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Interchange Justification Report – Methods and Assumptions

NW La Center Road/I-5 Interchange Improvement Project (MP 16.80)

La Center, Washington

Final

October 2013

Interchange Justification Report – Methods and Assumptions

NW La Center Road/I-5 Interchange Improvement Project (MP 16.80)

La Center, Washington

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Project No. 12393.0

September 2013

STAKEHOLDER ACCEPTANCE

The undersigned parties, including all members of the team from the Washington Department of Transportation (WSDOT) and the Federal Highway Administration (FHWA) concur with the Interchange Justification Report Methods and Assumptions for the NW La Center Road/I-5 Interchange Project as presented in this document.

WSDOT Region:

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Signature	Signature
Project Development Engineer Title	Traffic Engineer Title
10/28/13 Date	10-28-13 Date

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Oct 24, 2013 Date	10/24/2013 Date

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Don Petersen
Name

Signature

FHWA Washington Division
Safety/Geometric Design Engineer
Title

10/24/2013
Date

(1) Participation on the Stakeholders Committee and/or signing of this document does not constitute approval of the NW La Center Road/I-5 Interchange Improvement Project Interchange Justification Report.
(2) All members of the Stakeholder Committee will accept this document as a guide and reference as the study progresses through the various stages of project development. If there are any agreed upon changes to the assumptions in this document a revision will be created, endorsed and signed by all the stakeholders.

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EXECUTIVE SUMMARY

The Exit 16 interchange (at NW La Center Road and NW 319th Street, milepost 16.80) along Interstate 5 currently serves the City of La Center and surrounding rural areas. The interchange is a diamond interchange with a two-lane structure over the freeway and stop-controlled access at the ramp terminals. Closely spaced frontage road intersections exist just outside each of the I-5 ramp terminals, posing access management challenges to the operations of the interchange. From a pure capacity standpoint, the existing interchange form is adequate to support existing development within the City of La Center and surrounding rural areas. However, the interchange has been the subject of recent planning studies that examined the impacts of enhancing development opportunities along NW La Center Road on the east and west sides of I-5. One near-term development opportunity involves 152 acres of land owned by Salishan Mohegan, LLC along the west side of I-5. This property spans the north and south sides of NW 319th Street and is proposed to be developed as a major casino center associated with the Cowlitz Tribe (Cowlitz Reservation Development).

Given the anticipated traffic impacts associated with the Cowlitz Reservation Development, it is recognized that the existing NW La Center Road/I-5 interchange will need to be reconstructed/modified along with the supporting local circulation network in order to provide safe and efficient access to/from I-5.

To support the interchange reconstruction/modification project, the Washington State Department of Transportation (WSDOT) and the Federal Highway Administration (FHWA) requires an Interchange Justification Report (IJR). The IJR documents the interchange planning process, the evaluation of improvement alternatives, the design of the preferred alternative, the impacts to the Interstate system and local street network, and the coordination that supports and justifies the request for an access revision. As a component of the IJR process, the *WSDOT Design Manual* requires a '*Methods and Assumptions Document'* be developed to record assumptions, criteria, and support team decisions used in the IJR. The remainder of this document outlines the *Methods and Assumptions* that will be used in the NW La Center Road/I-5 Interchange IJR.

INTRODUCTION AND PROJECT DESCRIPTION

The existing NW La Center Road/I-5 Interchange is a simple diamond interchange form that was constructed to provide access between I-5, the City of La Center, and surrounding rural residential areas. Based on a limited interchange form and the findings of several recent planning studies[1][2], the interchange and supporting local circulation system are not capable of safely and efficiently supporting extensive new development. One such development, the Cowlitz Reservation Development involves 152 acres of land owned by the Salishan Mohegan, LLC. This property, which is located on the west side of I-5 and spans the north and south sides of NW 319th Street, is proposed to be developed as a cultural center, housing for tribal elders, a gaming facility, and a potential hotel.

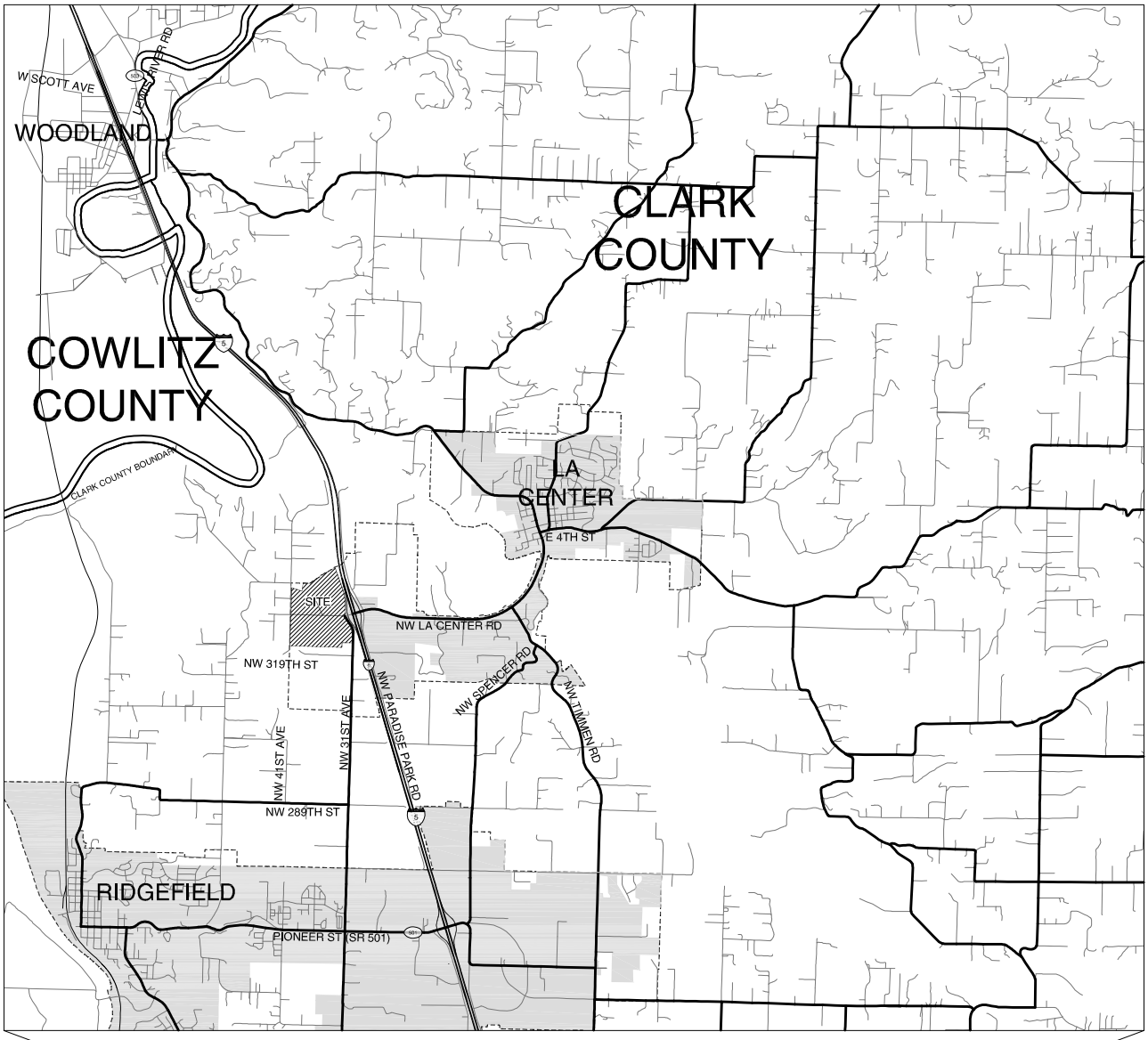
To support the Cowlitz Reservation Development, the existing interchange and supporting local street network will need to be reconfigured to better accommodate intensified traffic patterns at the interchange. An IJR will be completed to document the planning, evaluation, and selection of the necessary interchange replacement. The IJR will be completed with the following focus areas:

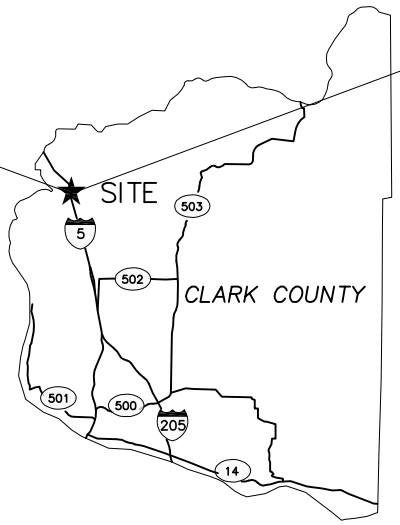
- Accommodating multi-modal traffic circulation in a safe and efficient manner,
- Addressing and satisfying regulatory agency approval criteria,
- Minimizing negative impacts to adjacent property owners (right-of-way and access),
- Addressing the existing closely spaced frontage road intersections at NW 319th Street and NW Paradise Park Road.
- Advancing the transportation system in a manner consistent with long-term community aspirations (e.g, La Center Transportation Plan), and
- Ensuring that the selected interchange form supports future expansion to meet the surrounding communities' growth needs through 2036.
- Interchange improvement(s) will not inhibit WSDOT's ability to improve or expand mainline I-5.

The IJR will focus on the existing NW La Center Road/I-5 Interchange and its functional area along the NW 319th Street/NW La Center Road corridors. This will include the two adjacent frontage roads on either side of the interchange. As illustrated in Figure 1, the project study area will also include the two upstream/downstream (SR 501 Exit 14 at milepost 14.17 and SR 503 Exit 21 at milepost 21.08) interchanges along the I-5 corridor. Analysis included in the IJR will formally document these minimal impacts. The following sections describe the existing conditions of the interstate system and the non-interstate highway/local transportation system within the project study area.

[1] *La Center Junction Subarea Plan*, City of La Center, 2010

[2] *Cowlitz Indian Tribe Casino Project Traffic Impact Study*, Parsons Brinkerhoff, 2006





NOTE: SITE BOUNDARY
IS APPROXIMATE

STUDY AREA
LA CENTER, WASHINGTON

FIGURE
1

I-5 Mainline

Within the interchange improvement study area, I-5 is a 6-lane, median-separated, interstate highway. The WSDOT State Highway Log classifies this section of I-5 as *Rural*. Existing average annual daily traffic (AADT) for this section of I-5 is approximately 65,350 vehicles per day based on the most recent 2011 data at nearby R045 permanent traffic recorder station located at milepost 20.14. The posted speed limit along this segment of I-5 is 70 mph.

NW La Center Road/I-5 Interchange

The NW La Center Road interchange is a diamond interchange located at milepost 16.80. The interchange is located within the City of La Center. The interchange consists of single-lane on- and off-ramps with unsignalized ramp terminals at NW La Center Road. Traffic volumes on I-5 at the NW La Center Road interchange are approximately 62,000 vehicles per day.

The ramp terminals are located approximately 535 feet (centerline-to-centerline) apart and are separated by a relatively narrow two-lane overpass structure with no formal pedestrian accommodations. The I-5/NW La Center Road interchange is served by several local roadways that provide connectivity between I-5, La Center, and the surrounding rural areas. These facilities are documented below.

NW La Center Road

NW La Center Road is an east-west, two-lane roadway that connects I-5 and the City of La Center. Clark County classifies NW La Center Road as a *Major Collector*. Within the vicinity of the interchange, there are no sidewalks or bicycle lanes along either side of the roadway. Based on recent traffic count information, the existing ADT east of the I-5 interchange is approximately 11,000 vehicles per day.

NW 319th Street

West of I-5, NW La Center Road becomes NW 319th Street. This east-west roadway is classified as a *Rural Minor Collector* by Clark County and primarily serves the rural residential development located between I-5 and the Columbia River to the west. Existing ADT along this roadway is approximately 1,500 vehicles per day.

NW 31st Avenue

NW 31st Avenue is a north-south roadway located on the west side of I-5 south of NW 319th Street. Clark County classifies NW 31st Avenue as a *Rural Major Collector*. Oriented parallel to I-5, this roadway acts as a rural frontage road to I-5 providing a continuous connection between NW 319th Street and the City of Ridgefield to the south. The intersection of NW 31st Avenue with NW 319th Street is located approximately 100 feet (centerline-to-centerline) from the I-5 southbound ramp terminal.

NW Paradise Park Road

NW Paradise Park Road is a north-south roadway located on the east side of I-5. Clark County classifies NW Paradise Park Road as a *Local* roadway. As with NW 31st Avenue, NW Paradise Park Road acts as a rural

frontage road to I-5 and connects to NW La Center Road approximately 125 feet (centerline-to-centerline) east of the northbound ramp terminal. NW Paradise Park Road provides access to Paradise Point State Park.

SR 503/I-5 Interchange

The SR 503/I-5 interchange is a split diamond interchange located in Woodland, WA. This interchange is located approximately 4.28 miles north of the NW La Center Road/I-5 interchange at milepost 21.08 in Woodland, WA.

SR 501/I-5 Interchange

The SR 501/I-5 Interchange is diamond interchange located approximately 2.63 miles south of the NW La Center Road/I-5 interchange at milepost 14.17. Recently reconstructed to include a six-lane overpass and signalized ramp terminals, this interchange primarily serves the City of Ridgefield and the surrounding rural residential areas.

I-5 Weigh Station

An existing weigh station for northbound I-5 traffic is located south of the La Center/I-5 interchange at milepost 15.5.

PROJECT DESCRIPTION

The NW La Center Road interchange improvement project is expected to mitigate the impacts of the proposed Cowlitz Reservation Development at full-buildout in year 2016. For the purposes of the analysis, the proposed Cowlitz Reservation Development is anticipated to include the following uses:

- 2,440 gaming positions (the IJR will study 3,500 gaming positions for a conservative analysis)
- Up to 3,450 parking spaces
- 4 restaurants
- 5,000 – 6,000 square feet of retail space
- Casino bars
- Event Center with seating for up to 1,500 guests
- Valet parking services
- 250-room hotel

The traffic impacts of such a development are expected to necessitate the reconstruction of the existing NW La Center Road/I-5 interchange and realignment of NW 31st Avenue and NW Paradise Park Road. As previously stated, the IJR will formally document the planning, alternatives development, alternatives evaluation, and selection of the preferred interchange form to address the anticipated project traffic as well as the background traffic growth in the study area. To support this effort, the following sections highlight the study parameters and assumptions that will be incorporated into the IJR analysis.

ANALYSIS YEARS/PERIODS

Based on preliminary scoping efforts with the City of La Center, Clark County, WSDOT and FHWA, three analysis years, 2012, 2016 and 2036, will be required. The 2016 study year is assumed to represent the build out year of the Cowlitz Reservation Development and will be used for identifying mitigations that will be needed for and funded exclusively (no federal, state, or local dollars will be used to plan, design, and/or construct the project) by Salishan Mohegan, LLC. The 2036 study year scenario is informational for WSDOT to ensure that near-term interchange improvements don't preclude the ability to provide future long-term improvements.

In order to assess the impact of the Cowlitz Reservation Development, conditions will be analyzed for the following time periods based daily profile counts of the surrounding roadways and the anticipated trip generation profile of the casino:

- Weekday morning peak period (7:00-9:00 a.m.)
- Weekday evening roadway peak period (4:00-6:00 p.m.)
- Friday peak period (4:00-6:00 p.m.) [This time period represents when traffic volumes in the site vicinity would peak in the future with trips associated from the proposed Cowlitz Reservation Development]

PROJECT AND STUDY AREAS

The project study area will focus on the NW La Center Road/I-5 Interchange and immediately adjacent frontage road network. A transportation impact analysis of intersections impacted by the Cowlitz Reservation Development will be prepared to address the transportation system impacts beyond the NW LaCenter Road/I-5 Interchange on the local LaCenter and Clark County roadway network. The following NW La Center Road/I-5 interchange intersections have been identified for detailed operations analyses within the IJR:

- NW 31st Avenue/NW 319th Street;
- I-5 Southbound Ramp/NW La Center Road;
- I-5 Northbound Ramp/NW La Center Road; and
- Paradise Road/NW La Center Road

In addition to the intersection operations, the IJR will include I-5 mainline and merge/diverge analyses for the following locations:

- I-5 at the NW La Center Road interchange ramps; and
- I-5 at the weigh station located approximately 1.25 miles south of the NW La Center Road interchange.

The project study area extends to the northern interchange (I-5/SR 503 in Woodland) and southern interchange (I-5/SR 501 in Ridgefield).

TRAFFIC OPERATIONS ANALYSIS

In total, the traffic operations analyses will be performed for the following scenarios:

- Existing 2012 Weekday AM Peak Hour
- Existing 2012 Weekday PM Peak Hour
- Existing 2012 Weekday Friday PM Peak Hour
- 2016 Background Weekday AM Peak Hour
- 2016 Background Weekday PM Peak Hour
- 2016 Background Weekday Friday PM Peak Hour
- 2016 w/Cowlitz Reservation Development (No-Build), Weekday AM Peak Hour
- 2016 w/Cowlitz Reservation Development (No-Build), Weekday PM Peak Hour
- 2016 w/Cowlitz Reservation Development (No-Build), Weekday Friday PM Peak Hour
- 2016 w/Cowlitz Reservation Development and interchange improvements (Build), Weekday AM Peak Hour
- 2016 w/Cowlitz Reservation Development and interchange improvements (Build), Weekday PM Peak Hour
- 2016 w/Cowlitz Reservation Development and interchange improvements (Build), Weekday Friday PM Peak Hour
- 2036 Background (No-Build) Weekday AM Peak Hour
- 2036 Background (No-Build) Weekday PM Peak Hour
- 2036 Background (No-Build) Weekday Friday PM Peak Hour
- 2036 w/Cowlitz Reservation Development and 2016 identified interchange improvements (Build), Weekday AM Peak Hour
- 2036 w/Cowlitz Reservation Development and 2016 interchange improvements (Build), Weekday PM Peak Hour
- 2036 w/Cowlitz Reservation Development and 2016 interchange improvements (Build), Weekday Friday PM Peak Hour

EXISTING CONDITIONS ANALYSIS

The existing operations and level of service will be assessed at the identified study intersections/I-5 mainline/merge-diverge areas during the three peak hour analysis periods using 2012 traffic volumes. These volumes were developed using data collected in mid-September 2012 and data provided by WSDOT for the permanent traffic recorder (PTR) station R045 located on I-5 north of the NW La Center Road/I-5 Interchange in the study area. The process used to develop traffic volumes for the I-5 mainline and interchange ramps that are representative of typical traffic volumes was developed based on conversation with WSDOT staff. The existing traffic volumes development is described in detail in *Appendix A*.

Synchro/SimTraffic and HCS 2010 will be used for the traffic operation analysis. Synchro and SimTraffic (Version 7) will be used to analyze signalized and stop-controlled intersections. HCS 2010 will be used to analyze the I-5 mainline performance and the interchange merge/diverge areas.

2016 BACKGROUND ANALYSIS

This analysis will determine traffic operations at the study intersections/I-5 mainline/merge-diverge areas during all three study periods in the year 2016 without any improvements or changes to the interchange/local roadway network. Traffic volumes for the year 2016 will be derived based on the 2011 Clark County Metropolitan Transportation Plan (MTP) model. Where feasible, the projected volumes will be calculated by first using a straight-line interpolation between the base 2010 and future year 2036 traffic volume projections from the model and then post-processing (using the NCHRP 255 methodology) the results. In-process development data has been requested[3] from the City of La Center, City of Ridgefield, City of Woodland, and Clark County and included as part of year 2016 forecast traffic volumes.

City of La Center, City of Ridgefield, and Clark County transportation improvement plans will be reviewed for the surrounding area to determine how any planned improvements may impact access to the site and operations at the study intersections.

Synchro/SimTraffic, and HCS 2010 will be used for the traffic operation analysis. Synchro and SimTraffic (Version 7) will be used to analyze signalized and stop-controlled intersections. HCS 2010 will be used to analyze the I-5 Mainline performance and the interchange merge/diverge areas.

2016 WITH COWLITZ RESERVATION DEVELOPMENT ANALYSIS

Traffic operations at the study intersections/I-5 mainline/merge-diverge areas for all three study periods will be estimated in the year 2016 with the additional traffic volumes generated by the Cowlitz Reservation Development. The expected trip generation form the Cowlitz Reservation Development will then be added to the 2016 background volumes to create this analysis scenario. The assumption is that no improvements are made to the roadway network or intersections. In addition, no capacity improvements to I-5 will be assumed in the study area by 2016.

Synchro/SimTraffic, and HCS 2010 will be used for the traffic operation analysis. Synchro and SimTraffic (Version 7) will be used to analyze signalized and stop-controlled intersections. HCS 2010 will be used to analyze the I-5 Mainline performance and the interchange merge/diverge areas.

It is anticipated that roundabouts will be a design consideration in the development and analysis of interchange improvement alternatives. In these instances, the traffic analysis software SIDRA will be used to conduct the analysis. In recognition of WSDOT standards, *Appendix B* outlines several SIDRA variables that will be changed from the default parameters.

[3] The City of La Center has identified one in-process development (KWRL School Bus Facility Traffic Impact Study, H. Lee & Associates, May 26, 2010)

TRIP GENERATION AND ASSIGNMENT

Trip generation estimates for the proposed Cowlitz Reservation Development will be based on data from other similar casino developments (a separate Trip Generation memorandum will be prepared for review and consent by all stakeholders prior to the publication of the Draft IJR). Based on past experience and a preliminary assessment of the data, we recommend calculating trips per gaming position[4]. Data indicates that the number of trips generated at a casino is more highly correlated to the number of gaming positions than the square footage of gaming space or the size of the entire development. We will assign the site-generated traffic to the study intersections using the estimated trip distribution patterns within the site vicinity for each of the three analysis periods. The proposed peak hour trip assignments for the Cowlitz Reservation Development are shown in *Appendix C*.

2016 WITH COWLITZ RESERVATION DEVELOPMENT AND INTERCHANGE IMPROVEMENTS ANALYSIS

This scenario will present the proposed mitigation to address the impacts of the proposed Cowlitz Reservation Development. The operations at the study intersections/I-5 mainline/merge-diverge areas for the three analysis periods based on projected 2016 traffic volumes and the Cowlitz Reservation Development. An initial level of analysis will involve using forecasted volumes and potentially Synchro and HCS 2010 to determine the two critical time periods of this 2016 scenario. Based on our understanding of the proposed development, it is expected that the two critical time periods will be the Weekday p.m. peak hour and the Friday Evening/Weekend peak hour period.

If necessary, a VISSIM model of the study area will be created if a preferred interchange alternative scenario does not meet the operational performances specified in the body of this report. Additional details of the VISSIM modeling is outlined in *Appendix D*.

2036 BACKGROUND ANALYSIS

This analysis will determine traffic operations at the study intersections/I-5 mainline/merge-diverge areas during all three study periods in the year 2036 without any improvements or changes to the interchange/local roadway network. Traffic volumes for the year 2036 will be derived based on the 2011 Clark County Metropolitan Transportation Plan (MTP) model.

2036 WITH COWLITZ RESERVATION DEVELOPMENT AND 2016 INTERCHANGE IMPROVEMENTS ANALYSIS

A long-term 2036 scenario will be analyzed to demonstrate the long-term impacts of the Cowlitz Reservation Development. Future traffic volumes for the 2036 scenario will be projected based on the same methodology previous described above. The analysis will be used to ensure that the proposed interchange project does not preclude the development of future capacity needs and is designed in such a way that it can be readily expanded to meet the year 2036 needs.

[4] Gaming positions include the number of slot machines, seats at gaming tables, or other positions at various gaming mechanisms.

SELECTION OF MEASURES OF EFFECTIVENESS

Multiple Measures of Effectiveness (MOE) will be used for the operational analysis of the different scenarios. Level of Service (LOS) is the critical measure to determine whether the project can meet the minimum operation requirements.

WSDOT

The WSDOT Design Manual, Chapter 320 describes the measure of effectiveness (MOE) used for determining a highway facilities' level of service (LOS) as follows:

- The level of service (LOS) for operating state highway facilities is based upon measures of effectiveness (MOEs), in accordance with the latest version of the Highway Capacity Manual.
- These MOEs (see Table 1 below) describe the measures best suited for analyzing state highway facilities, such as freeway segments, signalized intersections, and on- or off-ramps. Depending on the facility, WSDOT LOS thresholds are LOS C and LOS D on state highway facilities.

Table 1 WSOT Measures of Effectiveness by Facility Type

Type of Facility	Measure of Effectiveness (MOE)
Basic Freeway Segments	Density (pc/mi/ln)
Ramps	Density (pc/mi/ln)
Ramp Terminals	Delay (sec/veh)
Multilane Highways	Density (pc/mi/ln)
Two-Lane Highways	Percent Time Spent Following Average Travel Speed (mi/hr)
Signalized Intersections	Control Delay Per Vehicle (sec/veh)
Unsignalized Intersections	Average Control Delay Per Vehicle (sec/veh)
Urban Streets	Average Travel Speed (mi/hr)

Intersection Analysis – Level of Service (LOS), Delay, Volume/Capacity (V/C) Ratio, Queues

For intersection analysis, LOS is determined by the average delay (seconds). The 2010 Highway Capacity Manual (HCM) provides LOS criteria for intersections, illustrated in Table 2. As shown in the table, the same LOS criteria will be used for both signalized intersections and roundabouts.

Table 2 LOS Criteria for Intersection with Traffic Control (HCM 2010)

LOS	Traffic Signals and Roundabouts	Stop Signs and Yield Signs
	Total Delay per Vehicle (sec)	Control Delay per Vehicle (sec)
A	≤10	0-10
B	>10 and 20	>10 and 15
C	>20 and 35	>15 and 25
D	>35 and 55	>25 and 35
E	>55 and 80	>35 and 50
F	>80	>50

Per discussions with WSDOT staff, it has been noted that the existing interchange is in a predominately rural area. However, it is anticipated that the proposed Cowlitz Reservation Development will change the character of the area to a more urban setting. Therefore, the LOS C standard will be used at the interchange ramp terminals for the existing conditions analysis and the 2016 analysis, while the LOS D standard will be used for the 2036 analysis.

Mainline LOS, Density, Speed, Travel Time

For freeway analysis (including mainline analysis of I-5, merge, and diverge), LOS is determined by the density of traffic. The HCM provides LOS criteria for freeway merge, diverge, and weave, shown in Table 3.

Table 3 LOS Criteria for Freeway Merge/Diverge/Weave (HCM 2010)

LOS	Maximum Density (pc/mi/ln)	
	Merge/Diverge	Weave
A	≤10	0-10
B	>10-20	>10-20
C	>20-28	>20-28
D	>28-35	>28-35
E	>35	>35
F	Demand Exceeds Capacity	Demand Exceeds Capacity

Speed (mph) and travel time (minutes) are also indictors of the performance of an individual segment and the overall freeway facility. HCS 2010 will be the primary software for freeway facility analysis.

The base saturation flow rate for all signalized intersection analyses will be 1,900.

INTERCHANGE JUSTIFICATION REPORT REQUIREMENTS

As outlined by the *WSDOT Design Manual*, there are eight policy point requirements that need to be addressed as part of an IJR. These eight policy points are outlined below:

- Policy Point 1 – Need for Access Point Revision
  - The IJR will describe the need for the interchange improvement and why the existing interchange is not sufficient to meet the design year needs.
  - Data analysis will be provided to support the needs findings.
- Policy Point 2 – Reasonable Alternatives
  - This policy point will be one of the main focal points for the NW La Center Road/I-5 Interchange Improvement Project.
  - All reasonable alternatives will be described and considered in the interchange form alternatives analysis. These will include the design options, locations, and transportation system management-type improvements to meet the proposal design year needs.
  - All reasonable design alternatives will be evaluated and documented in the evaluation process.
- Policy Point 3 – Operational and Safety Analyses
  - This policy point will be one of the main focal points for the NW La Center Road/I-5 Interchange Improvement Project.
  - An operational and safety analysis will be conducted per WSDOT IJR guidelines.
- Policy Point 4 – Access Connections and Design
  - Access within the vicinity of the interchange will be critical component of the NW La Center Road/I-5 Interchange Improvement Project given the presence of the two existing frontage roads on both sides of the interchange.
  - The analysis will include documentation on how the interchange improvements relate to the WSDOT Design Manual spacing criteria. Any design deviations needed to support the preferred interchange design will be fully addressed in this section.
- Policy Point 5 – Land Use and Transportation Plans
  - Future land use and transportation considerations will be accounted for the in the near- and long-term operations analyses.
  - The interchange improvement proposal will address consistency with local and regional land use and transportation plans.
- Policy Point 6 – Future Interchanges
  - The proposed interchange improvement will demonstrate compliance with other planned access points and revisions along the I-5 study corridor.

- Policy Point 7 – Coordination
    - In parallel with the IJR, a separate transportation impact analysis will be prepared for the Cowlitz Development Project. The applicable traffic volume increases from this separate study effort will be included at the IJR study intersections and appropriate references will be made as necessary to ensure coordination and consistency.
- Policy Point 8 – Environmental Processes
    - A separate NEPA process is being developed in parallel with the IJR.

To meet these requirements, all eight policy points will be addressed in the NW La Center Road/I-5 Interchange Improvement Project IJR.

Appendix A

Existing Traffic Volumes Development

EXISTING TRAFFIC VOLUMES DEVELOPMENT

A variety of traffic volume data were utilized as part of this transportation analysis, including:

- Twenty-four hour tube counts collected at all four ramps of the I-5/La Center Road Interchange from September 2012;
- Basic Axle Classification Report data for permanent traffic recorder (PTR) R045, located on I-5 at milepost 20.14 for portions of 2010, 2011, and 2012;
- Diamond Traffic Counter sixty minute counts for ramps of the I-5/La Center interchange from March 2011.

NW La Center Road/I-5

KAI collected twenty-four hour tube counts at the ramps of the I-5/La Center Road interchange for Friday, September 14, 2012 through Sunday, September 23, 2012. These automated tube counts collected hourly traffic volumes and vehicle classification by direction. The average of the Tuesday through Thursday data was used to develop the weekday AM peak (7:00 AM – 9:00 AM) and weekday PM peak (4:00 PM – 6:00 PM) volumes and truck percentages. The data from Friday, September 14 and Friday, September 21, 2012 was used to develop the Friday peak (4:00 PM – 6:00 PM) volumes and truck percentages. The data was not seasonally adjusted, as traffic reports from station R045 suggest that September traffic volumes are higher than average. This is further shown in *Attachment A*, which includes the monthly conversion factors for station R045. The factor to convert September average weekday traffic (AWDT) to annual average daily traffic (AADT) is 0.96, indicating that September traffic is higher than average traffic. Therefore, using the September counts is conservative. *Attachment A* also includes an analysis of PTR data provided by Ray Shank that justifies the use of September count data.

I-5 Mainline

WSDOT provided a basic axle classification report for ATR station R045, which is located on I-5 at milepost 20.14, just north of the I-5/La Center Road interchange, from September 2012. Traffic volumes at the station from Wednesday, September 19, 2012 through Monday, September 24, 2012 were available. Therefore, an average of the weekday AM peak period (7:00 AM – 9:00 AM) and weekday PM peak period (4:00 PM – 6:00 PM) traffic volumes from Wednesday and Thursday were used to estimate the weekday peak periods. In order to confirm the appropriateness of this data, it was compared to additional data at the ATR station, which suggested the September 2012 data is fairly typical for the freeway. This comparison is provided in *Attachment 2*, which includes peak volume data at station R045 from September 2010 and June 2012. Also, historical WSDOT data from R045 indicates that September is one of the higher months in terms of traffic volumes (as explained above and demonstrated in *Attachment A*). Therefore, using September data is conservative.

The volumes at the ATR station were used in conjunction with the ramp volumes to extrapolate the volumes on I-5 south of the NW La Center Road/I-5 interchange. The truck percentages recorded at the station were used for all of I-5.

STATE OF WASHINGTON - DEPARTMENT OF TRANSPORTATION
T R I P S S Y S T E M
PERMANENT TRAFFIC RECORDERS*
CONVERSION FACTORS: AVERAGE WEEKDAY TRAFFIC (AWDT) TO ANNUAL AVERAGE DAILY TRAFFIC (AADT)
RURAL STATIONS

MONTH	AWDT	FACTOR	AWDT	FACTOR	AWDT	FACTOR	AWDT	FACTOR	AWDT	FACTOR	AWDT	FACTOR	AWDT	FACTOR
	R014		R020		R023		R037		R038		R039		R040W	
JANUARY	10379	1.64	5374	1.13	8573	1.29	899	1.85	2446	2.04	21331	1.57	737	2.34
FEBRUARY	11520	1.48	5597	1.09	8379	1.32	988	1.69	3111	1.60	23374	1.43	939	1.84
MARCH	13542	1.26	5968	1.02	9519	1.16	730	2.28	2476	2.01	23650	1.42	895	1.93
APRIL	14694	1.16	6287	.97	10090	1.09	756	2.20	2488	2.00	24596	1.36	875	1.97
MAY	16080	1.06	6225	.98	10603	1.04	1178	1.41	2973	1.68	27405	1.22	1131	1.53
JUNE	18375	.93	6431	.95	11624	.95	1946	.86	3435	1.45	30724	1.09	1514	1.14
JULY	20766	.82	6830	.89	13173	.84	2751	.61	4736	1.05	34678	.97	2058	.84
AUGUST	19917	.86	7491	.81	13389	.82	2598	.64	4594	1.08	34974	.96	1980	.87
SEPTEMBER	16819	1.01	7509	.81	11733	.94	2115	.79	3588	1.39	30199	1.11	1833	.94
OCTOBER	14669	1.16	6739	.90	10267	1.07	1693	.98	2966	1.68	26444	1.27	1345	1.28
NOVEMBER	14439	1.18	5988	1.02	9709	1.14	968	1.72	2517	1.98	24541	1.37	980	1.76
DECEMBER	12652	1.35	5565	1.09	9852	1.12	1090	1.53	3798	1.31	26149	1.28	1052	1.64
AADT	17032		6091		11031		1666		4982		33518		1726	

	R041		R042		R043		R045		R047E		R047S		R047W	
JANUARY	3385	1.39	8086	1.78	4535	1.13	55528	1.18	10682	1.40	2795	1.85	9168	1.34
FEBRUARY	3652	1.28	8993	1.60	4566	1.12	55963	1.17	11081	1.35	2978	1.74	9445	1.30
MARCH	3923	1.20	10410	1.38	4610	1.11	60528	1.08	11399	1.31	3257	1.59	9581	1.28
APRIL	4155	1.13	12065	1.19	5079	1.01	62155	1.05	13025	1.15	3760	1.38	10048	1.22
MAY	4492	1.04	12552	1.15	5248	.97	63336	1.03	14443	1.03	4287	1.21	11966	1.03
JUNE	4852	.97	14410	1.00	5328	.96	68173	.96	15687	.95	5030	1.03	12926	.95
JULY	5236	.90	16740	.86	5890	.87	72012	.91	18019	.83	6275	.83	14568	.84
AUGUST	5327	.88	17019	.85	6294	.81	72811	.90	17679	.84	6071	.85	14492	.85
SEPTEMBER	5140	.91	13466	1.07	5637	.91	67949	.96	16049	.93	5020	1.03	13581	.91
OCTOBER	4629	1.01	12238	1.18	5035	1.01	63914	1.02	15127	.99	4535	1.14	12805	.96
NOVEMBER	4215	1.11	11291	1.27	4518	1.13	63466	1.03	12281	1.22	3564	1.45	10327	1.19
DECEMBER	4043	1.16	10480	1.37	4475	1.14	62679	1.04	12635	1.18	3799	1.36	10908	1.13
AADT	4689		14396		5106		65349		14932		5180		12293	

	R048		R054		R055		R057		R058		R061		R063	
JANUARY	11870	1.35	1791	1.16	6359	1.67	2053	2.04	1636	2.56	10422	1.33	6622	1.23
FEBRUARY	12730	1.25	1756	1.19	7117	1.49	2143	1.95	2045	2.05	11574	1.20	6934	1.17
MARCH	13781	1.16	1984	1.05	8223	1.29	2352	1.78	1771	2.37	12856	1.08	7338	1.11
APRIL	14972	1.07	2070	1.01	9133	1.16	2775	1.51	2165	1.94	12918	1.07	7711	1.06
MAY	15747	1.01	1940	1.07	9767	1.09	3252	1.29	2862	1.46	13203	1.05	8294	.98
JUNE	16815	.95	2183	.95	11256	.94	3816	1.10	3345	1.25	14358	.96	8718	.93
JULY	17658	.90	2494	.84	12958	.82	4865	.86	4628	.91	15584	.89	9467	.86
AUGUST	17380	.92	2703	.77	12814	.83	4776	.88	4451	.94	15920	.87	9419	.86
SEPTEMBER	16619	.96	2438	.85	10960	.97	3751	1.12	3496	1.20	14059	.99	8564	.95
OCTOBER	15947	1.00	2255	.92	9463	1.12	3390	1.23	2857	1.47	13364	1.04	8101	1.01
NOVEMBER	14191	1.13	1848	1.13	8799	1.21	2789	1.50	2166	1.93	12634	1.10	7658	1.06
DECEMBER	13372	1.19	1820	1.14	8213	1.29	3038	1.38	2866	1.46	12027	1.15	7412	1.10
AADT	15970		2083		10627		4185		4191		13851		8143	

* OREGON-OWNED RECORDERS AND FERRY TERMINALS EXCLUDED

Kelly Laustsen

From: Shank, Ray <ShankR@wsdot.wa.gov>
Sent: Thursday, November 29, 2012 3:00 PM
To: Matt Hughart
Cc: Keniston, Rick; Bellinger, Dave; Nova, Robert; Clark, Mike; Kelly Laustsen; Jeff Whitman
Subject: Cowlitz Reservation Development - Volume Methodology Discussion

Matt,

The following comments/guidance has been provided by our headquarters staff regarding the development of traffic volumes to be used in the analysis of the I-5/LaCenter Interchange.

Justification Discussion for using September 2012 Count Data

The Permanent Traffic Recorder (PTR) R045 is used for factoring mainline I-5 from the LaCenter Interchange northward. We use PTR R109 for factoring the mainline I-5 through the SR 501 (Ridgefield) Interchange.

Looking into this data, the seasonality we ascribe to both the end of SR 501 and the end of 503 (and therefore should reflect the ramps as well) comes from an average of urban sites we label GR-02. This is a much flatter seasonal curve than R045 or R109. The figures below reflect 2011 total monthly volume divided by total annual volume for GR-02, R045 and R109. What they show (somewhat cryptically) is that the 7-day average from your short count is likely only going to be a few percent off from the annual average. Since this is well within the margin of error for factoring, we would just consider the September count average as equivalent to the annual average.

Factor	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
GR-02	7.9%	7.4%	8.5%	8.3%	8.6%	8.7%	8.8%	9.0%	8.5%	8.4%	7.9%	8.2%
R045	7.2%	6.8%	8.1%	8.0%	8.4%	8.8%	9.7%	10.0%	8.8%	8.4%	7.9%	8.0%
R109	7.4%	7.0%	8.2%	8.1%	8.5%	8.8%	9.5%	9.7%	8.7%	8.3%	7.9%	8.1%

The peak hour volumes from the short count are anticipated to be appreciably lower than a 30th highest hour. The fact that R045 has significantly different temporal trends than the ramps means it is not appropriate as a factor source.

Therefore to justify using the available September data, we suggest multiplying the short count peak hour volume by 1.3 and determine if the higher volume would have any practical implication for design over the un-factored peak. If the answer is no, just use the short count peak as is. If the answer is yes, we will have to discuss further to determine an appropriate methodology.

Comparing Counts at Adjacent Interchanges

Weekday counts are available for all ramps of the Ridgefield, LaCenter, and Woodland Interchanges in March 2011. We can utilize these short counts along with the data you collected at the LaCenter Interchange in September 2012 to create a factor to derive estimated September 2012 volume data for the adjacent interchanges. In order to create this factor, we're assuming similar temporal trends between these three interchanges.

After looking at the September 2012 data, it appears that the peak hour on Friday is slightly lower than that of the weekday peak hour. To be conservative in our evaluation, the weekday peak volume data for the ramps will be applied as the Friday peak hour volume.

Additional Data Effort

- PTR R045 Validation – I have requested a status update for this effort and will let you know when the validation has been completed.

- SR 503/Woodland Interchange Study – After reviewing the study, the forecast year was 2025 and likely won't help with your volume projection for the Woodland interchange. However, if you think it might help I can forward you a CD containing a copy.

- Weigh Station Data – I should receive some information tomorrow regarding the number of commercial vehicles that use the weigh station. I will forward this information onto you when it becomes available.

Please review and let me know if you have any questions.

Ray Shank
Transportation Planner
WSDOT - SW Region
11018 NE 51st Circle
Vancouver, WA 98682
(360) 905-2087
shankr@wsdot.wa.gov

I-5 Data Comparison

PTR Station R045

Wed/Thurs Avg	Northbound				Southbound			
9/19-20/2012	1	2	3	**Total**	4	5	6	**Total**
6:00 AM	517	638.5	414	**1569.5**	442	714	503	**1659**
7:00 AM	571.5	840.5	567.5	**1979.5**	490	815.5	564.5	**1870**
8:00 AM	557	722.5	453.5	**1733**	479.5	759	477	**1715.5**
4:00 PM	792	912.5	677.5	**2382**	620	1080.5	992	**2692.5**
5:00 PM	779.5	895	638.5	**2313**	585	1021.5	890.5	**2497**
6:00 PM	648	773.5	529	**1950.5**	462.5	742	502	**1706.5**

Fri	Northbound				Southbound			
9/21/2012	1	2	3	**Total**	4	5	6	**Total**
4:00 PM	898	1130	1097	**3125**	660	1177	1144	**2981**
5:00 PM	897	1084	1071	**3052**	607	1117	1065	**2789**
6:00 PM	761	1030	939	**2730**	542	963	781	**2286**

Wed	Northbound				Southbound			
9/22/2010	1	2	3	**Total**	4	5	6	**Total**
6:00 AM	480	663	440	**1583**	470	718	452	**1640**
7:00 AM	612	784	549	**1945**	506	833	616	**1955**
8:00 AM	574	737	459	**1770**	480	771	448	**1699**
4:00 PM	757	877	646	**2280**	593	993	858	**2444**
5:00 PM	760	847	610	**2217**	547	1,006	849	**2402**
6:00 PM	676	779	520	**1975**	452	781	479	**1712**

Fri	Northbound				Southbound			
9/24/2010	1	2	3	**Total**	4	5	6	**Total**
4:00 PM	902	1,074	958	**2934**	680	1,195	1,345	**3220**
5:00 PM	895	1,072	967	**2934**	593	1,113	1,001	**2707**
6:00 PM	753	926	767	**2446**	536	960	838	**2334**

Wed	Northbound				Southbound			
6/13/2012	1	2	3	**Total**	4	5	6	**Total**
6:00 AM	508	667	387	**1562**	441	665	592	**1698**
7:00 AM	597	800	578	**1975**	495	721	599	**1815**
8:00 AM	574	693	467	**1734**	454	754	595	**1803**
4:00 PM	781	874	633	**2288**	569	959	1,087	**2615**
5:00 PM	776	841	599	**2216**	519	884	889	**2292**
6:00 PM	609	692	447	**1748**	408	665	494	**1567**

Fri	Northbound				Southbound			
6/15/2012	1	2	3	**Total**	4	5	6	**Total**
4:00 PM	868	1,094	1,155	**3117**	583	1,054	1,348	**2985**
5:00 PM	856	1,042	1,034	**2932**	504	1,038	1,191	**2733**
6:00 PM	760	917	840	**2517**	106	953	1,342	**2401**

Appendix B

SIDRA Assumptions and Methods

WSDOT Roundabout Standard Operations Analysis

It is recognized that WSDOT uses different methodologies than what is accepted in NCHRP 572 Roundabouts: An informational guide. The following parameters will be used in the roundabout analysis for the NW La Center Road/I-5 Interchange Improvement Project.

1) Change the Level of Service Method to HCM 2000

2) Change Capacity Model to SIDRA Standard

3) Change Roundabout LOS Method to 'Same as signalized intersections'

4) Change Entry Lane Width to 14 ft

5) Environment Factor:

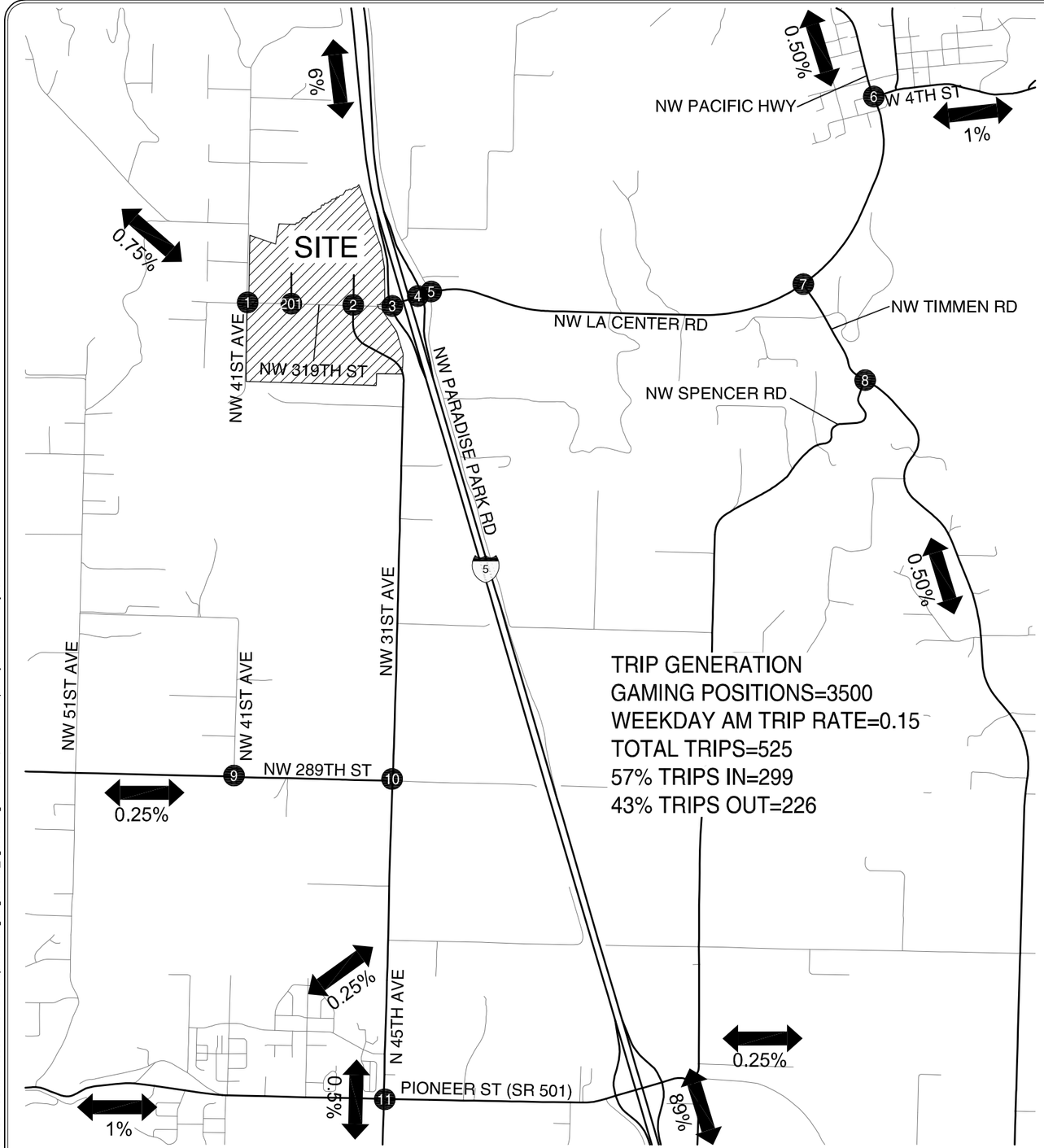
- La Center does not have any roundabouts. Therefore, a 1.2 environment factor (which is consistent with HCM 2010) will be used. For future 2036 scenarios, the environmental factor will be adjusted to 1.1 per WSDOT methodology.

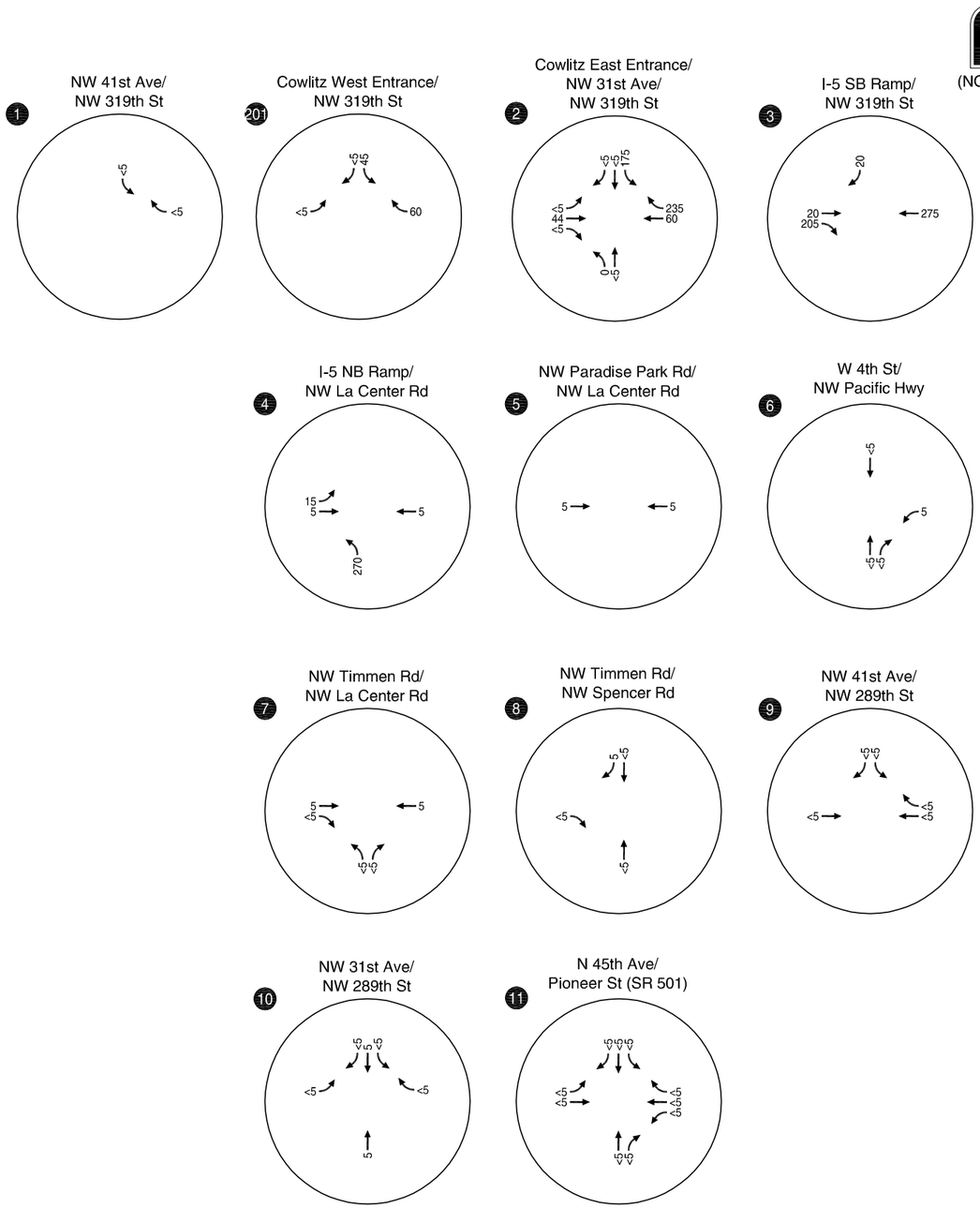
6) Basic Saturation Rate

- Although the existing interchange is in a predominately rural area, it is anticipated that the proposed Cowlitz Reservation Development will change the character of the area to more of an urban setting. As such, it is proposed that 1,900 be used as the base saturation rate.

Appendix C

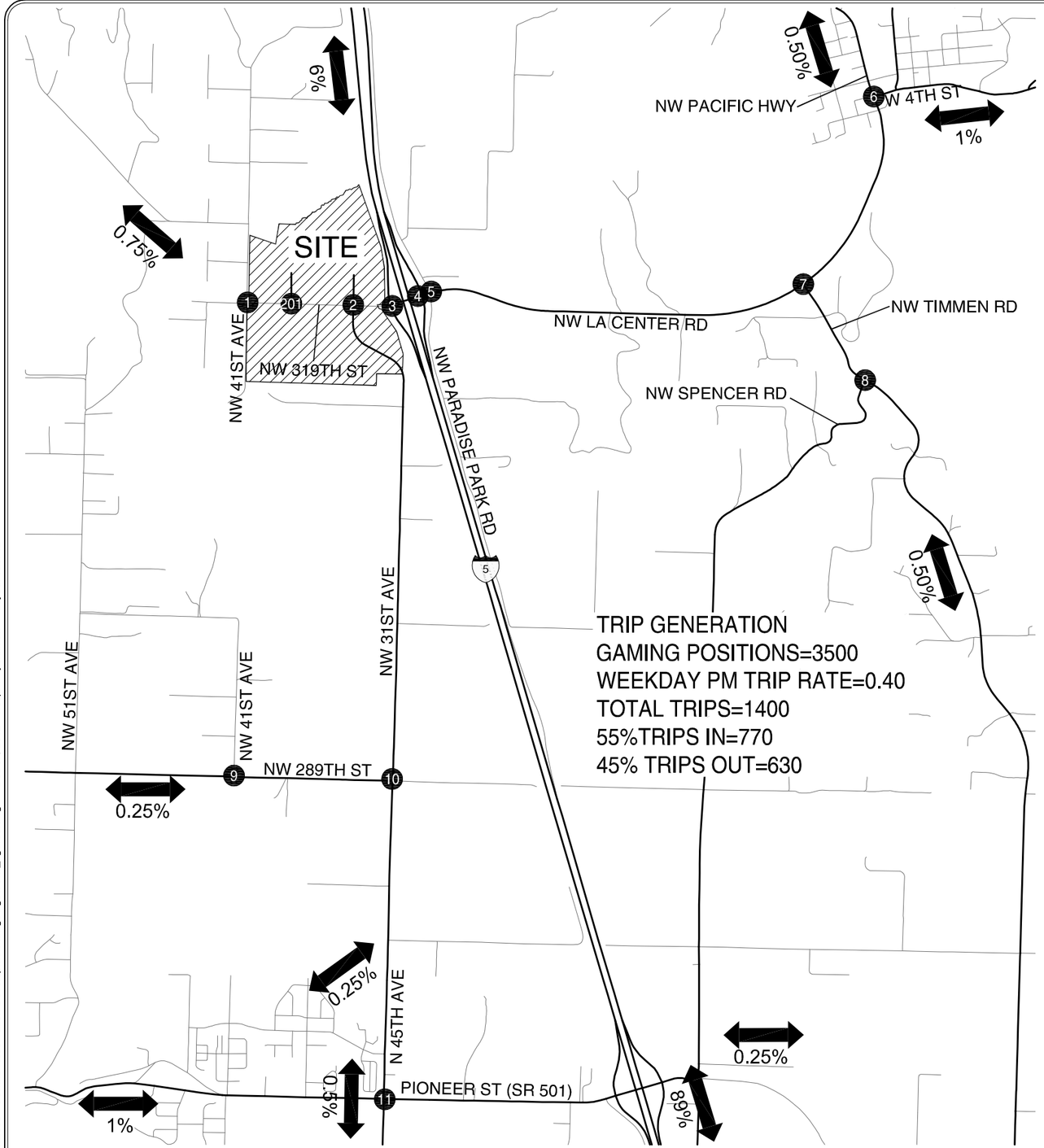
Trip Distribution and Assignment

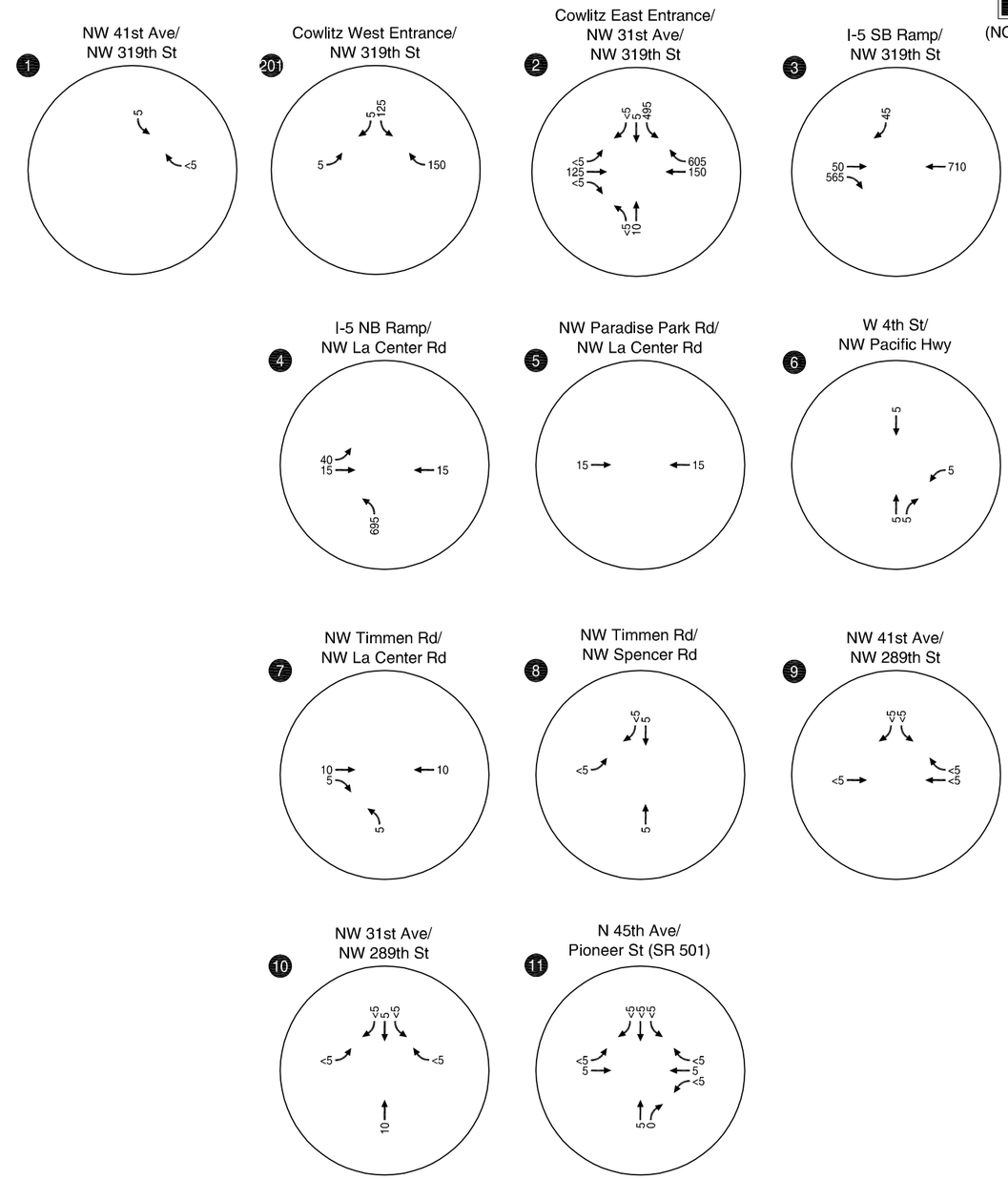




COWLITZ DEVELOPMENT TRIP GENERATION & DISTRIBUTION
WEEKDAY AM PEAK HOUR
LA CENTER, WASHINGTON

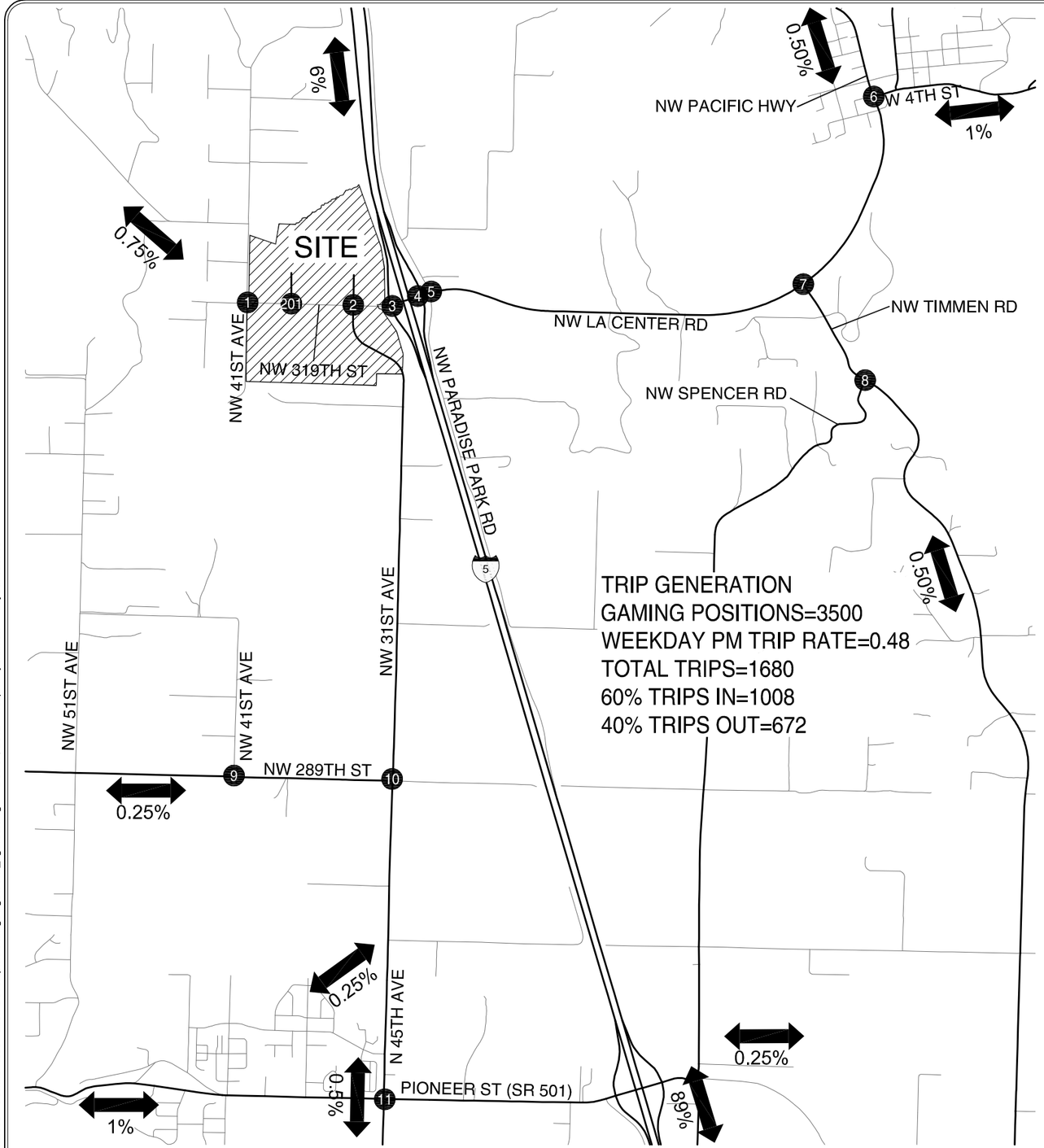
FIGURE 11

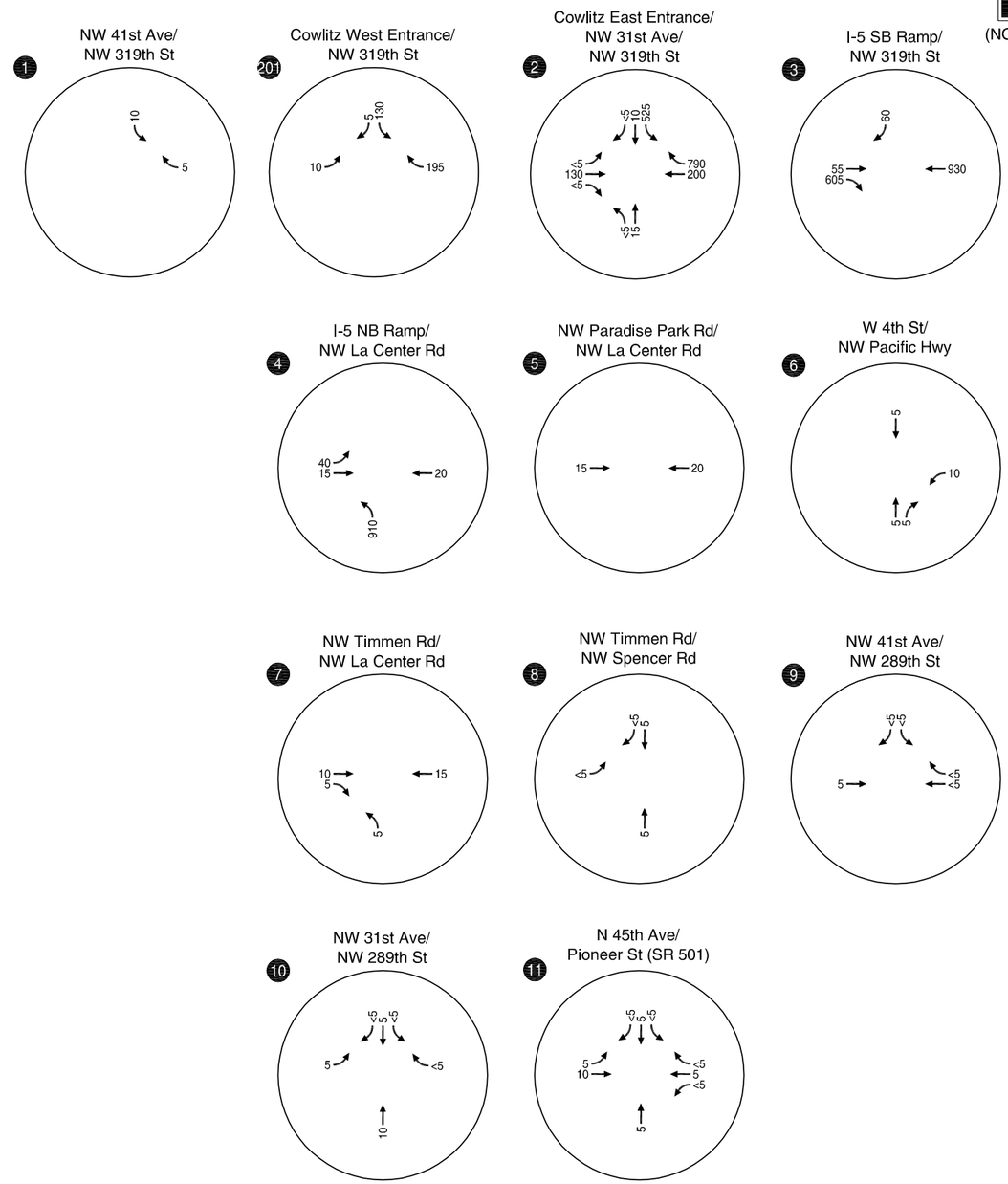




COWLITZ DEVELOPMENT TRIP GENERATION & DISTRIBUTION
WEEKDAY PM PEAK HOUR
LA CENTER, WASHINGTON

FIGURE **12**

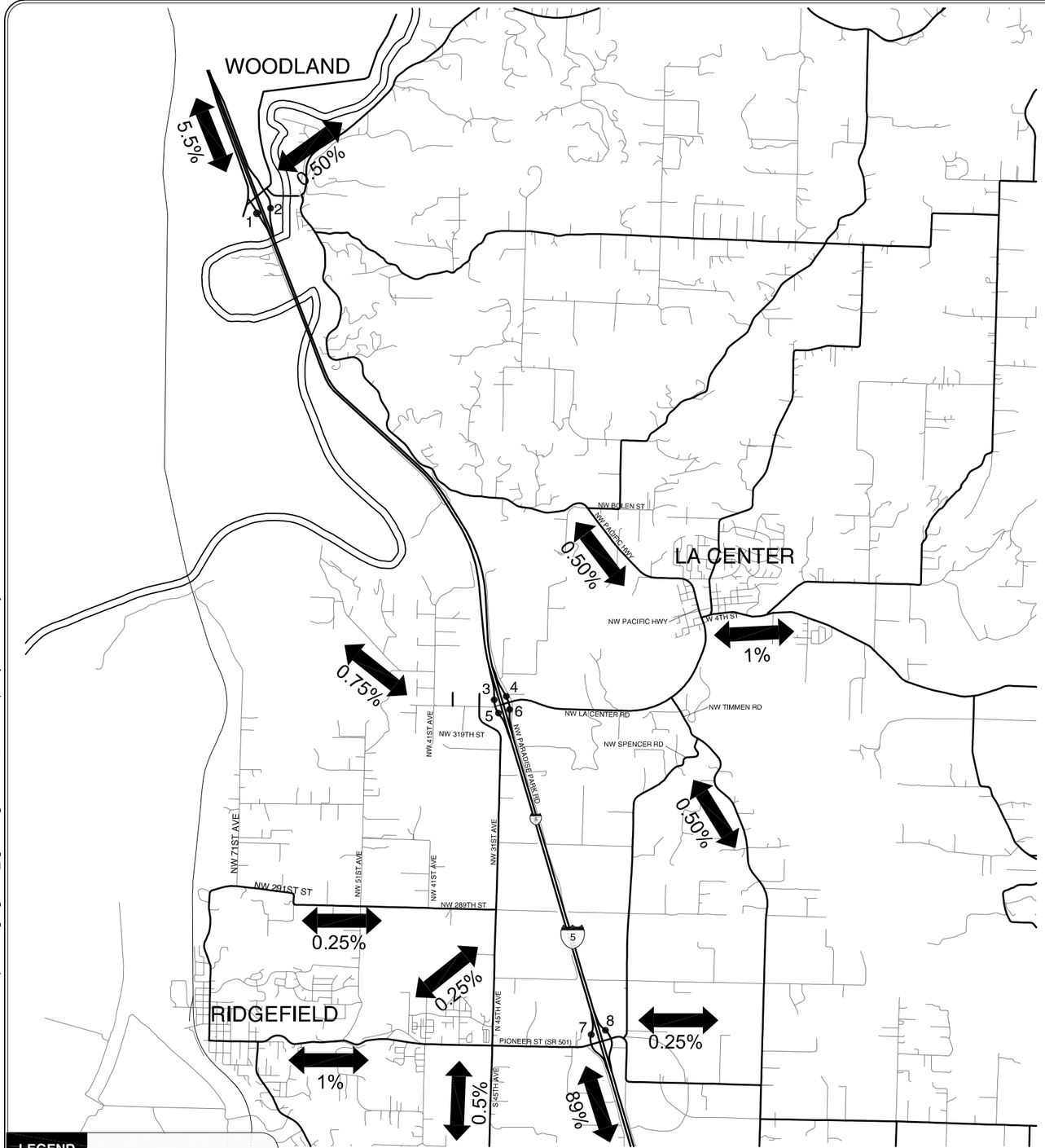




(NO SCALE)

COWLITZ DEVELOPMENT TRIP GENERATION & DISTRIBUTION
FRIDAY PM PEAK HOUR
LA CENTER, WASHINGTON

FIGURE **13**



(NO SCALE)

PEAK HOUR RAMP VOLUME BY LOCATION

1 - WOODLAND SB ON-RAMP

AM	PM	FRI PM
2	4	5

2 - WOODLAND NB OFF-RAMP

AM	PM	FRI PM
1	3	3

3 - LA CENTER SB OFF-RAMP

AM	PM	FRI PM
18	46	60

4 - LA CENTER NB ON-RAMP

AM	PM	FRI PM
14	38	40

5 - LA CENTER SB ON-RAMP

AM	PM	FRI PM
203	567	605

6 - LA CENTER NB OFF-RAMP

AM	PM	FRI PM
269	693	907

7 - RIDGEFIELD SB OFF-RAMP

AM	PM	FRI PM
2	6	7

8 - RIDGEFIELD NB ON-RAMP

AM	PM	FRI PM
3	8	10

LEGEND

● - STUDY ON/OFF RAMPS

COWLITZ DEVELOPMENT TRIP GENERATION & DISTRIBUTION
I-5 ON & OFF RAMPS
LA CENTER, WASHINGTON

FIGURE 1

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

Appendix D

VISSIM Modeling Assumptions and Methods

The purpose of this appendix is to outline the processes and standards associated with developing any needed microsimulation (VISSIM) models for the NW La Center Road/I-5 Interchange improvement project. These microsimulation models will be developed using VISSIM to determine the impacts associated with the following issues:

- Development of the Cowlitz Reservation
- Modifications to NW La Center Road and the its interchange with I-5

The remainder of this appendix outlines the process Kittelson & Associates, Inc. (KAI) will use to develop any applicable VISSIM models for this project.

Modeling Study Area

As previously developed by regional stakeholders, the prepared VISSIM models will include the following intersections.

- NW 31st Avenue/NW 319th Street
- I-5 Southbound Ramp/NW La Center Road
- I-5 Northbound Ramp/NW La Center Road
- Paradise Road/NW La Center Road

In addition to the above intersections, I-5 ramps will be modeled, along with their interaction with I-5, for the ramps at the NW La Center Road Interchange, the SR 501 Interchange, the SR 503 interchange, and the I-5 weigh station.

Scenarios/Study Time Periods

Per the above methods and assumptions, VISSIM will only be used if a preferred alternative scenario does not meet the operational performances specified in the body of this report. For these scenarios, VISSIM will be used to review the alternative to determine feasibility of implementation. For each of these scenarios the following two time periods will be analyzed.

- Weekday PM Peak Hour
- Weekday Friday PM Peak Hour (Due to Casino use)

Prior to the future alternative being modeled in VISSIM, an existing conditions model will be developed and calibrated for the same time periods. The procedures used for this calibration and delivery of models are discussed further in this appendix.

For each VISSIM model the peak period data will be entered in the model in 15 minute intervals along with a thirty minute “warm-up” period. For this model, the term peak period refers to the point in time where forecasted traffic along either NW La Center Road or at the interchange’s ramps results in a failing level of service (congestion) to the point where the model recovers (uncongested). It is believed that this will be no greater than two hours. Peak period information will be documented in the final report. The warm-up

period of the model cannot be used to develop meaningful measures of effectiveness; however, it is used to "prime" the model for peak hour conditions. Data for the warm-up periods will be developed based on the same traffic data used to develop the peak hour data with the warm-up period being 90% as intense as the peak hour. The peak hour factor for the peak hour will be the same as in existing condition.

Model Development

Development of the VISSIM models will follow the Federal Highway Administration's (FHWA) 7 step process as outlined in the *FHWA's Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software.* These steps are summarized below.

- Identification of Study Purpose, Scope, and Approach
- Data Collection and Preparation
- Base Model Development
- Error Checking
- Calibration
- Alternatives Analysis
- Final Report and Technical Documentation

Based on the above process, the project team has prepared a list of assumptions which will be used for the individual steps. These are summarized below.

Identification of Study Purpose, Scope, and Approach

The purpose and scope for this project were previously developed and approved by the regional stakeholders. No alternation to the scope and purpose is being proposed at this time.

Data Collection and Preparation

Data sources required for model construction have been identified and are documented below.

Geometric Data

Geometric data for the future condition will be developed based on the functional layout and design phase of this project and will be entered into VISSIM.

Traffic Control Data

Control data for the future year conditions will be based on the functional analysis and design phase of this project. Control data includes, but is not limited to, the following:

- Signal Timing
- Speed Limits
- Turn Restrictions
- Yield Signs/Stop Signs

Traffic Demand Data

Future year data will be developed through a trip generation and traffic forecasting exercise to be carried out and documented during this project. Existing year traffic count information will also be used to determine the base background heavy vehicle percentage. Vehicle characteristics, aside from heavy vehicle percentage, and performance data has not been collected and the default values contained within VISSIM will be used. Heavy vehicle models within the VISSIM model will be split between AASHTO design vehicles WB 40, 50, 65 and 67 as determined by the available data.

Origin-Destination Data

O-D data will not be developed for this project due to the model area's limited extents. As such all potential legal O-D pairs will be allowed and volume distribution will be handled through VISSIM's routing decisions. When routing decisions need to cover multiple intersections, relative percentages will be applied to the routes based on the turning movement distributions the route travel's through. Precautions will be taken to prevent I-5 off-ramp traffic from entering the network and immediately entering the adjacent I-5 on-ramp, unless this is observed in the field.

Travel Time Data

Travel time data will not be collected for this project due to the limited extents of the model. Average vehicle speed will be compared to the posted speed limits and field visit data to ensure drivers are travelling at reasonable speeds.

Base Model Development

Using the data outlined above, the required scenarios and existing conditions will be developed using VISSIM and industry best practices. Base model development represents a model which still needs to be validated and is only the first preliminary step in model development. The following key information regarding the base model is summarized below.

Basic Settings

- VISSIM version 5.40 will be used
- A modeling resolution of 10 steps per second will be used

- Aggregated data will be developed based on 10 individual model runs and checked against FHWA procedures to ensure that the model is statistically valid. For this effort, a confidence interval of 95% will be assumed.
    - If the model is shown to require more runs, the model will be further ran and continuously checked for stabilization.
- Default vehicle lengths and distributions will be used for passenger vehicles.
    - Heavy vehicles will use AASHTO design vehicles WB 40, 50, 62, 65 and 67 as determined by the available data.
- Wiedemann 74 driver behaviors will be used for NW La Center Road modeling
- Wiedemann 99 driver behaviors will be used for I-5 mainline and ramp modeling
    - Any model specific settings will be documented in the final technical documentation
    - Desired speed curves will be developed based on available I-5 mainline data

Routing Decisions

Routing decisions will be coded in a manner that the beginning of the decision (red bar) is as far upstream of the first decision point as possible. The will enable a vehicle to make a decision at the first possible opportunity. In instances of short distances between intersections, routing decisions may need to combine multiple routes in order to minimize unrealistic lane changes. At this time it has not been determined if passenger vehicle and heavy vehicle traffic share similar routes. If it is determined that they do not, a specific set of routing decisions will be included to accommodate heavy vehicle routing through the model.

Speed Decisions

Speed decisions will be placed at each entrance to the model. For instances where a speed change will occur, the decision point will be placed so the vehicle will change speeds as soon as they are on the link with the new anticipated speed. For off and on-ramps, speed decisions will be placed accordingly per the geometric and control data from the alternative development.

Reduced Speed Areas

Reduced speed areas will be placed on any link or connector whose corresponding roadway geometry would cause vehicles to temporarily slow down to negotiate the area. The most common area for reduced speed zones are for left and right turn movements. As this data will not be collected, the following reduced speed area settings will be used for passenger vehicles.

- Right Turns – 10 mph (7 mph – 13 mph)
- Left Turns – 15 mph (12 mph – 18 mph)

Heavy vehicles will use the following speeds.

- Right Turns – 8 mph (5 mph – 10 mph)
- Left Turns – 12 mph (10 mph – 15 mph)

Conflicts Areas/Priority Rules

Conflicts in VISSIM can be modeled using conflict areas and/or priority rules. Typically it is desired to use conflict areas; however, certain situations may require the use of priority rules. For this model, the project team will prioritize the use of conflict areas over priority rules.

Error Checking

KAI's error checking process is summarized below. It is similar to the process outlined in *FHWA Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software*.

- Review Input
  - Roadway network
  - Traffic volumes and routing
  - Traffic control
- Review Animation
  - Driver behavior
  - Location, extent and frequency of congestion
  - Miscellaneous localized problems
- Review Errors
  - Traffic unable to enter network
  - Traffic removed from simulation

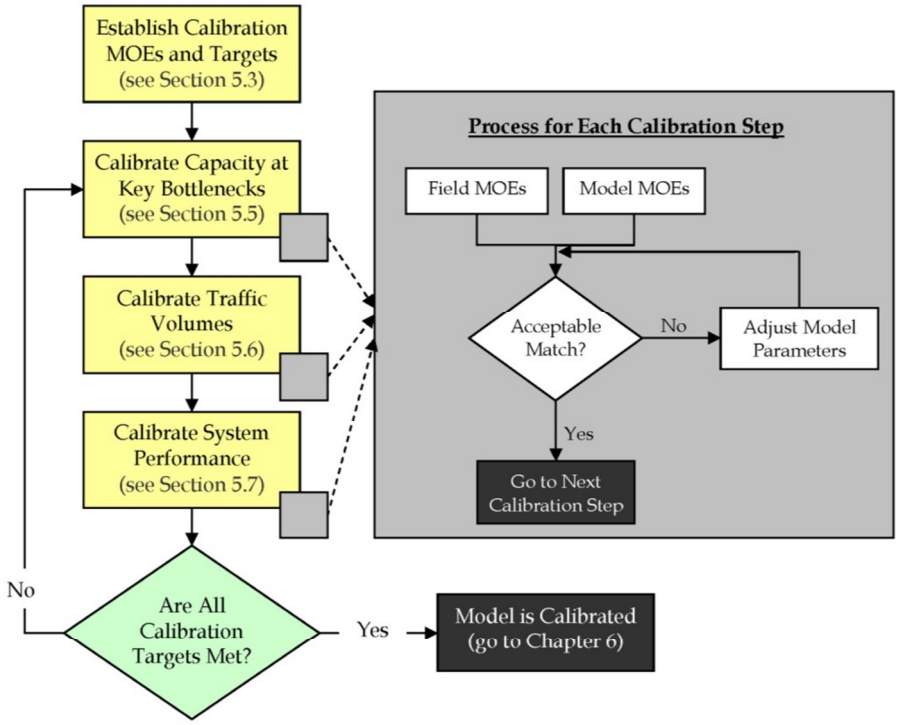
Error checking for this project will be conducted by a senior engineer with the project modeler performing a back check on the identified issues. Error checking will be completed prior to model calibration.

Existing Condition Model Calibration

Calibration of the VISSIM model will occur for the "existing condition" models only. Any modified parameters will be carried forward to future conditions models. The existing conditions model is deemed calibrated when the volume, speed, and other operational observations are satisfactorily replicated to those in the field.

The calibration process we will follow is illustrated in Figure 1 below. This figure is from *FHWA Traffic Analysis Toolbox Volume IV* which discusses CORSIM modeling. However, the general principals of calibration do not change between VISSIM and other microsimulation tools.

Figure 1 – Calibration Approach Flowchart



Calibration for the existing conditions model will be based on reaching target thresholds of model reported results versus field measured data. Each of the thresholds for these areas is detailed below. For this effort, traffic volume will be the primary calibration metrics, while queue lengths and visual accuracy will be secondary efforts. Once the below outlined targets are met, the model will be considered calibrated and existing condition measures of effectiveness will be collected.

Traffic Volume Calibration (Primary Calibration Indicator)

Traffic volume calibration involves measuring averaged modeled volumes against field measured data. To do this comparison the project team will use the GEH statistic formula. The GEH formula was empirically developed to review traffic models involving a wide variety of traffic volume intensities. Its primary benefit is that it accounts for the desire to have varying levels of agreement depending on how large or small traffic volumes are.

An example of this issue is that a turning movement of 50 vehicles per hour may experience a typical stochastic model fluctuation of between 10 - 20 vehicles or 20 - 40 percent and still be acceptable. While a mainline volume of 5000 vehicles per hour, should experience a fluctuation of no more then 5 – 10 percent. In using the GEH formula, the same set of rules can be used for any volume as the desired deviation from the measured volume is built into the formula. In this manner, the formula is similar to a Chi-Squared test.

The GEH formula is: $$GEH = \sqrt{\frac{(M-C)^2}{(0.5(C+M))}}$$

For this modeling effort, the following guidance will be used regarding the GEH score of calibrated movements.

i. GEH Less than 2 – Calibrated Value
ii. GEH Between 2 and 5 – Acceptable Value
iii. GEH Between 5 and 10 – Review model, provide comment if volume cannot be further calibrated
iv. GEH Greater than 10 – Revise model, provide explanation in report if volume cannot be further calibrated

Target goals for this model develop are:

- 85% of the modeled movements with a GEH score below a 5, and
- The model aggregated with a GEH score below a 4.

Instances where it is not possible to meet these goals will be documented in the final technical documentation.

I-5 Speed Data (Primary Calibration Indicator)

I-5 speed data will be used as the second primary calibration metric. Two values will be reviewed based on available data; the average mainline speed, by direction, across all through lanes and the 85th percentile speed across all through lanes. The proposed calibration targets are documented for each below.

- Average speed across all lanes within 5% (approximately +/- 3.5 mph)
- 85th percentile speed across all lanes within 5% (approximately +/- 4 mph)

Instances where it is not possible to meet these goals will be documented in the final technical documentation.

Queuing Calibration (Secondary Calibration Indicator)

Queuing will be collected visually during the project team's field visits. As such, the model will only be calibrated in a general sense to queuing. The visual information gathered will be documented in the final technical memorandum and the model will be visually inspected to ensure that queues are neither significantly shorter nor longer than what was observed in the field.

Visual Calibration (Secondary Calibration Indicator)

VISSIM is capable of producing a visual output of the model which the analyst can then compare to their own experience in the field and others' field notes. This visual observation will be completed to ensure that the model overall is operating as expected and that the representation of driver behavior is reasonable. Any unique situations which occur in the model will be documented in the final technical documentation.

Future Condition Analysis

Once a calibrated existing conditions model is created, the future conditions documented above will be analyzed using the base assumptions developed during calibration. Future year traffic volumes and geometric modifications have been developed outside of the VISSIM effort and will be incorporated in the future VISSIM model.

Similar to calibration a base level of volume validation will be completed to ensure that modeled volumes are in line with expected volumes. Once volume validation is complete, the future year model will undergo error checking and will be considered complete. Following these steps, the future year alternatives' measures of effectiveness will be produced.

Measures of effectiveness will be based on VISSIM's default data collection settings. Current settings are not HCM compliant in that the HCM and VISSIM measure delay slightly differently. However, per the ODOT VISSIM protocols (endorsed by WSDOT); it was determined that the difference in delay calculations is minimal and the appropriate course action is to refer to the delay values generated by VISSIM by the term delay instead of HCM delay. HCM level of service will continue to be applied using the VISSIM delay data.

VISSIM Milestones

Due to the expedient nature of this effort the following project milestones are proposed for model review by project stakeholders.

- Calibrated Base Model and Calibration and Results Report
- Future Alternative Models with Corresponding Documentation
- Final Report with all Alternative Models

Further milestones included as part of the larger project will cover topics such as forecast volumes, alternative geometry, traffic control, project background and project justification. Results from these efforts will be forwarded onto technical reviewers based on their availability at the above milestones.

Final Report and Technical Documentation

Technical documentation for a VISSIM modeling effort involves two parts. The first is a final technical report which will include the following items:

- Project Background
- Base Assumptions
- Areas of concern or special interest
- Future Year Conditions
- Supporting Appendices (traffic counts, model outputs, signal data.., etc)

The second deliverable is the VISSIM model themselves, including the existing condition model as well as any alternatives. The following VISSIM files will be provided to the reviewing agency(s) and allow for independent verification of the models.

- VISSIM (.inp) files
- Signal Timing (.rbc) Files
- Background Imagery (various formats) and background scaling files (.bgr)
- Random Seed Numbers

Appendix B Transportation Impact Analysis (TIA) for the Cowlitz Reservation Development

Due to the size of the Transportation Impact Analysis, it is provided as a separate file.

Appendix C Engineering Assessment of NW La Center Road/I-5 Interchange Structure

NW La Center Road/I-5 Interchange Existing Bridge Review

Prepared For: Cowlitz Reservation Development Project Team

Prepared By: Don Wagner, CH2M HILL

Date: July 23, 2014

The existing NW La Center Road Bridge over I-5 is a four span structure constructed in 1969 with an overall length of 313 feet with span lengths of 105.5 feet over the northbound and southbound Interstate 5 Freeway (I-5) and 51 feet long end spans. The overall bridge width is 34 feet and the minimum vertical clearance is 16.5 feet. The bridge provides a 26 foot wide roadway with one 11 foot wide travel lane and 2 foot wide shoulder in each direction and 3 foot wide sidewalks on each side. The bridge superstructure includes prestressed concrete girders with a cast in place concrete deck. The bridge substructure includes cast in place concrete abutments and piers supported by timber piling.

Based upon the most recent inspection, the bridge is generally in fair to good condition with some hairline map cracking of the deck, columns and cap beams. Several girders located over I-5 have high vehicle impact damage with spalls, delamination and exposed prestress strands and repairs. The bridge inventory load rating is 33 tons and operating load rating is 56 tons. The bridge is not posted.

The existing bridge will require widening to meet current roadway travel lane, shoulder, and sidewalk width design standards. In addition, future traffic demands result in the need for at least two travel lanes in each direction. Due to right of way constraints on the northeast side of the bridge, widening on the south side of the bridge is preferred. The roadway profile on I-5 raises to the south. Widening on the south side of the existing bridge and maintaining the existing cross slope will result in a reduction in the minimum vertical clearance to less than 16.5 feet without either reducing the structure depth, lowering the I-5 profile, raising the overcrossing roadway profile or some combination of these. In addition, traffic will need to be maintained during construction of the widening resulting in the need for staged construction of the widening.

The existing bridge does not meet current seismic design standards. The existing bridge structural seismic deficiencies include columns that do not have sufficient transverse reinforcing steel to provide confinement in the plastic hinge regions at the top and bottom, cap beams that do not have sufficient top and bottom reinforcing steel to accommodate the column plastic moment demands, footings that do not have top reinforcing steel, and timber piles that are embedded 6 inches and do not include any tension ties. In addition, the bridge

spans are all simple spans with no continuity at the intermediate piers and no longitudinal restrainers.

Chapter 4 of the WSDOT Bridge Design Manual requires for widening of an existing bridge that element seismic capacity/demand ratios be compared before and after widening. If the seismic capacity/demand ratio is not decreased, the widening can be designed and constructed without retrofitting existing seismically deficient bridge elements. If the widened bridge capacity/demand ratios are decreased, the seismically deficient existing elements must be retrofitted as part of the widening project.

Considering the existing bridge structural system and seismic deficiencies, it will be difficult to widen the existing bridge without increasing the existing seismic capacity/demand ratios. Thus, the existing structure will need to be retrofitted for the widening. Considering the age and condition of the existing bridge, replacement of the bridge deck and the outer girders with high load impact damage should be included with the widening and retrofit of the existing bridge. In addition, considering traffic must be maintained and construction must be staged, the cost of the widening, retrofitting, and deck and girder replacement will likely be about the same or more than a new wider bridge. The new bridge can be constructed south of the existing bridge while traffic is maintained on the existing bridge resulting in minimal traffic impacts except when the roadway tie-ins are constructed at each end of the bridge. As such, replacement of the existing bridge is recommended in lieu of widening and retrofitting the existing bridge.

Appendix D March 14th, 2013 Alternatives Workshop Meeting Minutes

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
610 SW Alder Street, Suite 700, Portland, OR 97205 P 503.228.5230 F 503.273.8169

I-5/NW La Center Road Interchange Improvement – Alternatives Workshop

March 14, 2013 at 10:00 AM

Date:	March 21, 2013	Project #: 12393.0
To:	Washington Department of Transportation (WSDOT) Staff, City of La Center (City) Staff, and Project Team	
From:	Kittelson and Associates, Inc. (KAI)	
Project:	I-5/NW La Center Road Interchange Improvement	
Subject:	Summary Meeting Notes	

Summary of Action Items:

- Project Team to update Property and Right-of-Way (ROW) Map to adjust ROW lines on west side of interchange to accurately reflect County ROW.
- Project Team to develop additional interchange concept sketches to include designs developed as part of the La Center Sub Area Plan.
- Project Team to consider comments received during meeting related to interchange and corridor concepts that have been developed thus far.
- Project Team to distribute a matrix comparing the interchange concepts in the next couple of weeks.
- Project Team to evaluation NB Terminal dual left-turn utilization based on Casino entrance and circulation plan and conduct an event sensitivity analysis for evening events.
- WSDOT and City staff to provide any additional comments on the Operations Memorandum, Design Criteria Memorandums, and interchange and corridor concepts developed by the Project Team by Monday, March 25th, 2013.
- WSDOT and City staff to provide any additional interchange or corridor concepts for the Project Team's consideration by Monday, March 25th, 2013.

1. Introductions
    - The focus of this meeting is on the interchange form (I-5/NW La Center Road), as well as the alignments of NW 319th Street and NW 31st Avenue on the west side of the interchange. The scheduled April 2nd meeting will address the alignment of NW Paradise Park Road.

- The purpose of this meeting is to present the concepts that have been developed thus far, receive feedback, and gather input on any additional concepts the project team should consider.

2. Background

   a. Summary of available property and right-of-way for improvements

      - The Property and Right-of Way Map (Figure A) displays existing ROW constraints, property ownership, and wetlands. The majority of challenges and constraints are on the east side of the interchange (narrow ROW, property negotiation discussions).
      - **Action Item: It was noted that NW 31st Avenue is in the County ROW (not the City). KAI will update the map to accurately reflect ROW on the west side of the interchange.**

   b. Overview of future interchange operations

      - Merge/diverge operations show that the northbound (NB) off-ramp and southbound (SB) on-ramp do not meet standards in 2016 or 2036 with the Cowlitz Reservation development. Therefore, double-lane ramps are necessary.
        - *Question: Did you explore just extending the ramps?* Yes, we looked at a variety of options.
      - With signals at the ramp terminal intersections, a 4-lane bridge structure will be required in 2016 and a 6-lane structure in 2036 to support future traffic volumes and the proposed Cowlitz Reservation development.
        - *Question: How do the intersections look with the proposed 2016 configuration and 2036 volumes?* Unacceptable – intersections are operating over-capacity.
        - *Comment: It looks like the AM peak is very concentrated (one dominant movement), while the PM peak is more dispersed (several movements). Also, the AM peak is more concentrated because everyone leaves for work near the same time.* True. However, the volume of vehicles making opposing movements (in conflict with the left-turn onto I-5 southbound) in the AM is low.
        - *Question: The NB off-ramp has 960 left turns. How does this intersection operate at a LOS D?* The operations displayed in the memorandum are with the proposed geometry, not the existing geometry.
        - *Question: Is there a second access to the site?* Yes, an additional access is planned farther west. We split the volumes 50/50 at the two accesses for this analysis. We also looked at a scenario where 85% of vehicles enter at the first access and exit at the second access based on the one-way operations currently anticipate on site. We will consider the distribution of vehicles in each access when refining the site plan layout. We will also look at weaving maneuvers along the NW 319th Street/NW La Canter Road corridor.

- **Action Item: KAI will evaluate the** NB Terminal dual left-turn utilization based on Casino entrance and circulation plan and conduct an event sensitivity analysis for evening events
- With roundabouts at the ramp terminals, there is more flexibility for staging the design, and a narrower bridge structure (4-lane) is required. The specifics of the signal and roundabout designs are further discussed later in the meeting.
  - *Comment: WSDOT will consider both roundabouts and signals. WSDOT does not like roundabouts on high-speed facilities (posted speed greater than 50 mph), but at ramp terminals they are typically acceptable.*
  - *Question: Have you considered teardrop roundabouts instead of circular roundabouts?* Yes. Circular roundabouts provide the opportunity for U-turns if accesses need to be limited in the vicinity of the ramp terminals, but we will also consider teardrop roundabouts.
- **Action item:** The project team requests any additional comments or questions on the Operations Memorandum as soon as possible so we can incorporate them before the process goes any farther.

c. Overview of design criteria

- The goal is to maintain the existing gore points on the I-5 SB off-ramp and I-5 NB on-ramp; design new gore points on I-5 NB off-ramp and I-5 SB on-ramp (future operations require double-lane ramps).
  - *Question: Have you checked geometry of existing ramps?* Not yet, but intend to. At a high-level assessment, we are concerned about the existing acceleration and deceleration distances, respectively.
  - *Question: Are there environmental impacts if the ramps are altered?* Potentially not (based on how far the gore points are moved), but we haven't looked at this specifically.
- The design speed for the cross road (i.e., NW La Center Road and NW 319th Street) is currently anticipated for 55 mph.
  - *Comment: It appears that a 35-mph design speed would be more appropriate in the vicinity of the interchange.* For a signalized corridor, the design speed dictates the horizontal alignment and the associate superelevation, while roundabouts provide more flexibility for the approaching geometry due to managing speeds. Project team will work with City and Clark County staff to establish the desired design speed for the NW La Center Road/NW 319th Street corridor.
- **Action items:**
  - The project team requests any additional comments or questions on the design criteria assumptions as soon as possible.
  - The project team requests an appropriate design speed for the NW La Center Road/NW 319th Street corridor.

d. Existing structure assessment

- The existing structure has sufficient capacity to carry existing loads.
- The existing structure is substandard in terms of lane-widths, shoulders, and lack of sidewalk.
- The vertical clearance appears to be 16.5 feet. We do not have exact deck clearance information, as the original assumption was that we will not retain the existing structure. If there is an option to keep the structure, we will survey the bridge main deck and ensure vertical clearances.
- The grades approaching the bridge over the highway is approximately 2.5-2.8%. The profile over the bridge is within a vertical curve.
- Our preliminary recommendation is to potentially reuse the existing substructure and replace the superstructure.
- There are seismic issues, so that any widening of the bridge structure will require the substructure to be upgraded. Therefore, it may be advisable to replace the full-bridge in terms of cost-effectiveness.
- *Question: Is there room to add a lane in each direction along I-5 under the existing structure?* This is likely possible, but we can't say with certainty yet. The median is approximately 64 feet.

e. Site constraints (environmental, topography)

- There are no wetlands in the northeast (NE) corner (Fudge property) or impacts to the stream.
    - *Question: You have taken in to account that the Cowlitz Reservation development may use the stream, correct (i.e. for clean wastewater)?* Yes, we have had initial discussions about this but will continue to look at this possibility.
- In the southeast (SE) corner (Carlson property), there is compacted top soil, wetland areas (category 4), and a previous waste-site. This restricts how far NW La Center Road can be moved south and to the east. With the realignment of NW Paradise Park Road, it may be difficult to maintain the S-curve and have the road tie in at a 90-degree intersection angle.
- On the west side of the interchange, the wetlands represented on the maps were surveyed as part of the environmental impact statement (EIS).

3. Interchange Concepts

a. Initial design concepts

- Part of the interchange justification report (IJR) process involves doing a thorough look at other potential alternatives.
- The operations analysis done thus far on the ramps and at the ramp terminals assumes the existing diamond interchange form, but we are also considering other interchange forms.
- We have developed 8 interchange concepts and created single-line sketches to get an idea of what the interchange form will look like. Once a form is selected, we will further develop the concept and identify impacts.

- *Question: The analysis is based on where identified deficiencies are, correct*? Yes, we are reacting to where we have identified deficiencies due to growth in the area.
- *Question: Any there issues with weigh-station south of interchange?* There are no merge/diverge issues there, but there are potentially mainline capacity issues.
- *Question (on Concept 5): The NB off-ramp does not have to be aligned with the cloverleaf ramp, correct?* Yes, the concepts show one option, typically the worst-case scenario.
- The parclo concepts will push the ramp gore points farther from the interchange and have significant impacts on properties at each quadrant of the interchange.
- The project team would like to get any additional thoughts or ideas to add to mix of options. We would like to ensure that we have a thorough and robust assessment to include in the IJR.

b. Evaluation criteria

- The project team presented the preliminary evaluation criteria to compare the interchange concepts.
- *Comment: We should also consider the potential for wrong-way movements (i.e. on the loop ramps).*
- *Comment: The evaluation assessment in the IJR should be in as concise a form as possible (i.e., a matrix). We don't need a long write-up or analysis.*

c. Work session to sketch other potential concepts to consider

- No additional concepts were suggested during the meeting.
- *Comment: The parclo designs where the ramps and frontage roads are next to each other may create complications and be hard to deal with from a driver expectation point of view. The parclo concepts also have significant right-of-way impacts. They can be problematic with wrong-way movements and driver confusion.*
- *Comment: The project team has done a thorough job of capturing the concepts WSDOT would typically look at.*
- *Question: Have you looked at sub-area concepts?* Yes. We will look at these more thoroughly and include a sketch of any applicable concepts in the evaluation.
    - ***Action Item: the project team will add sketches of any applicable concepts from the La Center sub-area concept plan.***
- ***Action item: the project team requests any additional ideas or concepts in the next week.***

4. Corridor Concepts

a. Horizontal and vertical alignments

i. La Center Road

- Constraints for the alignment of NW La Center Road include:
    - The existing bridge structure and how we construct/expand the bridge while maintaining traffic;
    - Staying within the existing ROW on the east side of interchange; and
    - Wetland constraints.

