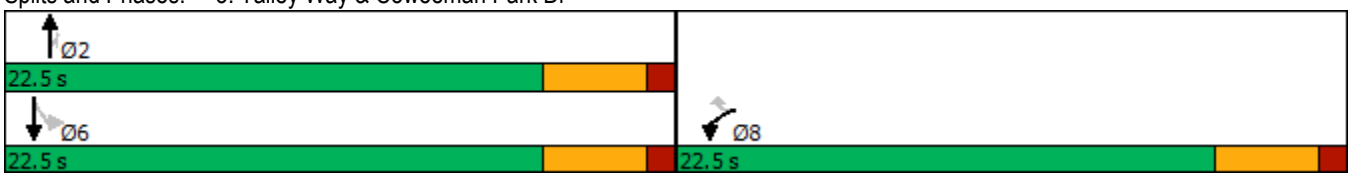
Approach	EB	NB	SB
HCM Control Delay, s	83.8	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	120	-	-
HCM Lane V/C Ratio	-	0.686	-	-
HCM Control Delay (s)	-	83.8	-	-
HCM Lane LOS	-	F	-	-
HCM 95th %tile Q(veh)	-	3.7	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	420	150	215	420	195	230
Future Volume (vph)	420	150	215	420	195	230
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	300	0		0	0	
Storage Lanes	2	1		1	0	
Taper Length (ft)	25				25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	25		25			25
Link Distance (ft)	671		855			251
Travel Time (s)	18.3		23.3			6.8
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0	18.0	18.0	18.0	18.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	Min	Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0

Intersection Summary	
Area Type:	Other
Cycle Length: 45	
Actuated Cycle Length: 34	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 3: Talley Way & Coweeman Park Dr



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	420	150	215	420	195	230
Future Volume (veh/h)	420	150	215	420	195	230
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1682	1313	1504	1750	1627	1695
Adj Flow Rate, veh/h	506	36	259	133	235	277
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	5	32	18	0	9	4
Cap, veh/h	807	289	677	667	530	704
Arrive On Green	0.26	0.26	0.45	0.45	0.45	0.45
Sat Flow, veh/h	3107	1113	1504	1483	686	1641
Grp Volume(v), veh/h	506	36	259	133	260	252
Grp Sat Flow(s),veh/h/ln	1554	1113	1504	1483	785	1466
Q Serve(g_s), s	4.5	0.8	3.5	1.7	6.6	3.5
Cycle Q Clear(g_c), s	4.5	0.8	3.5	1.7	10.1	3.5
Prop In Lane	1.00	1.00		1.00	0.90	
Lane Grp Cap(c), veh/h	807	289	677	667	574	659
V/C Ratio(X)	0.63	0.12	0.38	0.20	0.45	0.38
Avail Cap(c_a), veh/h	1804	646	873	861	707	851
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.1	8.8	5.7	5.2	8.7	5.7
Incr Delay (d2), s/veh	0.8	0.2	0.4	0.1	0.6	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.2	0.7	0.3	1.1	0.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.9	9.0	6.0	5.3	9.3	6.0
LnGrp LOS	B	A	A	A	A	A
Approach Vol, veh/h	542		392			512
Approach Delay, s/veh	10.8		5.8			7.7
Approach LOS	B		A			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		18.4			18.4	12.6
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		18.0			18.0	18.0
Max Q Clear Time (g_c+I1), s		5.5			12.1	6.5
Green Ext Time (p_c), s		1.7			1.8	1.7

Intersection Summary	
HCM 6th Ctrl Delay	8.3
HCM 6th LOS	A

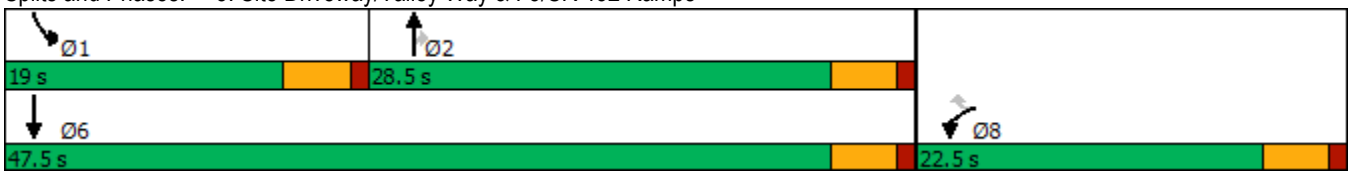
4: I-5/SR 432 Ramps & Coweeman Park Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	4.0	0.3	0.6	3.3	0.4
Total Del/Veh (s)	13.1	4.2	11.8	12.4	1.1	1.1	3.8