- There are less ROW constraints on the west side of the interchange, so most challenges for the alignment are on the east side.
- The goal is to leave 12-foot lanes on the bridge structure and maintain 2 feet of clearance for workers during construction. If we maintain and expand the existing bridge structure, we will likely expand to one side.
- The initial alignment layouts are based on the design criteria and assumptions.
- To accommodate potential vertical alignments, the existing structure would either have to be raised or significantly modified (which may not be cost effective).
- The roundabout concept has the option of building a second separate bridge structure, with each structure providing for one direction of traffic. The structure could be built to accommodate long-term demand with striping used to size it for near-term demand.
- The ramp terminals will have to be raised 3-5 feet.
- *Question: There is limited left-turn storage on the bridge between the ramp terminals. Could you pull the terminals closer together to create tight diamond?* We have the design working with signal timing (in terms of providing sufficient left turn storage), but we can look at that convention.
    - **Action Item: Project team to consider design with more closely spaced ramp terminals, with left-turn vehicles stored outside the interchange.**

ii. NW 31st Avenue, and NW 319th Street

- The horizontal alignment of NW 319th Street will be developed to tie-in with NW La Center Road across the bridge and avoid wetland impacts. The alignment will be further refined based on the bridge structure and placement of ramp terminal intersections.
- The alignment of NW 319th Street west of the interchange cannot be fully developed without discussions with the County.
    - *Comment: We can ask the County questions now, but they cannot provide engineering guidance.* Once we define the layouts further we can sit down with the County to work out an appropriate alignment of NW 319th Street to match the existing facilities on the west of the project.
- *Comment: WSDOT noted that another project was able to pay for the wetland impacts using Habitat Bank, LLC. This may be a possibility for this project as well if wetland impacts are unavoidable. Credits may be available in the next couple months.*
- *Question: Will the County road be on easement through tribal land?* No, the County will own the land.
- Once the layouts are further defined, we will thoroughly look at on-site circulation, weaving, and how to move vehicles in out and of the site.

b. Ramp terminals and frontage road intersections

i. Signals or roundabouts

- The project team presented a design with signals at the ramp terminal and frontage road intersections to accommodate projected 2016 traffic volumes (including the proposed Cowlitz Reservation development).

- *Question: What assumptions were made about left-turn utilization from the northbound off-ramp to NW La Center Road?* We will have to check this and do a sensitivity analysis.

- The project team presented a design with signals at the intersections that accommodates projected 2036 traffic volumes (including the proposed Cowlitz Reservation development).
  - The 2036 design requires widening the bridge structure and expanding the intersections. We typically widen to the outside on both sides, although this creates complications with the bridge structure and alignment.
- The project team presented design options to accommodate the projected 2016 and 2036 traffic volumes with roundabouts instead of signals.
  - A narrow (4-lane) bridge structure is required with roundabouts.
  - From a constructability and design perspective, roundabouts provide more flexibility.
  - The roundabout design can be expanded from 2016 to 2036 by widening to the inside (using the splitter islands). Additional turn lanes are also required on the ramps to accommodate 2036 traffic volumes.

c. Work session to sketch other potential concepts to consider

- No additional concepts were suggested during the meeting.
- **Action Item:** The project team requests any comments on the signal or roundabout layouts or any additional concepts in the next week.

5. Next Steps

- The project team will produce meeting minutes and distribute them with a copy of the PowerPoint in the next week.
- **Action Item:** The project team requests any additional interchange or corridor concepts in the next week.
- **Action Item:** The project team will distribute a matrix comparing the interchange concepts in the next couple of weeks.
- A second workshop is scheduled for April 2nd (10 am – noon)
  - Additional property negotiation discussions are necessary before this meeting can be held.
  - The meeting will discuss the alignment of NW Paradise Park Road.
    - *Question: Will the frontage roads be moved farther from interchange?* Yes, the question is how far. We will also maintain full access to the gas station in the NE quadrant of the interchange.
- The goal is to submit the TIA and IJR by May 2nd
  - The project team would like to receive and incorporate all comments before the submittal.

Other Items:

- Property Update

  - Carlson and Fudge property owners are cooperative
  - The preferred alternative is to use a westernly NW Paradise Park Road alignment, which would help provide full access to the gas station. However, the Landon property is not yet available.
- *Question: What is the timeline for conducting the bridge assessment?* The assessment will only be done if we intend to maintain the existing structure, which is likely only plausible with the roundabout design.
- *Comment: The City of La Center noted that they would like to see the potential frontage road alignments and impacts on City. They also noted that a diverging diamond interchange (DDI) design is likely to be unpopular, although left-turn movements on to I-5 have been a concern. As the City does not currently have someone to main traffic signals (and likely won't for a while), roundabouts work well.*
- *Comment: WSDOT noted that there would have to be a reason to use a DDI above other alternatives (i.e. roundabouts) and it would be less desirable. FHWA will have the final say on the interchange form.*
- *Question: Have you looked at operations for the SPUI?* We have not done a detailed analysis, but will look at farther. The bridge structure to accommodate a SPUI would be large and expensive, and the form would also create pedestrian and bike concerns due to the size of the intersection.
- *Question Can the design handle the flow in/out of the site during an event when traffic volumes in and out of the site are not balanced?* The project team will look into this and consider operations during special events (e.g., flagging).
- *Comment: From a guest perspective, roundabouts are likely more comfortable and attractive. The DDI form would have some negatives, and may lessen property values (as there may be concerns associated with the design).*
- Steve Horenstein provided an updated on the federal case, and noted that it is moving along. Recent news articles related to the case have not represented the situation accurately. Steve noted that we have a strategy for addressing the situation, and will likely lose approximately 4 months in the project timeline.

Appendix E July 14th, 2014 Alternatives Workshop Meeting Minutes

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
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ALTERNATIVES WORKSHOP #2: JULY 14, 2014 at 1:30 PM

Date: July 17, 2014 Project #: 12393.0

To: WSDOT Staff, City of La Center Staff, and Project Team

From: Marc Butorac, P.E. PTOE and Matt Hughart, AICP

Project: Cowlitz Reservation Development

Subject: Workshop Meeting Summary

This memorandum provides a summary of the action items developed as part of the July 14, 2014 Alternatives Workshop #2 held at WSDOT as well as high level meeting notes and a copy of the PowerPoint presentation. ***Please review these materials and let us know if we have inadvertently missed any of the requested action items or if you would like to see any additional points of clarification be provided in this meeting summary by Tuesday, July 22nd.*** We will be providing a written summary addressing the action items below by Friday, July 25th.

Summary of Action Items:

A. **Begin formal Coordination with Washington State Parks and Recreation**: Project team to reach out to officials at Paradise Point State Park regarding interchange and frontage road realignments.
B. **324th Avenue Connection to Paradise Park Road**: Project team to look at alternatives for enhancing this connection.
C. **2037 Design Cost Estimates**: Project team to prepare the cost estimates for the 2037 full buildout improvements under both the signal and roundabout options
D. **2037 No-Build Operation Analysis**: Project team to prepare operations without secondary improvements.
E. **Refined Roundabout Design Plan and discuss Bicycle & Pedestrian Accommodations:** Project team to prepare narrative and additional plans that illustrate pedestrian and bicycle accommodations for the roundabout designs.
F. **Preliminary List of Design Deviations**: Project team to prepare a preliminary list of design deviations and provide a brief narrative on the preliminary justifications to WSDOT for review prior to initial IJR submittal.
G. **Weekday PM Peak Analysis**: Project team to prepare a brief discussion and comparison of the weekday p.m. peak hour to the Friday p.m. peak hour in the IJR and TIA.

H. **31st Documentation for City Ownership**: Project team to prepare documentation of 31st ROW

I. **Work Session Response Packet:** Project team to prepare a response packet addressing these action items and submit to WSDOT and City of La Center.

Meeting Notes

1.) Introductions
- See attached attendance list and copy of the presentation.
- Clark County staff were invited, but chose not to attend this Workshop.
  - ***Comment:*** *IJR Policy Point requires coordination with all impacted agencies. Clark County coordination issue will need to be addressed in IJR.*

2.) Project Update
- Project Schedule
  - DRAFT IJR and TIA on-going – targeting September submittal
  - Re-Evaluation Report on-going – targeting October submittal
  - SEPA/NEPA review – targeting January 2015 completion
  - Final Interchange Design (pending review and approval) – Jan 2015 to Jan 2016
  - Construction - ~Spring 2016 to ~Fall 2017
- Property Acquisition
  - Property acquisition and options are being acquired to accommodate frontage road realignments

3.) Interchange Form Alternatives Analysis
- Diamond form based on March 2013 Work Shop.
- Developing a new overpass alignment south of existing structure for construction phasing and maintenance of traffic.
- New overpass profile approximately 5 feet higher than existing.
- Ramp Modifications
  - NB Dual Lane Exit (similar to Ridgefield)
  - SB Dual Lane Entrance at Terminal with merge prior to Mainline merge
  - ***Comment:*** *Need to produce a list of design deviations. WSDOT staff would like to review them prior to being included in IJR.*
- Dual NB off-ramp will have impacts to existing Paradise Park Road alignment and likely require some mitigation.
- ***Comment:*** *Analysis needs to show 2017 and 2037 no-build operations.*

4.) Frontage Road Alternatives Analysis
- Private acquisition of property for roadway realignment – no eminent domain
- 8 frontage road alignment concepts were developed
- Preferred frontage road alignment – Option E2
  - ***Comment:*** *More analysis and discussion is needed regarding 324th connection to Paradise Park Road.*
  - ***Comment:*** *Project team should begin discussions with Paradise Park State Park officials regarding proposed Paradise Park Road realignment.*

5.) Ramp Terminal Control Analysis
- Signalized and Roundabout scenarios being analyzed
- 2017 and 2037 layouts were presented

- ***Comment***: Are alternatives being driven solely by projected volumes? No, staging, maintaining adjacent parcel sizes, and construction issues are also being considered.

- 2017 Signalization – Preliminary Cost of $24.2M (±20%)
- 2017 Roundabout – Preliminary Cost of $25.6M (±20%)
    - ***Comment:*** *Cost estimates should be developed for 2037 build scenarios to determine how long-term costs compare. Long-term signalization may be higher than long-term roundabout.*
- Preliminary Preferred Ramp Terminal Control – Roundabouts
    - Better Near- and Long-term Operations
    - Overpass width set in the near-term
    - Safety benefits
    - Aesthetics / Gateway Treatment
        - ***Comment:*** *Need to assess pedestrian and bicycle accommodation for roundabout designs*
        - ***Comment:*** *Need to assess La Center Road/Realigned Paradise Park intersection as a signal with roundabouts at the ramp terminals.*

6.) 319th Alignment Alternatives
- Existing 319th is an easement
    - ***Comment:*** *Send WSDOT documentation of La Center boundary along 31st.*
- Preferred new southerly alignment to accommodate more efficient east-west through travel.
- New alignment avoids wetlands

7.) Next Steps
- WSDOT staff to review memos submitted as part of the Workshop and provide project team comments by end of July.
- Project team will prepare a response memo addressing Workshop comments.
- Submittal of Draft IJR and TIA – September 1st
- Tentative date for next meeting is August 6th at 1:30 p.m.

Appendix F Technical Memorandum: Interchange Evaluation – Intersection Traffic Control

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
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TECHNICAL MEMORANDUM
NW La Center Road/I-5 Interchange Improvement Project
Signalized Interchange Evaluation

Date: February 23rd, 2015

Project #: 12393

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Copy: Project Team (i.e., CH2MHILL, Olson Engineering, and BergerABAM)

This memorandum presents the intersection analysis findings and design alternatives for intersection control at the NW La Center Road/Interstate 5 (I-5) interchange. Specifically, the memorandum assesses the lane configurations and storage lengths needed to support projected future traffic conditions with traffic signals at the interchange ramp terminals and frontage road intersections. The results of this assessment were used to inform the interchange improvement recommendations included in the NW La Center Road/I-5 Interchange Justification Report (IJR).

METHODOLOGY AND ASSUMPTIONS

The operational analysis results presented in this memorandum assess intersection geometric needs for signalized intersection control at the following intersections:

- NW 319th Street/NW 31st Avenue
- NW La Center Road/I-5 Southbound Ramp Terminal
- NW La Center Road/I-5 Northbound Ramp Terminal
- NW La Center Road/NW Paradise Park Road

These intersections were analyzed for two horizon years during two peak hour conditions[1]:

- Opening Year 2017 Weekday AM and Weekend Peak[2] Hours
- Future Year 2037 Weekday AM and Weekend Peak[2] Hours

[1]The weekday AM and weekend (Friday PM) peak hours are provided because they are the time periods with directional volumes controlling design decisions. The weekday PM peak hour is documented in the IJR for the preferred roundabout corridor alternative as currently scoped; however, this time period has lower critical movement volumes compared to the weekend peak hour (Friday PM peak) and thus was excluded from this evaluation.

[2]The Friday PM peak hour represents the development's weekend peak hour and will be referred to as "Weekend Peak Hour".

Analysis Assumptions

The following key assumptions were made in preparing the analysis:

- The need to mitigate the four intersections is identified in the NW La Center Road/I-5 Interchange Improvement Project Interchange Justification Report (IJR). The IJR highlights the intersection and interchange improvement needs for accommodating trips traveling to the Cowlitz Reservation Development during the critical weekend peak hour and accommodating eastbound trips from the City of La Center to I-5 during the AM peak hour.
- The IJR provides the methodology for developing 2017 and 2037 traffic volumes.
- All four analysis scenarios include site-generated traffic from full build-out of the proposed Cowlitz Reservation Development. The site-generated traffic was added to 2017 and 2037 background traffic volumes to arrive at the total traffic volumes.
- With the project, NW 31st Avenue will be realigned and the intersection with NW 319th Street moved approximately 600 feet (centerline-to-centerline) west of the southbound ramp terminal.
- With the project, NW 319th Street will be relocated approximately 350 feet south of its current alignment.
- With the project, Paradise Park Road will be realigned and the intersection with NW La Center Road moved approximately 450 feet (centerline-to-centerline) east of the northbound ramp terminal.
    - This analysis assumes the existing gas station driveway near the Paradise Park Road/La Center Road intersection will operate as a right-in/right-out driveway. Therefore, all left turning traffic into and out of the gas station would use the Paradise Park Road /La Center Road intersection.
    - The IJR identifies traffic volumes at this intersection do not meet signal warrants under 2017 traffic conditions, but do meet signal warrants under 2037 traffic conditions. This evaluation assumes a stop controlled (northbound and southbound approaches) intersection in 2017, and a signalized intersection in 2037.
- A detailed site plan for the Cowlitz Reservation Development was not available at the time this evaluation was prepared; therefore, the analysis presented in this technical memorandum is predicated on the assumption that the two site accesses on NW 319th Street results in a roughly even distribution of site traffic with 50% entering and exiting the site at the NW 319th Street/NW 31st Avenue (east access) intersection, and 50% entering and exiting the site at the west access along 319th Street. The 50/50 trip distribution split also translates to a 50/50 lane utilization for the northbound left-turn lanes at the NW La Center Road/NB Ramp Terminal.

Analysis Methodology

The traffic signal intersection operational analyses presented in this technical memorandum were prepared following *Highway Capacity Manual 2010* (HCM 2010) analysis procedures using Synchro 8 software. Synchro 8 analyzes individual signalized intersections as well as coordinated traffic signal timings along a corridor. Queuing analyses reflects the average 95th percentile queues obtained from five simulation runs using SimTraffic software. Queue lengths are rounded up to the nearest 25 feet.

SIGNALIZED CORRIDOR ASSESSMENT

The following sections assess intersection operations and queueing on the corridor with signal control at the ramp terminals and frontage road intersections. The analysis was utilized to determine the lane configurations and storage necessary to accommodate future traffic projections.

Opening Year 2017 Build (Signalized) Total Traffic Conditions

The build total traffic conditions analysis forecasts how the study intersections will operate with the traffic generated by the Cowlitz Reservation Development assuming traffic signals and associated lane widenings are installed at the intersection of NW 31st Avenue/NW 319th Street/East Site Access and the I-5 ramp terminals. The traffic volumes at the intersection of NW La Center Road/NW Paradise Park Road are not sufficient to warrant signalization, so the intersection was modeled with two-way stop control.

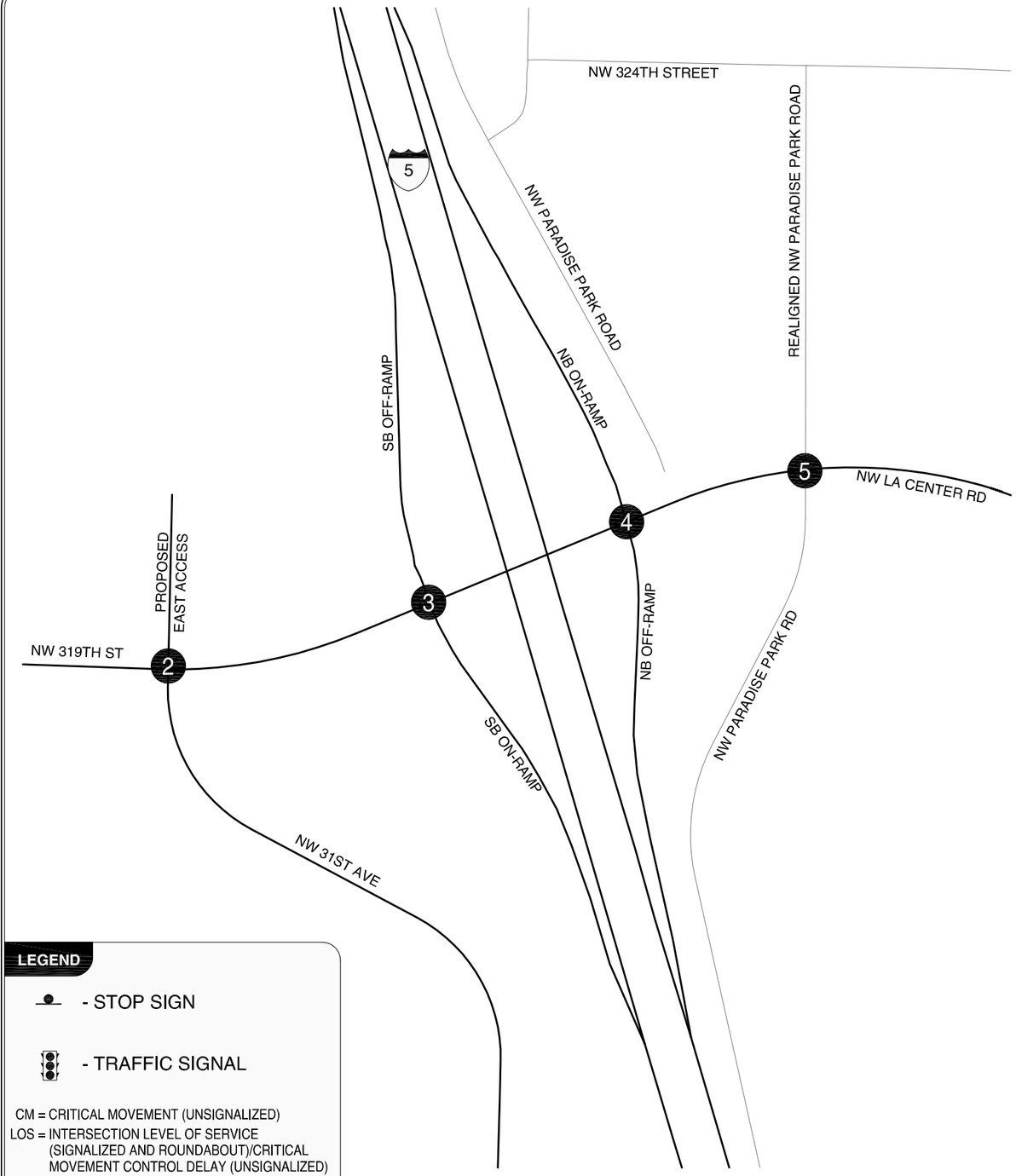
Figure 1 illustrates the assumed potential 2017 build lane configurations. Figure 2 illustrates the 2017 signalized design concept at the study intersections. Table 1 provides level of service (LOS) results for the signalized intersections during the weekday AM and weekend peak hours (also shown in Figure 1).

Appendix "A" includes the 2017 build total intersection operations analysis worksheets.

Table 1 2017 Signalized Intersection Operations (Build)

Intersection	Operating Standard	Weekday AM Peak Hour	Weekend Peak Hour
NW 319th Street/NW 31st Avenue	D	A	B
NW La Center Road/I-5 SB Ramp Terminal	C	A	A
NW La Center Road/I-5 NB Ramp Terminal	C	B	B
NW La Center Road/NW Paradise Park Road	E	E	E

As shown in Table 1, all intersections satisfy the LOS criteria.



LEGEND

- STOP SIGN

- TRAFFIC SIGNAL

CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED AND ROUNDABOUT)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED AND ROUNDABOUT)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

(NO SCALE)

	Site East Access/ NW 31st Ave/ NW 319th St	I-5 SB Ramp/ NW 319th St	I-5 NB Ramp/ NW La Center Rd	NW Paradise Park Rd/ NW La Center Rd
WEEKDAY AM PEAK HOUR	2	3	4	5
	<5 / 5 / 110 <5 / 155 / 15 LOS=A Del=6.3 V/C=0.32 (NB) 145 / 190 / 50 5 / 5 / 60	25 / 25 / 120 120 / 225 LOS=A Del=9.7 V/C=0.87 (WBL) 360 / 535	75 / 160 LOS=B Del=17.3 V/C=0.85 (NBR) 155 / 605 290 / 5 / 320	65 / 50 / 40 90 / 385 / 5 CM=SB LOS=E Del=48.2 V/C=0.58 10 / 630 / 10 10 / 5 / 5
WEEKEND PEAK HOUR	2	3	4	5
	<5 / 10 / 330 <5 / 385 / 15 LOS=B Del=15.7 V/C=0.84 (SBL) 495 / 555 / 75 5 / 15 / 65	140 / 170 145 / 635 LOS=A Del=8.6 V/C=0.77 (SBL) 980 / 375	75 / 245 LOS=B Del=14.8 V/C=0.66 (NBR) 125 / 430 925 / 5 / 565	35 / 50 80 / 720 / 5 CM=NB LOS=E Del=37.4 V/C=0.15 10 / 455 / 5 10 / 5 / 5

2017 BUILD TOTAL TRAFFIC CONDITIONS, LANE CONFIGURATIONS, & TRAFFIC CONTROL DEVICES
WEEKDAY AM & WEEKEND PEAK HOURS
LA CENTER, WASHINGTON

FIGURE 1

CONCEPTUAL

NW LA CENTER ROAD

NW 319TH ST

NW 31ST AVE

I-5 SB

I-5 NB

NW PARADISE PARK ROAD

STOP

STOP

0 60 120 180 240

SCALE: 1"=120'

2017 SIGNAL DESIGN CONCEPT
LA CENTER, WASHINGTON

FIGURE **2**

Kittelson & Associates, Inc.
Transportation Engineering / Planning

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Table 2 provides the associated projected 95th percentile queue lengths. Available storage lengths are provided based on the conceptual design illustrated in Figure 2.

Table 2 2017 Signalized Intersection 95th Percentile Queue Lengths (feet) (Build)

Intersection	Approach Lane	Weekday AM Peak Hour	Weekend Peak Hour	Available Storage	Adequate Storage?
NW 319th Street/ NW 31st Avenue (Traffic Signal)	SB Left	75	200	225	Yes
	SB Through/Right	25	25	300	Yes
	EB Left	25	25	150	Yes
	EB Through/Right	75	175	500+	Yes
	NB Left	25	25	100	Yes
	NB Through/Right	75	75	500+	Yes
	WB Left	75	125	325	Yes
	WB Through	100	300	550[1]	Yes
	WB Right	75	150	550[1]	Yes
NW La Center Road/ I-5 SB Ramp Terminal (Traffic Signal)	SB Through/Left	150	150	500+	Yes
	SB Right	25	100	425	Yes
	EB Through	175	125	550[1]	Yes
	WB Through (right lane)	125	150	450[1]	Yes
	WB Through (middle lane)	150	125	450[1]	Yes
	WB Left	150	50	225	Yes
NW La Center Road/ I-5 NB Ramp Terminal (Traffic Signal)	NB Left (left lane)	150	200	300	Yes
	NB Left (middle lane)	125	250	500+	Yes
	NB Through/Right	150	200	500+	Yes
	WB Through	200	200	425[1]	Yes
	WB Through/Right	100	125	200	Yes
	EB Left	125	100	175	Yes
	EB Through	75	100	450[1]	Yes
NW La Center Road/ Paradise Park Road (Two-Way Stop-Control)	SB	125	75	125	Yes
	EB Left	100	75	125	Yes
	NB	50	75	15	Yes
	WB Left	25	25	125	Yes

[1]Distance to adjacent intersection
EB=Eastbound, NB=Northbound, SB=Southbound, WB=Westbound

Table 2 shows the projected 95th percentile queues can be accommodated within the available storage areas.

Future Year 2037 Total Traffic Conditions

An operational analysis was conducted for the horizon year 2037 to ensure the proposed interchange area improvements identified under the year 2017 do not preclude future improvement needs.

2037 No-Build Analysis

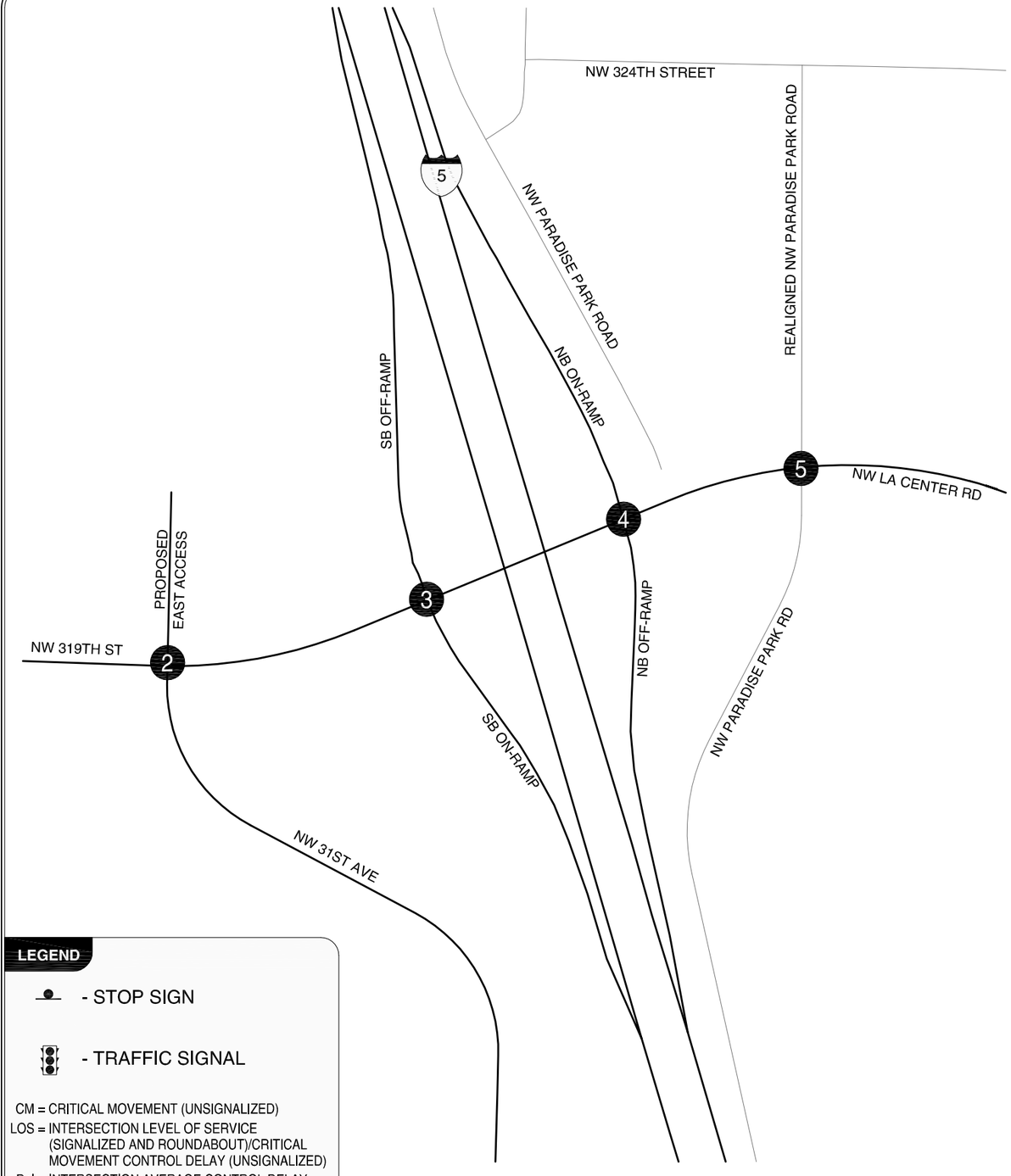
A 2037 "No-Build" analysis was conducted to determine what infrastructure improvements may be needed beyond those identified in the 2017 total signalized build analysis. The operations at the study intersections in 2037 with the proposed Cowlitz Reservation Development and 2017 signalized infrastructure improvements are provided in Table 3 and Figure 3.

Appendix "B" includes the 2037 no-build total intersection operations analysis worksheets.

Table 3 2037 Signalized Intersection Operations (No-Build)

Intersection	Operating Standard	Weekday AM Peak Hour	Weekend Peak Hour
NW 319th Street/NW 31st Avenue	D	A	C
NW La Center Road/I-5 SB Ramp Terminal	D	B	B
NW La Center Road/I-5 NB Ramp Terminal	D	C	C
NW La Center Road/NW Paradise Park Road	E	F	F

As shown in Table 3, the NW 319th Street/NW 31st Avenue, NW La Center Road/Southbound Ramp, and NW La Center Road/Northbound Ramp intersections satisfy the LOS criteria. Although these intersections meet the overall LOS criteria, some intersection approaches are near capacity during the weekday AM and weekend peak periods. In addition, considerations should be made for additional lanes at these intersections as described in the next section.

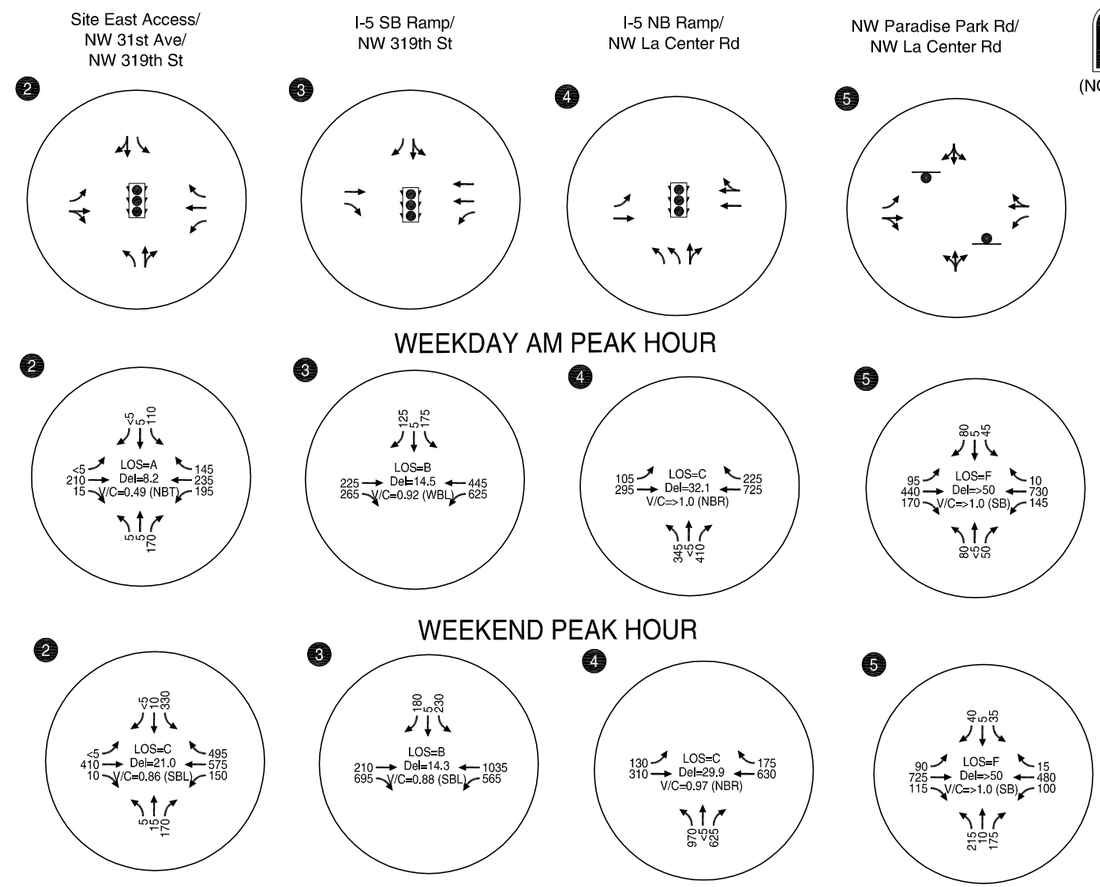


LEGEND

- STOP SIGN

- TRAFFIC SIGNAL

CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED AND ROUNDABOUT)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED AND ROUNDABOUT)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO



2037 NO-BUILD (WITH 2017 INFRASTRUCTURE) TOTAL TRAFFIC CONDITIONS, LANE CONFIGURATIONS, & TRAFFIC CONTROL DEVICES
WEEKDAY AM & WEEKEND PEAK HOURS
LA CENTER, WASHINGTON

FIGURE 3

2037 Build Analysis

While the 319th Street/31st Avenue and ramp terminal intersections meet the overall LOS criteria, the long-term 2037 design should consider the following improvement measures (beyond those needed in 2017) to mitigate for long-term local and regional growth not accounted for in the RTC travel demand models and not associated with the Cowlitz Reservation Development:

- a second eastbound and westbound through lane along NW 319th Street west of the NW 31st Avenue intersection;
- a second eastbound through lane on the overpass between the I-5 ramp terminal intersections;
- a second westbound and eastbound left-turn lane on the overpass between the I-5 ramp terminal intersections;
- a traffic signal at NW La Center Road/NW Paradise Park Road with two thru lanes on the eastbound and westbound approaches.

Figure 4 illustrates the assumed potential 2037 build lane configurations. Figure 5 illustrates the 2037 signalized design concept at the study intersection. Table 4 provides level of service (LOS) results for the signalized intersections during the weekday AM and weekend peak hours (also shown in Figure 4).

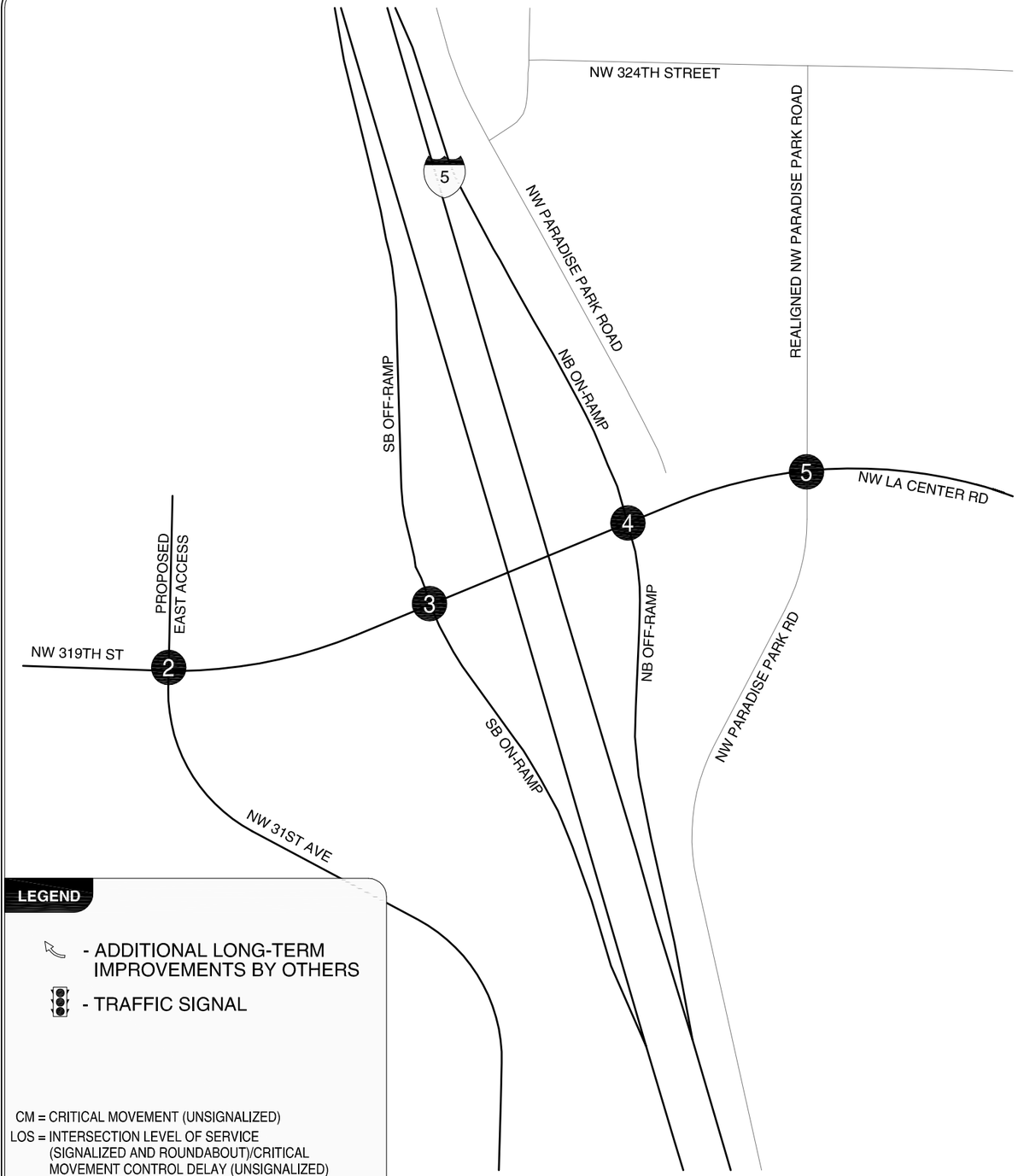
Appendix "C" includes the 2037 build total intersection operations analysis worksheets.

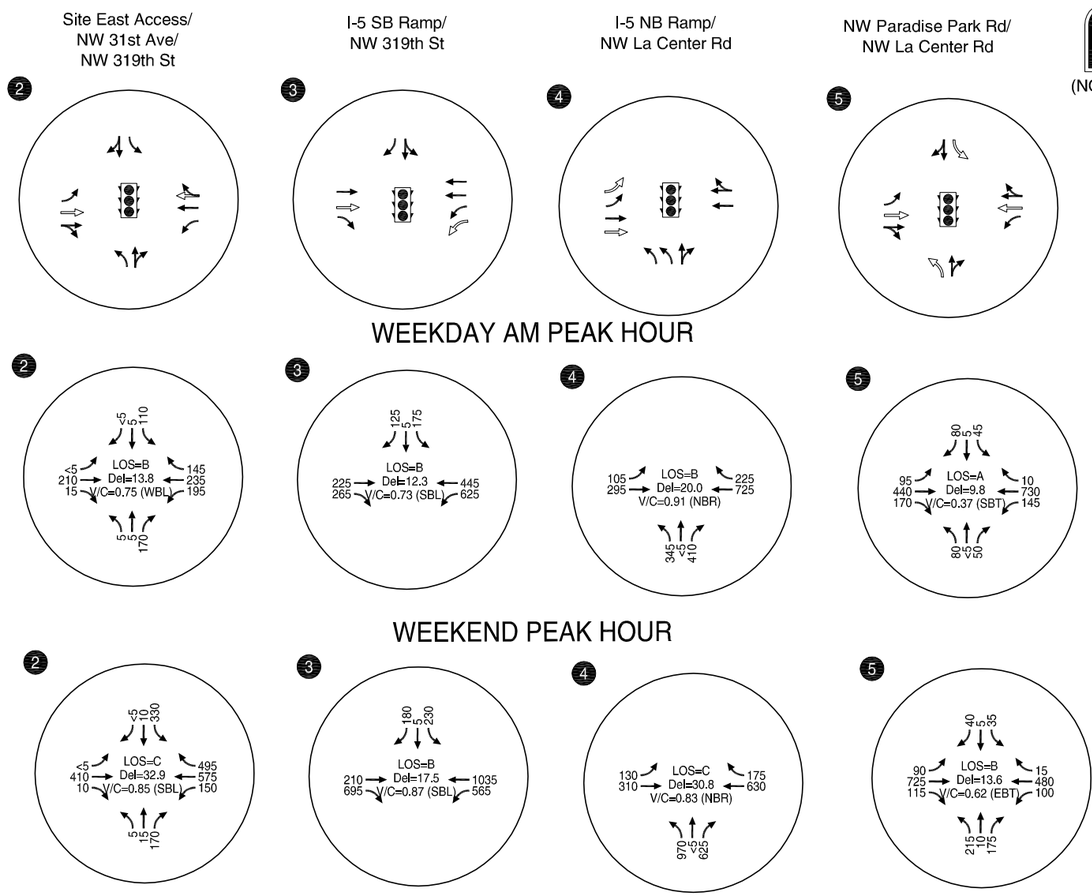
Table 4 2037 Signalized Intersection Operations (Build)

Intersection	Operating Standard	Weekday AM Hour	Weekend Hour
NW 319th Street/NW 31st Avenue	D	B	C
NW La Center Road/I-5 SB Ramp Terminal	D	B	B
NW La Center Road/I-5 NB Ramp Terminal[1]	D	B	C
NW La Center Road/NW Paradise Park Road	D	A	B

[1]Lane utilization at this intersection assumed all westbound traffic turning left onto the I-5 southbound on-ramp at the NW 319th Street/I-5 SB Ramp intersection, would line up in the westbound left/through lane (left lane) at the NW La Center Road/I-5 NB Ramp Terminal.

As shown in Table 4, all intersections are projected to operate acceptably in 2037 with signal control and the lane configurations shown in Figure 4. Table 5 provides projected 95th percentile queue lengths. Available storage lengths are provided based on the conceptual design illustrated in Figure 5.





LEGEND

- ADDITIONAL LONG-TERM IMPROVEMENTS BY OTHERS
- TRAFFIC SIGNAL

CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED AND ROUNDABOUT)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED AND ROUNDABOUT)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

2037 BUILD TOTAL TRAFFIC CONDITIONS, LANE CONFIGURATIONS, & TRAFFIC CONTROL DEVICES
WEEKDAY AM, WEEKDAY PM, & WEEKEND PEAK HOURS
LA CENTER, WASHINGTON

FIGURE 4

CONCEPTUAL

NW LA CENTER ROAD

NW 319TH ST

NW 31ST AVE

I-5 SB

I-5 NB

NW PARADISE PARK ROAD

0 60 120 180 240

SCALE: 1"=120'

2037 SIGNAL DESIGN CONCEPT
LA CENTER, WASHINGTON

FIGURE **5**

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Transportation Engineering / Planning

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Table 5 2037 Signalized Intersection 95th Percentile Queue Lengths (feet) (Build)

Intersection	Approach Lane	Weekday AM Peak Hour	Weekend Peak Hour	Available Storage	Adequate Storage?
NW 319th Street/ NW 31st Avenue (Traffic Signal)	SB Left	100	350	350	Yes
	SB Through/Right	50	50	300	Yes
	EB Left	25	25	150	Yes
	EB Through	75	150	500+	Yes
	EB Through/Right	100	300	500+	Yes
	NB Left	25	25	100	Yes
	NB Through/Right	100	175	500+	Yes
	WB Left	150	175	375	Yes
	WB Through	75	225	550[1]	Yes
	WB Through/Right	125	325	550[1]	Yes
NW 319th Street/ I-5 SB Ramp Terminal (Traffic Signal)	SB Through/Left	225	250	500+	Yes
	SB Right	75	150	425	Yes
	EB Through	200	175	550[1]	Yes
	EB Through	150	100	550[1]	Yes
	WB Through	100	150	450[1]	Yes
	WB Through	125	200	450[1]	Yes
	WB Left	125	50	225	Yes
	WB Left	150	75	225	Yes
NW La Center Road/ I-5 NB Ramp Terminal (Traffic Signal)	NB Left	150	350	350	Yes
	NB Left	200	400	500+	Yes
	NB Through/Right	175	375	500+	Yes
	WB Through	250	225	425[1]	Yes
	WB Through/Right	150	250	425[1]	Yes
	EB Left	100	75	175	Yes
	EB Left	125	100	175	Yes
	EB Through	75	75	450[1]	Yes
	EB Through	100	100	450[1]	Yes
NW La Center Road/ NW Paradise Park Road (Traffic Signal)	SB Left	100	75	175	Yes
	SB Through/Right	75	50	500+	Yes
	EB Left	75	75	175	Yes
	EB Through	100	175	400[1]	Yes
	EB Through/Right	150	200	400[1]	Yes
	NB Left	100	175	125	Yes
	NB Through/Right	100	100	500+	Yes
	WB Left	125	100	100	Yes
	WB Through	150	150	500+	Yes
	WB Through/Right	125	125	275	Yes

[1]Distance to adjacent intersection
EB=Eastbound, NB=Northbound, SB=Southbound, WB=Westbound

Table 5 shows the projected 95th percentile queues can be accommodated within the available storage areas.

CONSTRUCTION PHASING CONSIDERATIONS

Preliminary construction phasing insights are summarized below.

I-5 Overpass Alignment Options

There are two options for the NW 319th Street-NW La Center Road alignment across the I-5 overpass; each with its own bridge construction approach.

- Option #1 – Maintain existing NW 319th Street alignment (west side of I-5). Half of the new bridge (to accommodate 2017 traffic conditions) will be built to the south of the existing bridge. During construction, traffic will then be shifted onto the new bridge, while the existing bridge is being removed and the north half of the bridge is being completed. To accommodate future 2037 traffic conditions the bridge will be widening to the north.

- Option #2 – Realign NW 319th Street to the south of its current location. The entire new bridge (to accommodate 2017 traffic conditions) will be built to the south of the existing bridge. To accommodate future 2037 traffic conditions the bridge will be widened to the north.

For the signalized option, construction phasing between 2017 and 2037 would be planned so that future 2037 roadway needs would be widened to the outside from the 2017 configuration. This phased implementation approach will minimize "throw-away" work and outlines an approach to locate and construct signal equipment to accommodate the ultimate configuration, while serving the near-term configuration with narrower cross sections. Special attention should be given to drainage (especially with the installation of curbed facilities) to minimize reconstruction.

Existing on-ramp and off-ramp alignments could be maintained, reducing overall impacts to the project. All ramp widening could be accomplished by maintaining the inside edge of the existing ramp and widening to the outside based on capacity needs. However, the geometry of the northbound off- and southbound on-ramps will be revisited to address existing undesirable horizontal alignments (i.e., radius of curve closets to the freeway).

CONCLUSIONS

Based on the operations and queueing assessment presented within this memorandum, signals can be constructed at the ramp terminals and frontage roads of the NW La Center Road/I-5 Interchange to support projected future traffic conditions. There are advantages and constraints associated with this option. For one, signals have the advantage of being easier to construct while maintaining traffic during construction.

The information presented in this memorandum was used to inform the decision process and selection of traffic control as part of the NW La Center Road/I-5 Interchange IJR.

Appendix A 2017 Build Total Intersection Operations Analysis Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	155	15	49	192	146	5	5	78	110	5	5
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.98		0.98	0.99		0.99	0.99		0.99
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
Adj Sat Flow, veh/h/ln	1900	1833	1900	1712	1863	1881	1900	1562	1900	1881	1881	1900
Adj Flow Rate, veh/h	5	155	15	49	192	146	5	5	78	110	5	5
Adj No. of Lanes	1	1	0	1	1	1	1	1	0	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	4	4	11	2	1	0	1	1	1	1	1
Cap, veh/h	608	558	54	629	633	532	606	16	247	522	171	171
Arrive On Green	0.34	0.34	0.34	0.34	0.34	0.34	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	1046	1642	159	1095	1863	1564	1410	80	1244	1310	858	858
Grp Volume(v), veh/h	5	0	170	49	192	146	5	0	83	110	0	10
Grp Sat Flow(s),veh/h/ln	1046	0	1801	1095	1863	1564	1410	0	1323	1310	0	1717
Q Serve(g_s), s	0.1	0.0	1.5	0.7	1.6	1.5	0.1	0.0	1.2	1.7	0.0	0.1
Cycle Q Clear(g_c), s	1.7	0.0	1.5	2.2	1.6	1.5	0.2	0.0	1.2	2.9	0.0	0.1
Prop In Lane	1.00		0.09	1.00		1.00	1.00		0.94	1.00		0.50
Lane Grp Cap(c), veh/h	608	0	612	629	633	532	606	0	263	522	0	341
V/C Ratio(X)	0.01	0.00	0.28	0.08	0.30	0.27	0.01	0.00	0.32	0.21	0.00	0.03
Avail Cap(c_a), veh/h	1459	0	2077	1520	2149	1804	1951	0	1526	1773	0	1980
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.9	0.0	5.2	6.0	5.3	5.2	7.1	0.0	7.4	8.6	0.0	7.0
Incr Delay (d2), s/veh	0.0	0.0	0.2	0.1	0.3	0.3	0.0	0.0	0.7	0.2	0.0	0.0
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	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.7	0.2	0.8	0.6	0.0	0.0	0.5	0.6	0.0	0.1
LnGrp Delay(d),s/veh	5.9	0.0	5.5	6.1	5.5	5.5	7.1	0.0	8.1	8.8	0.0	7.0
LnGrp LOS	A		A	A	A	A	A		A	A		A
Approach Vol, veh/h		175			387			88			120	
Approach Delay, s/veh		5.5			5.6			8.0			8.7	
Approach LOS		A			A			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		12.4		9.3		12.4		9.3
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0
Max Green Setting (Gmax), s		25.0		25.0		25.0		25.0
Max Q Clear Time (g_c+I1), s		3.7		4.9		4.2		3.2
Green Ext Time (p_c), s		2.6		0.8		2.6		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	6.3
HCM 2010 LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	118	225	535	361	0	0	0	0	118	4	25
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	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
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1583	1863	1827	1863	0				1900	1664	1759
Adj Flow Rate, veh/h	0	118	0	535	361	0				118	4	25
Adj No. of Lanes	0	1	1	1	2	0				0	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Percent Heavy Veh, %	0	20	2	4	2	0				8	50	8
Cap, veh/h	0	258	258	614	2279	0				154	5	150
Arrive On Green	0.00	0.16	0.00	0.59	1.00	0.00				0.10	0.10	0.10
Sat Flow, veh/h	0	1583	1583	1740	3632	0				1535	52	1495
Grp Volume(v), veh/h	0	118	0	535	361	0				122	0	25
Grp Sat Flow(s),veh/h/ln	0	1583	1583	1740	1770	0				1587	0	1495
Q Serve(g_s), s	0.0	2.6	0.0	10.2	0.0	0.0				2.9	0.0	0.6
Cycle Q Clear(g_c), s	0.0	2.6	0.0	10.2	0.0	0.0				2.9	0.0	0.6
Prop In Lane	0.00		1.00	1.00		0.00				0.97		1.00
Lane Grp Cap(c), veh/h	0	258	258	614	2279	0				160	0	150
V/C Ratio(X)	0.00	0.46	0.00	0.87	0.16	0.00				0.76	0.00	0.17
Avail Cap(c_a), veh/h	0	485	485	1600	4792	0				689	0	649
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.99	0.00	0.93	0.93	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	14.8	0.0	7.3	0.0	0.0				17.2	0.0	16.1
Incr Delay (d2), s/veh	0.0	1.2	0.0	3.7	0.0	0.0				7.4	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.2	0.0	5.2	0.0	0.0				1.6	0.0	0.3
LnGrp Delay(d),s/veh	0.0	16.1	0.0	11.0	0.0	0.0				24.6	0.0	16.6
LnGrp LOS		B		B	A					C		B
Approach Vol, veh/h		118			896						147	
Approach Delay, s/veh		16.1			6.6						23.2	
Approach LOS		B			A						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	59.7	11.4		8.9		71.1		
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Green Setting (Gmax), s	36.0	12.0		17.0		53.0		
Max Q Clear Time (g_c+I1), s	12.2	4.6		4.9		2.0		
Green Ext Time (p_c), s	1.7	1.6		0.0		3.1		

Intersection Summary	
HCM 2010 Ctrl Delay	9.7
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	77	159	0	0	604	156	292	4	321	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	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			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1624	1624	0	0	1781	1900	1881	1767	1900			
Adj Flow Rate, veh/h	77	159	0	0	604	156	292	4	321			
Adj No. of Lanes	1	1	0	0	2	0	2	1	0			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Percent Heavy Veh, %	17	17	0	0	4	4	1	50	1			
Cap, veh/h	401	997	0	0	1637	422	887	5	379			
Arrive On Green	0.61	0.61	0.00	0.00	0.61	0.61	0.26	0.26	0.26			
Sat Flow, veh/h	613	1624	0	0	2754	687	3476	19	1486			
Grp Volume(v), veh/h	77	159	0	0	383	377	292	0	325			
Grp Sat Flow(s),veh/h/ln	613	1624	0	0	1692	1660	1738	0	1505			
Q Serve(g_s), s	5.5	3.2	0.0	0.0	8.6	8.7	5.2	0.0	15.7			
Cycle Q Clear(g_c), s	14.2	3.2	0.0	0.0	8.6	8.7	5.2	0.0	15.7			
Prop In Lane	1.00		0.00	0.00		0.41	1.00		0.99			
Lane Grp Cap(c), veh/h	401	997	0	0	1039	1020	887	0	384			
V/C Ratio(X)	0.19	0.16	0.00	0.00	0.37	0.37	0.33	0.00	0.85			
Avail Cap(c_a), veh/h	401	997	0	0	1039	1020	1045	0	452			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.79	0.79	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	10.9	6.3	0.0	0.0	7.4	7.4	23.2	0.0	27.1			
Incr Delay (d2), s/veh	0.8	0.3	0.0	0.0	1.0	1.0	0.2	0.0	12.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.0	1.5	0.0	0.0	4.2	4.3	2.5	0.0	7.8			
LnGrp Delay(d),s/veh	11.7	6.6	0.0	0.0	8.4	8.4	23.4	0.0	39.3			
LnGrp LOS	B	A			A	A	C		D			
Approach Vol, veh/h		236			760			617				
Approach Delay, s/veh		8.3			8.4			31.8				
Approach LOS		A			A			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		55.5				55.5		24.5
Change Period (Y+Rc), s		5.0				5.0		5.0
Max Green Setting (Gmax), s		47.0				47.0		23.0
Max Q Clear Time (g_c+I1), s		16.2				10.7		17.7
Green Ext Time (p_c), s		7.6				7.9		1.8

Intersection Summary	
HCM 2010 Ctrl Delay	17.3
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	91	384	5	10	628	9	10	0	5
Conflicting Peds, #/hr	0	0	0	5	0	5	0	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	200	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	42	13	0	25	3	20	14	0	25
Mvmt Flow	91	384	5	10	628	9	10	0	5

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	642	0	0	394	0	0	1266	1236	397
Stage 1	-	-	-	-	-	-	574	574	-
Stage 2	-	-	-	-	-	-	692	662	-
Critical Hdwy	4.52	-	-	4.35	-	-	7.24	6.5	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.24	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.24	5.5	-
Follow-up Hdwy	2.578	-	-	2.425	-	-	3.626	4	3.525
Pot Cap-1 Maneuver	778	-	-	1050	-	-	138	178	605
Stage 1	-	-	-	-	-	-	483	506	-
Stage 2	-	-	-	-	-	-	415	462	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	778	-	-	1046	-	-	102	154	600
Mov Cap-2 Maneuver	-	-	-	-	-	-	102	154	-
Stage 1	-	-	-	-	-	-	425	445	-
Stage 2	-	-	-	-	-	-	344	456	-

Approach	EB	WB	NB
HCM Control Delay, s	1.9	0.1	33.5
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	141	778	-	-	1046	-	-	186
HCM Lane V/C Ratio	0.106	0.117	-	-	0.01	-	-	0.581
HCM Control Delay (s)	33.5	10.2	-	-	8.5	-	-	48.2
HCM Lane LOS	D	B	-	-	A	-	-	E
HCM 95th %tile Q(veh)	0.3	0.4	-	-	0	-	-	3.1

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	39	4	65
Conflicting Peds, #/hr	5	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	69	100	30
Mvmt Flow	39	4	65

Major/Minor	Minor2		
Conflicting Flow All	1234	1234	638
Stage 1	658	658	-
Stage 2	576	576	-
Critical Hdwy	7.79	7.5	6.5
Critical Hdwy Stg 1	6.79	6.5	-
Critical Hdwy Stg 2	6.79	6.5	-
Follow-up Hdwy	4.121	4.9	3.57
Pot Cap-1 Maneuver	113	116	430
Stage 1	359	339	-
Stage 2	403	375	-
Platoon blocked, %			
Mov Cap-1 Maneuver	100	101	428
Mov Cap-2 Maneuver	100	101	-
Stage 1	316	334	-
Stage 2	351	330	-

Approach	SB
HCM Control Delay, s	48.2
HCM LOS	E

Minor Lane/Major Mvmt

Intersection: 102: NW 31st Ave/East Access & NW 319th St

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (ft)	28	92	76	140	102	28	78	94	23
Average Queue (ft)	4	33	25	40	35	3	35	41	6
95th Queue (ft)	19	71	61	97	76	17	67	74	22
Link Distance (ft)		650		532	532		1521		545
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	300		325			300		300	
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 103: I-5 SB On Ramp/I-5 SB Off Ramp & NW 319th St/NW La Center Rd

Movement	EB	WB	WB	WB	SB	SB
Directions Served	T	L	T	T	LT	R
Maximum Queue (ft)	182	180	161	147	165	45
Average Queue (ft)	85	78	80	62	74	14
95th Queue (ft)	161	139	141	119	135	35
Link Distance (ft)	532		502	502	656	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		225				400
Storage Blk Time (%)		0				
Queuing Penalty (veh)		0				

Intersection: 104: I-5 NB Off Ramp/I-5 NB On Ramp & NW La Center Rd

Movement	EB	EB	WB	WB	NB	NB	NB
Directions Served	L	T	T	TR	L	L	TR
Maximum Queue (ft)	143	109	215	120	143	155	172
Average Queue (ft)	64	25	119	40	77	71	76
95th Queue (ft)	123	74	203	89	133	123	132
Link Distance (ft)	502	502	211	211		810	810
Upstream Blk Time (%)			0				
Queuing Penalty (veh)			2				
Storage Bay Dist (ft)					350		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 105: NW Paradise Park Rd & NW La Center Rd

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	115	39	45	17	51	149
Average Queue (ft)	49	1	5	1	12	62
95th Queue (ft)	96	17	25	7	38	124
Link Distance (ft)		189		2587	1309	964
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	200		200			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Zone Summary

Zone wide Queuing Penalty: 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	387	15	77	553	493	5	15	66	329	10	5
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.99
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
Adj Sat Flow, veh/h/ln	1881	1830	1900	1792	1863	1881	1520	1837	1900	1881	1881	1900
Adj Flow Rate, veh/h	5	387	15	77	553	493	5	15	66	329	10	5
Adj No. of Lanes	1	1	0	1	1	1	1	1	0	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	4	4	6	2	1	25	1	1	1	1	1
Cap, veh/h	219	697	27	354	743	975	8	26	115	392	359	179
Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.01	0.09	0.09	0.22	0.30	0.30
Sat Flow, veh/h	543	1748	68	938	1863	1569	1448	290	1278	1792	1181	590
Grp Volume(v), veh/h	5	0	402	77	553	493	5	0	81	329	0	15
Grp Sat Flow(s),veh/h/ln	543	0	1816	938	1863	1569	1448	0	1568	1792	0	1771
Q Serve(g_s), s	0.4	0.0	8.8	3.5	13.0	9.0	0.2	0.0	2.5	9.0	0.0	0.3
Cycle Q Clear(g_c), s	13.4	0.0	8.8	12.3	13.0	9.0	0.2	0.0	2.5	9.0	0.0	0.3
Prop In Lane	1.00		0.04	1.00		1.00	1.00		0.81	1.00		0.33
Lane Grp Cap(c), veh/h	219	0	724	354	743	975	8	0	142	392	0	538
V/C Ratio(X)	0.02	0.00	0.56	0.22	0.74	0.51	0.64	0.00	0.57	0.84	0.00	0.03
Avail Cap(c_a), veh/h	256	0	849	418	871	1083	113	0	519	489	0	932
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.9	0.0	11.9	16.7	13.2	5.5	25.5	0.0	22.4	19.2	0.0	12.6
Incr Delay (d2), s/veh	0.0	0.0	0.7	0.3	2.9	0.4	64.6	0.0	3.6	10.2	0.0	0.0
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	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	4.5	0.9	7.2	3.9	0.2	0.0	1.2	5.6	0.0	0.2
LnGrp Delay(d),s/veh	19.0	0.0	12.6	17.0	16.1	5.9	90.1	0.0	26.0	29.4	0.0	12.6
LnGrp LOS	B		B	B	B	A	F		C	C		B
Approach Vol, veh/h		407			1123			86			344	
Approach Delay, s/veh		12.7			11.7			29.7			28.7	
Approach LOS		B			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		25.5	5.3	20.6		25.5	16.2	9.6
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		24.0	4.0	27.0		24.0	14.0	17.0
Max Q Clear Time (g_c+I1), s		15.4	2.2	2.3		15.0	11.0	4.5
Green Ext Time (p_c), s		5.0	0.0	0.5		5.2	0.3	0.3

Intersection Summary	
HCM 2010 Ctrl Delay	15.7
HCM 2010 LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	146	636	375	982	0	0	0	0	172	4	141
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	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
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1845	1863	1863	1881	0				1900	1829	1759
Adj Flow Rate, veh/h	0	146	0	375	982	0				172	4	141
Adj No. of Lanes	0	1	1	1	2	0				0	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Percent Heavy Veh, %	0	3	2	2	1	0				8	0	8
Cap, veh/h	0	423	363	698	2518	0				224	5	197
Arrive On Green	0.00	0.23	0.00	0.79	1.00	0.00				0.13	0.13	0.13
Sat Flow, veh/h	0	1845	1583	1774	3668	0				1704	40	1495
Grp Volume(v), veh/h	0	146	0	375	982	0				176	0	141
Grp Sat Flow(s),veh/h/ln	0	1845	1583	1774	1787	0				1743	0	1495
Q Serve(g_s), s	0.0	4.0	0.0	4.8	0.0	0.0				6.0	0.0	5.5
Cycle Q Clear(g_c), s	0.0	4.0	0.0	4.8	0.0	0.0				6.0	0.0	5.5
Prop In Lane	0.00		1.00	1.00		0.00				0.98		1.00
Lane Grp Cap(c), veh/h	0	423	363	698	2518	0				229	0	197
V/C Ratio(X)	0.00	0.35	0.00	0.54	0.39	0.00				0.77	0.00	0.72
Avail Cap(c_a), veh/h	0	423	363	698	2518	0				486	0	417
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.71	0.00	0.84	0.84	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	19.7	0.0	4.5	0.0	0.0				25.6	0.0	25.4
Incr Delay (d2), s/veh	0.0	0.3	0.0	2.5	0.4	0.0				5.3	0.0	4.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.1	0.0	2.7	0.1	0.0				3.2	0.0	2.5
LnGrp Delay(d),s/veh	0.0	20.0	0.0	7.0	0.4	0.0				30.9	0.0	30.2
LnGrp LOS		C		A	A					C		C
Approach Vol, veh/h		146			1357						317	
Approach Delay, s/veh		20.0			2.2						30.6	
Approach LOS		C			A						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	29.0	19.0		13.0		48.0		
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Green Setting (Gmax), s	24.0	14.0		17.0		43.0		
Max Q Clear Time (g_c+I1), s	6.8	6.0		8.0		2.0		
Green Ext Time (p_c), s	1.0	4.3		0.1		9.2		

Intersection Summary	
HCM 2010 Ctrl Delay	8.6
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	74	244	0	0	430	124	927	4	564	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	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			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1881	1810	0	0	1809	1900	1881	1845	1900			
Adj Flow Rate, veh/h	74	244	0	0	430	124	927	4	564			
Adj No. of Lanes	1	1	0	0	2	0	2	1	0			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Percent Heavy Veh, %	1	5	0	0	3	3	1	0	1			
Cap, veh/h	246	537	0	0	783	224	1913	6	858			
Arrive On Green	0.30	0.30	0.00	0.00	0.30	0.30	0.55	0.55	0.55			
Sat Flow, veh/h	859	1810	0	0	2731	755	3476	11	1559			
Grp Volume(v), veh/h	74	244	0	0	279	275	927	0	568			
Grp Sat Flow(s),veh/h/ln	859	1810	0	0	1719	1676	1738	0	1570			
Q Serve(g_s), s	5.2	7.2	0.0	0.0	8.9	9.0	10.7	0.0	16.7			
Cycle Q Clear(g_c), s	14.2	7.2	0.0	0.0	8.9	9.0	10.7	0.0	16.7			
Prop In Lane	1.00		0.00	0.00		0.45	1.00		0.99			
Lane Grp Cap(c), veh/h	246	537	0	0	510	497	1913	0	864			
V/C Ratio(X)	0.30	0.45	0.00	0.00	0.55	0.55	0.48	0.00	0.66			
Avail Cap(c_a), veh/h	307	664	0	0	631	615	1913	0	864			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.92	0.92	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	25.3	18.7	0.0	0.0	19.3	19.4	9.0	0.0	10.4			
Incr Delay (d2), s/veh	0.6	0.6	0.0	0.0	0.9	1.0	0.9	0.0	3.9			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.3	3.7	0.0	0.0	4.3	4.3	5.3	0.0	8.0			
LnGrp Delay(d),s/veh	26.0	19.3	0.0	0.0	20.2	20.3	9.9	0.0	14.3			
LnGrp LOS	C	B			C	C	A		B			
Approach Vol, veh/h		318			554			1495				
Approach Delay, s/veh		20.8			20.3			11.6				
Approach LOS		C			C			B				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		24.4				24.4		45.6
Change Period (Y+Rc), s		5.0				5.0		5.0
Max Green Setting (Gmax), s		24.0				24.0		36.0
Max Q Clear Time (g_c+I1), s		16.2				11.0		18.7
Green Ext Time (p_c), s		3.2				4.3		9.6

Intersection Summary	
HCM 2010 Ctrl Delay	14.8
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	82	721	5	5	455	8	10	5	5
Conflicting Peds, #/hr	0	0	0	5	0	5	0	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	200	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	13	4	17	0	3	17	11	0	50
Mvmt Flow	82	721	5	5	455	8	10	5	5

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	468	0	0	731	0	0	1386	1371	734
Stage 1	-	-	-	-	-	-	893	893	-
Stage 2	-	-	-	-	-	-	493	478	-
Critical Hdwy	4.23	-	-	4.1	-	-	7.21	6.5	6.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.21	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.21	5.5	-
Follow-up Hdwy	2.317	-	-	2.2	-	-	3.599	4	3.75
Pot Cap-1 Maneuver	1038	-	-	883	-	-	115	147	350
Stage 1	-	-	-	-	-	-	324	363	-
Stage 2	-	-	-	-	-	-	541	559	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1038	-	-	879	-	-	99	133	347
Mov Cap-2 Maneuver	-	-	-	-	-	-	99	133	-
Stage 1	-	-	-	-	-	-	297	333	-
Stage 2	-	-	-	-	-	-	503	554	-

Approach	EB	WB	NB
HCM Control Delay, s	0.9	0.1	37.4
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	131	1038	-	-	879	-	-	186
HCM Lane V/C Ratio	0.153	0.079	-	-	0.006	-	-	0.36
HCM Control Delay (s)	37.4	8.8	-	-	9.1	-	-	34.9
HCM Lane LOS	E	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.5	0.3	-	-	0	-	-	1.5

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	30	4	33
Conflicting Peds, #/hr	5	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	0	0	13
Mvmt Flow	30	4	33

Major/Minor	Minor2		
Conflicting Flow All	1372	1369	464
Stage 1	474	474	-
Stage 2	898	895	-
Critical Hdwy	7.1	6.5	6.33
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.417
Pot Cap-1 Maneuver	124	148	576
Stage 1	575	561	-
Stage 2	337	362	-
Platoon blocked, %			
Mov Cap-1 Maneuver	110	134	574
Mov Cap-2 Maneuver	110	134	-
Stage 1	527	555	-
Stage 2	300	332	-

Approach	SB
HCM Control Delay, s	34.9
HCM LOS	D

Minor Lane/Major Mvmt

Intersection: 102: NW 31st Ave/East Access & NW 319th St

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (ft)	30	209	168	375	217	47	91	234	31
Average Queue (ft)	6	95	49	153	59	6	39	113	6
95th Queue (ft)	24	166	117	289	144	27	72	198	23
Link Distance (ft)		650		532	532		1521		545
Upstream Blk Time (%)				0	0				
Queuing Penalty (veh)				0	0				
Storage Bay Dist (ft)	300		325			300		300	
Storage Blk Time (%)		0		1				0	
Queuing Penalty (veh)		0		1				0	

Intersection: 103: I-5 SB On Ramp/I-5 SB Off Ramp & NW 319th St/NW La Center Rd

Movement	EB	WB	WB	WB	SB	SB
Directions Served	T	L	T	T	LT	R
Maximum Queue (ft)	145	51	178	138	173	104
Average Queue (ft)	70	9	82	67	85	45
95th Queue (ft)	116	36	148	119	142	84
Link Distance (ft)	532		503	503	656	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		225				400
Storage Blk Time (%)			0			
Queuing Penalty (veh)			1			

Intersection: 104: I-5 NB Off Ramp/I-5 NB On Ramp & NW La Center Rd

Movement	EB	EB	WB	WB	NB	NB	NB
Directions Served	L	T	T	TR	L	L	TR
Maximum Queue (ft)	110	140	186	126	208	328	243
Average Queue (ft)	56	45	134	56	124	122	113
95th Queue (ft)	101	97	198	104	186	237	200
Link Distance (ft)		503	175	175		817	817
Upstream Blk Time (%)			3			0	
Queuing Penalty (veh)			8			0	
Storage Bay Dist (ft)	175				350		
Storage Blk Time (%)		0					
Queuing Penalty (veh)		0					

Intersection: 105: NW Paradise Park Rd & NW La Center Rd

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	76	31	19	18	66	86
Average Queue (ft)	30	2	1	1	20	33
95th Queue (ft)	64	17	9	8	55	66
Link Distance (ft)		230		2587	1309	964
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	200		200			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Zone Summary

Zone wide Queuing Penalty: 10

Appendix B 2037 No-build Total Intersection Operations Analysis Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	211	15	193	234	146	5	5	168	110	5	5
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.98	0.99		0.99	0.99		0.99
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
Adj Sat Flow, veh/h/ln	1900	1832	1900	1712	1863	1881	1900	1553	1900	1881	1881	1900
Adj Flow Rate, veh/h	5	211	15	193	234	146	5	5	168	110	5	5
Adj No. of Lanes	1	1	0	1	1	1	1	1	0	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	4	4	11	2	1	0	1	1	1	1	1
Cap, veh/h	562	708	50	574	782	659	600	10	346	417	233	233
Arrive On Green	0.42	0.42	0.42	0.42	0.42	0.42	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	1009	1688	120	1045	1863	1570	1414	38	1276	1212	860	860
Grp Volume(v), veh/h	5	0	226	193	234	146	5	0	173	110	0	10
Grp Sat Flow(s),veh/h/ln	1009	0	1808	1045	1863	1570	1414	0	1314	1212	0	1720
Q Serve(g_s), s	0.1	0.0	2.7	4.9	2.7	1.9	0.1	0.0	3.6	2.7	0.0	0.1
Cycle Q Clear(g_c), s	2.8	0.0	2.7	7.5	2.7	1.9	0.2	0.0	3.6	6.3	0.0	0.1
Prop In Lane	1.00		0.07	1.00		1.00	1.00		0.97	1.00		0.50
Lane Grp Cap(c), veh/h	562	0	759	574	782	659	600	0	356	417	0	467
V/C Ratio(X)	0.01	0.00	0.30	0.34	0.30	0.22	0.01	0.00	0.49	0.26	0.00	0.02
Avail Cap(c_a), veh/h	1167	0	1843	1201	1899	1601	959	0	690	725	0	903
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.2	0.0	6.2	8.7	6.2	6.0	8.7	0.0	9.9	12.5	0.0	8.6
Incr Delay (d2), s/veh	0.0	0.0	0.2	0.3	0.2	0.2	0.0	0.0	1.0	0.3	0.0	0.0
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	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	1.4	1.4	1.4	0.8	0.0	0.0	1.4	0.9	0.0	0.1
LnGrp Delay(d),s/veh	7.2	0.0	6.4	9.1	6.4	6.2	8.7	0.0	10.9	12.9	0.0	8.7
LnGrp LOS	A		A	A	A	A	A		B	B		A
Approach Vol, veh/h		231			573			178			120	
Approach Delay, s/veh		6.5			7.3			10.9			12.5	
Approach LOS		A			A			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		18.6		13.8		18.6		13.8
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0
Max Green Setting (Gmax), s		33.0		17.0		33.0		17.0
Max Q Clear Time (g_c+I1), s		4.8		8.3		9.5		5.6
Green Ext Time (p_c), s		4.2		0.9		4.0		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	8.2
HCM 2010 LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	225	264	627	445	0	0	0	0	177	3	127
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	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
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1583	1863	1827	1863	0				1900	1672	1759
Adj Flow Rate, veh/h	0	225	0	627	445	0				177	3	127
Adj No. of Lanes	0	1	1	1	2	0				0	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Percent Heavy Veh, %	0	20	2	4	2	0				8	50	8
Cap, veh/h	0	307	307	679	2387	0				228	4	217
Arrive On Green	0.00	0.19	0.00	0.65	1.00	0.00				0.15	0.15	0.15
Sat Flow, veh/h	0	1583	1583	1740	3632	0				1567	27	1495
Grp Volume(v), veh/h	0	225	0	627	445	0				180	0	127
Grp Sat Flow(s),veh/h/ln	0	1583	1583	1740	1770	0				1594	0	1495
Q Serve(g_s), s	0.0	7.4	0.0	17.5	0.0	0.0				6.0	0.0	4.4
Cycle Q Clear(g_c), s	0.0	7.4	0.0	17.5	0.0	0.0				6.0	0.0	4.4
Prop In Lane	0.00		1.00	1.00		0.00				0.98		1.00
Lane Grp Cap(c), veh/h	0	307	307	679	2387	0				231	0	217
V/C Ratio(X)	0.00	0.73	0.00	0.92	0.19	0.00				0.78	0.00	0.58
Avail Cap(c_a), veh/h	0	371	371	1413	4023	0				489	0	459
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.97	0.00	0.89	0.89	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	21.0	0.0	8.9	0.0	0.0				22.8	0.0	22.1
Incr Delay (d2), s/veh	0.0	5.7	0.0	5.4	0.0	0.0				5.6	0.0	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.7	0.0	8.8	0.0	0.0				3.0	0.0	1.9
LnGrp Delay(d),s/veh	0.0	26.6	0.0	14.3	0.0	0.0				28.4	0.0	24.6
LnGrp LOS		C		B	A					C		C
Approach Vol, veh/h		225			1072						307	
Approach Delay, s/veh		26.6			8.4						26.8	
Approach LOS		C			A						C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	61.2	15.8		13.0		77.0		
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Green Setting (Gmax), s	45.0	13.0		17.0		63.0		
Max Q Clear Time (g_c+I1), s	19.5	9.4		8.0		2.0		
Green Ext Time (p_c), s	2.1	1.4		0.1		4.6		

Intersection Summary	
HCM 2010 Ctrl Delay	14.5
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	106	297	0	0	727	227	346	2	408	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	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			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1624	1863	0	0	1863	1900	1881	1859	1900			
Adj Flow Rate, veh/h	106	323	0	0	790	247	346	2	443			
Adj No. of Lanes	1	1	0	0	2	0	2	1	0			
Peak Hour Factor	1.00	0.92	1.00	0.92	0.92	0.92	1.00	1.00	0.92			
Percent Heavy Veh, %	17	2	0	0	2	2	1	50	1			
Cap, veh/h	306	1180	0	0	1682	526	888	2	402			
Arrive On Green	0.63	0.63	0.00	0.00	0.63	0.63	0.26	0.26	0.26			
Sat Flow, veh/h	472	1863	0	0	2749	830	3476	7	1574			
Grp Volume(v), veh/h	106	323	0	0	526	511	346	0	445			
Grp Sat Flow(s),veh/h/ln	472	1863	0	0	1770	1716	1738	0	1581			
Q Serve(g_s), s	13.6	6.9	0.0	0.0	14.0	14.0	7.4	0.0	23.0			
Cycle Q Clear(g_c), s	27.6	6.9	0.0	0.0	14.0	14.0	7.4	0.0	23.0			
Prop In Lane	1.00		0.00	0.00		0.48	1.00		1.00			
Lane Grp Cap(c), veh/h	306	1180	0	0	1121	1087	888	0	404			
V/C Ratio(X)	0.35	0.27	0.00	0.00	0.47	0.47	0.39	0.00	1.10			
Avail Cap(c_a), veh/h	306	1180	0	0	1121	1087	888	0	404			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.12	0.12	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	15.8	7.3	0.0	0.0	8.6	8.6	27.7	0.0	33.5			
Incr Delay (d2), s/veh	0.4	0.1	0.0	0.0	1.4	1.5	0.3	0.0	75.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.8	3.5	0.0	0.0	7.2	7.0	3.6	0.0	18.4			
LnGrp Delay(d),s/veh	16.2	7.4	0.0	0.0	10.0	10.1	28.0	0.0	108.5			
LnGrp LOS	B	A			B	B	C		F			
Approach Vol, veh/h		429			1037			791				
Approach Delay, s/veh		9.6			10.0			73.3				
Approach LOS		A			B			E				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		62.0				62.0		28.0
Change Period (Y+Rc), s		5.0				5.0		5.0
Max Green Setting (Gmax), s		57.0				57.0		23.0
Max Q Clear Time (g_c+I1), s		29.6				16.0		25.0
Green Ext Time (p_c), s		12.4				14.4		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	32.1
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	147.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	96	439	170	147	728	11	78	2	52
Conflicting Peds, #/hr	0	0	0	5	0	5	0	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	200	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	100	92	100	92	100	100
Heavy Vehicles, %	2	2	2	25	2	20	2	0	25
Mvmt Flow	104	477	185	147	791	11	85	2	52

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	807	0	0	667	0	0	1924	1884	580
Stage 1	-	-	-	-	-	-	783	783	-
Stage 2	-	-	-	-	-	-	1141	1101	-
Critical Hdwy	4.12	-	-	4.35	-	-	7.12	6.5	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.5	-
Follow-up Hdwy	2.218	-	-	2.425	-	-	3.518	4	3.525
Pot Cap-1 Maneuver	818	-	-	823	-	-	~ 51	72	474
Stage 1	-	-	-	-	-	-	387	407	-
Stage 2	-	-	-	-	-	-	244	290	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	818	-	-	820	-	-	~ 26	51	470
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 26	51	-
Stage 1	-	-	-	-	-	-	336	354	-
Stage 2	-	-	-	-	-	-	150	237	-

Approach	EB	WB	NB
HCM Control Delay, s	1.4	1.6	$ 1278.8
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	41	818	-	-	820	-	-	56
HCM Lane V/C Ratio	3.385	0.128	-	-	0.179	-	-	2.462
HCM Control Delay (s)	$ 1278.8	10	-	-	10.3	-	-	$ 821.8
HCM Lane LOS	F	B	-	-	B	-	-	F
HCM 95th %tile Q(veh)	15.6	0.4	-	-	0.7	-	-	13.9

Notes

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

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	47	5	79
Conflicting Peds, #/hr	5	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	92
Heavy Vehicles, %	69	100	2
Mvmt Flow	47	5	86

Major/Minor	Minor2		
Conflicting Flow All	1906	1972	802
Stage 1	1096	1096	-
Stage 2	810	876	-
Critical Hdwy	7.79	7.5	6.22
Critical Hdwy Stg 1	6.79	6.5	-
Critical Hdwy Stg 2	6.79	6.5	-
Follow-up Hdwy	4.121	4.9	3.318
Pot Cap-1 Maneuver	~ 35	35	384
Stage 1	194	195	-
Stage 2	291	259	-
Platoon blocked, %			
Mov Cap-1 Maneuver	~ 23	25	382
Mov Cap-2 Maneuver	~ 23	25	-
Stage 1	169	159	-
Stage 2	224	225	-

Approach	SB
HCM Control Delay, s	$ 821.8
HCM LOS	F

Minor Lane/Major Mvmt

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	410	12	149	573	493	5	15	168	329	10	5
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.99
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
Adj Sat Flow, veh/h/ln	1881	1829	1900	1792	1863	1881	1520	1831	1900	1881	1881	1900
Adj Flow Rate, veh/h	5	410	12	149	573	493	5	15	168	329	10	5
Adj No. of Lanes	1	1	0	1	1	1	1	1	0	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	4	4	6	2	1	25	1	1	1	1	1
Cap, veh/h	201	804	24	356	848	1055	8	19	213	381	421	211
Arrive On Green	0.45	0.45	0.45	0.45	0.45	0.45	0.01	0.15	0.15	0.21	0.36	0.36
Sat Flow, veh/h	532	1767	52	925	1863	1573	1448	127	1424	1792	1181	591
Grp Volume(v), veh/h	5	0	422	149	573	493	5	0	183	329	0	15
Grp Sat Flow(s),veh/h/ln	532	0	1819	925	1863	1573	1448	0	1551	1792	0	1772
Q Serve(g_s), s	0.6	0.0	13.5	11.2	19.8	12.5	0.3	0.0	9.3	14.5	0.0	0.5
Cycle Q Clear(g_c), s	20.5	0.0	13.5	24.7	19.8	12.5	0.3	0.0	9.3	14.5	0.0	0.5
Prop In Lane	1.00		0.03	1.00		1.00	1.00		0.92	1.00		0.33
Lane Grp Cap(c), veh/h	201	0	828	356	848	1055	8	0	232	381	0	632
V/C Ratio(X)	0.02	0.00	0.51	0.42	0.68	0.47	0.66	0.00	0.79	0.86	0.00	0.02
Avail Cap(c_a), veh/h	316	0	1220	556	1250	1395	71	0	322	721	0	994
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.6	0.0	15.9	24.6	17.6	6.6	40.7	0.0	33.6	31.1	0.0	17.1
Incr Delay (d2), s/veh	0.0	0.0	0.5	0.8	1.0	0.3	68.2	0.0	8.6	5.9	0.0	0.0
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	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	6.8	2.9	10.4	5.3	0.3	0.0	4.6	7.8	0.0	0.2
LnGrp Delay(d),s/veh	25.7	0.0	16.3	25.4	18.5	6.9	108.9	0.0	42.2	37.1	0.0	17.1
LnGrp LOS	C		B	C	B	A	F		D	D		B
Approach Vol, veh/h		427			1215			188			344	
Approach Delay, s/veh		16.5			14.7			44.0			36.2	
Approach LOS		B			B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		42.3	5.4	34.2		42.3	22.4	17.3
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		55.0	4.0	46.0		55.0	33.0	17.0
Max Q Clear Time (g_c+I1), s		22.5	2.3	2.5		26.7	16.5	11.3
Green Ext Time (p_c), s		11.1	0.0	1.3		10.6	0.9	0.5

Intersection Summary	
HCM 2010 Ctrl Delay	21.0
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	211	697	563	1034	0	0	0	0	229	3	182
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	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
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1845	1863	1863	1881	0				1900	1828	1759
Adj Flow Rate, veh/h	0	211	0	563	1034	0				229	3	182
Adj No. of Lanes	0	1	1	1	2	0				0	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Percent Heavy Veh, %	0	3	2	2	1	0				8	0	8
Cap, veh/h	0	400	344	858	2680	0				261	3	227
Arrive On Green	0.00	0.22	0.00	0.97	1.00	0.00				0.15	0.15	0.15
Sat Flow, veh/h	0	1845	1583	1774	3668	0				1719	23	1495
Grp Volume(v), veh/h	0	211	0	563	1034	0				232	0	182
Grp Sat Flow(s),veh/h/ln	0	1845	1583	1774	1787	0				1742	0	1495
Q Serve(g_s), s	0.0	10.3	0.0	2.9	0.0	0.0				13.2	0.0	11.9
Cycle Q Clear(g_c), s	0.0	10.3	0.0	2.9	0.0	0.0				13.2	0.0	11.9
Prop In Lane	0.00		1.00	1.00		0.00				0.99		1.00
Lane Grp Cap(c), veh/h	0	400	344	858	2680	0				264	0	227
V/C Ratio(X)	0.00	0.53	0.00	0.66	0.39	0.00				0.88	0.00	0.80
Avail Cap(c_a), veh/h	0	400	344	858	2680	0				412	0	354
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.75	0.00	0.78	0.78	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	35.1	0.0	0.9	0.0	0.0				42.1	0.0	41.5
Incr Delay (d2), s/veh	0.0	1.0	0.0	3.1	0.3	0.0				12.6	0.0	7.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	5.3	0.0	1.4	0.1	0.0				7.3	0.0	5.4
LnGrp Delay(d),s/veh	0.0	36.0	0.0	4.0	0.3	0.0				54.7	0.0	48.7
LnGrp LOS		D		A	A					D		D
Approach Vol, veh/h		211			1597						414	
Approach Delay, s/veh		36.0			1.6						52.1	
Approach LOS		D			A						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	54.0	27.0		20.4		81.0		
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Green Setting (Gmax), s	49.0	22.0		24.0		76.0		
Max Q Clear Time (g_c+I1), s	4.9	12.3		15.2		2.0		
Green Ext Time (p_c), s	1.9	5.4		0.1		11.2		

Intersection Summary	
HCM 2010 Ctrl Delay	14.3
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	131	308	0	0	629	173	968	2	626	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	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			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1881	1863	0	0	1863	1900	1881	1863	1900			
Adj Flow Rate, veh/h	131	335	0	0	684	188	968	2	680			
Adj No. of Lanes	1	1	0	0	2	0	2	1	0			
Peak Hour Factor	1.00	0.92	1.00	0.92	0.92	0.92	1.00	1.00	0.92			
Percent Heavy Veh, %	1	2	0	0	2	2	1	0	1			
Cap, veh/h	247	852	0	0	1256	345	1548	2	704			
Arrive On Green	0.46	0.46	0.00	0.00	0.46	0.46	0.45	0.45	0.45			
Sat Flow, veh/h	639	1863	0	0	2838	754	3476	5	1579			
Grp Volume(v), veh/h	131	335	0	0	441	431	968	0	682			
Grp Sat Flow(s),veh/h/ln	639	1863	0	0	1770	1730	1738	0	1584			
Q Serve(g_s), s	19.2	12.3	0.0	0.0	18.6	18.6	22.1	0.0	43.3			
Cycle Q Clear(g_c), s	37.8	12.3	0.0	0.0	18.6	18.6	22.1	0.0	43.3			
Prop In Lane	1.00		0.00	0.00		0.44	1.00		1.00			
Lane Grp Cap(c), veh/h	247	852	0	0	810	792	1548	0	706			
V/C Ratio(X)	0.53	0.39	0.00	0.00	0.54	0.54	0.63	0.00	0.97			
Avail Cap(c_a), veh/h	289	974	0	0	925	905	1548	0	706			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.80	0.80	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	33.9	18.5	0.0	0.0	20.2	20.2	22.0	0.0	27.9			
Incr Delay (d2), s/veh	1.4	0.2	0.0	0.0	0.6	0.6	1.9	0.0	26.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	3.5	6.4	0.0	0.0	9.2	9.0	11.0	0.0	24.0			
LnGrp Delay(d),s/veh	35.3	18.8	0.0	0.0	20.8	20.8	23.9	0.0	54.5			
LnGrp LOS	D	B			C	C	C		D			
Approach Vol, veh/h		466			872			1650				
Approach Delay, s/veh		23.4			20.8			36.5				
Approach LOS		C			C			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		52.3				52.3		57.7
Change Period (Y+Rc), s		5.0				5.0		5.0
Max Green Setting (Gmax), s		54.0				54.0		46.0
Max Q Clear Time (g_c+I1), s		39.8				20.6		45.3
Green Ext Time (p_c), s		7.4				11.2		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	29.9
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	260.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	91	727	116	101	478	14	215	8	174
Conflicting Peds, #/hr	0	0	0	5	0	5	0	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	100	92	100	92	100	100
Heavy Vehicles, %	2	2	2	0	2	17	2	0	50
Mvmt Flow	99	790	126	101	520	14	234	8	174

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	539	0	0	921	0	0	1814	1797	863
Stage 1	-	-	-	-	-	-	1056	1056	-
Stage 2	-	-	-	-	-	-	758	741	-
Critical Hdwy	4.12	-	-	4.1	-	-	7.12	6.5	6.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.5	-
Follow-up Hdwy	2.218	-	-	2.2	-	-	3.518	4	3.75
Pot Cap-1 Maneuver	1029	-	-	750	-	-	~ 60	81	292
Stage 1	-	-	-	-	-	-	272	305	-
Stage 2	-	-	-	-	-	-	399	426	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1029	-	-	747	-	-	~ 43	63	290
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 43	63	-
Stage 1	-	-	-	-	-	-	245	275	-
Stage 2	-	-	-	-	-	-	313	367	-

Approach	EB	WB	NB
HCM Control Delay, s	0.9	1.7	$ 1248.8
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	43	250	1029	-	-	747	-	-	16	292
HCM Lane V/C Ratio	5.435	0.728	0.096	-	-	0.135	-	-	2.25	0.166
HCM Control Delay (s)	$ 2182.2	50.2	8.9	-	-	10.6	-	-	$ 1065.2	19.8
HCM Lane LOS	F	F	A	-	-	B	-	-	F	C
HCM 95th %tile Q(veh)	27.1	5	0.3	-	-	0.5	-	-	5.1	0.6

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

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	36	5	40
Conflicting Peds, #/hr	5	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	200	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	92
Heavy Vehicles, %	0	0	2
Mvmt Flow	36	5	43

Major/Minor	Minor2		
Conflicting Flow All	1881	1853	532
Stage 1	734	734	-
Stage 2	1147	1119	-
Critical Hdwy	7.1	6.5	6.22
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.318
Pot Cap-1 Maneuver	55	75	547
Stage 1	415	429	-
Stage 2	244	285	-
Platoon blocked, %			
Mov Cap-1 Maneuver	~ 16	58	545
Mov Cap-2 Maneuver	~ 16	58	-
Stage 1	374	369	-
Stage 2	85	257	-

Approach	SB
HCM Control Delay, s	$ 465.3
HCM LOS	F

Minor Lane/Major Mvmt

Appendix C 2037 Build Total Intersection Operations Analysis Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	211	15	193	234	146	5	15	168	110	10	5
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	0.99		0.99	1.00		0.99
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
Adj Sat Flow, veh/h/ln	1900	1832	1900	1827	1870	1900	1900	1831	1900	1881	1881	1900
Adj Flow Rate, veh/h	5	211	15	193	234	146	5	15	168	110	10	5
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	4	4	4	2	2	0	1	1	1	1	1
Cap, veh/h	10	677	48	256	737	440	555	35	390	391	320	160
Arrive On Green	0.01	0.21	0.21	0.15	0.35	0.35	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	1810	3295	232	1740	2122	1268	1413	129	1439	1204	1182	591
Grp Volume(v), veh/h	5	111	115	193	194	186	5	0	183	110	0	15
Grp Sat Flow(s),veh/h/ln	1810	1740	1787	1740	1776	1613	1413	0	1568	1204	0	1773
Q Serve(g_s), s	0.1	2.2	2.2	4.2	3.2	3.4	0.1	0.0	3.8	3.3	0.0	0.2
Cycle Q Clear(g_c), s	0.1	2.2	2.2	4.2	3.2	3.4	0.4	0.0	3.8	7.2	0.0	0.2
Prop In Lane	1.00		0.13	1.00		0.79	1.00		0.92	1.00		0.33
Lane Grp Cap(c), veh/h	10	358	367	256	617	560	555	0	425	391	0	480
V/C Ratio(X)	0.51	0.31	0.31	0.75	0.31	0.33	0.01	0.00	0.43	0.28	0.00	0.03
Avail Cap(c_a), veh/h	182	829	852	873	1560	1416	1093	0	1023	850	0	1156
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.8	13.4	13.4	16.3	9.5	9.6	10.8	0.0	12.0	14.9	0.0	10.7
Incr Delay (d2), s/veh	35.8	0.5	0.5	4.5	0.3	0.3	0.0	0.0	0.7	0.4	0.0	0.0
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	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	1.1	1.1	2.4	1.6	1.6	0.0	0.0	1.7	1.1	0.0	0.1
LnGrp Delay(d),s/veh	55.6	13.9	13.9	20.8	9.8	9.9	10.8	0.0	12.7	15.3	0.0	10.7
LnGrp LOS	E	B	B	C	A	A	B		B	B		B
Approach Vol, veh/h		231			573			188			125	
Approach Delay, s/veh		14.8			13.5			12.6			14.8	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.9	13.2		15.8	5.2	18.8		15.8
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	20.0	19.0		26.0	4.0	35.0		26.0
Max Q Clear Time (g_c+I1), s	6.2	4.2		9.2	2.1	5.4		5.8
Green Ext Time (p_c), s	0.4	3.0		1.4	0.0	3.6		1.5

Intersection Summary	
HCM 2010 Ctrl Delay	13.8
HCM 2010 LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	225	264	627	445	0	0	0	0	177	3	127
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	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
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1583	1863	1827	1863	0				1900	1672	1759
Adj Flow Rate, veh/h	0	225	0	627	445	0				177	3	127
Adj No. of Lanes	0	2	1	2	2	0				0	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Percent Heavy Veh, %	0	20	2	4	2	0				8	50	8
Cap, veh/h	0	627	330	915	2130	0				242	4	231
Arrive On Green	0.00	0.21	0.00	0.27	0.60	0.00				0.15	0.15	0.15
Sat Flow, veh/h	0	3088	1583	3375	3632	0				1567	27	1495
Grp Volume(v), veh/h	0	225	0	627	445	0				180	0	127
Grp Sat Flow(s),veh/h/ln	0	1504	1583	1688	1770	0				1594	0	1495
Q Serve(g_s), s	0.0	2.6	0.0	6.8	2.3	0.0				4.4	0.0	3.2
Cycle Q Clear(g_c), s	0.0	2.6	0.0	6.8	2.3	0.0				4.4	0.0	3.2
Prop In Lane	0.00		1.00	1.00		0.00				0.98		1.00
Lane Grp Cap(c), veh/h	0	627	330	915	2130	0				246	0	231
V/C Ratio(X)	0.00	0.36	0.00	0.68	0.21	0.00				0.73	0.00	0.55
Avail Cap(c_a), veh/h	0	1615	850	2801	5270	0				1128	0	1059
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.98	0.00	0.84	0.84	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	13.9	0.0	13.4	3.7	0.0				16.5	0.0	16.0
Incr Delay (d2), s/veh	0.0	0.3	0.0	0.8	0.0	0.0				4.2	0.0	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.1	0.0	3.2	1.1	0.0				2.2	0.0	1.4
LnGrp Delay(d),s/veh	0.0	14.2	0.0	14.1	3.8	0.0				20.7	0.0	18.1
LnGrp LOS		B		B	A					C		B
Approach Vol, veh/h		225			1072						307	
Approach Delay, s/veh		14.2			9.8						19.6	
Approach LOS		B			A						B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	75.1	13.5		11.3		88.7		
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Green Setting (Gmax), s	34.0	22.0		29.0		61.0		
Max Q Clear Time (g_c+I1), s	8.8	4.6		6.4		4.3		
Green Ext Time (p_c), s	2.3	3.9		0.1		4.8		

Intersection Summary	
HCM 2010 Ctrl Delay	12.3
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	106	297	0	0	727	227	346	2	408	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	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			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1624	1863	0	0	1863	1900	1881	1859	1900			
Adj Flow Rate, veh/h	106	323	0	0	790	247	346	2	443			
Adj No. of Lanes	2	2	0	0	2	0	2	1	0			
Peak Hour Factor	1.00	0.92	1.00	0.92	0.92	0.92	1.00	1.00	0.92			
Percent Heavy Veh, %	17	2	0	0	2	2	1	50	1			
Cap, veh/h	157	2089	0	0	1293	404	1070	2	485			
Arrive On Green	0.05	0.59	0.00	0.00	0.97	0.97	0.31	0.31	0.31			
Sat Flow, veh/h	3000	3632	0	0	2749	830	3476	7	1574			
Grp Volume(v), veh/h	106	323	0	0	526	511	346	0	445			
Grp Sat Flow(s),veh/h/ln	1500	1770	0	0	1770	1716	1738	0	1581			
Q Serve(g_s), s	3.4	4.0	0.0	0.0	1.9	1.9	7.5	0.0	26.6			
Cycle Q Clear(g_c), s	3.4	4.0	0.0	0.0	1.9	1.9	7.5	0.0	26.6			
Prop In Lane	1.00		0.00	0.00		0.48	1.00		1.00			
Lane Grp Cap(c), veh/h	157	2089	0	0	862	836	1070	0	487			
V/C Ratio(X)	0.67	0.15	0.00	0.00	0.61	0.61	0.32	0.00	0.91			
Avail Cap(c_a), veh/h	214	2089	0	0	862	836	1132	0	515			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	0.81	0.81	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	45.7	9.1	0.0	0.0	0.7	0.7	26.1	0.0	32.7			
Incr Delay (d2), s/veh	4.0	0.1	0.0	0.0	3.2	3.3	0.2	0.0	20.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.5	2.0	0.0	0.0	1.3	1.3	3.6	0.0	14.4			
LnGrp Delay(d),s/veh	49.8	9.2	0.0	0.0	3.9	4.0	26.3	0.0	53.0			
LnGrp LOS	D	A			A	A	C		D			
Approach Vol, veh/h		429			1037			791				
Approach Delay, s/veh		19.2			3.9			41.3				
Approach LOS		B			A			D				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		64.7			10.1	54.6		35.3
Change Period (Y+Rc), s		5.0			5.0	5.0		5.0
Max Green Setting (Gmax), s		58.0			7.0	46.0		32.0
Max Q Clear Time (g_c+I1), s		6.0			5.4	3.9		28.6
Green Ext Time (p_c), s		11.6			0.0	11.2		1.6

Intersection Summary	
HCM 2010 Ctrl Delay	20.0
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	96	439	170	147	728	11	78	2	52	47	5	79
Number	5	2	12	1	6	16	3	8	18	7	4	14
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	0.99		0.99	0.99		0.99
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1520	1858	1900	1863	1531	1900	1727	1769	1900
Adj Flow Rate, veh/h	104	477	0	147	791	11	85	2	52	47	5	86
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	1.00	0.92	1.00	0.92	1.00	1.00	1.00	1.00	0.92
Percent Heavy Veh, %	2	2	2	25	2	2	2	0	0	10	100	100
Cap, veh/h	501	2068	0	619	2157	30	233	8	206	248	14	234
Arrive On Green	0.09	1.00	0.00	0.07	0.61	0.61	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	1774	3632	0	1448	3565	50	1291	48	1249	1237	83	1421
Grp Volume(v), veh/h	104	477	0	147	392	410	85	0	54	47	0	91
Grp Sat Flow(s),veh/h/ln	1774	1770	0	1448	1765	1849	1291	0	1297	1237	0	1503
Q Serve(g_s), s	1.8	0.0	0.0	3.2	9.1	9.1	5.1	0.0	2.9	2.8	0.0	4.4
Cycle Q Clear(g_c), s	1.8	0.0	0.0	3.2	9.1	9.1	9.4	0.0	2.9	5.7	0.0	4.4
Prop In Lane	1.00		0.00	1.00		0.03	1.00		0.96	1.00		0.95
Lane Grp Cap(c), veh/h	501	2068	0	619	1068	1119	233	0	214	248	0	248
V/C Ratio(X)	0.21	0.23	0.00	0.24	0.37	0.37	0.37	0.00	0.25	0.19	0.00	0.37
Avail Cap(c_a), veh/h	663	2068	0	882	1068	1119	418	0	401	426	0	464
HCM Platoon Ratio	2.00	2.00	2.00	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	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.6	0.0	0.0	5.5	8.1	8.1	34.2	0.0	29.5	31.9	0.0	30.0
Incr Delay (d2), s/veh	0.2	0.3	0.0	0.2	1.0	0.9	1.0	0.0	0.6	0.4	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.1	0.0	1.3	4.6	4.8	1.9	0.0	1.1	1.0	0.0	1.9
LnGrp Delay(d),s/veh	5.8	0.3	0.0	5.7	9.1	9.0	35.2	0.0	30.1	32.3	0.0	31.0
LnGrp LOS	A	A		A	A	A	D		C	C		C
Approach Vol, veh/h		581			949			139			138	
Approach Delay, s/veh		1.3			8.5			33.2			31.4	
Approach LOS		A			A			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.3	71.3		18.4	8.6	73.0		18.4
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	20.0	40.0		25.0	11.0	49.0		25.0
Max Q Clear Time (g_c+I1), s	5.2	2.0		7.7	3.8	11.1		11.4
Green Ext Time (p_c), s	0.3	9.5		1.1	0.1	9.5		1.0

Intersection Summary		
HCM 2010 Ctrl Delay		9.8
HCM 2010 LOS		A

Intersection: 102: NW 31st Ave/East Access & NW 319th St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	33	83	120	161	95	138	33	102	111	36
Average Queue (ft)	4	36	48	75	21	57	4	48	52	9
95th Queue (ft)	21	74	93	132	64	107	20	78	95	32
Link Distance (ft)		649	649		526	526		1509		543
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	300			375			300		300	
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 103: I-5 SB On Ramp/I-5 SB Off Ramp & NW 319th St/NW La Center Rd

Movement	EB	EB	WB	WB	WB	WB	SB	SB
Directions Served	T	T	L	L	T	T	LT	R
Maximum Queue (ft)	218	168	183	204	127	136	244	91
Average Queue (ft)	113	72	33	57	43	52	129	38
95th Queue (ft)	192	138	106	143	102	109	210	73
Link Distance (ft)	526	526			503	503	650	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			225	225				400
Storage Blk Time (%)			0	0				
Queuing Penalty (veh)			0	0				

Intersection: 104: I-5 NB Off Ramp/I-5 NB On Ramp & NW La Center Rd

Movement	EB	EB	EB	EB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	T	TR	L	L	TR
Maximum Queue (ft)	122	140	89	107	204	190	167	201	203
Average Queue (ft)	30	54	26	34	157	68	81	120	89
95th Queue (ft)	86	108	68	88	231	136	150	181	159
Link Distance (ft)			503	503	194	194		800	800
Upstream Blk Time (%)					4	0			
Queuing Penalty (veh)					17	0			
Storage Bay Dist (ft)	175	175					350		
Storage Blk Time (%)	0	0							
Queuing Penalty (veh)	0	0							

Intersection: 105: NW Paradise Park Rd & NW La Center Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	71	144	166	137	163	146	124	125	93	90
Average Queue (ft)	35	29	67	58	63	46	53	35	40	37
95th Queue (ft)	63	88	133	113	132	112	99	84	81	74
Link Distance (ft)		270	270		2579	2579		1296		965
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	200			200			100		150	
Storage Blk Time (%)		0			0		2	0		
Queuing Penalty (veh)		0			0		1	0		

Zone Summary

Zone wide Queuing Penalty: 19

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	410	12	149	573	493	5	15	168	329	10	5
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.99	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
Adj Sat Flow, veh/h/ln	1881	1829	1900	1792	1871	1900	1520	1831	1900	1881	1881	1900
Adj Flow Rate, veh/h	5	410	12	149	573	493	5	15	168	329	10	5
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	1	4	4	6	2	2	25	1	1	1	1	1
Cap, veh/h	8	543	16	461	761	654	8	20	221	388	432	216
Arrive On Green	0.00	0.16	0.16	0.45	0.71	0.71	0.01	0.15	0.15	0.22	0.37	0.37
Sat Flow, veh/h	1792	3446	101	1707	1798	1545	1448	128	1434	1792	1183	591
Grp Volume(v), veh/h	5	206	216	149	566	500	5	0	183	329	0	15
Grp Sat Flow(s),veh/h/ln	1792	1737	1809	1707	1778	1566	1448	0	1562	1792	0	1774
Q Serve(g_s), s	0.3	11.3	11.3	5.6	19.8	19.9	0.3	0.0	11.1	17.5	0.0	0.5
Cycle Q Clear(g_c), s	0.3	11.3	11.3	5.6	19.8	19.9	0.3	0.0	11.1	17.5	0.0	0.5
Prop In Lane	1.00		0.06	1.00		0.99	1.00		0.92	1.00		0.33
Lane Grp Cap(c), veh/h	8	274	285	461	752	663	8	0	240	388	0	648
V/C Ratio(X)	0.61	0.75	0.76	0.32	0.75	0.75	0.67	0.00	0.76	0.85	0.00	0.02
Avail Cap(c_a), veh/h	72	473	492	461	752	663	58	0	393	523	0	894
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.92	0.92	0.92	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	49.3	40.0	40.0	21.4	11.3	11.3	49.3	0.0	40.2	37.3	0.0	20.1
Incr Delay (d2), s/veh	55.9	17.4	17.0	0.4	6.3	7.2	70.2	0.0	4.9	9.4	0.0	0.0
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	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	6.7	7.0	2.6	10.8	9.7	0.3	0.0	5.2	9.7	0.0	0.3
LnGrp Delay(d),s/veh	105.2	57.3	56.9	21.8	17.6	18.5	119.5	0.0	45.2	46.7	0.0	20.2
LnGrp LOS	F	E	E	C	B	B	F		D	D		C
Approach Vol, veh/h		427			1215			188			344	
Approach Delay, s/veh		57.7			18.5			47.1			45.6	
Approach LOS		E			B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	52.6	20.6	5.5	41.3	26.2	47.0	26.5	20.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	19.0	27.0	4.0	50.0	4.0	42.0	29.0	25.0
Max Q Clear Time (g_c+I1), s	7.6	13.3	2.3	2.5	2.3	21.9	19.5	13.1
Green Ext Time (p_c), s	0.3	1.9	0.0	3.9	0.0	7.0	2.0	0.7

Intersection Summary	
HCM 2010 Ctrl Delay	32.9
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	211	697	563	1034	0	0	0	0	229	3	182
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	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
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1845	1863	1863	1881	0				1900	1828	1759
Adj Flow Rate, veh/h	0	211	0	563	1034	0				229	3	182
Adj No. of Lanes	0	2	1	2	2	0				0	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Percent Heavy Veh, %	0	3	2	2	1	0				8	0	8
Cap, veh/h	0	816	369	1567	2649	0				263	3	229
Arrive On Green	0.00	0.39	0.00	0.46	0.74	0.00				0.15	0.15	0.15
Sat Flow, veh/h	0	3597	1583	3442	3668	0				1719	23	1495
Grp Volume(v), veh/h	0	211	0	563	1034	0				232	0	182
Grp Sat Flow(s),veh/h/ln	0	1752	1583	1721	1787	0				1742	0	1495
Q Serve(g_s), s	0.0	3.9	0.0	10.1	10.0	0.0				12.3	0.0	11.1
Cycle Q Clear(g_c), s	0.0	3.9	0.0	10.1	10.0	0.0				12.3	0.0	11.1
Prop In Lane	0.00		1.00	1.00		0.00				0.99		1.00
Lane Grp Cap(c), veh/h	0	816	369	1567	2649	0				267	0	229
V/C Ratio(X)	0.00	0.26	0.00	0.36	0.39	0.00				0.87	0.00	0.80
Avail Cap(c_a), veh/h	0	816	369	1567	2649	0				738	0	633
HCM Platoon Ratio	1.00	1.67	1.67	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.80	0.00	0.67	0.67	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	23.3	0.0	16.8	4.5	0.0				39.1	0.0	38.6
Incr Delay (d2), s/veh	0.0	0.6	0.0	0.4	0.3	0.0				8.5	0.0	6.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.9	0.0	4.9	5.0	0.0				6.6	0.0	4.9
LnGrp Delay(d),s/veh	0.0	23.9	0.0	17.2	4.7	0.0				47.6	0.0	44.7
LnGrp LOS		C		B	A					D		D
Approach Vol, veh/h		211			1597						414	
Approach Delay, s/veh		23.9			9.1						46.3	
Approach LOS		C			A						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	48.0	52.5		19.5		100.5		
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0		
Max Green Setting (Gmax), s	43.0	22.0		40.0		70.0		
Max Q Clear Time (g_c+I1), s	12.1	5.9		14.3		12.0		
Green Ext Time (p_c), s	2.1	7.5		0.2		11.2		

Intersection Summary	
HCM 2010 Ctrl Delay	17.5
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	131	308	0	0	629	173	968	2	626	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	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			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1881	1863	0	0	1863	1900	1881	1863	1900			
Adj Flow Rate, veh/h	131	335	0	0	684	188	968	2	680			
Adj No. of Lanes	2	2	0	0	2	0	2	1	0			
Peak Hour Factor	1.00	0.92	1.00	0.92	0.92	0.92	1.00	1.00	0.92			
Percent Heavy Veh, %	1	2	0	0	2	2	1	0	1			
Cap, veh/h	190	1411	0	0	822	226	1809	2	822			
Arrive On Green	0.07	0.53	0.00	0.00	0.30	0.30	0.52	0.52	0.52			
Sat Flow, veh/h	3476	3632	0	0	2838	754	3476	5	1579			
Grp Volume(v), veh/h	131	335	0	0	441	431	968	0	682			
Grp Sat Flow(s),veh/h/ln	1738	1770	0	0	1770	1730	1738	0	1584			
Q Serve(g_s), s	4.1	5.7	0.0	0.0	25.9	25.9	20.6	0.0	40.4			
Cycle Q Clear(g_c), s	4.1	5.7	0.0	0.0	25.9	25.9	20.6	0.0	40.4			
Prop In Lane	1.00		0.00	0.00		0.44	1.00		1.00			
Lane Grp Cap(c), veh/h	190	1411	0	0	530	518	1809	0	825			
V/C Ratio(X)	0.69	0.24	0.00	0.00	0.83	0.83	0.54	0.00	0.83			
Avail Cap(c_a), veh/h	281	1683	0	0	619	605	1809	0	825			
HCM Platoon Ratio	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.95	0.95	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	50.8	17.1	0.0	0.0	36.4	36.4	17.8	0.0	22.5			
Incr Delay (d2), s/veh	4.2	0.1	0.0	0.0	8.3	8.5	1.1	0.0	9.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.1	2.8	0.0	0.0	13.8	13.6	10.1	0.0	19.8			
LnGrp Delay(d),s/veh	55.0	17.1	0.0	0.0	44.8	45.0	18.9	0.0	31.8			
LnGrp LOS	D	B			D	D	B		C			
Approach Vol, veh/h		466			872			1650				
Approach Delay, s/veh		27.8			44.9			24.2				
Approach LOS		C			D			C				

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		48.4			11.1	37.3		71.6
Change Period (Y+Rc), s		4.0			5.0	4.0		5.0
Max Green Setting (Gmax), s		53.0			9.0	39.0		58.0
Max Q Clear Time (g_c+I1), s		7.7			6.1	27.9		42.4
Green Ext Time (p_c), s		9.4			0.1	5.4		9.9

Intersection Summary	
HCM 2010 Ctrl Delay	30.8
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	91	727	116	101	478	14	215	8	174	36	5	40
Number	5	2	12	1	6	16	3	8	18	7	4	14
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		0.99	1.00		0.99	1.00		0.99
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
Adj Sat Flow, veh/h/ln	1863	1863	1900	1900	1856	1900	1863	1864	1900	1900	1867	1900
Adj Flow Rate, veh/h	99	790	0	101	520	14	234	8	174	36	5	43
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	1.00	0.92	1.00	0.92	1.00	1.00	1.00	1.00	0.92
Percent Heavy Veh, %	2	2	2	0	2	2	2	0	0	0	0	0
Cap, veh/h	488	1272	0	378	1334	36	487	19	419	368	46	397
Arrive On Green	0.06	0.36	0.00	0.06	0.38	0.38	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	1774	3632	0	1810	3507	94	1345	70	1517	1217	167	1437
Grp Volume(v), veh/h	99	790	0	101	261	273	234	0	182	36	0	48
Grp Sat Flow(s),veh/h/ln	1774	1770	0	1810	1763	1838	1345	0	1587	1217	0	1604
Q Serve(g_s), s	1.6	9.1	0.0	0.0	5.3	5.3	7.8	0.0	4.6	1.2	0.0	1.1
Cycle Q Clear(g_c), s	1.6	9.1	0.0	0.0	5.3	5.3	8.9	0.0	4.6	5.9	0.0	1.1
Prop In Lane	1.00		0.00	1.00		0.05	1.00		0.96	1.00		0.90
Lane Grp Cap(c), veh/h	488	1272	0	378	670	699	487	0	438	368	0	443
V/C Ratio(X)	0.20	0.62	0.00	0.27	0.39	0.39	0.48	0.00	0.42	0.10	0.00	0.11
Avail Cap(c_a), veh/h	669	3869	0	598	1999	2084	1260	0	1349	1066	0	1364
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.5	13.0	0.0	16.9	11.1	11.1	16.6	0.0	14.6	17.0	0.0	13.3
Incr Delay (d2), s/veh	0.2	0.5	0.0	0.4	0.4	0.4	0.7	0.0	0.6	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	4.5	0.0	1.3	2.6	2.7	3.0	0.0	2.1	0.4	0.0	0.5
LnGrp Delay(d),s/veh	8.7	13.5	0.0	17.2	11.5	11.5	17.4	0.0	15.2	17.1	0.0	13.4
LnGrp LOS	A	B		B	B	B	B		B	B		B
Approach Vol, veh/h		889			635			416			84	
Approach Delay, s/veh		13.0			12.4			16.4			15.0	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.0	22.8		18.6	7.0	23.8		18.6
Change Period (Y+Rc), s	5.0	* 5		5.0	4.0	5.0		5.0
Max Green Setting (Gmax), s	9.0	* 54		42.0	8.0	56.0		42.0
Max Q Clear Time (g_c+I1), s	2.0	11.1		7.9	3.6	7.3		10.9
Green Ext Time (p_c), s	1.8	6.7		2.3	0.1	3.2		2.3

Intersection Summary		
HCM 2010 Ctrl Delay		13.6
HCM 2010 LOS		B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection: 102: NW 31st Ave/East Access & NW 319th St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	34	172	301	190	298	385	47	206	384	43
Average Queue (ft)	3	67	181	109	105	175	4	86	220	11
95th Queue (ft)	18	137	283	174	215	316	23	169	355	35
Link Distance (ft)		945	945		526	526		1509		789
Upstream Blk Time (%)						0				
Queuing Penalty (veh)						0				
Storage Bay Dist (ft)	300			375			300		400	
Storage Blk Time (%)					0			0	0	
Queuing Penalty (veh)					0			0	0	

Intersection: 103: I-5 SB On Ramp/I-5 SB Off Ramp & NW 319th St/NW La Center Rd

Movement	EB	EB	WB	WB	WB	WB	SB	SB
Directions Served	T	T	L	L	T	T	LT	R
Maximum Queue (ft)	208	114	106	120	182	195	290	174
Average Queue (ft)	91	41	5	14	80	112	156	77
95th Queue (ft)	165	93	47	67	152	179	252	141
Link Distance (ft)	526	526			503	503	650	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			225	225				400
Storage Blk Time (%)				0	0			
Queuing Penalty (veh)				0	0			

Intersection: 104: I-5 NB Off Ramp/I-5 NB On Ramp & NW La Center Rd

Movement	EB	EB	EB	EB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	T	TR	L	L	TR
Maximum Queue (ft)	69	102	76	97	211	206	389	522	415
Average Queue (ft)	31	59	33	38	203	131	225	276	155
95th Queue (ft)	71	92	73	81	209	229	342	383	255
Link Distance (ft)			503	503	198	198		985	985
Upstream Blk Time (%)					37	4		0	0
Queuing Penalty (veh)					168	18		0	0
Storage Bay Dist (ft)	175	175					350		
Storage Blk Time (%)							0	1	
Queuing Penalty (veh)							1	7	

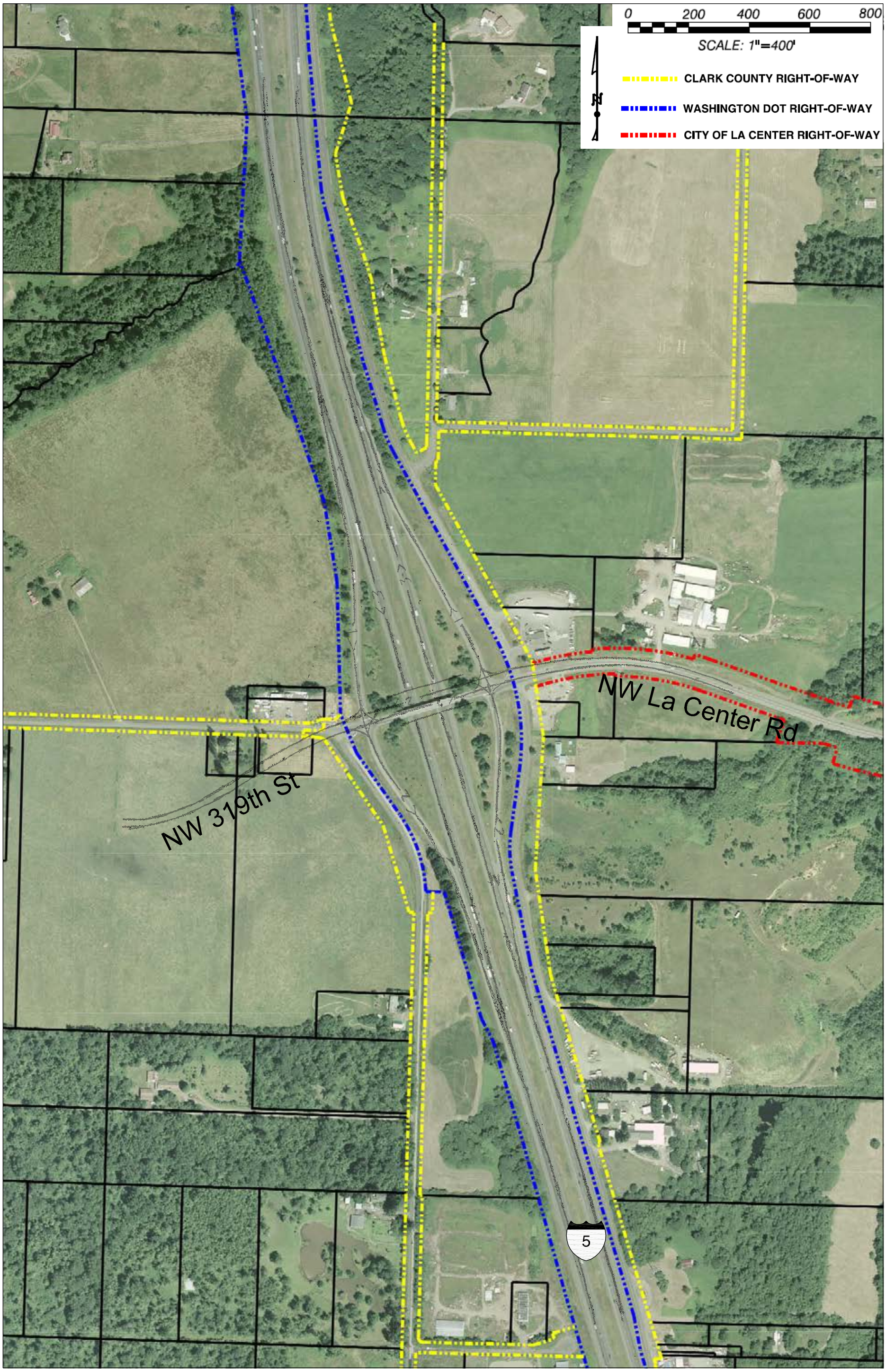
Intersection: 105: NW Paradise Park Rd & NW La Center Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	88	220	250	108	190	170	175	120	61	45
Average Queue (ft)	36	87	113	43	69	47	92	49	23	19
95th Queue (ft)	67	166	193	84	148	112	156	95	55	43
Link Distance (ft)		287	287		2579	2579		1296		965
Upstream Blk Time (%)		0	0							
Queuing Penalty (veh)		0	1							
Storage Bay Dist (ft)	200			400			400		400	
Storage Blk Time (%)		0								
Queuing Penalty (veh)		0								

Zone Summary

Zone wide Queuing Penalty: 195

Appendix G Single-Line Sketches of Interchange Concept Alternatives



SIGNALIZED DIAMOND INTERCHANGE
LA CENTER, WASHINGTON

FIGURE 1

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

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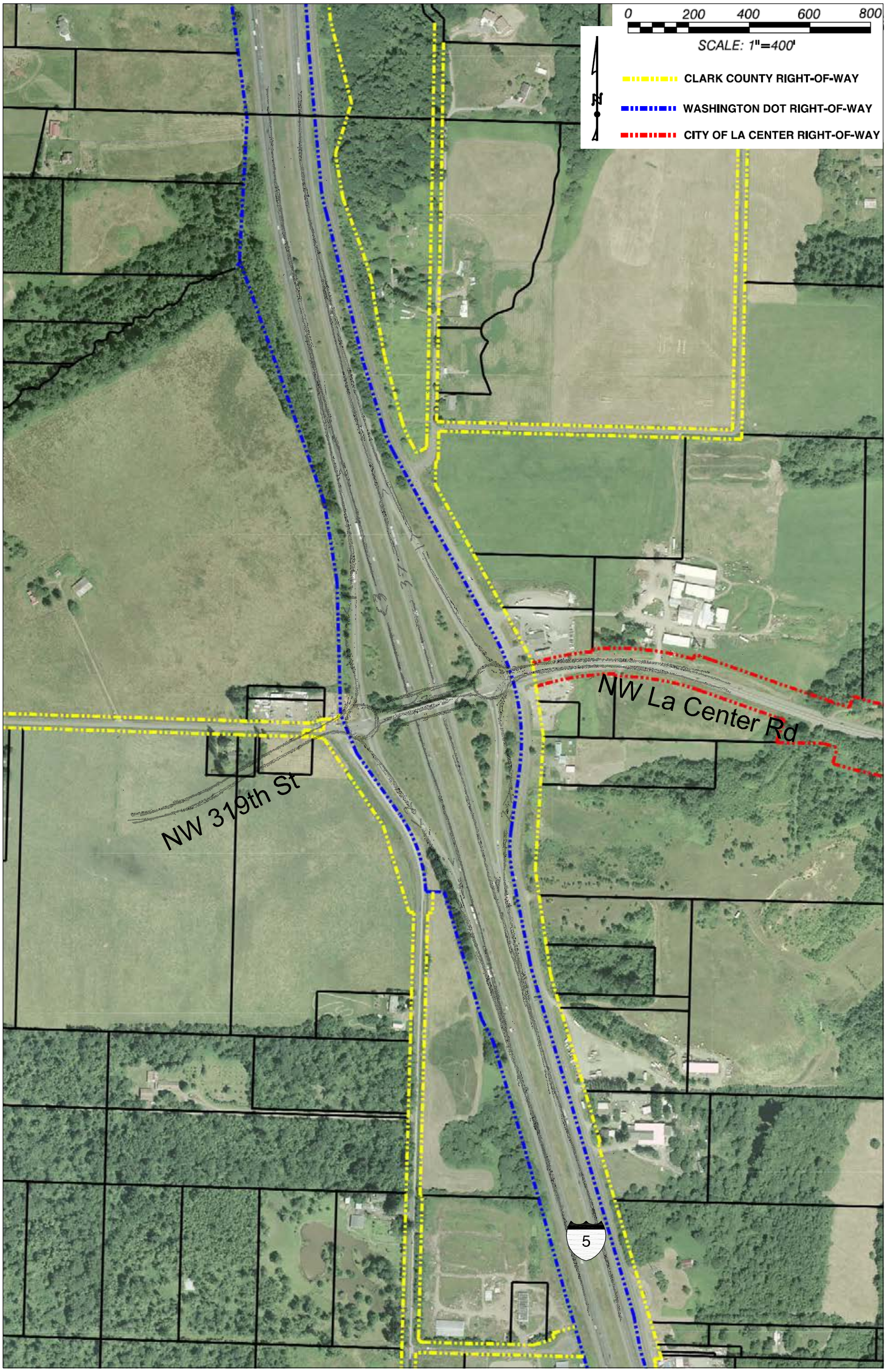

ROUNDABOUT DIAMOND INTERCHANGE
LA CENTER, WASHINGTON

FIGURE 2

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

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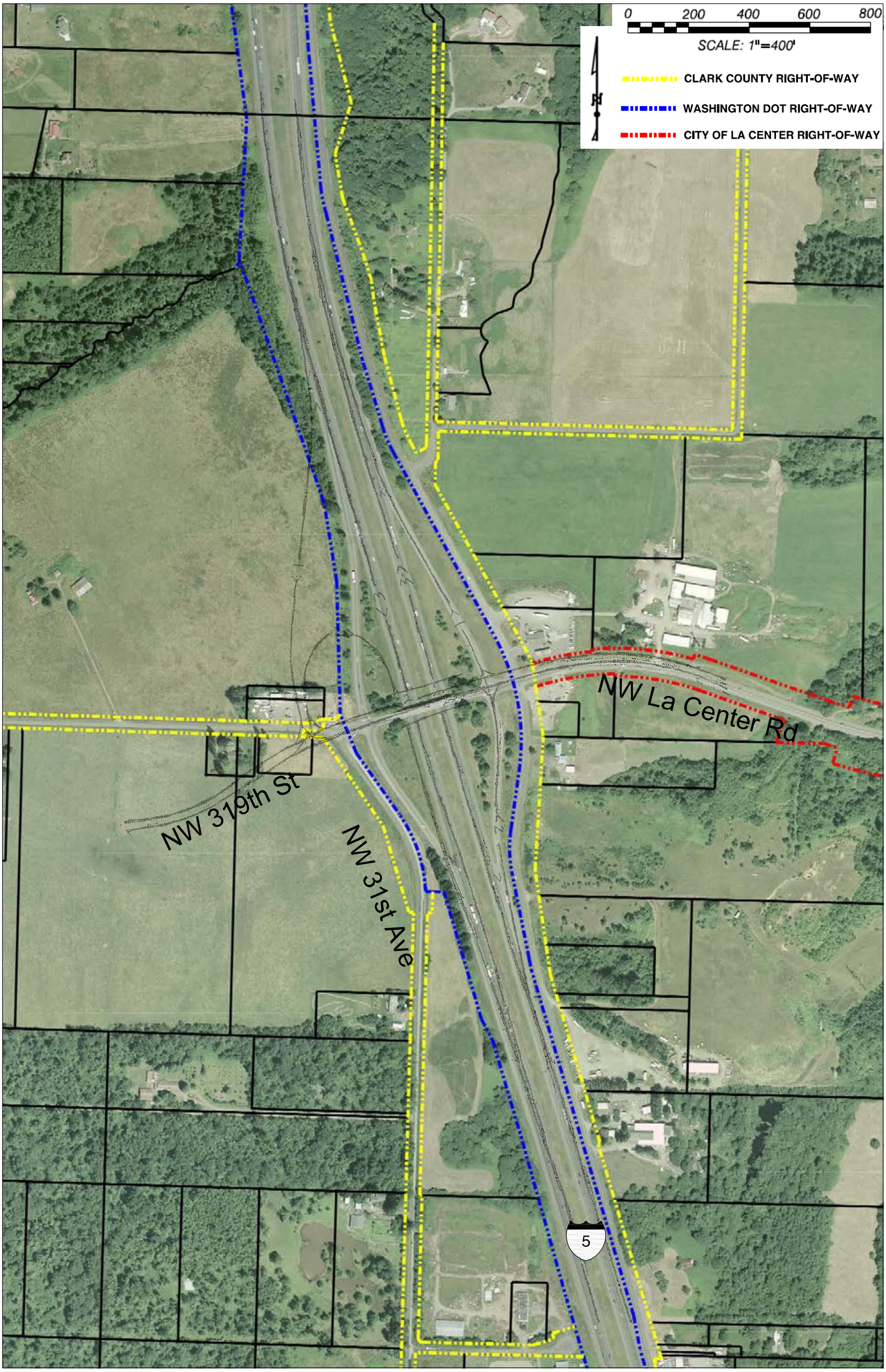
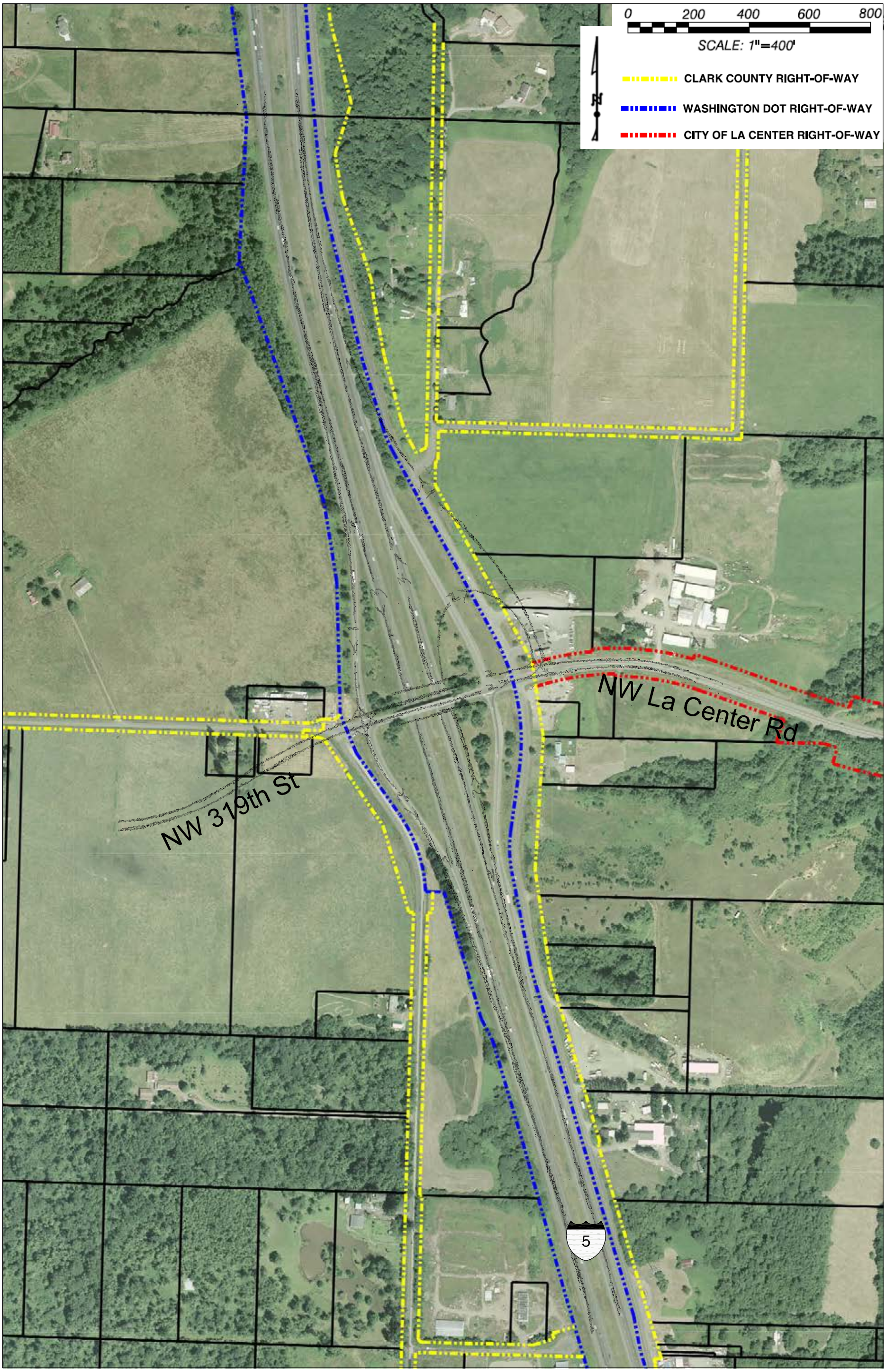


PARTIAL CLOVERLEAF INTERCHANGE (SOUTHBOUND PARCLO A)
LA CENTER, WASHINGTON

FIGURE 3

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

H:\proj\file\12393 - Cowlitz Reservation Development\dwgs\design\Interchange Concepts\Sketches\3-4-2013\Interchange Concepts.dwg Jul 07, 2014 - 12:50pm - bcullimore Layout Tab: 3_civleaf

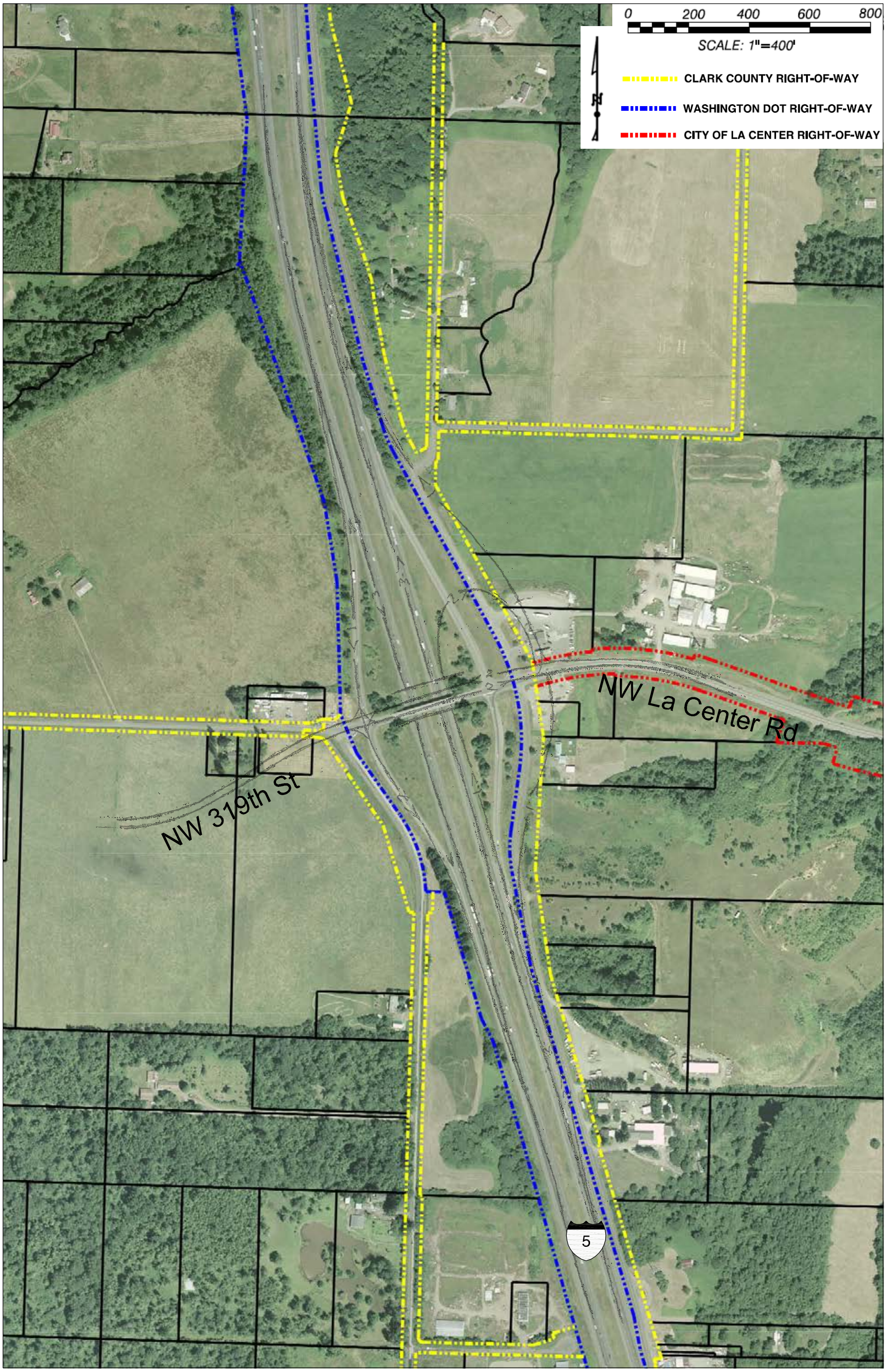


PARTIAL CLOVERLEAF INTERCHANGE (NORTHBOUND PARCLO B)
LA CENTER, WASHINGTON

FIGURE 4

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

H:\proj\file\12393 - Cowlitz Reservation Development\dwgs\design\Interchange Concepts\Sketches\3-4-2013\Interchange Concepts.dwg Jul 07, 2014 - 12:53pm - bcullimore Layout Tab: 4_civleafNE

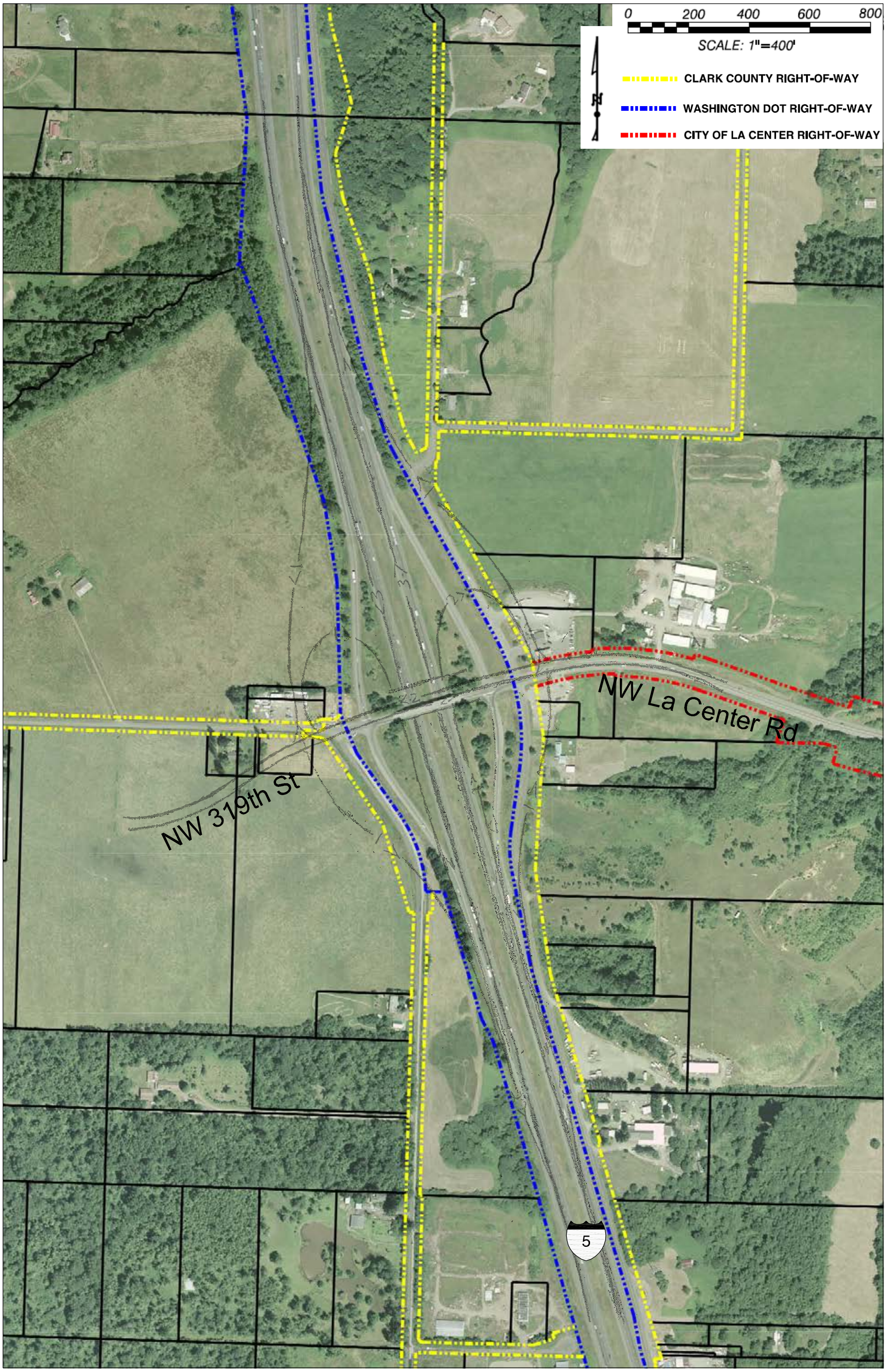


PARTIAL CLOVERLEAF INTERCHANGE (NORTHBOUND PARCLO B AND "A" RAMP)
LA CENTER, WASHINGTON

FIGURE 5

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

H:\proj\file\12393 - Cowlitz Reservation Development\dwgs\design\Interchange Concepts\Sketches\3-4-2013\Interchange Concepts.dwg Jul 07, 2014 - 12:55pm - bcullimore Layout Tab: 5_clvleafNE



PARTIAL CLOVERLEAF INTERCHANGE (SOUTHBOUND PARCLO A, NORTHBOUND PARCLO B, AND "A" RAMP)
LA CENTER, WASHINGTON

FIGURE 6

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

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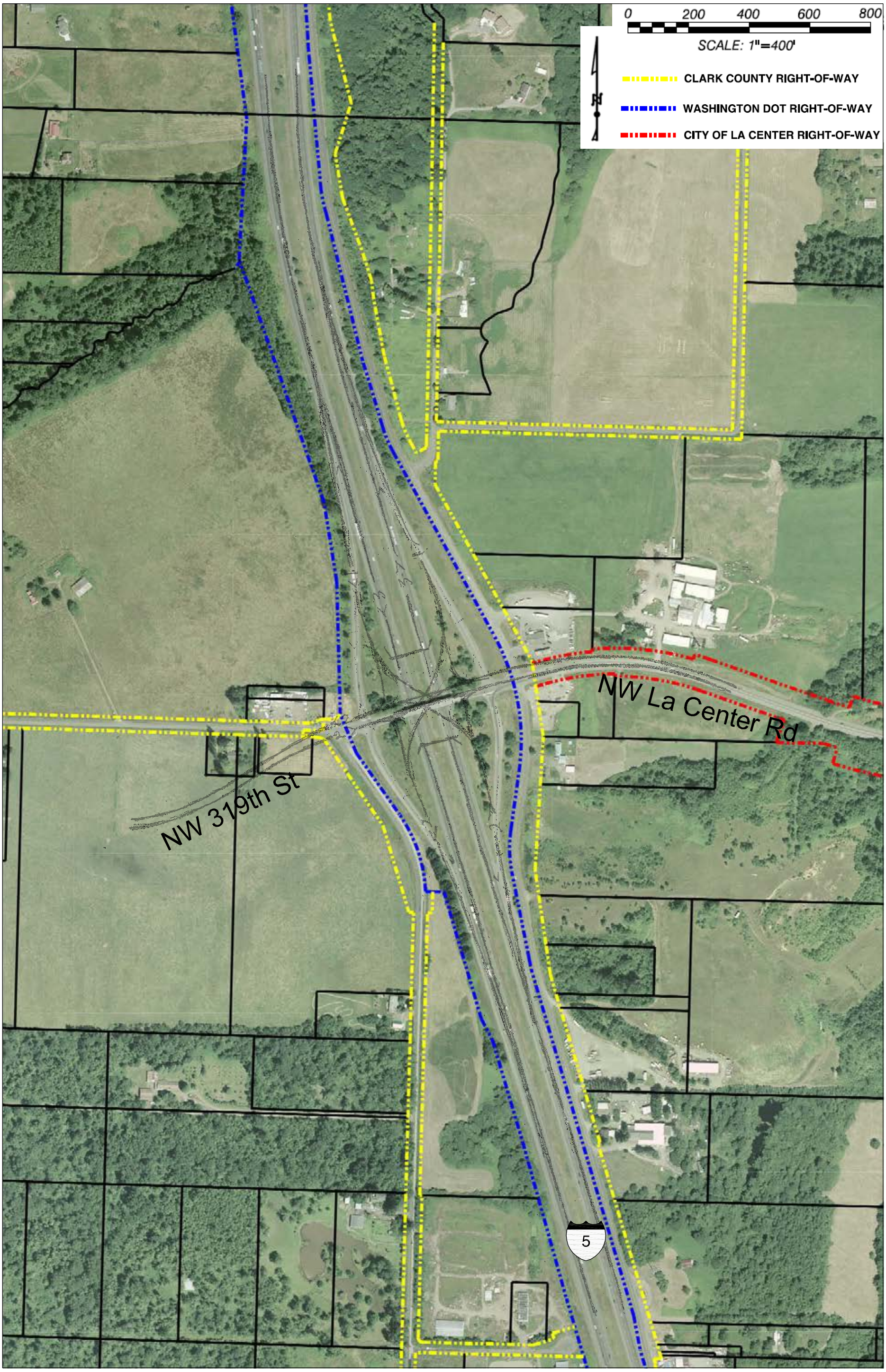
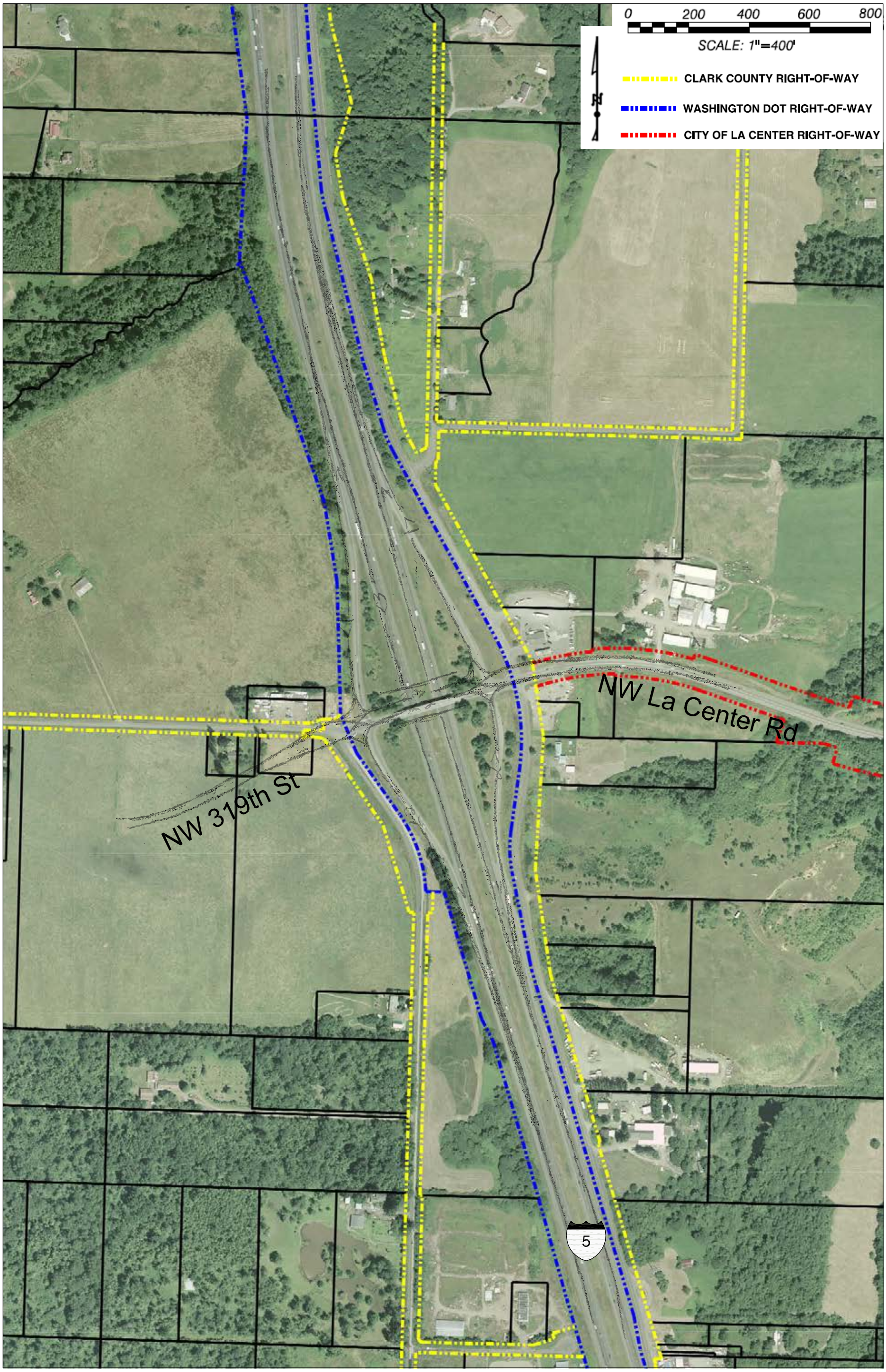


SINGLE-POINT URBAN INTERCHANGE (SPUI)
LA CENTER, WASHINGTON

FIGURE 7



DIVERGING DIAMOND INTERCHANGE
LA CENTER, WASHINGTON

FIGURE 8

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

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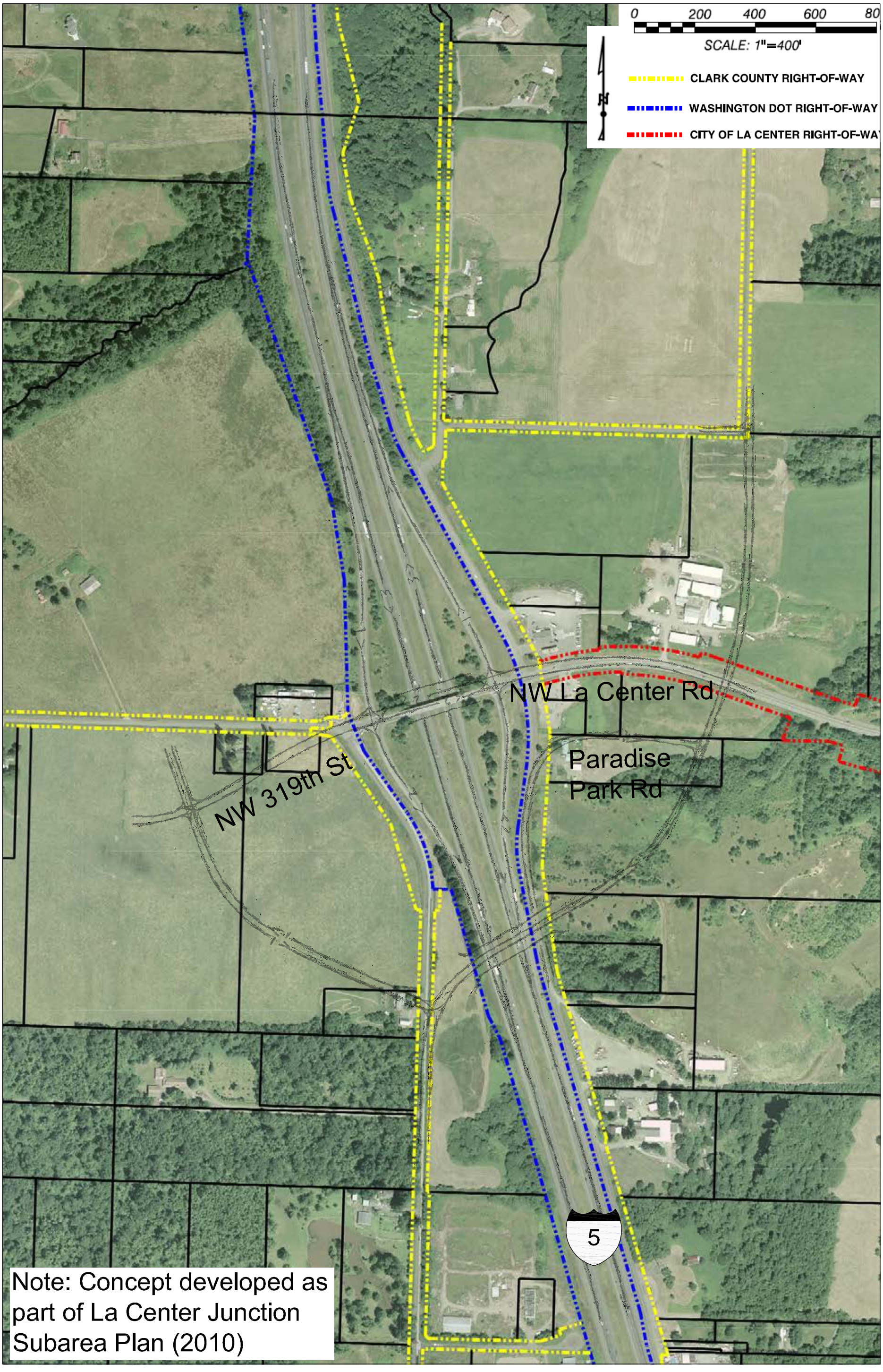

DIAMOND INTERCHANGE WITH ADDITIONAL OVERCROSSING
LA CENTER JUCTION SUBAREA PLAN CONCEPT 2
LA CENTER, WASHINGTON

FIGURE 9

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

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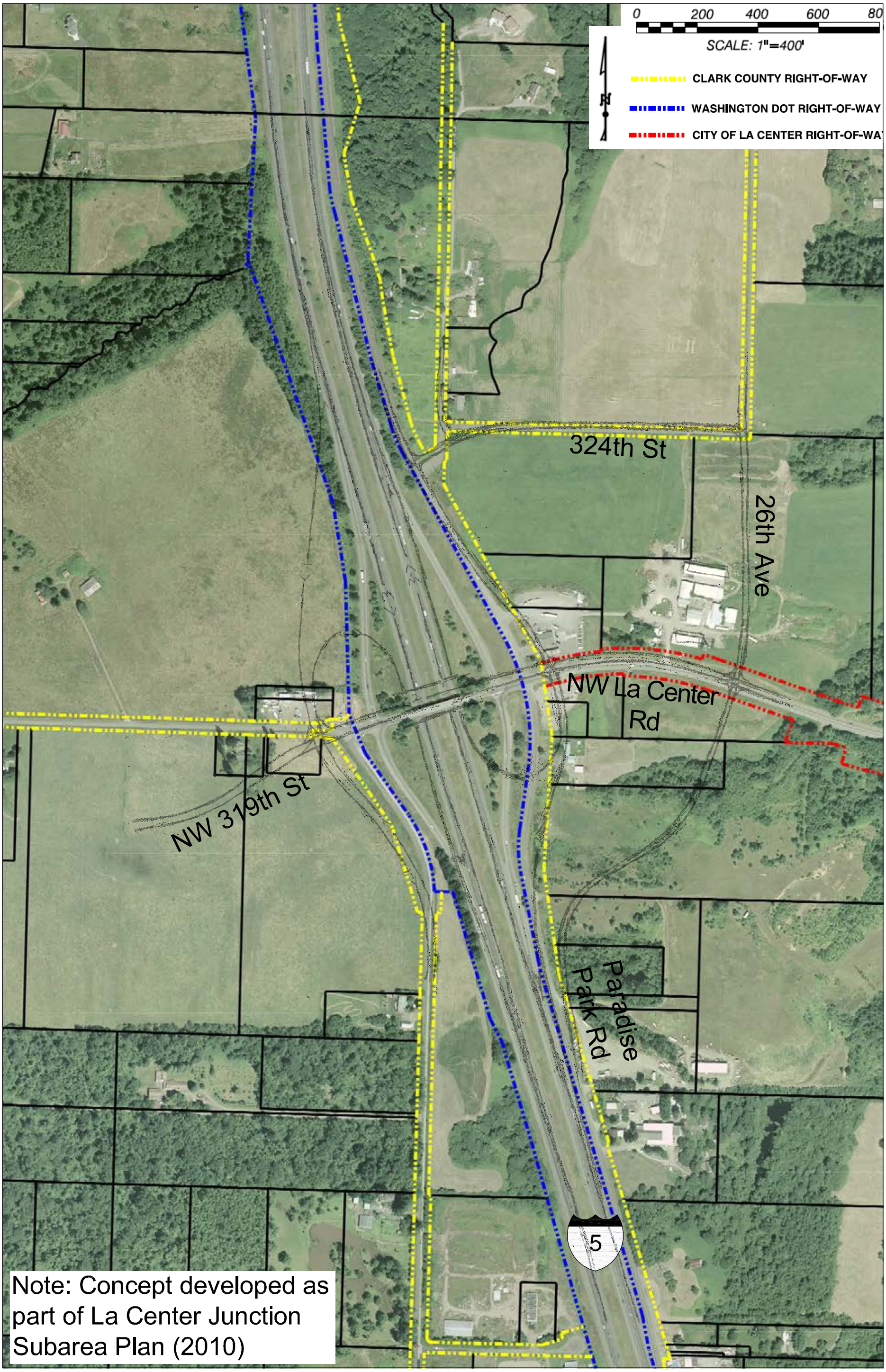


PARTIAL CLOVERLEAF INTERCHANGE (PARCLO A)
LA CENTER JUCTION SUBAREA PLAN CONCEPT 3
LA CENTER, WASHINGTON

FIGURE 9

Appendix H Detailed Interchange Design Concept Review

APPENDIX H: DETAILED CONCEPT REVIEW

Concept 1 – Signalized Diamond Interchange

Transportation Operations (+1): the existing interchange can accommodate projected traffic volumes by widening the existing bridge structure and adding additional lanes at the ramp terminals.

Land Use (+1): Right-of-way impacts would be minimal with this concept, and existing businesses/land uses within the vicinity of the interchange could be maintained.

Multimodal Accessibility (+1): bike lanes and sidewalks can be provided by improving the existing interchange. Traffic signals at the ramp terminals control high-speed movements from the freeway, helping protect bicyclists and pedestrians.

Cost (+2): improvement costs to the existing interchange would likely be to the lower end compared to the other concepts.

Environmental Impact (+1): the environmental impact would be minimized by not significantly expanding the footprint of the interchange or altering the freeway ramps.

Constructability (+1): construction of this improvement could be done in phases and would have minimal impacts to adjacent land uses and traffic operations during construction. This improvement requires minimal alternations to the existing freeway ramps.

Accessibility & Connectivity (0): this concept would not inhibit local connectivity. However, accommodating some existing private property accesses along NW La Center Road that would be located within the intersection influence area may be challenging.

Concept 2 – Roundabout Diamond Interchange

Transportation Operations (+2): the existing interchange can accommodate projected traffic volumes by widening the existing bridge structure and adding additional lanes at the ramp terminals. Using roundabouts at the ramp terminals improves operations and requires fewer lanes across the bridge structure.

Land Use (+1): Right-of-way impacts would be minimal with this concept, and existing businesses/land uses within the vicinity of the interchange could be maintained.

Multimodal Accessibility (+1): bike lanes and sidewalks can be provided by improving the existing interchange. Roundabouts at the ramp terminals control high-speed movements from the freeway, helping protect bicyclists and pedestrians.

Cost (+2): improvement costs to the existing interchange would likely be to the lower end compared to the other concepts.

Environmental Impact (+1): the environmental impact would be minimized by not significantly expanding the footprint of the interchange or altering the freeway ramps.

Constructability (+1): construction of this improvement could be done in phases and would have minimal impacts to adjacent land uses during construction. Maintaining traffic operations during construction would be more difficult than under the signalized concepts. This improvement requires minimal alternations to the existing freeway ramps.

Accessibility & Connectivity (0): this concept would not inhibit local connectivity or access to any property. Accesses between roundabouts can be limited to right-in/right-out, because left-turns can be accommodated at the roundabouts.

CoNcept 3 – Partial Cloverleaf Interchange (Southbound parclo A)

Transportation Operations (+2): a partial cloverleaf interchange would provide additional capacity for the southbound on-ramp during the AM peak.

Land Use (-1): the interchange configuration would have a large footprint to the northwest of the interchange.

Multimodal Accessibility (0): the movements with loop ramp would be potentially high speed, causing potential conflicts for bicycle and pedestrian users. Running the right-turns associated with the loop ramp through a signal would create a controlled environment. The south side of the overpass will have fewer conflicts associated with bicycles and pedestrians through the interchange ramp terminal area.

Cost (-1): construction of this interchange would require reconstruction of the overpass and southbound on- and off-ramps.

Environmental Impact (-1): environmental impacts would be significant with the expansion of the footprint of the interchange, particularly on the north side of the interchange.

Constructability (0): construction of this improvement could be done in phases, but could require significant disruption of existing traffic operations, particularly for the impacted ramps.

Accessibility & Connectivity (0): this concept would not inhibit local connectivity or access to any property. However, accommodating some existing private property accesses along NW La Center Road that would be located within the intersection influence area may be challenging.

Concept 4 – Partial Cloverleaf Interchange (Northbound parclo B)

Transportation Operations (+2): a partial cloverleaf interchange would provide additional capacity for the northbound off-ramp during the PM peak.

Land Use (-1): the interchange configuration would have a large footprint to the northeast of the interchange, which would impact the existing gas station.

Multimodal Accessibility (0): the movements with loop ramp would be potentially high speed, causing significant conflicts for bicycle and pedestrian users. Running the right-turns associated with the loop ramp through a signal would create a controlled environment. The south side of the overpass will have fewer conflicts associated with bicycles and pedestrians through the interchange ramp terminal area.

Cost (-1): construction of this interchange would require reconstruction of the overpass and northbound on- and off-ramps.

Environmental Impact (-1): environmental impacts would be significant with the expansion of the footprint of the interchange, particularly on the north side of the interchange.

Constructability (0): construction of this improvement could be done in phases, but could require significant disruption of existing traffic operations, particularly for the impacted ramps.

Accessibility & Connectivity (0): this concept would impact property and access to the existing gas station northeast of the interchange. Otherwise, it would not inhibit local connectivity. However, accommodating some existing private property accesses along NW La Center Road that would be located within the intersection influence area may be challenging.

Concept 5 – Partial Cloverleaf Interchange (Northbound parclo B and "A" Ramp)

Transportation Operations (+2): a partial cloverleaf interchange would provide additional capacity for the northbound off-ramp during the PM peak**.**

Land Use (-2): the interchange configuration would have a large footprint to the northeast of the interchange, which would impact the existing gas station.

Multimodal Accessibility (0): the movements with loop ramp would be potentially high speed, causing significant conflicts for bicycle and pedestrian users. Running the right-turns associated with the loop ramp through a signal would create a controlled environment. However, the south side of the overpass will have fewer conflicts associated with bicycles and pedestrians through the interchange ramp terminal area.

Cost (-1): construction of this interchange would require reconstruction of the overpass and northbound on- and off-ramps.

Environmental Impact (-1): environmental impacts would be significant with the expansion of the footprint of the interchange, particularly on the north side of the interchange.

Constructability (0): construction of this improvement could be done in phases, but could require significant disruption of existing traffic operations, particularly for the impacted ramps.

Accessibility & Connectivity (-1): this concept would impact property and access to the existing gas station northeast of the interchange. Otherwise, it would not inhibit local connectivity.

Concept 6 – Partial Cloverleaf Interchange (Southbound Parclo A, Northbound Parclo B, and "A" Ramp)

Transportation Operations (+2): a partial cloverleaf interchange would provide additional capacity for the southbound on-ramp during the AM peak and northbound off-ramp during the PM peak.

Land Use (-2): the interchange configuration would have a large footprint to the north of the interchange, which would impact the existing gas station.

Multimodal Accessibility (-1): the movements with loop ramps would be potentially high speed, causing significant conflicts for bicycle and pedestrian users. Running the right-turns associated with the loop ramp through a signal would create a controlled environment. However, the south side of the overpass will have fewer conflicts associated with bicycles and pedestrians through the interchange ramp terminal area.

Cost (-2): construction of this interchange would require reconstruction of the overpass and all ramps.

Environmental Impact (-2): environmental impacts would be significant with the expansion of the footprint of the interchange, particularly on the north side of the interchange on both sides of I-5.

Constructability (-1): construction of this improvement could be done in phases, but could require significant disruption of existing traffic operations, particularly for the impacts associated with two new loop ramps.

Accessibility & Connectivity (-1): this concept would impact property and access to the existing gas station northeast of the interchange. Otherwise, it would not inhibit local connectivity.

Concept 7 – Single-Point Urban Interchange (SPUI) Configuration

Transportation Operations (+2): a SPUI configuration would provide significant additional capacity for the interchange.

Land Use (+2): while the bridge would have a large footprint, impacts to the quadrants of the interchange and existing businesses or land uses are minimal.

Multimodal Accessibility (-2): bicyclists and pedestrians cannot easily be accommodated with a SPUI configuration and will face significant challenges navigating the interchange due to exposure associated with the large intersection footprint.

Cost (-1): construction of this interchange would require significant reconstruction of a large overpass structure and approach realignments.

Environmental Impact (+1): environmental impacts would be minimal, as the interchange does not require significant changes to the freeway ramps.

Constructability (-1): construction of this improvement has challenges constructing it in phases and would require significant disruption of existing traffic operations.

Accessibility & Connectivity (+1): this concept would not inhibit local connectivity or access to any property.

Concept 8 – Diverging Diamond Interchange (DDI)

Transportation Operations (+2): a diverging diamond would provide significant additional capacity for the interchange.

Land Use (+1): while the bridge would have to be widened, the right-of-way impacts would not be significant with this concept.

Multimodal Accessibility (-1): bicyclists and pedestrians may be unfamiliar with the interchange form.

Cost (+2): construction of this interchange would likely be to the lower end compared to the other concepts, as it only requires minimal alternations to the existing freeway ramps.

Environmental Impact (+1): environmental impact would be minimized by not significantly expanding the footprint of the interchange or the freeway ramps.

Constructability (+1): construction of this improvement could be done in phases, but would require longer disruption of existing traffic operations. This improvement requires minimal alternations to the existing freeway ramps.

Accessibility & Connectivity (0): this concept would not inhibit local connectivity or access to any property, but would be unfamiliar to users. Additionally, exiting freeway traffic cannot immediately re-enter through the ramp terminals.

Concept 9 – Diamond Interchange with Additional Overcrossing

Transportation Operations (+1): the existing interchange can accommodate projected traffic volumes by widening the existing bridge structure and adding additional lanes at the ramp terminals. The additional overcrossing south of the interchange provides capacity for local trips, but these are relatively low volume.

Land Use (-2): Right-of-way impacts directly adjacent to the interchange would be minimal with this concept. However, the additional overcrossing would significantly impact the properties further southeast of the interchange.

Multimodal Accessibility (+2): bike lanes and sidewalks can be provided by improving the existing interchange and on the additional overcrossing.

Cost (-2): adding an additional overcrossing and improving the existing interchange would have significant costs.

Environmental Impact (-2): the environmental impacts associated with the additional overcrossing would be significant.

Constructability (+1): construction of this improvement could be done in phases and would have minimal impacts to adjacent land uses and traffic operations during construction. This improvement requires minimal alternations to the existing freeway ramps.

Accessibility & Connectivity (0): this concept would not inhibit local connectivity and is consistent with the City of La Center's plans (developed as part of La Center Junction Subarea Plan).

Concept 10 – Partial Cloverleaf Interchange (Parclo A)

Transportation Operations (+2): a partial cloverleaf interchange would provide additional capacity for the southbound on-ramp during the AM peak, but the northbound loop on-ramp does not serve a dominant movement.

Land Use (-2): the interchange configuration would have a large footprint to the northwest and southeast quadrants of the interchange.

Multimodal Accessibility (-2): the movements with loop ramps would be potentially high speed, causing significant conflicts for bicycle and pedestrian users. Running the right-turns associated with the loop ramp through a signal would create a controlled environment.

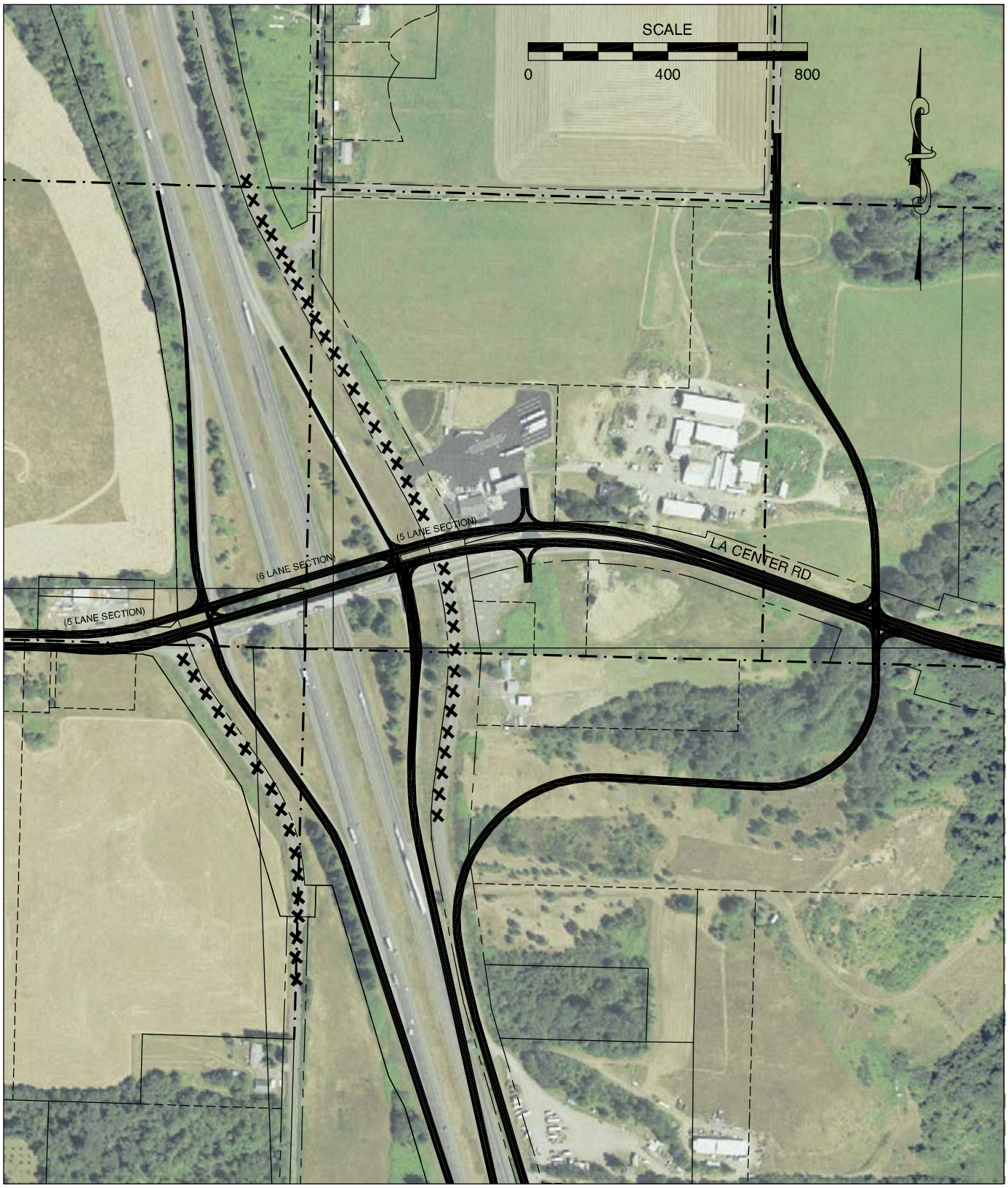
Cost (-2): construction of this interchange would require reconstruction of the overpass and all ramps.

Environmental Impact (-2): environmental impacts would be significant with the expansion of the footprint of the interchange and movement of the ramps.

Constructability (-1): construction of this improvement could be done in phases, but could require significant disruption of existing traffic operations, particularly for the impacts associated with two new loop ramps.

Accessibility & Connectivity (0): this concept would not inhibit local connectivity or access to any property. However, accommodating some existing private property accesses along NW La Center Road that would be located within the intersection influence area may be challenging.

Appendix I Single-Line Sketches of Frontage Road Options



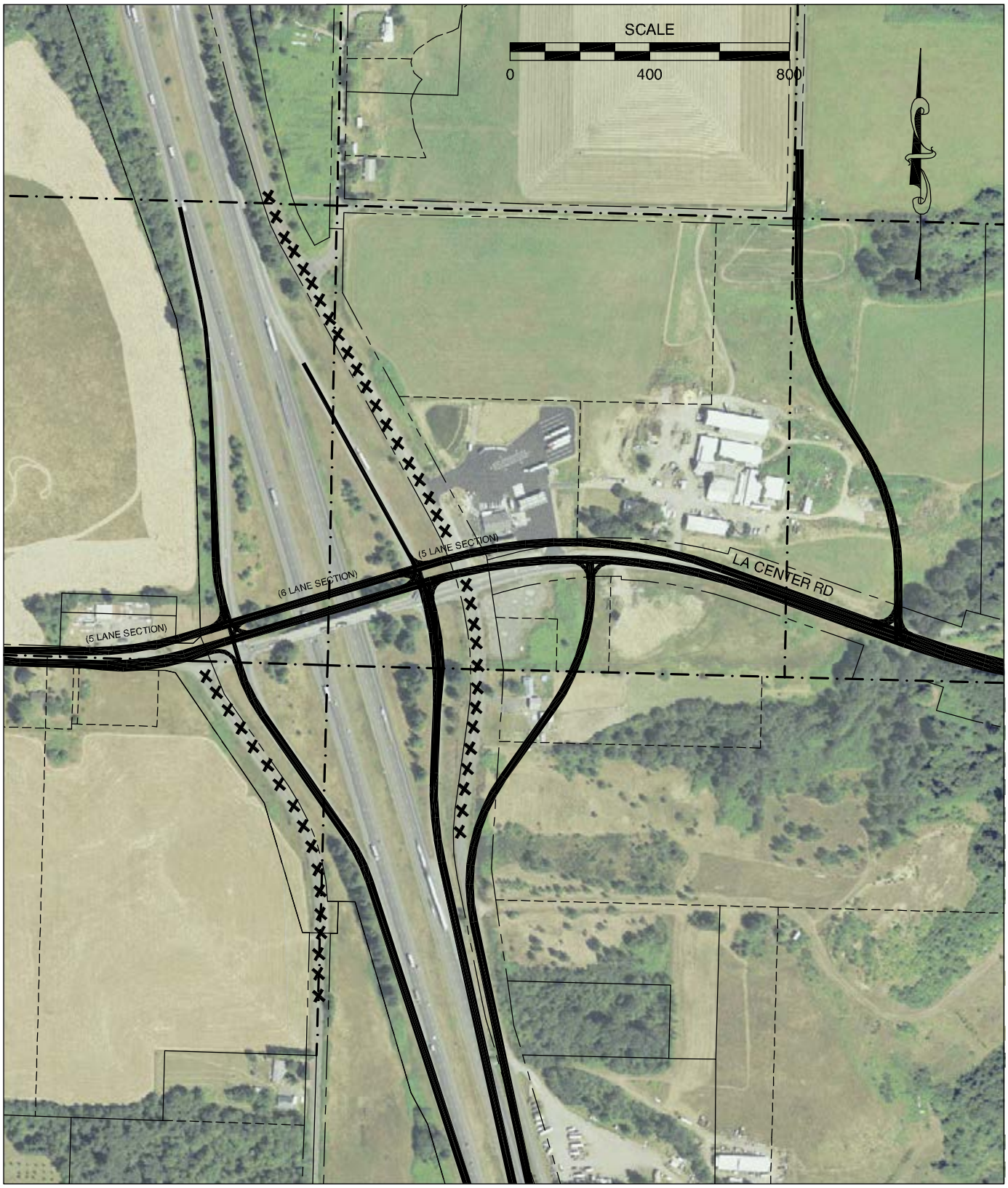
CARLSON/ FUDGE: OPTION A

FRONTAGE ROAD REALIGNMENT
LA CENTER, WASHINGTON

FIGURE 2

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

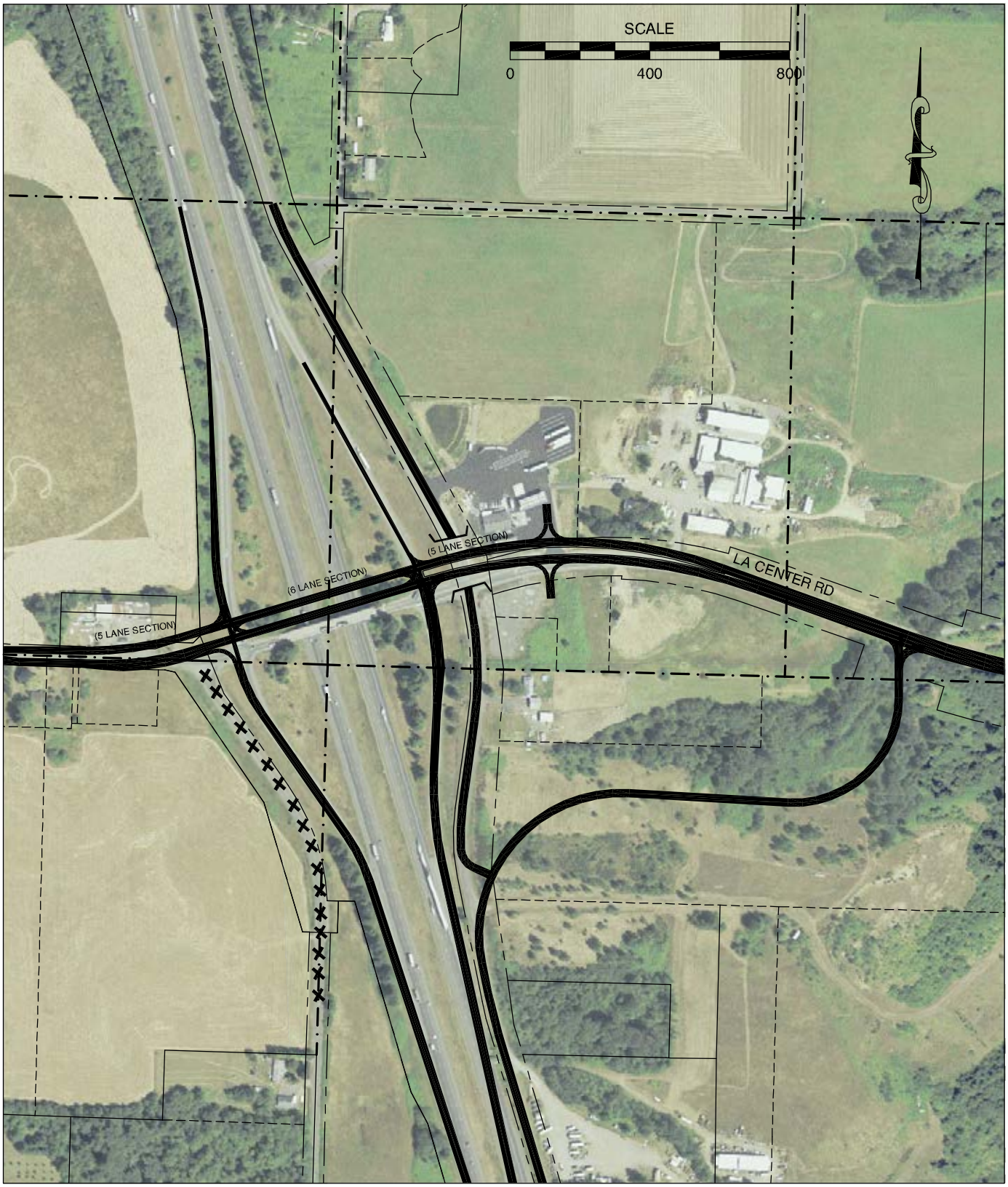
H:\projfile\12393 - Cowlitz Reservation Development\dwgs\fdesign\fdesign05.dwg Jul 11, 2014 - 9:42am - bcullimore Layout Tab: FIGURE 2



CARLSON/ BURK/ LANDON/ FUDGE: OPTION B

FRONTAGE ROAD REALIGNMENT
LA CENTER, WASHINGTON

FIGURE
3



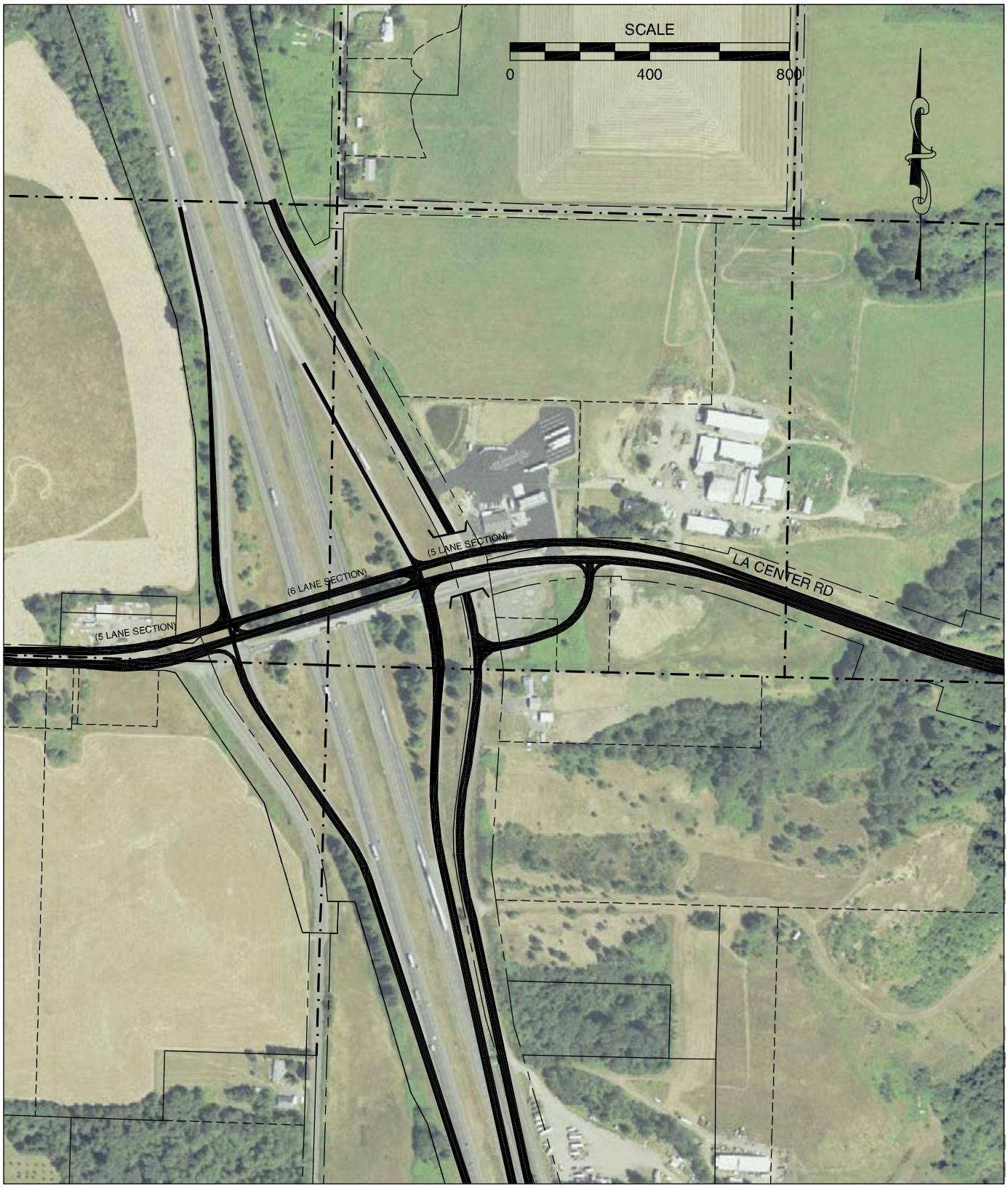
CARLSON/ LA CENTER ROAD UNDERPASS: OPTION C

FRONTAGE ROAD REALIGNMENT
LA CENTER, WASHINGTON

FIGURE 4

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING/ PLANNING

H:\profile\12393 - Cowlitz Reservation Development\dwgs\design\fdesign\fdesign05.dwg Jul 11, 2014 - 9:56am - bcullimore Layout Tab: FIGURE 4



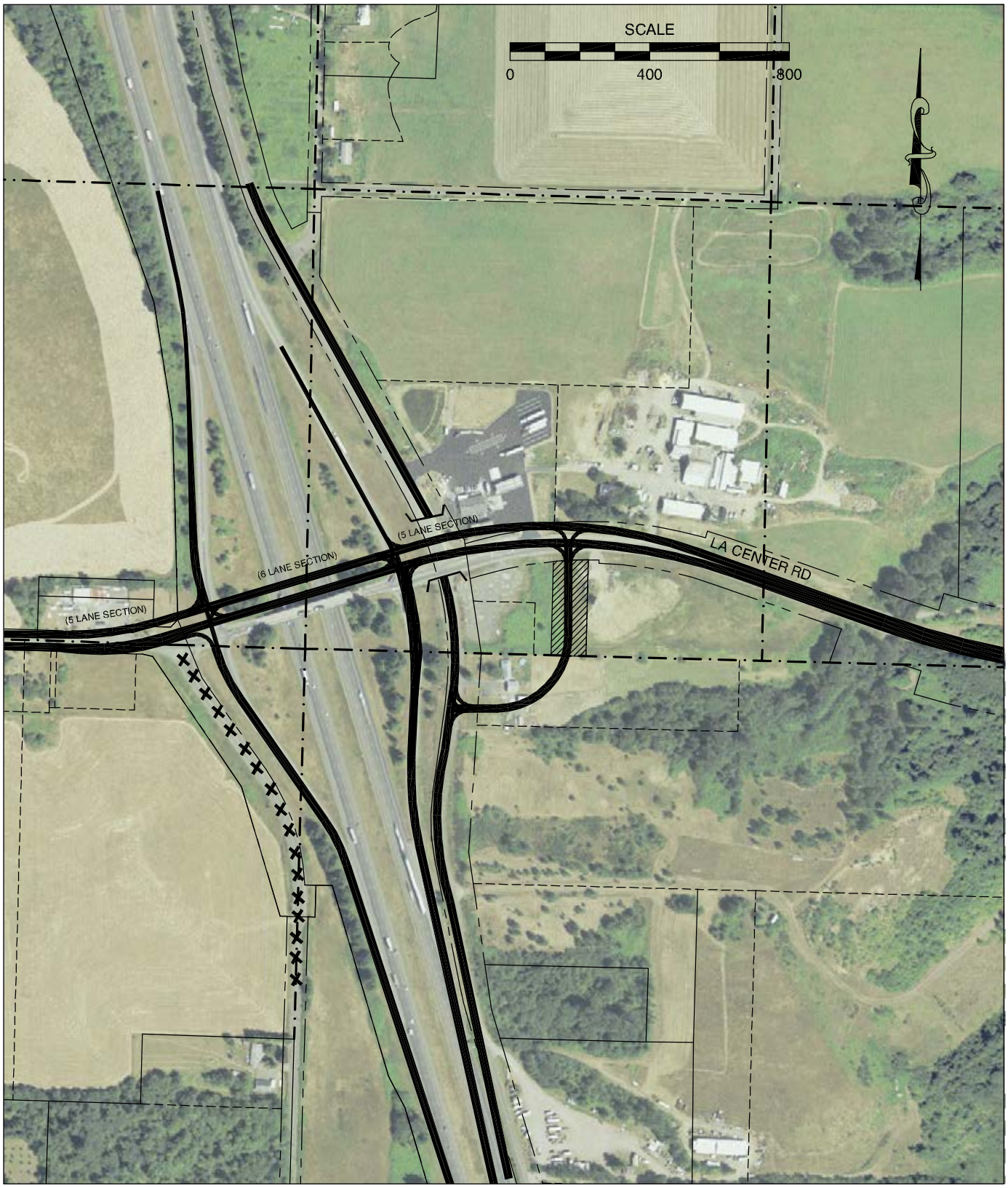
LANDON/ LA CENTER ROAD UNDERPASS: OPTION D

FRONTAGE ROAD REALIGNMENT
LA CENTER, WASHINGTON

FIGURE
4A

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

H:\proj\file\12393 - Cowlitz Reservation Development\dwgs\fdesign\fdesign05.dwg Jul 11, 2014 - 10:24am - bcullimore Layout Tab: FIGURE 4A



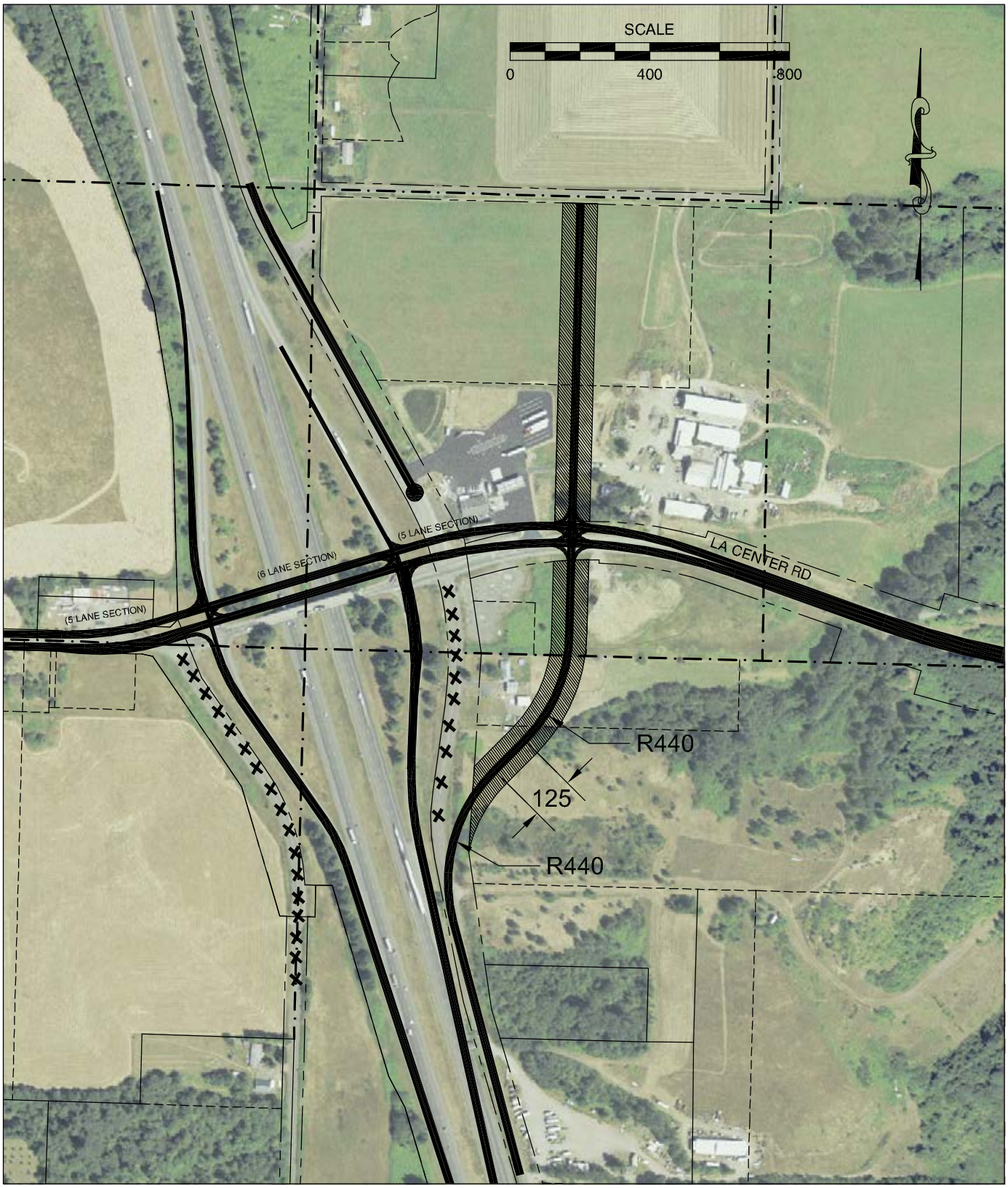
BURK/ LANDON: OPTION E1

FRONTAGE ROAD REALIGNMENT
LA CENTER, WASHINGTON

FIGURE
5A

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

H:\projfile\12393 - Cowlitz Reservation Development\dwgs\fdesign\fdesign05.dwg Jul 11, 2014 - 10:11am - bcullimore Layout Tab: FIGURE 5A



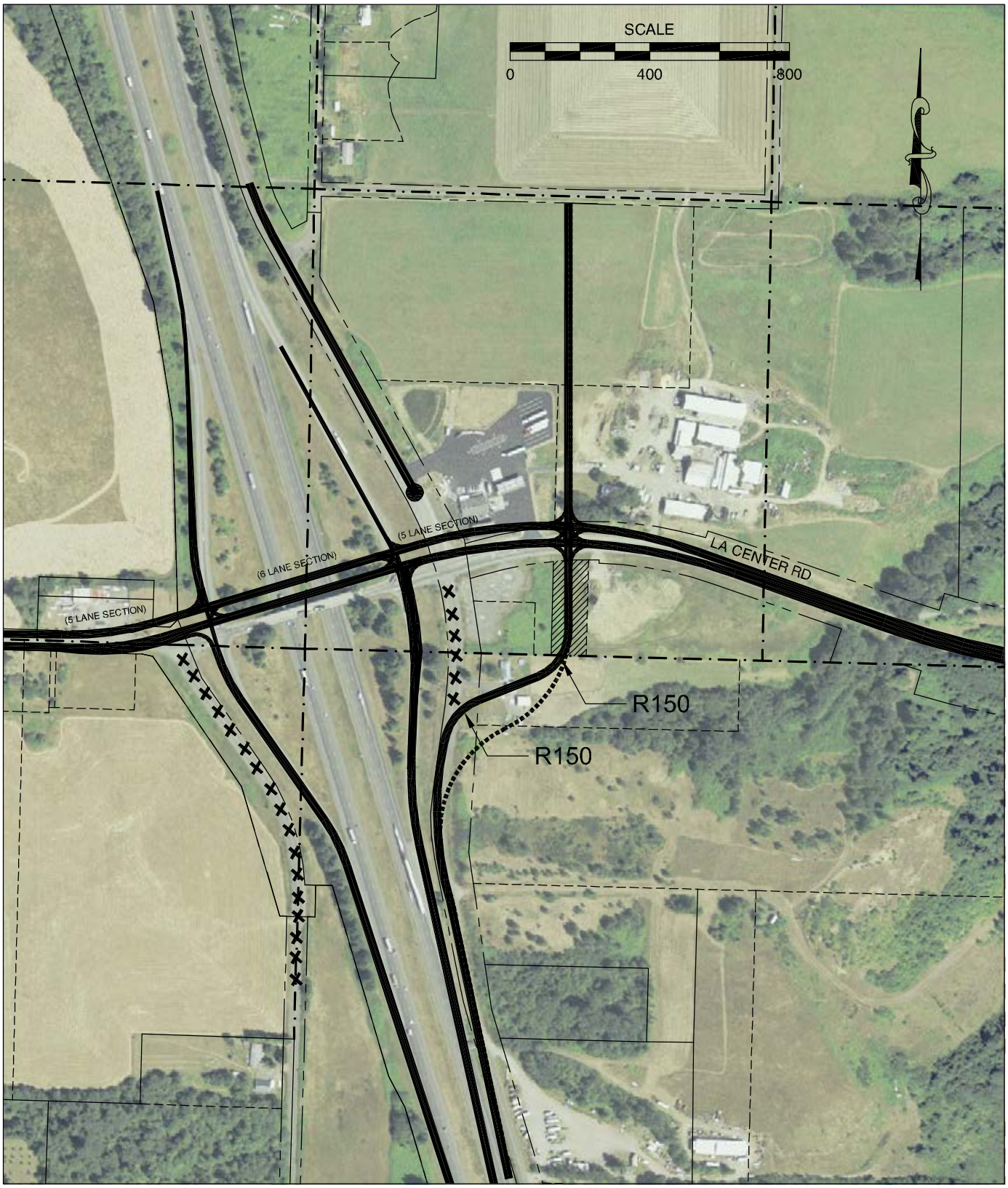
CARLSON/BURK/ LANDON/FUDGE/3B: OPTION E2

FRONTAGE ROAD REALIGNMENT
LA CENTER, WASHINGTON

FIGURE
5B

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING/ PLANNING

H:\profile\12393 - Cowlitz Reservation Development\dwgs\design\design05.dwg Jul 11, 2014 - 11:19am - bcullimore Layout Tab: FIGURE 5B



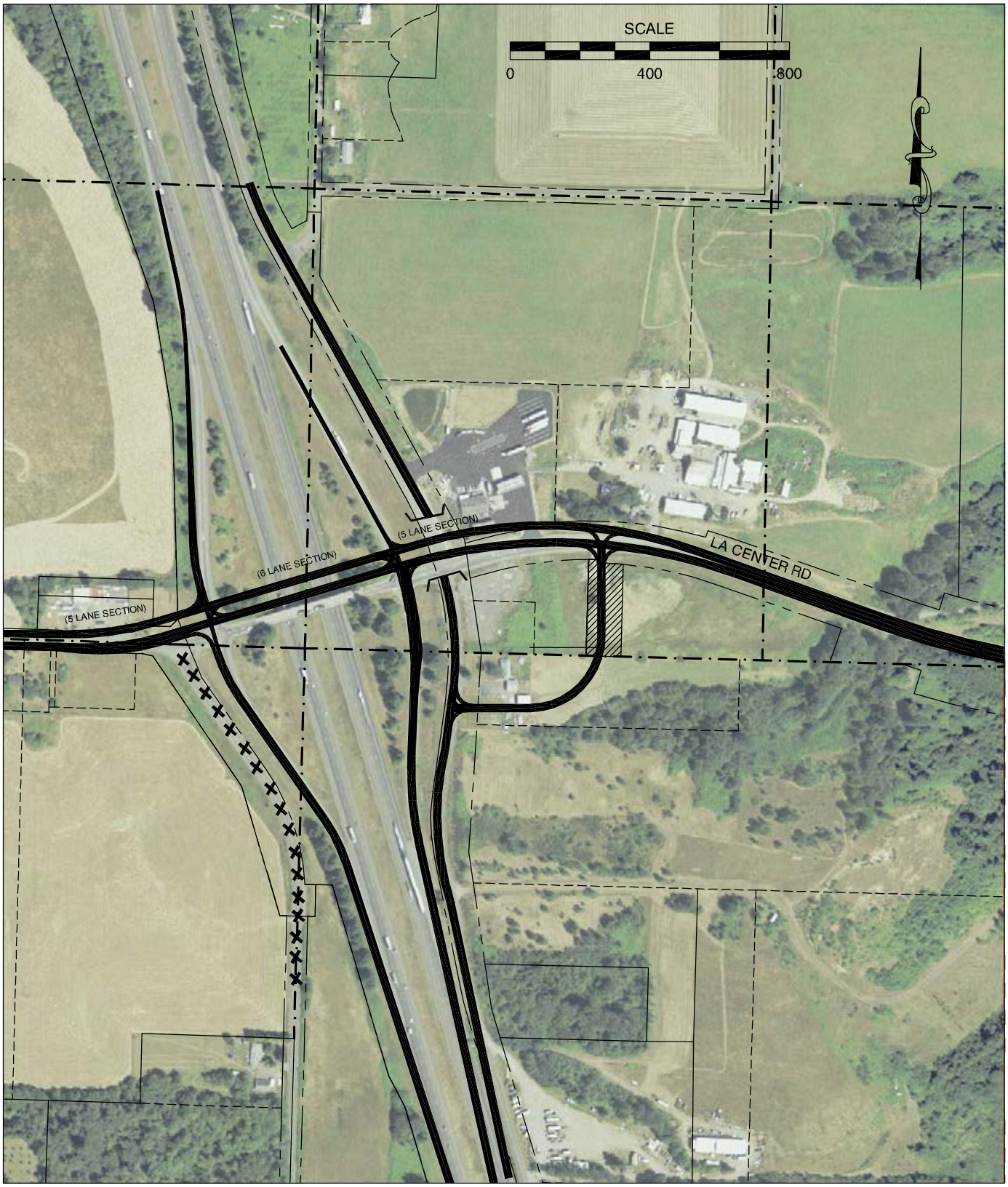
BURK/ LANDON: OPTION E3

FRONTAGE ROAD REALIGNMENT
LA CENTER, WASHINGTON

FIGURE
5C

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING/ PLANNING

H:\profile\12393 - Cowlitz Reservation Development\dwgs\fdesign\fdesign05.dwg Jul 11, 2014 - 11:21am - bcullimore Layout Tab: FIGURE 5C



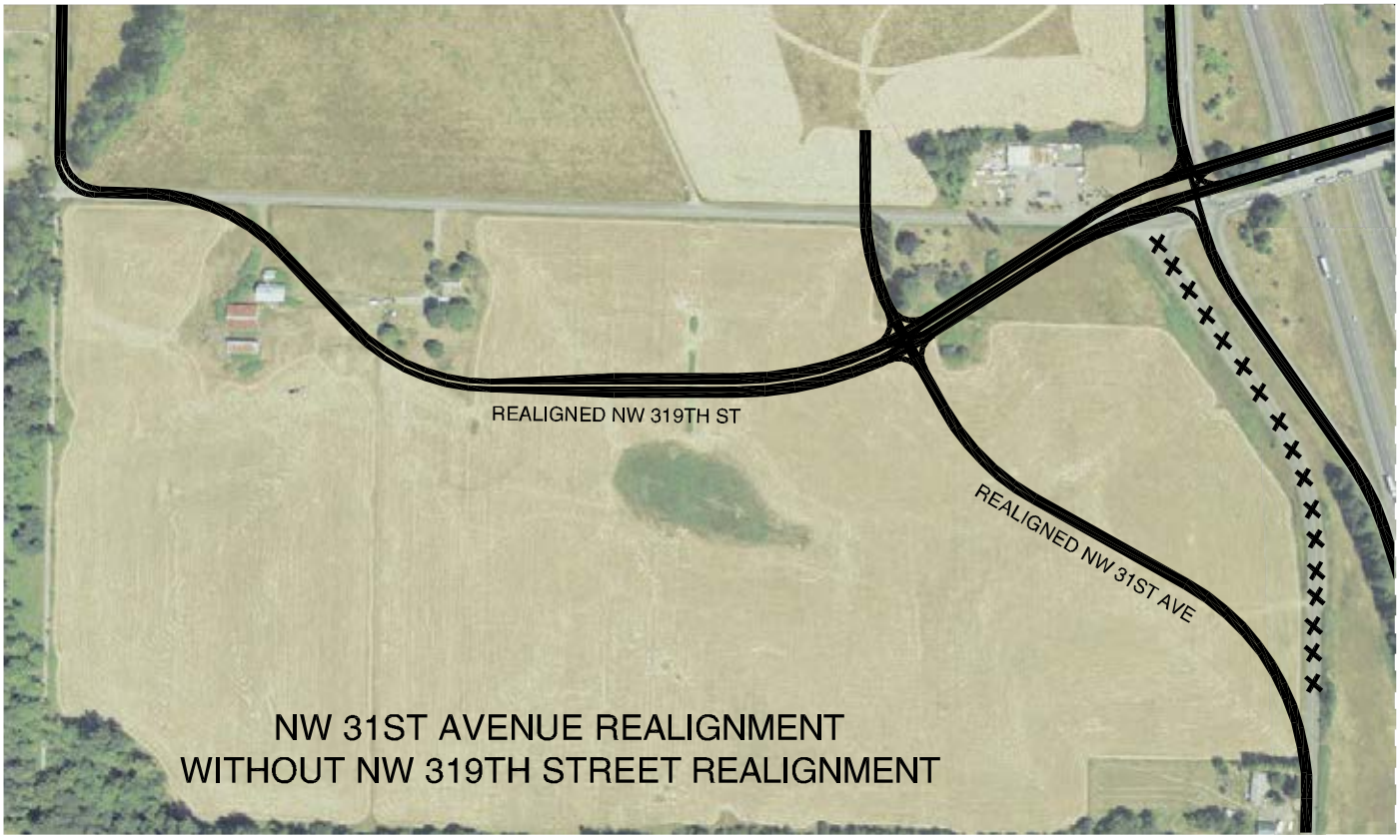
BURK/ VANVESSEM: OPTION F

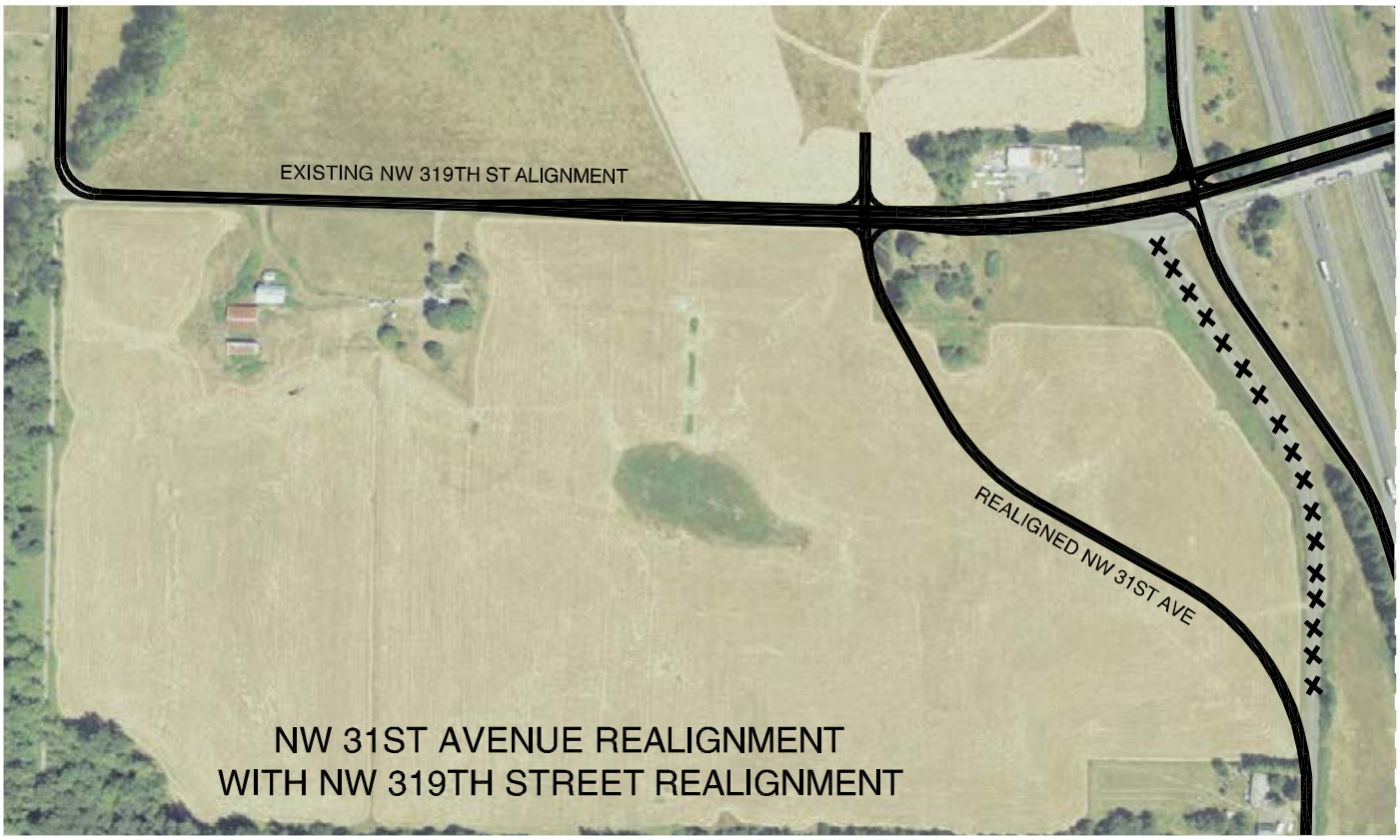
FRONTAGE ROAD REALIGNMENT
LA CENTER, WASHINGTON

FIGURE 6

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING/ PLANNING

H:\profile\12393 - Cowlitz Reservation Development\dwgs\fdesign\fdesign05.dwg Jul 11, 2014 - 11:22am - bcullimore Layout Tab: FIGURE 7





FRONTAGE ROAD REALIGNMENT
WEST OF INTERCHANGE
LA CENTER, WASHINGTON

Figure 7

Appendix J Cowlitz Reservation Development IJR Analysis Methodology

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
610 SW Alder Street, Suite 700, Portland, OR 97205 P 503.228.5230 F 503.273.8169

TECHNICAL MEMORANDUM
Cowlitz Reservation Development IJR Analysis Methodology

Date: October 16th, 2014 Project #: 12393

To: Ray Shank, Washington Department of Transportation
Rick Keniston, PE, Washington Department of Transportation
Dave Bellinger, PE, Washington Department of Transportation

From: Matt Hughart, AICP; Marc Butorac, PE, PTOE; Chris Brehmer, PE, & Kelly Laustsen; Kittelson & Associates, Inc.