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	250	170	465	565	240	410
Future Volume (vph)	250	170	465	565	240	410
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	350	0		0	400	
Storage Lanes	2	1		1	1	
Taper Length (ft)	25				25	
Right Turn on Red		Yes		Yes		
Link Speed (mph)	30		25			30
Link Distance (ft)	557		460			855
Travel Time (s)	12.7		12.5			19.4
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5
Total Split (s)	22.5	22.5	28.5	28.5	19.0	47.5
Total Split (%)	32.1%	32.1%	40.7%	40.7%	27.1%	67.9%
Maximum Green (s)	18.0	18.0	24.0	24.0	14.5	43.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	Min	None	Min
Walk Time (s)	7.0	7.0	7.0	7.0		7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0		11.0
Pedestrian Calls (#/hr)	0	0	0	0		0

Intersection Summary	
Area Type:	Other
Cycle Length: 70	
Actuated Cycle Length: 60.6	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	

Splits and Phases: 5: Site Driveway/Talley Way & I-5/SR 432 Ramps



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	250	170	465	565	240	410
Future Volume (veh/h)	250	170	465	565	240	410
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1723	1545	1723	1723	1641	1723
Adj Flow Rate, veh/h	272	22	505	190	261	446
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	15	2	2	8	2
Cap, veh/h	439	180	634	538	318	2188
Arrive On Green	0.14	0.14	0.37	0.37	0.20	0.67
Sat Flow, veh/h	3183	1310	1723	1460	1563	3359
Grp Volume(v), veh/h	272	22	505	190	261	446
Grp Sat Flow(s),veh/h/ln	1591	1310	1723	1460	1563	1637
Q Serve(g_s), s	3.7	0.7	12.2	4.4	7.4	2.4
Cycle Q Clear(g_c), s	3.7	0.7	12.2	4.4	7.4	2.4
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	439	180	634	538	318	2188
V/C Ratio(X)	0.62	0.12	0.80	0.35	0.82	0.20
Avail Cap(c_a), veh/h	1234	508	890	755	488	3031
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.9	17.6	13.1	10.7	17.7	3.0
Incr Delay (d2), s/veh	1.4	0.3	3.4	0.4	6.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.2	4.5	1.3	2.9	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.3	17.9	16.5	11.0	24.2	3.0
LnGrp LOS	C	B	B	B	C	A
Approach Vol, veh/h	294		695			707
Approach Delay, s/veh	20.1		15.0			10.8
Approach LOS	C		B			B

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	13.9	21.6			35.5	10.9
Change Period (Y+Rc), s	4.5	4.5			4.5	4.5
Max Green Setting (Gmax), s	14.5	24.0			43.0	18.0
Max Q Clear Time (g_c+I1), s	9.4	14.2			4.4	5.7
Green Ext Time (p_c), s	0.4	2.9			3.3	0.8

Intersection Summary			
HCM 6th Ctrl Delay		14.2	
HCM 6th LOS		B	

MOVEMENT SUMMARY

Site: 6 [Projected 2029 With Project (Site Folder: General)]

I-5 NB Ramps/SR 432 Ramps at Old Pacific Hwy
PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: NB Old Pacific Hwy														
8	T1	225	1.0	245	1.0	0.363	6.0	LOS A	2.2	56.9	0.60	0.62	0.60	36.2
18	R2	125	3.0	136	3.0	0.363	6.1	LOS A	2.2	56.9	0.60	0.62	0.60	35.0
Approach		350	1.7	380	1.7	0.363	6.0	LOS A	2.2	56.9	0.60	0.62	0.60	35.7
East: WB Kelso Dr														
1	L2	115	1.0	125	1.0	0.139	10.7	LOS B	0.7	18.5	0.41	0.64	0.41	34.7
16	R2	35	0.0	38	0.0	0.139	4.8	LOS A	0.7	18.5	0.41	0.64	0.41	33.7
Approach		150	0.8	163	0.8	0.139	9.3	LOS A	0.7	18.5	0.41	0.64	0.41	34.5
North: SB SR 432 Ramps														
7	L2	335	2.0	364	2.0	0.564	10.6	LOS B	4.6	116.7	0.45	0.57	0.45	35.4
4	T1	335	2.0	364	2.0	0.564	4.7	LOS A	4.6	116.7	0.45	0.57	0.45	35.3
Approach		670	2.0	728	2.0	0.564	7.7	LOS A	4.6	116.7	0.45	0.57	0.45	35.3
West: NB I-5 Off-Ramp														
5	L2	5	0.0	5	0.0	0.113	14.5	LOS B	0.7	17.7	0.76	0.74	0.76	35.3
2	T1	50	2.0	54	2.0	0.113	8.7	LOS A	0.7	17.7	0.76	0.74	0.76	35.1
12	R2	20	0.0	22	0.0	0.113	8.6	LOS A	0.7	17.7	0.76	0.74	0.76	34.1
Approach		75	1.3	82	1.3	0.113	9.1	LOS A	0.7	17.7	0.76	0.74	0.76	34.8
All Vehicles		1245	1.7	1353	1.7	0.564	7.5	LOS A	4.6	116.7	0.51	0.60	0.51	35.3

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