This memorandum documents the freeway analysis methodology proposed for inclusion in the I-5/La Center Interchange Justification Report (IJR) and supplements the information contained in the approved *IJR Methods & Assumptions* document, dated October 2013.

This incremental memorandum is being provided to allow WSDOT an opportunity to review and comment on the transportation methodology and assumptions as the IJR is being prepared. Our intent it to secure consensus on the study methodology and findings in an incremental manner that will also allow the Applicant's project team an opportunity to make adjustments as needed prior to submittal of the formal IJR document. This memorandum largely reflects and confirms our email discussions with WSDOT staff, with documentation of these discussions provided in *Attachment A.*

BACKGROUND & ANALYSIS METHODOLOGY

Figure 1 illustrates the site vicinity and the study interchange. Kittelson & Associates, Inc. (KAI) staff visited the study area and inventoried the existing transportation system in September 2012 and in July 2014. In addition, Quality Counts, LLC collected traffic volume data at several locations, as documented later in this memorandum.

The operational methodology presented in this memorandum is consistent with the methods described in the approved *IJR Methods and Assumptions* document, dated October 2013. As a component of the IJR process, the *WSDOT Design Manual* requires a '*Methods and Assumptions Document*' be developed to record assumptions, criteria, and support team decisions used in the IJR. The *Methods and Assumptions* document for the I-5/La Center Interchange was approved in October 2013.

In addition to the IJR, a transportation impact analysis (TIA) will be prepared to document the impacts of the proposed Cowlitz Reservation development on the local system. The TIA will incorporate the preferred alternative from the IJR and will report analysis of the IJR study intersections along NW La Center Road/NW 319th Street under existing and forecast future conditions as per the IJR.

METHODOLOGY

The freeway mainline and freeway merge/diverge operational analyses presented in this report were prepared following *Highway Capacity Manual 2010* (HCM 2010) analysis procedures using Highway Capacity Software (HCS) 2010 traffic analysis software. HCS 2010 is a software package that analyzes ramp merge and diverge areas focusing on an influence area of 1,500 feet, including the acceleration or deceleration lane and adjacent freeway lanes.

Measures of Effectiveness (MOE)

The *WSDOT Design Manual*, Chapter 320 describes the measure of effectiveness (MOE) used for determining a highway facilities' level of service (LOS) as follows:

- The level of service (LOS) for operating state highway facilities is based upon measures of effectiveness (MOEs), in accordance with the latest version of the *Highway Capacity Manual.*
- These MOEs (see Table 1 below) describe the measures best suited for analyzing state highway facilities, such as freeway segments and on- or off-ramps. Depending on the facility, WSDOT LOS thresholds are LOS C and LOS D on state highway facilities.

Table 1 WSDOT Measures of Effectiveness by Facility Type

Type of Facility	Measure of Effectiveness (MOE)
Basic Freeway Segments	Density (pc/mi/ln)
Ramps	Density (pc/mi/ln)
Ramp Terminals	Delay (sec/veh)
Multilane Highways	Density (pc/mi/ln)

pc/mi/ln = passenger cars per mile per lane

The level of service (LOS) for freeway merge, diverge, and weave operations is determined by traffic density based on criteria outlined in the *Highway Capacity Manual (HCM) 2010,* as shown in Table 2.

Table 2 LOS Criteria for Freeway Merge/Diverge/Weave (HCM 2010)

LOS	Maximum Density (pc/mi/ln)	
	Merge/Diverge	Weave
A	≤10	0-10
B	>10-20	>10-20
C	>20-28	>20-28
D	>28-35	>28-35
E	>35	>35
F	Demand Exceeds Capacity	Demand Exceeds Capacity

Speed (mph) and travel time (minutes) are also indicators of the performance of an individual segment and the overall freeway facility.

WSDOT Operating Standards

WSDOT provides a table of LOS standards for state highways of statewide significance (HSS) based on RCW 47.06.140(2). Regional transportation planning organizations (RTPOs) and WSDOT jointly develop and RTPOs establish LOS standards for regionally significant state highways based on RCW 47.80.030(1)(c). Table 3 presents the WSDOT standards for state facilities in Clark County and Cowlitz County.

Table 3 WSDOT Level of Service Standards for Washington State Highways, January 1, 2010

Regional Organization/County	LOS for Non-HHS[1]		LOS for HSS[1]	
	Urban	Rural	Urban	Rural
(RTC) Southwest Washington Regional Transportation Council – MA/MP/RTPO				
Clark County	E	C	D	C
Cowlitz County	D	C	D	C

[1] HSS=Highway of Statewide Significance

Per WSDOT direction, LOS C will be the standard used for the I-5 mainline and merge/diverge operations for the existing conditions analysis. As noted in the IJR *Methods & Assumptions*, LOS C will also be the standard used through the 2017 analysis scenarios, while LOS D will be used for the 2037 scenarios.

Analysis Years/Periods

In order to assess the impact of the proposed Cowlitz Reservation Development, three analysis years (existing 2014, 2017, and 2037) will be required. Conditions were analyzed during the following time periods:

- Weekday morning peak period (7:00-9:00 AM)
- Weekday evening roadway peak period (4:00-6:00 PM)

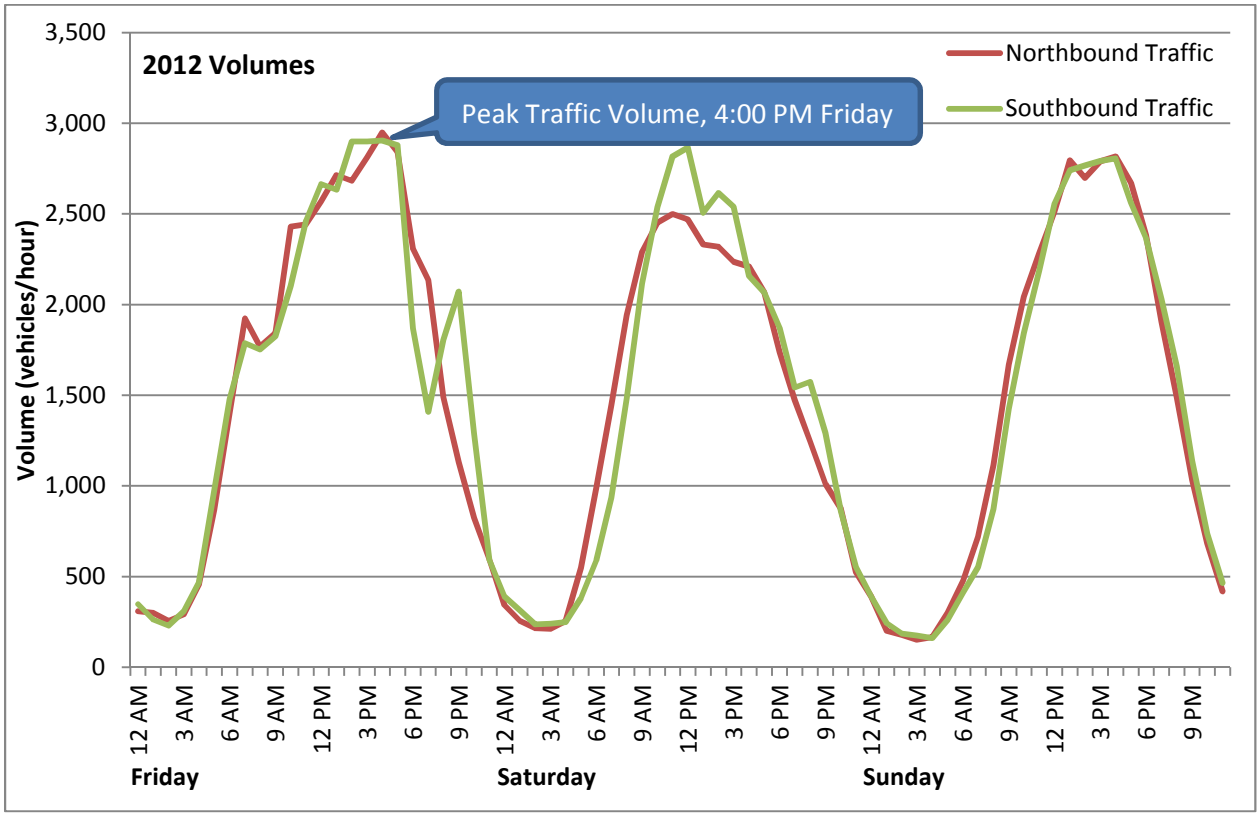
- Weekend peak period (Friday 3:00-6:00 PM)

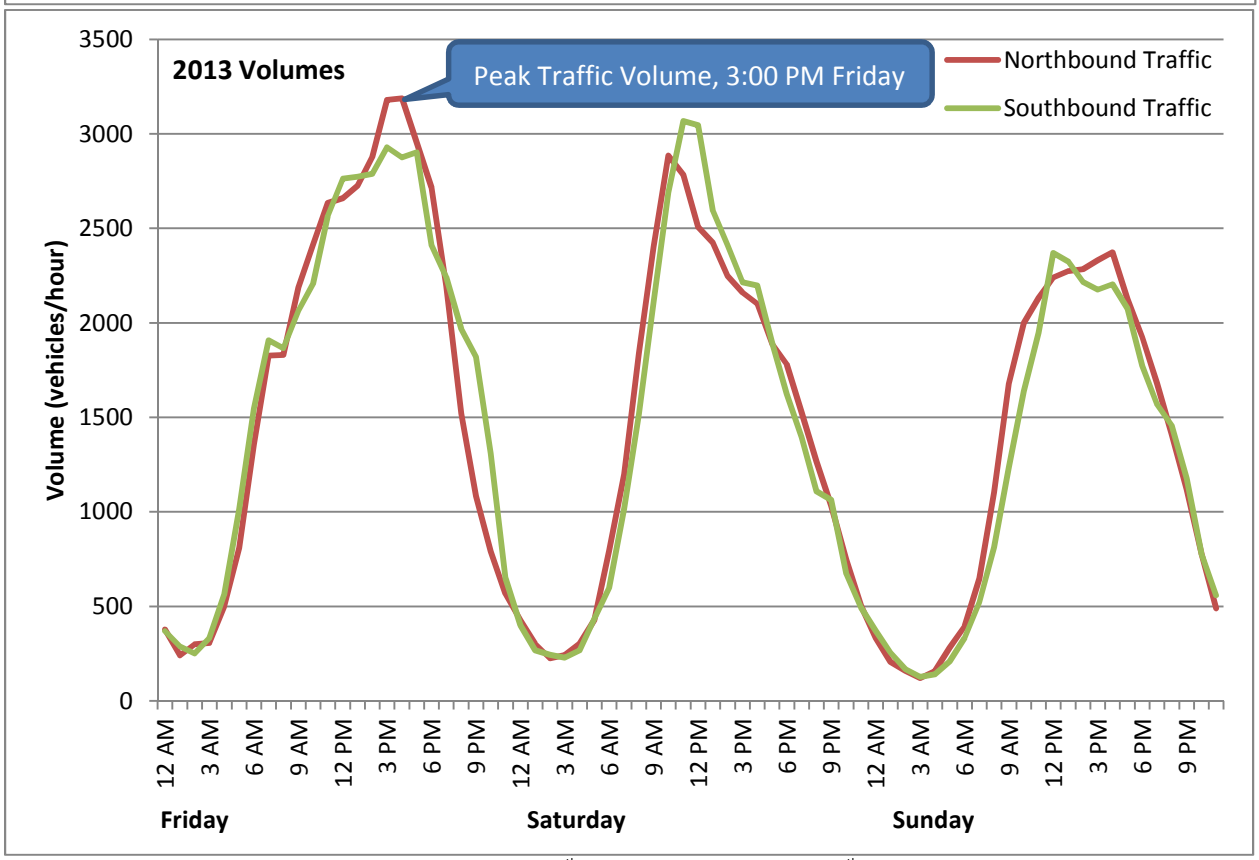
The weekend peak period was selected to address the unique trip generating characteristics of the casino and recreational travel on I-5. As recorded in the *Cowlitz Reservation Development Trip Generation Memo* dated October 2012, the trip generation profile of a casino was reviewed over the weekend, recognizing that casino trip generation typically peaks during the weekend. Traffic volumes in the vicinity of the site and on I-5 were assessed to better understand weekend traffic conditions and peaking characteristics in the area; particularly the distinct recreational directional trip patterns between the Portland and Seattle/Tacoma metropolitan areas. The cumulative impact of the background volumes and development trips is anticipated to typically be highest during the Friday PM peak. The two graphs in Exhibit 1 provide a profile of weekend volumes on I-5 from September 2012 (provided in the Trip Generation Memo[1]) and May 2013. In both cases, I-5 volumes are highest during Friday afternoon in both the northbound and southbound directions.

As described in detail in the October 2013 trip generation memo, trip generation rates anticipated at the casino over the course of a typical weekend were also assessed. Data from a number of other sites were reviewed and showed that the individual casinos peaked at different times and days of the weekend. However, considering both the existing volumes on I-5 and the measured casino generated traffic at other sites, Friday evening was selected to capture the highest cumulative impact from existing I-5 volumes and anticipated casino-generated traffic. Most of the casinos experience a Friday peak near 5:00 PM, indicating that the combination of traffic on the roadway system and produced by the proposed casino is likely to peak near this time as well. As discussed later in this memorandum, the counts were compared to the 30th highest hour volumes on I-5 to ensure they are representative of design hour volumes.

[1] Memo titled *Cowlitz Reservation Development Trip Generation Memo* and dated November 12, 2012. A copy is provided in *Attachment B*.

Exhibit 1: I-5 Weekend Volume Profiles





Note: Data in top graph is from WSDOT for Friday, September 17th, 2012 – Sunday, September 19th, 2012; data in bottom graph is for Friday, May 24th, 2013 – Sunday, May 26th, 2013

Analysis Inputs

Where possible, inputs for the freeway mainline and merge/diverge analysis were derived from available data. The lengths of deceleration and acceleration lanes for the merge analysis were measured in Google Maps. All heavy vehicles were entered as "trucks and buses" as the data collected did not specify recreational vehicles. Where data was not available, defaults values from the *HCM 2010* were applied. Free-flow speed was assumed as 35 miles per hour (mph) on the ramps and 70 mph on the mainline, based on default values from the *HCM 2010*.

TRAFFIC VOLUMES DEVELOPMENT

Turning-movement counts were collected at the I-5/La Center Ramp terminals for a typical weekday and Friday in mid-May 2014. At the same time, I-5 mainline counts were collected south of the interchange. Traffic data from the weigh station on northbound I-5 located south of the NW La Center Road interchange was received from WSDOT for June 2014. The turning movement counts and mainline data are provided in *Attachments C* and *D*, respectively. Data from the weigh station is provided in *Attachment E.* The following sub-sections describe the development of traffic volumes for use in the existing and future analysis.

Peak Hour Factor

The ramp volumes at I-5/La Center were derived from the turning movement counts collected at the ramp terminals. In accordance with the *HCM 2010* methodology, the peak hour volumes were developed by multiplying the peak 15 minutes by four and a peak hour factor of 1.0 was used for the analysis.

Seasonal Adjustment Factor

The WSDOT automatic traffic recorder (ATR) 045 is located just north of the NW La Center Road interchange with no ingress/egress points in-between. It therefore serves as a good proxy for I-5 mainline volumes at the interchange. Based on 2013 data collected at the ATR, the seasonal adjustment factor for May is 1.04 (*2013 Annual Traffic Report*, *Attachment F*). The traffic volumes on the I-5 mainline were multiplied by this factor to be representative of average traffic volumes.

Design Hour Volumes

WSDOT typically uses volumes representative of the 30th highest hour for design hour volumes. In order to ensure that the volumes used in the IJR analysis are representative of the design hour volumes, we compared the seasonally adjusted May 2014 volumes to the 29th, 30th, and 31st highest hours collected at ATR 045 in 2013. The results are shown in Table 4.

Table 4 I-5 Volumes north of La Center Interchange

Location	29th Highest Hourly Volume (1 PM, Nov 30, 2013)	30th Highest Hourly Volume (4 PM, Jul 28, 2013)	31st Highest Hourly Volume (3 PM, Dec 1, 2013)	Weekend Counts* (4:45 PM, May 16, 2014)	Weekend Counts* (seasonally adjusted)
NB Mainline	3,295	2,917	3,450	3,141	3,267
SB Mainline	3,196	3,568	3,032	2,933	3,050
Total	**6,491**	**6,485**	**6,482**	**6,074**	**6,317**

*Based on 4 × peak 15 minute volume

As seen in the table, the seasonally adjusted weekend peak hour counts (collected on Friday, May 16th, 2014) are of similar magnitude to the 30th highest hour counts. Therefore, these volumes are appropriate for use in the existing conditions assessment and as a basis for estimating future volumes.

Truck Percentages and Volumes at the Weigh Station

I-5 mainline counts were collected south of the interchange for a typical weekday and Friday in mid-May 2014. Based on the data collection method used, the counts reflect total vehicles and do not differentiate between vehicle classifications. Therefore, I-5 mainline data from 2012 at the ATR station 045 was used to estimate truck percentages on I-5 both northbound and southbound for the analysis periods. The summarized data and truck percentages used for the analysis are provided in *Attachment G.*

Traffic data from the weigh station on northbound I-5 located south of the NW La Center Road interchange was received from WSDOT for June 2014. The data provides volumes on I-5 and entering the weigh station for the weekday and Friday peak periods of analysis. The average truck volumes at the weigh station for the peak periods were derived from the data for each analysis time period (weekday AM, weekday PM, and weekend peak). The data from WSDOT reflects the number of trucks at the weigh station for the entire peak period (i.e. 7:00 to 9:00 AM). In order to estimate the number of trucks within the peak hour, the total volume was multiplied by the proportion of trucks on I-5 during just the peak hour within the peak period (based on I-5 data from 2013 also provided by WSDOT). The data from the weigh station and calculations performed to estimate the number of trucks entering/exiting the weigh station during the analysis periods are provided in *Attachment E.*

Future Volumes

Near-term 2017

The 2017 background volumes on the I-5 mainline were developed by applying a 2% linear annual growth rate to the seasonally adjusted volumes used in the existing conditions analysis. The growth rate was developed based on comparison of the Southwest Washington Regional Transportation Council (RTC) travel demand models for the horizon years 2005 and 2035. The 2035 RTC model used in

this analysis does not reflect recently revised (lower) county-wide population growth rate assumptions adopted by Clark County (the County's population growth estimate is now an average 1.12 percent annual growth county-wide). We understand the RTC models will be revised in the future to reflect the County's lower population growth assumptions and, as a result, the future volumes developed for this analysis using two percent annual growth are likely conservatively high.

The ramp volumes were extrapolated from counts at the ramp terminals. The ramp terminal counts were developed by applying an annual growth rate to existing traffic count data and adding the in-process traffic volumes. Annual growth rates were applied to the existing traffic count data by intersection approach per agency scoping direction. Growth rates were selected by reviewing historical traffic counts around the interchange area, which indicated a rate of 2% at the I-5 on- and off-ramps and approximately 3% along La Center Road. At the interchange, volumes were balanced following the application of annual growth rates.

Long-term 2037

Consistent with the horizon year 2017 model volume development, the 2037 background mainline volumes on I-5 were developed by applying a 2% linear annual growth rate to the seasonally adjusted peak hour volumes. For purposes of the 2037 analysis, the growth rate was applied to the seasonally adjusted (30^{th} highest hour) peak hour volumes (as opposed to applying the annual growth rate to volumes derived using four times the peak fifteen minute volumes). Use of the actual hourly volume instead of volumes derived by multiplying the peak 15-minute volume by four recognizes that travel demand on I-5 is expected to spread over the hour in the long-term and exhibit less of the existing peaking characteristic. This approach is consistent with applying a peak hour factor of 1.0 in the long-term analysis.

Year 2037 traffic volume projections were developed using existing traffic count data and forecast future volume data provided by RTC's regional travel demand model. A summary of the volume development methodology and assumptions is provided in the following sections.

Travel Demand Model

RTC uses the travel demand forecasting program VISUM to estimate future traffic volumes on primary roadways such as freeways, arterials, and collectors. RTC's travel demand forecast model was developed in part based on the *2011 Metropolitan Transportation Plan for Clark County* (MTP). Horizon year 2035 land uses are based on the adopted *Comprehensive Growth Management Plan for Clark County* (Clark County, September 2007) which has a horizon year of 2024 extended a further eleven years to the MTP's 2035 horizon. The 2035 demographic projections and land use allocations were developed by local jurisdictions working in partnership with RTC.

The model's data input includes population and employment for both "base year" conditions (Year 2010) and future "design year" conditions (Year 2035). The 2035 RTC model used in this analysis does

not reflect recently revised (lower) county-wide population growth rate assumptions adopted by Clark County (as of the time this report was prepared, the County's population growth estimate was reduced to an average 1.12 percent annual growth county-wide). It is understood that the 2035 RTC model will be revised in the future to reflect the County's lower population growth assumptions and, as a result, the future volumes developed for the 2037 analysis using two percent annual growth are likely conservatively high.

2037 Background Traffic Model Post Processing for Weekday PM and Friday PM (Weekend) Peak Hour

The RTC VISUM model provides PM peak hour volumes including directional flows on key roadway links (i.e. road segment between intersections) and turning movement volumes at key intersections. *Appendix "P"* contains the VISUM output sheets for both the 2010 base year and 2035 design year for the project area roadways and intersections.

Because the RTC model does not include all local streets and driveway connections, the raw forecast turning movements at individual intersections from the model are not typically used for design purposes. Rather, the model is used to identify the order-of-magnitude future growth along the primary travel corridors, based on planned changes to the land use and transportation systems within the region. Output from the model is "post-processed" (manually adjusted) using field traffic data and engineering judgment to identify turning movements at each study intersection. This method of refining the raw traffic volumes is standard practice for planning and forecasting analyses and is discussed further and in more detail below.

The RTC model volumes were refined using techniques outlined in NCHRP Report 255 to "post-process" the data. In this process, the future traffic projections from the model were evaluated with respect to current year 2014 traffic counts and the relative differences between the model scenarios. The results of using both the "ratio" method and the "difference" method, as outlined in the NCHRP report, were compared. In this case, the average of the "ratio" and "difference" methods was used to establish the initial projected volume of through traffic. Manual adjustments were made to the projected turning movements at individual intersections to better reflect the existing traffic counts and the anticipated build-out conditions to achieve 2035 developed volumes. Finally, a two percent growth rate was applied to the 2035 turning movement volumes to estimate year 2037 volumes.

All of the calculations and adjustments described above are provided in Appendix "Q".

2037 Background Traffic for Weekday AM Peak Hour

Because the RTC regional travel demand model provides forecast volumes only for the weekday PM peak hour, projections for the 2035 weekday AM and weekend peak hours were developed manually assuming similar growth patterns from the PM peak hour projections. The projected growth at the interchange from the weekday PM peak hour was factored according to the ratio of existing AM to PM

peak hour volumes. This factored growth was then applied to the existing weekday AM peak hour counts and distributed according to existing travel patterns. Manual adjustments were made to the projected turning movements at each intersection to reflect the anticipated build-out conditions during the 2035 weekday AM peak hour. Finally, a two percent growth rate was applied to the 2035 turning movement volumes to estimate year 2037 volumes.

For methodology validation purposes, the resultant 2037 projections were compared to the RTC 2035 model volumes and year 2030 volumes derived in the Ridgefield IJR completed in 2009. The results of this comparison are shown in Table 5.

Table 5 Future I-5 Volumes south of La Center Interchange

Location	Ridgefield IJR (2030 Build PM)	RTC Model (2035 PM Peak)	2037 Background Weekend Peak (30th Highest Hour)
Northbound Mainline	4,485	4,910	4,997
Southbound Mainline	4,330	3,816	4,506
Total	**8,815**	**8,726**	**9,503**

As seen in the table, the weekend peak hour volumes used in the I-5/La Center IJR are significantly higher than those used in the Ridgefield IJR[2] or forecasted in the RTC model (recognize that the RTC model volumes will likely be reduced in the future due to the revised Clark County population growth projections). Based on the above comparison, we conclude the methodology employed to develop the year 2037 traffic volume projections results in volume projections that are reasonably conservative (high).

NEXT STEPS

The I-5 freeway conditions assessment was presented in *Technical Memorandum #2: Cowlitz Reservation Development Preliminary Interchange Evaluation* and discussed in the I-5/La Center Interchange Improvement Project IJR Workshop on July 14th, 2014. The analysis will also be incorporated into the draft IJR document being prepared as part of the Cowlitz Reservation Development project. This memorandum will also be referenced in the IJR.

Recognizing that this methodology serves as an essential foundation for the remainder of the study, we request that you review the material presented in this memorandum and provide us with any suggested revisions or questions that you may have.

[2] IJR for I-5 / SR 501 Ridgefield, prepared by WSDOT and HDR and dated May 4, 2009

ATTACHMENTS

A. Emails with WSDOT Staff documenting Methods and Assumptions
B. *Cowlitz Reservation Development Trip Generation Memo*
C. Turning Movement Counts at I-5/La Center Road Ramp Terminals
D. I-5 volumes mainline volumes south of La Center Road
E. Weigh Station Data from June 2014
F. Seasonal Adjustment Factor for R045
G. Truck Percentages for I-5

Attachment A: Emails w WSDOT Staff documenting Methods & Assumptions

Kelly Laustsen

From: Shank, Ray <ShankR@wsdot.wa.gov>
Sent: Wednesday, July 09, 2014 4:25 PM
To: Kelly Laustsen
Cc: Matt Hughart; Chris Brehmer; Clark, Mike; Bellinger, Dave; Keniston, Rick
Subject: RE: Follow-Up - I-5/La Center Analysis

Kelly,

As mentioned in our phone discussion earlier today, using your proposed methodology of seasonally adjusting the Friday PM counts appears to be acceptable. When comparing the adjusted short count data to our typical design hour methodology, the resulting volumes were very similar (within ~15 vehicles for the peak direction). Since we've gone through these steps, we may want to include some discussion that we used data from the adjacent PTR to validate using the adjusted short count data.

After looking at the PTR data, it appears that while the heaviest northbound volumes on I-5 occur during the Friday PM Peak, the heaviest southbound volumes occur on Sunday. We talked about this a little bit on the phone. You mentioned that the cumulative impact of southbound I-5 volumes and new trips generated by the development on the Friday PM Peak may be more than that of the impacts anticipated on Sunday. I think we are still good with our current set of scenarios, but perhaps we should confirm this direction with the rest of the stakeholders at Monday's meeting.

Let us know if you have any questions.

Ray Shank
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WSDOT - SW Region
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shankr@wsdot.wa.gov

From: Kelly Laustsen [mailto:klaustsen@kittelson.com]
Sent: Tuesday, July 08, 2014 11:22 AM
To: Shank, Ray
Cc: Matt Hughart; Chris Brehmer; Clark, Mike; Bellinger, Dave; Keniston, Rick
Subject: RE: Follow-Up - I-5/La Center Analysis

Hi Ray,

Thanks for the additional information. I looked at the ATR data you sent and prepared the table below showing volumes north of the interchange under a number of scenarios. As you can see, the distribution of volumes northbound/southbound varies between the 29th, 30th, and 31st highest hourly volumes, likely influenced by the time of day, week and month or area events. I'd suggest that we maintain the distribution from the counts we collected (based on a review of the ATR data, this is pretty typical of a Friday PM). If we apply the same seasonal factor that we used for the AM and PM counts of 1.04, the volumes are relatively close to the 30th highest hour.

	29th Highest Hourly Vol (1pm, Nov 30, 2013)	30th Highest Hourly (4pm, Jul 28,	31st Highest Hourly Vol (3pm, Dec 1, 2013)	Friday PM Counts* (4:45pm, May 16, 2014)	Friday PM Counts* (seasonally adjusted)

		2013)			
NB Mainline	3295	2917	3450	3141	3267
SB Mainline	3196	3568	3032	2933	3050
Total	6491	6485	6482	6074	6317

*Based on 4*peak 15 minute volume

We suggest using the Friday PM counts we collected with the seasonal adjustment of 1.04. Although these volumes are slightly lower than the 30th highest hourly volume, we are using the long-term analysis (with a 2%/year growth rate) for our design, which is conservative. Please let me know if you think this is reasonable.

Thanks!
Kelly

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From: Shank, Ray [mailto:ShankR@wsdot.wa.gov]
Sent: Monday, July 07, 2014 9:02 AM
To: Kelly Laustsen
Cc: Matt Hughart; Chris Brehmer; Clark, Mike; Bellinger, Dave; Keniston, Rick
Subject: RE: Follow-Up - I-5/La Center Analysis

Kelly,

Thanks for providing the September 2012 count data for comparison. As you mentioned, these counts are relatively similar. The methodology proposed in an earlier e-mail, using May 2014 counts with a 1.04 adjustment factor for interstate volumes, uses the most recent data along with historical temporal trends and will likely provide us with representative peak hour volumes.

Attached you will find the 2013 data for PTR R045 which is located just south of the I-5/SR 503 Interchange near Woodland. Please review and let us know if it meets your needs.

For the Friday PM peak volumes, I'd like to use a volume set that is representative of the 30th highest hour, which is our typical methodology for design hour volumes (DHV). As mentioned in my previous e-mail, historical trends seem to indicate that the 30th highest hour occurs during the Friday PM peak. The amount of information that goes into developing DHV (hourly volume data over an entire year) is much more robust than using short count data (approx. one week of data). Therefore, I would prefer to use this methodology. However, if the derived DHV is similar to that of the adjusted short count data then we can consider using the short count data in the analysis.

Let us know if you need anything else.

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shankr@wsdot.wa.gov

From: Kelly Laustsen [mailto:klaustsen@kittelson.com]
Sent: Monday, July 07, 2014 5:01 AM
To: Shank, Ray
Cc: Matt Hughart; Chris Brehmer; Clark, Mike; Bellinger, Dave; Keniston, Rick
Subject: RE: Follow-Up - I-5/La Center Analysis

Hi Ray,

Thank you for your quick, thorough responses – I really appreciate all your help. A couple comments/questions:

- You asked for a comparison between the counts we collected in September 2012 and May 2014 – see the table below (note that I've shown the total volume recorded during the peak hour as opposed to 4*peak 15 minute volume). As you can see, our counts are relatively similar (with some increases and decreases of <10%).

	Weekday AM	Weekday PM	Friday PM
NB Mainline (south of interchange)	2067 (2031)	2850 (2776)	3372 (3531)
SB Mainline (south of interchange)	2395 (2295)	2543 (2766)	2999 (3060)

May 2014 (September 2012)

- You referenced the 2013 data from ATR 045. I received 2010-2012 data for I-5, but don't believe I have 2013. Could you send along to me when you have an opportunity?
- For the Friday PM peak, you suggested identifying the 30th highest hour volumes as design volumes. Would you suggest using these in place of the actual counts we collected during the Friday PM peak, or comparing to our counts to assess whether they are appropriate?

Thanks again! Hope you enjoyed the holiday.
Kelly

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From: Shank, Ray [mailto:ShankR@wsdot.wa.gov]
Sent: Thursday, July 03, 2014 2:15 PM
To: Kelly Laustsen
Cc: Matt Hughart; Chris Brehmer; Clark, Mike; Bellinger, Dave; Keniston, Rick
Subject: RE: Follow-Up - I-5/La Center Analysis

Kelly,

Please find my responses to your questions in the e-mail below.

Let us know if you need anything else.

Ray Shank
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shankr@wsdot.wa.gov

From: Kelly Laustsen [mailto:klaustsen@kittelson.com]
Sent: Wednesday, July 02, 2014 8:09 PM
To: Shank, Ray
Cc: Matt Hughart; Chris Brehmer
Subject: Follow-Up - I-5/La Center Analysis

Hi Ray,

Thanks again for talking with Chris, Matt and me this afternoon, particularly on such short notice. I really appreciate your help in our development of traffic volumes for the interchange analysis we are conducting at I-5/La Center Road for the proposed Cowlitz development. I've summarized our discussion points from today and noted in italics where I would appreciate your confirmation or additional information. I've also provided some supplemental background information.

Background Information

- Time periods: weekday AM peak hour, weekday PM peak hour, Friday PM peak hour
- Analysis years: existing, 2017, 2037
- Analyzing I-5 mainline north and south of La Center, merge/diverge at La Center Road and weigh station
- Data collected: we collected counts on the I-5 mainline (just south of La Center Road) on May 16th and 20th. For reference, our peak hour volumes are summarized below (note that this reflects a peak hour factor of 1.00 – see Analysis Methodology Question #1).

	Weekday AM	Weekday PM	Friday PM
NB Off Ramp	312	579	589
NB On Ramp	172	133	162
SB On Ramp	482	364	412
SB Off Ramp	112	208	257
NB Mainline (south of interchange)	2332	2956	3568
SB Mainline (south of interchange)	2628	2672	3088

Analysis Methodology Questions

1. Peak Hour Factor – we have collected volumes on I-5 and at the La Center ramp terminals. We propose to develop peak hour counts by multiplying the peak 15 minutes by four and applying a PHF of 1.00. You indicated that you were likely comfortable with this approach – *can you confirm?*

   I am comfortable with this approach as it should result in a more conservative analysis.

2. Seasonal Adjustment Factor – we collected our traffic counts in mid-May 2014. Our previous counts were collected in September 2012. We did not apply a seasonal adjustment factor to our counts before (since September is typically a higher month). The conversion factor for R045 (the permanent traffic recorder on I-5 just north of La Center Road) for the month of May is 1.04, as shown in the attached page from the 2013 Annual Traffic Report.
   Should we apply an adjustment to our May counts?

   AM and PM Peaks
   Applying the 1.04 adjustment factor to the counts collected along the interstate in May seems like a practical approach to reach representative peak hour volumes. As a reasonableness check, I would be interested to know how this new volume set relates to the previously collected data back in September of 2012.

Friday PM Peak

We should take advantage of the permanent traffic recorder (R045) as it is located just to the north, without any ingress or egress access points influencing volumes between the recorder and the LaCenter Interchange. I believe that you mentioned during our phone conversation that you received 2013 data for this recorder already (If not, I should be able to supply this information). From this year long data set, we can identify volumes that are representative of the 30th highest hour, which is typically used as our design hour volumes. No adjustment factors will need to be applied using this approach. The peak hour report for this PTR can be located at the following webpage: http://www.wsdot.wa.gov/mapsdata/travel/peakhourreport.htm. Although, the latest report for 2013 has yet to be published, our Traffic Data Office has supplied us with some of the key information.

2013 PTR R045 Data
AADT: 67911
K30 = 9.55
K100 = 8.99
K200 = 8.64
D30 = 50.63

While the full 2013 report has yet to be published, the 2011 report seems to indicate that the design hour volumes should be representative of the Friday PM Peak Hour.

Local Intersections

For volumes along the local roadway, see my response to question number 3.

- *If we do need to apply a seasonal adjustment factor, should we just apply it to the I-5 mainline?* I assume based on the uses surrounding La Center Road that volumes on the ramps do not fluctuate significantly during the year. See response above. I would recommend that the ramp volumes use the same approach as that of the Local Intersections.
- *If we do need to apply a seasonal adjustment factor, should we grow the seasonally adjusted volumes for our future year (2017 and 2037) analyses?* We are applying a 2% annual linear growth rate (based on our assessment of RTC's most updated model). Future volumes will be developed from our base year volumes. Any adjustments made to the base year would thereby be incorporated into the future volumes and further adjustment will not be required.

3. Additional Factors/Adjustments – you indicated that we should apply a factor of 1.3 for the existing conditions analysis as a sensitivity test (to account for the fact that we are using average volumes and not converting for design hour volumes). *Can you confirm that we should apply this sensitivity test and just for the existing conditions assessment?*

The sensitivity test that applies a factor of 1.3 to the existing conditions was intended for volumes at the local intersections (i.e. ramp terminals as well as any other intersections along La Center Road and 319th Street). We are applying this test since the adjustment factors developed from PTR R045 are not applicable as the temporal trends along I-5 are not similar to that of the local streets. This test, bumping up the volumes by 30%, takes a high clip look to assess the level of risk we might be taking using the information from the limited short count data. If the higher volume does not have any practical implication for the design, then we can just use the short count data as is. However, if the higher volume does result in an impact to the design, then we will have to discuss possible adjustments to these volumes more thoroughly.

This test was previously suggested by our TDGO office. If you have a different approach that you would like to apply when developing the local volumes, I'd be willing to listen.

4. Weigh station volumes – we are assessing merge/diverge operations at the weigh station on I-5 south of La Center. *Can you provide any volumes at the weigh station or estimate of typical volumes?*

   The attached excel file contains some weigh station data and the attached PDF helps to demonstrate where the counts are located. Please review and let me know if this is what you're looking for.

Please let me know if you have any questions about the information above and thanks again for your help.
Kelly

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Attachment B: Cowlitz Reservation Development Trip Generation Memo

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TECHNICAL MEMORANDUM #3:
Cowlitz Reservation Development Trip Generation

Date: November 12, 2012 Project #: 12393

To: Jeffrey B. Sarvis, City of La Center Public Works
Tony Cooper, PE, City of La Center Public Works
Rick Keniston, PE, Washington State Department of Transportation
Steve Schulte, PE, Clark County Department of Public Works
David Jardin, Clark County Department of Public Works
Chris Clemow, PE, Group Mackenzie on behalf of the City of La Center

From: Kelly Laustsen; Marc Butorac, PE, PTOE; & Chris Brehmer, PE

The memorandum documents proposed trip generation assumptions for the proposed Cowlitz Reservation Development to be located in in La Center, Washington. Pending review agency feedback, the trip rates proposed in this memorandum will be used to prepare a traffic impact analysis and interchange justification report (IJR) for the proposed development. In addition to the traditional morning (7:00 – 9:00 AM) and evening (4:00 – 6:00 PM) peak periods, the trip generation assessment identified the need to study Friday evening peak conditions during the 5:00 – 6:00 PM hour. The assessment includes the directional split of trips to and from the site, as well as an analysis of trip type. The remainder of this document describes the proposed development, the trip assessment methodology, the recommended peak hour analysis periods and the corresponding trip rates.

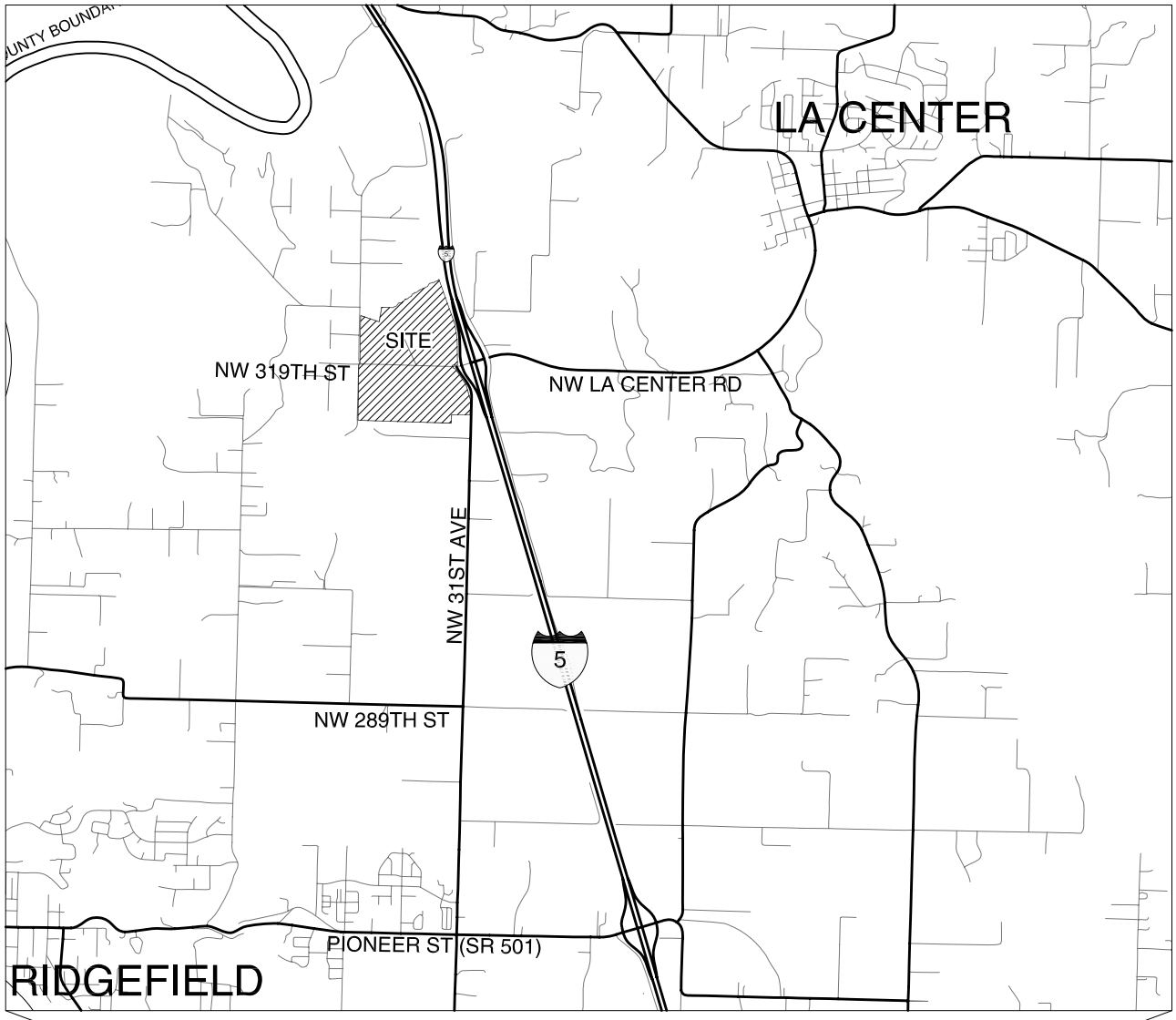
PROPOSED COWLITZ RESERVATION DEVELOPMENT OVERVIEW

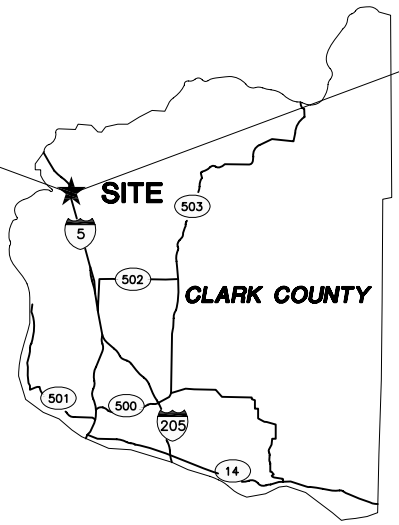
The proposed Cowlitz Reservation Development will be located west of the I-5/La Center interchange in La Center, Washington as shown in Figure 1. The site is located approximately 25 miles north of the Portland, Oregon metropolitan region and is targeted for opening in 2016.

While the final site land uses have yet to be determined, at full build-out the site may include up to:

- 3,500 gaming positions (2,000 slots, 60 banked tables, 15 poker tables as Phase One; 1,000 gaming positions in a future phase);
- 4 interior restaurants;
- 5,000 – 6,000 square feet of interior retail space;
- Casino bars;
- An event center with seating for up to 1,500 guests; and
- 250-room hotel with restaurant and retail space.

Up to 3,450 parking spaces are expected on-site and valet parking services will be available.





NOTE: SITE BOUNDARY
IS APPROXIMATE

SITE VICINITY
LA CENTER, WASHINGTON

FIGURE
1

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METHODOLOGY

Typically the City of La Center, the Washington State Department of Transportation (WSDOT), and Clark County require analysis of weekday morning (7:00 – 9:00 AM) and evening (4:00-6:00 PM) peak commuter conditions. Other analysis periods may be identified on an as-needed basis. With the agency requirements in mind, trip generation estimates were developed for the site through a series of steps that included:

- Conducting a literary search of available trip generation data to identify analysis periods and available data;
- Synthesizing trip data collected at similar casino facilities;
- Collecting data at a comparable casino facility in Washington;
- Identifying recommended peak hour analysis periods based on the data collected; and
- Identifying recommended trips rates and volumes by analysis period.

LITERATURE REVIEW

Several sources of data were reviewed to determine the appropriate approach for identifying the time periods to analyze the traffic impacts of the proposed Cowlitz development and anticipated trip generation of the development. Consistent with industry practice, weekday AM and PM peak trip data was first sought through the Institute of Transportation Engineers (ITE) *Trip Generation*.

Review of ITE *Trip Generation, 9th Edition* identified limited data available for casino-related uses. Specifically, the most comparable land use was found to be ITE Land Use Code 473: Casino/Video Lottery Establishment. *Trip Generation* indicates the Land Use Code 473 database is limited to weekday p.m. peak hour data only and that the data was collected at six sites that provide electronic or manually-controlled slot machines. *Trip Generation* further indicates that full food service is generally not provided at the facilities; however, refreshments or alcoholic beverages may be served. ITE states the *Trip Generation* data does not include full-service casinos or casino/hotel facilities. Based on this information and the proposed development uses, additional trip data was sought.

Consistent with *Trip Generation's* recommendation to obtain additional data as needed, a literature review of available trip generation studies was conducted (highlights of the literature review results are provided in *Appendix A*). The literature review offered insights as to information needed to develop a reasonable trip rate for the proposed development while also offering several insights that included:

- Gaming positions correlate well with site trip generation and serve as a recommended independent variable.
- An entertainment venue in which concerts are held can also increase the trip generation potential of a casino.

- Casino/resort facilities located in Las Vegas and Reno are not indicative of trip generation potential for sites similar to the proposed development due to the sheer magnitude in size difference and the area in which they are located.
- Ancillary uses at a casino (i.e. restaurants, retail space) are encompassed in the casino's overall trip generation rate.
- The presence of an on-site hotel may reduce the casino's peak trip generation rate relative to sites without on-site housing.

DATA SOURCES

Previously published trip data was obtained from five tribal casinos in the Northwest and one in the northeast which had qualities similar to the Cowlitz Reservation Development. In addition, trip data was collected as part of this study at a casino in Snoqualmie, Washington. Table 1 presents a summary of the sites considered in developing the final trip rates as well as the key characteristics of each.

Table 1: Summary of Casino Data Used to Develop Site Trip Estimates

Casino	Location		Ancillary Uses	Gaming Positions (when data collected)	Data Collected
Snoqualmie	Snoqualmie, WA	25 miles east of Seattle, WA	Restaurants, Entertainment Venue	2,185	Seven Day Tube Counts (Sept & Oct 2012)
Mohegan Sun at Pocono Downs	Wilkes-Barre, PA	15 miles southwest of Scranton, PA	Restaurants, Live harness racing, retail	2,466 (2009) 1,099 (2007)	Seven Day Tube Counts (Jan 2007 & Sept 2009)
Spirit Mountain	Grand Ronde, OR	35 miles northwest of Salem, OR	Restaurants, Bingo, Arcade, Children's Area, Entertainment Venue, Hotel	1,994	Weekend Tube Counts (Aug 2005)
Seven Feathers	Canyonville, OR	25 miles south of Roseburg, OR	Restaurants, Bingo, Hotel, Entertainment Venue, Gift Gallery, Hotel	1,198	Weekend Tube Counts (Aug 2005)
Muckleshoot	Auburn, WA	30 miles south of Seattle, WA	Restaurants, Bingo, Retail, Entertainment Venue, Convention and Meeting Space	2,596	Weekend Tube Counts (Aug 2005)
Tulalip Resort Casino	Tulalip, WA	35 miles north of Seattle, WA	Restaurants, Entertainment Venue	1,986	Friday Evening Tube Counts (May 2004)
Northern Quest	Airway Heights, WA	10 miles west of Spokane, WA	Restaurants, Entertainment Venue	995	Friday Evening Turning Movement Counts (May 2004)

TRIP GENERATION ANALYSIS

The trip data was reviewed in steps: first to identify analysis periods that would represent peak conditions; second to derive trip rates within each of the analysis periods; third to determine the directional split of trips to and from the site; and fourth to assess trip type, including any diverted or pass-by trips. This process is described below.

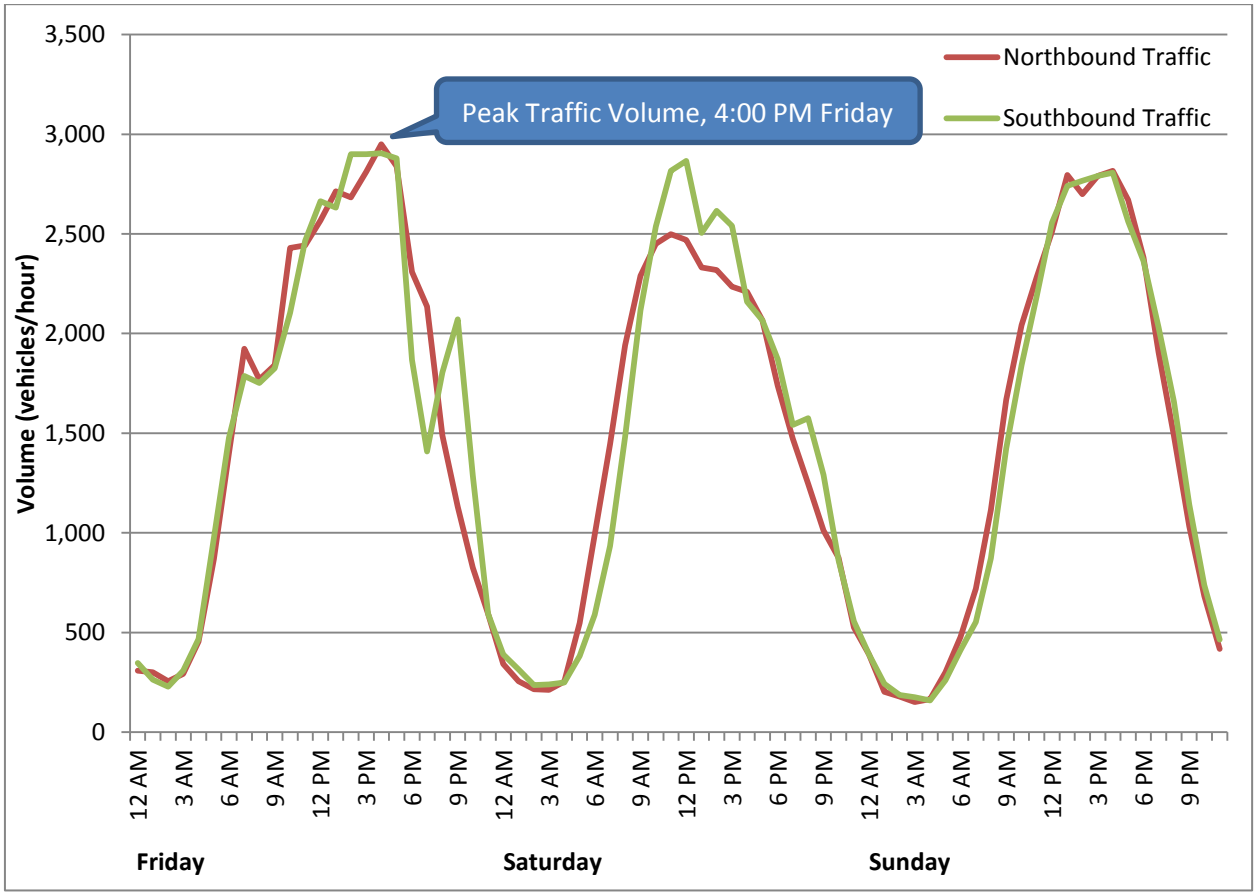
Analysis Study Periods

In addition to typical weekday AM and PM commuter peak hour periods, the trip generation profile of casinos was reviewed over Fridays and weekends recognizing casino trip generation typically peaks during the weekend. Traffic volumes in the site vicinity were reviewed to better understand weekend traffic conditions and peaking characteristics in the area especially the distinct recreational directional trip patterns between the Portland and Seattle/Tacoma metropolitan areas.

System Volume Profile

Traffic volume profiles on I-5 and at the I-5/La Center Road interchange were reviewed to better understand the peaking characteristics of the traffic system in the study area. Traffic volumes on I-5 were assessed using data collected at the WSDOT permanent recorder station R045, which is located north of the La Center/I-5 interchange at milepost 20.14. As shown in Exhibit 1, weekend traffic volumes peak at 4:00 PM on Friday for both northbound and southbound traffic. The directional split on I-5 during this period and throughout the weekend is roughly evenly split between northbound and southbound traffic.

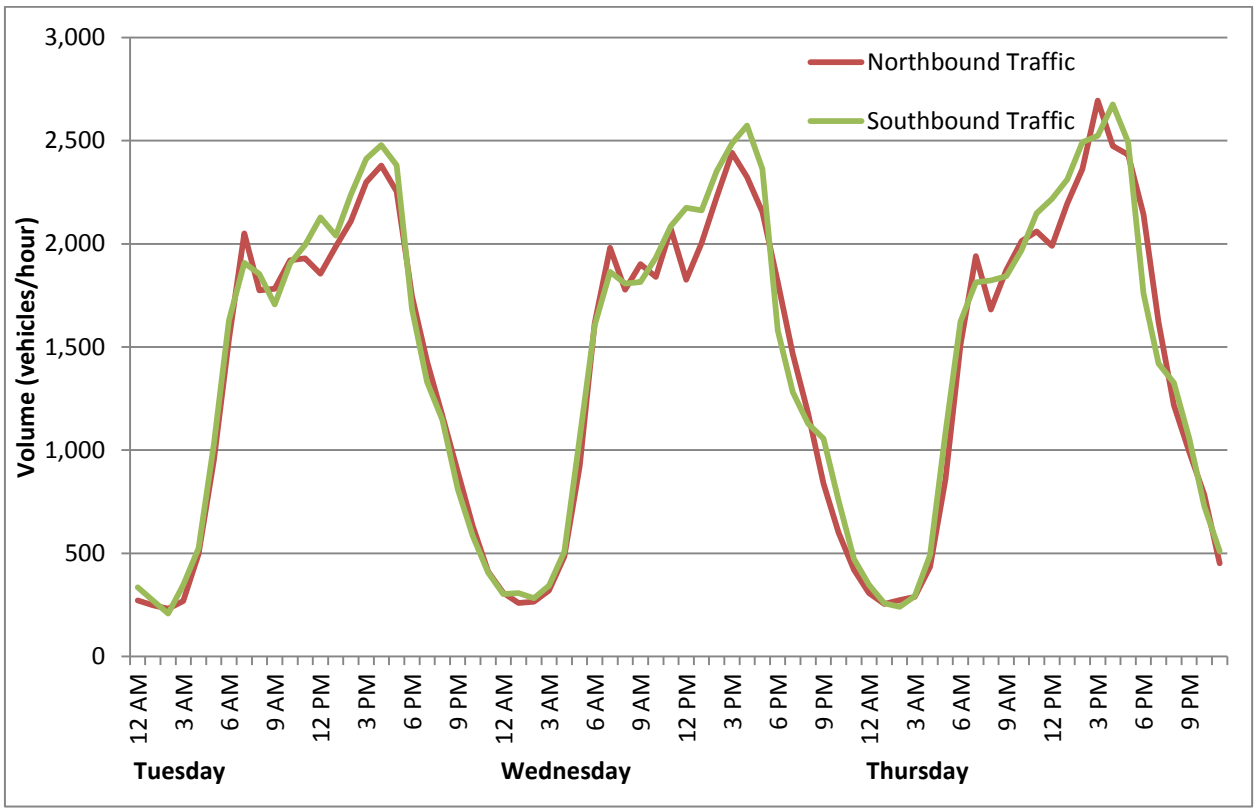
Exhibit 1: I-5 Weekend Volume Profile



Note: Data shown is from WSDOT for Friday, September 17th, 2010 – Sunday, September 19th, 2010

Traffic volumes on I-5 during the week were also reviewed to note any patterns in directional split or volumes. Exhibit 2 illustrates northbound and southbound volumes on I-5 from a Tuesday through Thursday.

Exhibit 2: I-5 Weekday Volume Profile



Note: Data shown is for Tuesday, September 14th, 2010 – Thursday, September 16th, 2010

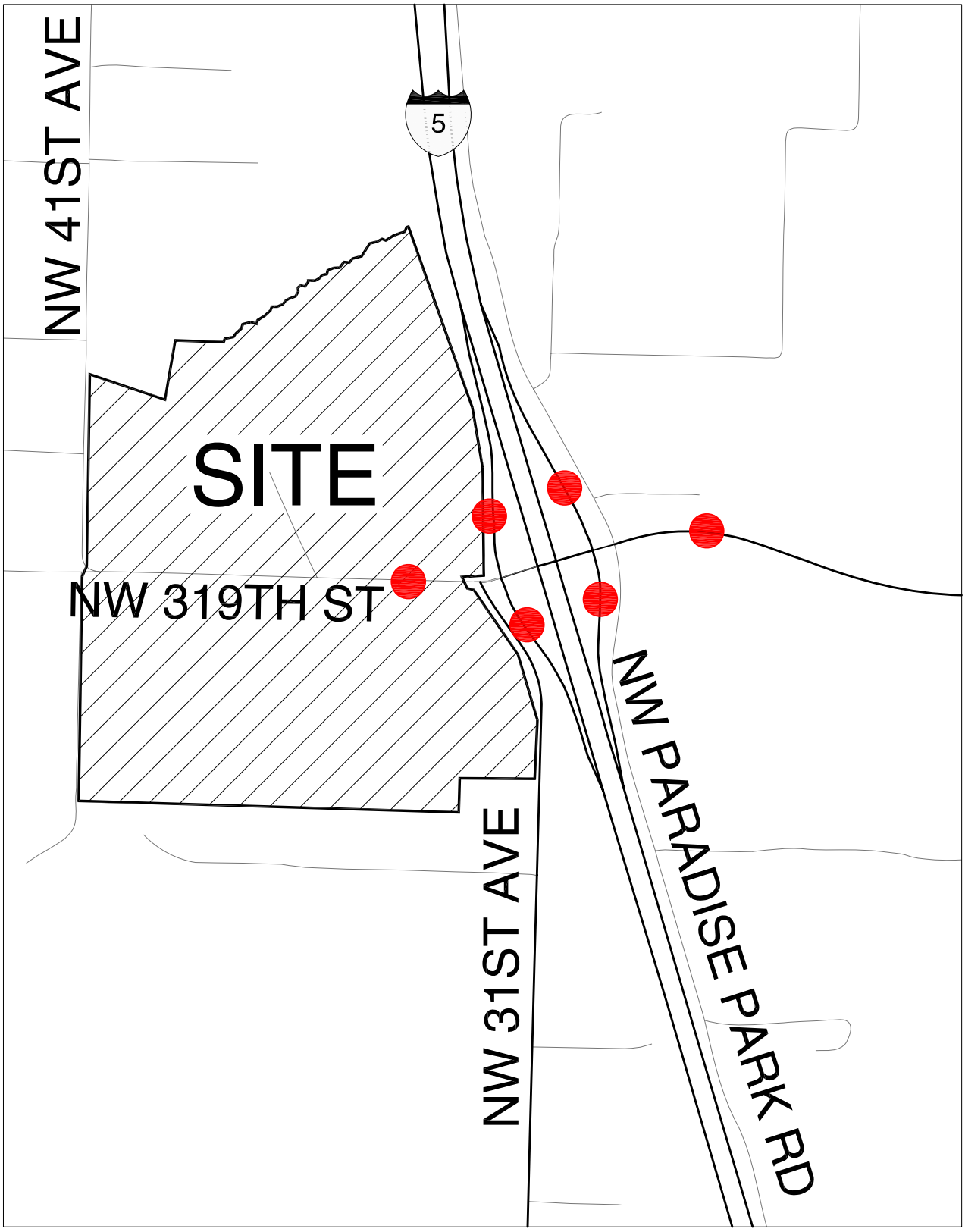
As seen in the exhibit, weekday traffic volumes peak between 3:00 and 5:00 PM. Peak volumes increase gradually throughout the week. The directional split between northbound and southbound traffic is approximately even.

Traffic volume profiles in the study area were also assessed using 24-hour tube count data collected in September 2012 at the following locations (Data sheets are provided in *Appendix B*):

- I-5 southbound off-ramp to La Center Road;
- I-5 southbound on-ramp from La Center Road;
- I-5 northbound off-ramp to La Center Road; and
- I-5 northbound on-ramp from La Center Road.

The location of these sites relative to the proposed Cowlitz development is shown in Figure 2.

Exhibit 3 illustrates the hourly sum of traffic volumes at the four ramps between Friday morning and Sunday night. Based on this volume profile, traffic volumes at the I-5/La Center Road interchange peak at 5:00 PM on Friday afternoon.



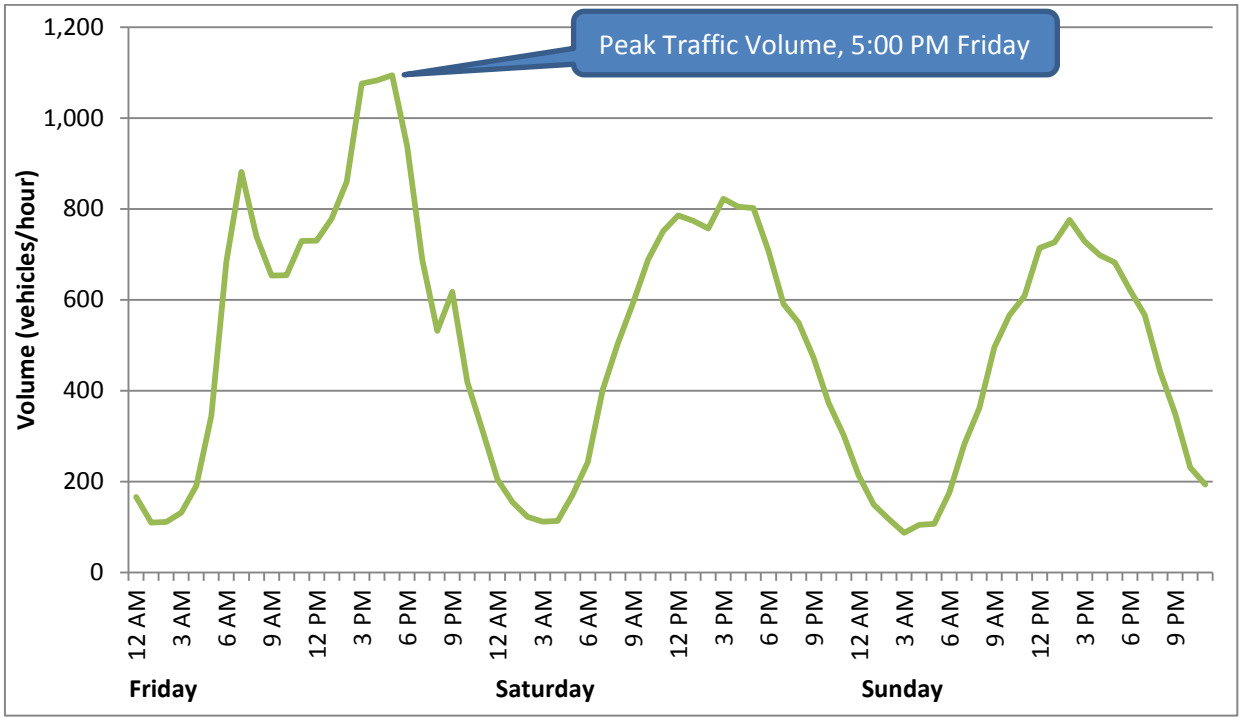
LEGEND

- TUBE COUNT LOCATION

TUBE COUNT LOCATIONS
LA CENTER, WASHINGTON

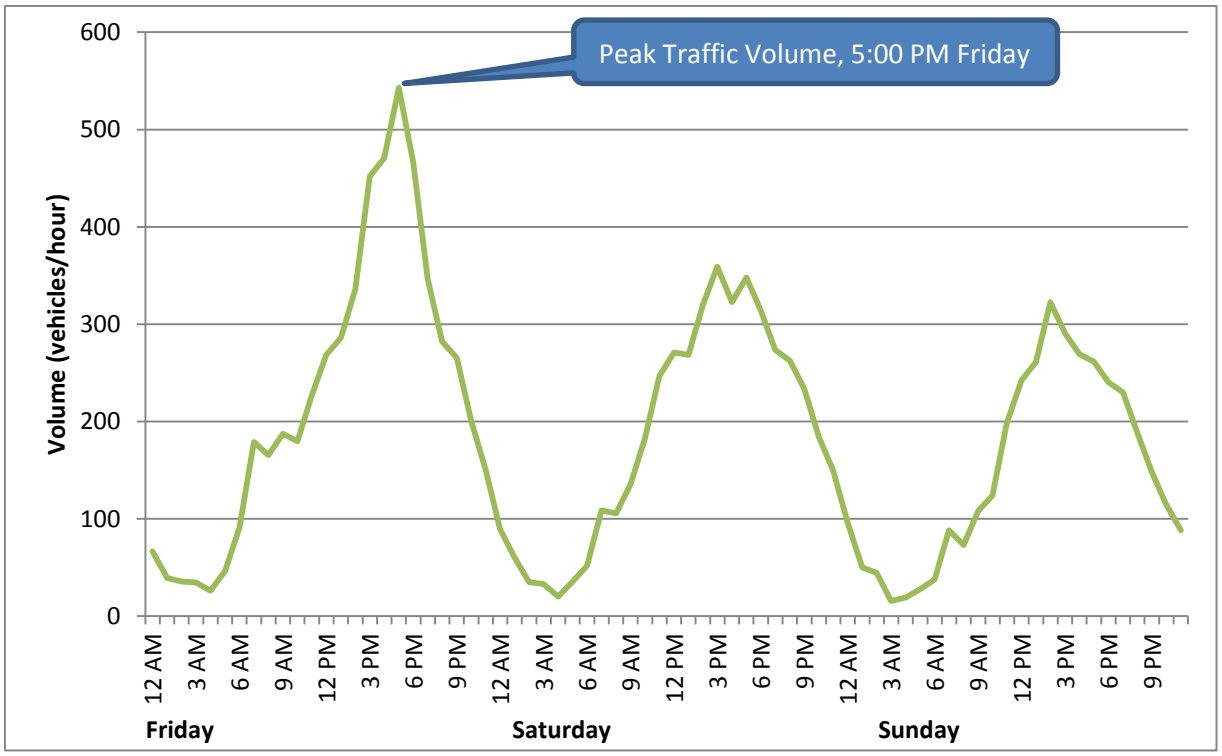
FIGURE
2

Exhibit 3: La Center/I-5 Ramps Weekend Volume Profile (Sum of Ramp Volumes)



Most traffic is anticipated to access the site by traveling north on I-5. Therefore, the traffic volume profile at the I-5 northbound off-ramp to La Center Road was assessed independently. The weekend profile is shown in Exhibit 4. As shown in the exhibit, traffic volumes also peak at 5:00 PM on Friday.

Exhibit 4: I-5 NB Off-Ramp to La Center Road Weekend Volume Profile



Based on this assessment, traffic volumes on I-5 in the vicinity of the site peak during the weekend on Friday at 4:00 PM, but are relatively constant between 3:00 and 6:00 PM. During this time, the directional split is approximately even between northbound and southbound traffic. Traffic volumes on the ramps at the I-5/La Center Road interchange peak at 5:00 PM on Friday and area also relatively constant between 3:00 and 6:00 PM.

Casino Weekend Volume Profile

Trip generation rates were also reviewed at each of the casino sites over the course of a typical weekend. Table 2 identifies the day and time when peak trip generation was experienced during the Friday-Sunday period.

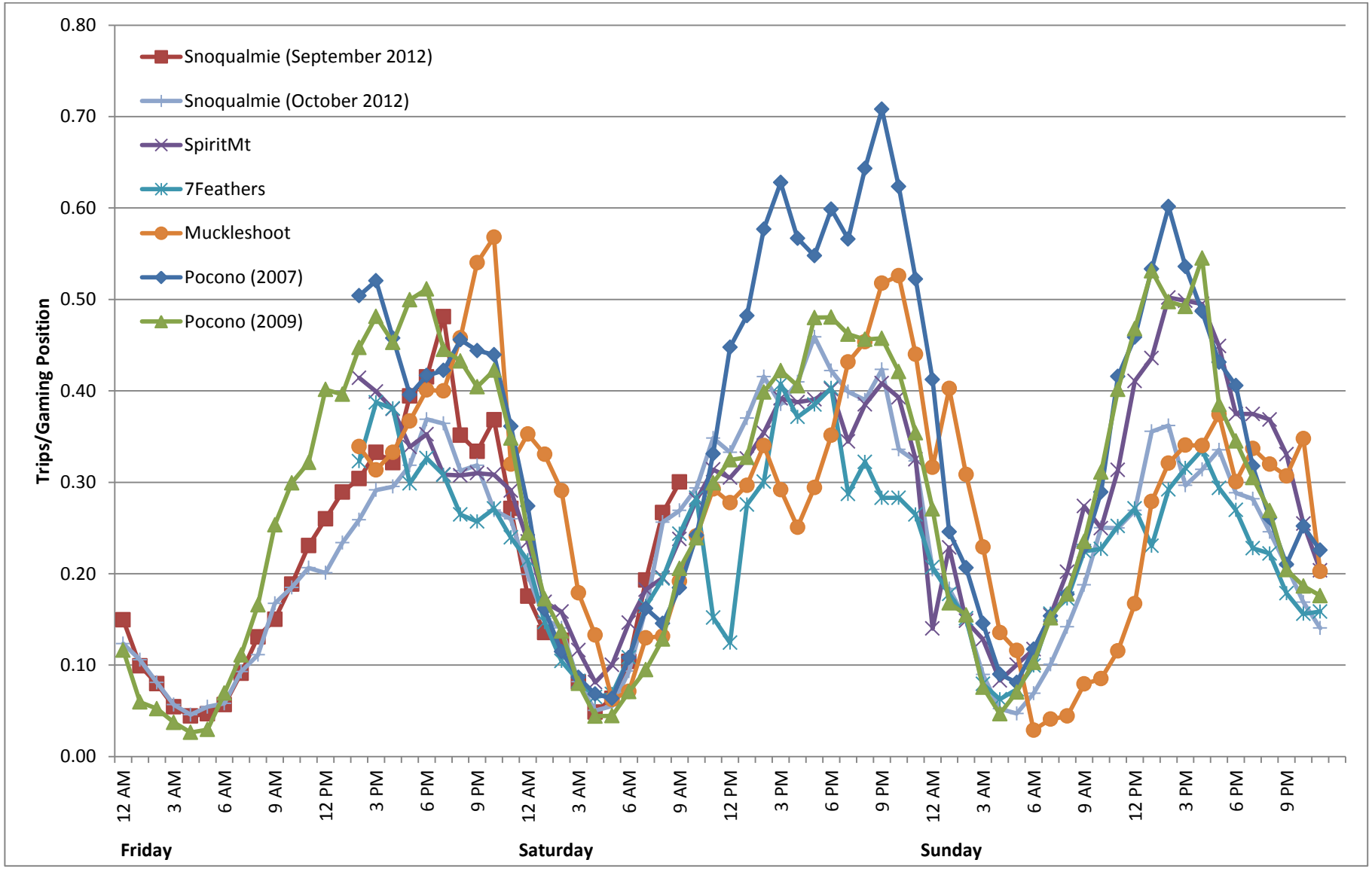
Table 2: Casino Weekend Peak Periods

Casino	Peak Day	Peak Hour
Snoqualmie (September 2012)[1]	Friday	7:00 – 8:00 PM
Snoqualmie (October 2012)	Saturday	5:00 – 6:00 PM
Pocono Downs (2007 data) [2]	Saturday	9:00 – 10:00 PM
Pocono Downs (2009 data)[2]	Sunday	4:00 – 5:00 PM
Spirit Mountain	Sunday	2:00 – 3:00 PM
Seven Feathers	Saturday	3:00 – 4:00PM
Muckleshoot	Friday	10:00 – 11:00 PM
Tulalip[3]	Friday	7:00 – 8:00 PM
Northern Quest[4]	Friday	7:00 – 8:00 PM

[1]Data was collected at Snoqualmie in both September and October 2012. The September data was collected from 12:00 AM on Friday to 10:00 AM on Saturday.
[2] Data was collected at Pocono Downs in both 2007 and 2009. The casino underwent a significant expansion between these years.
[3] Data was collected at Tulalip from 4:00-8:00 PM on Friday.
[4] Data was collected at Northern Quest from 2:00-8:00 PM on Friday.

Exhibit 5 illustrates the hourly trip rate at each of the casinos during the same period. As shown in both Table 2 and Exhibit 5, the individual casinos peak at different times and days of the weekend. In part, the peak times reflect the travel distance and level of congestions between the individual site and metropolitan areas in the vicinity. For example, facilities such as Spirit Mountain and Seven Feathers located further from metropolitan areas tend to require greater travel time to reach and thus tend to experience peaks outside typical commuter peak periods.

Exhibit 5: Casino Weekend Trip Rate Profiles



Note: Data collection at Snoqualmie (in September 2012), Pocono (in 2007), Spirit Mountain, Seven Feathers, Muckleshoot, Tulalip, and Northern Quest shown for periods during which data was collected.

Combined Roadway System and Casino Weekend Volumes

The combination of existing roadway network traffic volumes on the system near the Cowlitz site and the measured casino generated traffic at other sites were both considered to determine the most appropriate weekend peak period to study. I-5 peaks between 4:00 and 5:00 PM on Friday afternoon and the ramps at the I-5/La Center Road interchange peak between 5:00 and 6:00 PM on Friday afternoon, while the casinos show a large range of peaking characteristics. Although several of the casinos show weekend peaks on Saturday or Sunday, existing traffic volumes on the La Center area roadway system are notably lower during these days, as seen in Exhibit 1 and 3. Most of the casinos experience a Friday peak near 5:00 PM, so that the combination of traffic on the roadway system and produced by the proposed casino is likely to peak near this time as well.

The directionality of existing traffic and expected trips to the site was also considered to ensure a time period was not selected when traffic on the system and traffic to the site will be traveling in opposite directions. The directionality of traffic on I-5 Friday afternoon is approximately evenly split between northbound and southbound traffic, as shown in Exhibit 1. The majority of trips to the site are expected to arrive by traveling northbound on I-5. Therefore, Friday at 5:00PM is again a conservative analysis period. Based on this review, we propose Friday from 5:00 to 6:00 PM be used as the weekend peak analysis period.

Snoqualmie Site Trip Data Collection

A trip generation study was completed at the Snoqualmie site based on the City of La Center's request to conduct an additional trip generation study at a casino in Washington state that it is directly comparable to the proposed Cowlitz Reservation Development in terms of size, content, and location. As shown in Table 1, the Snoqualmie site is similar in size and amenities, including an entertainment venue. Further, the location of the Snoqualmie site outside of the Seattle metropolitan area on an Interstate facility is akin to the Cowlitz Reservation Developments location north of the Portland metropolitan area. The Snoqualmie site is located immediately north of Interstate 90 and is readily accessible from the Seattle metropolitan area. Although traffic volumes on Interstate 90 are lower than those on Interstate 5 (ADT of 46,00 on I-90 compared to 65,000 on I-5[1]), the proximity of Snoqualmie to a large metropolitan area is akin to the proposed Cowlitz development's proximity to the Portland metropolitan area.

Twenty-four hour tube count data was collected at the two accesses to the Snoqualmie Casino on Friday, September 21st, 2012 and the first full week in October, 2012 (provided in *Appendix C* for reference). The on-site entertainment venue was operational on both Fridays that data was collected, with the event in September likely drawing more visitors (Drew Carey performed at 8:00 PM on September 21st, 2012). The trip generation data from Snoqualmie was used in conjunction to the data

[1] Based on data from the WSDOT Travel and Collision Data Office

previously collected at the other six casino sites to develop the rates for the proposed Cowlitz development.

Weekend Trip Generation Rate

After selecting Friday from 5:00 to 6:00 PM as the weekend analysis study period, the available trip data for the seven sites shown in Table 1 was further analyzed to determine the appropriate casino trip generation rate for the weekend period. The peak hour trip generation rate was identified and calculated at each site between the hours of 3:00 and 8:00 PM on a Friday using the trip rate data for each site. This longer time period was selected to produce a conservative analysis recognizing customer travel distance to each site varies and likely influences peak period timing. Table 3 summarizes the corresponding average Friday peak hour trip rates.

Table 3: Casino Trip Generation Rates between 3:00 – 8:00 PM on Friday

Casino	Peak Time	Trip Rate (trips/gaming position)
Snoqualmie (September 2012)	7:00 – 8:00 PM	0.48
Snoqualmie (October 2012)	6:00 – 7:00 PM	0.37
Pocono Downs (2007 data)	3:00 – 4:00 PM	0.52
Pocono Downs (2009 data)	6:00 – 7:00 PM	0.51
Spirit Mountain	3:00 – 4:00 PM	0.40
Seven Feathers	3:00 – 4:00 PM	0.39
Muckleshoot	6:00 – 7:00 PM	0.40
Tulalip	6:00 – 7:00 PM	0.44
Northern Quest	7:00 – 8:00 PM	0.53
	Range	*0.37-0.52*
	Average	*0.45*

The resultant average trip rate of 0.45 trips/gaming position falls between the trip rates observed at the Snoqualmie site for the two dates in September and October (which is judged by the Applicant to be most comparable to the Cowlitz Reservation Development). A rate of 0.48 trips/gaming position was observed at the Snoqualmie site in September. While 0.48 trips/gaming position is lower than the rates reported at Pocono Downs in 2007 and 2009, the proposed Cowlitz Reservation Development is expected to more closely resemble the northwest casino sites and their trip rates. By comparison, Pocono Downs includes live harness racing and is located on the east coast with a large population base to draw from.

Based on this review, we propose to base the trip generation rate for the traffic analysis off the higher observed data at Snoqualmie in September 2012 and use 0.48 trips/gaming position for assessing

Friday 5:00 – 6:00 PM peak hour conditions. The 0.48 trips/gaming position rate is higher than the average rate shown in Table 3 and all is also higher than any of the other northwest casinos, thus yielding a conservative analysis.

Weekday AM and PM Trip Generation Rates

As previously noted, traffic conditions at the proposed Cowlitz Reservation Development will also be studied during the weekday morning peak period (7:00 AM to 9:00 AM) and weekday evening peak period (4:00 PM to 6:00 PM). Traffic volume data collected at the Snoqualmie site in October, 2012 and Pocono Downs in 2007 was used to develop weekday trip rates given the lack of available weekday data for any of the other northwest sites. The Snoqualmie data was collected on a Wednesday and Thursday (and averaged), while the Pocono data was collected on a Tuesday. The volume profiles throughout the weekday for these two sites are shown in Exhibit 6.

Exhibit 6: Weekday Casino Volume Profiles

The weekday AM and PM peak trip generation rates were derived by averaging the rates from both sites, as shown in Table 4.

Table 4: Casino Weekday Trip Generation Rates

Casino	AM Peak Time	Trip Rate (trips/gaming position)	PM Peak Time	Trip Rate (trips/gaming position)
Snoqualmie (October 2012)	8:00 AM	0.15	5:00 PM	0.39
Pocono Downs (2007 data)	8:00 AM	0.16	4:00 PM	0.41
	Average	*0.15*	*Average*	*0.40*

Directional Split of Trips to and from Site

After identifying trip generation rates for each time period, the directional split of trips to and from the site during each time period was analyzed using the data collected from the seven casinos. The split of trips in and out of each site during the three analysis periods is provided in Table 5.

Table 5: Casino Weekday Trip Generation Rates

Casino	Time Period					
	Weekend Peak		Weekday AM		Weekday PM	
	In	Out	In	Out	In	Out
Snoqualmie (September 2012)	62%	38%				
Snoqualmie (October 2012)	58%	42%	54%	46%	55%	45%
Pocono (2007 data)	45%	55%	59%	41%	38%	62%
Pocono (2009 data)	61%	39%				
Spirit Mountain	47%	53%				
7 Feathers	53%	47%				
Muckleshoot	56%	44%				
Tulalip	61%	39%				
Northern Quest	59%	41%				
Minimum	*39%*	*39%*	*54%*	*41%*	*38%*	*45%*
Maximum	*61%*	*61%*	*59%*	*46%*	*55%*	*62%*
Average (Snoqualmie Data)	***60%***	***40%***				
Average (All Data)	***55%***	***45%***	***57%***	***43%***	***47%***	***53%***

As seen in the table, the proportion of trips in and out of each casino varies notably from site to site. The directional split of trips at the Snoqualmie site during the weekend peak shows trips in to the casino as the dominant movement. The average directional split calculated from all sites also shows trips in as the dominant movement. Therefore, it is proposed to use the average of the data collected at Snoqualmie (60% in and 40% out) to identify the directional split during the weekend peak period. During the weekday AM peak period, the directional split at Snoqualmie and Pocono both show trips in

to the site as the dominant movement. Therefore, it is proposed to use the average of both sites to develop the weekday AM peak period (57% in and 43% out). During the weekday PM peak period, data at Snoqualmie shows trips in as the dominant movement, while data at Pocono shows the reverse. Given the similarity between Snoqualmie and the proposed Cowlitz Reservation Development in terms of distance from a major metropolitan area, the development is likely to more closely remember Snoqualmie. Therefore, the directional distribution of trips during the weekday PM peak period proposed for the trip generation analysis is 55% in and 45% out (to match the data from Snoqualmie). The proposed directional splits of traffic are shown in Table 6.

Table 6: Proposed Cowlitz Reservation Development Trip Directional Splits

Time Period	Directional Split	
	In	Out
Weekend Peak Period (Friday at 5:00 PM)	60%	40%
Weekday AM Peak Period	57%	43%
Weekday PM Peak Period	55%	45%

Trip Type

Lastly, the trip type was considered for the proposed development. Typically, a portion of trips to a commercial development will be pass-by or diverted trips. Pass-by trips represent patrons (and trips) that are currently traveling on the surrounding roadway network for some other primary purpose (such as a trip from work to home) and stop into the site en route during their normal travel. As such, pass-by trips do not result in a net increase in traffic on the surrounding transportation system and, typically, their only effect occurs at the immediate intersections and site driveways where they become turning movements. Diverted trips represent patrons (and trips) that are currently traveling on the roadway network in the site's vicinity, but must change their travel pattern to access the site. Therefore, diverted trips are not net new trips on the roadway network, but rather altered trips already on the network. All other trips to the site are considered net new trips, because they would not be present on the roadway network without the proposed development.

Traffic volumes and patterns in the vicinity of the site were reviewed to inform the assessment of trip type. Due to the relatively low volumes on NW 319th Street which is immediately adjacent to the site, a small portion of trips generated by the proposed Cowlitz development are likely to be pass-by trips. A more significant portion of trips may be diverted from I-5 and use the interchange at La Center Road to access the site. These trips, although diverted, are still new trips to the local roadway network in the vicinity of the site.

In order to provide a conservative analysis, we are proposing to treat all trips to and from the site as net new trips. No adjustments will be made for pass-by or diverted trips.

CONCLUSIONS

Peak trip generation rates for use in the proposed Cowlitz Reservation Development traffic analysis were derived based on a review of existing literature pertaining to casino trip generation and data collected at seven casinos. The proposed trip rates and directional splits to be used for the three identified peak hour time periods in the transportation impact analysis and IJR are summarized in Table 7.

Table 7: Proposed Cowlitz Reservation Development Trip Generation Rates and Directional Split

Time Period	Trip Rate (trips/gaming position)	Directional Split	
		In	Out
Weekend Peak Period (Friday at 5:00 PM)	0.48	60%	40%
Weekday AM Peak Period	0.15	57%	43%
Weekday PM Peak Period	0.40	55%	45s%

Please review this memorandum and provide us with any questions or comments by November 28, 2012 so that we may proceed with preparation of the respective studies in a timely manner. If you have questions, please contact us at (503) 228-5230.

Appendix A Literature Review

APPENDIX A: LITERATURE REVIEW

The literature review included the following studies:

Ackeret and Hosea. Trip Generation Rates for Las Vegas Area Hotel-Casinos. ITE Journal, May 1992.

This report summarized driveway counts conducted at various Las Vegas area casinos over a five-year period.

Box and Bunte. Gaming Casino Traffic. ITE Journal, March 1998.

This report summarized trip generation rates at the St. Charles Casino and Casino Queen, both located near St. Louis, MO based on the number of gaming positions.

Trueblood and Gude. Trip Generation Characteristics of Small to Medium Sized Casinos. ITE Annual Meeting, 2001.

This report summarized rates at small to medium sized casinos in the Omaha metro area based on the number of slot machines.

Rowe, Kaseko, and Ackeret. Recalibration of Trip Generation Model for Las Vegas Hotel/Casinos. ITE Journal, May 2002.

This report summarized the trip generation of hotel-casinos in Las Vegas based on gaming positions, rooms, employees, and casino floor square footage.

Huntington and Butorac. Review of the Transportation Element of the Environmental Assessment for Cowlitz Indian Tribe. Kittelson & Associates Report, June 7, 2004.

During the review of a TIA for another casino in the Pacific Northwest, KAI conducted counts at two similar casinos in the region, Northern Quest Casino and Tulalip Casino. Trip generation rates were developed based on the number of gaming machines.

Trip Generation, 9th Edition. Institute of Transportation Engineers (ITE), 2012.

The ITE Trip Generation Manual was reviewed for casino land uses. It was determined that the only land use close to a casino in the manual, Casino/Video Lottery Establishment, was not an appropriate representation of the proposed Cascade Locks casino.

Trip Generation Rates Summary

The following table is a summary of the trip generation rates found in the studies presented above. Specifically, the table summarizes rates for the Friday p.m. peak of the adjacent street using number of

gaming positions as the variable. A summary of Saturday peak hour rates is also included. However, only two of the studies summarized in this memorandum contained Saturday peak hour data and only one of those studies contained rates for the peak of the adjacent street.

	Average Trips per Gaming Position, Friday PM Peak - Adj. Street	Average Trips per Gaming Position, Saturday
Casino St. Charles	0.43	0.64 (Peak of Generator)
Casino Queen	0.57	N/A
Omaha Area	0.59	0.64 (Peak of Adj. Street)
Vegas Local Casinos	0.79	N/A
Northern Quest	0.49	N/A
Tulalip Casino	0.42	N/A
Average	**0.55**	**0.64**
Average w/o Vegas	**0.50**	**0.64**

As shown in the summary table, the average trip generation rate during the Friday p.m. peak hour is 0.55 vehicles/gaming position. If the Las Vegas casinos, which generally have different trip generation characteristics, are removed from the average, the resulting average is 0.50 vehicles/gaming position during the Friday p.m. peak hour. The Saturday peak hour average rate, although based on very limited data, is 0.64 vehicles/gaming position.

Conclusions

After completing the literature review, we found that much of the national data was either incomplete or for casinos that were not similar in use, size, and geographic location to the Cowlitz Reservation Development (e.g. Las Vegas casinos and riverboat casinos). Although the literature review provided some interesting insights into the general trip generation characteristics of casinos, the rates provided in these studies did not necessarily reflect the rates of a tribal casino as is being proposed by Cowlitz. Some conclusions from the literature review include:

- Gaming positions correlate well with site trip generation and serve as a recommended independent variable.
- An entertainment venue in which concerts are held can also increase the trip generation potential of a casino.
- Casino/resort facilities located in Las Vegas and Reno are not indicative of trip generation potential for sites similar to the proposed development due to the sheer magnitude in size difference and the area in which they are located.
- Ancillary uses at a casino (i.e. restaurants, retail space) are encompassed in the casino's overall trip generation rate.
- The presence of an on-site hotel may reduce the casino's peak trip generation rate relative to sites without on-site housing.

Appendix B Tube Count Volume Data Sheets from I-5/La Center Rd Ramps

LOCATION: NW 319th St west of I-5 SB ramp
QC JOB #: 10797101
SPECIFIC LOCATION: 0 ft from
DIRECTION: EB/WB
CITY/STATE: La Center, WA
DATE: Sep 14 2012 - Sep 16 2012

Start Time	Mon	Tue	Wed	Thu	Fri 14-Sep-12	Average Weekday Hourly Traffic	Sat 15-Sep-12	Sun 16-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM					1	1	18	18	12	
1:00 AM					2	2	11	22	12	
2:00 AM					3	3	6	0	3	
3:00 AM					2	2	2	8	4	
4:00 AM					9	9	13	2	8	
5:00 AM					35	35	19	20	25	
6:00 AM					80	80	27	33	47	
7:00 AM					117	117	61	35	71	
8:00 AM					**145**	**145**	83	54	94	
9:00 AM					115	115	126	**124**	122	
10:00 AM					107	107	130	109	115	
11:00 AM					120	120	**145**	108	**124**	
12:00 PM					108	108	148	117	124	
1:00 PM					93	93	103	**139**	112	
2:00 PM					148	148	**161**	116	142	
3:00 PM					166	166	135	111	137	
4:00 PM					**168**	**168**	141	120	**143**	
5:00 PM					168	168	116	98	127	
6:00 PM					139	139	111	76	109	
7:00 PM					90	90	78	62	77	
8:00 PM					70	70	73	48	64	
9:00 PM					33	33	54	21	36	
10:00 PM					35	35	45	12	31	
11:00 PM					15	15	19	5	13	
Day Total					1969	1969	1825	1458	1752	
% Weekday Average					100.0%					
% Week Average					112.4%	112.4%	104.2%	83.2%		
AM Peak Volume					8:00 AM 145	8:00 AM 145	11:00 AM 145	9:00 AM 124	11:00 AM 124	
PM Peak Volume					4:00 PM 168	4:00 PM 168	2:00 PM 161	1:00 PM 139	4:00 PM 143	

Comments:

LOCATION: NW 319th St west of I-5 SB ramp
QC JOB #: 10797101
SPECIFIC LOCATION: 0 ft from
DIRECTION: EB/WB
CITY/STATE: La Center, WA
DATE: Sep 17 2012 - Sep 23 2012

Start Time	Mon 17-Sep-12	Tue 18-Sep-12	Wed 19-Sep-12	Thu 20-Sep-12	Fri 21-Sep-12	Average Weekday Hourly Traffic	Sat 22-Sep-12	Sun 23-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM	1	6	3	11	11	6	10	30	10	
1:00 AM	9	1	2	0	2	3	20	15	7	
2:00 AM	6	5	2	4	5	4	3	2	4	
3:00 AM	2	4	5	3	9	5	3	8	5	
4:00 AM	16	11	5	13	18	13	4	1	10	
5:00 AM	30	41	31	35	30	33	17	0	26	
6:00 AM	89	68	74	68	87	77	23	12	60	
7:00 AM	**124**	**158**	145	**159**	**137**	**145**	69	28	117	
8:00 AM	89	105	**158**	141	116	122	117	73	114	
9:00 AM	97	96	71	77	75	83	88	98	86	
10:00 AM	116	80	97	92	111	99	115	89	100	
11:00 AM	79	131	116	99	132	111	**159**	**125**	**120**	
12:00 PM	87	99	104	83	118	98	136	121	107	
1:00 PM	108	132	102	123	124	118	114	**163**	124	
2:00 PM	105	111	87	114	**149**	113	**138**	104	115	
3:00 PM	101	**135**	**147**	**156**	142	**136**	117	92	**127**	
4:00 PM	**123**	134	146	112	136	130	133	98	126	
5:00 PM	117	129	140	129	143	132	116	93	124	
6:00 PM	115	88	102	112	140	111	110	77	106	
7:00 PM	71	80	86	74	77	78	86	73	78	
8:00 PM	44	50	38	59	35	45	76	41	49	
9:00 PM	25	39	30	35	46	35	42	44	37	
10:00 PM	31	23	11	26	49	28	33	19	27	
11:00 PM	4	6	7	7	24	10	34	3	12	
Day Total	1589	1732	1709	1732	1916	1735	1763	1409	1691	
% Weekday Average	80.7%	99.8%	98.5%	99.8%	110.4%					
% Week Average	90.7%	102.4%	101.1%	102.4%	113.3%	102.6%	104.3%	83.3%		
AM Peak	7:00 AM	7:00 AM	8:00 AM	7:00 AM	7:00 AM	7:00 AM	11:00 AM	11:00 AM	11:00 AM	
Volume	124	158	158	159	137	145	159	125	120	
PM Peak	4:00 PM	3:00 PM	3:00 PM	3:00 PM	2:00 PM	3:00 PM	2:00 PM	1:00 PM	3:00 PM	
Volume	123	135	147	156	149	136	138	163	127	

Comments:

SUMMARY - Tube Count - Volume Data (Weekday)

LOCATION: NW 319th St west of I-5 SB ramp
SPECIFIC LOCATION: 0 ft from
CITY/STATE: La Center, WA

QC JOB #: 10797101
DIRECTION: EB/WB
DATE: Sep 10 2012 - Sep 14 2012

Start Time	Mon 10-Sep-12	Tue 11-Sep-12	Wed 12-Sep-12	Thu 13-Sep-12	Fri 14-Sep-12	Average Weekday Hourly Traffic			Average Weekday Profile
12:00 AM	1	6	3	11	1	4			
1:00 AM	9	1	2	0	2	3			
2:00 AM	6	5	2	4	3	4			
3:00 AM	2	4	5	3	2	3			
4:00 AM	16	11	5	13	9	11			
5:00 AM	30	41	31	35	35	34			
6:00 AM	89	68	74	68	80	76			
7:00 AM	**124**	**158**	145	**159**	117	**141**			
8:00 AM	89	105	**158**	141	**145**	128			
9:00 AM	97	96	71	77	115	91			
10:00 AM	116	80	97	92	107	98			
11:00 AM	79	131	116	99	120	109			
12:00 PM	87	99	104	83	108	96			
1:00 PM	108	132	102	123	93	112			
2:00 PM	105	111	87	114	148	113			
3:00 PM	101	**135**	**147**	**156**	166	**141**			
4:00 PM	**123**	134	146	112	**168**	137			
5:00 PM	117	129	140	129	168	137			
6:00 PM	115	88	102	112	139	111			
7:00 PM	71	80	86	74	90	80			
8:00 PM	44	50	38	59	70	52			
9:00 PM	25	39	30	35	33	32			
10:00 PM	31	23	11	26	35	25			
11:00 PM	4	6	7	7	15	8			
Day Total	1589	1732	1709	1732	1969	1746			
% Weekday Average	91.0%	99.2%	97.9%	99.2%	112.8%				
% Week Average									
AM Peak	7:00 AM	7:00 AM	8:00 AM	7:00 AM	8:00 AM	7:00 AM			
Volume	124	158	158	159	145	141			
PM Peak	4:00 PM	3:00 PM	3:00 PM	3:00 PM	4:00 PM	3:00 PM			
Volume	123	135	147	156	168	141			

Comments:

SUMMARY - Tube Count - Volume Data (Weekend)

LOCATION: NW 319th St west of I-5 SB ramp
SPECIFIC LOCATION: 0 ft from
CITY/STATE: La Center, WA

QC JOB #: 10797101
DIRECTION: EB/WB
DATE: Sep 15 2012 - Sep 16 2012

Start Time			Sat 15-Sep-12	Sun 16-Sep-12	Average Weekend Hourly Traffic	Average Weekend Profile
12:00 AM			18	18	18	
1:00 AM			11	22	17	
2:00 AM			6	0	3	
3:00 AM			2	8	5	
4:00 AM			13	2	8	
5:00 AM			19	20	20	
6:00 AM			27	33	30	
7:00 AM			61	35	48	
8:00 AM			83	54	69	
9:00 AM			126	**124**	125	
10:00 AM			130	109	120	
11:00 AM			**145**	108	**127**	
12:00 PM			148	117	133	
1:00 PM			103	**139**	121	
2:00 PM			**161**	116	**139**	
3:00 PM			135	111	123	
4:00 PM			141	120	131	
5:00 PM			116	98	107	
6:00 PM			111	76	94	
7:00 PM			78	62	70	
8:00 PM			73	48	61	
9:00 PM			54	21	38	
10:00 PM			45	12	29	
11:00 PM			19	5	12	
Day Total			1825	1458	1648	
% Weekday Average						
% Week Average			110.7%	88.5%		
AM Peak Volume			11:00 AM 145	9:00 AM 124	11:00 AM 127	
PM Peak Volume			2:00 PM 161	1:00 PM 139	2:00 PM 139	

Comments:

SUMMARY - Tube Count - Volume Data (Week)

LOCATION: NW 319th St west of I-5 SB ramp
QC JOB #: 10797101
SPECIFIC LOCATION: 0 ft from
DIRECTION: EB/WB
CITY/STATE: La Center, WA
DATE: Sep 10 2012 - Sep 16 2012

Start Time	Mon 10-Sep-12	Tue 11-Sep-12	Wed 12-Sep-12	Thu 13-Sep-12	Fri 14-Sep-12	Average Weekday Hourly Traffic	Sat 15-Sep-12	Sun 16-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM	1	6	3	11	1	4	18	18	8	
1:00 AM	9	1	2	0	2	3	11	22	7	
2:00 AM	6	5	2	4	3	4	6	0	4	
3:00 AM	2	4	5	3	2	3	2	8	4	
4:00 AM	16	11	5	13	9	11	13	2	10	
5:00 AM	30	41	31	35	35	34	19	20	30	
6:00 AM	89	68	74	68	80	76	27	33	63	
7:00 AM	**124**	**158**	145	**159**	117	**141**	61	35	**114**	
8:00 AM	89	105	**158**	141	**145**	128	83	54	111	
9:00 AM	97	96	71	77	115	91	126	**124**	101	
10:00 AM	116	80	97	92	107	98	130	109	104	
11:00 AM	79	131	116	99	120	109	**145**	108	114	
12:00 PM	87	99	104	83	108	96	148	117	107	
1:00 PM	108	132	102	123	93	112	103	**139**	114	
2:00 PM	105	111	87	114	148	113	**161**	116	120	
3:00 PM	101	**135**	**147**	**156**	166	**141**	135	111	**136**	
4:00 PM	**123**	134	146	112	**168**	137	141	120	135	
5:00 PM	117	129	140	129	168	137	116	98	128	
6:00 PM	115	88	102	112	139	111	111	76	106	
7:00 PM	71	80	86	74	90	80	78	62	77	
8:00 PM	44	50	38	59	70	52	73	48	55	
9:00 PM	25	39	30	35	33	32	54	21	34	
10:00 PM	31	23	11	26	35	25	45	12	26	
11:00 PM	4	6	7	7	15	8	19	5	9	
Day Total	1589	1732	1709	1732	1969	1746	1825	1458	1717	
% Weekday Average	91.0%	99.2%	97.9%	99.2%	112.8%					
% Week Average	92.5%	100.9%	99.5%	100.9%	114.7%	101.7%	106.3%	84.9%		
AM Peak	7:00 AM	7:00 AM	8:00 AM	7:00 AM	8:00 AM	7:00 AM	11:00 AM	9:00 AM	7:00 AM	
Volume	124	158	158	159	145	141	145	124	114	
PM Peak	4:00 PM	3:00 PM	3:00 PM	3:00 PM	4:00 PM	3:00 PM	2:00 PM	1:00 PM	3:00 PM	
Volume	123	135	147	156	168	141	161	139	136	

Comments:

LOCATION: NW La Center Rd east of Paradise Park Rd
QC JOB #: 10797102
SPECIFIC LOCATION: 0 ft from
DIRECTION: EB/WB
CITY/STATE: La Center, WA
DATE: Sep 14 2012 - Sep 16 2012

Start Time	Mon	Tue	Wed	Thu	Fri 14-Sep-12	Average Weekday Hourly Traffic	Sat 15-Sep-12	Sun 16-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM					137	137	173	191	167	
1:00 AM					91	91	155	124	123	
2:00 AM					89	89	100	89	93	
3:00 AM					85	85	88	82	85	
4:00 AM					166	166	110	99	125	
5:00 AM					277	277	160	100	179	
6:00 AM					536	536	182	158	292	
7:00 AM					**784**	**784**	308	250	447	
8:00 AM					644	644	417	279	447	
9:00 AM					498	498	507	430	478	
10:00 AM					492	492	579	**486**	519	
11:00 AM					568	568	**625**	464	**552**	
12:00 PM					574	574	677	583	611	
1:00 PM					619	619	675	580	625	
2:00 PM					674	674	667	546	629	
3:00 PM					869	869	690	599	719	
4:00 PM					848	848	**723**	**630**	**734**	
5:00 PM					**895**	**895**	680	586	720	
6:00 PM					784	784	599	571	651	
7:00 PM					560	560	567	498	542	
8:00 PM					470	470	484	384	446	
9:00 PM					482	482	410	315	402	
10:00 PM					383	383	316	188	296	
11:00 PM					281	281	268	180	243	
Day Total					11806	11806	10160	8412	10125	
% Weekday Average					100.0%					
% Week Average					116.6%	116.6%	100.3%	83.1%		
AM Peak					7:00 AM	7:00 AM	11:00 AM	10:00 AM	11:00 AM	
Volume					784	784	625	486	552	
PM Peak					5:00 PM	5:00 PM	4:00 PM	4:00 PM	4:00 PM	
Volume					895	895	723	630	734	

Comments:

LOCATION: NW La Center Rd east of Paradise Park Rd
QC JOB #: 10797102
SPECIFIC LOCATION: 0 ft from
DIRECTION: EB/WB
CITY/STATE: La Center, WA
DATE: Sep 17 2012 - Sep 23 2012

Start Time	Mon 17-Sep-12	Tue 18-Sep-12	Wed 19-Sep-12	Thu 20-Sep-12	Fri 21-Sep-12	Average Weekday Hourly Traffic	Sat 22-Sep-12	Sun 23-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM	132	112	98	121	154	123	195	161	139	
1:00 AM	80	71	87	85	90	83	124	127	95	
2:00 AM	65	57	92	78	75	73	132	120	88	
3:00 AM	88	89	77	80	89	85	101	89	88	
4:00 AM	165	133	149	142	137	145	99	87	130	
5:00 AM	321	308	309	311	267	303	142	91	250	
6:00 AM	575	583	594	554	551	571	209	136	457	
7:00 AM	**770**	**827**	**785**	**744**	**735**	**772**	343	263	**638**	
8:00 AM	592	659	665	624	604	629	424	317	555	
9:00 AM	536	460	443	448	521	482	465	436	473	
10:00 AM	440	420	463	419	492	447	571	427	462	
11:00 AM	483	503	457	480	553	495	**614**	**475**	509	
12:00 PM	501	448	505	480	556	498	580	533	515	
1:00 PM	499	506	514	566	600	537	589	563	548	
2:00 PM	545	640	597	624	736	628	635	626	629	
3:00 PM	764	758	759	817	826	785	**669**	**637**	747	
4:00 PM	788	865	886	850	864	851	668	549	781	
5:00 PM	**922**	**913**	**945**	**929**	**919**	**926**	653	568	**836**	
6:00 PM	745	705	700	776	838	753	577	509	693	
7:00 PM	505	582	587	578	556	562	460	459	532	
8:00 PM	394	460	438	435	418	429	441	407	428	
9:00 PM	304	352	304	347	517	365	393	259	354	
10:00 PM	200	216	207	248	380	250	331	206	255	
11:00 PM	170	184	210	203	297	213	280	184	218	
Day Total	10584	10851	10871	10939	11775	11005	9695	8229	10420	
% Weekday Average	89.6%	98.6%	98.8%	99.4%	107.0%					
% Week Average	104.5%	104.1%	104.3%	105.0%	113.0%	105.6%	93.0%	79.0%		
AM Peak	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	11:00 AM	11:00 AM	7:00 AM	
Volume	770	827	785	744	735	772	614	475	638	
PM Peak	5:00 PM	5:00 PM	5:00 PM	5:00 PM	5:00 PM	5:00 PM	3:00 PM	3:00 PM	5:00 PM	
Volume	922	913	945	929	919	926	669	637	836	

Comments:

SUMMARY - Tube Count - Volume Data (Weekday)

LOCATION: NW La Center Rd east of Paradise Park Rd
SPECIFIC LOCATION: 0 ft from
CITY/STATE: La Center, WA

QC JOB #: 10797102
DIRECTION: EB/WB
DATE: Sep 10 2012 - Sep 14 2012

Start Time	Mon 10-Sep-12	Tue 11-Sep-12	Wed 12-Sep-12	Thu 13-Sep-12	Fri 14-Sep-12	Average Weekday Hourly Traffic			Average Weekday Profile
12:00 AM	132	112	98	121	137	120			
1:00 AM	80	71	87	85	91	83			
2:00 AM	65	57	92	78	89	76			
3:00 AM	88	89	77	80	85	84			
4:00 AM	165	133	149	142	166	151			
5:00 AM	321	308	309	311	277	305			
6:00 AM	575	583	594	554	536	568			
7:00 AM	**770**	**827**	**785**	**744**	**784**	**782**			
8:00 AM	592	659	665	624	644	637			
9:00 AM	536	460	443	448	498	477			
10:00 AM	440	420	463	419	492	447			
11:00 AM	483	503	457	480	568	498			
12:00 PM	501	448	505	480	574	502			
1:00 PM	499	506	514	566	619	541			
2:00 PM	545	640	597	624	674	616			
3:00 PM	764	758	759	817	869	793			
4:00 PM	788	865	886	850	848	847			
5:00 PM	**922**	**913**	**945**	**929**	**895**	**921**			
6:00 PM	745	705	700	776	784	742			
7:00 PM	505	582	587	578	560	562			
8:00 PM	394	460	438	435	470	439			
9:00 PM	304	352	304	347	482	358			
10:00 PM	200	216	207	248	383	251			
11:00 PM	170	184	210	203	281	210			
Day Total	10584	10851	10871	10939	11806	11010			
% Weekday Average	96.1%	98.6%	98.7%	99.4%	107.2%				
% Week Average									
AM Peak Volume	7:00 AM 770	7:00 AM 827	7:00 AM 785	7:00 AM 744	7:00 AM 784	7:00 AM 782			
PM Peak Volume	5:00 PM 922	5:00 PM 913	5:00 PM 945	5:00 PM 929	5:00 PM 895	5:00 PM 921			

Comments:

SUMMARY - Tube Count - Volume Data (Weekend)

LOCATION: NW La Center Rd east of Paradise Park Rd
QC JOB #: 10797102
SPECIFIC LOCATION: 0 ft from
DIRECTION: EB/WB
CITY/STATE: La Center, WA
DATE: Sep 15 2012 - Sep 16 2012

Start Time			Sat 15-Sep-12	Sun 16-Sep-12	Average Weekend Hourly Traffic	Average Weekend Profile
12:00 AM			173	191	182	
1:00 AM			155	124	140	
2:00 AM			100	89	95	
3:00 AM			88	82	85	
4:00 AM			110	99	105	
5:00 AM			160	100	130	
6:00 AM			182	158	170	
7:00 AM			308	250	279	
8:00 AM			417	279	348	
9:00 AM			507	430	469	
10:00 AM			579	**486**	533	
11:00 AM			**625**	464	**545**	
12:00 PM			677	583	630	
1:00 PM			675	580	628	
2:00 PM			667	546	607	
3:00 PM			690	599	645	
4:00 PM			**723**	**630**	**677**	
5:00 PM			680	586	633	
6:00 PM			599	571	585	
7:00 PM			567	498	533	
8:00 PM			484	384	434	
9:00 PM			410	315	363	
10:00 PM			316	188	252	
11:00 PM			268	180	224	
Day Total			10160	8412	9292	
% Weekday Average						
% Week Average			109.3%	90.5%		
AM Peak Volume			11:00 AM 625	10:00 AM 486	11:00 AM 545	
PM Peak Volume			4:00 PM 723	4:00 PM 630	4:00 PM 677	

Comments:

SUMMARY - Tube Count - Volume Data (Week)

LOCATION: NW La Center Rd east of Paradise Park Rd
QC JOB #: 10797102
SPECIFIC LOCATION: 0 ft from
DIRECTION: EB/WB
CITY/STATE: La Center, WA
DATE: Sep 10 2012 - Sep 16 2012

Start Time	Mon 10-Sep-12	Tue 11-Sep-12	Wed 12-Sep-12	Thu 13-Sep-12	Fri 14-Sep-12	Average Weekday Hourly Traffic	Sat 15-Sep-12	Sun 16-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM	132	112	98	121	137	120	173	191	138	
1:00 AM	80	71	87	85	91	83	155	124	99	
2:00 AM	65	57	92	78	89	76	100	89	81	
3:00 AM	88	89	77	80	85	84	88	82	84	
4:00 AM	165	133	149	142	166	151	110	99	138	
5:00 AM	321	308	309	311	277	305	160	100	255	
6:00 AM	575	583	594	554	536	568	182	158	455	
7:00 AM	**770**	**827**	**785**	**744**	**784**	**782**	308	250	**638**	
8:00 AM	592	659	665	624	644	637	417	279	554	
9:00 AM	536	460	443	448	498	477	507	430	475	
10:00 AM	440	420	463	419	492	447	579	**486**	471	
11:00 AM	483	503	457	480	568	498	**625**	464	511	
12:00 PM	501	448	505	480	574	502	677	583	538	
1:00 PM	499	506	514	566	619	541	675	580	566	
2:00 PM	545	640	597	624	674	616	667	546	613	
3:00 PM	764	758	759	817	869	793	690	599	751	
4:00 PM	788	865	886	850	848	847	**723**	**630**	799	
5:00 PM	**922**	**913**	**945**	**929**	**895**	**921**	680	586	**839**	
6:00 PM	745	705	700	776	784	742	599	571	697	
7:00 PM	505	582	587	578	560	562	567	498	554	
8:00 PM	394	460	438	435	470	439	484	384	438	
9:00 PM	304	352	304	347	482	358	410	315	359	
10:00 PM	200	216	207	248	383	251	316	188	251	
11:00 PM	170	184	210	203	281	210	268	180	214	
Day Total	10584	10851	10871	10939	11806	11010	10160	8412	10518	
% Weekday Average	96.1%	98.6%	98.7%	99.4%	107.2%					
% Week Average	100.6%	103.2%	103.4%	104.0%	112.2%	104.7%	96.6%	80.0%		
AM Peak Volume	7:00 AM 770	7:00 AM 827	7:00 AM 785	7:00 AM 744	7:00 AM 784	7:00 AM 782	11:00 AM 625	10:00 AM 486	7:00 AM 638	
PM Peak Volume	5:00 PM 922	5:00 PM 913	5:00 PM 945	5:00 PM 929	5:00 PM 895	5:00 PM 921	4:00 PM 723	4:00 PM 630	5:00 PM 839	

Comments:

LOCATION: I-5 NB on-ramp at La Center Rd

QC JOB #: 10797105

SPECIFIC LOCATION: 0 ft from

DIRECTION: NB

CITY/STATE: La Center, WA

DATE: Sep 18 2012 - Sep 23 2012

Start Time	Mon	Tue 18-Sep-12	Wed 19-Sep-12	Thu 20-Sep-12	Fri 21-Sep-12	Average Weekday Hourly Traffic	Sat 22-Sep-12	Sun 23-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM		12	16	10	22	15	14	16	15	
1:00 AM		11	16	10	9	12	12	14	12	
2:00 AM		18	15	17	14	16	19	10	16	
3:00 AM		29	19	19	21	22	10	10	18	
4:00 AM		23	36	32	36	32	10	17	26	
5:00 AM		54	70	60	52	59	31	18	48	
6:00 AM		126	115	116	116	118	45	30	91	
7:00 AM		**156**	**153**	**137**	128	**144**	78	43	**116**	
8:00 AM		137	113	129	121	125	97	75	112	
9:00 AM		122	105	96	91	104	91	**101**	101	
10:00 AM		79	109	131	116	109	**113**	101	108	
11:00 AM		124	118	61	**129**	108	100	86	103	
12:00 PM		85	80	105	122	98	122	119	106	
1:00 PM		119	113	95	107	109	**128**	90	109	
2:00 PM		101	116	108	114	110	96	**127**	110	
3:00 PM		143	**151**	**151**	**170**	**154**	103	84	**134**	
4:00 PM		**152**	136	141	155	146	99	105	131	
5:00 PM		118	145	107	137	127	96	86	115	
6:00 PM		100	84	100	107	98	87	80	93	
7:00 PM		86	58	101	87	83	58	66	76	
8:00 PM		35	51	58	46	48	55	48	49	
9:00 PM		29	49	39	132	62	47	47	57	
10:00 PM		24	18	22	42	27	25	20	25	
11:00 PM		17	23	14	24	20	26	16	20	
Day Total		1900	1909	1859	2098	1946	1562	1409	1791	
% Weekday Average		97.6%	98.1%	95.5%	107.8%					
% Week Average		106.1%	106.6%	103.8%	117.1%	108.7%	87.2%	78.7%		
AM Peak Volume		7:00 AM 156	7:00 AM 153	7:00 AM 137	11:00 AM 129	7:00 AM 144	10:00 AM 113	9:00 AM 101	7:00 AM 116	
PM Peak Volume		4:00 PM 152	3:00 PM 151	3:00 PM 151	3:00 PM 170	3:00 PM 154	1:00 PM 128	2:00 PM 127	3:00 PM 134	

Comments:

LOCATION: I-5 NB on-ramp at La Center Rd

QC JOB #: 10797105

SPECIFIC LOCATION: 0 ft from

DIRECTION: NB

CITY/STATE: La Center, WA

DATE: Sep 24 2012 - Sep 27 2012

Start Time	Mon 24-Sep-12	Tue 25-Sep-12	Wed 26-Sep-12	Thu 27-Sep-12	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM	20	11	17	9		14			14	
1:00 AM	9	12	17	10		12			12	
2:00 AM	6	13	20	18		14			14	
3:00 AM	19	20	22	26		22			22	
4:00 AM	51	32	37	35		39			39	
5:00 AM	64	64	74	68		68			68	
6:00 AM	105	109	115	109		110			110	
7:00 AM	**145**	**156**	**150**	**143**		**149**			**149**	
8:00 AM	120	125	134	124		126			126	
9:00 AM	104	88	112	83		97			97	
10:00 AM	106	89	83	100		95			95	
11:00 AM	117	108	115	97		109			109	
12:00 PM	102	121	114	111		112			112	
1:00 PM	83	95	87	103		92			92	
2:00 PM	0	58	119	105		71			71	
3:00 PM	0	113	141	**153**		102			102	
4:00 PM	**120**	134	**148**	136		**135**			**135**	
5:00 PM	99	**136**	133	152		130			130	
6:00 PM	89	105	95	90		95			95	
7:00 PM	67	79	73	85		76			76	
8:00 PM	33	88	37	43		50			50	
9:00 PM	27	31	40	33		33			33	
10:00 PM	23	19	22	24		22			22	
11:00 PM	19	15	20	17		18			18	
Day Total	1528	1821	1925	1874		1791			1791	
% Weekday Average	78.5%	101.7%	107.5%	104.6%						
% Week Average	85.3%	101.7%	107.5%	104.6%		100.0%				
AM Peak	7:00 AM	7:00 AM	7:00 AM	7:00 AM		7:00 AM			7:00 AM	
Volume	145	156	150	143		149			149	
PM Peak	4:00 PM	5:00 PM	4:00 PM	3:00 PM		4:00 PM			4:00 PM	
Volume	120	136	148	153		135			135	

Comments:

SUMMARY - Tube Count - Volume Data (Weekday)

LOCATION: I-5 NB on-ramp at La Center Rd
SPECIFIC LOCATION: 0 ft from
CITY/STATE: La Center, WA

QC JOB #: 10797105
DIRECTION: NB
DATE: Sep 17 2012 - Sep 21 2012

Start Time	Mon 17-Sep-12	Tue 18-Sep-12	Wed 19-Sep-12	Thu 20-Sep-12	Fri 21-Sep-12	Average Weekday Hourly Traffic			Average Weekday Profile
12:00 AM	20	12	16	10	22	16			
1:00 AM	9	11	16	10	9	11			
2:00 AM	6	18	15	17	14	14			
3:00 AM	19	29	19	19	21	21			
4:00 AM	51	23	36	32	36	36			
5:00 AM	64	54	70	60	52	60			
6:00 AM	105	126	115	116	116	116			
7:00 AM	**145**	**156**	**153**	**137**	128	**144**			
8:00 AM	120	137	113	129	121	124			
9:00 AM	104	122	105	96	91	104			
10:00 AM	106	79	109	131	116	108			
11:00 AM	117	124	118	61	**129**	110			
12:00 PM	102	85	80	105	122	99			
1:00 PM	83	119	113	95	107	103			
2:00 PM	0	101	116	108	114	88			
3:00 PM	0	143	**151**	**151**	**170**	123			
4:00 PM	**120**	**152**	136	141	155	**141**			
5:00 PM	99	118	145	107	137	121			
6:00 PM	89	100	84	100	107	96			
7:00 PM	67	86	58	101	87	80			
8:00 PM	33	35	51	58	46	45			
9:00 PM	27	29	49	39	132	55			
10:00 PM	23	24	18	22	42	26			
11:00 PM	19	17	23	14	24	19			
Day Total	1528	1900	1909	1859	2098	1860			
% Weekday Average	82.2%	102.2%	102.6%	99.9%	112.8%				
% Week Average									
AM Peak	7:00 AM	7:00 AM	7:00 AM	7:00 AM	11:00 AM	7:00 AM			
Volume	145	156	153	137	129	144			
PM Peak	4:00 PM	4:00 PM	3:00 PM	3:00 PM	3:00 PM	4:00 PM			
Volume	120	152	151	151	170	141			

Comments:

SUMMARY - Tube Count - Volume Data (Weekend)

LOCATION: I-5 NB on-ramp at La Center Rd
SPECIFIC LOCATION: 0 ft from
CITY/STATE: La Center, WA

QC JOB #: 10797105
DIRECTION: NB
DATE: Sep 22 2012 - Sep 23 2012

Start Time			Sat 22-Sep-12	Sun 23-Sep-12	Average Weekend Hourly Traffic	Average Weekend Profile
12:00 AM			14	16	15	
1:00 AM			12	14	13	
2:00 AM			19	10	15	
3:00 AM			10	10	10	
4:00 AM			10	17	14	
5:00 AM			31	18	25	
6:00 AM			45	30	38	
7:00 AM			78	43	61	
8:00 AM			97	75	86	
9:00 AM			91	**101**	96	
10:00 AM			**113**	101	**107**	
11:00 AM			100	86	93	
12:00 PM			122	119	**121**	
1:00 PM			**128**	90	109	
2:00 PM			96	**127**	112	
3:00 PM			103	84	94	
4:00 PM			99	105	102	
5:00 PM			96	86	91	
6:00 PM			87	80	84	
7:00 PM			58	66	62	
8:00 PM			55	48	52	
9:00 PM			47	47	47	
10:00 PM			25	20	23	
11:00 PM			26	16	21	
Day Total			1562	1409	1491	
% Weekday Average						
% Week Average			104.8%	94.5%		
AM Peak Volume			10:00 AM 113	9:00 AM 101	10:00 AM 107	
PM Peak Volume			1:00 PM 128	2:00 PM 127	12:00 PM 121	

Comments:

SUMMARY - Tube Count - Volume Data (Week)

LOCATION: I-5 NB on-ramp at La Center Rd
SPECIFIC LOCATION: 0 ft from
CITY/STATE: La Center, WA

QC JOB #: 10797105
DIRECTION: NB
DATE: Sep 17 2012 - Sep 23 2012

Start Time	Mon 17-Sep-12	Tue 18-Sep-12	Wed 19-Sep-12	Thu 20-Sep-12	Fri 21-Sep-12	Average Weekday Hourly Traffic	Sat 22-Sep-12	Sun 23-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM	20	12	16	10	22	16	14	16	16	
1:00 AM	9	11	16	10	9	11	12	14	12	
2:00 AM	6	18	15	17	14	14	19	10	14	
3:00 AM	19	29	19	19	21	21	10	10	18	
4:00 AM	51	23	36	32	36	36	10	17	29	
5:00 AM	64	54	70	60	52	60	31	18	50	
6:00 AM	105	126	115	116	116	116	45	30	93	
7:00 AM	**145**	**156**	**153**	**137**	128	**144**	78	43	**120**	
8:00 AM	120	137	113	129	121	124	97	75	113	
9:00 AM	104	122	105	96	91	104	91	**101**	101	
10:00 AM	106	79	109	131	116	108	**113**	101	108	
11:00 AM	117	124	118	61	**129**	110	100	86	105	
12:00 PM	102	85	80	105	122	99	122	119	105	
1:00 PM	83	119	113	95	107	103	**128**	90	105	
2:00 PM	0	101	116	108	114	88	96	**127**	95	
3:00 PM	0	143	**151**	**151**	**170**	123	103	84	115	
4:00 PM	**120**	**152**	136	141	155	**141**	99	105	**130**	
5:00 PM	99	118	145	107	137	121	96	86	113	
6:00 PM	89	100	84	100	107	96	87	80	92	
7:00 PM	67	86	58	101	87	80	58	66	75	
8:00 PM	33	35	51	58	46	45	55	48	47	
9:00 PM	27	29	49	39	132	55	47	47	53	
10:00 PM	23	24	18	22	42	26	25	20	25	
11:00 PM	19	17	23	14	24	19	26	16	20	
Day Total	1528	1900	1909	1859	2098	1860	1562	1409	1754	
% Weekday Average	82.2%	102.2%	102.6%	99.9%	112.8%					
% Week Average	87.1%	108.3%	108.8%	106.0%	119.6%	106.0%	89.1%	80.3%		
AM Peak Volume	7:00 AM 145	7:00 AM 156	7:00 AM 153	7:00 AM 137	11:00 AM 129	7:00 AM 144	10:00 AM 113	9:00 AM 101	7:00 AM 120	
PM Peak Volume	4:00 PM 120	4:00 PM 152	3:00 PM 151	3:00 PM 151	3:00 PM 170	4:00 PM 141	1:00 PM 128	2:00 PM 127	4:00 PM 130	

Comments:

LOCATION: I-5 NB off-ramp at La Center Rd

QC JOB #: 10797106

SPECIFIC LOCATION: 0 ft from

DIRECTION: NB

CITY/STATE: La Center , WA

DATE: Sep 14 2012 - Sep 16 2012

Start Time	Mon	Tue	Wed	Thu	Fri 14-Sep-12	Average Weekday Hourly Traffic	Sat 15-Sep-12	Sun 16-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM					62	62	89	101	84	
1:00 AM					33	33	63	56	51	
2:00 AM					46	46	41	33	40	
3:00 AM					37	37	35	17	30	
4:00 AM					31	31	15	21	22	
5:00 AM					51	51	36	29	39	
6:00 AM					85	85	50	43	59	
7:00 AM					182	182	105	83	123	
8:00 AM					158	158	120	77	118	
9:00 AM					210	210	142	99	150	
10:00 AM					174	174	191	133	166	
11:00 AM					**217**	**217**	**228**	**199**	**215**	
12:00 PM					273	273	278	242	264	
1:00 PM					305	305	285	286	292	
2:00 PM					332	332	340	**311**	328	
3:00 PM					487	487	356	248	364	
4:00 PM					471	471	351	257	360	
5:00 PM					**524**	**524**	**365**	242	**377**	
6:00 PM					448	448	328	225	334	
7:00 PM					313	313	297	214	275	
8:00 PM					323	323	272	168	254	
9:00 PM					282	282	252	137	224	
10:00 PM					218	218	178	128	175	
11:00 PM					157	157	153	73	128	
Day Total					5419	5419	4570	3422	4472	
% Weekday Average					100.0%					
% Week Average					121.2%	121.2%	102.2%	76.5%		
AM Peak					11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	
Volume					217	217	228	199	215	
PM Peak					5:00 PM	5:00 PM	5:00 PM	2:00 PM	5:00 PM	
Volume					524	524	365	311	377	

Comments:

LOCATION: I-5 NB off-ramp at La Center Rd
QC JOB #: 10797106
SPECIFIC LOCATION: 0 ft from
DIRECTION: NB
CITY/STATE: La Center , WA
DATE: Sep 17 2012 - Sep 23 2012

Start Time	Mon 17-Sep-12	Tue 18-Sep-12	Wed 19-Sep-12	Thu 20-Sep-12	Fri 21-Sep-12	Average Weekday Hourly Traffic	Sat 22-Sep-12	Sun 23-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM	38	50	56	52	71	53	90	90	64	
1:00 AM	34	32	40	37	45	38	57	44	41	
2:00 AM	19	34	26	31	25	27	29	56	31	
3:00 AM	18	30	21	37	32	28	31	14	26	
4:00 AM	30	21	27	27	21	25	25	17	24	
5:00 AM	39	49	43	52	42	45	35	26	41	
6:00 AM	72	89	78	67	97	81	53	32	70	
7:00 AM	137	180	158	171	176	164	112	93	147	
8:00 AM	141	215	167	221	173	183	91	69	154	
9:00 AM	154	170	159	173	165	164	129	117	152	
10:00 AM	163	143	175	202	185	174	174	115	165	
11:00 AM	**195**	**247**	**244**	**230**	**237**	**231**	**265**	**198**	**231**	
12:00 PM	216	211	246	222	264	232	264	243	238	
1:00 PM	264	236	260	282	267	262	252	236	257	
2:00 PM	292	310	299	295	340	307	299	**334**	310	
3:00 PM	379	379	390	425	417	398	**362**	333	384	
4:00 PM	448	456	479	506	470	472	294	281	419	
5:00 PM	**585**	**553**	**521**	**529**	**562**	**550**	331	281	**480**	
6:00 PM	456	410	435	501	484	457	300	256	406	
7:00 PM	310	372	326	309	380	339	250	246	313	
8:00 PM	195	292	261	285	241	255	253	208	248	
9:00 PM	178	256	217	220	249	224	215	159	213	
10:00 PM	128	134	152	128	183	145	191	101	145	
11:00 PM	82	78	119	102	144	105	146	103	111	
Day Total	4573	4947	4899	5104	5270	4959	4248	3652	4670	
% Weekday Average	84.4%	99.8%	98.8%	102.9%	106.3%					
% Week Average	102.3%	105.9%	104.9%	109.3%	112.8%	106.2%	91.0%	78.2%		
AM Peak	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	
Volume	195	247	244	230	237	231	265	198	231	
PM Peak	5:00 PM	5:00 PM	5:00 PM	5:00 PM	5:00 PM	5:00 PM	3:00 PM	2:00 PM	5:00 PM	
Volume	585	553	521	529	562	550	362	334	480	

Comments:

SUMMARY - Tube Count - Volume Data (Weekday)

LOCATION: I-5 NB off-ramp at La Center Rd
SPECIFIC LOCATION: 0 ft from
CITY/STATE: La Center , WA

QC JOB #: 10797106
DIRECTION: NB
DATE: Sep 10 2012 - Sep 14 2012

Start Time	Mon 10-Sep-12	Tue 11-Sep-12	Wed 12-Sep-12	Thu 13-Sep-12	Fri 14-Sep-12	Average Weekday Hourly Traffic	Average Weekday Profile
12:00 AM	38	50	56	52	62	52	
1:00 AM	34	32	40	37	33	35	
2:00 AM	19	34	26	31	46	31	
3:00 AM	18	30	21	37	37	29	
4:00 AM	30	21	27	27	31	27	
5:00 AM	39	49	43	52	51	47	
6:00 AM	72	89	78	67	85	78	
7:00 AM	137	180	158	171	182	166	
8:00 AM	141	215	167	221	158	180	
9:00 AM	154	170	159	173	210	173	
10:00 AM	163	143	175	202	174	171	
11:00 AM	**195**	**247**	**244**	**230**	**217**	**227**	
12:00 PM	216	211	246	222	273	234	
1:00 PM	264	236	260	282	305	269	
2:00 PM	292	310	299	295	332	306	
3:00 PM	379	379	390	425	487	412	
4:00 PM	448	456	479	506	471	472	
5:00 PM	**585**	**553**	**521**	**529**	**524**	**542**	
6:00 PM	456	410	435	501	448	450	
7:00 PM	310	372	326	309	313	326	
8:00 PM	195	292	261	285	323	271	
9:00 PM	178	256	217	220	282	231	
10:00 PM	128	134	152	128	218	152	
11:00 PM	82	78	119	102	157	108	
Day Total	4573	4947	4899	5104	5419	4989	
% Weekday Average	91.7%	99.2%	98.2%	102.3%	108.6%		
% Week Average							
AM Peak	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	
Volume	195	247	244	230	217	227	
PM Peak	5:00 PM	5:00 PM	5:00 PM	5:00 PM	5:00 PM	5:00 PM	
Volume	585	553	521	529	524	542	

Comments:

SUMMARY - Tube Count - Volume Data (Weekend)

LOCATION: I-5 NB off-ramp at La Center Rd
SPECIFIC LOCATION: 0 ft from
CITY/STATE: La Center , WA

QC JOB #: 10797106
DIRECTION: NB
DATE: Sep 15 2012 - Sep 16 2012

Start Time			Sat 15-Sep-12	Sun 16-Sep-12	Average Weekend Hourly Traffic	Average Weekend Profile
12:00 AM			89	101	95	
1:00 AM			63	56	60	
2:00 AM			41	33	37	
3:00 AM			35	17	26	
4:00 AM			15	21	18	
5:00 AM			36	29	33	
6:00 AM			50	43	47	
7:00 AM			105	83	94	
8:00 AM			120	77	99	
9:00 AM			142	99	121	
10:00 AM			191	133	162	
11:00 AM			**228**	**199**	**214**	
12:00 PM			278	242	260	
1:00 PM			285	286	286	
2:00 PM			340	**311**	**326**	
3:00 PM			356	248	302	
4:00 PM			351	257	304	
5:00 PM			**365**	242	304	
6:00 PM			328	225	277	
7:00 PM			297	214	256	
8:00 PM			272	168	220	
9:00 PM			252	137	195	
10:00 PM			178	128	153	
11:00 PM			153	73	113	
Day Total			4570	3422	4002	
% Weekday Average						
% Week Average			114.2%	85.5%		
AM Peak Volume			11:00 AM 228	11:00 AM 199	11:00 AM 214	
PM Peak Volume			5:00 PM 365	2:00 PM 311	2:00 PM 326	

Comments:

SUMMARY - Tube Count - Volume Data (Week)

LOCATION: I-5 NB off-ramp at La Center Rd
SPECIFIC LOCATION: 0 ft from
CITY/STATE: La Center , WA

QC JOB #: 10797106
DIRECTION: NB
DATE: Sep 10 2012 - Sep 16 2012

Start Time	Mon 10-Sep-12	Tue 11-Sep-12	Wed 12-Sep-12	Thu 13-Sep-12	Fri 14-Sep-12	Average Weekday Hourly Traffic	Sat 15-Sep-12	Sun 16-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM	38	50	56	52	62	52	89	101	64	
1:00 AM	34	32	40	37	33	35	63	56	42	
2:00 AM	19	34	26	31	46	31	41	33	33	
3:00 AM	18	30	21	37	37	29	35	17	28	
4:00 AM	30	21	27	27	31	27	15	21	25	
5:00 AM	39	49	43	52	51	47	36	29	43	
6:00 AM	72	89	78	67	85	78	50	43	69	
7:00 AM	137	180	158	171	182	166	105	83	145	
8:00 AM	141	215	167	221	158	180	120	77	157	
9:00 AM	154	170	159	173	210	173	142	99	158	
10:00 AM	163	143	175	202	174	171	191	133	169	
11:00 AM	**195**	**247**	**244**	**230**	**217**	**227**	**228**	**199**	**223**	
12:00 PM	216	211	246	222	273	234	278	242	241	
1:00 PM	264	236	260	282	305	269	285	286	274	
2:00 PM	292	310	299	295	332	306	340	**311**	311	
3:00 PM	379	379	390	425	487	412	356	248	381	
4:00 PM	448	456	479	506	471	472	351	257	424	
5:00 PM	**585**	**553**	**521**	**529**	**524**	**542**	**365**	242	**474**	
6:00 PM	456	410	435	501	448	450	328	225	400	
7:00 PM	310	372	326	309	313	326	297	214	306	
8:00 PM	195	292	261	285	323	271	272	168	257	
9:00 PM	178	256	217	220	282	231	252	137	220	
10:00 PM	128	134	152	128	218	152	178	128	152	
11:00 PM	82	78	119	102	157	108	153	73	109	
Day Total	4573	4947	4899	5104	5419	4989	4570	3422	4705	
% Weekday Average	91.7%	99.2%	98.2%	102.3%	108.6%					
% Week Average	97.2%	105.1%	104.1%	108.5%	115.2%	106.0%	97.1%	72.7%		
AM Peak	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	
Volume	195	247	244	230	217	227	228	199	223	
PM Peak	5:00 PM	5:00 PM	5:00 PM	5:00 PM	5:00 PM	5:00 PM	5:00 PM	2:00 PM	5:00 PM	
Volume	585	553	521	529	524	542	365	311	474	

Comments:

LOCATION: I-5 SB on-ramp at La Center Rd

QC JOB #: 10797107

SPECIFIC LOCATION: 0 ft from

DIRECTION: SB

CITY/STATE: La Center , WA

DATE: Sep 14 2012 - Sep 16 2012

Start Time	Mon	Tue	Wed	Thu	Fri 14-Sep-12	Average Weekday Hourly Traffic	Sat 15-Sep-12	Sun 16-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM					63	63	89	96	83	
1:00 AM					66	66	72	73	70	
2:00 AM					52	52	57	54	54	
3:00 AM					56	56	57	53	55	
4:00 AM					122	122	85	70	92	
5:00 AM					220	220	97	56	124	
6:00 AM					415	415	124	104	214	
7:00 AM					**497**	**497**	168	123	263	
8:00 AM					413	413	248	168	276	
9:00 AM					304	304	290	236	277	
10:00 AM					300	300	**311**	**277**	**296**	
11:00 AM					300	300	295	234	276	
12:00 PM					215	215	**316**	245	259	
1:00 PM					263	263	280	**248**	264	
2:00 PM					240	240	239	210	230	
3:00 PM					**323**	**323**	255	233	**270**	
4:00 PM					292	292	274	224	263	
5:00 PM					263	263	223	198	228	
6:00 PM					216	216	218	190	208	
7:00 PM					161	161	167	168	165	
8:00 PM					136	136	166	130	144	
9:00 PM					107	107	143	110	120	
10:00 PM					116	116	104	67	96	
11:00 PM					103	103	87	77	89	
Day Total					5243	5243	4365	3644	4416	
% Weekday Average					100.0%					
% Week Average					118.7%	118.7%	98.8%	82.5%		
AM Peak Volume					7:00 AM 497	7:00 AM 497	10:00 AM 311	10:00 AM 277	10:00 AM 296	
PM Peak Volume					3:00 PM 323	3:00 PM 323	12:00 PM 316	1:00 PM 248	3:00 PM 270	

Comments:

LOCATION: I-5 SB on-ramp at La Center Rd

QC JOB #: 10797107

SPECIFIC LOCATION: 0 ft from

DIRECTION: SB

CITY/STATE: La Center , WA

DATE: Sep 17 2012 - Sep 23 2012

Start Time	Mon 17-Sep-12	Tue 18-Sep-12	Wed 19-Sep-12	Thu 20-Sep-12	Fri 21-Sep-12	Average Weekday Hourly Traffic	Sat 22-Sep-12	Sun 23-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM	82	58	50	71	69	66	88	81	71	
1:00 AM	52	35	53	51	38	46	61	76	52	
2:00 AM	43	37	52	44	55	46	62	59	50	
3:00 AM	60	58	68	47	61	59	59	54	58	
4:00 AM	126	115	130	109	110	118	70	56	102	
5:00 AM	270	273	239	243	218	249	90	58	199	
6:00 AM	434	421	447	417	431	430	122	83	336	
7:00 AM	**495**	**544**	**494**	**507**	**484**	**505**	179	126	**404**	
8:00 AM	360	361	409	371	358	372	258	187	329	
9:00 AM	319	257	266	258	319	284	288	219	275	
10:00 AM	245	240	245	244	259	247	263	**231**	247	
11:00 AM	248	231	232	225	235	234	**310**	219	243	
12:00 PM	234	202	214	220	250	224	241	**239**	229	
1:00 PM	208	222	213	247	233	225	231	215	224	
2:00 PM	237	224	225	238	280	241	233	219	237	
3:00 PM	**245**	227	258	**274**	**293**	259	236	239	**253**	
4:00 PM	234	**281**	**267**	234	288	**261**	**260**	199	252	
5:00 PM	229	234	252	240	230	237	236	211	233	
6:00 PM	179	187	195	197	204	192	189	178	190	
7:00 PM	112	122	174	152	160	144	154	161	148	
8:00 PM	99	115	117	99	114	109	140	137	117	
9:00 PM	96	104	88	97	138	105	108	103	105	
10:00 PM	73	79	63	98	130	89	130	65	91	
11:00 PM	80	79	79	85	113	87	105	69	87	
Day Total	4760	4706	4830	4768	5070	4829	4113	3484	4532	
% Weekday Average	90.8%	97.5%	100.0%	98.7%	105.0%					
% Week Average	107.8%	103.8%	106.6%	105.2%	111.9%	106.6%	90.8%	76.9%		
AM Peak	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	11:00 AM	10:00 AM	7:00 AM	
Volume	495	544	494	507	484	505	310	231	404	
PM Peak	3:00 PM	4:00 PM	4:00 PM	3:00 PM	3:00 PM	4:00 PM	4:00 PM	12:00 PM	3:00 PM	
Volume	245	281	267	274	293	261	260	239	253	

Comments:

SUMMARY - Tube Count - Volume Data (Weekday)

LOCATION: I-5 SB on-ramp at La Center Rd
SPECIFIC LOCATION: 0 ft from
CITY/STATE: La Center , WA

QC JOB #: 10797107
DIRECTION: SB
DATE: Sep 10 2012 - Sep 14 2012

Start Time	Mon 10-Sep-12	Tue 11-Sep-12	Wed 12-Sep-12	Thu 13-Sep-12	Fri 14-Sep-12	Average Weekday Hourly Traffic			Average Weekday Profile
12:00 AM	82	58	50	71	63	65			
1:00 AM	52	35	53	51	66	51			
2:00 AM	43	37	52	44	52	46			
3:00 AM	60	58	68	47	56	58			
4:00 AM	126	115	130	109	122	120			
5:00 AM	270	273	239	243	220	249			
6:00 AM	434	421	447	417	415	427			
7:00 AM	**495**	**544**	**494**	**507**	**497**	**507**			
8:00 AM	360	361	409	371	413	383			
9:00 AM	319	257	266	258	304	281			
10:00 AM	245	240	245	244	300	255			
11:00 AM	248	231	232	225	300	247			
12:00 PM	234	202	214	220	215	217			
1:00 PM	208	222	213	247	263	231			
2:00 PM	237	224	225	238	240	233			
3:00 PM	**245**	227	258	**274**	**323**	**265**			
4:00 PM	234	**281**	**267**	234	292	262			
5:00 PM	229	234	252	240	263	244			
6:00 PM	179	187	195	197	216	195			
7:00 PM	112	122	174	152	161	144			
8:00 PM	99	115	117	99	136	113			
9:00 PM	96	104	88	97	107	98			
10:00 PM	73	79	63	98	116	86			
11:00 PM	80	79	79	85	103	85			
Day Total	4760	4706	4830	4768	5243	4862			
% Weekday Average	97.9%	96.8%	99.3%	98.1%	107.8%				
% Week Average									
AM Peak	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM			
Volume	495	544	494	507	497	507			
PM Peak	3:00 PM	4:00 PM	4:00 PM	3:00 PM	3:00 PM	3:00 PM			
Volume	245	281	267	274	323	265			

Comments:

SUMMARY - Tube Count - Volume Data (Weekend)

LOCATION: I-5 SB on-ramp at La Center Rd
SPECIFIC LOCATION: 0 ft from
CITY/STATE: La Center , WA

QC JOB #: 10797107
DIRECTION: SB
DATE: Sep 15 2012 - Sep 16 2012

Start Time			Sat 15-Sep-12	Sun 16-Sep-12	Average Weekend Hourly Traffic	Average Weekend Profile
12:00 AM			89	96	93	
1:00 AM			72	73	73	
2:00 AM			57	54	56	
3:00 AM			57	53	55	
4:00 AM			85	70	78	
5:00 AM			97	56	77	
6:00 AM			124	104	114	
7:00 AM			168	123	146	
8:00 AM			248	168	208	
9:00 AM			290	236	263	
10:00 AM			**311**	**277**	**294**	
11:00 AM			295	234	265	
12:00 PM			**316**	245	**281**	
1:00 PM			280	**248**	264	
2:00 PM			239	210	225	
3:00 PM			255	233	244	
4:00 PM			274	224	249	
5:00 PM			223	198	211	
6:00 PM			218	190	204	
7:00 PM			167	168	168	
8:00 PM			166	130	148	
9:00 PM			143	110	127	
10:00 PM			104	67	86	
11:00 PM			87	77	82	
Day Total			4365	3644	4011	
% Weekday Average						
% Week Average			108.8%	90.9%		
AM Peak Volume			10:00 AM 311	10:00 AM 277	10:00 AM 294	
PM Peak Volume			12:00 PM 316	1:00 PM 248	12:00 PM 281	

Comments:

SUMMARY - Tube Count - Volume Data (Week)

LOCATION: I-5 SB on-ramp at La Center Rd
SPECIFIC LOCATION: 0 ft from
CITY/STATE: La Center , WA

QC JOB #: 10797107
DIRECTION: SB
DATE: Sep 10 2012 - Sep 16 2012

Start Time	Mon 10-Sep-12	Tue 11-Sep-12	Wed 12-Sep-12	Thu 13-Sep-12	Fri 14-Sep-12	Average Weekday Hourly Traffic	Sat 15-Sep-12	Sun 16-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM	82	58	50	71	63	65	89	96	73	
1:00 AM	52	35	53	51	66	51	72	73	57	
2:00 AM	43	37	52	44	52	46	57	54	48	
3:00 AM	60	58	68	47	56	58	57	53	57	
4:00 AM	126	115	130	109	122	120	85	70	108	
5:00 AM	270	273	239	243	220	249	97	56	200	
6:00 AM	434	421	447	417	415	427	124	104	337	
7:00 AM	**495**	**544**	**494**	**507**	**497**	**507**	168	123	**404**	
8:00 AM	360	361	409	371	413	383	248	168	333	
9:00 AM	319	257	266	258	304	281	290	236	276	
10:00 AM	245	240	245	244	300	255	**311**	**277**	266	
11:00 AM	248	231	232	225	300	247	295	234	252	
12:00 PM	234	202	214	220	215	217	**316**	245	235	
1:00 PM	208	222	213	247	263	231	280	**248**	240	
2:00 PM	237	224	225	238	240	233	239	210	230	
3:00 PM	**245**	227	258	**274**	**323**	**265**	255	233	**259**	
4:00 PM	234	**281**	**267**	234	292	262	274	224	258	
5:00 PM	229	234	252	240	263	244	223	198	234	
6:00 PM	179	187	195	197	216	195	218	190	197	
7:00 PM	112	122	174	152	161	144	167	168	151	
8:00 PM	99	115	117	99	136	113	166	130	123	
9:00 PM	96	104	88	97	107	98	143	110	106	
10:00 PM	73	79	63	98	116	86	104	67	86	
11:00 PM	80	79	79	85	103	85	87	77	84	
Day Total	4760	4706	4830	4768	5243	4862	4365	3644	4614	
% Weekday Average	97.9%	96.8%	99.3%	98.1%	107.8%					
% Week Average	103.2%	102.0%	104.7%	103.3%	113.6%	105.4%	94.6%	79.0%		
AM Peak	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	10:00 AM	10:00 AM	7:00 AM	
Volume	495	544	494	507	497	507	311	277	404	
PM Peak	3:00 PM	4:00 PM	4:00 PM	3:00 PM	3:00 PM	3:00 PM	12:00 PM	1:00 PM	3:00 PM	
Volume	245	281	267	274	323	265	316	248	259	

Comments:

LOCATION: I-5 SB off-ramp at La Center Rd

QC JOB #: 10797108

SPECIFIC LOCATION: 0 ft from

DIRECTION: SB

CITY/STATE: La Center, WA

DATE: Sep 14 2012 - Sep 16 2012

Start Time	Mon	Tue	Wed	Thu	Fri 14-Sep-12	Average Weekday Hourly Traffic	Sat 15-Sep-12	Sun 16-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM					12	12	12	15	13	
1:00 AM					15	15	15	15	15	
2:00 AM					7	7	10	9	9	
3:00 AM					19	19	10	8	12	
4:00 AM					9	9	9	3	7	
5:00 AM					28	28	10	6	15	
6:00 AM					50	50	25	13	29	
7:00 AM					87	87	44	27	53	
8:00 AM					66	66	42	30	46	
9:00 AM					69	69	97	64	77	
10:00 AM					79	79	**112**	92	94	
11:00 AM					**115**	**115**	110	**105**	**110**	
12:00 PM					106	106	114	115	112	
1:00 PM					140	140	126	129	132	
2:00 PM					162	162	108	113	128	
3:00 PM					143	143	112	116	124	
4:00 PM					**167**	**167**	123	115	135	
5:00 PM					152	152	**128**	**142**	**141**	
6:00 PM					122	122	110	125	119	
7:00 PM					94	94	108	115	106	
8:00 PM					83	83	92	86	87	
9:00 PM					128	128	61	54	81	
10:00 PM					61	61	43	25	43	
11:00 PM					30	30	33	19	27	
Day Total					1944	1944	1654	1541	1715	
% Weekday Average					100.0%					
% Week Average					113.4%	113.4%	96.4%	89.9%		
AM Peak Volume					11:00 AM 115	11:00 AM 115	10:00 AM 112	11:00 AM 105	11:00 AM 110	
PM Peak Volume					4:00 PM 167	4:00 PM 167	5:00 PM 128	5:00 PM 142	5:00 PM 141	

Comments:

LOCATION: I-5 SB off-ramp at La Center Rd
QC JOB #: 10797108
SPECIFIC LOCATION: 0 ft from
DIRECTION: SB
CITY/STATE: La Center, WA
DATE: Sep 17 2012 - Sep 23 2012

Start Time	Mon 17-Sep-12	Tue 18-Sep-12	Wed 19-Sep-12	Thu 20-Sep-12	Fri 21-Sep-12	Average Weekday Hourly Traffic	Sat 22-Sep-12	Sun 23-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM	8	12	5	14	11	10	13	11	11	
1:00 AM	7	8	17	7	5	9	17	6	10	
2:00 AM	8	4	10	8	9	8	7	4	7	
3:00 AM	12	7	12	3	16	10	12	8	10	
4:00 AM	9	10	15	18	16	14	2	9	11	
5:00 AM	21	39	29	25	27	28	12	3	22	
6:00 AM	49	42	53	60	59	53	20	16	43	
7:00 AM	78	**101**	**90**	**79**	81	86	40	26	71	
8:00 AM	59	60	81	63	68	66	53	43	61	
9:00 AM	72	76	52	64	58	64	59	54	62	
10:00 AM	83	71	75	61	79	74	**100**	82	79	
11:00 AM	**100**	85	78	75	**97**	**87**	94	**89**	**88**	
12:00 PM	84	91	104	104	108	98	114	106	102	
1:00 PM	107	113	93	99	135	109	118	**159**	118	
2:00 PM	114	139	117	135	137	128	103	111	122	
3:00 PM	139	142	160	144	149	147	117	120	139	
4:00 PM	160	132	**178**	170	167	161	109	111	147	
5:00 PM	**174**	**172**	173	**216**	183	**184**	**129**	118	**166**	
6:00 PM	116	137	101	127	**188**	134	96	110	125	
7:00 PM	105	102	100	85	95	97	89	96	96	
8:00 PM	74	60	60	54	74	64	67	59	64	
9:00 PM	52	47	50	47	67	53	71	41	54	
10:00 PM	21	27	23	38	46	31	50	36	34	
11:00 PM	17	23	13	25	32	22	28	14	22	
Day Total	1669	1700	1689	1721	1907	1737	1520	1432	1664	
% Weekday Average	85.9%	97.9%	97.2%	99.1%	109.8%					
% Week Average	97.3%	102.2%	101.5%	103.4%	114.6%	104.4%	91.3%	86.1%		
AM Peak	11:00 AM	7:00 AM	7:00 AM	7:00 AM	11:00 AM	11:00 AM	10:00 AM	11:00 AM	11:00 AM	
Volume	100	101	90	79	97	87	100	89	88	
PM Peak	5:00 PM	5:00 PM	4:00 PM	5:00 PM	6:00 PM	5:00 PM	5:00 PM	1:00 PM	5:00 PM	
Volume	174	172	178	216	188	184	129	159	166	

Comments:

SUMMARY - Tube Count - Volume Data (Weekday)

LOCATION: I-5 SB off-ramp at La Center Rd
SPECIFIC LOCATION: 0 ft from
CITY/STATE: La Center, WA

QC JOB #: 10797108
DIRECTION: SB
DATE: Sep 10 2012 - Sep 14 2012

Start Time	Mon 10-Sep-12	Tue 11-Sep-12	Wed 12-Sep-12	Thu 13-Sep-12	Fri 14-Sep-12	Average Weekday Hourly Traffic			Average Weekday Profile
12:00 AM	8	12	5	14	12	10			
1:00 AM	7	8	17	7	15	11			
2:00 AM	8	4	10	8	7	7			
3:00 AM	12	7	12	3	19	11			
4:00 AM	9	10	15	18	9	12			
5:00 AM	21	39	29	25	28	28			
6:00 AM	49	42	53	60	50	51			
7:00 AM	78	**101**	**90**	**79**	87	87			
8:00 AM	59	60	81	63	66	66			
9:00 AM	72	76	52	64	69	67			
10:00 AM	83	71	75	61	79	74			
11:00 AM	**100**	85	78	75	**115**	**91**			
12:00 PM	84	91	104	104	106	98			
1:00 PM	107	113	93	99	140	110			
2:00 PM	114	139	117	135	162	133			
3:00 PM	139	142	160	144	143	146			
4:00 PM	160	132	**178**	170	**167**	161			
5:00 PM	**174**	**172**	173	**216**	152	**177**			
6:00 PM	116	137	101	127	122	121			
7:00 PM	105	102	100	85	94	97			
8:00 PM	74	60	60	54	83	66			
9:00 PM	52	47	50	47	128	65			
10:00 PM	21	27	23	38	61	34			
11:00 PM	17	23	13	25	30	22			
Day Total	1669	1700	1689	1721	1944	1745			
% Weekday Average	95.6%	97.4%	96.8%	98.6%	111.4%				
% Week Average									
AM Peak	11:00 AM	7:00 AM	7:00 AM	7:00 AM	11:00 AM	11:00 AM			
Volume	100	101	90	79	115	91			
PM Peak	5:00 PM	5:00 PM	4:00 PM	5:00 PM	4:00 PM	5:00 PM			
Volume	174	172	178	216	167	177			

Comments:

SUMMARY - Tube Count - Volume Data (Weekend)

LOCATION: I-5 SB off-ramp at La Center Rd
SPECIFIC LOCATION: 0 ft from
CITY/STATE: La Center, WA

QC JOB #: 10797108
DIRECTION: SB
DATE: Sep 15 2012 - Sep 16 2012

Start Time			Sat 15-Sep-12	Sun 16-Sep-12	Average Weekend Hourly Traffic	Average Weekend Profile
12:00 AM			12	15	14	
1:00 AM			15	15	15	
2:00 AM			10	9	10	
3:00 AM			10	8	9	
4:00 AM			9	3	6	
5:00 AM			10	6	8	
6:00 AM			25	13	19	
7:00 AM			44	27	36	
8:00 AM			42	30	36	
9:00 AM			97	64	81	
10:00 AM			**112**	92	102	
11:00 AM			110	**105**	**108**	
12:00 PM			114	115	115	
1:00 PM			126	129	128	
2:00 PM			108	113	111	
3:00 PM			112	116	114	
4:00 PM			123	115	119	
5:00 PM			**128**	**142**	**135**	
6:00 PM			110	125	118	
7:00 PM			108	115	112	
8:00 PM			92	86	89	
9:00 PM			61	54	58	
10:00 PM			43	25	34	
11:00 PM			33	19	26	
Day Total			1654	1541	1603	
% Weekday Average						
% Week Average			103.2%	96.1%		
AM Peak Volume			10:00 AM 112	11:00 AM 105	11:00 AM 108	
PM Peak Volume			5:00 PM 128	5:00 PM 142	5:00 PM 135	

Comments:

SUMMARY - Tube Count - Volume Data (Week)

LOCATION: I-5 SB off-ramp at La Center Rd
QC JOB #: 10797108
SPECIFIC LOCATION: 0 ft from
DIRECTION: SB
CITY/STATE: La Center, WA
DATE: Sep 10 2012 - Sep 16 2012

Start Time	Mon 10-Sep-12	Tue 11-Sep-12	Wed 12-Sep-12	Thu 13-Sep-12	Fri 14-Sep-12	Average Weekday Hourly Traffic	Sat 15-Sep-12	Sun 16-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM	8	12	5	14	12	10	12	15	11	
1:00 AM	7	8	17	7	15	11	15	15	12	
2:00 AM	8	4	10	8	7	7	10	9	8	
3:00 AM	12	7	12	3	19	11	10	8	10	
4:00 AM	9	10	15	18	9	12	9	3	10	
5:00 AM	21	39	29	25	28	28	10	6	23	
6:00 AM	49	42	53	60	50	51	25	13	42	
7:00 AM	78	**101**	**90**	**79**	87	87	44	27	72	
8:00 AM	59	60	81	63	66	66	42	30	57	
9:00 AM	72	76	52	64	69	67	97	64	71	
10:00 AM	83	71	75	61	79	74	**112**	92	82	
11:00 AM	**100**	85	78	75	**115**	**91**	110	**105**	**95**	
12:00 PM	84	91	104	104	106	98	114	115	103	
1:00 PM	107	113	93	99	140	110	126	129	115	
2:00 PM	114	139	117	135	162	133	108	113	127	
3:00 PM	139	142	160	144	143	146	112	116	137	
4:00 PM	160	132	**178**	170	**167**	161	123	115	149	
5:00 PM	**174**	**172**	173	**216**	152	**177**	**128**	**142**	**165**	
6:00 PM	116	137	101	127	122	121	110	125	120	
7:00 PM	105	102	100	85	94	97	108	115	101	
8:00 PM	74	60	60	54	83	66	92	86	73	
9:00 PM	52	47	50	47	128	65	61	54	63	
10:00 PM	21	27	23	38	61	34	43	25	34	
11:00 PM	17	23	13	25	30	22	33	19	23	
Day Total	1669	1700	1689	1721	1944	1745	1654	1541	1703	
% Weekday Average	95.6%	97.4%	96.8%	98.6%	111.4%					
% Week Average	98.0%	99.8%	99.2%	101.1%	114.2%	102.5%	97.1%	90.5%		
AM Peak Volume	11:00 AM 100	7:00 AM 101	7:00 AM 90	7:00 AM 79	11:00 AM 115	11:00 AM 91	10:00 AM 112	11:00 AM 105	11:00 AM 95	
PM Peak Volume	5:00 PM 174	5:00 PM 172	4:00 PM 178	5:00 PM 216	4:00 PM 167	5:00 PM 177	5:00 PM 128	5:00 PM 142	5:00 PM 165	

Comments:

Appendix C Tube Count Volume Data Sheets from Snoqualmie

LOCATION: Combined Volume-Main Driveway to Snoqualmie Casino north of roundabout at SE North Bend Way **QC JOB #:** 10822001

SPECIFIC LOCATION: 100 ft from North Bend Way **DIRECTION:** NB

CITY/STATE: Snoqualmie, WA **DATE:** Sep 21 2012 - Sep 23 2012

Start Time	Mon	Tue	Wed	Thu	Fri 21-Sep-12	Average Weekday Hourly Traffic	Sat 22-Sep-12	Sun 23-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM					43	43	77	**365**	**162**	
1:00 AM					43	43	69	276	129	
2:00 AM					16	16	38	222	92	
3:00 AM					18	18	21	153	64	
4:00 AM					15	15	19	91	42	
5:00 AM					34	34	51	55	47	
6:00 AM					47	47	69	60	59	
7:00 AM					79	79	164	68	104	
8:00 AM					101	101	174	124	133	
9:00 AM					153	153	**260**	55	156	
10:00 AM					210	210	183	0	131	
11:00 AM					**253**	**253**	192	0	148	
12:00 PM					261	261	240	**0**	167	
1:00 PM					237	237	271	0	169	
2:00 PM					248	248	297	0	182	
3:00 PM					295	295	470	0	255	
4:00 PM					249	249	303	0	184	
5:00 PM					340	340	304	0	215	
6:00 PM					449	449	319	0	256	
7:00 PM					**531**	**531**	310	0	**280**	
8:00 PM					301	301	281	0	194	
9:00 PM					271	271	314	0	195	
10:00 PM					205	205	**537**	0	247	
11:00 PM					183	183	382	0	188	
Day Total					4582	4582	5345	1469	3799	
% Weekday Average					100.0%					
% Week Average					120.6%	120.6%	140.7%	38.7%		
AM Peak					11:00 AM	11:00 AM	9:00 AM	12:00 AM	12:00 AM	
Volume					253	253	260	365	162	
PM Peak					7:00 PM	7:00 PM	10:00 PM	12:00 PM	7:00 PM	
Volume					531	531	537	0	280	

Comments:

LOCATION: Combined Volume-Main Driveway to Snoqualmie Casino north of roundabout at SE North Bend Way **QC JOB #:** 10822001

SPECIFIC LOCATION: 100 ft from North Bend Way **DIRECTION:** NB

CITY/STATE: Snoqualmie, WA **DATE:** Sep 24 2012 - Sep 30 2012

Start Time	Mon 24-Sep-12	Tue 25-Sep-12	Wed 26-Sep-12	Thu 27-Sep-12	Fri 28-Sep-12	Average Weekday Hourly Traffic	Sat 29-Sep-12	Sun 30-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
1:00 AM	0	0	0	0	0	0	0	0	0	
2:00 AM	0	0	0	0	0	0	0	0	0	
3:00 AM	0	0	0	0	0	0	0	0	0	
4:00 AM	0	0	0	0	0	0	0	0	0	
5:00 AM	0	0	0	0	0	0	0	0	0	
6:00 AM	0	0	0	0	0	0	0	0	0	
7:00 AM	0	0	0	0	0	0	0	0	0	
8:00 AM	0	0	0	0	0	0	0	0	0	
9:00 AM	0	0	0	0	0	0	0	0	0	
10:00 AM	0	0	0	0	0	0	0	0	0	
11:00 AM	0	0	0	0	0	0	0	0	0	
12:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
1:00 PM	0	0	0	0	0	0	0	0	0	
2:00 PM	0	0	0	0	0	0	0	0	0	
3:00 PM	0	0	0	0	0	0	0	0	0	
4:00 PM	0	0	0	0	0	0	0	0	0	
5:00 PM	0	0	0	0	0	0	0	0	0	
6:00 PM	0	0	0	0	0	0	0	0	0	
7:00 PM	0	0	0	0	0	0	0	0	0	
8:00 PM	0	0	0	0	0	0	0	0	0	
9:00 PM	0	0	0	0	0	0	0	0	0	
10:00 PM	0	0	0	0	0	0	0	0	0	
11:00 PM	0	0	0	0	0	0	0	0	0	
Day Total	0	0	0	0	0	0	0	0	0	
% Weekday Average	0.0%									
% Week Average	0.0%									
AM Peak	12:00 AM	12:00 AM	12:00 AM	12:00 AM	12:00 AM	12:00 AM	12:00 AM	12:00 AM	12:00 AM	
Volume	0	0	0	0	0	0	0	0	0	
PM Peak	12:00 PM	12:00 PM	12:00 PM	12:00 PM	12:00 PM	12:00 PM	12:00 PM	12:00 PM	12:00 PM	
Volume	0	0	0	0	0	0	0	0	0	

Comments:

LOCATION: Combined Volume-Main Driveway to Snoqualmie Casino north of roundabout at SE North Bend Way **QC JOB #:** 10822001

SPECIFIC LOCATION: 100 ft from North Bend Way **DIRECTION:** NB

CITY/STATE: Snoqualmie, WA **DATE:** Oct 01 2012 - Oct 01 2012

Start Time	Mon 01-Oct-12	Tue	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM	0					0			0	
1:00 AM	0					0			0	
2:00 AM	0					0			0	
3:00 AM	0					0			0	
4:00 AM	0					0			0	
5:00 AM	0					0			0	
6:00 AM	0					0			0	
7:00 AM	0					0			0	
8:00 AM	0					0			0	
9:00 AM	0					0			0	
10:00 AM	0					0			0	
11:00 AM	**2**					**2**			**2**	
12:00 PM										
1:00 PM										
2:00 PM										
3:00 PM										
4:00 PM										
5:00 PM										
6:00 PM										
7:00 PM										
8:00 PM										
9:00 PM										
10:00 PM										
11:00 PM										
Day Total	2					2			2	
% Weekday Average										
% Week Average						100.0%				
AM Peak	11:00 AM					11:00 AM			11:00 AM	
Volume	2					2			2	
PM Peak										
Volume										

Comments:

SUMMARY - Tube Count - Volume Data (Weekday)

LOCATION: Combined Volume-Main Driveway to Snoqualmie Casino north of roundabout at SE North Bend Way
QC JOB #: 10822001
SPECIFIC LOCATION: 100 ft from North Bend Way
DIRECTION: NB
CITY/STATE: Snoqualmie, WA
DATE: Sep 17 2012 - Sep 21 2012

Start Time	Mon 17-Sep-12	Tue 18-Sep-12	Wed 19-Sep-12	Thu 20-Sep-12	Fri 21-Sep-12	Average Weekday Hourly Traffic	Average Weekday Profile
12:00 AM	**0**	**0**	**0**	**0**	43	9	
1:00 AM	0	0	0	0	43	9	
2:00 AM	0	0	0	0	16	3	
3:00 AM	0	0	0	0	18	4	
4:00 AM	0	0	0	0	15	3	
5:00 AM	0	0	0	0	34	7	
6:00 AM	0	0	0	0	47	9	
7:00 AM	0	0	0	0	79	16	
8:00 AM	0	0	0	0	101	20	
9:00 AM	0	0	0	0	153	31	
10:00 AM	0	0	0	0	210	42	
11:00 AM	0	0	0	0	**253**	**51**	
12:00 PM	**0**	**0**	**0**	**0**	261	52	
1:00 PM	0	0	0	0	237	47	
2:00 PM	0	0	0	0	248	50	
3:00 PM	0	0	0	0	295	59	
4:00 PM	0	0	0	0	249	50	
5:00 PM	0	0	0	0	340	68	
6:00 PM	0	0	0	0	449	90	
7:00 PM	0	0	0	0	**531**	**106**	
8:00 PM	0	0	0	0	301	60	
9:00 PM	0	0	0	0	271	54	
10:00 PM	0	0	0	0	205	41	
11:00 PM	0	0	0	0	183	37	
Day Total	0	0	0	0	4582	918	
% Weekday Average	0.0%	0.0%	0.0%	0.0%	499.1%		
% Week Average							
AM Peak	12:00 AM	12:00 AM	12:00 AM	12:00 AM	11:00 AM	11:00 AM	
Volume	0	0	0	0	253	51	
PM Peak	12:00 PM	12:00 PM	12:00 PM	12:00 PM	7:00 PM	7:00 PM	
Volume	0	0	0	0	531	106	

Comments:

SUMMARY - Tube Count - Volume Data (Weekend)

LOCATION: Combined Volume-Main Driveway to Snoqualmie Casino north of roundabout at SE North Bend Way
QC JOB #: 10822001
SPECIFIC LOCATION: 100 ft from North Bend Way
DIRECTION: NB
CITY/STATE: Snoqualmie, WA
DATE: Sep 22 2012 - Sep 23 2012

Start Time			Sat 22-Sep-12	Sun 23-Sep-12	Average Weekend Hourly Traffic	Average Weekend Profile
12:00 AM			77	**365**	**221**	
1:00 AM			69	276	173	
2:00 AM			38	222	130	
3:00 AM			21	153	87	
4:00 AM			19	91	55	
5:00 AM			51	55	53	
6:00 AM			69	60	65	
7:00 AM			164	68	116	
8:00 AM			174	124	149	
9:00 AM			**260**	55	158	
10:00 AM			183	0	92	
11:00 AM			192	0	96	
12:00 PM			240	**0**	120	
1:00 PM			271	0	136	
2:00 PM			297	0	149	
3:00 PM			470	0	235	
4:00 PM			303	0	152	
5:00 PM			304	0	152	
6:00 PM			319	0	160	
7:00 PM			310	0	155	
8:00 PM			281	0	141	
9:00 PM			314	0	157	
10:00 PM			**537**	0	**269**	
11:00 PM			382	0	191	
Day Total			5345	1469	3412	
% Weekday Average						
% Week Average			156.7%	43.1%		
AM Peak Volume			9:00 AM 260	12:00 AM 365	12:00 AM 221	
PM Peak Volume			10:00 PM 537	12:00 PM 0	10:00 PM 269	

Comments:

SUMMARY - Tube Count - Volume Data (Week)

LOCATION: Combined Volume-Main Driveway to Snoqualmie Casino north of roundabout at SE North Bend Way
QC JOB #: 10822001
SPECIFIC LOCATION: 100 ft from North Bend Way
DIRECTION: NB
CITY/STATE: Snoqualmie, WA
DATE: Sep 17 2012 - Sep 23 2012

Start Time	Mon 17-Sep-12	Tue 18-Sep-12	Wed 19-Sep-12	Thu 20-Sep-12	Fri 21-Sep-12	Average Weekday Hourly Traffic	Sat 22-Sep-12	Sun 23-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM	**0**	**0**	**0**	**0**	43	9	77	**365**	**69**	
1:00 AM	0	0	0	0	43	9	69	276	55	
2:00 AM	0	0	0	0	16	3	38	222	39	
3:00 AM	0	0	0	0	18	4	21	153	27	
4:00 AM	0	0	0	0	15	3	19	91	18	
5:00 AM	0	0	0	0	34	7	51	55	20	
6:00 AM	0	0	0	0	47	9	69	60	25	
7:00 AM	0	0	0	0	79	16	164	68	44	
8:00 AM	0	0	0	0	101	20	174	124	57	
9:00 AM	0	0	0	0	153	31	**260**	55	67	
10:00 AM	0	0	0	0	210	42	183	0	56	
11:00 AM	0	0	0	0	**253**	**51**	192	0	64	
12:00 PM	**0**	**0**	**0**	**0**	261	52	240	**0**	72	
1:00 PM	0	0	0	0	237	47	271	0	73	
2:00 PM	0	0	0	0	248	50	297	0	78	
3:00 PM	0	0	0	0	295	59	470	0	109	
4:00 PM	0	0	0	0	249	50	303	0	79	
5:00 PM	0	0	0	0	340	68	304	0	92	
6:00 PM	0	0	0	0	449	90	319	0	110	
7:00 PM	0	0	0	0	**531**	**106**	310	0	**120**	
8:00 PM	0	0	0	0	301	60	281	0	83	
9:00 PM	0	0	0	0	271	54	314	0	84	
10:00 PM	0	0	0	0	205	41	**537**	0	106	
11:00 PM	0	0	0	0	183	37	382	0	81	
Day Total	0	0	0	0	4582	918	5345	1469	1628	
% Weekday Average	0.0%	0.0%	0.0%	0.0%	499.1%					
% Week Average	0.0%	0.0%	0.0%	0.0%	281.4%	56.4%	328.3%	90.2%		
AM Peak	12:00 AM	12:00 AM	12:00 AM	12:00 AM	11:00 AM	11:00 AM	9:00 AM	12:00 AM	12:00 AM	
Volume	0	0	0	0	253	51	260	365	69	
PM Peak	12:00 PM	12:00 PM	12:00 PM	12:00 PM	7:00 PM	7:00 PM	10:00 PM	12:00 PM	7:00 PM	
Volume	0	0	0	0	531	106	537	0	120	

Comments:

LOCATION: Combined Volume-Main Driveway to Snoqualmie Casino north of roundabout at SE North Bend Way **QC JOB #:** 10822001

SPECIFIC LOCATION: 100 ft from North Bend Way **DIRECTION:** SB

CITY/STATE: Snoqualmie, WA **DATE:** Sep 21 2012 - Sep 23 2012

Start Time	Mon	Tue	Wed	Thu	Fri 21-Sep-12	Average Weekday Hourly Traffic	Sat 22-Sep-12	Sun 23-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM					**235**	**235**	307	76	206	
1:00 AM					141	141	251	69	154	
2:00 AM					117	117	224	31	124	
3:00 AM					83	83	127	15	75	
4:00 AM					60	60	68	20	49	
5:00 AM					40	40	43	37	40	
6:00 AM					35	35	56	64	52	
7:00 AM					40	40	89	116	82	
8:00 AM					71	71	124	134	110	
9:00 AM					51	51	172	235	153	
10:00 AM					94	94	318	345	252	
11:00 AM					93	93	**345**	**363**	**267**	
12:00 PM					160	160	317	417	298	
1:00 PM					216	216	329	459	335	
2:00 PM					244	244	324	**474**	347	
3:00 PM					222	222	126	443	264	
4:00 PM					236	236	362	423	340	
5:00 PM					262	262	387	422	357	
6:00 PM					238	238	432	448	373	
7:00 PM					288	288	**452**	438	**393**	
8:00 PM					316	316	362	393	357	
9:00 PM					335	335	288	361	328	
10:00 PM					**475**	**475**	253	293	340	
11:00 PM					333	333	216	234	261	
Day Total					4385	4385	5972	6310	5557	
% Weekday Average					100.0%					
% Week Average					78.9%	78.9%	107.5%	113.6%		
AM Peak					12:00 AM	12:00 AM	11:00 AM	11:00 AM	11:00 AM	
Volume					235	235	345	363	267	
PM Peak					10:00 PM	10:00 PM	7:00 PM	2:00 PM	7:00 PM	
Volume					475	475	452	474	393	

Comments:

LOCATION: Combined Volume-Main Driveway to Snoqualmie Casino north of roundabout at SE North Bend Way **QC JOB #:** 10822001

SPECIFIC LOCATION: 100 ft from North Bend Way **DIRECTION:** SB

CITY/STATE: Snoqualmie, WA **DATE:** Sep 24 2012 - Sep 30 2012

Start Time	Mon 24-Sep-12	Tue 25-Sep-12	Wed 26-Sep-12	Thu 27-Sep-12	Fri 28-Sep-12	Average Weekday Hourly Traffic	Sat 29-Sep-12	Sun 30-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM	197	158	114	121	220	162	342	339	213	
1:00 AM	131	170	92	92	157	128	286	262	170	
2:00 AM	93	99	75	89	126	96	219	245	135	
3:00 AM	73	68	62	49	86	68	130	165	90	
4:00 AM	44	65	42	40	55	49	93	95	62	
5:00 AM	59	59	54	57	76	61	89	103	71	
6:00 AM	132	70	123	128	83	107	144	116	114	
7:00 AM	215	99	176	208	128	165	214	146	169	
8:00 AM	226	125	215	231	160	191	262	209	204	
9:00 AM	278	128	253	288	214	232	310	255	247	
10:00 AM	329	224	290	354	243	288	387	319	307	
11:00 AM	**383**	**398**	**300**	**388**	**304**	**355**	**476**	**357**	**372**	
12:00 PM	391	226	339	370	331	331	550	357	366	
1:00 PM	434	354	450	436	344	404	**577**	459	436	
2:00 PM	439	343	387	403	366	388	570	458	424	
3:00 PM	436	396	418	438	388	415	560	436	439	
4:00 PM	**455**	**497**	488	**459**	384	**457**	526	471	469	
5:00 PM	426	478	**489**	440	422	451	505	497	465	
6:00 PM	402	493	479	449	452	455	513	524	**473**	
7:00 PM	398	399	389	434	**503**	425	501	399	432	
8:00 PM	363	327	316	442	498	389	439	**541**	418	
9:00 PM	382	275	277	404	474	362	472	445	390	
10:00 PM	346	218	201	359	417	308	460	336	334	
11:00 PM	237	166	167	302	437	262	452	239	286	
Day Total	6869	5835	6196	6981	6868	6549	9077	7773	7086	
% Weekday Average	156.6%	89.1%	94.6%	106.6%	104.9%					
% Week Average	123.6%	82.3%	87.4%	98.5%	96.9%	92.4%	128.1%	109.7%		
AM Peak Volume	11:00 AM 383	11:00 AM 398	11:00 AM 300	11:00 AM 388	11:00 AM 304	11:00 AM 355	11:00 AM 476	11:00 AM 357	11:00 AM 372	
PM Peak Volume	4:00 PM 455	4:00 PM 497	5:00 PM 489	4:00 PM 459	7:00 PM 503	4:00 PM 457	1:00 PM 577	8:00 PM 541	6:00 PM 473	

Comments:

LOCATION: Combined Volume-Main Driveway to Snoqualmie Casino north of roundabout at SE North Bend Way **QC JOB #:** 10822001

SPECIFIC LOCATION: 100 ft from North Bend Way **DIRECTION:** SB

CITY/STATE: Snoqualmie, WA **DATE:** Oct 01 2012 - Oct 01 2012

Start Time	Mon 01-Oct-12	Tue	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM	213					213			213	
1:00 AM	142					142			142	
2:00 AM	101					101			101	
3:00 AM	76					76			76	
4:00 AM	44					44			44	
5:00 AM	76					76			76	
6:00 AM	126					126			126	
7:00 AM	205					205			205	
8:00 AM	207					207			207	
9:00 AM	288					288			288	
10:00 AM	**334**					**334**			**334**	
11:00 AM	136					136			136	
12:00 PM										
1:00 PM										
2:00 PM										
3:00 PM										
4:00 PM										
5:00 PM										
6:00 PM										
7:00 PM										
8:00 PM										
9:00 PM										
10:00 PM										
11:00 PM										
Day Total	1948					1948			1948	
% Weekday Average	29.7%									
% Week Average	27.5%					100.0%				
AM Peak	10:00 AM					10:00 AM			10:00 AM	
Volume	334					334			334	
PM Peak										
Volume										

Comments:

SUMMARY - Tube Count - Volume Data (Weekday)

LOCATION: Combined Volume-Main Driveway to Snoqualmie Casino north of roundabout at SE North Bend Way
QC JOB #: 10822001
SPECIFIC LOCATION: 100 ft from North Bend Way
DIRECTION: SB
CITY/STATE: Snoqualmie, WA
DATE: Sep 17 2012 - Sep 21 2012

Start Time	Mon 17-Sep-12	Tue 18-Sep-12	Wed 19-Sep-12	Thu 20-Sep-12	Fri 21-Sep-12	Average Weekday Hourly Traffic	Average Weekday Profile
12:00 AM	197	158	114	121	**235**	165	
1:00 AM	131	170	92	92	141	125	
2:00 AM	93	99	75	89	117	95	
3:00 AM	73	68	62	49	83	67	
4:00 AM	44	65	42	40	60	50	
5:00 AM	59	59	54	57	40	54	
6:00 AM	132	70	123	128	35	98	
7:00 AM	215	99	176	208	40	148	
8:00 AM	226	125	215	231	71	174	
9:00 AM	278	128	253	288	51	200	
10:00 AM	329	224	290	354	94	258	
11:00 AM	**383**	**398**	**300**	**388**	93	**312**	
12:00 PM	391	226	339	370	160	297	
1:00 PM	434	354	450	436	216	378	
2:00 PM	439	343	387	403	244	363	
3:00 PM	436	396	418	438	222	382	
4:00 PM	**455**	**497**	488	**459**	236	**427**	
5:00 PM	426	478	**489**	440	262	419	
6:00 PM	402	493	479	449	238	412	
7:00 PM	398	399	389	434	288	382	
8:00 PM	363	327	316	442	316	353	
9:00 PM	382	275	277	404	335	335	
10:00 PM	346	218	201	359	**475**	320	
11:00 PM	237	166	167	302	333	241	
Day Total	6869	5835	6196	6981	4385	6055	
% Weekday Average	113.4%	96.4%	102.3%	115.3%	72.4%		
% Week Average							
AM Peak	11:00 AM	11:00 AM	11:00 AM	11:00 AM	12:00 AM	11:00 AM	
Volume	383	398	300	388	235	312	
PM Peak	4:00 PM	4:00 PM	5:00 PM	4:00 PM	10:00 PM	4:00 PM	
Volume	455	497	489	459	475	427	

Comments:

SUMMARY - Tube Count - Volume Data (Weekend)

LOCATION: Combined Volume-Main Driveway to Snoqualmie Casino north of roundabout at SE North Bend Way
QC JOB #: 10822001
SPECIFIC LOCATION: 100 ft from North Bend Way
DIRECTION: SB
CITY/STATE: Snoqualmie, WA
DATE: Sep 22 2012 - Sep 23 2012

Start Time			Sat 22-Sep-12	Sun 23-Sep-12	Average Weekend Hourly Traffic	Average Weekend Profile
12:00 AM			307	76	192	
1:00 AM			251	69	160	
2:00 AM			224	31	128	
3:00 AM			127	15	71	
4:00 AM			68	20	44	
5:00 AM			43	37	40	
6:00 AM			56	64	60	
7:00 AM			89	116	103	
8:00 AM			124	134	129	
9:00 AM			172	235	204	
10:00 AM			318	345	332	
11:00 AM			**345**	**363**	**354**	
12:00 PM			317	417	367	
1:00 PM			329	459	394	
2:00 PM			324	**474**	399	
3:00 PM			126	443	285	
4:00 PM			362	423	393	
5:00 PM			387	422	405	
6:00 PM			432	448	440	
7:00 PM			**452**	438	**445**	
8:00 PM			362	393	378	
9:00 PM			288	361	325	
10:00 PM			253	293	273	
11:00 PM			216	234	225	
Day Total			5972	6310	6146	
% Weekday Average						
% Week Average			97.2%	102.7%		
AM Peak			11:00 AM	11:00 AM	11:00 AM	
Volume			345	363	354	
PM Peak			7:00 PM	2:00 PM	7:00 PM	
Volume			452	474	445	

Comments:

SUMMARY - Tube Count - Volume Data (Week)

LOCATION: Combined Volume-Main Driveway to Snoqualmie Casino north of roundabout at SE North Bend Way
QC JOB #: 10822001
SPECIFIC LOCATION: 100 ft from North Bend Way
DIRECTION: SB
CITY/STATE: Snoqualmie, WA
DATE: Sep 17 2012 - Sep 23 2012

Start Time	Mon 17-Sep-12	Tue 18-Sep-12	Wed 19-Sep-12	Thu 20-Sep-12	Fri 21-Sep-12	Average Weekday Hourly Traffic	Sat 22-Sep-12	Sun 23-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM	197	158	114	121	**235**	165	307	76	173	
1:00 AM	131	170	92	92	141	125	251	69	135	
2:00 AM	93	99	75	89	117	95	224	31	104	
3:00 AM	73	68	62	49	83	67	127	15	68	
4:00 AM	44	65	42	40	60	50	68	20	48	
5:00 AM	59	59	54	57	40	54	43	37	50	
6:00 AM	132	70	123	128	35	98	56	64	87	
7:00 AM	215	99	176	208	40	148	89	116	135	
8:00 AM	226	125	215	231	71	174	124	134	161	
9:00 AM	278	128	253	288	51	200	172	235	201	
10:00 AM	329	224	290	354	94	258	318	345	279	
11:00 AM	**383**	**398**	**300**	**388**	93	**312**	**345**	**363**	**324**	
12:00 PM	391	226	339	370	160	297	317	417	317	
1:00 PM	434	354	450	436	216	378	329	459	383	
2:00 PM	439	343	387	403	244	363	324	**474**	373	
3:00 PM	436	396	418	438	222	382	126	443	354	
4:00 PM	**455**	**497**	488	**459**	236	**427**	362	423	417	
5:00 PM	426	478	**489**	440	262	419	387	422	415	
6:00 PM	402	493	479	449	238	412	432	448	**420**	
7:00 PM	398	399	389	434	288	382	**452**	438	400	
8:00 PM	363	327	316	442	316	353	362	393	360	
9:00 PM	382	275	277	404	335	335	288	361	332	
10:00 PM	346	218	201	359	**475**	320	253	293	306	
11:00 PM	237	166	167	302	333	241	216	234	236	
Day Total	6869	5835	6196	6981	4385	6055	5972	6310	6078	
% Weekday Average	113.4%	96.4%	102.3%	115.3%	72.4%					
% Week Average	113.0%	96.0%	101.9%	114.9%	72.1%	99.6%	98.3%	103.8%		
AM Peak	11:00 AM	11:00 AM	11:00 AM	11:00 AM	12:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	
Volume	383	398	300	388	235	312	345	363	324	
PM Peak	4:00 PM	4:00 PM	5:00 PM	4:00 PM	10:00 PM	4:00 PM	7:00 PM	2:00 PM	6:00 PM	
Volume	455	497	489	459	475	427	452	474	420	

Comments:

LOCATION: Combined Volume-Main Driveway to Snoqualmie Casino north of roundabout at SE North Bend Way **QC JOB #:** 10822001

SPECIFIC LOCATION: 100 ft from North Bend Way **DIRECTION:** NB/SB

CITY/STATE: Snoqualmie, WA **DATE:** Sep 21 2012 - Sep 23 2012

Start Time	Mon	Tue	Wed	Thu	Fri 21-Sep-12	Average Weekday Hourly Traffic	Sat 22-Sep-12	Sun 23-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM					278	278	384	**441**	368	
1:00 AM					184	184	320	345	283	
2:00 AM					133	133	262	253	216	
3:00 AM					101	101	148	168	139	
4:00 AM					75	75	87	111	91	
5:00 AM					74	74	94	92	87	
6:00 AM					82	82	125	124	110	
7:00 AM					119	119	253	184	185	
8:00 AM					172	172	298	258	243	
9:00 AM					204	204	432	290	309	
10:00 AM					304	304	501	345	383	
11:00 AM					**346**	**346**	**537**	363	**415**	
12:00 PM					421	421	557	417	465	
1:00 PM					453	453	600	459	504	
2:00 PM					492	492	621	**474**	529	
3:00 PM					517	517	596	443	519	
4:00 PM					485	485	665	423	524	
5:00 PM					602	602	691	422	572	
6:00 PM					687	687	751	448	629	
7:00 PM					**819**	**819**	762	438	**673**	
8:00 PM					617	617	643	393	551	
9:00 PM					606	606	602	361	523	
10:00 PM					680	680	**790**	293	588	
11:00 PM					516	516	598	234	449	
Day Total					8967	8967	11317	7779	9355	
% Weekday Average					100.0%					
% Week Average					95.9%	95.9%	121.0%	83.2%		
AM Peak					11:00 AM	11:00 AM	11:00 AM	12:00 AM	11:00 AM	
Volume					346	346	537	441	415	
PM Peak					7:00 PM	7:00 PM	10:00 PM	2:00 PM	7:00 PM	
Volume					819	819	790	474	673	

Comments:

LOCATION: Combined Volume-Main Driveway to Snoqualmie Casino north of roundabout at SE North Bend Way **QC JOB #:** 10822001

SPECIFIC LOCATION: 100 ft from North Bend Way **DIRECTION:** NB/SB

CITY/STATE: Snoqualmie, WA **DATE:** Sep 24 2012 - Sep 30 2012

Start Time	Mon 24-Sep-12	Tue 25-Sep-12	Wed 26-Sep-12	Thu 27-Sep-12	Fri 28-Sep-12	Average Weekday Hourly Traffic	Sat 29-Sep-12	Sun 30-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM	197	158	114	121	220	162	342	339	213	
1:00 AM	131	170	92	92	157	128	286	262	170	
2:00 AM	93	99	75	89	126	96	219	245	135	
3:00 AM	73	68	62	49	86	68	130	165	90	
4:00 AM	44	65	42	40	55	49	93	95	62	
5:00 AM	59	59	54	57	76	61	89	103	71	
6:00 AM	132	70	123	128	83	107	144	116	114	
7:00 AM	215	99	176	208	128	165	214	146	169	
8:00 AM	226	125	215	231	160	191	262	209	204	
9:00 AM	278	128	253	288	214	232	310	255	247	
10:00 AM	329	224	290	354	243	288	387	319	307	
11:00 AM	**383**	**398**	**300**	**388**	**304**	**355**	**476**	**357**	**372**	
12:00 PM	391	226	339	370	331	331	550	357	366	
1:00 PM	434	354	450	436	344	404	**577**	459	436	
2:00 PM	439	343	387	403	366	388	570	458	424	
3:00 PM	436	396	418	438	388	415	560	436	439	
4:00 PM	**455**	**497**	488	**459**	384	**457**	526	471	469	
5:00 PM	426	478	**489**	440	422	451	505	497	465	
6:00 PM	402	493	479	449	452	455	513	524	**473**	
7:00 PM	398	399	389	434	**503**	425	501	399	432	
8:00 PM	363	327	316	442	498	389	439	**541**	418	
9:00 PM	382	275	277	404	474	362	472	445	390	
10:00 PM	346	218	201	359	417	308	460	336	334	
11:00 PM	237	166	167	302	437	262	452	239	286	
Day Total	6869	5835	6196	6981	6868	6549	9077	7773	7086	
% Weekday Average	76.6%	89.1%	94.6%	106.6%	104.9%					
% Week Average	73.4%	82.3%	87.4%	98.5%	96.9%	92.4%	128.1%	109.7%		
AM Peak	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	
Volume	383	398	300	388	304	355	476	357	372	
PM Peak	4:00 PM	4:00 PM	5:00 PM	4:00 PM	7:00 PM	4:00 PM	1:00 PM	8:00 PM	6:00 PM	
Volume	455	497	489	459	503	457	577	541	473	

Comments:

LOCATION: Combined Volume-Main Driveway to Snoqualmie Casino north of roundabout at SE North Bend Way **QC JOB #:** 10822001

SPECIFIC LOCATION: 100 ft from North Bend Way **DIRECTION:** NB/SB

CITY/STATE: Snoqualmie, WA **DATE:** Oct 01 2012 - Oct 01 2012

Start Time	Mon 01-Oct-12	Tue	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM	213					213			213	
1:00 AM	142					142			142	
2:00 AM	101					101			101	
3:00 AM	76					76			76	
4:00 AM	44					44			44	
5:00 AM	76					76			76	
6:00 AM	126					126			126	
7:00 AM	205					205			205	
8:00 AM	207					207			207	
9:00 AM	288					288			288	
10:00 AM	**334**					**334**			**334**	
11:00 AM	138					138			138	
12:00 PM										
1:00 PM										
2:00 PM										
3:00 PM										
4:00 PM										
5:00 PM										
6:00 PM										
7:00 PM										
8:00 PM										
9:00 PM										
10:00 PM										
11:00 PM										
Day Total	1950					1950			1950	
% Weekday Average	29.8%									
% Week Average	27.5%					100.0%				
AM Peak	10:00 AM					10:00 AM			10:00 AM	
Volume	334					334			334	
PM Peak										
Volume										

Comments:

SUMMARY - Tube Count - Volume Data (Weekday)

LOCATION: Combined Volume-Main Driveway to Snoqualmie Casino north of roundabout at SE North Bend Way
QC JOB #: 10822001
SPECIFIC LOCATION: 100 ft from North Bend Way
DIRECTION: NB/SB
CITY/STATE: Snoqualmie, WA
DATE: Sep 17 2012 - Sep 21 2012

Start Time	Mon 17-Sep-12	Tue 18-Sep-12	Wed 19-Sep-12	Thu 20-Sep-12	Fri 21-Sep-12	Average Weekday Hourly Traffic	Average Weekday Profile
12:00 AM	197	158	114	121	278	174	
1:00 AM	131	170	92	92	184	134	
2:00 AM	93	99	75	89	133	98	
3:00 AM	73	68	62	49	101	71	
4:00 AM	44	65	42	40	75	53	
5:00 AM	59	59	54	57	74	61	
6:00 AM	132	70	123	128	82	107	
7:00 AM	215	99	176	208	119	163	
8:00 AM	226	125	215	231	172	194	
9:00 AM	278	128	253	288	204	230	
10:00 AM	329	224	290	354	304	300	
11:00 AM	**383**	**398**	**300**	**388**	**346**	**363**	
12:00 PM	391	226	339	370	421	349	
1:00 PM	434	354	450	436	453	425	
2:00 PM	439	343	387	403	492	413	
3:00 PM	436	396	418	438	517	441	
4:00 PM	**455**	**497**	488	**459**	485	477	
5:00 PM	426	478	**489**	440	602	487	
6:00 PM	402	493	479	449	687	**502**	
7:00 PM	398	399	389	434	**819**	488	
8:00 PM	363	327	316	442	617	413	
9:00 PM	382	275	277	404	606	389	
10:00 PM	346	218	201	359	680	361	
11:00 PM	237	166	167	302	516	278	
Day Total	6869	5835	6196	6981	8967	6971	
% Weekday Average	98.5%	83.7%	88.9%	100.1%	128.6%		
% Week Average							
AM Peak	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	
Volume	383	398	300	388	346	363	
PM Peak	4:00 PM	4:00 PM	5:00 PM	4:00 PM	7:00 PM	6:00 PM	
Volume	455	497	489	459	819	502	

Comments:

SUMMARY - Tube Count - Volume Data (Weekend)

LOCATION: Combined Volume-Main Driveway to Snoqualmie Casino north of roundabout at SE North Bend Way
QC JOB #: 10822001
SPECIFIC LOCATION: 100 ft from North Bend Way
DIRECTION: NB/SB
CITY/STATE: Snoqualmie, WA
DATE: Sep 22 2012 - Sep 23 2012

Start Time			Sat 22-Sep-12	Sun 23-Sep-12	Average Weekend Hourly Traffic	Average Weekend Profile
12:00 AM			384	**441**	413	
1:00 AM			320	345	333	
2:00 AM			262	253	258	
3:00 AM			148	168	158	
4:00 AM			87	111	99	
5:00 AM			94	92	93	
6:00 AM			125	124	125	
7:00 AM			253	184	219	
8:00 AM			298	258	278	
9:00 AM			432	290	361	
10:00 AM			501	345	423	
11:00 AM			**537**	363	**450**	
12:00 PM			557	417	487	
1:00 PM			600	459	530	
2:00 PM			621	**474**	548	
3:00 PM			596	443	520	
4:00 PM			665	423	544	
5:00 PM			691	422	557	
6:00 PM			751	448	**600**	
7:00 PM			762	438	600	
8:00 PM			643	393	518	
9:00 PM			602	361	482	
10:00 PM			**790**	293	542	
11:00 PM			598	234	416	
Day Total			11317	7779	9554	
% Weekday Average						
% Week Average			118.5%	81.4%		
AM Peak Volume			11:00 AM 537	12:00 AM 441	11:00 AM 450	
PM Peak Volume			10:00 PM 790	2:00 PM 474	6:00 PM 600	

Comments:

SUMMARY - Tube Count - Volume Data (Week)

LOCATION: Combined Volume-Main Driveway to Snoqualmie Casino north of roundabout at SE North Bend Way
QC JOB #: 10822001
SPECIFIC LOCATION: 100 ft from North Bend Way
DIRECTION: NB/SB
CITY/STATE: Snoqualmie, WA
DATE: Sep 17 2012 - Sep 23 2012

Start Time	Mon 17-Sep-12	Tue 18-Sep-12	Wed 19-Sep-12	Thu 20-Sep-12	Fri 21-Sep-12	Average Weekday Hourly Traffic	Sat 22-Sep-12	Sun 23-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM	197	158	114	121	278	174	384	**441**	242	
1:00 AM	131	170	92	92	184	134	320	345	191	
2:00 AM	93	99	75	89	133	98	262	253	143	
3:00 AM	73	68	62	49	101	71	148	168	96	
4:00 AM	44	65	42	40	75	53	87	111	66	
5:00 AM	59	59	54	57	74	61	94	92	70	
6:00 AM	132	70	123	128	82	107	125	124	112	
7:00 AM	215	99	176	208	119	163	253	184	179	
8:00 AM	226	125	215	231	172	194	298	258	218	
9:00 AM	278	128	253	288	204	230	432	290	268	
10:00 AM	329	224	290	354	304	300	501	345	335	
11:00 AM	**383**	**398**	**300**	**388**	**346**	**363**	**537**	363	**388**	
12:00 PM	391	226	339	370	421	349	557	417	389	
1:00 PM	434	354	450	436	453	425	600	459	455	
2:00 PM	439	343	387	403	492	413	621	**474**	451	
3:00 PM	436	396	418	438	517	441	596	443	463	
4:00 PM	**455**	**497**	488	**459**	485	477	665	423	496	
5:00 PM	426	478	**489**	440	602	487	691	422	507	
6:00 PM	402	493	479	449	687	**502**	751	448	**530**	
7:00 PM	398	399	389	434	**819**	488	762	438	520	
8:00 PM	363	327	316	442	617	413	643	393	443	
9:00 PM	382	275	277	404	606	389	602	361	415	
10:00 PM	346	218	201	359	680	361	**790**	293	412	
11:00 PM	237	166	167	302	516	278	598	234	317	
Day Total	6869	5835	6196	6981	8967	6971	11317	7779	7706	
% Weekday Average	98.5%	83.7%	88.9%	100.1%	128.6%					
% Week Average	89.1%	75.7%	80.4%	90.6%	116.4%	90.5%	146.9%	100.9%		
AM Peak	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	12:00 AM	11:00 AM	
Volume	383	398	300	388	346	363	537	441	388	
PM Peak	4:00 PM	4:00 PM	5:00 PM	4:00 PM	7:00 PM	6:00 PM	10:00 PM	2:00 PM	6:00 PM	
Volume	455	497	489	459	819	502	790	474	530	

Comments:

LOCATION: West Driveway to Snoqualmie Casino
SPECIFIC LOCATION: 100 ft from North Bend Way
CITY/STATE: Snoqualmie , WA

QC JOB #: 10822002
DIRECTION: NB
DATE: Sep 20 2012 - Sep 23 2012

Start Time	Mon	Tue	Wed	Thu 20-Sep-12	Fri 21-Sep-12	Average Weekday Hourly Traffic	Sat 22-Sep-12	Sun 23-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM					8	8	5	64	26	
1:00 AM					11	11	14	56	27	
2:00 AM					1	1	4	**80**	28	
3:00 AM					4	4	2	26	11	
4:00 AM					5	5	3	20	9	
5:00 AM					20	20	12	16	16	
6:00 AM					28	28	26	14	23	
7:00 AM					54	54	34	14	34	
8:00 AM					64	64	59	29	51	
9:00 AM					73	73	**84**	24	60	
10:00 AM					70	70	62	54	62	
11:00 AM					**99**	**99**	55	39	**64**	
12:00 PM					93	93	46	41	60	
1:00 PM					109	**109**	68	49	75	
2:00 PM					103	103	54	59	72	
3:00 PM				**0**	120	60	68	36	56	
4:00 PM				0	119	60	68	61	62	
5:00 PM				0	**158**	79	95	55	**77**	
6:00 PM				0	120	60	98	**77**	74	
7:00 PM				0	121	61	61	42	56	
8:00 PM				0	74	37	61	56	48	
9:00 PM				0	63	32	45	26	34	
10:00 PM				0	28	14	**99**	49	44	
11:00 PM				0	18	9	62	45	31	
Day Total				0	1563	1154	1185	1032	1100	
% Weekday Average				0.0%	135.4%					
% Week Average				0.0%	142.1%	104.9%	107.7%	93.8%		
AM Peak					11:00 AM	11:00 AM	9:00 AM	2:00 AM	11:00 AM	
Volume					99	99	84	80	64	
PM Peak				3:00 PM	5:00 PM	1:00 PM	10:00 PM	6:00 PM	5:00 PM	
Volume				0	158	109	99	77	77	

Comments:

LOCATION: West Driveway to Snoqualmie Casino
QC JOB #: 10822002
SPECIFIC LOCATION: 100 ft from North Bend Way
DIRECTION: NB
CITY/STATE: Snoqualmie , WA
DATE: Sep 24 2012 - Sep 30 2012

Start Time	Mon 24-Sep-12	Tue 25-Sep-12	Wed 26-Sep-12	Thu 27-Sep-12	Fri 28-Sep-12	Average Weekday Hourly Traffic	Sat 29-Sep-12	Sun 30-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM	45	**33**	25	31	**39**	**35**	**76**	**74**	**46**	
1:00 AM	33	18	13	22	19	21	44	39	27	
2:00 AM	23	30	21	27	28	26	61	69	37	
3:00 AM	8	16	7	7	18	11	26	41	18	
4:00 AM	16	4	10	7	16	11	19	20	13	
5:00 AM	6	7	8	6	8	7	5	12	7	
6:00 AM	14	9	13	18	11	13	17	15	14	
7:00 AM	26	21	18	23	8	19	18	20	19	
8:00 AM	**48**	26	33	38	28	35	34	30	34	
9:00 AM	32	18	21	27	32	26	27	29	27	
10:00 AM	42	16	35	**52**	22	33	50	39	37	
11:00 AM	42	16	**37**	37	23	31	45	33	33	
12:00 PM	40	20	48	41	32	36	68	38	41	
1:00 PM	47	50	55	51	41	49	94	58	57	
2:00 PM	84	46	45	59	47	56	**127**	66	68	
3:00 PM	62	54	67	63	44	58	101	35	61	
4:00 PM	**86**	82	81	**104**	63	83	74	66	79	
5:00 PM	65	**615**	83	79	47	**178**	86	48	**146**	
6:00 PM	85	345	**100**	98	88	143	100	80	128	
7:00 PM	55	90	66	69	**92**	74	68	47	70	
8:00 PM	54	57	50	68	74	61	60	**86**	64	
9:00 PM	39	48	43	58	46	47	51	36	46	
10:00 PM	61	45	66	66	61	60	66	38	58	
11:00 PM	34	26	41	33	53	37	57	56	43	
Day Total	1047	1692	986	1084	940	1150	1374	1075	1173	
% Weekday Average	90.7%	147.1%	85.7%	94.3%	81.7%					
% Week Average	95.2%	144.2%	84.1%	92.4%	80.1%	98.0%	117.1%	91.6%		
AM Peak	8:00 AM	12:00 AM	11:00 AM	10:00 AM	12:00 AM	12:00 AM	12:00 AM	12:00 AM	12:00 AM	
Volume	48	33	37	52	39	35	76	74	46	
PM Peak	4:00 PM	5:00 PM	6:00 PM	4:00 PM	7:00 PM	5:00 PM	2:00 PM	8:00 PM	5:00 PM	
Volume	86	615	100	104	92	178	127	86	146	

Comments:

LOCATION: West Driveway to Snoqualmie Casino
QC JOB #: 10822002
SPECIFIC LOCATION: 100 ft from North Bend Way
DIRECTION: NB
CITY/STATE: Snoqualmie , WA
DATE: Oct 01 2012 - Oct 01 2012

Start Time	Mon 01-Oct-12	Tue	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM	38					38			38	
1:00 AM	30					30			30	
2:00 AM	29					29			29	
3:00 AM	14					14			14	
4:00 AM	13					13			13	
5:00 AM	8					8			8	
6:00 AM	12					12			12	
7:00 AM	21					21			21	
8:00 AM	34					34			34	
9:00 AM	27					27			27	
10:00 AM	**42**					**42**			**42**	
11:00 AM	14					14			14	
12:00 PM										
1:00 PM										
2:00 PM										
3:00 PM										
4:00 PM										
5:00 PM										
6:00 PM										
7:00 PM										
8:00 PM										
9:00 PM										
10:00 PM										
11:00 PM										
Day Total	282					282			282	
% Weekday Average	24.5%									
% Week Average	24.0%					100.0%				
AM Peak	10:00 AM					10:00 AM			10:00 AM	
Volume	42					42			42	
PM Peak										
Volume										

Comments:

SUMMARY - Tube Count - Volume Data (Weekday)

LOCATION: West Driveway to Snoqualmie Casino
SPECIFIC LOCATION: 100 ft from North Bend Way
CITY/STATE: Snoqualmie , WA

QC JOB #: 10822002
DIRECTION: NB
DATE: Sep 17 2012 - Sep 21 2012

Start Time	Mon 17-Sep-12	Tue 18-Sep-12	Wed 19-Sep-12	Thu 20-Sep-12	Fri 21-Sep-12	Average Weekday Hourly Traffic	Average Weekday Profile
12:00 AM	45	**33**	25	31	8	28	
1:00 AM	33	18	13	22	11	19	
2:00 AM	23	30	21	27	1	20	
3:00 AM	8	16	7	7	4	8	
4:00 AM	16	4	10	7	5	8	
5:00 AM	6	7	8	6	20	9	
6:00 AM	14	9	13	18	28	16	
7:00 AM	26	21	18	23	54	28	
8:00 AM	**48**	26	33	38	64	42	
9:00 AM	32	18	21	27	73	34	
10:00 AM	42	16	35	**52**	70	43	
11:00 AM	42	16	**37**	37	**99**	**46**	
12:00 PM	40	20	48	41	93	48	
1:00 PM	47	50	55	51	109	62	
2:00 PM	84	46	45	**59**	103	67	
3:00 PM	62	54	67	0	120	61	
4:00 PM	**86**	82	81	0	119	74	
5:00 PM	65	**615**	83	0	**158**	**184**	
6:00 PM	85	345	**100**	0	120	130	
7:00 PM	55	90	66	0	121	66	
8:00 PM	54	57	50	0	74	47	
9:00 PM	39	48	43	0	63	39	
10:00 PM	61	45	66	0	28	40	
11:00 PM	34	26	41	0	18	24	
Day Total	1047	1692	986	446	1563	1143	
% Weekday Average	91.6%	148.0%	86.3%	39.0%	136.7%		
% Week Average							
AM Peak	8:00 AM	12:00 AM	11:00 AM	10:00 AM	11:00 AM	11:00 AM	
Volume	48	33	37	52	99	46	
PM Peak	4:00 PM	5:00 PM	6:00 PM	2:00 PM	5:00 PM	5:00 PM	
Volume	86	615	100	59	158	184	

Comments:

SUMMARY - Tube Count - Volume Data (Weekend)

LOCATION: West Driveway to Snoqualmie Casino
SPECIFIC LOCATION: 100 ft from North Bend Way
CITY/STATE: Snoqualmie , WA

QC JOB #: 10822002
DIRECTION: NB
DATE: Sep 22 2012 - Sep 23 2012

Start Time			Sat 22-Sep-12	Sun 23-Sep-12	Average Weekend Hourly Traffic	Average Weekend Profile
12:00 AM			5	64	35	
1:00 AM			14	56	35	
2:00 AM			4	**80**	42	
3:00 AM			2	26	14	
4:00 AM			3	20	12	
5:00 AM			12	16	14	
6:00 AM			26	14	20	
7:00 AM			34	14	24	
8:00 AM			59	29	44	
9:00 AM			**84**	24	54	
10:00 AM			62	54	**58**	
11:00 AM			55	39	47	
12:00 PM			46	41	44	
1:00 PM			68	49	59	
2:00 PM			54	59	57	
3:00 PM			68	36	52	
4:00 PM			68	61	65	
5:00 PM			95	55	75	
6:00 PM			98	**77**	**88**	
7:00 PM			61	42	52	
8:00 PM			61	56	59	
9:00 PM			45	26	36	
10:00 PM			**99**	49	74	
11:00 PM			62	45	54	
Day Total			1185	1032	1114	
% Weekday Average						
% Week Average			106.4%	92.6%		
AM Peak Volume			9:00 AM 84	2:00 AM 80	10:00 AM 58	
PM Peak Volume			10:00 PM 99	6:00 PM 77	6:00 PM 88	

Comments:

SUMMARY - Tube Count - Volume Data (Week)

LOCATION: West Driveway to Snoqualmie Casino
SPECIFIC LOCATION: 100 ft from North Bend Way
CITY/STATE: Snoqualmie , WA

QC JOB #: 10822002
DIRECTION: NB
DATE: Sep 17 2012 - Sep 23 2012

Start Time	Mon 17-Sep-12	Tue 18-Sep-12	Wed 19-Sep-12	Thu 20-Sep-12	Fri 21-Sep-12	Average Weekday Hourly Traffic	Sat 22-Sep-12	Sun 23-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM	45	**33**	25	31	8	28	5	64	30	
1:00 AM	33	18	13	22	11	19	14	56	24	
2:00 AM	23	30	21	27	1	20	4	**80**	27	
3:00 AM	8	16	7	7	4	8	2	26	10	
4:00 AM	16	4	10	7	5	8	3	20	9	
5:00 AM	6	7	8	6	20	9	12	16	11	
6:00 AM	14	9	13	18	28	16	26	14	17	
7:00 AM	26	21	18	23	54	28	34	14	27	
8:00 AM	**48**	26	33	38	64	42	59	29	42	
9:00 AM	32	18	21	27	73	34	**84**	24	40	
10:00 AM	42	16	35	**52**	70	43	62	54	**47**	
11:00 AM	42	16	**37**	37	**99**	**46**	55	39	46	
12:00 PM	40	20	48	41	93	48	46	41	47	
1:00 PM	47	50	55	51	109	62	68	49	61	
2:00 PM	84	46	45	**59**	103	67	54	59	64	
3:00 PM	62	54	67	0	120	61	68	36	58	
4:00 PM	**86**	82	81	0	119	74	68	61	71	
5:00 PM	65	**615**	83	0	**158**	**184**	95	55	**153**	
6:00 PM	85	345	**100**	0	120	130	98	**77**	118	
7:00 PM	55	90	66	0	121	66	61	42	62	
8:00 PM	54	57	50	0	74	47	61	56	50	
9:00 PM	39	48	43	0	63	39	45	26	38	
10:00 PM	61	45	66	0	28	40	**99**	49	50	
11:00 PM	34	26	41	0	18	24	62	45	32	
Day Total	1047	1692	986	446	1563	1143	1185	1032	1134	
% Weekday Average	91.6%	148.0%	86.3%	39.0%	136.7%					
% Week Average	92.3%	149.2%	86.9%	39.3%	137.8%	100.8%	104.5%	91.0%		
AM Peak	8:00 AM	12:00 AM	11:00 AM	10:00 AM	11:00 AM	11:00 AM	9:00 AM	2:00 AM	10:00 AM	
Volume	48	33	37	52	99	46	84	80	47	
PM Peak	4:00 PM	5:00 PM	6:00 PM	2:00 PM	5:00 PM	5:00 PM	10:00 PM	6:00 PM	5:00 PM	
Volume	86	615	100	59	158	184	99	77	153	

Comments:

LOCATION: West Driveway to Snoqualmie Casino
SPECIFIC LOCATION: 100 ft from North Bend Way
CITY/STATE: Snoqualmie , WA

QC JOB #: 10822002
DIRECTION: SB
DATE: Sep 20 2012 - Sep 23 2012

Start Time	Mon	Tue	Wed	Thu 20-Sep-12	Fri 21-Sep-12	Average Weekday Hourly Traffic	Sat 22-Sep-12	Sun 23-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM					41	41	58	9	36	
1:00 AM					22	22	36	15	24	
2:00 AM					40	40	**66**	1	36	
3:00 AM					14	14	38	4	19	
4:00 AM					17	17	17	3	12	
5:00 AM					8	8	9	12	10	
6:00 AM					14	14	14	15	14	
7:00 AM					26	26	35	24	28	
8:00 AM					50	50	58	34	47	
9:00 AM					51	51	52	66	56	
10:00 AM					38	38	57	62	52	
11:00 AM					**59**	**59**	66	**85**	**70**	
12:00 PM					54	54	65	59	59	
1:00 PM					70	**70**	93	75	79	
2:00 PM					69	69	89	69	76	
3:00 PM				**0**	90	45	100	75	66	
4:00 PM				0	98	49	100	72	68	
5:00 PM				0	102	51	**129**	**87**	**80**	
6:00 PM				0	100	50	104	36	60	
7:00 PM				0	**111**	56	84	50	61	
8:00 PM				0	77	39	53	28	40	
9:00 PM				0	60	30	70	38	42	
10:00 PM				0	97	49	15	9	30	
11:00 PM				0	59	30	21	12	23	
Day Total				0	1367	972	1429	940	1088	
% Weekday Average				0.0%	140.6%					
% Week Average				0.0%	125.6%	89.3%	131.3%	86.4%		
AM Peak					11:00 AM	11:00 AM	2:00 AM	11:00 AM	11:00 AM	
Volume					59	59	66	85	70	
PM Peak				3:00 PM	7:00 PM	1:00 PM	5:00 PM	5:00 PM	5:00 PM	
Volume				0	111	70	129	87	80	

Comments:

LOCATION: West Driveway to Snoqualmie Casino
QC JOB #: 10822002
SPECIFIC LOCATION: 100 ft from North Bend Way
DIRECTION: SB
CITY/STATE: Snoqualmie , WA
DATE: Sep 24 2012 - Sep 30 2012

Start Time	Mon 24-Sep-12	Tue 25-Sep-12	Wed 26-Sep-12	Thu 27-Sep-12	Fri 28-Sep-12	Average Weekday Hourly Traffic	Sat 29-Sep-12	Sun 30-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM	3	5	3	7	3	4	13	7	6	
1:00 AM	14	13	15	13	14	14	13	15	14	
2:00 AM	2	1	2	1	2	2	2	1	2	
3:00 AM	3	2	3	0	4	2	3	2	2	
4:00 AM	4	4	1	0	2	2	2	3	2	
5:00 AM	12	12	13	15	18	14	13	13	14	
6:00 AM	22	19	25	23	17	21	26	14	21	
7:00 AM	42	38	39	44	35	40	25	25	35	
8:00 AM	44	34	36	47	50	42	43	31	41	
9:00 AM	**75**	45	**67**	**66**	61	63	81	59	65	
10:00 AM	67	55	65	63	54	61	76	45	61	
11:00 AM	65	**89**	64	58	**71**	**69**	**100**	**67**	**73**	
12:00 PM	56	25	67	57	53	52	116	58	62	
1:00 PM	84	60	111	70	75	80	132	83	88	
2:00 PM	84	76	74	78	73	77	**134**	69	84	
3:00 PM	96	98	78	108	90	94	85	76	90	
4:00 PM	**102**	101	98	98	70	94	79	83	90	
5:00 PM	99	**134**	**126**	**117**	**117**	**119**	90	**90**	**110**	
6:00 PM	58	99	94	62	96	82	74	45	75	
7:00 PM	60	51	47	83	88	66	70	45	63	
8:00 PM	34	17	26	51	64	38	50	27	38	
9:00 PM	45	33	23	49	50	40	68	32	43	
10:00 PM	21	11	9	26	28	19	24	9	18	
11:00 PM	16	15	13	21	23	18	25	9	17	
Day Total	1108	1037	1099	1157	1158	1113	1344	908	1114	
% Weekday Average	114.0%	93.2%	98.7%	104.0%	104.0%					
% Week Average	101.8%	93.1%	98.7%	103.9%	103.9%	99.9%	120.6%	81.5%		
AM Peak	9:00 AM	11:00 AM	9:00 AM	9:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	
Volume	75	89	67	66	71	69	100	67	73	
PM Peak	4:00 PM	5:00 PM	5:00 PM	5:00 PM	5:00 PM	5:00 PM	2:00 PM	5:00 PM	5:00 PM	
Volume	102	134	126	117	117	119	134	90	110	

Comments:

LOCATION: West Driveway to Snoqualmie Casino
QC JOB #: 10822002
SPECIFIC LOCATION: 100 ft from North Bend Way
DIRECTION: SB
CITY/STATE: Snoqualmie , WA
DATE: Oct 01 2012 - Oct 01 2012

Start Time	Mon 01-Oct-12	Tue	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM	0					0			0	
1:00 AM	15					15			15	
2:00 AM	4					4			4	
3:00 AM	0					0			0	
4:00 AM	6					6			6	
5:00 AM	11					11			11	
6:00 AM	16					16			16	
7:00 AM	46					46			46	
8:00 AM	35					35			35	
9:00 AM	**78**					**78**			**78**	
10:00 AM	66					66			66	
11:00 AM	17					17			17	
12:00 PM										
1:00 PM										
2:00 PM										
3:00 PM										
4:00 PM										
5:00 PM										
6:00 PM										
7:00 PM										
8:00 PM										
9:00 PM										
10:00 PM										
11:00 PM										
Day Total	294					294			294	
% Weekday Average	26.4%									
% Week Average	26.4%					100.0%				
AM Peak	9:00 AM					9:00 AM			9:00 AM	
Volume	78					78			78	
PM Peak										
Volume										

Comments:

SUMMARY - Tube Count - Volume Data (Weekday)

LOCATION: West Driveway to Snoqualmie Casino
SPECIFIC LOCATION: 100 ft from North Bend Way
CITY/STATE: Snoqualmie , WA

QC JOB #: 10822002
DIRECTION: SB
DATE: Sep 17 2012 - Sep 21 2012

Start Time	Mon 17-Sep-12	Tue 18-Sep-12	Wed 19-Sep-12	Thu 20-Sep-12	Fri 21-Sep-12	Average Weekday Hourly Traffic	Average Weekday Profile
12:00 AM	3	5	3	7	41	12	
1:00 AM	14	13	15	13	22	15	
2:00 AM	2	1	2	1	40	9	
3:00 AM	3	2	3	0	14	4	
4:00 AM	4	4	1	0	17	5	
5:00 AM	12	12	13	15	8	12	
6:00 AM	22	19	25	23	14	21	
7:00 AM	42	38	39	44	26	38	
8:00 AM	44	34	36	47	50	42	
9:00 AM	**75**	45	**67**	**66**	51	61	
10:00 AM	67	55	65	63	38	58	
11:00 AM	65	**89**	64	58	**59**	**67**	
12:00 PM	56	25	67	57	54	52	
1:00 PM	84	60	111	70	70	79	
2:00 PM	84	76	74	**78**	69	76	
3:00 PM	96	98	78	0	90	72	
4:00 PM	**102**	101	98	0	98	80	
5:00 PM	99	**134**	**126**	0	102	**92**	
6:00 PM	58	99	94	0	100	70	
7:00 PM	60	51	47	0	**111**	54	
8:00 PM	34	17	26	0	77	31	
9:00 PM	45	33	23	0	60	32	
10:00 PM	21	11	9	0	97	28	
11:00 PM	16	15	13	0	59	21	
Day Total	1108	1037	1099	542	1367	1031	
% Weekday Average	107.5%	100.6%	106.6%	52.6%	132.6%		
% Week Average							
AM Peak	9:00 AM	11:00 AM	9:00 AM	9:00 AM	11:00 AM	11:00 AM	
Volume	75	89	67	66	59	67	
PM Peak	4:00 PM	5:00 PM	5:00 PM	2:00 PM	7:00 PM	5:00 PM	
Volume	102	134	126	78	111	92	

Comments:

SUMMARY - Tube Count - Volume Data (Weekend)

LOCATION: West Driveway to Snoqualmie Casino
SPECIFIC LOCATION: 100 ft from North Bend Way
CITY/STATE: Snoqualmie , WA

QC JOB #: 10822002
DIRECTION: SB
DATE: Sep 22 2012 - Sep 23 2012

Start Time			Sat 22-Sep-12	Sun 23-Sep-12	Average Weekend Hourly Traffic	Average Weekend Profile
12:00 AM			58	9	34	
1:00 AM			36	15	26	
2:00 AM			**66**	1	34	
3:00 AM			38	4	21	
4:00 AM			17	3	10	
5:00 AM			9	12	11	
6:00 AM			14	15	15	
7:00 AM			35	24	30	
8:00 AM			58	34	46	
9:00 AM			52	66	59	
10:00 AM			57	62	60	
11:00 AM			66	**85**	**76**	
12:00 PM			65	59	62	
1:00 PM			93	75	84	
2:00 PM			89	69	79	
3:00 PM			100	75	88	
4:00 PM			100	72	86	
5:00 PM			**129**	**87**	**108**	
6:00 PM			104	36	70	
7:00 PM			84	50	67	
8:00 PM			53	28	41	
9:00 PM			70	38	54	
10:00 PM			15	9	12	
11:00 PM			21	12	17	
Day Total			1429	940	1190	
% Weekday Average						
% Week Average			120.1%	79.0%		
AM Peak Volume			2:00 AM 66	11:00 AM 85	11:00 AM 76	
PM Peak Volume			5:00 PM 129	5:00 PM 87	5:00 PM 108	

Comments:

SUMMARY - Tube Count - Volume Data (Week)

LOCATION: West Driveway to Snoqualmie Casino
SPECIFIC LOCATION: 100 ft from North Bend Way
CITY/STATE: Snoqualmie , WA

QC JOB #: 10822002
DIRECTION: SB
DATE: Sep 17 2012 - Sep 23 2012

Start Time	Mon 17-Sep-12	Tue 18-Sep-12	Wed 19-Sep-12	Thu 20-Sep-12	Fri 21-Sep-12	Average Weekday Hourly Traffic	Sat 22-Sep-12	Sun 23-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM	3	5	3	7	41	12	58	9	18	
1:00 AM	14	13	15	13	22	15	36	15	18	
2:00 AM	2	1	2	1	40	9	**66**	1	16	
3:00 AM	3	2	3	0	14	4	38	4	9	
4:00 AM	4	4	1	0	17	5	17	3	7	
5:00 AM	12	12	13	15	8	12	9	12	12	
6:00 AM	22	19	25	23	14	21	14	15	19	
7:00 AM	42	38	39	44	26	38	35	24	35	
8:00 AM	44	34	36	47	50	42	58	34	43	
9:00 AM	**75**	45	**67**	**66**	51	61	52	66	60	
10:00 AM	67	55	65	63	38	58	57	62	58	
11:00 AM	65	**89**	64	58	**59**	**67**	66	**85**	**69**	
12:00 PM	56	25	67	57	54	52	65	59	55	
1:00 PM	84	60	111	70	70	79	93	75	80	
2:00 PM	84	76	74	**78**	69	76	89	69	77	
3:00 PM	96	98	78	0	90	72	100	75	77	
4:00 PM	**102**	101	98	0	98	80	100	72	82	
5:00 PM	99	**134**	**126**	0	102	**92**	**129**	**87**	**97**	
6:00 PM	58	99	94	0	100	70	104	36	70	
7:00 PM	60	51	47	0	**111**	54	84	50	58	
8:00 PM	34	17	26	0	77	31	53	28	34	
9:00 PM	45	33	23	0	60	32	70	38	38	
10:00 PM	21	11	9	0	97	28	15	9	23	
11:00 PM	16	15	13	0	59	21	21	12	19	
Day Total	1108	1037	1099	542	1367	1031	1429	940	1074	
% Weekday Average	107.5%	100.6%	106.6%	52.6%	132.6%					
% Week Average	103.2%	96.6%	102.3%	50.5%	127.3%	96.0%	133.1%	87.5%		
AM Peak	9:00 AM	11:00 AM	9:00 AM	9:00 AM	11:00 AM	11:00 AM	2:00 AM	11:00 AM	11:00 AM	
Volume	75	89	67	66	59	67	66	85	69	
PM Peak	4:00 PM	5:00 PM	5:00 PM	2:00 PM	7:00 PM	5:00 PM	5:00 PM	5:00 PM	5:00 PM	
Volume	102	134	126	78	111	92	129	87	97	

Comments:

LOCATION: West Driveway to Snoqualmie Casino
QC JOB #: 10822002
SPECIFIC LOCATION: 100 ft from North Bend Way
DIRECTION: NB/SB
CITY/STATE: Snoqualmie , WA
DATE: Sep 20 2012 - Sep 23 2012

Start Time	Mon	Tue	Wed	Thu 20-Sep-12	Fri 21-Sep-12	Average Weekday Hourly Traffic	Sat 22-Sep-12	Sun 23-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM					49	49	63	73	62	
1:00 AM					33	33	50	71	51	
2:00 AM					41	41	70	81	64	
3:00 AM					18	18	40	30	29	
4:00 AM					22	22	20	23	22	
5:00 AM					28	28	21	28	26	
6:00 AM					42	42	40	29	37	
7:00 AM					80	80	69	38	62	
8:00 AM					114	114	117	63	98	
9:00 AM					124	124	**136**	90	117	
10:00 AM					108	108	119	116	114	
11:00 AM					**158**	**158**	121	**124**	**134**	
12:00 PM					147	147	111	100	119	
1:00 PM					179	**179**	161	124	155	
2:00 PM					172	172	143	128	148	
3:00 PM				**0**	210	105	168	111	122	
4:00 PM				0	217	109	168	133	130	
5:00 PM				0	**260**	130	**224**	**142**	**157**	
6:00 PM				0	220	110	202	113	134	
7:00 PM				0	232	116	145	92	117	
8:00 PM				0	151	76	114	84	87	
9:00 PM				0	123	62	115	64	76	
10:00 PM				0	125	63	114	58	74	
11:00 PM				0	77	39	83	57	54	
Day Total				0	2930	2125	2614	1972	2189	
% Weekday Average				0.0%	137.9%					
% Week Average				0.0%	133.9%	97.1%	119.4%	90.1%		
AM Peak					11:00 AM	11:00 AM	9:00 AM	11:00 AM	11:00 AM	
Volume					158	158	136	124	134	
PM Peak				3:00 PM	5:00 PM	1:00 PM	5:00 PM	5:00 PM	5:00 PM	
Volume				0	260	179	224	142	157	

Comments:

LOCATION: West Driveway to Snoqualmie Casino
QC JOB #: 10822002
SPECIFIC LOCATION: 100 ft from North Bend Way
DIRECTION: NB/SB
CITY/STATE: Snoqualmie , WA
DATE: Sep 24 2012 - Sep 30 2012

Start Time	Mon 24-Sep-12	Tue 25-Sep-12	Wed 26-Sep-12	Thu 27-Sep-12	Fri 28-Sep-12	Average Weekday Hourly Traffic	Sat 29-Sep-12	Sun 30-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM	48	38	28	38	42	39	89	81	52	
1:00 AM	47	31	28	35	33	35	57	54	41	
2:00 AM	25	31	23	28	30	27	63	70	39	
3:00 AM	11	18	10	7	22	14	29	43	20	
4:00 AM	20	8	11	7	18	13	21	23	15	
5:00 AM	18	19	21	21	26	21	18	25	21	
6:00 AM	36	28	38	41	28	34	43	29	35	
7:00 AM	68	59	57	67	43	59	43	45	55	
8:00 AM	92	60	69	85	78	77	77	61	75	
9:00 AM	107	63	88	93	93	89	108	88	91	
10:00 AM	**109**	71	100	**115**	76	94	126	84	97	
11:00 AM	107	**105**	**101**	95	**94**	**100**	**145**	**100**	**107**	
12:00 PM	96	45	115	98	85	88	184	96	103	
1:00 PM	131	110	166	121	116	129	226	141	144	
2:00 PM	168	122	119	137	120	133	**261**	135	152	
3:00 PM	158	152	145	171	134	152	186	111	151	
4:00 PM	**188**	183	179	**202**	133	177	153	**149**	170	
5:00 PM	164	**749**	**209**	196	164	**296**	176	138	**257**	
6:00 PM	143	444	194	160	**184**	225	174	125	203	
7:00 PM	115	141	113	152	180	140	138	92	133	
8:00 PM	88	74	76	119	138	99	110	113	103	
9:00 PM	84	81	66	107	96	87	119	68	89	
10:00 PM	82	56	75	92	89	79	90	47	76	
11:00 PM	50	41	54	54	76	55	82	65	60	
Day Total	2155	2729	2085	2241	2098	2262	2718	1983	2289	
% Weekday Average	101.4%	120.6%	92.2%	99.1%	92.7%					
% Week Average	98.4%	119.2%	91.1%	97.9%	91.7%	98.8%	118.7%	86.6%		
AM Peak	10:00 AM	11:00 AM	11:00 AM	10:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	
Volume	109	105	101	115	94	100	145	100	107	
PM Peak	4:00 PM	5:00 PM	5:00 PM	4:00 PM	6:00 PM	5:00 PM	2:00 PM	4:00 PM	5:00 PM	
Volume	188	749	209	202	184	296	261	149	257	

Comments:

LOCATION: West Driveway to Snoqualmie Casino
QC JOB #: 10822002
SPECIFIC LOCATION: 100 ft from North Bend Way
DIRECTION: NB/SB
CITY/STATE: Snoqualmie , WA
DATE: Oct 01 2012 - Oct 01 2012

Start Time	Mon 01-Oct-12	Tue	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM	38					38			38	
1:00 AM	45					45			45	
2:00 AM	33					33			33	
3:00 AM	14					14			14	
4:00 AM	19					19			19	
5:00 AM	19					19			19	
6:00 AM	28					28			28	
7:00 AM	67					67			67	
8:00 AM	69					69			69	
9:00 AM	105					105			105	
10:00 AM	**108**					**108**			**108**	
11:00 AM	31					31			31	
12:00 PM										
1:00 PM										
2:00 PM										
3:00 PM										
4:00 PM										
5:00 PM										
6:00 PM										
7:00 PM										
8:00 PM										
9:00 PM										
10:00 PM										
11:00 PM										
Day Total	576					576			576	
% Weekday Average	25.5%									
% Week Average	25.2%					100.0%				
AM Peak	10:00 AM					10:00 AM			10:00 AM	
Volume	108					108			108	
PM Peak										
Volume										

Comments:

SUMMARY - Tube Count - Volume Data (Weekday)

LOCATION: West Driveway to Snoqualmie Casino
SPECIFIC LOCATION: 100 ft from North Bend Way
CITY/STATE: Snoqualmie , WA

QC JOB #: 10822002
DIRECTION: NB/SB
DATE: Sep 17 2012 - Sep 21 2012

Start Time	Mon 17-Sep-12	Tue 18-Sep-12	Wed 19-Sep-12	Thu 20-Sep-12	Fri 21-Sep-12	Average Weekday Hourly Traffic	Average Weekday Profile
12:00 AM	48	38	28	38	49	40	
1:00 AM	47	31	28	35	33	35	
2:00 AM	25	31	23	28	41	30	
3:00 AM	11	18	10	7	18	13	
4:00 AM	20	8	11	7	22	14	
5:00 AM	18	19	21	21	28	21	
6:00 AM	36	28	38	41	42	37	
7:00 AM	68	59	57	67	80	66	
8:00 AM	92	60	69	85	114	84	
9:00 AM	107	63	88	93	124	95	
10:00 AM	**109**	71	100	**115**	108	101	
11:00 AM	107	**105**	**101**	95	**158**	**113**	
12:00 PM	96	45	115	98	147	100	
1:00 PM	131	110	166	121	179	141	
2:00 PM	168	122	119	**137**	172	144	
3:00 PM	158	152	145	0	210	133	
4:00 PM	**188**	183	179	0	217	153	
5:00 PM	164	**749**	**209**	0	**260**	**276**	
6:00 PM	143	444	194	0	220	200	
7:00 PM	115	141	113	0	232	120	
8:00 PM	88	74	76	0	151	78	
9:00 PM	84	81	66	0	123	71	
10:00 PM	82	56	75	0	125	68	
11:00 PM	50	41	54	0	77	44	
Day Total	2155	2729	2085	988	2930	2177	
% Weekday Average	99.0%	125.4%	95.8%	45.4%	134.6%		
% Week Average							
AM Peak	10:00 AM	11:00 AM	11:00 AM	10:00 AM	11:00 AM	11:00 AM	
Volume	109	105	101	115	158	113	
PM Peak	4:00 PM	5:00 PM	5:00 PM	2:00 PM	5:00 PM	5:00 PM	
Volume	188	749	209	137	260	276	

Comments:

SUMMARY - Tube Count - Volume Data (Weekend)

LOCATION: West Driveway to Snoqualmie Casino
SPECIFIC LOCATION: 100 ft from North Bend Way
CITY/STATE: Snoqualmie , WA

QC JOB #: 10822002
DIRECTION: NB/SB
DATE: Sep 22 2012 - Sep 23 2012

Start Time			Sat 22-Sep-12	Sun 23-Sep-12	Average Weekend Hourly Traffic	Average Weekend Profile
12:00 AM			63	73	68	
1:00 AM			50	71	61	
2:00 AM			70	81	76	
3:00 AM			40	30	35	
4:00 AM			20	23	22	
5:00 AM			21	28	25	
6:00 AM			40	29	35	
7:00 AM			69	38	54	
8:00 AM			117	63	90	
9:00 AM			**136**	90	113	
10:00 AM			119	116	118	
11:00 AM			121	**124**	**123**	
12:00 PM			111	100	106	
1:00 PM			161	124	143	
2:00 PM			143	128	136	
3:00 PM			168	111	140	
4:00 PM			168	133	151	
5:00 PM			**224**	**142**	**183**	
6:00 PM			202	113	158	
7:00 PM			145	92	119	
8:00 PM			114	84	99	
9:00 PM			115	64	90	
10:00 PM			114	58	86	
11:00 PM			83	57	70	
Day Total			2614	1972	2301	
% Weekday Average						
% Week Average			113.6%	85.7%		
AM Peak Volume			9:00 AM 136	11:00 AM 124	11:00 AM 123	
PM Peak Volume			5:00 PM 224	5:00 PM 142	5:00 PM 183	

Comments:

SUMMARY - Tube Count - Volume Data (Week)

LOCATION: West Driveway to Snoqualmie Casino
SPECIFIC LOCATION: 100 ft from North Bend Way
CITY/STATE: Snoqualmie , WA

QC JOB #: 10822002
DIRECTION: NB/SB
DATE: Sep 17 2012 - Sep 23 2012

Start Time	Mon 17-Sep-12	Tue 18-Sep-12	Wed 19-Sep-12	Thu 20-Sep-12	Fri 21-Sep-12	Average Weekday Hourly Traffic	Sat 22-Sep-12	Sun 23-Sep-12	Average Week Hourly Traffic	Average Week Profile
12:00 AM	48	38	28	38	49	40	63	73	48	
1:00 AM	47	31	28	35	33	35	50	71	42	
2:00 AM	25	31	23	28	41	30	70	81	43	
3:00 AM	11	18	10	7	18	13	40	30	19	
4:00 AM	20	8	11	7	22	14	20	23	16	
5:00 AM	18	19	21	21	28	21	21	28	22	
6:00 AM	36	28	38	41	42	37	40	29	36	
7:00 AM	68	59	57	67	80	66	69	38	63	
8:00 AM	92	60	69	85	114	84	117	63	86	
9:00 AM	107	63	88	93	124	95	**136**	90	100	
10:00 AM	**109**	71	100	**115**	108	101	119	116	105	
11:00 AM	107	**105**	**101**	95	**158**	**113**	121	**124**	**116**	
12:00 PM	96	45	115	98	147	100	111	100	102	
1:00 PM	131	110	166	121	179	141	161	124	142	
2:00 PM	168	122	119	**137**	172	144	143	128	141	
3:00 PM	158	152	145	0	210	133	168	111	135	
4:00 PM	**188**	183	179	0	217	153	168	133	153	
5:00 PM	164	**749**	**209**	0	**260**	**276**	**224**	**142**	**250**	
6:00 PM	143	444	194	0	220	200	202	113	188	
7:00 PM	115	141	113	0	232	120	145	92	120	
8:00 PM	88	74	76	0	151	78	114	84	84	
9:00 PM	84	81	66	0	123	71	115	64	76	
10:00 PM	82	56	75	0	125	68	114	58	73	
11:00 PM	50	41	54	0	77	44	83	57	52	
Day Total	2155	2729	2085	988	2930	2177	2614	1972	2212	
% Weekday Average	99.0%	125.4%	95.8%	45.4%	134.6%					
% Week Average	97.4%	123.4%	94.3%	44.7%	132.5%	98.4%	118.2%	89.2%		
AM Peak	10:00 AM	11:00 AM	11:00 AM	10:00 AM	11:00 AM	11:00 AM	9:00 AM	11:00 AM	11:00 AM	
Volume	109	105	101	115	158	113	136	124	116	
PM Peak	4:00 PM	5:00 PM	5:00 PM	2:00 PM	5:00 PM	5:00 PM	5:00 PM	5:00 PM	5:00 PM	
Volume	188	749	209	137	260	276	224	142	250	

Comments:

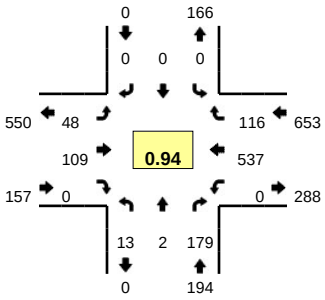
Attachment C: Turning Movement Counts at I-5/ La Center Road Ramp Terminals

Type of peak hour being reported: Intersection Peak

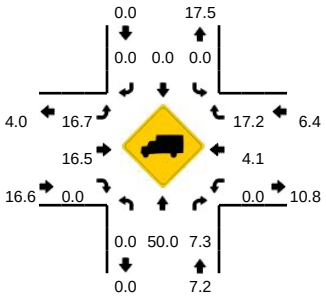
Method for determining peak hour: Total Entering Volume

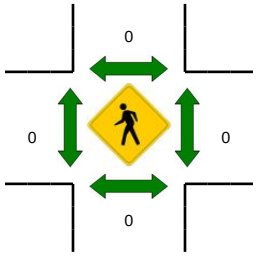
LOCATION: I-5 NB Ramps -- NW LaCenter Rd
CITY/STATE: La Center, WA

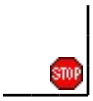
QC JOB #: 12598922
DATE: Tue, May 20 2014

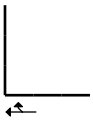


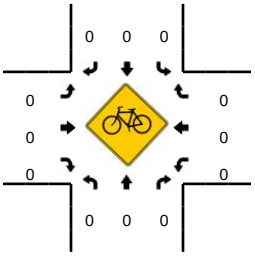
Peak-Hour: 7:10 AM -- 8:10 AM
Peak 15-Min: 7:35 AM -- 7:50 AM

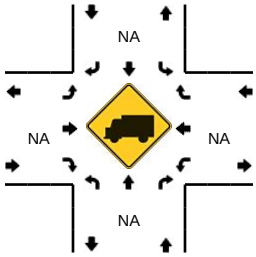


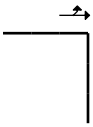


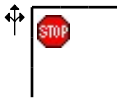


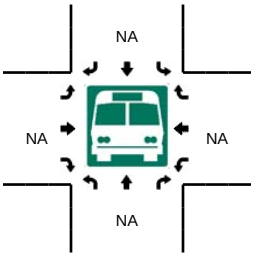












5-Min Count Period Beginning At	I-5 NB Ramps (Northbound)				I-5 NB Ramps (Southbound)				NW LaCenter Rd (Eastbound)				NW LaCenter Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	1	0	8	0	0	0	0	0	0	3	0	0	0	38	11	0	61	
7:05 AM	1	0	7	0	0	0	0	0	2	6	0	0	0	39	9	0	64	
7:10 AM	0	0	4	0	0	0	0	0	4	8	0	0	0	45	15	0	76	
7:15 AM	2	0	15	0	0	0	0	0	8	7	0	0	0	43	10	0	85	
7:20 AM	0	1	6	0	0	0	0	0	2	9	0	0	0	62	9	0	89	
7:25 AM	2	0	15	0	0	0	0	0	2	7	0	0	0	44	9	0	79	
7:30 AM	2	0	13	0	0	0	0	0	2	7	0	0	0	62	7	0	93	
7:35 AM	3	0	23	0	0	0	0	0	4	5	0	0	0	42	10	0	87	
7:40 AM	1	0	18	0	0	0	0	0	7	10	0	0	0	39	8	0	83	
7:45 AM	1	1	30	0	0	0	0	0	4	14	0	0	0	39	9	0	98	
7:50 AM	0	0	18	0	0	0	0	0	6	13	0	0	0	37	10	0	84	
7:55 AM	0	0	12	0	0	0	0	0	4	15	0	0	0	38	8	0	77	976
8:00 AM	1	0	9	0	0	0	0	0	2	13	0	0	0	39	13	0	77	992
8:05 AM	1	0	16	0	0	0	0	0	3	1	0	0	0	47	8	0	76	1004
8:10 AM	1	0	13	0	0	0	0	0	3	6	0	0	0	44	8	0	75	1003
8:15 AM	0	0	18	0	0	0	0	0	4	4	0	0	0	37	8	0	71	989
8:20 AM	3	0	10	0	0	0	0	0	4	8	0	0	0	43	12	0	80	980
8:25 AM	0	0	9	0	0	0	0	0	5	7	0	0	0	41	17	0	79	980
8:30 AM	1	0	6	0	0	0	0	0	1	6	0	0	0	35	13	0	62	949
8:35 AM	2	0	14	0	0	0	0	0	1	6	0	0	0	28	10	0	61	923
8:40 AM	1	0	6	0	0	0	0	0	2	7	0	0	0	29	11	0	56	896
8:45 AM	2	0	4	0	0	0	0	0	3	6	0	0	0	31	2	0	48	846
8:50 AM	1	0	14	0	0	0	0	0	2	4	0	0	0	18	6	0	45	807
8:55 AM	2	0	8	0	0	0	0	0	3	7	0	0	0	23	3	0	46	776

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	20	4	284	0	0	0	0	0	60	116	0	0	0	480	108	0	1072
Heavy Trucks	0	0	12		0	0	0		16	24	0		0	20	8		80
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 6/30/2014 8:00 AM

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

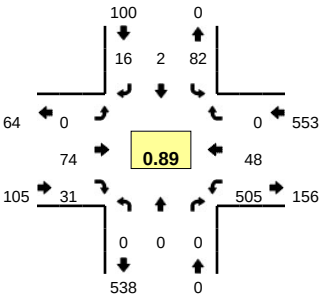
LOCATION: I-5 SB Ramps -- NW LaCenter Rd

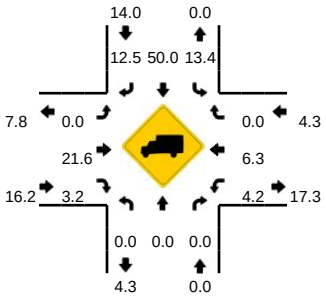
QC JOB #: 12598925

CITY/STATE: La Center, WA

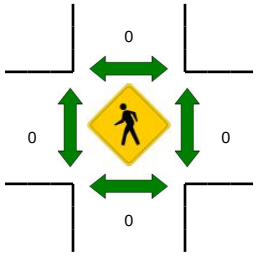
DATE: Tue, May 20 2014

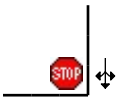
Peak-Hour: 7:10 AM -- 8:10 AM
Peak 15-Min: 7:20 AM -- 7:35 AM

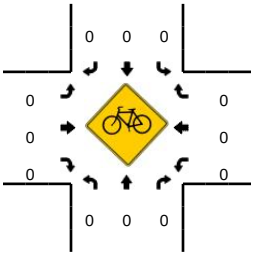


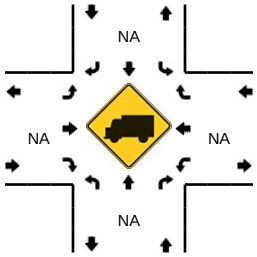


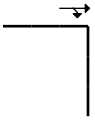
Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

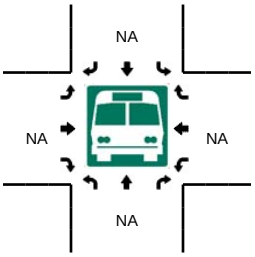












5-Min Count Period Beginning At	I-5 SB Ramps (Northbound)				I-5 SB Ramps (Southbound)				NW LaCenter Rd (Eastbound)				NW LaCenter Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	3	0	0	0	0	0	3	0	33	4	0	0	43	
7:05 AM	0	0	0	0	7	0	1	0	0	3	3	0	35	6	0	0	55	
7:10 AM	0	0	0	0	8	1	2	0	0	1	3	0	40	7	0	0	62	
7:15 AM	0	0	0	0	4	0	1	0	0	11	4	0	42	3	0	0	65	
7:20 AM	0	0	0	0	8	0	2	0	0	4	2	0	56	5	0	0	77	
7:25 AM	0	0	0	0	5	0	1	0	0	4	5	0	42	4	0	0	61	
7:30 AM	0	0	0	0	5	0	1	0	0	4	3	0	59	3	0	0	75	
7:35 AM	0	0	0	0	4	0	1	0	0	6	5	0	41	7	0	0	64	
7:40 AM	0	0	0	0	9	0	1	0	0	7	2	0	34	5	0	0	58	
7:45 AM	0	0	0	0	12	1	0	0	0	6	0	0	37	4	0	0	60	
7:50 AM	0	0	0	0	11	0	2	0	0	8	1	0	36	1	0	0	59	
7:55 AM	0	0	0	0	8	0	2	0	0	11	2	0	33	1	0	0	57	736
8:00 AM	0	0	0	0	7	0	3	0	0	8	1	0	41	1	0	0	61	754
8:05 AM	0	0	0	0	1	0	0	0	0	4	3	0	44	7	0	0	59	758
8:10 AM	0	0	0	0	3	1	0	0	0	4	1	0	44	1	0	0	54	750
8:15 AM	0	0	0	0	5	0	1	0	0	5	4	0	29	6	0	0	50	735
8:20 AM	0	0	0	0	8	0	0	0	0	3	5	0	37	7	0	0	60	718
8:25 AM	0	0	0	0	5	0	0	0	0	6	1	0	44	0	0	0	56	713
8:30 AM	0	0	0	0	5	0	1	0	0	2	2	0	32	3	0	0	45	683
8:35 AM	0	0	0	0	5	0	1	0	0	4	2	0	28	3	0	0	43	662
8:40 AM	0	0	0	0	6	0	1	0	0	2	5	0	29	3	0	0	46	650
8:45 AM	0	0	0	0	4	0	2	0	0	6	2	0	27	3	0	0	44	634
8:50 AM	0	0	0	0	2	0	0	0	0	4	3	0	18	4	0	0	31	606
8:55 AM	0	0	0	0	5	0	2	0	0	3	1	0	24	1	0	0	36	585

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	72	0	16	0	0	48	40	0	628	48	0	0	852
Heavy Trucks	0	0	0		8	0	0		0	4	4		28	0	0		44
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 6/30/2014 8:00 AM

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

Type of peak hour being reported: System Peak

Method for determining peak hour: Total Entering Volume

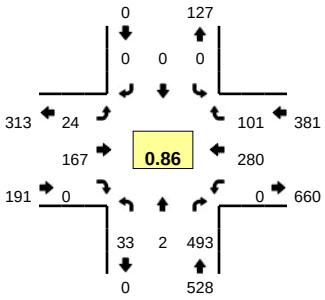
LOCATION: I-5 NB Ramps -- NW LaCenter Rd

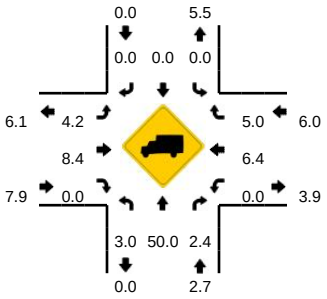
QC JOB #: 12598923

CITY/STATE: La Center, WA

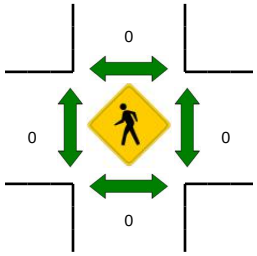
DATE: Tue, May 20 2014

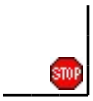
Peak-Hour: 4:35 PM -- 5:35 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

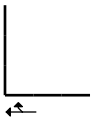


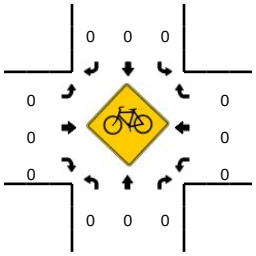


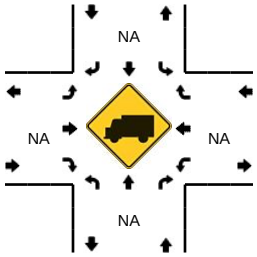
Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

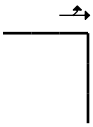


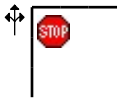


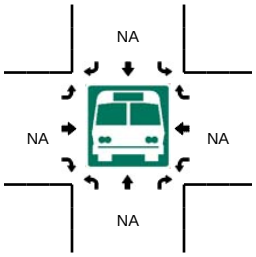












5-Min Count Period Beginning At	I-5 NB Ramps (Northbound)				I-5 NB Ramps (Southbound)				NW LaCenter Rd (Eastbound)				NW LaCenter Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	1	0	37	0	0	0	0	0	3	6	0	0	0	28	14	0	89	
4:05 PM	2	0	24	0	0	0	0	0	4	12	0	0	0	19	12	0	73	
4:10 PM	5	0	38	0	0	0	0	0	2	8	0	0	0	22	7	0	82	
4:15 PM	1	0	22	0	0	0	0	0	3	15	0	0	0	30	10	0	81	
4:20 PM	1	0	43	0	0	0	0	0	1	17	0	0	0	29	12	0	103	
4:25 PM	6	0	40	0	0	0	0	0	4	14	0	0	0	23	11	0	98	
4:30 PM	2	0	45	0	0	0	0	0	1	5	0	0	0	22	6	0	81	
4:35 PM	2	0	35	0	0	0	0	0	2	12	0	0	0	25	9	0	85	
4:40 PM	1	0	40	0	0	0	0	0	1	17	0	0	0	24	14	0	97	
4:45 PM	3	0	26	0	0	0	0	0	2	14	0	0	0	22	9	0	76	
4:50 PM	1	0	41	0	0	0	0	0	1	16	0	0	0	21	7	0	87	
4:55 PM	3	0	57	0	0	0	0	0	0	8	0	0	0	22	9	0	99	1051
5:00 PM	3	0	32	0	0	0	0	0	2	10	0	0	0	12	6	0	65	1027
5:05 PM	3	0	41	0	0	0	0	0	2	20	0	0	0	30	8	0	104	1058
5:10 PM	3	1	39	0	0	0	0	0	2	16	0	0	0	24	6	0	91	1067
5:15 PM	5	1	50	0	0	0	0	0	3	13	0	0	0	35	9	0	116	1102
5:20 PM	0	0	56	0	0	0	0	0	4	10	0	0	0	24	8	0	102	1101
5:25 PM	5	0	42	0	0	0	0	0	4	19	0	0	0	22	8	0	100	1103
5:30 PM	4	0	34	0	0	0	0	0	1	12	0	0	0	19	8	0	78	1100
5:35 PM	6	1	46	0	0	0	0	0	3	16	0	0	0	23	2	0	97	1112
5:40 PM	7	0	48	0	0	0	0	0	1	12	0	0	0	18	6	0	92	1107
5:45 PM	5	0	53	0	0	0	0	0	2	13	0	0	0	18	4	0	95	1126
5:50 PM	4	0	41	0	0	0	0	0	2	13	0	0	0	22	4	0	86	1125
5:55 PM	1	0	37	0	0	0	0	0	2	8	0	0	0	16	9	0	73	1099

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	40	4	592	0	0	0	0	0	44	168	0	0	0	324	100	0	1272
Heavy Trucks	0	0	12		0	0	0		0	8	0		0	16	8		44
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/29/2014 6:46 PM

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

Type of peak hour being reported: System Peak

Method for determining peak hour: Total Entering Volume

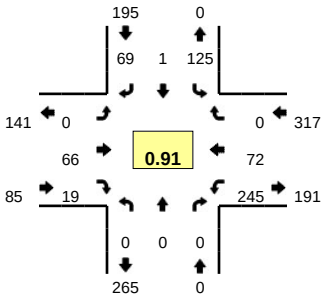
LOCATION: I-5 SB Ramps -- NW LaCenter Rd

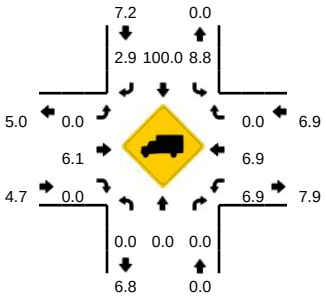
QC JOB #: 12598926

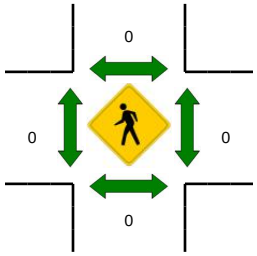
CITY/STATE: La Center, WA

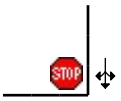
DATE: Tue, May 20 2014

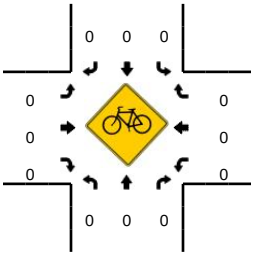
Peak-Hour: 4:35 PM -- 5:35 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

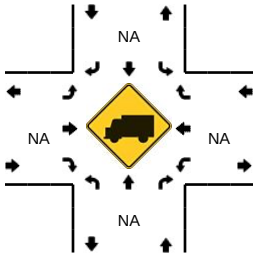


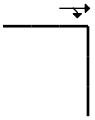


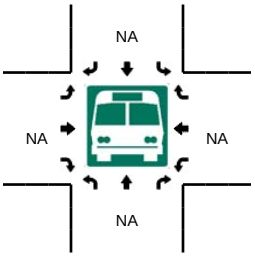












5-Min Count Period Beginning At	I-5 SB Ramps (Northbound)				I-5 SB Ramps (Southbound)				NW LaCenter Rd (Eastbound)				NW LaCenter Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	6	0	1	0	0	5	3	0	25	4	0	0	44	
4:05 PM	0	0	0	0	9	0	1	0	0	4	4	0	19	3	0	0	40	
4:10 PM	0	0	0	0	8	0	4	0	0	2	2	0	20	6	0	0	42	
4:15 PM	0	0	0	0	16	0	4	0	0	4	1	0	26	3	0	0	54	
4:20 PM	0	0	0	0	11	1	5	0	0	7	0	0	24	4	0	0	52	
4:25 PM	0	0	0	0	7	2	2	0	0	9	5	0	27	6	0	0	58	
4:30 PM	0	0	0	0	4	0	2	0	0	2	3	0	17	7	0	0	35	
4:35 PM	0	0	0	0	11	0	6	0	0	7	1	0	26	0	0	0	51	
4:40 PM	0	0	0	0	11	0	3	0	0	4	0	0	20	6	0	0	44	
4:45 PM	0	0	0	0	13	0	11	0	0	4	2	0	22	3	0	0	55	
4:50 PM	0	0	0	0	11	0	7	0	0	4	2	0	15	6	0	0	45	
4:55 PM	0	0	0	0	5	0	5	0	0	2	0	0	17	9	0	0	38	558
5:00 PM	0	0	0	0	7	1	6	0	0	6	3	0	9	5	0	0	37	551
5:05 PM	0	0	0	0	14	0	6	0	0	8	4	0	31	7	0	0	70	581
5:10 PM	0	0	0	0	13	0	6	0	0	8	1	0	16	8	0	0	52	591
5:15 PM	0	0	0	0	8	0	4	0	0	9	3	0	35	8	0	0	67	604
5:20 PM	0	0	0	0	7	0	2	0	0	6	2	0	22	2	0	0	41	593
5:25 PM	0	0	0	0	17	0	6	0	0	5	1	0	18	9	0	0	56	591
5:30 PM	0	0	0	0	8	0	7	0	0	3	0	0	14	9	0	0	41	597
5:35 PM	0	0	0	0	14	0	1	0	0	5	0	0	21	7	0	0	48	594
5:40 PM	0	0	0	0	12	0	4	0	0	2	0	0	14	8	0	0	40	590
5:45 PM	0	0	0	0	11	0	2	0	0	4	1	0	16	9	0	0	43	578
5:50 PM	0	0	0	0	11	1	1	0	0	3	1	0	19	7	0	0	43	576
5:55 PM	0	0	0	0	7	0	5	0	0	3	0	0	17	3	0	0	35	573

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	128	0	48	0	0	80	24	0	300	76	0	0	656
Heavy Trucks	0	0	0		4	0	0		0	0	0		20	0	0		24
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/29/2014 6:46 PM

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

Type of peak hour being reported: System Peak

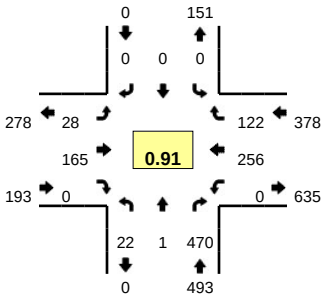
Method for determining peak hour: Total Entering Volume

LOCATION: I-5 NB Ramps -- NW LaCenter Rd

QC JOB #: 12598924

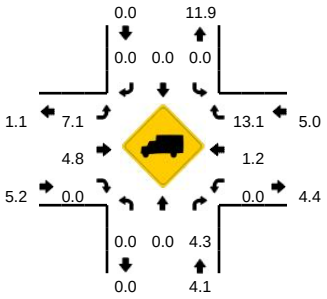
CITY/STATE: La Center, WA

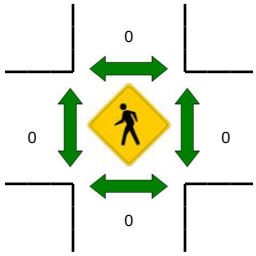
DATE: Fri, May 16 2014

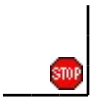


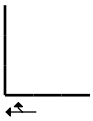
Peak-Hour: 5:00 PM -- 6:00 PM

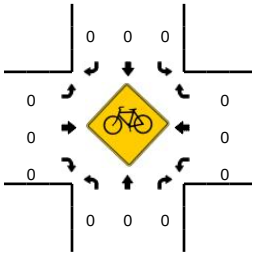
Peak 15-Min: 5:10 PM -- 5:25 PM

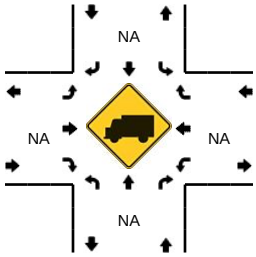


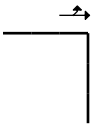


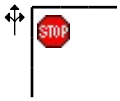


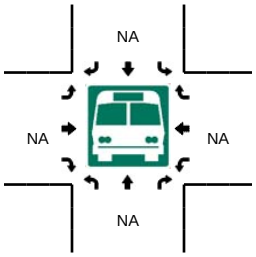












5-Min Count Period Beginning At	I-5 NB Ramps (Northbound)				I-5 NB Ramps (Southbound)				NW LaCenter Rd (Eastbound)				NW LaCenter Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	1	0	25	0	0	0	0	0	2	8	0	0	0	17	8	0	61	
4:05 PM	0	0	25	0	0	0	0	0	2	13	0	0	0	23	10	0	73	
4:10 PM	1	0	21	0	0	0	0	0	2	11	0	0	0	26	10	0	71	
4:15 PM	1	0	30	0	0	0	0	0	0	12	0	0	0	22	13	0	78	
4:20 PM	3	0	39	0	0	0	0	0	3	11	0	0	0	30	12	0	98	
4:25 PM	0	1	34	0	0	0	0	0	2	9	0	0	0	22	9	0	77	
4:30 PM	4	0	35	0	0	0	0	0	0	13	0	0	0	24	8	0	84	
4:35 PM	2	0	36	0	0	0	0	0	0	9	0	0	0	21	10	0	78	
4:40 PM	3	0	39	0	0	0	0	0	3	17	0	0	0	17	8	0	87	
4:45 PM	4	0	36	0	0	0	0	0	1	12	0	0	0	19	11	0	83	
4:50 PM	2	0	36	0	0	0	0	0	4	11	0	0	0	15	13	0	81	
4:55 PM	2	0	40	0	0	0	0	0	2	5	0	0	0	13	4	0	66	937
5:00 PM	2	0	32	0	0	0	0	0	3	12	0	0	0	16	10	0	75	951
5:05 PM	2	0	39	0	0	0	0	0	4	18	0	0	0	20	8	0	91	969
5:10 PM	0	0	41	0	0	0	0	0	1	18	0	0	0	16	15	0	91	989
5:15 PM	1	0	35	0	0	0	0	0	3	17	0	0	0	32	6	0	94	1005
5:20 PM	2	1	47	0	0	0	0	0	1	15	0	0	0	32	9	0	107	1014
5:25 PM	2	0	41	0	0	0	0	0	4	12	0	0	0	22	10	0	91	1028
5:30 PM	3	0	45	0	0	0	0	0	1	11	0	0	0	25	8	0	93	1037
5:35 PM	3	0	44	0	0	0	0	0	1	13	0	0	0	24	13	0	98	1057
5:40 PM	2	0	40	0	0	0	0	0	2	16	0	0	0	19	11	0	90	1060
5:45 PM	1	0	46	0	0	0	0	0	2	8	0	0	0	16	12	0	85	1062
5:50 PM	1	0	36	0	0	0	0	0	4	15	0	0	0	20	5	0	81	1062
5:55 PM	3	0	24	0	0	0	0	0	2	10	0	0	0	14	15	0	68	1064

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	12	4	492	0	0	0	0	0	20	200	0	0	0	320	120	0	1168
Heavy Trucks	0	0	16		0	0	0		0	16	0		0	0	32		64
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/29/2014 6:47 PM

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

Type of peak hour being reported: System Peak

Method for determining peak hour: Total Entering Volume

LOCATION: I-5 SB Ramps -- NW LaCenter Rd

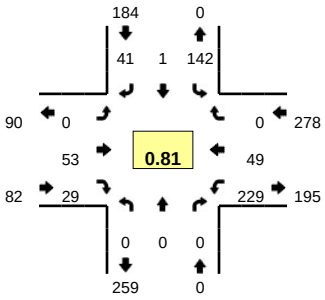
QC JOB #: 12598927

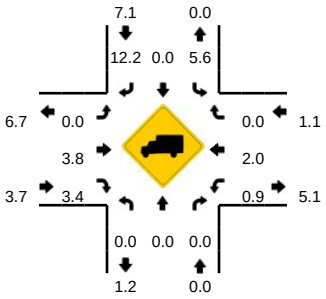
CITY/STATE: La Center, WA

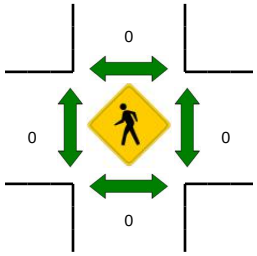
DATE: Fri, May 16 2014

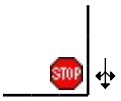
Peak-Hour: 5:00 PM -- 6:00 PM

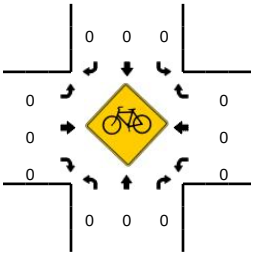
Peak 15-Min: 5:10 PM -- 5:25 PM

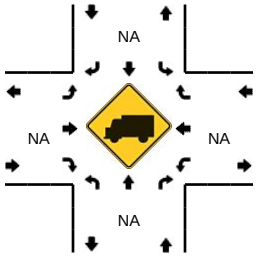


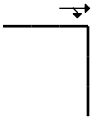


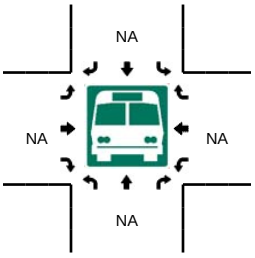












5-Min Count Period Beginning At	I-5 SB Ramps (Northbound)				I-5 SB Ramps (Southbound)				NW LaCenter Rd (Eastbound)				NW LaCenter Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	9	0	2	0	0	2	0	0	15	3	0	0	31	
4:05 PM	0	0	0	0	12	0	6	0	0	1	2	0	24	0	0	0	45	
4:10 PM	0	0	0	0	9	0	4	0	0	2	0	0	21	5	0	0	41	
4:15 PM	0	0	0	0	7	1	4	0	0	6	0	0	19	5	0	0	42	
4:20 PM	0	0	0	0	10	0	3	0	0	3	4	0	25	8	0	0	53	
4:25 PM	0	0	0	0	4	0	3	0	0	7	1	0	21	2	0	0	38	
4:30 PM	0	0	0	0	10	0	2	0	0	4	3	0	23	5	0	0	47	
4:35 PM	0	0	0	0	6	1	1	0	0	2	2	0	18	3	0	0	33	
4:40 PM	0	0	0	0	14	0	2	0	0	7	1	0	15	6	0	0	45	
4:45 PM	0	0	0	0	6	0	3	0	0	5	2	0	16	8	0	0	40	
4:50 PM	0	0	0	0	6	0	5	0	0	10	2	0	16	2	0	0	41	
4:55 PM	0	0	0	0	3	0	3	0	0	3	1	0	5	10	0	0	25	481
5:00 PM	0	0	0	0	9	0	2	0	0	8	3	0	12	5	0	0	39	489
5:05 PM	0	0	0	0	16	0	4	0	0	5	0	0	18	4	0	0	47	491
5:10 PM	0	0	0	0	18	0	3	0	0	3	2	0	17	1	0	0	44	494
5:15 PM	0	0	0	0	14	1	10	0	0	4	1	0	32	2	0	0	64	516
5:20 PM	0	0	0	0	12	0	4	0	0	5	7	0	27	5	0	0	60	523
5:25 PM	0	0	0	0	9	0	5	0	0	5	1	0	21	4	0	0	45	530
5:30 PM	0	0	0	0	10	0	6	0	0	4	3	0	21	6	0	0	50	533
5:35 PM	0	0	0	0	13	0	0	0	0	3	3	0	24	4	0	0	47	547
5:40 PM	0	0	0	0	11	0	0	0	0	5	1	0	14	7	0	0	38	540
5:45 PM	0	0	0	0	7	0	3	0	0	4	3	0	15	2	0	0	34	534
5:50 PM	0	0	0	0	15	0	2	0	0	3	2	0	16	5	0	0	43	536
5:55 PM	0	0	0	0	8	0	2	0	0	4	3	0	12	4	0	0	33	544

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	176	4	68	0	0	48	40	0	304	32	0	0	672
Heavy Trucks	0	0	0		8	0	20		0	4	4		0	0	0		36
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/29/2014 6:47 PM

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

Attachment D: I-5 mainline volumes south of La Center Road

Type of report: Tube Count - Volume Data

LOCATION: I-5 Mainline Counts South of La Center Rd Friday
QC JOB #: 12598966
SPECIFIC LOCATION: 0 ft from
DIRECTION: NB
CITY/STATE: La Center, WA
DATE: May 16 2014 - May 16 2014

Start Time	Mon	Tue	Wed	Thu	Fri 16-May-14	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM					404	404			404	
1:00 AM					328	328			328	
2:00 AM					293	293			293	
3:00 AM					330	330			330	
4:00 AM					508	508			508	
5:00 AM					1017	1017			1017	
6:00 AM					1579	1579			1579	
7:00 AM					2032	2032			2032	
8:00 AM					1842	1842			1842	
9:00 AM					2070	2070			2070	
10:00 AM					2279	2279			2279	
11:00 AM					**2511**	**2511**			**2511**	
12:00 PM					2744	2744			2744	
1:00 PM					2748	2748			2748	
2:00 PM					2857	2857			2857	
3:00 PM					3124	3124			3124	
4:00 PM					3080	3080			3080	
5:00 PM					**3374**	**3374**			**3374**	
6:00 PM					2794	2794			2794	
7:00 PM					2276	2276			2276	
8:00 PM					1726	1726			1726	
9:00 PM					1286	1286			1286	
10:00 PM					1000	1000			1000	
11:00 PM					758	758			758	
Day Total					42960	42960			42960	
% Weekday Average					100.0%					
% Week Average					100.0%	100.0%				
AM Peak Volume					11:00 AM 2511	11:00 AM 2511			11:00 AM 2511	
PM Peak Volume					5:00 PM 3374	5:00 PM 3374			5:00 PM 3374	

Comments:

Report generated on 6/4/2014 8:32 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

LOCATION: I-5 Mainline Counts South of La Center Rd Friday

QC JOB #: 12598966

SPECIFIC LOCATION: 0 ft from

DIRECTION: SB

CITY/STATE: La Center, WA

DATE: May 16 2014 - May 16 2014

Start Time	Mon	Tue	Wed	Thu	Fri 16-May-14	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM					423	423			423	
1:00 AM					314	314			314	
2:00 AM					252	252			252	
3:00 AM					347	347			347	
4:00 AM					625	625			625	
5:00 AM					1245	1245			1245	
6:00 AM					2020	2020			2020	
7:00 AM					2285	2285			2285	
8:00 AM					2251	2251			2251	
9:00 AM					2172	2172			2172	
10:00 AM					2267	2267			2267	
11:00 AM					**2607**	**2607**			**2607**	
12:00 PM					2803	2803			2803	
1:00 PM					2756	2756			2756	
2:00 PM					3061	3061			3061	
3:00 PM					**3312**	**3312**			**3312**	
4:00 PM					3255	3255			3255	
5:00 PM					2945	2945			2945	
6:00 PM					2417	2417			2417	
7:00 PM					2190	2190			2190	
8:00 PM					1962	1962			1962	
9:00 PM					1680	1680			1680	
10:00 PM					1183	1183			1183	
11:00 PM					734	734			734	
Day Total					45106	45106			45106	
% Weekday Average					100.0%					
% Week Average					100.0%	100.0%				
AM Peak Volume					11:00 AM 2607	11:00 AM 2607			11:00 AM 2607	
PM Peak Volume					3:00 PM 3312	3:00 PM 3312			3:00 PM 3312	

Comments:

LOCATION: I-5 Mainline Counts South of La Center Rd Tuesday

QC JOB #: 12598967

SPECIFIC LOCATION: 0 ft from

DIRECTION: NB

CITY/STATE: La Center, WA

DATE: May 20 2014 - May 20 2014

Start Time	Mon	Tue 20-May-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		347				347			347	
1:00 AM		258				258			258	
2:00 AM		285				285			285	
3:00 AM		324				324			324	
4:00 AM		459				459			459	
5:00 AM		997				997			997	
6:00 AM		1645				1645			1645	
7:00 AM		**2020**				**2020**			**2020**	
8:00 AM		1847				1847			1847	
9:00 AM		1783				1783			1783	
10:00 AM		1877				1877			1877	
11:00 AM		1958				1958			1958	
12:00 PM		2100				2100			2100	
1:00 PM		2045				2045			2045	
2:00 PM		2247				2247			2247	
3:00 PM		2274				2274			2274	
4:00 PM		2577				2577			2577	
5:00 PM		**2835**				**2835**			**2835**	
6:00 PM		2199				2199			2199	
7:00 PM		1824				1824			1824	
8:00 PM		1386				1386			1386	
9:00 PM		1027				1027			1027	
10:00 PM		745				745			745	
11:00 PM		572				572			572	
Day Total		35631				35631			35631	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		7:00 AM 2020				7:00 AM 2020			7:00 AM 2020	
PM Peak Volume		5:00 PM 2835				5:00 PM 2835			5:00 PM 2835	

Comments:

LOCATION: I-5 Mainline Counts South of La Center Rd Tuesday

QC JOB #: 12598967

SPECIFIC LOCATION: 0 ft from

DIRECTION: SB

CITY/STATE: La Center, WA

DATE: May 20 2014 - May 20 2014

Start Time	Mon	Tue 20-May-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		323				323			323	
1:00 AM		267				267			267	
2:00 AM		262				262			262	
3:00 AM		344				344			344	
4:00 AM		624				624			624	
5:00 AM		1390				1390			1390	
6:00 AM		2069				2069			2069	
7:00 AM		**2370**				**2370**			**2370**	
8:00 AM		2240				2240			2240	
9:00 AM		1924				1924			1924	
10:00 AM		1951				1951			1951	
11:00 AM		1942				1942			1942	
12:00 PM		2014				2014			2014	
1:00 PM		2077				2077			2077	
2:00 PM		2235				2235			2235	
3:00 PM		2503				2503			2503	
4:00 PM		**2582**				**2582**			**2582**	
5:00 PM		2521				2521			2521	
6:00 PM		1704				1704			1704	
7:00 PM		1247				1247			1247	
8:00 PM		1144				1144			1144	
9:00 PM		813				813			813	
10:00 PM		582				582			582	
11:00 PM		453				453			453	
Day Total		35581				35581			35581	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak		7:00 AM				7:00 AM			7:00 AM	
Volume		2370				2370			2370	
PM Peak		4:00 PM				4:00 PM			4:00 PM	
Volume		2582				2582			2582	

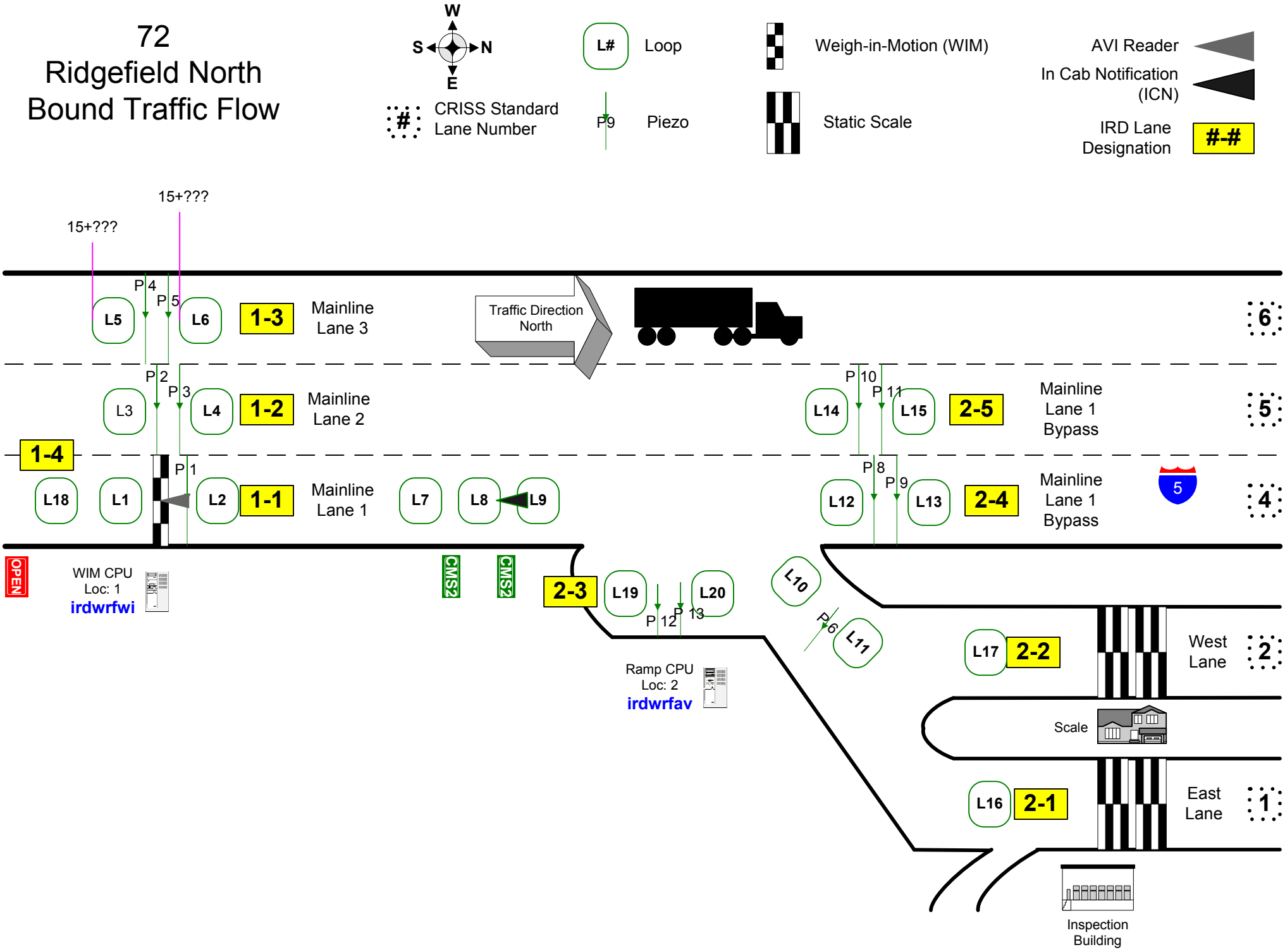
Comments:

Attachment E: Weigh Station Data from June 2014

I-5/Ridgefield Weigh Station Data
Source: WSDOT Commercial Vehicle Services

dayStrBgn	dayStrEnd	Day of the Week (KAI)	Time Period (KAI)	Day and Time (KAI)	lane	vehicle Count
20140613 15:00:00	20140613 18:00:00	Friday	3:00-6:00 PM	Friday 3:00-6:00 PM	Mainline 1 Bypass	27
20140613 15:00:00	20140613 18:00:00	Friday	3:00-6:00 PM	Friday 3:00-6:00 PM	Mainline 2 Bypass	330
20140613 15:00:00	20140613 18:00:00	Friday	3:00-6:00 PM	Friday 3:00-6:00 PM	Unknown Lane	48
20140613 15:00:00	20140613 18:00:00	Friday	3:00-6:00 PM	Friday 3:00-6:00 PM	Weigh Station East Lane	164
20140613 15:00:00	20140613 18:00:00	Friday	3:00-6:00 PM	Friday 3:00-6:00 PM	Weigh Station West Lane	18
20140614 15:00:00	20140614 18:00:00	Saturday	3:00-6:00 PM	Saturday 3:00-6:00 PM	Mainline 1 Bypass	10
20140614 15:00:00	20140614 18:00:00	Saturday	3:00-6:00 PM	Saturday 3:00-6:00 PM	Mainline 2 Bypass	145
20140614 15:00:00	20140614 18:00:00	Saturday	3:00-6:00 PM	Saturday 3:00-6:00 PM	Unknown Lane	34
20140614 15:00:00	20140614 18:00:00	Saturday	3:00-6:00 PM	Saturday 3:00-6:00 PM	Weigh Station East Lane	139
20140614 15:00:00	20140614 18:00:00	Saturday	3:00-6:00 PM	Saturday 3:00-6:00 PM	Weigh Station West Lane	18
20140615 15:00:00	20140615 18:00:00	Sunday	3:00-6:00 PM	Sunday 3:00-6:00 PM	Mainline 1 Bypass	21
20140615 15:00:00	20140615 18:00:00	Sunday	3:00-6:00 PM	Sunday 3:00-6:00 PM	Mainline 2 Bypass	183
20140615 15:00:00	20140615 18:00:00	Sunday	3:00-6:00 PM	Sunday 3:00-6:00 PM	Unknown Lane	45
20140615 15:00:00	20140615 18:00:00	Sunday	3:00-6:00 PM	Sunday 3:00-6:00 PM	Weigh Station East Lane	177
20140615 15:00:00	20140615 18:00:00	Sunday	3:00-6:00 PM	Sunday 3:00-6:00 PM	Weigh Station West Lane	99
20140620 15:00:00	20140620 18:00:00	Friday	3:00-6:00 PM	Friday 3:00-6:00 PM	Mainline 1 Bypass	39
20140620 15:00:00	20140620 18:00:00	Friday	3:00-6:00 PM	Friday 3:00-6:00 PM	Mainline 2 Bypass	348
20140620 15:00:00	20140620 18:00:00	Friday	3:00-6:00 PM	Friday 3:00-6:00 PM	Unknown Lane	55
20140620 15:00:00	20140620 18:00:00	Friday	3:00-6:00 PM	Friday 3:00-6:00 PM	Weigh Station East Lane	93
20140620 15:00:00	20140620 18:00:00	Friday	3:00-6:00 PM	Friday 3:00-6:00 PM	Weigh Station West Lane	84
20140621 15:00:00	20140621 18:00:00	Saturday	3:00-6:00 PM	Saturday 3:00-6:00 PM	Mainline 1 Bypass	9
20140621 15:00:00	20140621 18:00:00	Saturday	3:00-6:00 PM	Saturday 3:00-6:00 PM	Mainline 2 Bypass	174
20140621 15:00:00	20140621 18:00:00	Saturday	3:00-6:00 PM	Saturday 3:00-6:00 PM	Unknown Lane	32
20140621 15:00:00	20140621 18:00:00	Saturday	3:00-6:00 PM	Saturday 3:00-6:00 PM	Weigh Station East Lane	102
20140621 15:00:00	20140621 18:00:00	Saturday	3:00-6:00 PM	Saturday 3:00-6:00 PM	Weigh Station West Lane	31
20140622 15:00:00	20140622 18:00:00	Sunday	3:00-6:00 PM	Sunday 3:00-6:00 PM	Mainline 1 Bypass	37
20140622 15:00:00	20140622 18:00:00	Sunday	3:00-6:00 PM	Sunday 3:00-6:00 PM	Mainline 2 Bypass	304
20140622 15:00:00	20140622 18:00:00	Sunday	3:00-6:00 PM	Sunday 3:00-6:00 PM	Unknown Lane	59
20140622 15:00:00	20140622 18:00:00	Sunday	3:00-6:00 PM	Sunday 3:00-6:00 PM	Weigh Station East Lane	143
20140622 15:00:00	20140622 18:00:00	Sunday	3:00-6:00 PM	Sunday 3:00-6:00 PM	Weigh Station West Lane	41
20140627 15:00:00	20140627 18:00:00	Friday	3:00-6:00 PM	Friday 3:00-6:00 PM	Mainline 1 Bypass	295
20140627 15:00:00	20140627 18:00:00	Friday	3:00-6:00 PM	Friday 3:00-6:00 PM	Mainline 2 Bypass	38
20140627 15:00:00	20140627 18:00:00	Friday	3:00-6:00 PM	Friday 3:00-6:00 PM	Unknown Lane	35
20140627 15:00:00	20140627 18:00:00	Friday	3:00-6:00 PM	Friday 3:00-6:00 PM	Weigh Station East Lane	113
20140627 15:00:00	20140627 18:00:00	Friday	3:00-6:00 PM	Friday 3:00-6:00 PM	Weigh Station West Lane	88
20140628 15:00:00	20140628 18:00:00	Saturday	3:00-6:00 PM	Saturday 3:00-6:00 PM	Mainline 1 Bypass	147
20140628 15:00:00	20140628 18:00:00	Saturday	3:00-6:00 PM	Saturday 3:00-6:00 PM	Mainline 2 Bypass	25
20140628 15:00:00	20140628 18:00:00	Saturday	3:00-6:00 PM	Saturday 3:00-6:00 PM	Unknown Lane	37
20140628 15:00:00	20140628 18:00:00	Saturday	3:00-6:00 PM	Saturday 3:00-6:00 PM	Weigh Station East Lane	129
20140628 15:00:00	20140628 18:00:00	Sunday	3:00-6:00 PM	Sunday 3:00-6:00 PM	Weigh Station West Lane	53
20140629 15:00:00	20140629 18:00:00	Sunday	3:00-6:00 PM	Sunday 3:00-6:00 PM	Mainline 1 Bypass	207
20140629 15:00:00	20140629 18:00:00	Sunday	3:00-6:00 PM	Sunday 3:00-6:00 PM	Mainline 2 Bypass	41
20140629 15:00:00	20140629 18:00:00	Sunday	3:00-6:00 PM	Sunday 3:00-6:00 PM	Unknown Lane	63
20140629 15:00:00	20140629 18:00:00	Sunday	3:00-6:00 PM	Sunday 3:00-6:00 PM	Weigh Station East Lane	132
20140629 15:00:00	20140629 18:00:00	Sunday	3:00-6:00 PM	Sunday 3:00-6:00 PM	Weigh Station West Lane	131

72 Ridgefield North Bound Traffic Flow



I-5/Ridgefield Weigh Station Data Assessment
Source: WSDOT Commercial Vehicle Services

Average of vehicleCount	Column Labels					
Row Labels	Mainline 1	Mainline 2	Unknown Lane	Weigh Station	Weigh Station	Grand Total
Monday 7:00-9:00 AM	117	297	38	85	97	127
Monday 4:00-6:00 PM	160	141	24	80	84	98
Tuesday 7:00-9:00 AM	126	311	44	76	94	130
Tuesday 4:00-6:00 PM	179	183	18	86	73	108
Wednesday 7:00-9:00 AM	115	336	30	94	81	131
Wednesday 4:00-6:00 PM	179	191	13	69	73	105
Thursday 7:00-9:00 AM	97	309	44	128	113	138
Thursday 4:00-6:00 PM	143	166	25	98	94	107
Friday 7:00-9:00 AM	75	288	40	100	96	120
Friday 3:00-6:00 PM	120	239	46	123	63	118
Friday 4:00-6:00 PM	24	228	36	84	53	80
Saturday 3:00-6:00 PM	55	115	34	123	25	74
Sunday 3:00-6:00 PM	88	176	56	151	81	109
Grand Total	**116**	**229**	**35**	**100**	**79**	**112**

Period	Average # of Trucks to Weigh	% trucks in peak hour*	Peak Hour Truck Volume
Friday 3:00-6:00 PM	181	38%	69
Weekday 7:00-9:00 AM	192	51%	98
Weekday 4:00-6:00PM	164	53%	87

*Based on I-5 mainline data from 2013, see sheet labled "R045 2013 Data - Vehicle Classification by Hour"

R045 2013 Data - Vehicle Classification by Hour

Pivot tables based on data provided by WSDOT

Calculations to determine % of trucks in peak hour (out of trucks in peak p

Row Labels	Average of Hour 7	Average of Hour 8	Average of Hour 16	Average of Hour 17
Monday	**529**	**612**	**793**	**801**
Double-unit Truck	230	244	304	268
Motorcycle, Car, Van and Pickup	1743	2054	2717	2800
Single-unit Truck	107	119	124	112
Triple-unit Truck	36	31	27	23
Tuesday	**524**	**616**	**769**	**793**
Double-unit Truck	255	258	297	266
Motorcycle, Car, Van and Pickup	1687	2046	2624	2769
Single-unit Truck	113	127	131	116
Triple-unit Truck	42	34	25	22
Wednesday	**527**	**620**	**790**	**813**
Double-unit Truck	272	271	310	278
Motorcycle, Car, Van and Pickup	1686	2046	2695	2834
Single-unit Truck	107	128	127	114
Triple-unit Truck	45	37	29	25
Thursday	**518**	**622**	**825**	**840**
Double-unit Truck	265	267	303	267
Motorcycle, Car, Van and Pickup	1655	2061	2836	2948
Single-unit Truck	107	121	135	121
Triple-unit Truck	44	38	25	24
Grand Total	**524**	**618**	**794**	**812**

Weekday Totals:

Double-unit Truck	1022	1040	1216	1079
Motorcycle, Car, Van and Pickup	6771	8207	10872	11350
Single-unit Truck	435	495	517	464
Triple-unit Truck	166	139	106	95

Total Trucks	1622	1675	1838	1638
	51%		**53%**	
	weekday AM peak hour		**Weekday PM peak hour**	

Row Labels	Average of Hour 16	Average of Hour 17	Average of Hour 18
Friday	**956**	**968**	**912**
Double-unit Truck	256	229	189
Motorcycle, Car, Van and Pickup	3412	3505	3345
Single-unit Truck	136	122	101
Triple-unit Truck	22	19	15
Grand Total	**956**	**968**	**912**

Total Trucks	413	369	305
	38%		
	Friday peak hour		

Attachment F: Seasonal Adjustment Factor for R045

STATE OF WASHINGTON - DEPARTMENT OF TRANSPORTATION
T R I P S S Y S T E M
PERMANENT TRAFFIC RECORDERS*
CONVERSION FACTORS: AVERAGE WEEKDAY TRAFFIC (AWDT) TO ANNUAL AVERAGE DAILY TRAFFIC (AADT)
URBAN STATIONS

MONTH	AWDT	FACTOR	AWDT	FACTOR	AWDT	FACTOR	AWDT	FACTOR	AWDT	FACTOR	AWDT	FACTOR	AWDT	FACTOR
	R021		R036		R039		R044		R045		R046		R050	
JANUARY	38033	1.06	108001	1.04	23239	1.46	74545	1.04	56055	1.21	197444	1.04	42807	1.01
FEBRUARY	42002	.96	118361	.95	23383	1.45	78393	.99	58999	1.15	207554	.99	45810	.94
MARCH	41959	.96	120273	.93	23639	1.43	79150	.98	62917	1.08	209104	.98	45557	.94
APRIL	42740	.94	124406	.90	25450	1.33	80803	.96	64488	1.05	211599	.97	45462	.95
MAY	42791	.94	126935	.88	28790	1.18	83185	.93	65426	1.04	213648	.96	47930	.90
JUNE	44429	.91	126943	.88	31384	1.08	85417	.91	69713	.97	214990	.95	48629	.89
JULY	42765	.94	127329	.88	35182	.96	85823	.90	73437	.92	212771	.96	48469	.89
AUGUST	44104	.91	130313	.86	36347	.93	86461	.90	75460	.90	213631	.96	49468	.87
SEPTEMBER	43506	.93	126887	.88	29869	1.14	84322	.92	69104	.98	210406	.97	48260	.89
OCTOBER	42683	.94	124859	.90	26741	1.27	81759	.95	64634	1.05	206650	.99	47156	.91
NOVEMBER	40155	1.00	116789	.96	26197	1.29	80918	.96	68070	1.00	201126	1.02	45899	.94
DECEMBER	40151	1.00	120480	.93	23347	1.45	79799	.97	62072	1.09	199120	1.03	43735	.98
AADT	40316		112060		33917		77396		67911		204459		43040	
	R051		R052		R053		R059		R062		R069		R081	
JANUARY	107795	1.04	75221	1.01	18063	1.20	4462	1.51	69158	1.00	19782	1.08	55375	1.04
FEBRUARY	115115	.98	80417	.94	20082	1.08	4937	1.36	75796	.91	21226	1.01	60538	.95
MARCH	117814	.96	80733	.94	20957	1.03	5389	1.25	76830	.90	21878	.98	61460	.94
APRIL	119448	.94	82362	.92	22392	.97	6201	1.08	76114	.91	22744	.94	62399	.92
MAY	120400	.94	83166	.91	24153	.90	6837	.98	78936	.88	23396	.91	65040	.88
JUNE	123441	.91	83293	.91	24986	.87	7418	.91	78412	.88	23678	.90	63692	.90
JULY	122843	.92	83958	.90	25809	.84	8896	.76	75021	.92	25277	.85	60347	.95
AUGUST	125159	.90	84168	.90	25408	.85	8493	.79	77546	.89	25316	.84	62055	.93
SEPTEMBER	121693	.93	82181	.92	24821	.87	7314	.92	77420	.89	24206	.88	63564	.90
OCTOBER	119692	.94	82237	.92	23805	.91	6614	1.02	76812	.90	22628	.94	63772	.90
NOVEMBER	116367	.97	78868	.96	21420	1.01	5496	1.22	72861	.95	21359	1.00	61459	.94
DECEMBER	111575	1.01	76448	.99	20543	1.05	5011	1.34	71270	.97	20327	1.05	57223	1.00
AADT	112581		75598		21659		6726		69115		21373		57494	
	R082		R087		R089		R091		R097		R098		R101	
JANUARY	165073	1.06	55585	1.06	15021	1.08	112547	1.07	59847	1.15	96089	.99	61352	.98
FEBRUARY	174879	1.00	61566	.96	15841	1.03	119677	1.00	63228	1.09	99024	.96	65725	.91
MARCH	177823	.99	62222	.95	16102	1.01	121801	.98	65900	1.05	98654	.96	66309	.90
APRIL	182417	.96	63648	.93	16750	.97	122949	.98	67149	1.03	101309	.94	66728	.90
MAY	182008	.96	64355	.92	17271	.94	124707	.96	68301	1.01	102634	.93	68650	.87
JUNE	184680	.95	64264	.92	17766	.92	129858	.92	72437	.95	103019	.92	70596	.85
JULY	187429	.94	63766	.92	18687	.87	131249	.91	75022	.92	103347	.92	68058	.88
AUGUST	192942	.91	64254	.92	18479	.88	132850	.90	76633	.90	104119	.91	70643	.85
SEPTEMBER	185953	.94	62274	.95	17691	.92	125768	.95	69119	1.00	102414	.93	67168	.89
OCTOBER	181470	.97	63722	.93	17118	.95	120776	.99	65664	1.05	103310	.92	66098	.91
NOVEMBER	177641	.99	60521	.97	16331	1.00	120652	.99	68033	1.01	98433	.97	62567	.96
DECEMBER	174756	1.00	56323	1.05	15493	1.05	114148	1.05	64629	1.07	95597	1.00	59322	1.01
AADT	175574		58971		16270		119933		69050		95169		59944	

* OREGON-OWNED RECORDERS AND FERRY TERMINALS EXCLUDED

Attachment G: Truck Percentages for I-5

Washington State Department of Transportation

2012 4-BIN CLASSIFICATION by Hour Report for Woodland
Permanent Traffic Recorder R045 on I-5 @ mile post 20.14

Statewide Travel & Collision Data Office
Travel Data & Analysis Branch
Automated Data Collection & Processing Section
360-570-2392 or 360-570-2394

Pivot tables below created by KAI from data provided by WSDOT, contact above

Weekday AM Peak Hour

Average of Truck Percentage	Column Labels			
	700		700 Total	Grand Total
Row Labels	NORTH	SOUTH		
Monday	0.177326416	0.145665153	0.163133436	0.163133436
Tuesday	0.180604721	0.159704461	0.171235639	0.171235639
Wednesday	0.186982354	0.17125927	0.179934075	0.179934075
Thursday	0.186770075	0.16687609	0.177166082	0.177166082
Grand Total	**18%**	**16%**	**0.172867308**	**0.172867308**

Weekday PM Peak Hour

Average of Truck Percentage	Column Labels			
	1700		1700 Total	Grand Total
Row Labels	NORTH	SOUTH		
Monday	0.104518881	0.136570675	0.118886927	0.118886927
Tuesday	0.106122381	0.136227937	0.119617975	0.119617975
Wednesday	0.112648119	0.136050345	0.123138772	0.123138772
Thursday	0.108674719	0.128221009	0.118110859	0.118110859
Grand Total	**11%**	**13%**	**0.119938633**	**0.119938633**

Friday Peak Hour

Average of Truck Percentage	Column Labels			
	1700		1700 Total	Grand Total
Row Labels	NORTH	SOUTH		
Friday	0.083186501	0.105737658	0.094073267	0.094073267
Grand Total	**8%**	**11%**	**0.094073267**	**0.094073267**

Appendix K Existing Conditions Worksheets – Freeway Mainline

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/24/2014*
Analysis Time Period	*Weekday AM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 NB*
From/To	*SR 501 to La Center Rd*
Jurisdiction	*WSDOT*
Analysis Year	*Existing*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2425*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.917*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*1.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*3.2*	mph
FFS	*72.2*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*881*	pc/h/ln
S	*70.0*	mph
D = v_p / S	*12.6*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/24/2014*
Analysis Time Period	*Weekday AM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*SR 501 to La Center*
Jurisdiction	*WSDOT*
Analysis Year	*Existing*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2733*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*16*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.926*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*1.33*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*4.1*	mph
FFS	*71.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*984*	pc/h/ln
S	*70.0*	mph
D = v_p / S	*14.1*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/24/2014*
Analysis Time Period	*Weekday AM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 NB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	*Existing*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2285*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.917*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*830*	pc/h/ln
S	*75.0*	mph
D = v_p / S	*11.1*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/24/2014*
Analysis Time Period	*Weekday AM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	*Existing*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2362*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*16*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.926*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*850*	pc/h/ln
S	*75.0*	mph
D = v_p / S	*11.3*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

HCS 2010™ Version 6.50 Generated: 7/7/2014 11:49 AM

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/24/2014*
Analysis Time Period	*Weekday PM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 NB*
From/To	*SR 501 to La Center Rd*
Jurisdiction	*WSDOT*
Analysis Year	*Existing*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3074*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*11*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.948*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*1.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*3.2*	mph
FFS	*72.2*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1081*	pc/h/ln
S	*70.0*	mph
D = v_p / S	*15.4*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/24/2014*
Analysis Time Period	*Weekday PM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*SR 501 to La Center*
Jurisdiction	*WSDOT*
Analysis Year	*Existing*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2779*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.939*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*1.33*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*4.1*	mph
FFS	*71.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*987*	pc/h/ln
S	*70.0*	mph
D = v_p / S	*14.1*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/24/2014*
Analysis Time Period	*Weekday PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-5 NB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	*Existing*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2628*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*11*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.948*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*924*	pc/h/ln
S	*75.0*	mph
D = v_p / S	*12.3*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/24/2014*
Analysis Time Period	*Weekday PM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	*Existing*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2623*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.939*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*931*	pc/h/ln
S	*75.0*	mph
D = v_p / S	*12.4*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/24/2014*
Analysis Time Period	*Weekend Peak Period*

Site Information

Highway/Direction of Travel	*I-5 NB*
From/To	*SR 501 to La Center Rd*
Jurisdiction	*WSDOT*
Analysis Year	*Existing*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3710*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*1.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*3.2*	mph
FFS	*72.2*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1286*	pc/h/ln
S	*69.9*	mph
D = v_p / S	*18.4*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/24/2014*
Analysis Time Period	*Weekend Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*SR 501 to La Center*
Jurisdiction	*WSDOT*
Analysis Year	*Existing*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3212*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*11*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.948*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*1.33*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*4.1*	mph
FFS	*71.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1130*	pc/h/ln
S	*70.0*	mph
D = v_p / S	*16.1*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/24/2014*
Analysis Time Period	*Weekend Peak Hour*

Site Information

Highway/Direction of Travel	*I-5 NB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	*Existing*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3329*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1154*	pc/h/ln
S	*74.7*	mph
D = v_p / S	*15.4*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/24/2014*
Analysis Time Period	*Weekend Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	*Existing*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3074*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*11*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.948*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1081*	pc/h/ln
S	*74.9*	mph
D = v_p / S	*14.4*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

Appendix L Existing Conditions Worksheets – Merge/Diverge Locations

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	Existing

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 2500 ft	Acceleration Lane Length, L_A: 650	L_{down} = ft
V_u = 312 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2113	
	Ramp Volume, V_R: 172	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2113	1.00	Level	18	0	0.917	1.00	2303
Ramp	172	1.00	Level	18	0	0.917	1.00	187
UpStream	312	1.00	Level	7	0	0.966	1.00	323
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 249.66 (Equation 13-6 or 13-7)

P_{FM} = 0.596 using Equation (Exhibit 13-6)

V_{12} = 1372 pc/h

V_3 or V_{av34} 931 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1372 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2490	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1559	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 13.5 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.294 (Exibit 13-11)

S_R = 61.8 mph (Exhibit 13-11)

S_0 = 68.4 mph (Exhibit 13-11)

S = 64.1 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	Existing

Project Description 12393

Inputs

Upstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ Off; L_{up} = ft; V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	250
Freeway Volume, V_F	2425
Ramp Volume, V_R	312
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp: ☑ Yes ☑ On ☐ No ☐ Off; L_{down} = 2500 ft; V_D = 172 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2425	1.00	Level	18	0	0.917	1.00	2643
Ramp	312	1.00	Level	7	0	0.966	1.00	323
UpStream								
DownStream	172	1.00	Level	18	0	0.917	1.00	187

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R = mph (Exhibit 13-11)

S_0 = mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.679 using Equation (Exhibit 13-7)

V_{12} = 1898 pc/h

V_3 or V_{av34} 745 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2643	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2320	Exhibit 13-8	7200	No
V_R	323	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1898	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 18.3 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.457 (Exhibit 13-12)

S_R = 57.2 mph (Exhibit 13-12)

S_0 = 76.8 mph (Exhibit 13-12)

S = 61.6 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	Existing

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	550	☑ No	☐ Off
L_{up} =	2500 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	112 veh/h	Freeway Volume, V_F	2251	V_D =	veh/h
		Ramp Volume, V_R	482		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2251	1.00	Level	16	0	0.926	1.00	2431
Ramp	482	1.00	Level	4	0	0.980	1.00	492
UpStream	112	1.00	Level	14	0	0.935	1.00	120
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 297.92 (Equation 13-6 or 13-7)

P_{FM} = 0.593 using Equation (Exhibit 13-6)

V_{12} = 1441 pc/h

V_3 or V_{av34} 990 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1441 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2923	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1933	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 16.9 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.309 (Exibit 13-11)

S_R= 61.3 mph (Exhibit 13-11)

S_0= 68.2 mph (Exhibit 13-11)

S = 63.5 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	Existing

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 2500 ft
V_u = veh/h	Deceleration Lane Length L_D: 150	V_D = 482 veh/h
	Freeway Volume, V_F: 2363	
	Ramp Volume, V_R: 112	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2363	1.00	Level	16	0	0.926	1.00	2552
Ramp	112	1.00	Level	14	0	0.935	1.00	120
UpStream								
DownStream	482	1.00	Level	4	0	0.980	1.00	492

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.691 using Equation (Exhibit 13-7)

V_{12} = 1800 pc/h

V_3 or V_{av34} 752 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2552	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2432	Exhibit 13-8	7200	No
V_R	120	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1800	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 18.4 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.439 (Exhibit 13-12)

S_R= 57.7 mph (Exhibit 13-12)

S_0= 76.8 mph (Exhibit 13-12)

S = 62.3 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	Existing

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 2525 ft	Acceleration Lane Length, L_A: 400	L_{down} = ft
V_u = 98 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2425	
	Ramp Volume, V_R: 98	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2425	1.00	Level	18	0	0.917	1.00	2643
Ramp	98	1.00	Level	100	0	0.667	1.00	147
UpStream	98	1.00	Level	100	0	0.667	1.00	147
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 202.86 (Equation 13-6 or 13-7)

P_{FM} = 0.589 using Equation (Exhibit 13-6)

V_{12} = 1556 pc/h

V_3 or V_{av34} 1087 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1556 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2790	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1703	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 16.2 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.314 (Exibit 13-11)

S_R= 61.2 mph (Exhibit 13-11)

S_0= 67.9 mph (Exhibit 13-11)

S = 63.6 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	Existing

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☑ Yes	☑ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☐ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	975	L_{down} =	2525 ft
V_u =	veh/h	Freeway Volume, V_F	2425	V_D =	98 veh/h
		Ramp Volume, V_R	98		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2425	1.00	Level	18	0	0.917	1.00	2643
Ramp	98	1.00	Level	100	0	0.667	1.00	147
UpStream								
DownStream	98	1.00	Level	100	0	0.667	1.00	147

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.687 using Equation (Exhibit 13-7)

V_{12} = 1862 pc/h

V_3 or V_{av34} 781 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2643	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2496	Exhibit 13-8	7200	No
V_R	147	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1862	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 11.5 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.441 (Exhibit 13-12)

S_R= 57.6 mph (Exhibit 13-12)

S_0= 76.8 mph (Exhibit 13-12)

S = 62.2 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	Existing

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	650	☑ No	☐ Off
L_{up} =	2500 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	579 veh/h	Freeway Volume, V_F	2495	V_D =	veh/h
		Ramp Volume, V_R	133		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2495	1.00	Level	11	0	0.948	1.00	2632
Ramp	133	1.00	Level	8	0	0.962	1.00	138
UpStream	579	1.00	Level	4	0	0.980	1.00	591
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 309.58 (Equation 13-6 or 13-7)

P_{FM} = 0.596 using Equation (Exhibit 13-6)

V_{12} = 1568 pc/h

V_3 or V_{av34} 1064 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1568 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2770	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1706	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 14.6 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.297 (Exibit 13-11)

S_R= 61.7 mph (Exhibit 13-11)

S_0= 68.0 mph (Exhibit 13-11)

S = 64.0 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	Existing

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 2500 ft
V_u = veh/h	Deceleration Lane Length L_D: 250	V_D = 133 veh/h
	Freeway Volume, V_F: 3074	
	Ramp Volume, V_R: 579	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3074	1.00	Level	11	0	0.948	1.00	3243
Ramp	579	1.00	Level	4	0	0.980	1.00	591
UpStream								
DownStream	133	1.00	Level	8	0	0.962	1.00	138

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = 0.00 (Equation 13-12 or 13-13)

P_{FD} = 0.652 using Equation (Exhibit 13-7)

V_{12} = 2319 pc/h

V_3 or V_{av34} 924 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3243	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2652	Exhibit 13-8	7200	No
V_R	591	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2319	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 21.9 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.481 (Exhibit 13-12)

S_R= 56.5 mph (Exhibit 13-12)

S_0= 76.8 mph (Exhibit 13-12)

S = 61.1 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	Existing

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	550	☑ No	☐ Off
L_{up} =	2500 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	208 veh/h	Freeway Volume, V_F	2415	V_D =	veh/h
		Ramp Volume, V_R	364		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2415	1.00	Level	13	0	0.939	1.00	2572
Ramp	364	1.00	Level	5	0	0.976	1.00	373
UpStream	208	1.00	Level	8	0	0.962	1.00	216
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 302.63 (Equation 13-6 or 13-7)

P_{FM} = 0.593 using Equation (Exhibit 13-6)

V_{12} = 1525 pc/h

V_3 or V_{av34} 1047 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1525 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2945	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1898	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 16.7 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.309 (Exibit 13-11)

S_R= 61.4 mph (Exhibit 13-11)

S_0= 68.0 mph (Exhibit 13-11)

S = 63.6 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	Existing

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 2500 ft
V_u = veh/h	Deceleration Lane Length L_D: 150	V_D = 364 veh/h
	Freeway Volume, V_F: 2623	
	Ramp Volume, V_R: 208	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2623	1.00	Level	13	0	0.939	1.00	2793
Ramp	208	1.00	Level	8	0	0.962	1.00	216
UpStream								
DownStream	364	1.00	Level	5	0	0.976	1.00	373

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.680 using Equation (Exhibit 13-7)

V_{12} = 1969 pc/h

V_3 or V_{av34} 824 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2793	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2577	Exhibit 13-8	7200	No
V_R	216	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1969	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 19.8 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.447 (Exhibit 13-12)

S_R= 57.5 mph (Exhibit 13-12)

S_0= 76.8 mph (Exhibit 13-12)

S = 62.1 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	Existing

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	400	☑ No	☐ Off
L_{up} =	2525 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	87 veh/h	Freeway Volume, V_F	3074	V_D =	veh/h
		Ramp Volume, V_R	87		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3074	1.00	Level	11	0	0.948	1.00	3243
Ramp	87	1.00	Level	100	0	0.667	1.00	130
UpStream	87	1.00	Level	100	0	0.667	1.00	130
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 327.62 (Equation 13-6 or 13-7)

P_{FM} = 0.589 using Equation (Exhibit 13-6)

V_{12} = 1909 pc/h

V_3 or V_{av34} 1334 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1909 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3373	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2039	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 18.8 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.323 (Exibit 13-11)

S_R= 61.0 mph (Exhibit 13-11)

S_0= 67.0 mph (Exhibit 13-11)

S = 63.2 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	Existing

Project Description 12393

Inputs

Upstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ Off; L_{up} = ft; V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	975
Freeway Volume, V_F	3074
Ramp Volume, V_R	87
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp: ☑ Yes ☑ On ☐ No ☐ Off; L_{down} = 2525 ft; V_D = 87 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3074	1.00	Level	11	0	0.948	1.00	3243
Ramp	87	1.00	Level	100	0	0.667	1.00	130
UpStream								
DownStream	87	1.00	Level	100	0	0.667	1.00	130

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.673 using Equation (Exhibit 13-7)

V_{12} = 2225 pc/h

V_3 or V_{av34} 1018 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3243	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3113	Exhibit 13-8	7200	No
V_R	130	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2225	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 14.6 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.440 (Exhibit 13-12)

S_R= 57.7 mph (Exhibit 13-12)

S_0= 76.7 mph (Exhibit 13-12)

S = 62.6 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/25/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekend Peak Period	Analysis Year	Existing

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway/Ramp		Downstream Adj Ramp	
☑ Yes	☐ On	Freeway Number of Lanes, N	3	☐ Yes	☐ On
☐ No	☑ Off	Ramp Number of Lanes, N	1	☑ No	☐ Off
L_{up} =	2500 ft	Acceleration Lane Length, L_A	650	L_{down} =	ft
V_u =	518 veh/h	Deceleration Lane Length L_D		V_D =	veh/h
		Freeway Volume, V_F	3329		
		Ramp Volume, V_R	136		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	3329	1.00	Level	8	0	0.962	1.00	3462
Ramp	136	1.00	Level	9	0	0.957	1.00	142
UpStream	518	1.00	Level	3	0	0.985	1.00	526
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 488.06 (Equation 13-6 or 13-7)

P_{FM} = 0.596 using Equation (Exhibit 13-6)

V_{12} = 2062 pc/h

V_3 or V_{av34} 1400 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2062 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3604	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2204	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 18.5 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.311 (Exibit 13-11)

S_R = 61.3 mph (Exhibit 13-11)

S_0 = 66.8 mph (Exhibit 13-11)

S = 63.3 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/25/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekend Peak Period	Analysis Year	Existing

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☑ Yes	☑ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☐ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	250	L_{down} =	2500 ft
V_u =	veh/h	Freeway Volume, V_F	3711	V_D =	136 veh/h
		Ramp Volume, V_R	518		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3711	1.00	Level	8	0	0.962	1.00	3859
Ramp	518	1.00	Level	3	0	0.985	1.00	526
UpStream								
DownStream	136	1.00	Level	9	0	0.957	1.00	142

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.639 using Equation (Exhibit 13-7)

V_{12} = 2657 pc/h

V_3 or V_{av34} 1202 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3859	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3333	Exhibit 13-8	7200	No
V_R	526	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2657	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 24.9 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.475 (Exhibit 13-12)

S_R= 56.7 mph (Exhibit 13-12)

S_0= 76.0 mph (Exhibit 13-12)

S = 61.6 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/25/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekend Peak Period	Analysis Year	Existing

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 2500 ft	Acceleration Lane Length, L_A: 550	L_{down} = ft
V_u = 226 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2848	
	Ramp Volume, V_R: 364	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2848	1.00	Level	11	0	0.948	1.00	3005
Ramp	364	1.00	Level	3	0	0.985	1.00	369
UpStream	226	1.00	Level	7	0	0.966	1.00	234
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 394.44 (Equation 13-6 or 13-7)

P_{FM} = 0.593 using Equation (Exhibit 13-6)

V_{12} = 1782 pc/h

V_3 or V_{av34} 1223 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1782 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3374	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2151	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 18.6 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.316 (Exibit 13-11)

S_R= 61.2 mph (Exhibit 13-11)

S_0= 67.4 mph (Exhibit 13-11)

S = 63.3 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/25/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekend Peak Period	Analysis Year	Existing

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☑ Yes	☑ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☐ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	150	L_{down} =	2500 ft
V_u =	veh/h	Freeway Volume, V_F	3074	V_D =	364 veh/h
		Ramp Volume, V_R	226		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3074	1.00	Level	11	0	0.948	1.00	3243
Ramp	226	1.00	Level	7	0	0.966	1.00	234
UpStream								
DownStream	364	1.00	Level	3	0	0.985	1.00	369

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.668 using Equation (Exhibit 13-7)

V_{12} = 2244 pc/h

V_3 or V_{av34} 999 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3243	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3009	Exhibit 13-8	7200	No
V_R	234	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2244	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 22.2 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.449 (Exhibit 13-12)

S_R= 57.4 mph (Exhibit 13-12)

S_0= 76.8 mph (Exhibit 13-12)

S = 62.3 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Friday PM Peak Period	Analysis Year	Existing

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 2525 ft	Acceleration Lane Length, L_A: 400	L_{down} = ft
V_u = 69 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 3711	
	Ramp Volume, V_R: 69	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3711	1.00	Level	8	0	0.962	1.00	3859
Ramp	69	1.00	Level	100	0	0.667	1.00	103
UpStream	69	1.00	Level	100	0	0.667	1.00	103
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 453.67 (Equation 13-6 or 13-7)

P_{FM} = 0.589 using Equation (Exhibit 13-6)

V_{12} = 2272 pc/h

V_3 or V_{av34} 1587 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2272 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3962	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2375	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 21.4 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.335 (Exibit 13-11)

S_R= 60.6 mph (Exhibit 13-11)

S_0= 66.1 mph (Exhibit 13-11)

S = 62.7 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Friday PM Peak Period	Analysis Year	Existing

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☑ Yes	☑ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☐ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	975	L_{down} =	2525 ft
V_u =	veh/h	Freeway Volume, V_F	3711	V_D =	69 veh/h
		Ramp Volume, V_R	69		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3711	1.00	Level	8	0	0.962	1.00	3859
Ramp	69	1.00	Level	100	0	0.667	1.00	103
UpStream								
DownStream	69	1.00	Level	100	0	0.667	1.00	103

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.659 using Equation (Exhibit 13-7)

V_{12} = 2577 pc/h

V_3 or V_{av34} 1282 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3859	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3756	Exhibit 13-8	7200	No
V_R	103	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2577	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 17.6 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.437 (Exhibit 13-12)

S_R= 57.8 mph (Exhibit 13-12)

S_0= 75.7 mph (Exhibit 13-12)

S = 62.7 mph (Exhibit 13-13)

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Appendix M Existing Conditions Worksheets – Study Intersections

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		1	0
Taper Length (ft)			0		0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.964				0.872	
Flt Protected				0.973	0.997	
Satd. Flow (prot)	1730	0	0	1714	1357	0
Flt Permitted				0.973	0.997	
Satd. Flow (perm)	1730	0	0	1714	1357	0
Link Speed (mph)	40			40	40	
Link Distance (ft)	2274			144	957	
Travel Time (s)	38.8			2.5	16.3	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	4.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	44	16	40	32	4	68
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	8	0	11	4	0	23
Mvmt Flow	44	16	40	32	4	68

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	60	0	164	52
Stage 1	-	-	-	-	52	-
Stage 2	-	-	-	-	112	-
Critical Hdwy	-	-	4.21	-	6.4	6.43
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.299	-	3.5	3.507
Pot Cap-1 Maneuver	-	-	1488	-	831	959
Stage 1	-	-	-	-	976	-
Stage 2	-	-	-	-	918	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1488	-	809	959
Mov Cap-2 Maneuver	-	-	-	-	809	-
Stage 1	-	-	-	-	976	-
Stage 2	-	-	-	-	893	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.2	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	949	-	-	1488	-
HCM Lane V/C Ratio	0.076	-	-	0.027	-
HCM Control Delay (s)	9.1	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		25
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	0			0			0			0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.964										0.850
Flt Protected					0.958						0.954	
Satd. Flow (prot)	0	1567	0	0	1746	0	0	0	0	0	1584	1442
Flt Permitted					0.958						0.954	
Satd. Flow (perm)	0	1567	0	0	1746	0	0	0	0	0	1584	1442
Link Speed (mph)		40			40			50			50	
Link Distance (ft)		144			502			626			699	
Travel Time (s)		2.5			8.6			8.5			9.5	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	13.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	0	82	30	448	64	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	22	3	4	6	0	0	0	0
Mvmt Flow	0	82	30	448	64	0	0	0	0

Major/Minor	Major1			Major2		
Conflicting Flow All	64	0	0	112	0	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.1	-	-	4.14	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.236	-	-
Pot Cap-1 Maneuver	1551	-	-	1465	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-	-		-	-
Mov Cap-1 Maneuver	1551	-	-	1465	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB
HCM Control Delay, s	0	7.5
HCM LOS		

Minor Lane/Major Mvmt	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1551	-	-	1465	-	-	163	973
HCM Lane V/C Ratio	-	-	-	0.306	-	-	0.638	0.008
HCM Control Delay (s)	0	-	-	8.5	0	-	59.5	8.7
HCM Lane LOS	A	-	-	A	A	-	F	A
HCM 95th %tile Q(veh)	0	-	-	1.3	-	-	3.6	0

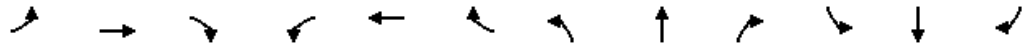
Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	100	4	8
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	25
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	13	50	12
Mvmt Flow	100	4	8

Major/Minor	Minor2		
Conflicting Flow All	1057	1072	64
Stage 1	960	960	-
Stage 2	97	112	-
Critical Hdwy	6.53	7	6.32
Critical Hdwy Stg 1	5.53	6	-
Critical Hdwy Stg 2	5.53	6	-
Follow-up Hdwy	3.617	4.45	3.408
Pot Cap-1 Maneuver	238	182	973
Stage 1	355	279	-
Stage 2	900	719	-
Platoon blocked, %			
Mov Cap-1 Maneuver	163	0	973
Mov Cap-2 Maneuver	163	0	-
Stage 1	242	0	-
Stage 2	900	0	-

Approach	SB
HCM Control Delay, s	55.9
HCM LOS	F

Minor Lane/Major Mvmt



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		50	0		0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (ft)	0			0			0			0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.976				0.850			
Flt Protected		0.984						0.959				
Satd. Flow (prot)	0	1598	0	0	1744	0	0	1692	1509	0	0	0
Flt Permitted		0.984						0.959				
Satd. Flow (perm)	0	1598	0	0	1744	0	0	1692	1509	0	0	0
Link Speed (mph)		40			40			50			50	
Link Distance (ft)		502			143			542			648	
Travel Time (s)		8.6			2.4			7.4			8.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	60	122	0	0	490	108	22	4	286
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	17	17	0	0	4	17	0	50	7
Mvmt Flow	60	122	0	0	490	108	22	4	286

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	598	0	0	122	0	0	786	840	122
Stage 1	-	-	-	-	-	-	242	242	-
Stage 2	-	-	-	-	-	-	544	598	-
Critical Hdwy	4.27	-	-	4.1	-	-	6.4	7	6.27
Critical Hdwy Stg 1	-	-	-	-	-	-	5.4	6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.4	6	-
Follow-up Hdwy	2.353	-	-	2.2	-	-	3.5	4.45	3.363
Pot Cap-1 Maneuver	909	-	-	1478	-	-	364	254	916
Stage 1	-	-	-	-	-	-	803	625	-
Stage 2	-	-	-	-	-	-	586	422	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	909	-	-	1478	-	-	338	0	916
Mov Cap-2 Maneuver	-	-	-	-	-	-	338	0	-
Stage 1	-	-	-	-	-	-	746	0	-
Stage 2	-	-	-	-	-	-	586	0	-

Approach	EB	WB	NB
HCM Control Delay, s	3	0	11.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	338	916	909	-	-	1478	-	-
HCM Lane V/C Ratio	0.077	0.312	0.066	-	-	-	-	-
HCM Control Delay (s)	16.5	10.7	9.2	0	-	0	-	-
HCM Lane LOS	C	B	A	A	-	A	-	-
HCM 95th %tile Q(veh)	0.2	1.3	0.2	-	-	0	-	-

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	0	0	0
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	0	0	0
Mvmt Flow	0	0	0

Major/Minor
Conflicting Flow All
Stage 1
Stage 2
Critical Hdwy
Critical Hdwy Stg 1
Critical Hdwy Stg 2
Follow-up Hdwy
Pot Cap-1 Maneuver
Stage 1
Stage 2
Platoon blocked, %
Mov Cap-1 Maneuver
Mov Cap-2 Maneuver
Stage 1
Stage 2

Approach
HCM Control Delay, s
HCM LOS

Minor Lane/Major Mvmt

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	0			0			0			0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.999			0.955			0.890	
Flt Protected	0.950				0.999			0.968			0.994	
Satd. Flow (prot)	1150	1725	0	0	1827	0	0	1493	0	0	1137	0
Flt Permitted	0.950				0.999			0.968			0.994	
Satd. Flow (perm)	1150	1725	0	0	1827	0	0	1493	0	0	1137	0
Link Speed (mph)		40			50			40			40	
Link Distance (ft)		143			173			583			174	
Travel Time (s)		2.4			2.4			9.9			3.0	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	12	392	4	8	538	4	8	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	57	10	0	25	3	67	14	0	25
Mvmt Flow	12	392	4	8	538	4	8	0	4

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	542	0	0	396	0	0	1002	976	394
Stage 1	-	-	-	-	-	-	418	418	-
Stage 2	-	-	-	-	-	-	584	558	-
Critical Hdwy	4.67	-	-	4.35	-	-	7.24	6.5	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.24	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.24	5.5	-
Follow-up Hdwy	2.713	-	-	2.425	-	-	3.626	4	3.525
Pot Cap-1 Maneuver	800	-	-	1048	-	-	210	253	608
Stage 1	-	-	-	-	-	-	589	594	-
Stage 2	-	-	-	-	-	-	477	515	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	800	-	-	1048	-	-	180	246	608
Mov Cap-2 Maneuver	-	-	-	-	-	-	180	246	-
Stage 1	-	-	-	-	-	-	580	585	-
Stage 2	-	-	-	-	-	-	416	509	-

Approach	EB	WB	NB
HCM Control Delay, s	0.3	0.1	21.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	235	800	-	-	1048	-	-	351
HCM Lane V/C Ratio	0.051	0.015	-	-	0.008	-	-	0.182
HCM Control Delay (s)	21.1	9.6	-	-	8.5	0	-	17.5
HCM Lane LOS	C	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.7

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	8	4	52
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	86	100	38
Mvmt Flow	8	4	52

Major/Minor	Minor2		
Conflicting Flow All	976	976	540
Stage 1	556	556	-
Stage 2	420	420	-
Critical Hdwy	7.96	7.5	6.58
Critical Hdwy Stg 1	6.96	6.5	-
Critical Hdwy Stg 2	6.96	6.5	-
Follow-up Hdwy	4.274	4.9	3.642
Pot Cap-1 Maneuver	164	174	478
Stage 1	393	384	-
Stage 2	475	452	-
Platoon blocked, %			
Mov Cap-1 Maneuver	160	170	478
Mov Cap-2 Maneuver	160	170	-
Stage 1	387	380	-
Stage 2	465	445	-

Approach	SB
HCM Control Delay, s	17.5
HCM LOS	C

Minor Lane/Major Mvmt

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		1	0
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.991				0.885	
Flt Protected				0.974	0.993	
Satd. Flow (prot)	1752	0	0	1757	1576	0
Flt Permitted				0.974	0.993	
Satd. Flow (perm)	1752	0	0	1757	1576	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	2274			144	957	
Travel Time (s)	51.7			3.3	21.8	

Intersection Summary	
Area Type:	Other

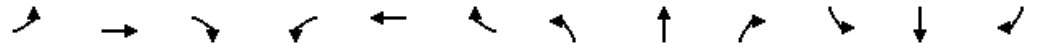
Intersection	
Int Delay, s/veh	4.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	73	5	97	87	17	96
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	8	0	2	9	0	7
Mvmt Flow	73	5	97	87	17	96

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	78	0	357	76
Stage 1	-	-	-	-	76	-
Stage 2	-	-	-	-	281	-
Critical Hdwy	-	-	4.12	-	6.4	6.27
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.218	-	3.5	3.363
Pot Cap-1 Maneuver	-	-	1520	-	645	971
Stage 1	-	-	-	-	952	-
Stage 2	-	-	-	-	771	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1520	-	602	971
Mov Cap-2 Maneuver	-	-	-	-	602	-
Stage 1	-	-	-	-	952	-
Stage 2	-	-	-	-	719	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	889	-	-	1520	-
HCM Lane V/C Ratio	0.127	-	-	0.064	-
HCM Control Delay (s)	9.6	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.2	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		25
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.973										0.850
Flt Protected					0.963						0.953	
Satd. Flow (prot)	0	1725	0	0	1735	0	0	0	0	0	1632	1583
Flt Permitted					0.963						0.953	
Satd. Flow (perm)	0	1725	0	0	1735	0	0	0	0	0	1632	1583
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		144			502			626			699	
Travel Time (s)		3.3			11.4			14.2			15.9	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	23.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	0	135	34	374	116	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	9	0	5	7	0	0	0	0
Mvmt Flow	0	135	34	374	116	0	0	0	0

Major/Minor	Major1			Major2		
Conflicting Flow All	116	0	0	169	0	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.1	-	-	4.15	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.245	-	-
Pot Cap-1 Maneuver	1485	-	-	1390	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-	-		-	-
Mov Cap-1 Maneuver	1485	-	-	1390	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB
HCM Control Delay, s	0	6.5
HCM LOS		

Minor Lane/Major Mvmt	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1485	-	-	1390	-	-	182	936
HCM Lane V/C Ratio	-	-	-	0.269	-	-	0.929	0.073
HCM Control Delay (s)	0	-	-	8.5	0	-	101	9.1
HCM Lane LOS	A	-	-	A	A	-	F	A
HCM 95th %tile Q(veh)	0	-	-	1.1	-	-	7.2	0.2

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	165	4	68
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	25
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	10	50	2
Mvmt Flow	165	4	68

Major/Minor	Minor2		
Conflicting Flow All	1016	1033	116
Stage 1	864	864	-
Stage 2	152	169	-
Critical Hdwy	6.5	7	6.22
Critical Hdwy Stg 1	5.5	6	-
Critical Hdwy Stg 2	5.5	6	-
Follow-up Hdwy	3.59	4.45	3.318
Pot Cap-1 Maneuver	255	192	936
Stage 1	400	312	-
Stage 2	857	676	-
Platoon blocked, %			
Mov Cap-1 Maneuver	182	0	936
Mov Cap-2 Maneuver	182	0	-
Stage 1	285	0	-
Stage 2	857	0	-

Approach	SB
HCM Control Delay, s	74.6
HCM LOS	F

Minor Lane/Major Mvmt

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		50	0		0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.971				0.850			
Flt Protected		0.995						0.958				
Satd. Flow (prot)	0	1741	0	0	1770	0	0	1630	1568	0	0	0
Flt Permitted		0.995						0.958				
Satd. Flow (perm)	0	1741	0	0	1770	0	0	1630	1568	0	0	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		502			143			542			648	
Travel Time (s)		11.4			3.3			12.3			14.7	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	10.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	32	268	0	0	436	119	54	8	591
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	9	0	0	4	5	6	50	3
Mvmt Flow	32	268	0	0	436	119	54	8	591

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	555	0	0	268	0	0	828	887	268
Stage 1	-	-	-	-	-	-	332	332	-
Stage 2	-	-	-	-	-	-	496	555	-
Critical Hdwy	4.15	-	-	4.1	-	-	6.46	7	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	5.46	6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.46	6	-
Follow-up Hdwy	2.245	-	-	2.2	-	-	3.554	4.45	3.327
Pot Cap-1 Maneuver	1001	-	-	1307	-	-	336	237	768
Stage 1	-	-	-	-	-	-	718	567	-
Stage 2	-	-	-	-	-	-	604	443	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1001	-	-	1307	-	-	323	0	768
Mov Cap-2 Maneuver	-	-	-	-	-	-	323	0	-
Stage 1	-	-	-	-	-	-	691	0	-
Stage 2	-	-	-	-	-	-	604	0	-

Approach	EB	WB	NB
HCM Control Delay, s	0.9	0	23.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	323	768	1001	-	-	1307	-	-
HCM Lane V/C Ratio	0.192	0.77	0.032	-	-	-	-	-
HCM Control Delay (s)	18.8	23.5	8.7	0	-	0	-	-
HCM Lane LOS	C	C	A	A	-	A	-	-
HCM 95th %tile Q(veh)	0.7	7.5	0.1	-	-	0	-	-

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	0	0	0
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	0	0	0
Mvmt Flow	0	0	0

Major/Minor
Conflicting Flow All
Stage 1
Stage 2
Critical Hdwy
Critical Hdwy Stg 1
Critical Hdwy Stg 2
Follow-up Hdwy
Pot Cap-1 Maneuver
Stage 1
Stage 2
Platoon blocked, %
Mov Cap-1 Maneuver
Mov Cap-2 Maneuver
Stage 1
Stage 2

Approach
HCM Control Delay, s
HCM LOS

Minor Lane/Major Mvmt

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.998			0.932			0.879	
Flt Protected	0.950				0.999			0.976			0.997	
Satd. Flow (prot)	1308	1818	0	0	1829	0	0	1728	0	0	1381	0
Flt Permitted	0.950				0.999			0.976			0.997	
Satd. Flow (perm)	1308	1818	0	0	1829	0	0	1728	0	0	1381	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		143			173			583			174	
Travel Time (s)		3.3			3.9			13.3			4.0	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	32	815	12	5	448	8	5	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	38	4	25	25	2	77	0	0	0
Mvmt Flow	32	815	12	5	448	8	5	0	5

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	456	0	0	827	0	0	1401	1351	821
Stage 1	-	-	-	-	-	-	885	885	-
Stage 2	-	-	-	-	-	-	516	466	-
Critical Hdwy	4.48	-	-	4.35	-	-	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.542	-	-	2.425	-	-	3.5	4	3.3
Pot Cap-1 Maneuver	939	-	-	713	-	-	119	152	378
Stage 1	-	-	-	-	-	-	342	366	-
Stage 2	-	-	-	-	-	-	546	566	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	939	-	-	713	-	-	92	145	378
Mov Cap-2 Maneuver	-	-	-	-	-	-	92	145	-
Stage 1	-	-	-	-	-	-	330	354	-
Stage 2	-	-	-	-	-	-	439	561	-

Approach	EB	WB	NB
HCM Control Delay, s	0.3	0.1	31.1
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	148	939	-	-	713	-	-	419
HCM Lane V/C Ratio	0.068	0.034	-	-	0.007	-	-	0.274
HCM Control Delay (s)	31.1	9	-	-	10.1	0	-	16.8
HCM Lane LOS	D	A	-	-	B	A	-	C
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	1.1

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	8	4	103
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	0	0	23
Mvmt Flow	8	4	103

Major/Minor	Minor2		
Conflicting Flow All	1350	1353	452
Stage 1	462	462	-
Stage 2	888	891	-
Critical Hdwy	7.1	6.5	6.43
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.507
Pot Cap-1 Maneuver	129	151	566
Stage 1	584	568	-
Stage 2	341	363	-
Platoon blocked, %			
Mov Cap-1 Maneuver	123	145	566
Mov Cap-2 Maneuver	123	145	-
Stage 1	564	563	-
Stage 2	325	351	-

Approach	SB
HCM Control Delay, s	16.8
HCM LOS	C

Minor Lane/Major Mvmt

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		1	0
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.975				0.875	
Flt Protected				0.973	0.996	
Satd. Flow (prot)	1651	0	0	1715	1570	0
Flt Permitted				0.973	0.996	
Satd. Flow (perm)	1651	0	0	1715	1570	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	2274			144	957	
Travel Time (s)	51.7			3.3	21.8	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	4.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	52	12	66	54	4	52
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	15	0	6	10	25	4
Mvmt Flow	52	12	66	54	4	52

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	64	0	244	58
Stage 1	-	-	-	-	58	-
Stage 2	-	-	-	-	186	-
Critical Hdwy	-	-	4.16	-	6.65	6.24
Critical Hdwy Stg 1	-	-	-	-	5.65	-
Critical Hdwy Stg 2	-	-	-	-	5.65	-
Follow-up Hdwy	-	-	2.254	-	3.725	3.336
Pot Cap-1 Maneuver	-	-	1513	-	697	1002
Stage 1	-	-	-	-	909	-
Stage 2	-	-	-	-	793	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1513	-	666	1002
Mov Cap-2 Maneuver	-	-	-	-	666	-
Stage 1	-	-	-	-	909	-
Stage 2	-	-	-	-	757	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.1	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	967	-	-	1513	-
HCM Lane V/C Ratio	0.058	-	-	0.044	-
HCM Control Delay (s)	9	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		25
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.948										0.850
Flt Protected					0.958						0.954	
Satd. Flow (prot)	0	1673	0	0	1774	0	0	0	0	0	1745	1429
Flt Permitted					0.958						0.954	
Satd. Flow (perm)	0	1673	0	0	1774	0	0	0	0	0	1745	1429
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		144			502			626			699	
Travel Time (s)		3.3			11.4			14.2			15.9	

Intersection Summary

Area Type: Other

Intersection	
Int Delay, s/veh	11.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	0	64	40	320	44	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	5	12	2	7	0	0	0	0
Mvmt Flow	0	64	40	320	44	0	0	0	0

Major/Minor	Major1			Major2		
Conflicting Flow All	44	0	0	104	0	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	1577	-	-	1488	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-	-		-	-
Mov Cap-1 Maneuver	1577	-	-	1488	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB
HCM Control Delay, s	0	7.1
HCM LOS		

Minor Lane/Major Mvmt	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1577	-	-	1488	-	-	286	996
HCM Lane V/C Ratio	-	-	-	0.215	-	-	0.524	0.076
HCM Control Delay (s)	0	-	-	8.1	0	-	30.7	8.9
HCM Lane LOS	A	-	-	A	A	-	D	A
HCM 95th %tile Q(veh)	0	-	-	0.8	-	-	2.8	0.2

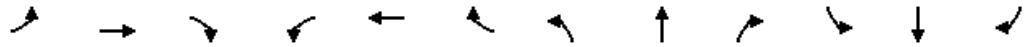
Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	146	4	76
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	25
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	4	0	13
Mvmt Flow	146	4	76

Major/Minor	Minor2		
Conflicting Flow All	768	788	44
Stage 1	684	684	-
Stage 2	84	104	-
Critical Hdwy	6.44	6.5	6.33
Critical Hdwy Stg 1	5.44	5.5	-
Critical Hdwy Stg 2	5.44	5.5	-
Follow-up Hdwy	3.536	4	3.417
Pot Cap-1 Maneuver	367	326	996
Stage 1	497	452	-
Stage 2	934	813	-
Platoon blocked, %			
Mov Cap-1 Maneuver	286	0	996
Mov Cap-2 Maneuver	286	0	-
Stage 1	388	0	-
Stage 2	934	0	-

Approach	SB
HCM Control Delay, s	23.4
HCM LOS	C

Minor Lane/Major Mvmt



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		50	0		0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.970				0.850			
Flt Protected		0.992						0.960				
Satd. Flow (prot)	0	1808	0	0	1755	0	0	1765	1568	0	0	0
Flt Permitted		0.992						0.960				
Satd. Flow (perm)	0	1808	0	0	1755	0	0	1765	1568	0	0	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		502			143			542			648	
Travel Time (s)		11.4			3.3			12.3			14.7	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	6.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	32	178	0	0	344	100	20	4	494
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	5	0	0	3	12	4	0	3
Mvmt Flow	32	178	0	0	344	100	20	4	494

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	444	0	0	178	0	0	636	686	178
Stage 1	-	-	-	-	-	-	242	242	-
Stage 2	-	-	-	-	-	-	394	444	-
Critical Hdwy	4.1	-	-	4.1	-	-	6.44	6.5	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	5.44	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.44	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.536	4	3.327
Pot Cap-1 Maneuver	1127	-	-	1410	-	-	439	373	862
Stage 1	-	-	-	-	-	-	794	709	-
Stage 2	-	-	-	-	-	-	677	579	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1127	-	-	1410	-	-	425	0	862
Mov Cap-2 Maneuver	-	-	-	-	-	-	425	0	-
Stage 1	-	-	-	-	-	-	769	0	-
Stage 2	-	-	-	-	-	-	677	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.3	0	14.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	425	862	1127	-	-	1410	-	-
HCM Lane V/C Ratio	0.056	0.573	0.028	-	-	-	-	-
HCM Control Delay (s)	14	14.6	8.3	0	-	0	-	-
HCM Lane LOS	B	B	A	A	-	A	-	-
HCM 95th %tile Q(veh)	0.2	3.7	0.1	-	-	0	-	-

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	0	0	0
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	0	0	0
Mvmt Flow	0	0	0

Major/Minor
Conflicting Flow All
Stage 1
Stage 2
Critical Hdwy
Critical Hdwy Stg 1
Critical Hdwy Stg 2
Follow-up Hdwy
Pot Cap-1 Maneuver
Stage 1
Stage 2
Platoon blocked, %
Mov Cap-1 Maneuver
Mov Cap-2 Maneuver
Stage 1
Stage 2

Approach
HCM Control Delay, s
HCM LOS

Minor Lane/Major Mvmt

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.999			0.966			0.883	
Flt Protected	0.950				0.999			0.976			0.995	
Satd. Flow (prot)	1570	1824	0	0	1829	0	0	1518	0	0	1456	0
Flt Permitted	0.950				0.999			0.976			0.995	
Satd. Flow (perm)	1570	1824	0	0	1829	0	0	1518	0	0	1456	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		143			173			583			174	
Travel Time (s)		3.3			3.9			13.3			4.0	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	4	664	4	4	360	4	8	4	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	15	4	17	0	3	67	11	0	50
Mvmt Flow	4	664	4	4	360	4	8	4	4

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	364	0	0	668	0	0	1084	1046	666
Stage 1	-	-	-	-	-	-	674	674	-
Stage 2	-	-	-	-	-	-	410	372	-
Critical Hdwy	4.25	-	-	4.1	-	-	7.21	6.5	6.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.21	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.21	5.5	-
Follow-up Hdwy	2.335	-	-	2.2	-	-	3.599	4	3.75
Pot Cap-1 Maneuver	1126	-	-	931	-	-	187	230	385
Stage 1	-	-	-	-	-	-	430	457	-
Stage 2	-	-	-	-	-	-	601	622	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1126	-	-	931	-	-	162	228	385
Mov Cap-2 Maneuver	-	-	-	-	-	-	162	228	-
Stage 1	-	-	-	-	-	-	428	455	-
Stage 2	-	-	-	-	-	-	525	619	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	23.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	207	1126	-	-	931	-	-	506
HCM Lane V/C Ratio	0.077	0.004	-	-	0.004	-	-	0.174
HCM Control Delay (s)	23.8	8.2	-	-	8.9	0	-	13.6
HCM Lane LOS	C	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.6

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	8	4	76
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	0	0	17
Mvmt Flow	8	4	76

Major/Minor	Minor2		
Conflicting Flow All	1048	1046	362
Stage 1	370	370	-
Stage 2	678	676	-
Critical Hdwy	7.1	6.5	6.37
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.453
Pot Cap-1 Maneuver	208	230	650
Stage 1	654	624	-
Stage 2	445	456	-
Platoon blocked, %			
Mov Cap-1 Maneuver	202	228	650
Mov Cap-2 Maneuver	202	228	-
Stage 1	652	621	-
Stage 2	435	454	-

Approach	SB
HCM Control Delay, s	13.6
HCM LOS	B

Minor Lane/Major Mvmt

Appendix N Signal Warrant Analysis Worksheets for Existing Conditions

KITTELSON & ASSOCIATES, INC.
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Fax: (503) 273-8169

Project #: 12393
Project Name: Cowlitz Reservation Development
Analyst: JJW
Date: 8/27/2014
File: H:\projfile\12393 - Cowlitz Reservation Development\excel\2014 Data\signal warrants\[103 2014 Existing AM Sig Warrant.xls]Data
Intersection: NW La Center Road and SB Ramp
Scenario: 2014 Existing

Warrant Summary

Warrant	Name	Analyzed?	Met?
#1	Eight-Hour Vehicular Volume	Yes	No
#2	Four-Hour Vehicular volume	Yes	No
#3	Peak Hour	Yes	No
#4	Pedestrian Volume	No	-
#5	School Crossing	No	-
#6	Coordinated Signal System	No	-
#7	Crash Experience	No	-
#8	Roadway Network	No	-

Raw Traffic Volumes

Hour		Major Street		Minor Street	
Begin	End	EB	WB	NB	SB
7:00 AM	8:00 AM	112	512	0	112
2nd	Highest Hour	108	492	0	108
3rd	Highest Hour	105	481	0	105
4th	Highest Hour	90	410	0	90
5th	Highest Hour	85	389	0	85
6th	Highest Hour	76	348	0	76
7th	Highest Hour	71	323	0	71
8th	Highest Hour	67	307	0	67
9th	Highest Hour	54	246	0	54
10th	Highest Hour	50	230	0	50
11th	Highest Hour	50	230	0	50
12th	Highest Hour	48	220	0	48
13th	Highest Hour	44	200	0	44
14th	Highest Hour	40	184	0	40
15th	Highest Hour	40	184	0	40
16th	Highest Hour	39	179	0	39
17th	Highest Hour	22	102	0	22
18th	Highest Hour	12	56	0	12
19th	Highest Hour	11	51	0	11
20th	Highest Hour	4	20	0	4
21st	Highest Hour	3	15	0	3
22nd	Highest Hour	3	15	0	3
23rd	Highest Hour	2	10	0	2
24th	Highest Hour	2	10	0	2

Input Parameters

Volume Adjustment Factor =	1.0
North-South Approach =	Minor
East-West Approach =	Major
Major Street Thru Lanes =	1
Minor Street Thru Lanes =	1
Speed > 40 mph?	yes
Population < 10,000?	yes
Warrant Factor	70%
Peak Hour or Daily Count?	Peak Hour
Major Street: 4th-Highest Hour / Peak Hour	80%
Major Street: 8th-Highest Hour / Peak Hour	60%
Minor Street: 4th-Highest Hour / Peak Hour	80%
Minor Street: 8th-Highest Hour / Peak Hour	60%

Analysis Traffic Volumes

Hour		Major Street		Minor Street	
Begin	End	EB	WB	NB	SB
7:00 AM	8:00 AM	112	512	0	112
2nd	Highest Hour	108	492	0	108
3rd	Highest Hour	105	481	0	105
4th	Highest Hour	90	410	0	90
5th	Highest Hour	85	389	0	85
6th	Highest Hour	76	348	0	76
7th	Highest Hour	71	323	0	71
8th	Highest Hour	67	307	0	67
9th	Highest Hour	54	246	0	54
10th	Highest Hour	50	230	0	50
11th	Highest Hour	50	230	0	50
12th	Highest Hour	48	220	0	48
13th	Highest Hour	44	200	0	44
14th	Highest Hour	40	184	0	40
15th	Highest Hour	40	184	0	40
16th	Highest Hour	39	179	0	39
17th	Highest Hour	22	102	0	22
18th	Highest Hour	12	56	0	12
19th	Highest Hour	11	51	0	11
20th	Highest Hour	4	20	0	4
21st	Highest Hour	3	15	0	3
22nd	Highest Hour	3	15	0	3
23rd	Highest Hour	2	10	0	2
24th	Highest Hour	2	10	0	2

Appendix O 2017 Background Conditions Worksheets – Freeway Mainline

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/25/2014*
Analysis Time Period	*Weekday AM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 NB*
From/To	*SR 501 to La Center Rd*
Jurisdiction	*WSDOT*
Analysis Year	*2017 BC*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2559*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.917*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*1.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*3.2*	mph
FFS	*72.2*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*930*	pc/h/ln
S	*70.0*	mph
D = v_p / S	*13.3*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/25/2014*
Analysis Time Period	*Weekday AM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*SR 501 to La Center*
Jurisdiction	*WSDOT*
Analysis Year	*2017_BC*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2919*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*16*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.926*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*1.33*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*4.1*	mph
FFS	*71.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1051*	pc/h/ln
S	*70.0*	mph
D = v_p / S	*15.0*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/25/2014*
Analysis Time Period	*Weekday AM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 NB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	*2017_BC*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2434*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.917*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*884*	pc/h/ln
S	*75.0*	mph
D = v_p / S	*11.8*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/25/2014*
Analysis Time Period	*Weekday AM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	*2017_BC*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2484*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*16*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.926*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*894*	pc/h/ln
S	*75.0*	mph
D = v_p / S	*11.9*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/24/2014*
Analysis Time Period	*Weekday PM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 NB_BC*
From/To	*SR 501 to La Center Rd*
Jurisdiction	*WSDOT*
Analysis Year	*2017_BC*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3270*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*11*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.948*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*1.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*3.2*	mph
FFS	*72.2*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1150*	pc/h/ln
S	*70.0*	mph
D = v_p / S	*16.4*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/25/2014*
Analysis Time Period	*Weekday PM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*SR 501 to La Center*
Jurisdiction	*WSDOT*
Analysis Year	*2017_BC*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2950*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.939*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*1.33*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*4.1*	mph
FFS	*71.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1047*	pc/h/ln
S	*70.0*	mph
D = v_p / S	*15.0*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/25/2014*
Analysis Time Period	*Weekday PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-5 NB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	*2017_BC*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2775*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*11*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.948*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*976*	pc/h/ln
S	*75.0*	mph
D = v_p / S	*13.0*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/25/2014*
Analysis Time Period	*Weekday PM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2775*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.939*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*985*	pc/h/ln
S	*75.0*	mph
D = v_p / S	*13.1*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/25/2014*
Analysis Time Period	*Weekend Peak Period*

Site Information

Highway/Direction of Travel	*I-5 NB*
From/To	*SR 501 to La Center Rd*
Jurisdiction	*WSDOT*
Analysis Year	*2017_BC*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3944*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*1.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*3.2*	mph
FFS	*72.2*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1367*	pc/h/ln
S	*69.7*	mph
D = v_p / S	*19.6*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/25/2014*
Analysis Time Period	*Weekend Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*SR 501 to La Center*
Jurisdiction	*WSDOT*
Analysis Year	*2017_BC*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3409*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*11*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.948*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*1.33*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*4.1*	mph
FFS	*71.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1199*	pc/h/ln
S	*70.0*	mph
D = v_p / S	*17.1*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/25/2014*
Analysis Time Period	*Weekend Peak Hour*

Site Information

Highway/Direction of Travel	*I-5 NB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	*2017_BC*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3517*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1219*	pc/h/ln
S	*74.5*	mph
D = v_p / S	*16.4*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/25/2014*
Analysis Time Period	*Weekend Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	*2017_BC*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3254*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*11*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.948*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1144*	pc/h/ln
S	*74.8*	mph
D = v_p / S	*15.3*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

Appendix P 2017 Background Conditions Worksheets – Merge/Diverge Locations

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	2017 BC

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 2500 ft	Acceleration Lane Length, L_A: 650	L_{down} = ft
V_u = 349 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2210	
	Ramp Volume, V_R: 224	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2210	1.00	Level	18	0	0.917	1.00	2409
Ramp	224	1.00	Level	18	0	0.917	1.00	244
UpStream	349	1.00	Level	7	0	0.966	1.00	361
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 284.54 (Equation 13-6 or 13-7)

P_{FM} = 0.596 using Equation (Exhibit 13-6)

V_{12} = 1435 pc/h

V_3 or V_{av34} 974 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1435 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2653	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1679	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 14.4 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.296 (Exibit 13-11)

S_R = 61.7 mph (Exhibit 13-11)

S_0 = 68.3 mph (Exhibit 13-11)

S = 64.0 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	2017 BC

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 2500 ft
V_u = veh/h	Deceleration Lane Length L_D: 224	V_D = 229 veh/h
	Freeway Volume, V_F: 2571	
	Ramp Volume, V_R: 349	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2571	1.00	Level	18	0	0.917	1.00	2802
Ramp	349	1.00	Level	7	0	0.966	1.00	361
UpStream								
DownStream	229	1.00	Level	18	0	0.917	1.00	250

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.673 using Equation (Exhibit 13-7)

V_{12} = 2005 pc/h

V_3 or V_{av34} 797 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2802	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2441	Exhibit 13-8	7200	No
V_R	361	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2005	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 19.5 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.460 (Exhibit 13-12)

S_R= 57.1 mph (Exhibit 13-12)

S_0= 76.8 mph (Exhibit 13-12)

S = 61.6 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	2017 BC

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	550	☑ No	☐ Off
L_{up} =	2500 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	131 veh/h	Freeway Volume, V_F	2353	V_D =	veh/h
		Ramp Volume, V_R	566		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2353	1.00	Level	16	0	0.926	1.00	2541
Ramp	566	1.00	Level	4	0	0.980	1.00	577
UpStream	131	1.00	Level	14	0	0.935	1.00	140
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 339.65 (Equation 13-6 or 13-7)

P_{FM} = 0.593 using Equation (Exhibit 13-6)

V_{12} = 1507 pc/h

V_3 or V_{av34} 1034 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1507 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3118	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2084	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 18.0 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.314 (Exibit 13-11)

S_R= 61.2 mph (Exhibit 13-11)

S_0= 68.1 mph (Exhibit 13-11)

S = 63.3 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	2017 BC

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 2500 ft
V_u = veh/h	Deceleration Lane Length L_D: 150	V_D = 566 veh/h
	Freeway Volume, V_F: 2484	
	Ramp Volume, V_R: 131	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2484	1.00	Level	16	0	0.926	1.00	2683
Ramp	131	1.00	Level	14	0	0.935	1.00	140
UpStream								
DownStream	566	1.00	Level	4	0	0.980	1.00	577

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.686 using Equation (Exhibit 13-7)

V_{12} = 1886 pc/h

V_3 or V_{av34} 797 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2683	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2543	Exhibit 13-8	7200	No
V_R	140	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1886	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 19.1 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.441 (Exhibit 13-12)

S_R= 57.7 mph (Exhibit 13-12)

S_0= 76.8 mph (Exhibit 13-12)

S = 62.3 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	2017_BC

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	400	☑ No	☐ Off
L_{up} =	2525 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	104 veh/h	Freeway Volume, V_F	2571	V_D =	veh/h
		Ramp Volume, V_R	104		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2571	1.00	Level	18	0	0.917	1.00	2802
Ramp	104	1.00	Level	100	0	0.667	1.00	156
UpStream	104	1.00	Level	100	0	0.667	1.00	156
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 238.81 (Equation 13-6 or 13-7)

P_{FM} = 0.589 using Equation (Exhibit 13-6)

V_{12} = 1650 pc/h

V_3 or V_{av34} 1152 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1650 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2958	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1806	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 17.0 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.317 (Exibit 13-11)

S_R= 61.1 mph (Exhibit 13-11)

S_0= 67.7 mph (Exhibit 13-11)

S = 63.5 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	2017_BC

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 2525 ft
V_u = veh/h	Deceleration Lane Length L_D: 975	V_D = 104 veh/h
	Freeway Volume, V_F: 2571	
	Ramp Volume, V_R: 104	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2571	1.00	Level	18	0	0.917	1.00	2802
Ramp	104	1.00	Level	100	0	0.667	1.00	156
UpStream								
DownStream	104	1.00	Level	100	0	0.667	1.00	156

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.683 using Equation (Exhibit 13-7)

V_{12} = 1963 pc/h

V_3 or V_{av34} 839 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2802	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2646	Exhibit 13-8	7200	No
V_R	156	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1963	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 12.4 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.442 (Exhibit 13-12)

S_R= 57.6 mph (Exhibit 13-12)

S_0= 76.8 mph (Exhibit 13-12)

S = 62.3 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	2017 BC

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 2500 ft	Acceleration Lane Length, L_A: 650	L_{down} = ft
V_u = 654 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2616	
	Ramp Volume, V_R: 159	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2616	1.00	Level	11	0	0.948	1.00	2760
Ramp	159	1.00	Level	8	0	0.962	1.00	165
UpStream	654	1.00	Level	4	0	0.980	1.00	667
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 342.75 (Equation 13-6 or 13-7)

P_{FM} = 0.596 using Equation (Exhibit 13-6)

V_{12} = 1644 pc/h

V_3 or V_{av34} 1116 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1644 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2925	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1809	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 15.4 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.299 (Exibit 13-11)

S_R= 61.6 mph (Exhibit 13-11)

S_0= 67.8 mph (Exhibit 13-11)

S = 63.8 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	2017 BC

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A	L_{down} = 2500 ft
V_u = veh/h	Deceleration Lane Length L_D: 250	V_D = 159 veh/h
	Freeway Volume, V_F: 3270	
	Ramp Volume, V_R: 654	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3270	1.00	Level	11	0	0.948	1.00	3450
Ramp	654	1.00	Level	4	0	0.980	1.00	667
UpStream								
DownStream	159	1.00	Level	8	0	0.962	1.00	165

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.643 using Equation (Exhibit 13-7)

V_{12} = 2457 pc/h

V_3 or V_{av34} 993 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3450	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2783	Exhibit 13-8	7200	No
V_R	667	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2457	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 23.1 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.488 (Exhibit 13-12)

S_R= 56.3 mph (Exhibit 13-12)

S_0= 76.8 mph (Exhibit 13-12)

S = 61.0 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	2017 BC

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 2500 ft	Acceleration Lane Length, L_A: 550	L_{down} = ft
V_u = 237 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2538	
	Ramp Volume, V_R: 412	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2538	1.00	Level	13	0	0.939	1.00	2703
Ramp	412	1.00	Level	5	0	0.976	1.00	422
UpStream	237	1.00	Level	8	0	0.962	1.00	246
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 341.15 (Equation 13-6 or 13-7)

P_{FM} = 0.593 using Equation (Exhibit 13-6)

V_{12} = 1603 pc/h

V_3 or V_{av34} 1100 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1603 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3125	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2025	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 17.6 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.312 (Exibit 13-11)

S_R= 61.3 mph (Exhibit 13-11)

S_0= 67.8 mph (Exhibit 13-11)

S = 63.4 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	2017 BC

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 2500 ft
V_u = veh/h	Deceleration Lane Length L_D: 150	V_D = 412 veh/h
	Freeway Volume, V_F: 2775	
	Ramp Volume, V_R: 237	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2775	1.00	Level	13	0	0.939	1.00	2955
Ramp	237	1.00	Level	8	0	0.962	1.00	246
UpStream								
DownStream	412	1.00	Level	5	0	0.976	1.00	422

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = 0.00 (Equation 13-12 or 13-13)

P_{FD} = 0.675 using Equation (Exhibit 13-7)

V_{12} = 2074 pc/h

V_3 or V_{av34} 881 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2955	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2709	Exhibit 13-8	7200	No
V_R	246	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2074	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 20.7 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.450 (Exhibit 13-12)

S_R= 57.4 mph (Exhibit 13-12)

S_0= 76.8 mph (Exhibit 13-12)

S = 62.1 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	2017_BC

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	400	☑ No	☐ Off
L_{up} =	2525 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	92 veh/h	Freeway Volume, V_F	3270	V_D =	veh/h
		Ramp Volume, V_R	92		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3270	1.00	Level	11	0	0.948	1.00	3450
Ramp	92	1.00	Level	100	0	0.667	1.00	138
UpStream	92	1.00	Level	100	0	0.667	1.00	138
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 373.63 (Equation 13-6 or 13-7)

P_{FM} = 0.589 using Equation (Exhibit 13-6)

V_{12} = 2031 pc/h

V_3 or V_{av34} 1419 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2031 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3588	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2169	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 19.8 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.327 (Exibit 13-11)

S_R= 60.8 mph (Exhibit 13-11)

S_0= 66.7 mph (Exhibit 13-11)

S = 63.0 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	2017_BC

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 2525 ft
V_u = veh/h	Deceleration Lane Length L_D: 975	V_D = 92 veh/h
	Freeway Volume, V_F: 3270	
	Ramp Volume, V_R: 92	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3270	1.00	Level	11	0	0.948	1.00	3450
Ramp	92	1.00	Level	100	0	0.667	1.00	138
UpStream								
DownStream	92	1.00	Level	100	0	0.667	1.00	138

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.667 using Equation (Exhibit 13-7)

V_{12} = 2348 pc/h

V_3 or V_{av34} 1102 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3450	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3312	Exhibit 13-8	7200	No
V_R	138	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2348	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 15.7 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.440 (Exhibit 13-12)

S_R= 57.7 mph (Exhibit 13-12)

S_0= 76.4 mph (Exhibit 13-12)

S = 62.6 mph (Exhibit 13-13)

HCS2010™ Version 6.50 Generated: 10/20/2014 11:20 AM

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekend Peak Period	Analysis Year	2017 BC

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes ☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	650	☑ No ☐ Off
L_{up} =	2500 ft	Deceleration Lane Length L_D		L_{down} = ft
V_u =	589 veh/h	Freeway Volume, V_F	3355	V_D = veh/h
		Ramp Volume, V_R	162	
		Freeway Free-Flow Speed, S_{FF}	70.0	
		Ramp Free-Flow Speed, S_{FR}	35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3355	1.00	Level	8	0	0.962	1.00	3489
Ramp	162	1.00	Level	9	0	0.957	1.00	169
UpStream	589	1.00	Level	3	0	0.985	1.00	598
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 499.61 (Equation 13-6 or 13-7)

P_{FM} = 0.596 using Equation (Exhibit 13-6)

V_{12} = 2078 pc/h

V_3 or V_{av34} 1411 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2078 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3658	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2247	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 18.8 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.312 (Exibit 13-11)

S_R= 61.3 mph (Exhibit 13-11)

S_0= 66.7 mph (Exhibit 13-11)

S = 63.3 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekend Peak Period	Analysis Year	2017 BC

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 2500 ft
V_u = veh/h	Deceleration Lane Length L_D: 250	V_D = 162 veh/h
	Freeway Volume, V_F: 3944	
	Ramp Volume, V_R: 589	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3944	1.00	Level	8	0	0.962	1.00	4102
Ramp	589	1.00	Level	3	0	0.985	1.00	598
UpStream								
DownStream	162	1.00	Level	9	0	0.957	1.00	169

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.630 using Equation (Exhibit 13-7)

V_{12} = 2805 pc/h

V_3 or V_{av34} 1297 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4102	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3504	Exhibit 13-8	7200	No
V_R	598	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2805	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 26.1 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.482 (Exhibit 13-12)

S_R= 56.5 mph (Exhibit 13-12)

S_0= 75.6 mph (Exhibit 13-12)

S = 61.4 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekend Peak Period	Analysis Year	2017_BC

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway/Ramp Inputs		Downstream Adj Ramp	
☑ Yes	☐ On	Freeway Number of Lanes, N	3	☐ Yes	☐ On
☐ No	☑ Off	Ramp Number of Lanes, N	1	☑ No	☐ Off
L_{up} =	2500 ft	Acceleration Lane Length, L_A	550	L_{down} =	ft
V_u =	257 veh/h	Deceleration Lane Length L_D		V_D =	veh/h
		Freeway Volume, V_F	2997		
		Ramp Volume, V_R	412		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2997	1.00	Level	11	0	0.948	1.00	3162
Ramp	412	1.00	Level	3	0	0.985	1.00	418
UpStream	257	1.00	Level	7	0	0.966	1.00	266
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 438.52 (Equation 13-6 or 13-7)

P_{FM} = 0.593 using Equation (Exhibit 13-6)

V_{12} = 1875 pc/h

V_3 or V_{av34} 1287 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1875 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3580	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2293	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 19.7 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.321 (Exibit 13-11)

S_R= 61.0 mph (Exhibit 13-11)

S_0= 67.2 mph (Exhibit 13-11)

S = 63.1 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekend Peak Period	Analysis Year	2017 BC

Project Description 12393

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	150
Freeway Volume, V_F	3254
Ramp Volume, V_R	257
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 2500 ft
V_D = 412 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3254	1.00	Level	11	0	0.948	1.00	3433
Ramp	257	1.00	Level	7	0	0.966	1.00	266
UpStream								
DownStream	412	1.00	Level	3	0	0.985	1.00	418

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R = mph (Exhibit 13-11)
S_0 = mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.662 using Equation (Exhibit 13-7)
V_{12} = 2362 pc/h
V_3 or V_{av34} 1071 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3433	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3167	Exhibit 13-8	7200	No
V_R	266	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2362	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 23.2 (pc/mi/ln)
LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.452 (Exhibit 13-12)
S_R = 57.3 mph (Exhibit 13-12)
S_0 = 76.5 mph (Exhibit 13-12)
S = 62.2 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Friday PM Peak Period	Analysis Year	2017_BC

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	400	☑ No	☐ Off
L_{up} =	2525 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	73 veh/h	Freeway Volume, V_F	3921	V_D =	veh/h
		Ramp Volume, V_R	73		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3921	1.00	Level	8	0	0.962	1.00	4078
Ramp	73	1.00	Level	100	0	0.667	1.00	109
UpStream	73	1.00	Level	100	0	0.667	1.00	109
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 501.82 (Equation 13-6 or 13-7)

P_{FM} = 0.589 using Equation (Exhibit 13-6)

V_{12} = 2401 pc/h

V_3 or V_{av34} 1677 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2401 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4187	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2510	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 22.5 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.341 (Exibit 13-11)

S_R= 60.5 mph (Exhibit 13-11)

S_0= 65.8 mph (Exhibit 13-11)

S = 62.5 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Friday PM Peak Period	Analysis Year	2017_BC

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	1	☑ Yes	☑ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☐ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	975	L_{down} =	2525 ft
V_u =	veh/h	Freeway Volume, V_F	3921	V_D =	73 veh/h
		Ramp Volume, V_R	73		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3921	1.00	Level	8	0	0.962	1.00	4078
Ramp	73	1.00	Level	100	0	0.667	1.00	109
UpStream								
DownStream	73	1.00	Level	100	0	0.667	1.00	109

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.653 using Equation (Exhibit 13-7)

V_{12} = 2701 pc/h

V_3 or V_{av34} 1377 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4078	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3969	Exhibit 13-8	7200	No
V_R	109	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2701	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 18.7 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.438 (Exhibit 13-12)

S_R= 57.7 mph (Exhibit 13-12)

S_0= 75.3 mph (Exhibit 13-12)

S = 62.7 mph (Exhibit 13-13)

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Appendix Q 2017 Background Conditions Worksheets – Study Intersections

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		1	0
Taper Length (ft)			0		0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.964				0.873	
Flt Protected				0.976	0.997	
Satd. Flow (prot)	1730	0	0	1726	1360	0
Flt Permitted				0.976	0.997	
Satd. Flow (perm)	1730	0	0	1726	1360	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	2274			144	957	
Travel Time (s)	51.7			3.3	21.8	

Intersection Summary	
Area Type:	Other

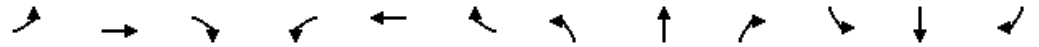
Intersection	
Int Delay, s/veh	4.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	55	20	49	51	5	78
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	8	0	11	4	0	23
Mvmt Flow	55	20	49	51	5	78

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	75	0	214	65
Stage 1	-	-	-	-	65	-
Stage 2	-	-	-	-	149	-
Critical Hdwy	-	-	4.21	-	6.4	6.43
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.299	-	3.5	3.507
Pot Cap-1 Maneuver	-	-	1469	-	779	943
Stage 1	-	-	-	-	963	-
Stage 2	-	-	-	-	884	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1469	-	753	943
Mov Cap-2 Maneuver	-	-	-	-	753	-
Stage 1	-	-	-	-	963	-
Stage 2	-	-	-	-	854	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.7	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	929	-	-	1469	-
HCM Lane V/C Ratio	0.089	-	-	0.033	-
HCM Control Delay (s)	9.3	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		25
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	0			0			0			0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.968										0.850
Flt Protected					0.959						0.954	
Satd. Flow (prot)	0	1566	0	0	1747	0	0	0	0	0	1587	1442
Flt Permitted					0.959						0.954	
Satd. Flow (perm)	0	1566	0	0	1747	0	0	0	0	0	1587	1442
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		144			502			626			699	
Travel Time (s)		3.3			11.4			14.2			15.9	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	33.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	0	101	32	530	91	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	22	3	4	6	0	0	0	0
Mvmt Flow	0	101	32	530	91	0	0	0	0

Major/Minor	Major1			Major2		
Conflicting Flow All	91	0	0	133	0	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.1	-	-	4.14	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.236	-	-
Pot Cap-1 Maneuver	1517	-	-	1440	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-	-		-	-
Mov Cap-1 Maneuver	1517	-	-	1440	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB
HCM Control Delay, s	0	7.6
HCM LOS		

Minor Lane/Major Mvmt	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1517	-	-	1440	-	-	108	940
HCM Lane V/C Ratio	-	-	-	0.368	-	-	1.13	0.009
HCM Control Delay (s)	0	-	-	8.9	0	-	200.9	8.9
HCM Lane LOS	A	-	-	A	A	-	F	A
HCM 95th %tile Q(veh)	0	-	-	1.7	-	-	7.7	0

Notes

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

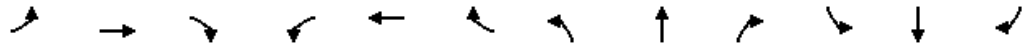
Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	118	4	8
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	25
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	13	50	12
Mvmt Flow	118	4	8

Major/Minor	Minor2		
Conflicting Flow All	1268	1284	91
Stage 1	1151	1151	-
Stage 2	117	133	-
Critical Hdwy	6.53	7	6.32
Critical Hdwy Stg 1	5.53	6	-
Critical Hdwy Stg 2	5.53	6	-
Follow-up Hdwy	3.617	4.45	3.408
Pot Cap-1 Maneuver	176	133	940
Stage 1	287	223	-
Stage 2	881	703	-
Platoon blocked, %			
Mov Cap-1 Maneuver	~ 108	0	940
Mov Cap-2 Maneuver	~ 108	0	-
Stage 1	176	0	-
Stage 2	881	0	-

Approach	SB
HCM Control Delay, s	189.1
HCM LOS	F

Minor Lane/Major Mvmt



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		50	0		0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (ft)	0			0			0			0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.972				0.850			
Flt Protected		0.986						0.959				
Satd. Flow (prot)	0	1601	0	0	1731	0	0	1696	1509	0	0	0
Flt Permitted		0.986						0.959				
Satd. Flow (perm)	0	1601	0	0	1731	0	0	1696	1509	0	0	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		502			143			542			648	
Travel Time (s)		11.4			3.3			12.3			14.7	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	64	155	0	0	598	156	23	4	321
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	17	17	0	0	4	17	0	50	7
Mvmt Flow	64	155	0	0	598	156	23	4	321

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	754	0	0	155	0	0	959	1037	155
Stage 1	-	-	-	-	-	-	283	283	-
Stage 2	-	-	-	-	-	-	676	754	-
Critical Hdwy	4.27	-	-	4.1	-	-	6.4	7	6.27
Critical Hdwy Stg 1	-	-	-	-	-	-	5.4	6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.4	6	-
Follow-up Hdwy	2.353	-	-	2.2	-	-	3.5	4.45	3.363
Pot Cap-1 Maneuver	792	-	-	1438	-	-	288	191	878
Stage 1	-	-	-	-	-	-	770	598	-
Stage 2	-	-	-	-	-	-	509	354	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	792	-	-	1438	-	-	263	0	878
Mov Cap-2 Maneuver	-	-	-	-	-	-	263	0	-
Stage 1	-	-	-	-	-	-	702	0	-
Stage 2	-	-	-	-	-	-	509	0	-

Approach	EB	WB	NB
HCM Control Delay, s	2.9	0	12.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	263	878	792	-	-	1438	-	-
HCM Lane V/C Ratio	0.103	0.366	0.081	-	-	-	-	-
HCM Control Delay (s)	20.2	11.4	9.9	0	-	0	-	-
HCM Lane LOS	C	B	A	A	-	A	-	-
HCM 95th %tile Q(veh)	0.3	1.7	0.3	-	-	0	-	-

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	0	0	0
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	0	0	0
Mvmt Flow	0	0	0

Major/Minor
Conflicting Flow All
Stage 1
Stage 2
Critical Hdwy
Critical Hdwy Stg 1
Critical Hdwy Stg 2
Follow-up Hdwy
Pot Cap-1 Maneuver
Stage 1
Stage 2
Platoon blocked, %
Mov Cap-1 Maneuver
Mov Cap-2 Maneuver
Stage 1
Stage 2

Approach
HCM Control Delay, s
HCM LOS

Minor Lane/Major Mvmt

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	0			0			0			0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.998			0.955			0.896	
Flt Protected	0.950				0.999			0.968			0.990	
Satd. Flow (prot)	1150	1727	0	0	1817	0	0	1493	0	0	1399	0
Flt Permitted	0.950				0.999			0.968			0.990	
Satd. Flow (perm)	1150	1727	0	0	1817	0	0	1493	0	0	1399	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		143			173			583			174	
Travel Time (s)		3.3			3.9			13.3			4.0	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	30	441	4	10	630	9	10	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	57	10	0	25	3	67	14	0	25
Mvmt Flow	30	441	4	10	630	9	10	0	5

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	639	0	0	445	0	0	1217	1162	443
Stage 1	-	-	-	-	-	-	503	503	-
Stage 2	-	-	-	-	-	-	714	659	-
Critical Hdwy	4.67	-	-	4.35	-	-	7.24	6.5	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.24	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.24	5.5	-
Follow-up Hdwy	2.713	-	-	2.425	-	-	3.626	4	3.525
Pot Cap-1 Maneuver	730	-	-	1004	-	-	149	197	569
Stage 1	-	-	-	-	-	-	529	545	-
Stage 2	-	-	-	-	-	-	404	464	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	730	-	-	1004	-	-	104	186	569
Mov Cap-2 Maneuver	-	-	-	-	-	-	104	186	-
Stage 1	-	-	-	-	-	-	507	523	-
Stage 2	-	-	-	-	-	-	293	457	-

Approach	EB	WB	NB
HCM Control Delay, s	0.6	0.1	33.1
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	143	730	-	-	1004	-	-	303
HCM Lane V/C Ratio	0.105	0.041	-	-	0.01	-	-	0.495
HCM Control Delay (s)	33.1	10.1	-	-	8.6	0	-	28
HCM Lane LOS	D	B	-	-	A	A	-	D
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	2.6

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	31	4	115
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	23	100	17
Mvmt Flow	31	4	115

Major/Minor	Minor2		
Conflicting Flow All	1161	1160	635
Stage 1	655	655	-
Stage 2	506	505	-
Critical Hdwy	7.33	7.5	6.37
Critical Hdwy Stg 1	6.33	6.5	-
Critical Hdwy Stg 2	6.33	6.5	-
Follow-up Hdwy	3.707	4.9	3.453
Pot Cap-1 Maneuver	157	130	453
Stage 1	422	340	-
Stage 2	512	408	-
Platoon blocked, %			
Mov Cap-1 Maneuver	149	123	453
Mov Cap-2 Maneuver	149	123	-
Stage 1	405	335	-
Stage 2	487	391	-

Approach	SB
HCM Control Delay, s	28
HCM LOS	D

Minor Lane/Major Mvmt

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		1	0
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.991				0.885	
Flt Protected				0.974	0.993	
Satd. Flow (prot)	1752	0	0	1757	1576	0
Flt Permitted				0.974	0.993	
Satd. Flow (perm)	1752	0	0	1757	1576	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	2274			144	957	
Travel Time (s)	51.7			3.3	21.8	

Intersection Summary	
Area Type:	Other

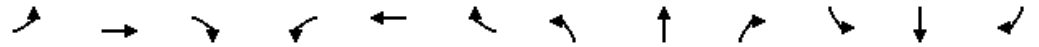
Intersection	
Int Delay, s/veh	4.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	73	5	97	87	17	96
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	8	0	2	9	0	7
Mvmt Flow	73	5	97	87	17	96

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	78	0	357	76
Stage 1	-	-	-	-	76	-
Stage 2	-	-	-	-	281	-
Critical Hdwy	-	-	4.12	-	6.4	6.27
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.218	-	3.5	3.363
Pot Cap-1 Maneuver	-	-	1520	-	645	971
Stage 1	-	-	-	-	952	-
Stage 2	-	-	-	-	771	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1520	-	602	971
Mov Cap-2 Maneuver	-	-	-	-	602	-
Stage 1	-	-	-	-	952	-
Stage 2	-	-	-	-	719	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	889	-	-	1520	-
HCM Lane V/C Ratio	0.127	-	-	0.064	-
HCM Control Delay (s)	9.6	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.2	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		25
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.973										0.850
Flt Protected					0.963						0.953	
Satd. Flow (prot)	0	1725	0	0	1735	0	0	0	0	0	1632	1583
Flt Permitted					0.963						0.953	
Satd. Flow (perm)	0	1725	0	0	1735	0	0	0	0	0	1632	1583
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		144			502			626			699	
Travel Time (s)		3.3			11.4			14.2			15.9	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	23.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	0	135	34	374	116	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	9	0	5	7	0	0	0	0
Mvmt Flow	0	135	34	374	116	0	0	0	0

Major/Minor	Major1			Major2		
Conflicting Flow All	116	0	0	169	0	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.1	-	-	4.15	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.245	-	-
Pot Cap-1 Maneuver	1485	-	-	1390	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-	-		-	-
Mov Cap-1 Maneuver	1485	-	-	1390	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB
HCM Control Delay, s	0	6.5
HCM LOS		

Minor Lane/Major Mvmt	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1485	-	-	1390	-	-	182	936
HCM Lane V/C Ratio	-	-	-	0.269	-	-	0.929	0.073
HCM Control Delay (s)	0	-	-	8.5	0	-	101	9.1
HCM Lane LOS	A	-	-	A	A	-	F	A
HCM 95th %tile Q(veh)	0	-	-	1.1	-	-	7.2	0.2

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	165	4	68
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	25
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	10	50	2
Mvmt Flow	165	4	68

Major/Minor	Minor2		
Conflicting Flow All	1016	1033	116
Stage 1	864	864	-
Stage 2	152	169	-
Critical Hdwy	6.5	7	6.22
Critical Hdwy Stg 1	5.5	6	-
Critical Hdwy Stg 2	5.5	6	-
Follow-up Hdwy	3.59	4.45	3.318
Pot Cap-1 Maneuver	255	192	936
Stage 1	400	312	-
Stage 2	857	676	-
Platoon blocked, %			
Mov Cap-1 Maneuver	182	0	936
Mov Cap-2 Maneuver	182	0	-
Stage 1	285	0	-
Stage 2	857	0	-

Approach	SB
HCM Control Delay, s	74.6
HCM LOS	F

Minor Lane/Major Mvmt

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		50	0		0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.971				0.850			
Flt Protected		0.995						0.958				
Satd. Flow (prot)	0	1741	0	0	1770	0	0	1630	1568	0	0	0
Flt Permitted		0.995						0.958				
Satd. Flow (perm)	0	1741	0	0	1770	0	0	1630	1568	0	0	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		502			143			542			648	
Travel Time (s)		11.4			3.3			12.3			14.7	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	10.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	32	268	0	0	436	119	54	8	591
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	9	0	0	4	5	6	50	3
Mvmt Flow	32	268	0	0	436	119	54	8	591

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	555	0	0	268	0	0	828	887	268
Stage 1	-	-	-	-	-	-	332	332	-
Stage 2	-	-	-	-	-	-	496	555	-
Critical Hdwy	4.15	-	-	4.1	-	-	6.46	7	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	5.46	6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.46	6	-
Follow-up Hdwy	2.245	-	-	2.2	-	-	3.554	4.45	3.327
Pot Cap-1 Maneuver	1001	-	-	1307	-	-	336	237	768
Stage 1	-	-	-	-	-	-	718	567	-
Stage 2	-	-	-	-	-	-	604	443	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1001	-	-	1307	-	-	323	0	768
Mov Cap-2 Maneuver	-	-	-	-	-	-	323	0	-
Stage 1	-	-	-	-	-	-	691	0	-
Stage 2	-	-	-	-	-	-	604	0	-

Approach	EB	WB	NB
HCM Control Delay, s	0.9	0	23.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	323	768	1001	-	-	1307	-	-
HCM Lane V/C Ratio	0.192	0.77	0.032	-	-	-	-	-
HCM Control Delay (s)	18.8	23.5	8.7	0	-	0	-	-
HCM Lane LOS	C	C	A	A	-	A	-	-
HCM 95th %tile Q(veh)	0.7	7.5	0.1	-	-	0	-	-

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	0	0	0
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	0	0	0
Mvmt Flow	0	0	0

Major/Minor
Conflicting Flow All
Stage 1
Stage 2
Critical Hdwy
Critical Hdwy Stg 1
Critical Hdwy Stg 2
Follow-up Hdwy
Pot Cap-1 Maneuver
Stage 1
Stage 2
Platoon blocked, %
Mov Cap-1 Maneuver
Mov Cap-2 Maneuver
Stage 1
Stage 2

Approach
HCM Control Delay, s
HCM LOS

Minor Lane/Major Mvmt

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.998			0.932			0.879	
Flt Protected	0.950				0.999			0.976			0.997	
Satd. Flow (prot)	1308	1818	0	0	1829	0	0	1728	0	0	1381	0
Flt Permitted	0.950				0.999			0.976			0.997	
Satd. Flow (perm)	1308	1818	0	0	1829	0	0	1728	0	0	1381	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		143			173			583			174	
Travel Time (s)		3.3			3.9			13.3			4.0	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	32	815	12	5	448	8	5	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	38	4	25	25	2	77	0	0	0
Mvmt Flow	32	815	12	5	448	8	5	0	5

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	456	0	0	827	0	0	1401	1351	821
Stage 1	-	-	-	-	-	-	885	885	-
Stage 2	-	-	-	-	-	-	516	466	-
Critical Hdwy	4.48	-	-	4.35	-	-	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.542	-	-	2.425	-	-	3.5	4	3.3
Pot Cap-1 Maneuver	939	-	-	713	-	-	119	152	378
Stage 1	-	-	-	-	-	-	342	366	-
Stage 2	-	-	-	-	-	-	546	566	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	939	-	-	713	-	-	92	145	378
Mov Cap-2 Maneuver	-	-	-	-	-	-	92	145	-
Stage 1	-	-	-	-	-	-	330	354	-
Stage 2	-	-	-	-	-	-	439	561	-

Approach	EB	WB	NB
HCM Control Delay, s	0.3	0.1	31.1
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	148	939	-	-	713	-	-	419
HCM Lane V/C Ratio	0.068	0.034	-	-	0.007	-	-	0.274
HCM Control Delay (s)	31.1	9	-	-	10.1	0	-	16.8
HCM Lane LOS	D	A	-	-	B	A	-	C
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	1.1

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	8	4	103
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	0	0	23
Mvmt Flow	8	4	103

Major/Minor	Minor2		
Conflicting Flow All	1350	1353	452
Stage 1	462	462	-
Stage 2	888	891	-
Critical Hdwy	7.1	6.5	6.43
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.507
Pot Cap-1 Maneuver	129	151	566
Stage 1	584	568	-
Stage 2	341	363	-
Platoon blocked, %			
Mov Cap-1 Maneuver	123	145	566
Mov Cap-2 Maneuver	123	145	-
Stage 1	564	563	-
Stage 2	325	351	-

Approach	SB
HCM Control Delay, s	16.8
HCM LOS	C

Minor Lane/Major Mvmt

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		1	0
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.976				0.875	
Flt Protected				0.974	0.996	
Satd. Flow (prot)	1651	0	0	1715	1570	0
Flt Permitted				0.974	0.996	
Satd. Flow (perm)	1651	0	0	1715	1570	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	2274			144	957	
Travel Time (s)	51.7			3.3	21.8	

Intersection Summary	
Area Type:	Other

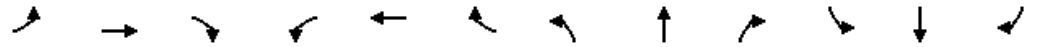
Intersection	
Int Delay, s/veh	4.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	69	15	77	70	5	66
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	15	0	6	10	25	4
Mvmt Flow	69	15	77	70	5	66

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	84	0	301	77
Stage 1	-	-	-	-	77	-
Stage 2	-	-	-	-	224	-
Critical Hdwy	-	-	4.16	-	6.65	6.24
Critical Hdwy Stg 1	-	-	-	-	5.65	-
Critical Hdwy Stg 2	-	-	-	-	5.65	-
Follow-up Hdwy	-	-	2.254	-	3.725	3.336
Pot Cap-1 Maneuver	-	-	1488	-	645	978
Stage 1	-	-	-	-	891	-
Stage 2	-	-	-	-	762	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1488	-	610	978
Mov Cap-2 Maneuver	-	-	-	-	610	-
Stage 1	-	-	-	-	891	-
Stage 2	-	-	-	-	721	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	938	-	-	1488	-
HCM Lane V/C Ratio	0.076	-	-	0.052	-
HCM Control Delay (s)	9.2	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.2	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		25
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.958										0.850
Flt Protected					0.959						0.953	
Satd. Flow (prot)	0	1698	0	0	1773	0	0	0	0	0	1743	1429
Flt Permitted					0.959						0.953	
Satd. Flow (perm)	0	1698	0	0	1773	0	0	0	0	0	1743	1429
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		144			502			626			699	
Travel Time (s)		3.3			11.4			14.2			15.9	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	18.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	0	93	42	365	66	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	5	12	2	7	0	0	0	0
Mvmt Flow	0	93	42	365	66	0	0	0	0

Major/Minor	Major1			Major2		
Conflicting Flow All	66	0	0	135	0	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	1549	-	-	1449	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-	-		-	-
Mov Cap-1 Maneuver	1549	-	-	1449	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB
HCM Control Delay, s	0	7
HCM LOS		

Minor Lane/Major Mvmt	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1549	-	-	1449	-	-	223	968
HCM Lane V/C Ratio	-	-	-	0.252	-	-	0.789	0.084
HCM Control Delay (s)	0	-	-	8.3	0	-	63.1	9.1
HCM Lane LOS	A	-	-	A	A	-	F	A
HCM 95th %tile Q(veh)	0	-	-	1	-	-	5.7	0.3

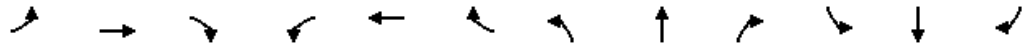
Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	172	4	81
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	25
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	4	0	13
Mvmt Flow	172	4	81

Major/Minor	Minor2		
Conflicting Flow All	910	931	66
Stage 1	796	796	-
Stage 2	114	135	-
Critical Hdwy	6.44	6.5	6.33
Critical Hdwy Stg 1	5.44	5.5	-
Critical Hdwy Stg 2	5.44	5.5	-
Follow-up Hdwy	3.536	4	3.417
Pot Cap-1 Maneuver	302	269	968
Stage 1	441	402	-
Stage 2	906	789	-
Platoon blocked, %			
Mov Cap-1 Maneuver	223	0	968
Mov Cap-2 Maneuver	223	0	-
Stage 1	326	0	-
Stage 2	906	0	-

Approach	SB
HCM Control Delay, s	46.1
HCM LOS	E

Minor Lane/Major Mvmt



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		50	0		0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.969				0.850			
Flt Protected		0.994						0.960				
Satd. Flow (prot)	0	1810	0	0	1752	0	0	1765	1568	0	0	0
Flt Permitted		0.994						0.960				
Satd. Flow (perm)	0	1810	0	0	1752	0	0	1765	1568	0	0	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		502			143			542			648	
Travel Time (s)		11.4			3.3			12.3			14.7	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	8.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	34	231	0	0	410	124	21	4	564
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	5	0	0	3	12	4	0	3
Mvmt Flow	34	231	0	0	410	124	21	4	564

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	534	0	0	231	0	0	771	833	231
Stage 1	-	-	-	-	-	-	299	299	-
Stage 2	-	-	-	-	-	-	472	534	-
Critical Hdwy	4.1	-	-	4.1	-	-	6.44	6.5	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	5.44	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.44	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.536	4	3.327
Pot Cap-1 Maneuver	1044	-	-	1349	-	-	366	307	806
Stage 1	-	-	-	-	-	-	748	670	-
Stage 2	-	-	-	-	-	-	623	528	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1044	-	-	1349	-	-	352	0	806
Mov Cap-2 Maneuver	-	-	-	-	-	-	352	0	-
Stage 1	-	-	-	-	-	-	720	0	-
Stage 2	-	-	-	-	-	-	623	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.1	0	19.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	352	806	1044	-	-	1349	-	-
HCM Lane V/C Ratio	0.071	0.7	0.033	-	-	-	-	-
HCM Control Delay (s)	16	19.2	8.6	0	-	0	-	-
HCM Lane LOS	C	C	A	A	-	A	-	-
HCM 95th %tile Q(veh)	0.2	5.9	0.1	-	-	0	-	-

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	0	0	0
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	0	0	0
Mvmt Flow	0	0	0

Major/Minor
Conflicting Flow All
Stage 1
Stage 2
Critical Hdwy
Critical Hdwy Stg 1
Critical Hdwy Stg 2
Follow-up Hdwy
Pot Cap-1 Maneuver
Stage 1
Stage 2
Platoon blocked, %
Mov Cap-1 Maneuver
Mov Cap-2 Maneuver
Stage 1
Stage 2

Approach
HCM Control Delay, s
HCM LOS

Minor Lane/Major Mvmt

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.998			0.966			0.884	
Flt Protected	0.950				0.999			0.976			0.995	
Satd. Flow (prot)	1570	1824	0	0	1819	0	0	1518	0	0	1458	0
Flt Permitted	0.950				0.999			0.976			0.995	
Satd. Flow (perm)	1570	1824	0	0	1819	0	0	1518	0	0	1458	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		143			173			583			174	
Travel Time (s)		3.3			3.9			13.3			4.0	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	16	774	5	5	421	8	10	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	15	4	17	0	3	67	11	0	50
Mvmt Flow	16	774	5	5	421	8	10	5	5

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	429	0	0	779	0	0	1298	1248	777
Stage 1	-	-	-	-	-	-	809	809	-
Stage 2	-	-	-	-	-	-	489	439	-
Critical Hdwy	4.25	-	-	4.1	-	-	7.21	6.5	6.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.21	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.21	5.5	-
Follow-up Hdwy	2.335	-	-	2.2	-	-	3.599	4	3.75
Pot Cap-1 Maneuver	1064	-	-	847	-	-	133	175	330
Stage 1	-	-	-	-	-	-	361	396	-
Stage 2	-	-	-	-	-	-	544	582	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1064	-	-	847	-	-	106	171	330
Mov Cap-2 Maneuver	-	-	-	-	-	-	106	171	-
Stage 1	-	-	-	-	-	-	356	390	-
Stage 2	-	-	-	-	-	-	444	577	-

Approach	EB	WB	NB
HCM Control Delay, s	0.2	0.1	34
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	144	1064	-	-	847	-	-	419
HCM Lane V/C Ratio	0.139	0.015	-	-	0.006	-	-	0.286
HCM Control Delay (s)	34	8.4	-	-	9.3	0	-	17
HCM Lane LOS	D	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.5	0	-	-	0	-	-	1.2

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	13	4	103
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	0	0	17
Mvmt Flow	13	4	103

Major/Minor	Minor2		
Conflicting Flow All	1249	1246	425
Stage 1	435	435	-
Stage 2	814	811	-
Critical Hdwy	7.1	6.5	6.37
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.453
Pot Cap-1 Maneuver	151	175	598
Stage 1	604	584	-
Stage 2	375	396	-
Platoon blocked, %			
Mov Cap-1 Maneuver	143	171	598
Mov Cap-2 Maneuver	143	171	-
Stage 1	595	579	-
Stage 2	359	390	-

Approach	SB
HCM Control Delay, s	17
HCM LOS	C

Minor Lane/Major Mvmt

Appendix R 2017 Total Traffic Conditions Worksheets – Freeway Mainline

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/25/2014*
Analysis Time Period	*Weekday AM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 NB*
From/To	*SR 501 to La Center Rd*
Jurisdiction	*WSDOT*
Analysis Year	*2017_casino*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2828*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.917*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*1.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*3.2*	mph
FFS	*72.2*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1028*	pc/h/ln
S	*70.0*	mph
D = v_p / S	*14.7*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/25/2014*
Analysis Time Period	*Weekday AM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*SR 501 to La Center*
Jurisdiction	*WSDOT*
Analysis Year	*2017_casino*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3117*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*16*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.926*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*1.33*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*4.1*	mph
FFS	*71.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1122*	pc/h/ln
S	*70.0*	mph
D = v_p / S	*16.0*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/25/2014*
Analysis Time Period	*Weekday AM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 NB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	*2017_casino*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2447*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.917*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*889*	pc/h/ln
S	*75.0*	mph
D = v_p / S	*11.9*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/25/2014*
Analysis Time Period	*Weekday AM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	*2017_casino*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2501*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*16*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.926*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*900*	pc/h/ln
S	*75.0*	mph
D = v_p / S	*12.0*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/25/2014*
Analysis Time Period	*Weekday PM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 NB*
From/To	*SR 501 to La Center Rd*
Jurisdiction	*WSDOT*
Analysis Year	

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3963*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*11*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.948*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*1.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*3.2*	mph
FFS	*72.2*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1394*	pc/h/ln
S	*69.6*	mph
D = v_p / S	*20.0*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/25/2014*
Analysis Time Period	*Weekday PM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*SR 501 to La Center*
Jurisdiction	*WSDOT*
Analysis Year	*2017_casino*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3516*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D				

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/25/2014*
Analysis Time Period	*Weekday PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-5 NB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	*2017_casino*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2812*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*11*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.948*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*989*	pc/h/ln
S	*75.0*	mph
D = v_p / S	*13.2*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/25/2014*
Analysis Time Period	*Weekday PM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	*2017_casino*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2821*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.939*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1001*	pc/h/ln
S	*75.0*	mph
D = v_p / S	*13.3*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/25/2014*
Analysis Time Period	*Weekend Peak Period*

Site Information

Highway/Direction of Travel	*I-5 NB*
From/To	*SR 501 to La Center Rd*
Jurisdiction	*WSDOT*
Analysis Year	*2017 with casino*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4850*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*1.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*3.2*	mph
FFS	*72.2*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1681*	pc/h/ln
S	*67.3*	mph
D = v_p / S	*25.0*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/25/2014*
Analysis Time Period	*Weekend Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*SR 501 to La Center*
Jurisdiction	*WSDOT*
Analysis Year	*2017 with casino*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4013*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*11*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.948*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*1.33*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*4.1*	mph
FFS	*71.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1411*	pc/h/ln
S	*69.5*	mph
D = v_p / S	*20.3*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/25/2014*
Analysis Time Period	*Weekend Peak Hour*

Site Information

Highway/Direction of Travel	*I-5 NB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	*2017 with casino*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3557*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1233*	pc/h/ln
S	*74.4*	mph
D = v_p / S	*16.6*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/25/2014*
Analysis Time Period	*Weekend Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	*2017 with casino*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3314*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*11*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.948*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1165*	pc/h/ln
S	*74.7*	mph
D = v_p / S	*15.6*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

Appendix S 2017 Total Traffic Conditions Worksheets – Merge/Diverge Locations

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	2017 with Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	650	☑ No	☐ Off
L_{up} =	2500 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	618 veh/h	Freeway Volume, V_F	2210	V_D =	veh/h
		Ramp Volume, V_R	237		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2210	1.00	Level	18	0	0.917	1.00	2409
Ramp	237	1.00	Level	18	0	0.917	1.00	258
UpStream	618	1.00	Level	7	0	0.966	1.00	640
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 287.54 (Equation 13-6 or 13-7)

P_{FM} = 0.596 using Equation (Exhibit 13-6)

V_{12} = 1435 pc/h

V_3 or V_{av34} 974 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1435 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2667	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1693	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 14.5 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.297 (Exibit 13-11)

S_R = 61.7 mph (Exhibit 13-11)

S_0 = 68.3 mph (Exhibit 13-11)

S = 63.9 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	2017 with Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 2500 ft
V_u = veh/h	Deceleration Lane Length L_D: 250	V_D = 237 veh/h
	Freeway Volume, V_F: 2828	
	Ramp Volume, V_R: 618	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2828	1.00	Level	18	0	0.917	1.00	3083
Ramp	618	1.00	Level	7	0	0.966	1.00	640
UpStream								
DownStream	237	1.00	Level	18	0	0.917	1.00	258

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.653 using Equation (Exhibit 13-7)

V_{12} = 2236 pc/h

V_3 or V_{av34} 847 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3083	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2443	Exhibit 13-8	7200	No
V_R	640	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2236	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 21.2 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.486 (Exhibit 13-12)

S_R= 56.4 mph (Exhibit 13-12)

S_0= 76.8 mph (Exhibit 13-12)

S = 60.8 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	2017 with Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	550	☑ No	☐ Off
L_{up} =	2500 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	148 veh/h	Freeway Volume, V_F	2353	V_D =	veh/h
		Ramp Volume, V_R	764		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2353	1.00	Level	16	0	0.926	1.00	2541
Ramp	764	1.00	Level	4	0	0.980	1.00	779
UpStream	148	1.00	Level	14	0	0.935	1.00	158
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 382.88 (Equation 13-6 or 13-7)

P_{FM} = 0.593 using Equation (Exhibit 13-6)

V_{12} = 1507 pc/h

V_3 or V_{av34} 1034 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1507 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3320	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2286	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 19.5 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.321 (Exibit 13-11)

S_R= 61.0 mph (Exhibit 13-11)

S_0= 68.1 mph (Exhibit 13-11)

S = 63.1 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	2017 with Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 2500 ft
V_u = veh/h	Deceleration Lane Length L_D: 150	V_D = 764 veh/h
	Freeway Volume, V_F: 2501	
	Ramp Volume, V_R: 148	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2501	1.00	Level	16	0	0.926	1.00	2701
Ramp	148	1.00	Level	14	0	0.935	1.00	158
UpStream								
DownStream	764	1.00	Level	4	0	0.980	1.00	779

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.685 using Equation (Exhibit 13-7)

V_{12} = 1900 pc/h

V_3 or V_{av34} 801 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	2701	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2543	Exhibit 13-8	7200	No
V_R	158	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1900	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 19.2 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.442 (Exhibit 13-12)

S_R= 57.6 mph (Exhibit 13-12)

S_0= 76.8 mph (Exhibit 13-12)

S = 62.2 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	2017_Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	400	☑ No	☐ Off
L_{up} =	2525 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	104 veh/h	Freeway Volume, V_F	2830	V_D =	veh/h
		Ramp Volume, V_R	104		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2830	1.00	Level	18	0	0.917	1.00	3085
Ramp	104	1.00	Level	100	0	0.667	1.00	156
UpStream	104	1.00	Level	100	0	0.667	1.00	156
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 299.37 (Equation 13-6 or 13-7)

P_{FM} = 0.589 using Equation (Exhibit 13-6)

V_{12} = 1816 pc/h

V_3 or V_{av34} 1269 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1816 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3241	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1972	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 18.3 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.321 (Exibit 13-11)

S_R= 61.0 mph (Exhibit 13-11)

S_0= 67.2 mph (Exhibit 13-11)

S = 63.3 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	2017_Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 2525 ft
V_u = veh/h	Deceleration Lane Length L_D: 975	V_D = 104 veh/h
	Freeway Volume, V_F: 2830	
	Ramp Volume, V_R: 104	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2830	1.00	Level	18	0	0.917	1.00	3085
Ramp	104	1.00	Level	100	0	0.667	1.00	156
UpStream								
DownStream	104	1.00	Level	100	0	0.667	1.00	156

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.676 using Equation (Exhibit 13-7)

V_{12} = 2135 pc/h

V_3 or V_{av34} 950 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3085	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2929	Exhibit 13-8	7200	No
V_R	156	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2135	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 13.8 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.442 (Exhibit 13-12)

S_R= 57.6 mph (Exhibit 13-12)

S_0= 76.8 mph (Exhibit 13-12)

S = 62.4 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	2017 with Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	650	☑ No	☐ Off
L_{up} =	2500 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	1347 veh/h	Freeway Volume, V_F	2616	V_D =	veh/h
		Ramp Volume, V_R	196		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2616	1.00	Level	11	0	0.948	1.00	2760
Ramp	196	1.00	Level	8	0	0.962	1.00	204
UpStream	1347	1.00	Level	4	0	0.980	1.00	1374
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 351.10 (Equation 13-6 or 13-7)

P_{FM} = 0.596 using Equation (Exhibit 13-6)

V_{12} = 1644 pc/h

V_3 or V_{av34} 1116 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1644 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	2964	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1848	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 15.7 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.300 (Exibit 13-11)

S_R= 61.6 mph (Exhibit 13-11)

S_0= 67.8 mph (Exhibit 13-11)

S = 63.8 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	2017 with Casino

Project Description 12393

Inputs

Upstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ Off; L_{up} = ft; V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	250
Freeway Volume, V_F	3963
Ramp Volume, V_R	1347
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp: ☑ Yes ☑ On ☐ No ☐ Off; L_{down} = 2500 ft; V_D = 196 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3963	1.00	Level	11	0	0.948	1.00	4181
Ramp	1347	1.00	Level	4	0	0.980	1.00	1374
UpStream								
DownStream	196	1.00	Level	8	0	0.962	1.00	204

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = 0.00 (Equation 13-12 or 13-13)

P_{FD} = 0.592 using Equation (Exhibit 13-7)

V_{12} = 3037 pc/h

V_3 or V_{av34} 1144 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4181	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2807	Exhibit 13-8	7200	No
V_R	1374	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3037	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 28.1 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.552 (Exhibit 13-12)

S_R= 54.6 mph (Exhibit 13-12)

S_0= 76.2 mph (Exhibit 13-12)

S = 59.2 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	2017 with Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 2500 ft	Acceleration Lane Length, L_A: 550	L_{down} = ft
V_u = 283 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 2538	
	Ramp Volume, V_R: 978	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2538	1.00	Level	13	0	0.939	1.00	2703
Ramp	978	1.00	Level	5	0	0.976	1.00	1002
UpStream	283	1.00	Level	8	0	0.962	1.00	294
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 465.27 (Equation 13-6 or 13-7)

P_{FM} = 0.593 using Equation (Exhibit 13-6)

V_{12} = 1603 pc/h

V_3 or V_{av34} 1100 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1603 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3705	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2605	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 21.9 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.335 (Exibit 13-11)

S_R= 60.6 mph (Exhibit 13-11)

S_0= 67.8 mph (Exhibit 13-11)

S = 62.6 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	2017 with Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A	L_{down} = 2500 ft
V_u = veh/h	Deceleration Lane Length L_D: 150	V_D = 978 veh/h
	Freeway Volume, V_F: 2821	
	Ramp Volume, V_R: 283	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2821	1.00	Level	13	0	0.939	1.00	3004
Ramp	283	1.00	Level	8	0	0.962	1.00	294
UpStream								
DownStream	978	1.00	Level	5	0	0.976	1.00	1002

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.671 using Equation (Exhibit 13-7)

V_{12} = 2113 pc/h

V_3 or V_{av34} 891 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3004	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2710	Exhibit 13-8	7200	No
V_R	294	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2113	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 21.1 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.454 (Exhibit 13-12)

S_R= 57.3 mph (Exhibit 13-12)

S_0= 76.8 mph (Exhibit 13-12)

S = 61.9 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	2017_Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	400	☑ No	☐ Off
L_{up} =	2525 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	92 veh/h	Freeway Volume, V_F	3963	V_D =	veh/h
		Ramp Volume, V_R	92		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3963	1.00	Level	11	0	0.948	1.00	4181
Ramp	92	1.00	Level	100	0	0.667	1.00	138
UpStream	92	1.00	Level	100	0	0.667	1.00	138
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 530.07 (Equation 13-6 or 13-7)

P_{FM} = 0.589 using Equation (Exhibit 13-6)

V_{12} = 2461 pc/h

V_3 or V_{av34} 1720 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2461 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4319	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2599	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 23.2 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.345 (Exibit 13-11)

S_R= 60.3 mph (Exhibit 13-11)

S_0= 65.6 mph (Exhibit 13-11)

S = 62.3 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	2017_Casino

Project Description 12393

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	975
Freeway Volume, V_F	3963
Ramp Volume, V_R	92
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 2525 ft
V_D = 92 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3963	1.00	Level	11	0	0.948	1.00	4181
Ramp	92	1.00	Level	100	0	0.667	1.00	138
UpStream								
DownStream	92	1.00	Level	100	0	0.667	1.00	138

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.649 using Equation (Exhibit 13-7)
V_{12} = 2762 pc/h
V_3 or V_{av34} 1419 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4181	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	4043	Exhibit 13-8	7200	No
V_R	138	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2762	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 19.2 (pc/mi/ln)
LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.440 (Exhibit 13-12)
S_R= 57.7 mph (Exhibit 13-12)
S_0= 75.2 mph (Exhibit 13-12)
S = 62.6 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekend Peak Period	Analysis Year	2017 with Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	650	☑ No	☐ Off
L_{up} =	2500 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	1495 veh/h	Freeway Volume, V_F	3355	V_D =	veh/h
		Ramp Volume, V_R	202		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3355	1.00	Level	8	0	0.962	1.00	3489
Ramp	202	1.00	Level	9	0	0.957	1.00	211
UpStream	1495	1.00	Level	3	0	0.985	1.00	1517
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 508.60 (Equation 13-6 or 13-7)

P_{FM} = 0.596 using Equation (Exhibit 13-6)

V_{12} = 2078 pc/h

V_3 or V_{av34} = 1411 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2078 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3700	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2289	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 19.2 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.314 (Exibit 13-11)

S_R = 61.2 mph (Exhibit 13-11)

S_0 = 66.7 mph (Exhibit 13-11)

S = 63.2 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekend Peak Period	Analysis Year	2017 with Casino

Project Description 12393

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	250
Freeway Volume, V_F	4850
Ramp Volume, V_R	1495
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 2500 ft
V_D = 202 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4850	1.00	Level	8	0	0.962	1.00	5044
Ramp	1495	1.00	Level	3	0	0.985	1.00	1517
UpStream								
DownStream	202	1.00	Level	9	0	0.957	1.00	211

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R = mph (Exhibit 13-11)
S_0 = mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.564 using Equation (Exhibit 13-7)
V_{12} = 3507 pc/h
V_3 or V_{av34} 1537 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5044	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3527	Exhibit 13-8	7200	No
V_R	1517	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3507	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 32.2 (pc/mi/ln)
LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.565 (Exhibit 13-12)
S_R = 54.2 mph (Exhibit 13-12)
S_0 = 74.7 mph (Exhibit 13-12)
S = 59.1 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekend Peak Period	Analysis Year	2017 with Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	550	☑ No	☐ Off
L_{up} =	2500 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	317 veh/h	Freeway Volume, V_F	2997	V_D =	veh/h
		Ramp Volume, V_R	1016		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2997	1.00	Level	11	0	0.948	1.00	3162
Ramp	1016	1.00	Level	3	0	0.985	1.00	1031
UpStream	317	1.00	Level	7	0	0.966	1.00	328
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 569.70 (Equation 13-6 or 13-7)

P_{FM} = 0.593 using Equation (Exhibit 13-6)

V_{12} = 1875 pc/h

V_3 or V_{av34} 1287 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1875 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4193	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2906	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 24.2 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.354 (Exibit 13-11)

S_R= 60.1 mph (Exhibit 13-11)

S_0= 67.2 mph (Exhibit 13-11)

S = 62.1 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekend Peak Period	Analysis Year	2017 with Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 2500 ft
V_u = veh/h	Deceleration Lane Length L_D: 150	V_D = 1016 veh/h
	Freeway Volume, V_F: 3314	
	Ramp Volume, V_R: 317	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3314	1.00	Level	11	0	0.948	1.00	3496
Ramp	317	1.00	Level	7	0	0.966	1.00	328
UpStream								
DownStream	1016	1.00	Level	3	0	0.985	1.00	1031

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.658 using Equation (Exhibit 13-7)

V_{12} = 2411 pc/h

V_3 or V_{av34} 1085 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3496	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3168	Exhibit 13-8	7200	No
V_R	328	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2411	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 23.6 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.458 (Exhibit 13-12)

S_R= 57.2 mph (Exhibit 13-12)

S_0= 76.5 mph (Exhibit 13-12)

S = 62.0 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Friday PM Peak Period	Analysis Year	2017_Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	400	☑ No	☐ Off
L_{up} =	2525 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	73 veh/h	Freeway Volume, V_F	4827	V_D =	veh/h
		Ramp Volume, V_R	73		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4827	1.00	Level	8	0	0.962	1.00	5020
Ramp	73	1.00	Level	100	0	0.667	1.00	109
UpStream	73	1.00	Level	100	0	0.667	1.00	109
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 703.41 (Equation 13-6 or 13-7)

P_{FM} = 0.589 using Equation (Exhibit 13-6)

V_{12} = 2955 pc/h

V_3 or V_{av34} 2065 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2955 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5129	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3064	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 26.8 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.377 (Exibit 13-11)

S_R= 59.5 mph (Exhibit 13-11)

S_0= 64.4 mph (Exhibit 13-11)

S = 61.3 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Friday PM Peak Period	Analysis Year	2017_Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 2525 ft
V_u = veh/h	Deceleration Lane Length L_D: 975	V_D = 73 veh/h
	Freeway Volume, V_F: 4827	
	Ramp Volume, V_R: 73	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4827	1.00	Level	8	0	0.962	1.00	5020
Ramp	73	1.00	Level	100	0	0.667	1.00	109
UpStream								
DownStream	73	1.00	Level	100	0	0.667	1.00	109

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.629 using Equation (Exhibit 13-7)

V_{12} = 3200 pc/h

V_3 or V_{av34} 1820 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5020	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	4911	Exhibit 13-8	7200	No
V_R	109	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3200	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 23.0 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.438 (Exhibit 13-12)

S_R= 57.7 mph (Exhibit 13-12)

S_0= 73.6 mph (Exhibit 13-12)

S = 62.6 mph (Exhibit 13-13)

Appendix T 2017 Total Traffic Conditions (Build) Worksheets – Northbound Off-Ramp Diverge

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	2017 with Casino - mitigated

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	2	☑ Yes	☑ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☐ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	237	L_{down} =	2500 ft
V_u =	veh/h	Freeway Volume, V_F	2828	V_D =	242 veh/h
		Ramp Volume, V_R	618		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2828	1.00	Level	18	0	0.917	1.00	3083
Ramp	618	1.00	Level	7	0	0.966	1.00	640
UpStream								
DownStream	242	1.00	Level	18	0	0.917	1.00	264

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.450 using Equation (Exhibit 13-7)

V_{12} = 1739 pc/h

V_3 or V_{av34} 1344 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1761 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3083	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2443	Exhibit 13-8	7200	No
V_R	640	Exhibit 13-10	4000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1739	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 12.9 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.486 (Exhibit 13-12)

S_R= 56.4 mph (Exhibit 13-12)

S_0= 75.5 mph (Exhibit 13-12)

S = 63.3 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	2017 with Casino - mitigated

Project Description 12393

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	2
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	250
Freeway Volume, V_F	3963
Ramp Volume, V_R	1347
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp
☑ Yes ☑ On
☐ No ☐ Off
L_{down} = 2500 ft
V_D = 196 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3963	1.00	Level	11	0	0.948	1.00	4181
Ramp	1347	1.00	Level	4	0	0.980	1.00	1374
UpStream								
DownStream	196	1.00	Level	8	0	0.962	1.00	204

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$
L_{EQ} = (Equation 13-6 or 13-7)
P_{FM} = using Equation (Exhibit 13-6)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)
S_R= mph (Exhibit 13-11)
S_0= mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$
L_{EQ} = (Equation 13-12 or 13-13)
P_{FD} = 0.450 using Equation (Exhibit 13-7)
V_{12} = 2637 pc/h
V_3 or V_{av34} 1544 pc/h (Equation 13-14 or 13-17)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4181	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2807	Exhibit 13-8	7200	No
V_R	1374	Exhibit 13-10	4000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2637	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$
D_R = 20.2 (pc/mi/ln)
LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.552 (Exhibit 13-12)
S_R= 54.6 mph (Exhibit 13-12)
S_0= 74.7 mph (Exhibit 13-12)
S = 60.6 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekend Peak Period	Analysis Year	2017 with Casino - mitigated

Project Description 12393

Inputs

Upstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ Off; L_{up} = ft; V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	2
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	250
Freeway Volume, V_F	4850
Ramp Volume, V_R	1495
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp: ☑ Yes ☑ On ☐ No ☐ Off; L_{down} = 2500 ft; V_D = 202 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4850	1.00	Level	8	0	0.962	1.00	5044
Ramp	1495	1.00	Level	3	0	0.985	1.00	1517
UpStream								
DownStream	202	1.00	Level	9	0	0.957	1.00	211

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.450 using Equation (Exhibit 13-7)

V_{12} = 3104 pc/h

V_3 or V_{av34} 1940 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5044	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3527	Exhibit 13-8	7200	No
V_R	1517	Exhibit 13-10	4000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3104	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 24.2 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.565 (Exhibit 13-12)

S_R= 54.2 mph (Exhibit 13-12)

S_0= 73.1 mph (Exhibit 13-12)

S = 60.2 mph (Exhibit 13-13)

Appendix U 2017 Total Traffic Conditions (No Build) Worksheets – Study Intersections

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	100			0	0	0
Storage Lanes	0			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.900		0.999	
Flt Protected		0.998			0.953	
Satd. Flow (prot)	0	1825	1647	0	1791	0
Flt Permitted		0.998			0.953	
Satd. Flow (perm)	0	1825	1647	0	1791	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		909	1364		495	
Travel Time (s)		20.7	31.0		11.3	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	2	60	51	146	110	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	1	4	12	1	1	1
Mvmt Flow	2	60	51	146	110	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	197	0	-	0	188	124
Stage 1	-	-	-	-	124	-
Stage 2	-	-	-	-	64	-
Critical Hdwy	4.11	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.209	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1382	-	-	-	803	929
Stage 1	-	-	-	-	904	-
Stage 2	-	-	-	-	961	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1382	-	-	-	802	929
Mov Cap-2 Maneuver	-	-	-	-	802	-
Stage 1	-	-	-	-	904	-
Stage 2	-	-	-	-	960	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1382	-	-	-	803
HCM Lane V/C Ratio	0.001	-	-	-	0.138
HCM Control Delay (s)	7.6	0	-	-	10.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	150		0	0		0	0		0	200		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.987			0.935			0.880				
Flt Protected				0.950				0.997		0.950		
Satd. Flow (prot)	1900	1809	0	1626	1749	0	0	1384	0	1787	1881	0
Flt Permitted				0.950				0.997		0.950		
Satd. Flow (perm)	1900	1809	0	1626	1749	0	0	1384	0	1787	1881	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1364			144			957			354	
Travel Time (s)		31.0			3.3			21.8			8.0	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	0	155	15	49	192	146	5	5	78
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	4	0	11	2	1	0	1	23
Mvmt Flow	0	155	15	49	192	146	5	5	78

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	338	0	0	170	0	0	529	599	163
Stage 1	-	-	-	-	-	-	163	163	-
Stage 2	-	-	-	-	-	-	366	436	-
Critical Hdwy	4.1	-	-	4.21	-	-	7.1	6.51	6.43
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.51	-
Follow-up Hdwy	2.2	-	-	2.299	-	-	3.5	4.009	3.507
Pot Cap-1 Maneuver	1232	-	-	1355	-	-	463	417	830
Stage 1	-	-	-	-	-	-	844	765	-
Stage 2	-	-	-	-	-	-	657	582	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1232	-	-	1355	-	-	446	402	830
Mov Cap-2 Maneuver	-	-	-	-	-	-	446	402	-
Stage 1	-	-	-	-	-	-	844	765	-
Stage 2	-	-	-	-	-	-	628	561	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1	10.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	748	1232	-	-	1355	-	-	380	438
HCM Lane V/C Ratio	0.118	-	-	-	0.036	-	-	0.289	0.011
HCM Control Delay (s)	10.5	0	-	-	7.8	-	-	18.3	13.3
HCM Lane LOS	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.4	0	-	-	0.1	-	-	1.2	0

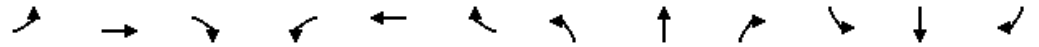
Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	110	5	0
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	200	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	1	1	1
Mvmt Flow	110	5	0

Major/Minor	Minor2		
Conflicting Flow All	567	533	265
Stage 1	363	363	-
Stage 2	204	170	-
Critical Hdwy	7.11	6.51	6.21
Critical Hdwy Stg 1	6.11	5.51	-
Critical Hdwy Stg 2	6.11	5.51	-
Follow-up Hdwy	3.509	4.009	3.309
Pot Cap-1 Maneuver	436	454	776
Stage 1	658	626	-
Stage 2	800	760	-
Platoon blocked, %			
Mov Cap-1 Maneuver	380	438	776
Mov Cap-2 Maneuver	380	438	-
Stage 1	658	603	-
Stage 2	720	760	-

Approach	SB
HCM Control Delay, s	18.1
HCM LOS	C

Minor Lane/Major Mvmt



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		25
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.911										0.850
Flt Protected					0.971						0.954	
Satd. Flow (prot)	0	1600	0	0	1788	0	0	0	0	0	1587	1495
Flt Permitted					0.971						0.954	
Satd. Flow (perm)	0	1600	0	0	1788	0	0	0	0	0	1587	1495
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		144			502			626			699	
Travel Time (s)		3.3			11.4			14.2			15.9	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	89.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	0	118	225	535	361	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	20	2	4	2	0	0	0	0
Mvmt Flow	0	118	225	535	361	0	0	0	0

Major/Minor	Major1			Major2		
Conflicting Flow All	361	0	0	343	0	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.1	-	-	4.14	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.236	-	-
Pot Cap-1 Maneuver	1209	-	-	1205	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-	-		-	-
Mov Cap-1 Maneuver	1209	-	-	1205	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB
HCM Control Delay, s	0	6.2
HCM LOS		

Minor Lane/Major Mvmt	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1209	-	-	1205	-	-	45	670
HCM Lane V/C Ratio	-	-	-	0.444	-	-	2.711	0.037
HCM Control Delay (s)	0	-	-	10.4	0	-	$ 965.8	10.6
HCM Lane LOS	A	-	-	B	A	-	F	B
HCM 95th %tile Q(veh)	0	-	-	2.3	-	-	13.1	0.1

Notes

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

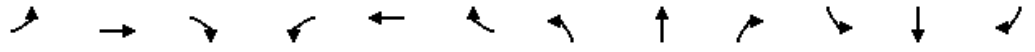
Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	118	4	25
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	25
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	13	50	8
Mvmt Flow	118	4	25

Major/Minor	Minor2		
Conflicting Flow All	1662	1774	361
Stage 1	1431	1431	-
Stage 2	231	343	-
Critical Hdwy	6.53	7	6.28
Critical Hdwy Stg 1	5.53	6	-
Critical Hdwy Stg 2	5.53	6	-
Follow-up Hdwy	3.617	4.45	3.372
Pot Cap-1 Maneuver	~ 100	63	670
Stage 1	208	159	-
Stage 2	782	560	-
Platoon blocked, %			
Mov Cap-1 Maneuver	~ 45	0	670
Mov Cap-2 Maneuver	~ 45	0	-
Stage 1	~ 93	0	-
Stage 2	782	0	-

Approach	SB
HCM Control Delay, s	$ 803.4
HCM LOS	F

Minor Lane/Major Mvmt



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		50	0		0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.972				0.850			
Flt Protected		0.984						0.953				
Satd. Flow (prot)	0	1598	0	0	1731	0	0	1781	1509	0	0	0
Flt Permitted		0.984						0.953				
Satd. Flow (perm)	0	1598	0	0	1731	0	0	1781	1509	0	0	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		502			143			542			648	
Travel Time (s)		11.4			3.3			12.3			14.7	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	33.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	77	159	0	0	604	156	292	4	321
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	17	17	0	0	4	17	1	50	7
Mvmt Flow	77	159	0	0	604	156	292	4	321

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	760	0	0	159	0	0	995	1073	159
Stage 1	-	-	-	-	-	-	313	313	-
Stage 2	-	-	-	-	-	-	682	760	-
Critical Hdwy	4.27	-	-	4.1	-	-	6.41	7	6.27
Critical Hdwy Stg 1	-	-	-	-	-	-	5.41	6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.41	6	-
Follow-up Hdwy	2.353	-	-	2.2	-	-	3.509	4.45	3.363
Pot Cap-1 Maneuver	788	-	-	1433	-	-	~ 273	181	873
Stage 1	-	-	-	-	-	-	744	579	-
Stage 2	-	-	-	-	-	-	504	352	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	788	-	-	1433	-	-	~ 244	0	873
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 244	0	-
Stage 1	-	-	-	-	-	-	664	0	-
Stage 2	-	-	-	-	-	-	504	0	-

Approach	EB	WB	NB
HCM Control Delay, s	3.3	0	87.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	244	873	788	-	-	1433	-	-
HCM Lane V/C Ratio	1.213	0.368	0.098	-	-	-	-	-
HCM Control Delay (s)	169.5	11.5	10.1	0	-	0	-	-
HCM Lane LOS	F	B	B	A	-	A	-	-
HCM 95th %tile Q(veh)	14.3	1.7	0.3	-	-	0	-	-

Notes

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

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	0	0	0
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	0	0	0
Mvmt Flow	0	0	0

Major/Minor
Conflicting Flow All
Stage 1
Stage 2
Critical Hdwy
Critical Hdwy Stg 1
Critical Hdwy Stg 2
Follow-up Hdwy
Pot Cap-1 Maneuver
Stage 1
Stage 2
Platoon blocked, %
Mov Cap-1 Maneuver
Mov Cap-2 Maneuver
Stage 1
Stage 2

Approach
HCM Control Delay, s
HCM LOS

Minor Lane/Major Mvmt

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.998			0.958			0.896	
Flt Protected	0.950				0.999			0.967			0.990	
Satd. Flow (prot)	1150	1727	0	0	1818	0	0	1499	0	0	1399	0
Flt Permitted	0.950				0.999			0.967			0.990	
Satd. Flow (perm)	1150	1727	0	0	1818	0	0	1499	0	0	1399	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		143			173			583			174	
Travel Time (s)		3.3			3.9			13.3			4.0	

Intersection Summary

Area Type: Other

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	30	445	4	9	636	9	9	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	57	10	0	25	3	67	14	0	25
Mvmt Flow	30	445	4	9	636	9	9	0	4

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	645	0	0	449	0	0	1225	1170	447
Stage 1	-	-	-	-	-	-	507	507	-
Stage 2	-	-	-	-	-	-	718	663	-
Critical Hdwy	4.67	-	-	4.35	-	-	7.24	6.5	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.24	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.24	5.5	-
Follow-up Hdwy	2.713	-	-	2.425	-	-	3.626	4	3.525
Pot Cap-1 Maneuver	726	-	-	1000	-	-	147	195	566
Stage 1	-	-	-	-	-	-	526	543	-
Stage 2	-	-	-	-	-	-	402	462	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	726	-	-	1000	-	-	102	184	566
Mov Cap-2 Maneuver	-	-	-	-	-	-	102	184	-
Stage 1	-	-	-	-	-	-	504	521	-
Stage 2	-	-	-	-	-	-	291	456	-

Approach	EB	WB	NB
HCM Control Delay, s	0.6	0.1	34.2
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	136	726	-	-	1000	-	-	300
HCM Lane V/C Ratio	0.096	0.041	-	-	0.009	-	-	0.5
HCM Control Delay (s)	34.2	10.2	-	-	8.6	0	-	28.4
HCM Lane LOS	D	B	-	-	A	A	-	D
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	2.6

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	31	4	115
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	23	100	17
Mvmt Flow	31	4	115

Major/Minor	Minor2		
Conflicting Flow All	1168	1168	641
Stage 1	659	659	-
Stage 2	509	509	-
Critical Hdwy	7.33	7.5	6.37
Critical Hdwy Stg 1	6.33	6.5	-
Critical Hdwy Stg 2	6.33	6.5	-
Follow-up Hdwy	3.707	4.9	3.453
Pot Cap-1 Maneuver	155	129	449
Stage 1	420	339	-
Stage 2	510	406	-
Platoon blocked, %			
Mov Cap-1 Maneuver	147	122	449
Mov Cap-2 Maneuver	147	122	-
Stage 1	403	334	-
Stage 2	485	389	-

Approach	SB
HCM Control Delay, s	28.4
HCM LOS	D

Minor Lane/Major Mvmt

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	100			0	0	0
Storage Lanes	0			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.894		0.998	
Flt Protected		0.996			0.953	
Satd. Flow (prot)	0	1891	1678	0	1789	0
Flt Permitted		0.996			0.953	
Satd. Flow (perm)	0	1891	1678	0	1789	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		909	1364		495	
Travel Time (s)		20.7	31.0		11.3	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	6	78	104	377	308	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	1	0	2	1	1	1
Mvmt Flow	6	78	104	377	308	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	481	0	-	0	383	293
Stage 1	-	-	-	-	293	-
Stage 2	-	-	-	-	90	-
Critical Hdwy	4.11	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.209	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1087	-	-	-	622	749
Stage 1	-	-	-	-	759	-
Stage 2	-	-	-	-	936	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1087	-	-	-	618	749
Mov Cap-2 Maneuver	-	-	-	-	618	-
Stage 1	-	-	-	-	759	-
Stage 2	-	-	-	-	930	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1087	-	-	-	619
HCM Lane V/C Ratio	0.006	-	-	-	0.504
HCM Control Delay (s)	8.3	0	-	-	16.6
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	2.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	150		0	0		0	0		0	150		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.933			0.893				
Flt Protected				0.950				0.994		0.950		
Satd. Flow (prot)	1900	1842	0	1770	1682	0	0	1585	0	1787	1727	0
Flt Permitted				0.950				0.994		0.950		
Satd. Flow (perm)	1900	1842	0	1770	1682	0	0	1585	0	1787	1727	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1364			144			957			513	
Travel Time (s)		31.0			3.3			21.8			11.7	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	167.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	0	381	5	97	464	377	15	10	96
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	3	0	2	9	1	0	10	7
Mvmt Flow	0	381	5	97	464	377	15	10	96

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	841	0	0	386	0	0	1236	1419	384
Stage 1	-	-	-	-	-	-	384	384	-
Stage 2	-	-	-	-	-	-	852	1035	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.1	6.6	6.27
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.6	-
Follow-up Hdwy	2.2	-	-	2.218	-	-	3.5	4.09	3.363
Pot Cap-1 Maneuver	803	-	-	1172	-	-	154	131	653
Stage 1	-	-	-	-	-	-	643	598	-
Stage 2	-	-	-	-	-	-	357	299	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	803	-	-	1172	-	-	137	120	653
Mov Cap-2 Maneuver	-	-	-	-	-	-	137	120	-
Stage 1	-	-	-	-	-	-	643	598	-
Stage 2	-	-	-	-	-	-	318	274	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	20.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	356	803	-	-	1172	-	-	106	157
HCM Lane V/C Ratio	0.34	-	-	-	0.083	-	-	2.906	0.064
HCM Control Delay (s)	20.2	0	-	-	8.3	-	-	$ 945.5	29.5
HCM Lane LOS	C	A	-	-	A	-	-	F	D
HCM 95th %tile Q(veh)	1.5	0	-	-	0.3	-	-	29.2	0.2

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

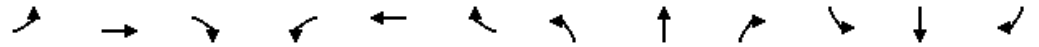
Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	308	10	0
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	150	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	1	10	0
Mvmt Flow	308	10	0

Major/Minor	Minor2		
Conflicting Flow All	1284	1233	653
Stage 1	847	847	-
Stage 2	437	386	-
Critical Hdwy	7.11	6.6	6.2
Critical Hdwy Stg 1	6.11	5.6	-
Critical Hdwy Stg 2	6.11	5.6	-
Follow-up Hdwy	3.509	4.09	3.3
Pot Cap-1 Maneuver	~ 142	171	471
Stage 1	358	367	-
Stage 2	600	596	-
Platoon blocked, %			
Mov Cap-1 Maneuver	~ 106	157	471
Mov Cap-2 Maneuver	~ 106	157	-
Stage 1	358	337	-
Stage 2	503	596	-

Approach	SB
HCM Control Delay, s	$ 916.7
HCM LOS	F

Minor Lane/Major Mvmt



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		25
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.897										0.850
Flt Protected					0.985						0.953	
Satd. Flow (prot)	0	1664	0	0	1818	0	0	0	0	0	1632	1583
Flt Permitted					0.985						0.953	
Satd. Flow (perm)	0	1664	0	0	1818	0	0	0	0	0	1632	1583
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		144			502			626			699	
Travel Time (s)		3.3			11.4			14.2			15.9	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	660

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	0	185	600	374	824	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	7	1	5	2	0	0	0	0
Mvmt Flow	0	185	600	374	824	0	0	0	0

Major/Minor	Major1			Major2		
Conflicting Flow All	824	0	0	785	0	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.1	-	-	4.15	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.245	-	-
Pot Cap-1 Maneuver	815	-	-	820	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-	-		-	-
Mov Cap-1 Maneuver	815	-	-	820	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB
HCM Control Delay, s	0	4.1
HCM LOS		

Minor Lane/Major Mvmt	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	815	-	-	820	-	-	9	373
HCM Lane V/C Ratio	-	-	-	0.456	-	-	18.778	0.306
HCM Control Delay (s)	0	-	-	13	0	-	$ 8807.3	18.8
HCM Lane LOS	A	-	-	B	A	-	F	C
HCM 95th %tile Q(veh)	0	-	-	2.4	-	-	22.8	1.3

Notes

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

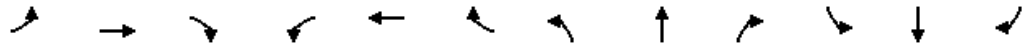
Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	165	4	114
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	25
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	10	50	2
Mvmt Flow	165	4	114

Major/Minor	Minor2		
Conflicting Flow All	2057	2357	824
Stage 1	1572	1572	-
Stage 2	485	785	-
Critical Hdwy	6.5	7	6.22
Critical Hdwy Stg 1	5.5	6	-
Critical Hdwy Stg 2	5.5	6	-
Follow-up Hdwy	3.59	4.45	3.318
Pot Cap-1 Maneuver	~ 58	25	373
Stage 1	180	134	-
Stage 2	603	342	-
Platoon blocked, %			
Mov Cap-1 Maneuver	~ 9	0	373
Mov Cap-2 Maneuver	~ 9	0	-
Stage 1	~ 29	0	-
Stage 2	603	0	-

Approach	SB
HCM Control Delay, s	$ 5267.1
HCM LOS	F

Minor Lane/Major Mvmt



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		50	0		0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.972				0.850			
Flt Protected		0.990						0.953				
Satd. Flow (prot)	0	1741	0	0	1772	0	0	1784	1568	0	0	0
Flt Permitted		0.990						0.953				
Satd. Flow (perm)	0	1741	0	0	1772	0	0	1784	1568	0	0	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		502			143			542			648	
Travel Time (s)		11.4			3.3			12.3			14.7	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	282.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	69	281	0	0	451	119	747	8	591
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	4	9	0	0	4	5	1	50	3
Mvmt Flow	69	281	0	0	451	119	747	8	591

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	570	0	0	281	0	0	930	989	281
Stage 1	-	-	-	-	-	-	419	419	-
Stage 2	-	-	-	-	-	-	511	570	-
Critical Hdwy	4.14	-	-	4.1	-	-	6.41	7	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	5.41	6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.41	6	-
Follow-up Hdwy	2.236	-	-	2.2	-	-	3.509	4.45	3.327
Pot Cap-1 Maneuver	993	-	-	1293	-	-	~ 298	205	755
Stage 1	-	-	-	-	-	-	~ 666	516	-
Stage 2	-	-	-	-	-	-	~ 604	436	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	993	-	-	1293	-	-	~ 274	0	755
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 274	0	-
Stage 1	-	-	-	-	-	-	~ 611	0	-
Stage 2	-	-	-	-	-	-	~ 604	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.8	0	$ 475.4
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	274	755	993	-	-	1293	-	-
HCM Lane V/C Ratio	2.755	0.783	0.069	-	-	-	-	-
HCM Control Delay (s)	$ 828.2	24.7	8.9	0	-	0	-	-
HCM Lane LOS	F	C	A	A	-	A	-	-
HCM 95th %tile Q(veh)	64.5	7.8	0.2	-	-	0	-	-

Notes

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

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	0	0	0
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	0	0	0
Mvmt Flow	0	0	0

Major/Minor
Conflicting Flow All
Stage 1
Stage 2
Critical Hdwy
Critical Hdwy Stg 1
Critical Hdwy Stg 2
Follow-up Hdwy
Pot Cap-1 Maneuver
Stage 1
Stage 2
Platoon blocked, %
Mov Cap-1 Maneuver
Mov Cap-2 Maneuver
Stage 1
Stage 2

Approach
HCM Control Delay, s
HCM LOS

Minor Lane/Major Mvmt

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.998			0.998			0.932			0.879	
Flt Protected	0.950				0.999			0.976			0.997	
Satd. Flow (prot)	1308	1818	0	0	1830	0	0	1728	0	0	1381	0
Flt Permitted	0.950				0.999			0.976			0.997	
Satd. Flow (perm)	1308	1818	0	0	1830	0	0	1728	0	0	1381	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		143			173			583			174	
Travel Time (s)		3.3			3.9			13.3			4.0	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	32	828	12	5	463	8	5	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	38	4	25	25	2	77	0	0	0
Mvmt Flow	32	828	12	5	463	8	5	0	5

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	471	0	0	840	0	0	1429	1379	834
Stage 1	-	-	-	-	-	-	898	898	-
Stage 2	-	-	-	-	-	-	531	481	-
Critical Hdwy	4.48	-	-	4.35	-	-	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.542	-	-	2.425	-	-	3.5	4	3.3
Pot Cap-1 Maneuver	926	-	-	704	-	-	114	146	371
Stage 1	-	-	-	-	-	-	337	361	-
Stage 2	-	-	-	-	-	-	536	557	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	926	-	-	704	-	-	88	140	371
Mov Cap-2 Maneuver	-	-	-	-	-	-	88	140	-
Stage 1	-	-	-	-	-	-	325	349	-
Stage 2	-	-	-	-	-	-	429	551	-

Approach	EB	WB	NB
HCM Control Delay, s	0.3	0.1	32.3
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	142	926	-	-	704	-	-	407
HCM Lane V/C Ratio	0.07	0.035	-	-	0.007	-	-	0.283
HCM Control Delay (s)	32.3	9	-	-	10.2	0	-	17.3
HCM Lane LOS	D	A	-	-	B	A	-	C
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	1.1

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	8	4	103
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	0	0	23
Mvmt Flow	8	4	103

Major/Minor	Minor2		
Conflicting Flow All	1378	1381	467
Stage 1	477	477	-
Stage 2	901	904	-
Critical Hdwy	7.1	6.5	6.43
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.507
Pot Cap-1 Maneuver	123	145	555
Stage 1	573	559	-
Stage 2	335	358	-
Platoon blocked, %			
Mov Cap-1 Maneuver	117	139	555
Mov Cap-2 Maneuver	117	139	-
Stage 1	553	553	-
Stage 2	319	346	-

Approach	SB
HCM Control Delay, s	17.3
HCM LOS	C

Minor Lane/Major Mvmt

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)		0%	0%		0%	
Storage Length (ft)	100			0	0	0
Storage Lanes	0			0	1	0
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.881		0.998	
Flt Protected		0.996			0.953	
Satd. Flow (prot)	0	1747	1637	0	1789	0
Flt Permitted		0.996			0.953	
Satd. Flow (perm)	0	1747	1637	0	1789	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		909	1364		495	
Travel Time (s)		20.7	31.0		11.3	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	6.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	7	74	65	493	328	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	1	9	12	1	1	1
Mvmt Flow	7	74	65	493	328	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	558	0	-	0	400	312
Stage 1	-	-	-	-	312	-
Stage 2	-	-	-	-	88	-
Critical Hdwy	4.11	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.209	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1018	-	-	-	608	731
Stage 1	-	-	-	-	744	-
Stage 2	-	-	-	-	938	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1018	-	-	-	604	731
Mov Cap-2 Maneuver	-	-	-	-	604	-
Stage 1	-	-	-	-	744	-
Stage 2	-	-	-	-	931	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	17.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1018	-	-	-	606
HCM Lane V/C Ratio	0.007	-	-	-	0.55
HCM Control Delay (s)	8.6	0	-	-	17.9
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	3.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	150		0	0		0	0		0	200		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.994			0.929			0.896				
Flt Protected				0.950				0.997		0.950		
Satd. Flow (prot)	1881	1819	0	1703	1739	0	0	1621	0	1787	1881	0
Flt Permitted				0.950				0.997		0.950		
Satd. Flow (perm)	1881	1819	0	1703	1739	0	0	1621	0	1787	1881	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1364			144			957			513	
Travel Time (s)		31.0			3.3			21.8			11.7	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	216.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	0	387	15	77	553	493	5	15	66
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	150	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	4	0	6	2	1	25	1	4
Mvmt Flow	0	387	15	77	553	493	5	15	66

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	1046	0	0	402	0	0	1354	1595	395
Stage 1	-	-	-	-	-	-	395	395	-
Stage 2	-	-	-	-	-	-	959	1200	-
Critical Hdwy	4.11	-	-	4.16	-	-	7.35	6.51	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.51	-
Follow-up Hdwy	2.209	-	-	2.254	-	-	3.725	4.009	3.336
Pot Cap-1 Maneuver	669	-	-	1135	-	-	113	107	650
Stage 1	-	-	-	-	-	-	587	606	-
Stage 2	-	-	-	-	-	-	281	259	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	669	-	-	1135	-	-	101	100	650
Mov Cap-2 Maneuver	-	-	-	-	-	-	101	100	-
Stage 1	-	-	-	-	-	-	587	606	-
Stage 2	-	-	-	-	-	-	254	241	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	22.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	286	669	-	-	1135	-	-	91	140
HCM Lane V/C Ratio	0.301	-	-	-	0.068	-	-	3.615	0.071
HCM Control Delay (s)	22.9	0	-	-	8.4	-	-	$ 1273.8	32.7
HCM Lane LOS	C	A	-	-	A	-	-	F	D
HCM 95th %tile Q(veh)	1.2	0	-	-	0.2	-	-	33.4	0.2

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

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	329	10	0
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	200	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	1	1	1
Mvmt Flow	329	10	0

Major/Minor	Minor2		
Conflicting Flow All	1389	1356	800
Stage 1	954	954	-
Stage 2	435	402	-
Critical Hdwy	7.11	6.51	6.21
Critical Hdwy Stg 1	6.11	5.51	-
Critical Hdwy Stg 2	6.11	5.51	-
Follow-up Hdwy	3.509	4.009	3.309
Pot Cap-1 Maneuver	~ 121	150	387
Stage 1	~ 312	339	-
Stage 2	602	602	-
Platoon blocked, %			
Mov Cap-1 Maneuver	~ 91	140	387
Mov Cap-2 Maneuver	~ 91	140	-
Stage 1	~ 312	316	-
Stage 2	527	602	-

Approach	SB
HCM Control Delay, s	$ 1237.2
HCM LOS	F

Minor Lane/Major Mvmt

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		25
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.890										0.850
Flt Protected					0.986						0.953	
Satd. Flow (prot)	0	1655	0	0	1850	0	0	0	0	0	1743	1495
Flt Permitted					0.986						0.953	
Satd. Flow (perm)	0	1655	0	0	1850	0	0	0	0	0	1743	1495
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		144			502			626			699	
Travel Time (s)		3.3			11.4			14.2			15.9	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	6153.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	0	146	636	375	982	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	3	2	2	1	0	0	0	0
Mvmt Flow	0	146	636	375	982	0	0	0	0

Major/Minor	Major1			Major2		
Conflicting Flow All	982	0	0	782	0	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	711	-	-	836	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-	-		-	-
Mov Cap-1 Maneuver	711	-	-	836	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB
HCM Control Delay, s	0	3.5
HCM LOS		

Minor Lane/Major Mvmt	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	711	-	-	836	-	-	1	294
HCM Lane V/C Ratio	-	-	-	0.449	-	-	176	0.48
HCM Control Delay (s)	0	-	-	12.8	0	-	$ 85822.9	28
HCM Lane LOS	A	-	-	B	A	-	F	D
HCM 95th %tile Q(veh)	0	-	-	2.3	-	-	24.6	2.5

Notes

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

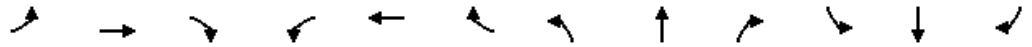
Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	172	4	141
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	25
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	4	0	8
Mvmt Flow	172	4	141

Major/Minor	Minor2		
Conflicting Flow All	2196	2514	982
Stage 1	1732	1732	-
Stage 2	464	782	-
Critical Hdwy	6.44	6.5	6.28
Critical Hdwy Stg 1	5.44	5.5	-
Critical Hdwy Stg 2	5.44	5.5	-
Follow-up Hdwy	3.536	4	3.372
Pot Cap-1 Maneuver	~ 49	29	294
Stage 1	~ 155	144	-
Stage 2	629	408	-
Platoon blocked, %			
Mov Cap-1 Maneuver	~ 1	0	294
Mov Cap-2 Maneuver	~ 1	0	-
Stage 1	~ 2	0	-
Stage 2	629	0	-

Approach	SB
HCM Control Delay, s	$ 47661.8
HCM LOS	F

Minor Lane/Major Mvmt



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		50	0		0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.970				0.850			
Flt Protected		0.988						0.953				
Satd. Flow (prot)	0	1804	0	0	1755	0	0	1793	1568	0	0	0
Flt Permitted		0.988						0.953				
Satd. Flow (perm)	0	1804	0	0	1755	0	0	1793	1568	0	0	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		502			143			542			648	
Travel Time (s)		11.4			3.3			12.3			14.7	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	410.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	74	244	0	0	430	124	927	4	564
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	1	5	0	0	3	12	1	0	3
Mvmt Flow	74	244	0	0	430	124	927	4	564

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	554	0	0	244	0	0	884	946	244
Stage 1	-	-	-	-	-	-	392	392	-
Stage 2	-	-	-	-	-	-	492	554	-
Critical Hdwy	4.11	-	-	4.1	-	-	6.41	6.5	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	5.41	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.41	5.5	-
Follow-up Hdwy	2.209	-	-	2.2	-	-	3.509	4	3.327
Pot Cap-1 Maneuver	1021	-	-	1334	-	-	~ 317	264	792
Stage 1	-	-	-	-	-	-	~ 685	610	-
Stage 2	-	-	-	-	-	-	~ 617	517	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1021	-	-	1334	-	-	~ 290	0	792
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 290	0	-
Stage 1	-	-	-	-	-	-	~ 627	0	-
Stage 2	-	-	-	-	-	-	~ 617	0	-

Approach	EB	WB	NB
HCM Control Delay, s	2	0	$ 648.8
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR
Capacity (veh/h)	290	792	1021	-	-	1334	-	-
HCM Lane V/C Ratio	3.21	0.712	0.072	-	-	-	-	-
HCM Control Delay (s)	$ 1029.8	20	8.8	0	-	0	-	-
HCM Lane LOS	F	C	A	A	-	A	-	-
HCM 95th %tile Q(veh)	84.3	6.1	0.2	-	-	0	-	-

Notes

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

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	0	0	0
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	0	0	0
Mvmt Flow	0	0	0

Major/Minor
Conflicting Flow All
Stage 1
Stage 2
Critical Hdwy
Critical Hdwy Stg 1
Critical Hdwy Stg 2
Follow-up Hdwy
Pot Cap-1 Maneuver
Stage 1
Stage 2
Platoon blocked, %
Mov Cap-1 Maneuver
Mov Cap-2 Maneuver
Stage 1
Stage 2

Approach
HCM Control Delay, s
HCM LOS

Minor Lane/Major Mvmt

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.998			0.966			0.884	
Flt Protected	0.950				0.999			0.976			0.995	
Satd. Flow (prot)	1570	1824	0	0	1820	0	0	1518	0	0	1458	0
Flt Permitted	0.950				0.999			0.976			0.995	
Satd. Flow (perm)	1570	1824	0	0	1820	0	0	1518	0	0	1458	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		143			173			583			174	
Travel Time (s)		3.3			3.9			13.3			4.0	

Intersection Summary	
Area Type:	Other

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	16	787	5	5	441	8	10	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	15	4	17	0	3	67	11	0	50
Mvmt Flow	16	787	5	5	441	8	10	5	5

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	449	0	0	792	0	0	1331	1281	790
Stage 1	-	-	-	-	-	-	822	822	-
Stage 2	-	-	-	-	-	-	509	459	-
Critical Hdwy	4.25	-	-	4.1	-	-	7.21	6.5	6.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.21	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.21	5.5	-
Follow-up Hdwy	2.335	-	-	2.2	-	-	3.599	4	3.75
Pot Cap-1 Maneuver	1046	-	-	838	-	-	126	167	324
Stage 1	-	-	-	-	-	-	355	391	-
Stage 2	-	-	-	-	-	-	530	570	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1046	-	-	838	-	-	100	163	324
Mov Cap-2 Maneuver	-	-	-	-	-	-	100	163	-
Stage 1	-	-	-	-	-	-	350	385	-
Stage 2	-	-	-	-	-	-	430	565	-

Approach	EB	WB	NB
HCM Control Delay, s	0.2	0.1	35.7
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	137	1046	-	-	838	-	-	404
HCM Lane V/C Ratio	0.146	0.015	-	-	0.006	-	-	0.297
HCM Control Delay (s)	35.7	8.5	-	-	9.3	0	-	17.6
HCM Lane LOS	E	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.5	0	-	-	0	-	-	1.2

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	13	4	103
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	0	0	17
Mvmt Flow	13	4	103

Major/Minor	Minor2		
Conflicting Flow All	1282	1279	445
Stage 1	455	455	-
Stage 2	827	824	-
Critical Hdwy	7.1	6.5	6.37
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.453
Pot Cap-1 Maneuver	144	167	583
Stage 1	589	572	-
Stage 2	369	390	-
Platoon blocked, %			
Mov Cap-1 Maneuver	136	163	583
Mov Cap-2 Maneuver	136	163	-
Stage 1	580	567	-
Stage 2	353	384	-

Approach	SB
HCM Control Delay, s	17.6
HCM LOS	C

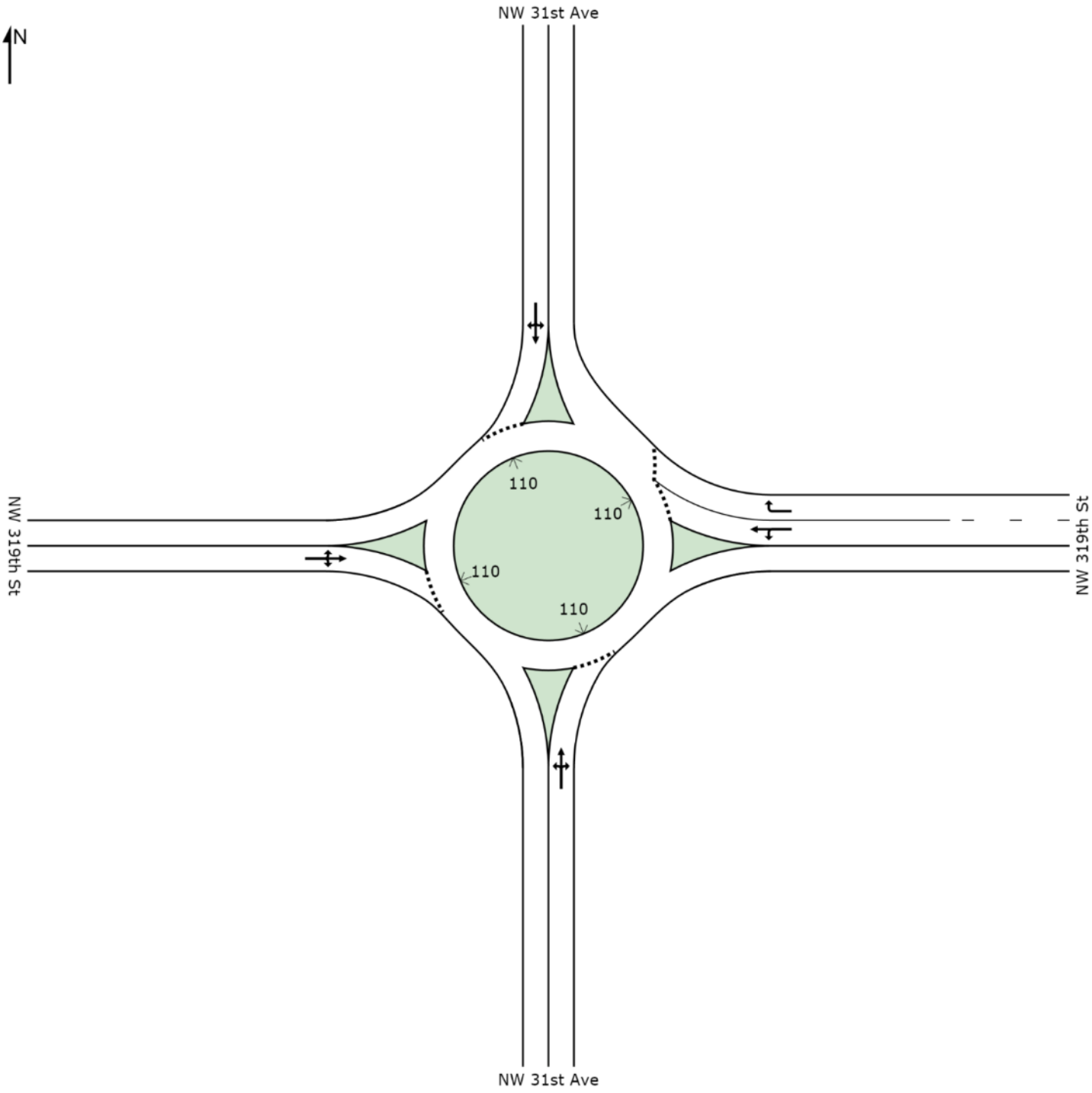
Minor Lane/Major Mvmt

Appendix V 2017 Total Traffic Conditions (Build) Worksheets – Study Intersections

SITE LAYOUT

Site: 2017 Total Build NW 319 St and NW 31st Ave Weekday AM

2017 Total Traffic Weekday AM
Roundabout



MOVEMENT SUMMARY

Site: 2017 Total Build NW 319 St and NW 31st Ave Weekday AM

2017 Total Traffic Weekday AM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NW 31st Ave											
3	L2	5	0.0	0.117	6.0	LOS A	0.5	15.8	0.46	0.33	34.4
8	T1	5	1.0	0.117	6.0	LOS A	0.5	15.8	0.46	0.33	34.3
18	R2	78	23.0	0.117	6.0	LOS A	0.5	15.8	0.46	0.33	30.2
Approach		88	20.4	0.117	6.0	LOS A	0.5	15.8	0.46	0.33	30.7
East: NW 319th St											
1	L2	49	11.0	0.153	3.5	LOS A	0.8	21.8	0.07	0.01	34.2
6	T1	192	2.0	0.153	3.5	LOS A	0.8	21.8	0.07	0.01	33.7
16	R2	146	1.0	0.108	3.5	LOS A	0.6	14.1	0.07	0.01	32.6
Approach		387	2.8	0.153	3.5	LOS A	0.8	21.8	0.07	0.01	33.4
North: NW 31st Ave											
7	L2	110	1.0	0.120	4.8	LOS A	0.6	14.2	0.41	0.27	30.2
4	T1	5	1.0	0.120	4.8	LOS A	0.6	14.2	0.41	0.27	32.4
14	R2	1	1.0	0.120	4.8	LOS A	0.6	14.2	0.41	0.27	30.8
Approach		116	1.0	0.120	4.8	LOS A	0.6	14.2	0.41	0.27	30.4
West: NW 319th St											
5	L2	1	1.0	0.172	5.2	LOS A	0.9	22.4	0.37	0.23	34.8
2	T1	155	4.0	0.172	5.2	LOS A	0.9	22.4	0.37	0.23	32.9
12	R2	15	0.0	0.172	5.2	LOS A	0.9	22.4	0.37	0.23	33.9
Approach		171	3.6	0.172	5.2	LOS A	0.9	22.4	0.37	0.23	33.0
All Vehicles		762	4.7	0.172	4.4	LOS A	0.9	22.4	0.24	0.14	32.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2017 Total Build NW 319 St and NW 31st Ave Weekday AM

2017 Total Traffic Weekday AM
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NW 31st Ave													
Lane 1[d]	88	20.4	754	0.117	100	6.0	LOS A	0.5	15.8	Full	1600	0.0	0.0
Approach	88	20.4		0.117		6.0	LOS A	0.5	15.8				
East: NW 319th St													
Lane 1[d]	241	3.8	1578	0.153	100	3.5	LOS A	0.8	21.8	Full	650	0.0	0.0
Lane 2	146	1.0	1356	0.108	100	3.5	LOS A	0.6	14.1	Full	650	0.0	0.0
Approach	387	2.8		0.153		3.5	LOS A	0.8	21.8				
North: NW 31st Ave													
Lane 1[d]	116	1.0	966	0.120	100	4.8	LOS A	0.6	14.2	Full	1400	0.0	0.0
Approach	116	1.0		0.120		4.8	LOS A	0.6	14.2				
West: NW 319th St													
Lane 1[d]	171	3.6	997	0.172	100	5.2	LOS A	0.9	22.4	Full	1300	0.0	0.0
Approach	171	3.6		0.172		5.2	LOS A	0.9	22.4				
Intersection	762	4.7		0.172		4.4	LOS A	0.9	22.4				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

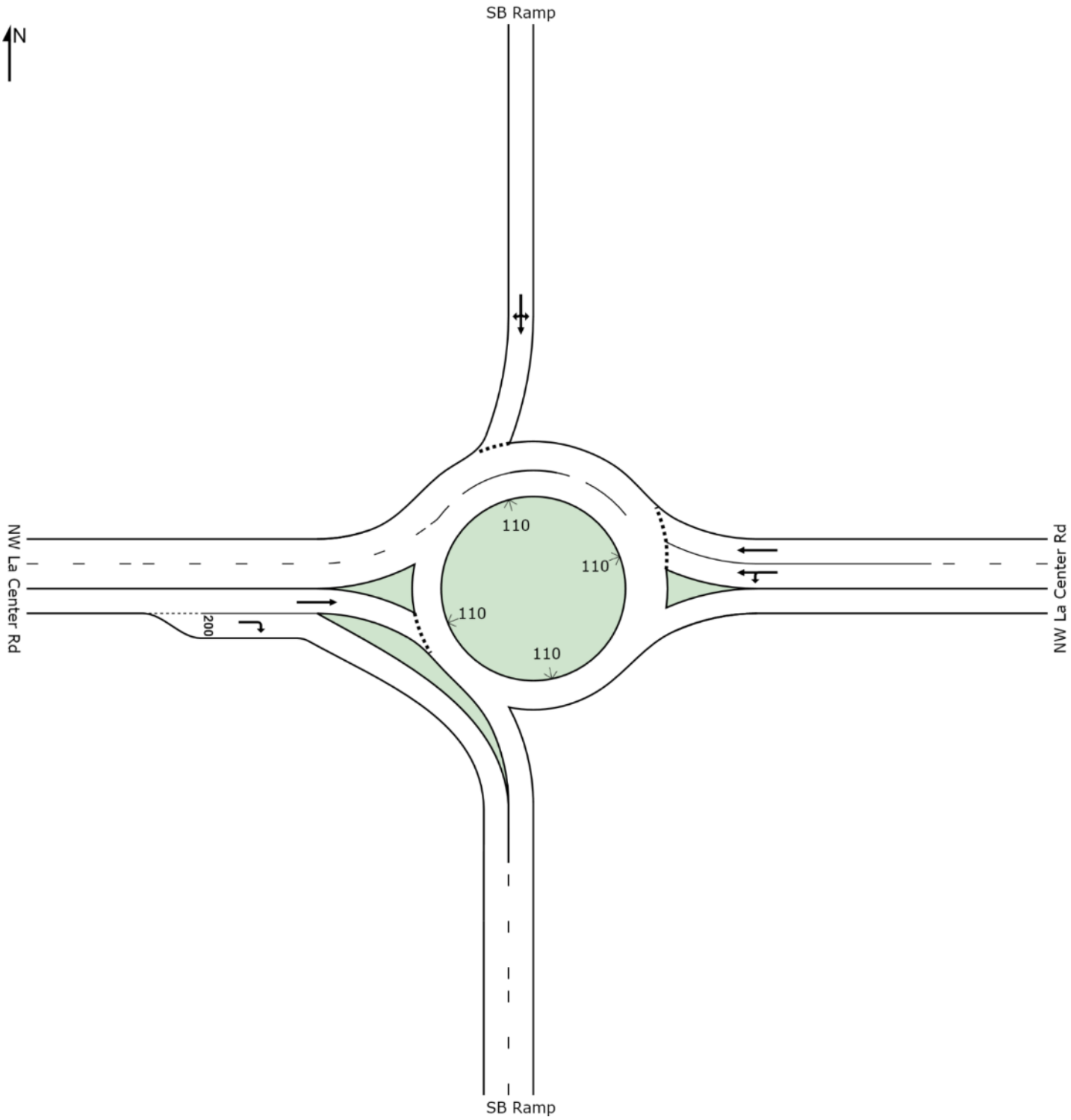
d Dominant lane on roundabout approach

SIDRA INTERSECTION 6

SITE LAYOUT

Site: 2017 Total Build NW La Center and SB Ramps Weekday AM

2017 Total Traffic Weekday AM
Roundabout



MOVEMENT SUMMARY

Site: 2017 Total Build NW La Center and SB Ramps Weekday AM

2017 Total Traffic Weekday AM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: NW La Center Rd											
1	L2	535	4.0	0.314	4.6	LOS A	0.0	0.0	0.00	0.00	32.2
6	T1	361	2.0	0.245	4.5	LOS A	0.0	0.0	0.00	0.00	38.5
Approach		896	3.2	0.314	4.6	LOS A	0.0	0.0	0.00	0.00	33.9
North: SB Ramp											
7	L2	118	13.0	0.269	10.4	LOS B	1.0	26.4	0.59	0.59	26.5
4	T1	4	50.0	0.269	10.4	LOS B	1.0	26.4	0.59	0.59	28.7
14	R2	25	8.0	0.269	10.4	LOS B	1.0	26.4	0.59	0.59	25.9
Approach		147	13.2	0.269	10.4	LOS B	1.0	26.4	0.59	0.59	26.5
West: NW La Center Rd											
2	T1	118	20.0	0.172	7.2	LOS A	0.9	26.3	0.67	0.60	29.1
12	R2	225	2.0	0.137	0.0	LOS A	0.0	0.0	0.00	0.00	35.9
Approach		343	8.2	0.172	2.5	LOS A	0.9	26.3	0.23	0.20	33.8
All Vehicles		1386	5.5	0.314	4.7	LOS A	1.0	26.4	0.12	0.11	32.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2017 Total Build NW La Center and SB Ramps Weekday AM

2017 Total Traffic Weekday AM
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
East: NW La Center Rd													
Lane 1[d]	535	4.0	1706	0.314	100	4.6	LOS A	0.0	0.0	Full	600	0.0	0.0
Lane 2	361	2.0	1471	0.245	78[5]	4.5	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	896	3.2		0.314		4.6	LOS A	0.0	0.0				
North: SB Ramp													
Lane 1[d]	147	13.2	546	0.269	100	10.4	LOS B	1.0	26.4	Full	1300	0.0	0.0
Approach	147	13.2		0.269		10.4	LOS B	1.0	26.4				
West: NW La Center Rd													
Lane 1[d]	118	20.0	688	0.172	100	7.2	LOS A	0.9	26.3	Full	650	0.0	0.0
Lane 2	225	2.0	1642	0.137	100	0.0	LOS A	0.0	0.0	Short	200	0.0	0.0
Approach	343	8.2		0.172		2.5	LOS A	0.9	26.3				
Intersection	1386	5.5		0.314		4.7	LOS A	1.0	26.4				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane underutilisation determined by program
d Dominant lane on roundabout approach

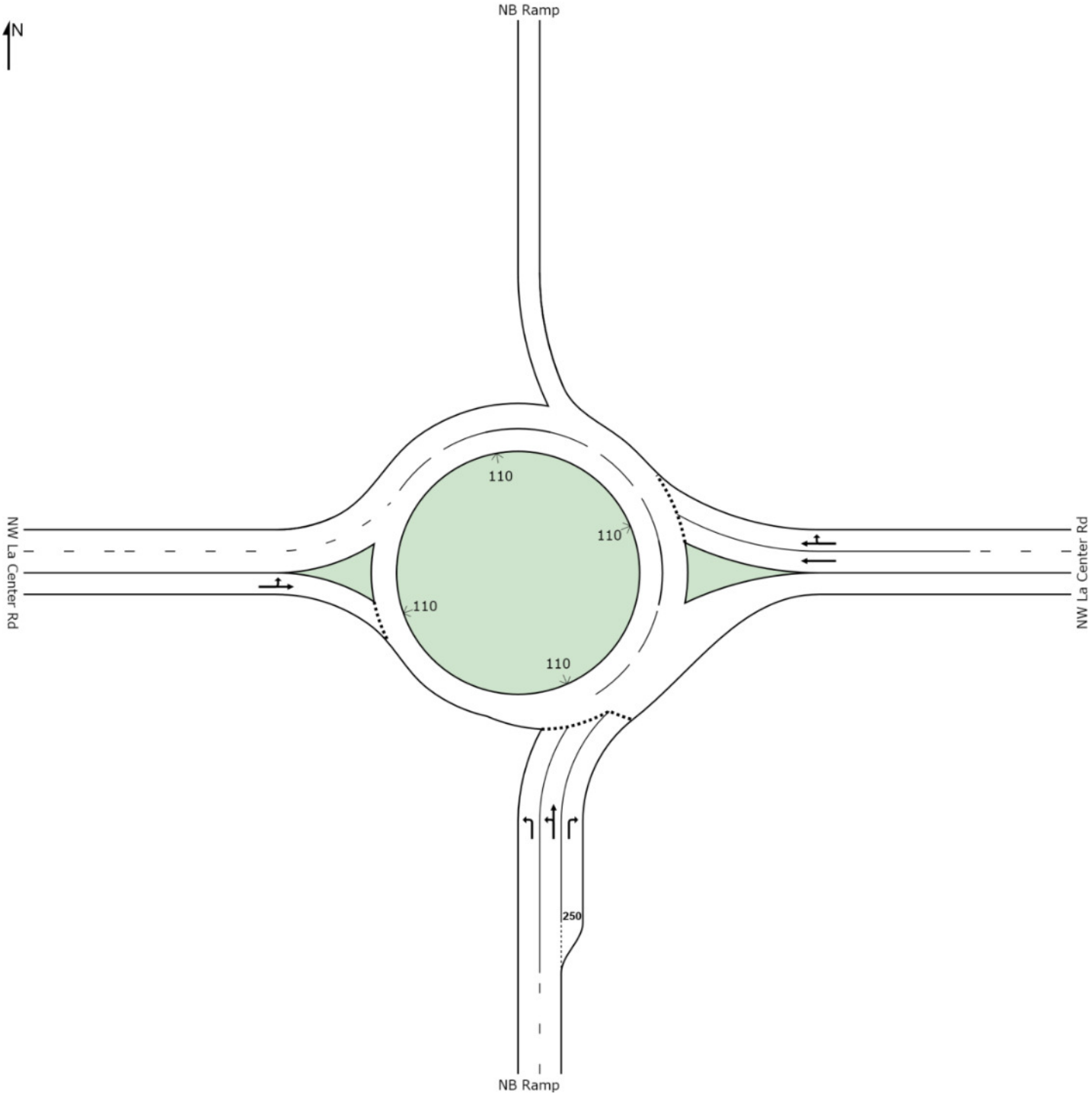
SIDRA INTERSECTION 6

SITE LAYOUT

Site: 2017 Total Build NW La Center and NB Ramps Weekday AM

2017 Total Traffic Weekday AM

Roundabout



MOVEMENT SUMMARY

Site: 2017 Total Build NW La Center and NB Ramps Weekday AM

2017 Total Traffic Weekday AM

Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Ramp											
3	L2	292	1.0	0.163	5.5	LOS A	0.8	19.4	0.44	0.31	24.9
8	T1	4	50.0	0.163	5.6	LOS A	0.8	19.6	0.44	0.31	29.1
18	R2	321	7.0	0.292	6.1	LOS A	1.6	41.8	0.46	0.33	29.7
Approach		617	4.4	0.292	5.8	LOS A	1.6	41.8	0.45	0.32	27.1
East: NW La Center Rd											
6	T1	604	4.0	0.563	11.2	LOS B	3.5	91.4	0.59	0.56	21.1
16	R2	156	17.0	0.349	10.4	LOS B	1.5	41.7	0.54	0.52	25.7
Approach		760	6.7	0.563	11.0	LOS B	3.5	91.4	0.58	0.55	22.1
West: NW La Center Rd											
5	L2	77	17.0	0.167	3.9	LOS A	0.0	0.0	0.00	0.00	34.7
2	T1	159	17.0	0.167	3.9	LOS A	0.0	0.0	0.00	0.00	34.5
Approach		236	17.0	0.167	3.9	LOS A	0.0	0.0	0.00	0.00	34.5
All Vehicles		1613	7.3	0.563	8.0	LOS A	3.5	91.4	0.44	0.38	25.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2017 Total Build NW La Center and NB Ramps Weekday AM

2017 Total Traffic Weekday AM

Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NB Ramp													
Lane 1	150	1.0	923	0.163	100	5.5	LOS A	0.8	19.4	Full	1800	0.0	0.0
Lane 2	146	2.3	898	0.163	100	5.6	LOS A	0.8	19.6	Full	180	0.0	0.0
Lane 3[d]	321	7.0	1098	0.292	100	6.1	LOS A	1.6	41.8	Short	250	0.0	0.0
Approach	617	4.4		0.292		5.8	LOS A	1.6	41.8				
East: NW La Center Rd													
Lane 1[d]	538	4.0	956	0.563	100	11.3	LOS B	3.5	91.4	Full	600	0.0	0.0
Lane 2	222	13.1	637	0.349	62[7]	10.4	LOS B	1.5	41.7	Full	600	0.0	0.0
Approach	760	6.7		0.563		11.0	LOS B	3.5	91.4				
West: NW La Center Rd													
Lane 1[d]	236	17.0	1413	0.167	100	3.9	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	236	17.0		0.167		3.9	LOS A	0.0	0.0				
Intersection	1613	7.3		0.563		8.0	LOS A	3.5	91.4				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

7 Lane underutilisation specified by user
d Dominant lane on roundabout approach

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	91	384	5	10	628	9	10	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	250	-	-	200	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	42	13	0	25	3	20	14	0	25
Mvmt Flow	91	384	5	10	628	9	10	0	5

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	637	0	0	389	0	0	1256	1226	387
Stage 1	-	-	-	-	-	-	569	569	-
Stage 2	-	-	-	-	-	-	687	657	-
Critical Hdwy	4.52	-	-	4.35	-	-	7.24	6.5	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.24	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.24	5.5	-
Follow-up Hdwy	2.578	-	-	2.425	-	-	3.626	4	3.525
Pot Cap-1 Maneuver	782	-	-	1055	-	-	140	180	613
Stage 1	-	-	-	-	-	-	486	509	-
Stage 2	-	-	-	-	-	-	418	465	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	782	-	-	1055	-	-	104	158	613
Mov Cap-2 Maneuver	-	-	-	-	-	-	104	158	-
Stage 1	-	-	-	-	-	-	429	450	-
Stage 2	-	-	-	-	-	-	348	461	-

Approach	EB	WB	NB
HCM Control Delay, s	1.9	0.1	32.9
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	144	782	-	-	1055	-	-	190
HCM Lane V/C Ratio	0.104	0.116	-	-	0.009	-	-	0.568
HCM Control Delay (s)	32.9	10.2	-	-	8.4	-	-	46.3
HCM Lane LOS	D	B	-	-	A	-	-	E
HCM 95th %tile Q(veh)	0.3	0.4	-	-	0	-	-	3

Intersection	
Int Delay, s/veh	

Movement	SBL	SBT	SBR
Vol, veh/h	39	4	65
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	69	100	30
Mvmt Flow	39	4	65

Major/Minor	Minor2		
Conflicting Flow All	1224	1224	633
Stage 1	653	653	-
Stage 2	571	571	-
Critical Hdwy	7.79	7.5	6.5
Critical Hdwy Stg 1	6.79	6.5	-
Critical Hdwy Stg 2	6.79	6.5	-
Follow-up Hdwy	4.121	4.9	3.57
Pot Cap-1 Maneuver	115	118	433
Stage 1	362	341	-
Stage 2	405	377	-
Platoon blocked, %			
Mov Cap-1 Maneuver	103	103	433
Mov Cap-2 Maneuver	103	103	-
Stage 1	320	338	-
Stage 2	355	333	-

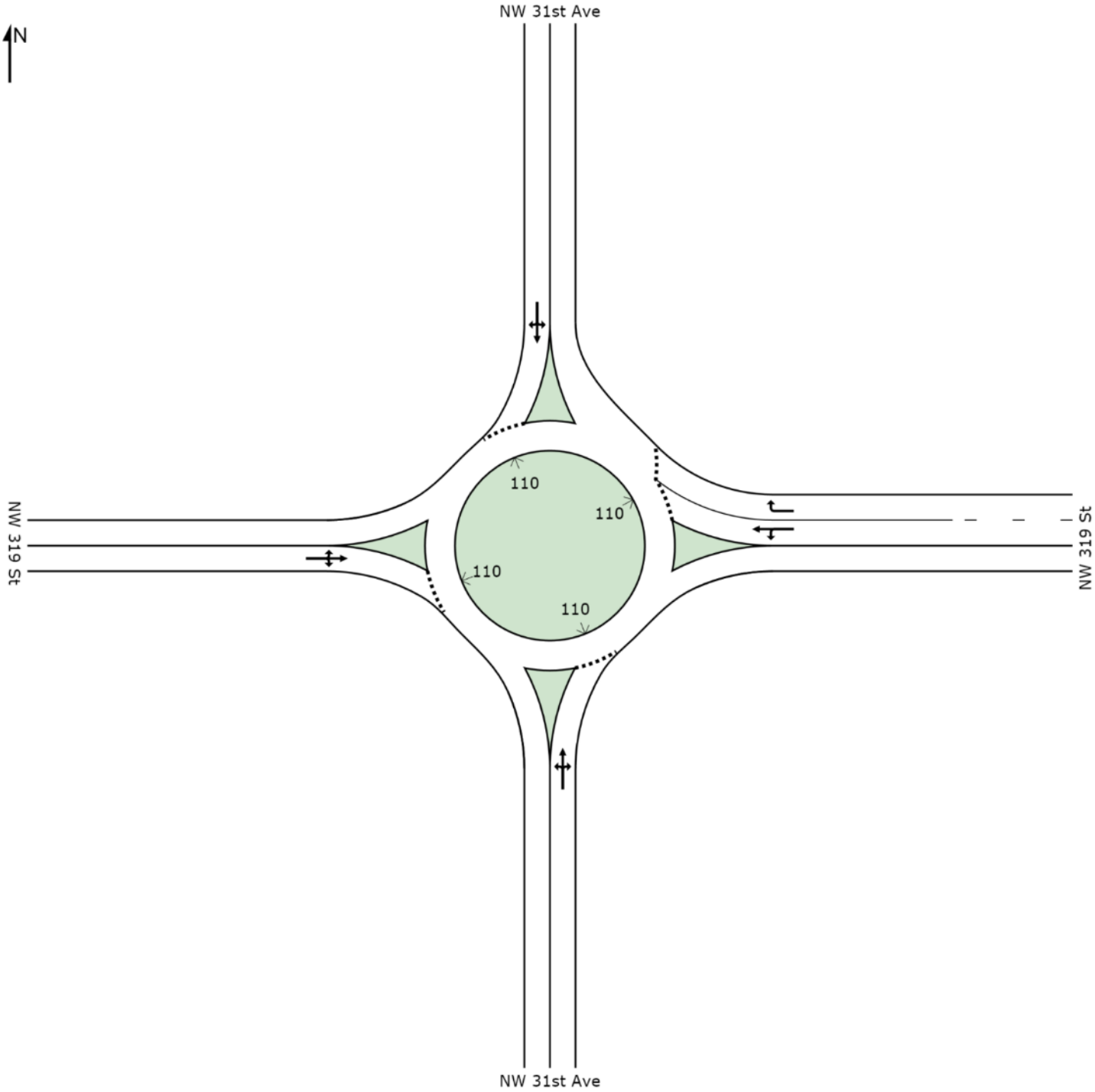
Approach	SB
HCM Control Delay, s	46.3
HCM LOS	E

Minor Lane/Major Mvmt

SITE LAYOUT

Site: 2017 Total Build NW 319 St and NW 31st Ave Weekday AM 85/15 Split

2017 Total Traffic Weekday AM
85/15 Split Sensitivity Analysis
Roundabout



MOVEMENT SUMMARY

Site: 2017 Total Build NW 319 St and NW 31st Ave Weekday PM

2017 Total Traffic Weekday PM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NW 31st Ave											
3	L2	17	0.0	0.211	8.9	LOS A	1.2	30.8	0.73	0.68	32.6
8	T1	10	10.0	0.211	8.9	LOS A	1.2	30.8	0.73	0.68	32.5
18	R2	96	7.0	0.211	8.9	LOS A	1.2	30.8	0.73	0.68	29.2
Approach		123	6.3	0.211	8.9	LOS A	1.2	30.8	0.73	0.68	30.0
East: NW 319th St											
1	L2	97	2.0	0.378	5.8	LOS A	2.9	77.6	0.18	0.06	33.0
6	T1	464	9.0	0.378	5.8	LOS A	2.9	77.6	0.18	0.06	31.8
16	R2	377	1.0	0.280	5.1	LOS A	1.9	47.5	0.17	0.05	31.5
Approach		938	5.1	0.378	5.5	LOS A	2.9	77.6	0.18	0.06	31.8
North: NW 31st Ave											
7	L2	308	1.0	0.450	11.4	LOS B	3.0	75.8	0.75	0.76	26.8
4	T1	10	10.0	0.450	11.4	LOS B	3.0	75.8	0.75	0.76	29.4
14	R2	1	0.0	0.450	11.4	LOS B	3.0	75.8	0.75	0.76	28.0
Approach		319	1.3	0.450	11.4	LOS B	3.0	75.8	0.75	0.76	26.9
West: NW 319th St											
5	L2	1	0.0	0.495	11.5	LOS B	3.6	92.3	0.73	0.67	31.4
2	T1	381	3.0	0.495	11.5	LOS B	3.6	92.3	0.73	0.67	28.8
12	R2	5	0.0	0.495	11.5	LOS B	3.6	92.3	0.73	0.67	30.7
Approach		387	3.0	0.495	11.5	LOS B	3.6	92.3	0.73	0.67	28.9
All Vehicles		1767	4.0	0.495	8.1	LOS A	3.6	92.3	0.44	0.36	30.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2017 Total Build NW 319 St and NW 31st Ave Weekday PM

2017 Total Traffic Weekday PM
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NW 31st Ave													
Lane 1[d]	123	6.3	582	0.211	100	8.9	LOS A	1.2	30.8	Full	1600	0.0	0.0
Approach	123	6.3		0.211		8.9	LOS A	1.2	30.8				
East: NW 319th St													
Lane 1[d]	561	7.8	1484	0.378	100	5.8	LOS A	2.9	77.6	Full	650	0.0	0.0
Lane 2	377	1.0	1348	0.280	100	5.1	LOS A	1.9	47.5	Full	650	0.0	0.0
Approach	938	5.1		0.378		5.5	LOS A	2.9	77.6				
North: NW 31st Ave													
Lane 1[d]	319	1.3	709	0.450	100	11.4	LOS B	3.0	75.8	Full	1400	0.0	0.0
Approach	319	1.3		0.450		11.4	LOS B	3.0	75.8				
West: NW 319th St													
Lane 1[d]	387	3.0	783	0.495	100	11.5	LOS B	3.6	92.3	Full	1300	0.0	0.0
Approach	387	3.0		0.495		11.5	LOS B	3.6	92.3				
Intersection	1767	4.0		0.495		8.1	LOS A	3.6	92.3				

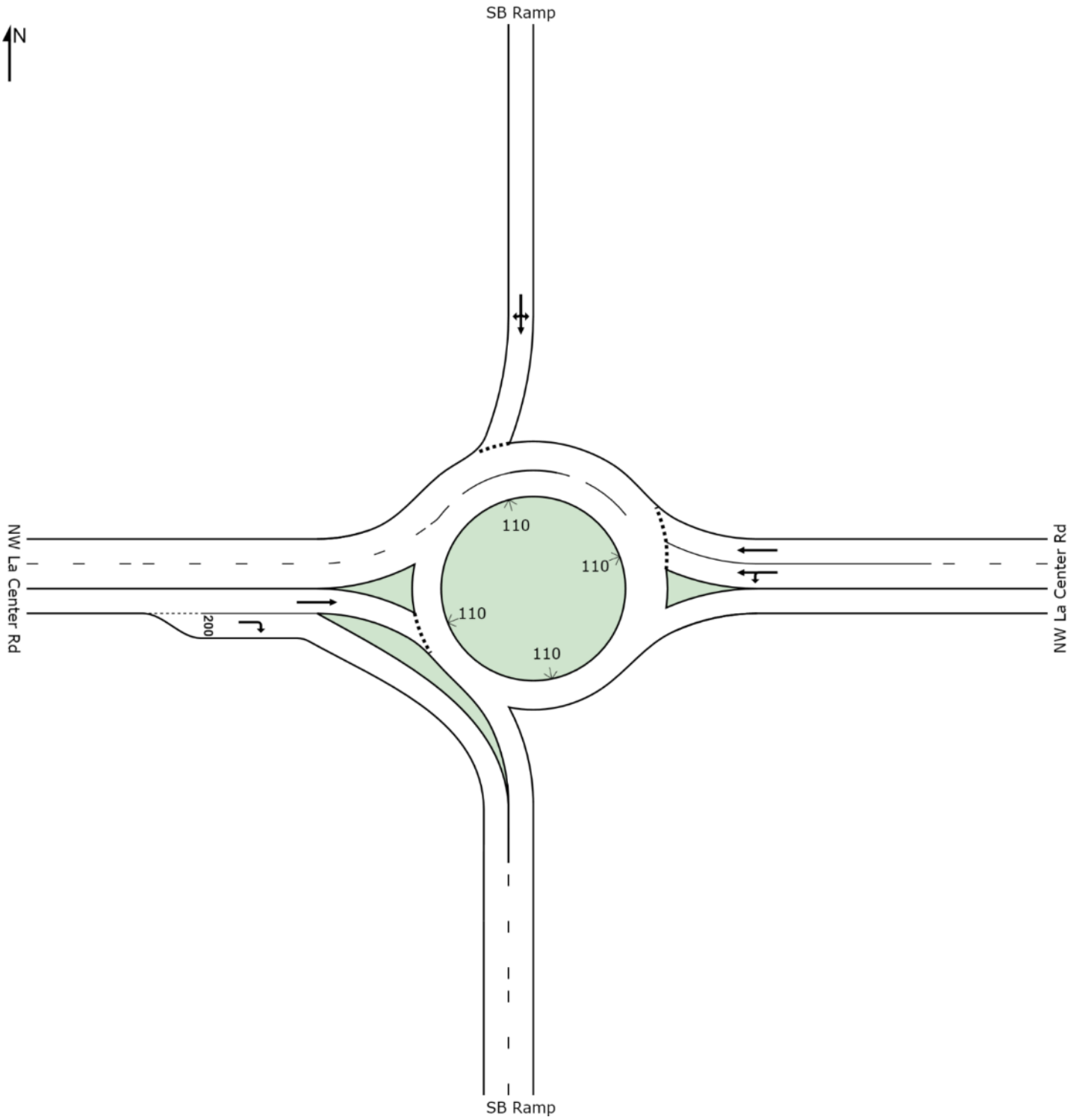
Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

SITE LAYOUT

Site: 2017 Total Build NW La Center and SB Ramps Weekday AM

2017 Total Traffic Weekday AM
Roundabout



MOVEMENT SUMMARY

Site: 2017 Total Build NW La Center and SB Ramps Weekday PM

2017 Total Traffic Weekday PM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: NW La Center Rd											
1	L2	374	5.0	0.373	5.8	LOS A	0.0	0.0	0.00	0.00	33.7
6	T1	824	2.0	0.373	5.3	LOS A	0.0	0.0	0.00	0.00	37.1
Approach		1198	2.9	0.373	5.4	LOS A	0.0	0.0	0.00	0.00	35.7
North: SB Ramp											
7	L2	165	10.0	0.531	16.8	LOS B	2.6	67.8	0.72	0.81	24.2
4	T1	4	50.0	0.531	16.8	LOS B	2.6	67.8	0.72	0.81	26.6
14	R2	114	2.0	0.531	16.8	LOS B	2.6	67.8	0.72	0.81	23.8
Approach		283	7.3	0.531	16.8	LOS B	2.6	67.8	0.72	0.81	24.1
West: NW La Center Rd											
2	T1	185	7.0	0.214	6.4	LOS A	1.2	32.0	0.64	0.54	30.5
12	R2	600	1.0	0.362	0.0	LOS A	0.0	0.0	0.00	0.00	35.9
Approach		785	2.4	0.362	1.5	LOS A	1.2	32.0	0.15	0.13	34.8
All Vehicles		2266	3.3	0.531	5.5	LOS A	2.6	67.8	0.14	0.14	33.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2017 Total Build NW La Center and SB Ramps Weekday PM

2017 Total Traffic Weekday PM
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
East: NW La Center Rd													
Lane 1	550	4.0	1474	0.373	100	5.8	LOS A	0.0	0.0	Full	600	0.0	0.0
Lane 2[d]	648	2.0	1739	0.373	100	5.2	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	1198	2.9		0.373		5.4	LOS A	0.0	0.0				
North: SB Ramp													
Lane 1[d]	283	7.3	533	0.531	100	16.8	LOS B	2.6	67.8	Full	1300	0.0	0.0
Approach	283	7.3		0.531		16.8	LOS B	2.6	67.8				
West: NW La Center Rd													
Lane 1[d]	185	7.0	864	0.214	100	6.4	LOS A	1.2	32.0	Full	650	0.0	0.0
Lane 2	600	1.0	1658	0.362	100	0.0	LOS A	0.0	0.0	Short	200	0.0	0.0
Approach	785	2.4		0.362		1.5	LOS A	1.2	32.0				
Intersection	2266	3.3		0.531		5.5	LOS A	2.6	67.8				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

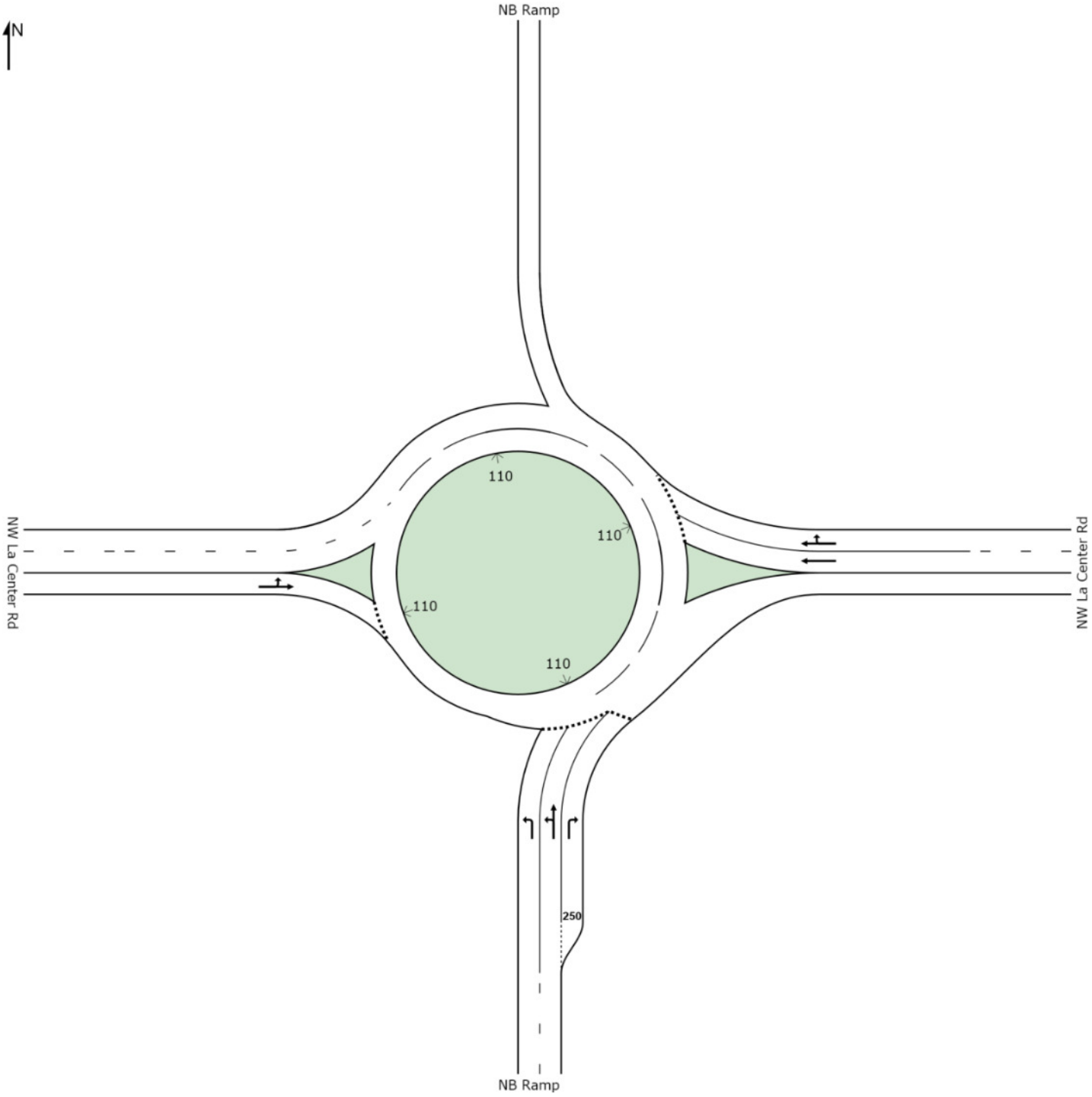
SIDRA INTERSECTION 6

SITE LAYOUT

Site: 2017 Total Build NW La Center and NB Ramps Weekday AM

2017 Total Traffic Weekday AM

Roundabout



MOVEMENT SUMMARY

Site: 2017 Total Build NW La Center and NB Ramps Weekday PM

2017 Total Traffic Weekday PM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Ramp											
3	L2	747	1.0	0.407	8.6	LOS A	2.4	60.3	0.59	0.49	23.9
8	T1	8	50.0	0.407	8.6	LOS A	2.4	60.6	0.59	0.49	27.9
18	R2	591	3.0	0.543	9.9	LOS A	4.0	102.7	0.64	0.54	27.9
Approach		1346	2.2	0.543	9.1	LOS A	4.0	102.7	0.61	0.51	25.5
East: NW La Center Rd											
6	T1	451	4.0	0.503	12.0	LOS B	2.8	71.1	0.69	0.73	20.7
16	R2	119	5.0	0.342	11.0	LOS B	1.5	38.4	0.65	0.66	25.6
Approach		570	4.2	0.503	11.8	LOS B	2.8	71.1	0.69	0.71	21.8
West: NW La Center Rd											
5	L2	69	4.0	0.229	4.2	LOS A	0.0	0.0	0.00	0.00	35.8
2	T1	281	9.0	0.229	4.2	LOS A	0.0	0.0	0.00	0.00	36.0
Approach		350	8.0	0.229	4.2	LOS A	0.0	0.0	0.00	0.00	35.9
All Vehicles		2266	3.6	0.543	9.1	LOS A	4.0	102.7	0.54	0.48	25.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2017 Total Build NW La Center and NB Ramps Weekday PM

2017 Total Traffic Weekday PM
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NB Ramp													
Lane 1	381	1.0	937	0.407	100	8.5	LOS A	2.4	60.3	Full	1800	0.0	0.0
Lane 2	374	2.0	918	0.407	100	8.6	LOS A	2.4	60.6	Full	1800	0.0	0.0
Lane 3[d]	591	3.0	1088	0.543	100	9.9	LOS A	4.0	102.7	Short	250	0.0	0.0
Approach	1346	2.2		0.543		9.1	LOS A	4.0	102.7				
East: NW La Center Rd													
Lane 1[d]	369	4.0	733	0.503	100	12.3	LOS B	2.8	71.1	Full	600	0.0	0.0
Lane 2	201	4.6	589	0.342	68[7]	11.0	LOS B	1.5	38.4	Full	600	0.0	0.0
Approach	570	4.2		0.503		11.8	LOS B	2.8	71.1				
West: NW La Center Rd													
Lane 1[d]	350	8.0	1531	0.229	100	4.2	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	350	8.0		0.229		4.2	LOS A	0.0	0.0				
Intersection	2266	3.6		0.543		9.1	LOS A	4.0	102.7				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

7 Lane underutilisation specified by user
d Dominant lane on roundabout approach

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	114	745	12	5	460	8	5	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	250	-	-	200	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	21	4	25	25	2	20	0	0	0
Mvmt Flow	114	745	12	5	460	8	5	0	5

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	468	0	0	757	0	0	1483	1457	751
Stage 1	-	-	-	-	-	-	979	979	-
Stage 2	-	-	-	-	-	-	504	478	-
Critical Hdwy	4.31	-	-	4.35	-	-	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-
Follow-up Hdwy	2.389	-	-	2.425	-	-	3.5	4	3.3
Pot Cap-1 Maneuver	1001	-	-	759	-	-	104	131	414
Stage 1	-	-	-	-	-	-	304	331	-
Stage 2	-	-	-	-	-	-	554	559	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1001	-	-	759	-	-	83	115	414
Mov Cap-2 Maneuver	-	-	-	-	-	-	83	115	-
Stage 1	-	-	-	-	-	-	269	293	-
Stage 2	-	-	-	-	-	-	493	555	-

Approach	EB	WB	NB
HCM Control Delay, s	1.2	0.1	33.1
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	138	1001	-	-	759	-	-	197
HCM Lane V/C Ratio	0.072	0.114	-	-	0.007	-	-	0.452
HCM Control Delay (s)	33.1	9.1	-	-	9.8	-	-	37.5
HCM Lane LOS	D	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	0.2	0.4	-	-	0	-	-	2.1

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	30	4	55
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	7	0	17
Mvmt Flow	30	4	55

Major/Minor	Minor2		
Conflicting Flow All	1456	1459	464
Stage 1	474	474	-
Stage 2	982	985	-
Critical Hdwy	7.17	6.5	6.37
Critical Hdwy Stg 1	6.17	5.5	-
Critical Hdwy Stg 2	6.17	5.5	-
Follow-up Hdwy	3.563	4	3.453
Pot Cap-1 Maneuver	105	131	568
Stage 1	562	561	-
Stage 2	294	329	-
Platoon blocked, %			
Mov Cap-1 Maneuver	94	115	568
Mov Cap-2 Maneuver	94	115	-
Stage 1	498	557	-
Stage 2	257	292	-

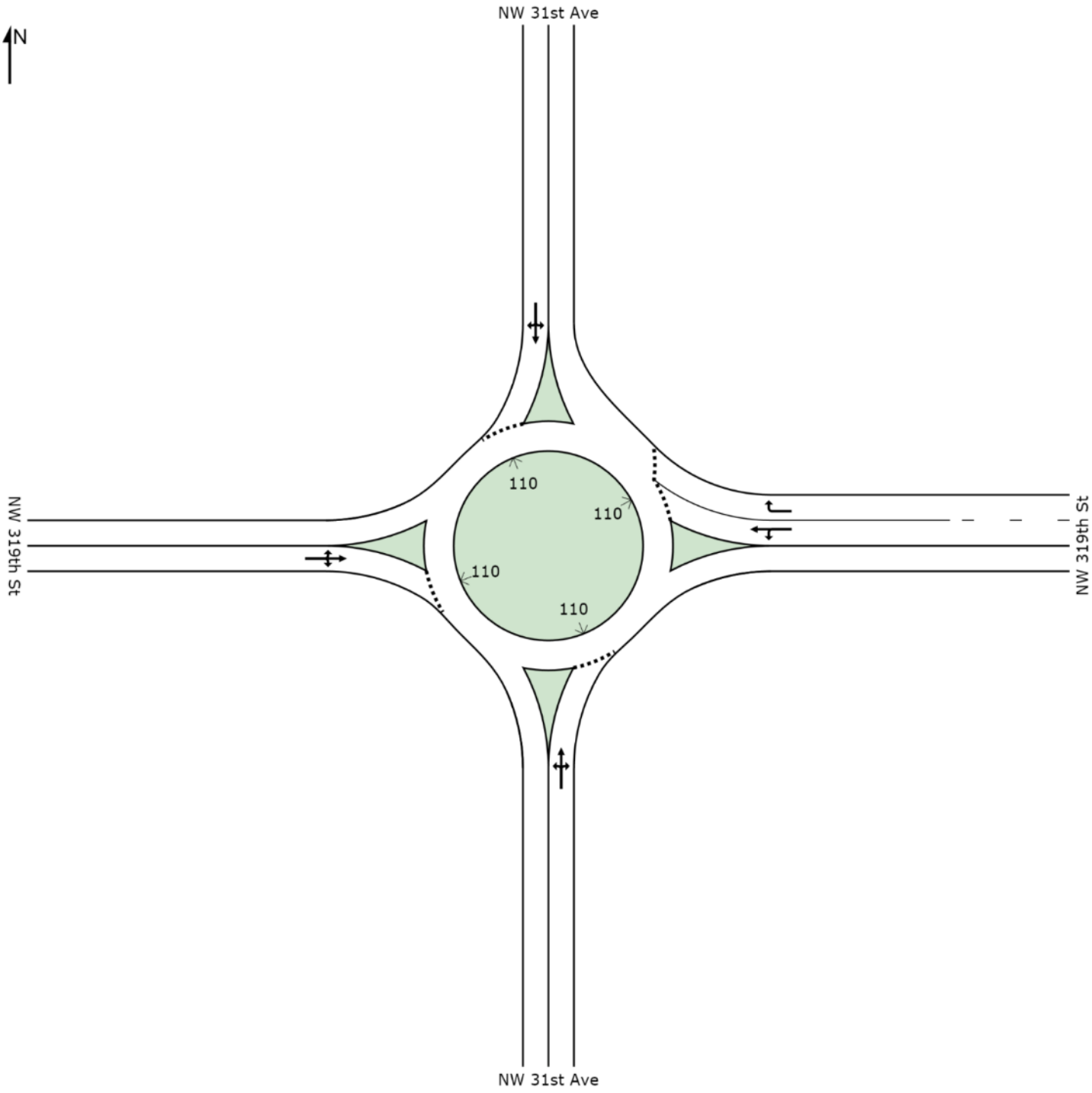
Approach	SB
HCM Control Delay, s	37.5
HCM LOS	E

Minor Lane/Major Mvmt

SITE LAYOUT

Site: 2017 Total Build NW 319 St and NW 31st Ave Weekday AM

2017 Total Traffic Weekday AM
Roundabout



MOVEMENT SUMMARY

Site: 2017 Total Build NW 319 St and NW 31st Ave Weekend Peak

2017 Total Traffic Weekend Peak

Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NW 31st Ave											
3	L2	5	25.0	0.150	8.1	LOS A	0.8	21.3	0.73	0.65	30.4
8	T1	15	1.0	0.150	8.1	LOS A	0.8	21.3	0.73	0.65	33.3
18	R2	66	4.0	0.150	8.1	LOS A	0.8	21.3	0.73	0.65	30.1
Approach		86	4.7	0.150	8.1	LOS A	0.8	21.3	0.73	0.65	30.8
East: NW 319th St											
1	L2	77	6.0	0.395	5.7	LOS A	3.2	80.6	0.16	0.04	33.1
6	T1	553	2.0	0.395	5.7	LOS A	3.2	80.6	0.16	0.04	32.3
16	R2	493	1.0	0.350	5.7	LOS A	2.6	65.3	0.16	0.04	31.1
Approach		1123	1.8	0.395	5.7	LOS A	3.2	80.6	0.16	0.04	31.8
North: NW 31st Ave											
7	L2	329	1.0	0.487	12.4	LOS B	3.5	88.1	0.78	0.81	26.3
4	T1	10	1.0	0.487	12.4	LOS B	3.5	88.1	0.78	0.81	29.2
14	R2	1	1.0	0.487	12.4	LOS B	3.5	88.1	0.78	0.81	27.6
Approach		340	1.0	0.487	12.4	LOS B	3.5	88.1	0.78	0.81	26.4
West: NW 319th St											
5	L2	1	1.0	0.526	12.4	LOS B	4.1	105.2	0.76	0.72	30.8
2	T1	387	4.0	0.526	12.4	LOS B	4.1	105.2	0.76	0.72	28.2
12	R2	15	0.0	0.526	12.4	LOS B	4.1	105.2	0.76	0.72	30.3
Approach		403	3.8	0.526	12.4	LOS B	4.1	105.2	0.76	0.72	28.3
All Vehicles		1952	2.2	0.526	8.4	LOS A	4.1	105.2	0.41	0.34	29.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2017 Total Build NW 319 St and NW 31st Ave Weekend Peak

2017 Total Traffic Weekend Peak

Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NW 31st Ave													
Lane 1[d]	86	4.7	574	0.150	100	8.1	LOS A	0.8	21.3	Full	1600	0.0	0.0
Approach	86	4.7		0.150		8.1	LOS A	0.8	21.3				
East: NW 319th St													
Lane 1[d]	630	2.5	1595	0.395	100	5.7	LOS A	3.2	80.6	Full	650	0.0	0.0
Lane 2	493	1.0	1409	0.350	100	5.7	LOS A	2.6	65.3	Full	650	0.0	0.0
Approach	1123	1.8		0.395		5.7	LOS A	3.2	80.6				
North: NW 31st Ave													
Lane 1[d]	340	1.0	698	0.487	100	12.4	LOS B	3.5	88.1	Full	1400	0.0	0.0
Approach	340	1.0		0.487		12.4	LOS B	3.5	88.1				
West: NW 319th St													
Lane 1[d]	403	3.8	767	0.526	100	12.4	LOS B	4.1	105.2	Full	1300	0.0	0.0
Approach	403	3.8		0.526		12.4	LOS B	4.1	105.2				
Intersection	1952	2.2		0.526		8.4	LOS A	4.1	105.2				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

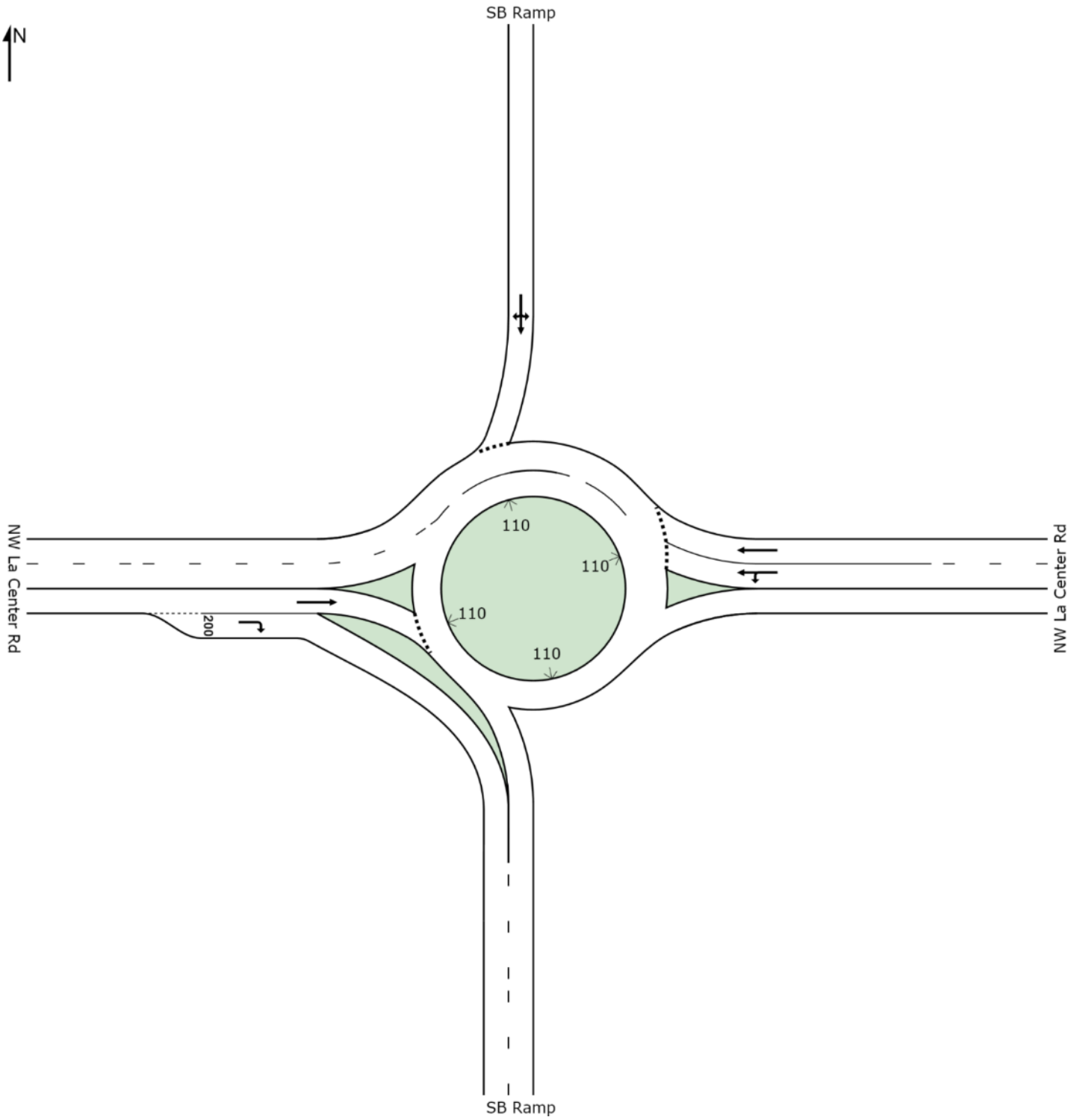
d Dominant lane on roundabout approach

SIDRA INTERSECTION 6

SITE LAYOUT

Site: 2017 Total Build NW La Center and SB Ramps Weekday AM

2017 Total Traffic Weekday AM
Roundabout



MOVEMENT SUMMARY

Site: 2017 Total Build NW La Center and SB Ramps Weekend

2017 Total Traffic Weekend Peak
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: NW La Center Rd											
1	L2	375	2.0	0.415	6.1	LOS A	0.0	0.0	0.00	0.00	34.7
6	T1	982	1.0	0.415	5.7	LOS A	0.0	0.0	0.00	0.00	37.2
Approach		1357	1.3	0.415	5.8	LOS A	0.0	0.0	0.00	0.00	36.2
North: SB Ramp											
7	L2	172	4.0	0.609	20.2	LOS C	3.3	85.3	0.78	0.90	23.1
4	T1	4	0.0	0.609	20.2	LOS C	3.3	85.3	0.78	0.90	25.9
14	R2	141	8.0	0.609	20.2	LOS C	3.3	85.3	0.78	0.90	22.4
Approach		317	5.7	0.609	20.2	LOS C	3.3	85.3	0.78	0.90	22.8
West: NW La Center Rd											
2	T1	146	3.0	0.159	5.5	LOS A	0.9	22.7	0.61	0.49	31.6
12	R2	636	2.0	0.387	0.0	LOS A	0.0	0.0	0.00	0.00	35.9
Approach		782	2.2	0.387	1.0	LOS A	0.9	22.7	0.11	0.09	35.2
All Vehicles		2456	2.1	0.609	6.2	LOS A	3.3	85.3	0.14	0.14	32.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2017 Total Build NW La Center and SB Ramps Weekend

2017 Total Traffic Weekend Peak
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
East: NW La Center Rd													
Lane 1	628	1.6	1511	0.415	100	6.1	LOS A	0.0	0.0	Full	600	0.0	0.0
Lane 2[d]	729	1.0	1757	0.415	100	5.6	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	1357	1.3		0.415		5.8	LOS A	0.0	0.0				
North: SB Ramp													
Lane 1[d]	317	5.7	520	0.609	100	20.2	LOS C	3.3	85.3	Full	1300	0.0	0.0
Approach	317	5.7		0.609		20.2	LOS C	3.3	85.3				
West: NW La Center Rd													
Lane 1[d]	146	3.0	917	0.159	100	5.5	LOS A	0.9	22.7	Full	650	0.0	0.0
Lane 2	636	2.0	1642	0.387	100	0.0	LOS A	0.0	0.0	Short	200	0.0	0.0
Approach	782	2.2		0.387		1.0	LOS A	0.9	22.7				
Intersection	2456	2.1		0.609		6.2	LOS A	3.3	85.3				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

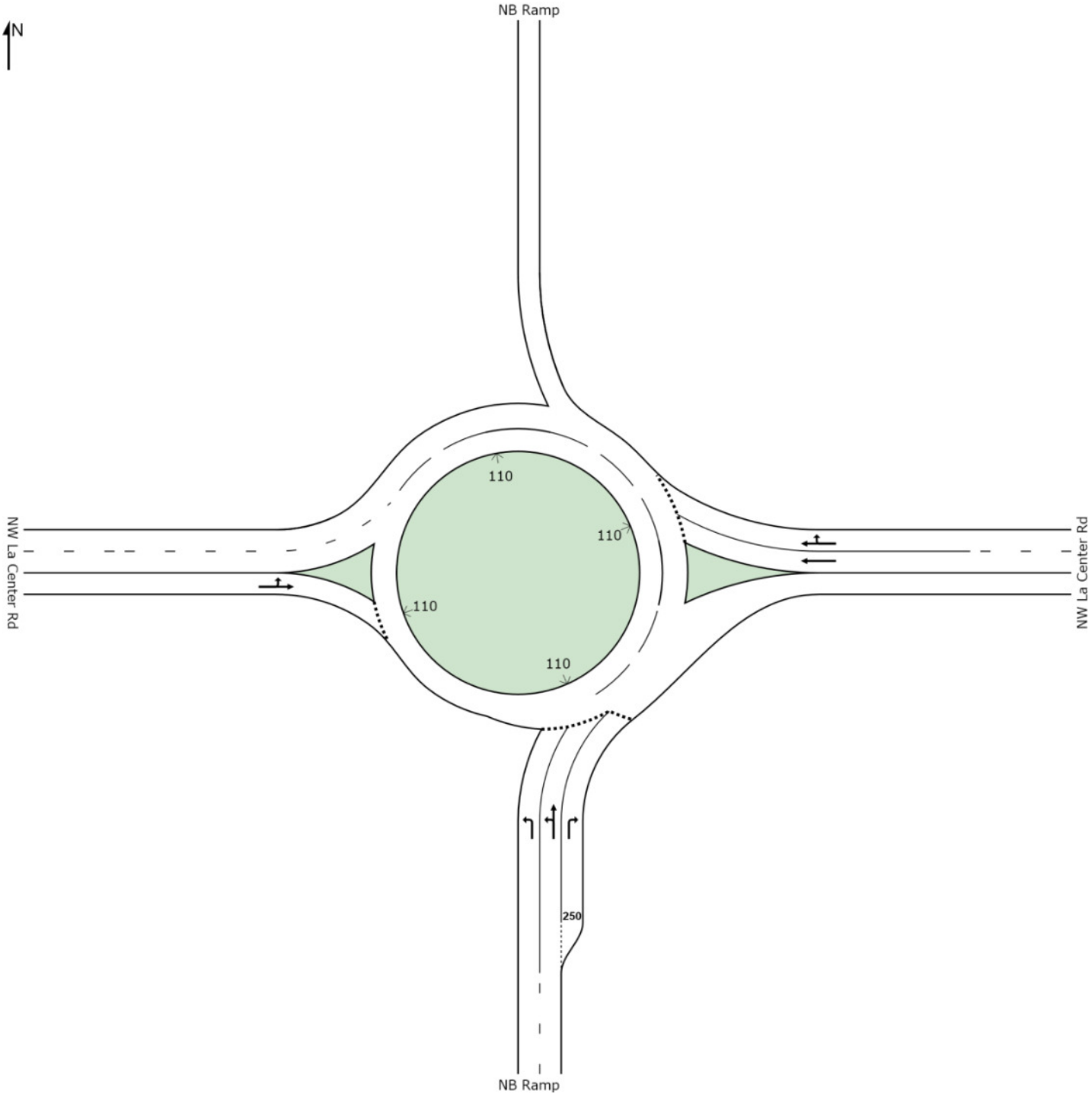
d Dominant lane on roundabout approach

SITE LAYOUT

Site: 2017 Total Build NW La Center and NB Ramps Weekday AM

2017 Total Traffic Weekday AM

Roundabout



MOVEMENT SUMMARY

Site: 2017 Total Build NW La Center and NB Ramps Weekend

2017 Total Traffic Weekend Peak
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Ramp											
3	L2	927	1.0	0.452	8.6	LOS A	2.8	71.0	0.57	0.45	22.0
8	T1	4	0.0	0.452	8.6	LOS A	2.8	71.0	0.57	0.45	28.1
18	R2	564	3.0	0.501	8.9	LOS A	3.3	85.4	0.59	0.46	28.4
Approach		1495	1.8	0.501	8.7	LOS A	3.3	85.4	0.58	0.46	24.0
East: NW La Center Rd											
6	T1	430	3.0	0.546	14.2	LOS B	3.1	79.8	0.74	0.79	19.8
16	R2	124	12.0	0.382	14.1	LOS B	1.7	45.1	0.70	0.73	23.8
Approach		554	5.0	0.546	14.2	LOS B	3.1	79.8	0.73	0.78	20.7
West: NW La Center Rd											
5	L2	74	1.0	0.200	3.8	LOS A	0.0	0.0	0.00	0.00	35.7
2	T1	244	5.0	0.200	3.8	LOS A	0.0	0.0	0.00	0.00	36.0
Approach		318	4.1	0.200	3.8	LOS A	0.0	0.0	0.00	0.00	35.9
All Vehicles		2367	2.8	0.546	9.3	LOS A	3.3	85.4	0.54	0.47	24.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2017 Total Build NW La Center and NB Ramps Weekend

2017 Total Traffic Weekend Peak
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NB Ramp													
Lane 1	465	1.0	1030	0.452	100	8.6	LOS A	2.8	71.0	Full	1800	0.0	0.0
Lane 2	466	1.0	1030	0.452	100	8.6	LOS A	2.8	71.0	Full	1800	0.0	0.0
Lane 3[d]	564	3.0	1126	0.501	100	8.9	LOS A	3.3	85.4	Short	250	0.0	0.0
Approach	1495	1.8		0.501		8.7	LOS A	3.3	85.4				
East: NW La Center Rd													
Lane 1[d]	373	3.0	682	0.546	100	14.2	LOS B	3.1	79.8	Full	600	0.0	0.0
Lane 2	181	9.2	474	0.382	70[7]	14.1	LOS B	1.7	45.1	Full	600	0.0	0.0
Approach	554	5.0		0.546		14.2	LOS B	3.1	79.8				
West: NW La Center Rd													
Lane 1[d]	318	4.1	1589	0.200	100	3.8	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	318	4.1		0.200		3.8	LOS A	0.0	0.0				
Intersection	2367	2.8		0.546		9.3	LOS A	3.3	85.4				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

7 Lane underutilisation specified by user
d Dominant lane on roundabout approach

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	82	721	5	5	455	8	10	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	250	-	-	200	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	13	4	17	0	3	17	11	0	50
Mvmt Flow	82	721	5	5	455	8	10	5	5

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	463	0	0	726	0	0	1376	1361	724
Stage 1	-	-	-	-	-	-	888	888	-
Stage 2	-	-	-	-	-	-	488	473	-
Critical Hdwy	4.23	-	-	4.1	-	-	7.21	6.5	6.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.21	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.21	5.5	-
Follow-up Hdwy	2.317	-	-	2.2	-	-	3.599	4	3.75
Pot Cap-1 Maneuver	1043	-	-	886	-	-	117	150	355
Stage 1	-	-	-	-	-	-	326	365	-
Stage 2	-	-	-	-	-	-	545	562	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1043	-	-	886	-	-	101	137	355
Mov Cap-2 Maneuver	-	-	-	-	-	-	101	137	-
Stage 1	-	-	-	-	-	-	300	336	-
Stage 2	-	-	-	-	-	-	507	559	-

Approach	EB	WB	NB
HCM Control Delay, s	0.9	0.1	36.5
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	134	1043	-	-	886	-	-	191
HCM Lane V/C Ratio	0.149	0.079	-	-	0.006	-	-	0.351
HCM Control Delay (s)	36.5	8.7	-	-	9.1	-	-	33.7
HCM Lane LOS	E	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.5	0.3	-	-	0	-	-	1.5

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	30	4	33
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	0	0	13
Mvmt Flow	30	4	33

Major/Minor	Minor2		
Conflicting Flow All	1362	1359	459
Stage 1	469	469	-
Stage 2	893	890	-
Critical Hdwy	7.1	6.5	6.33
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.417
Pot Cap-1 Maneuver	126	150	580
Stage 1	579	564	-
Stage 2	339	364	-
Platoon blocked, %			
Mov Cap-1 Maneuver	113	137	580
Mov Cap-2 Maneuver	113	137	-
Stage 1	533	561	-
Stage 2	303	335	-

Approach	SB
HCM Control Delay, s	33.7
HCM LOS	D

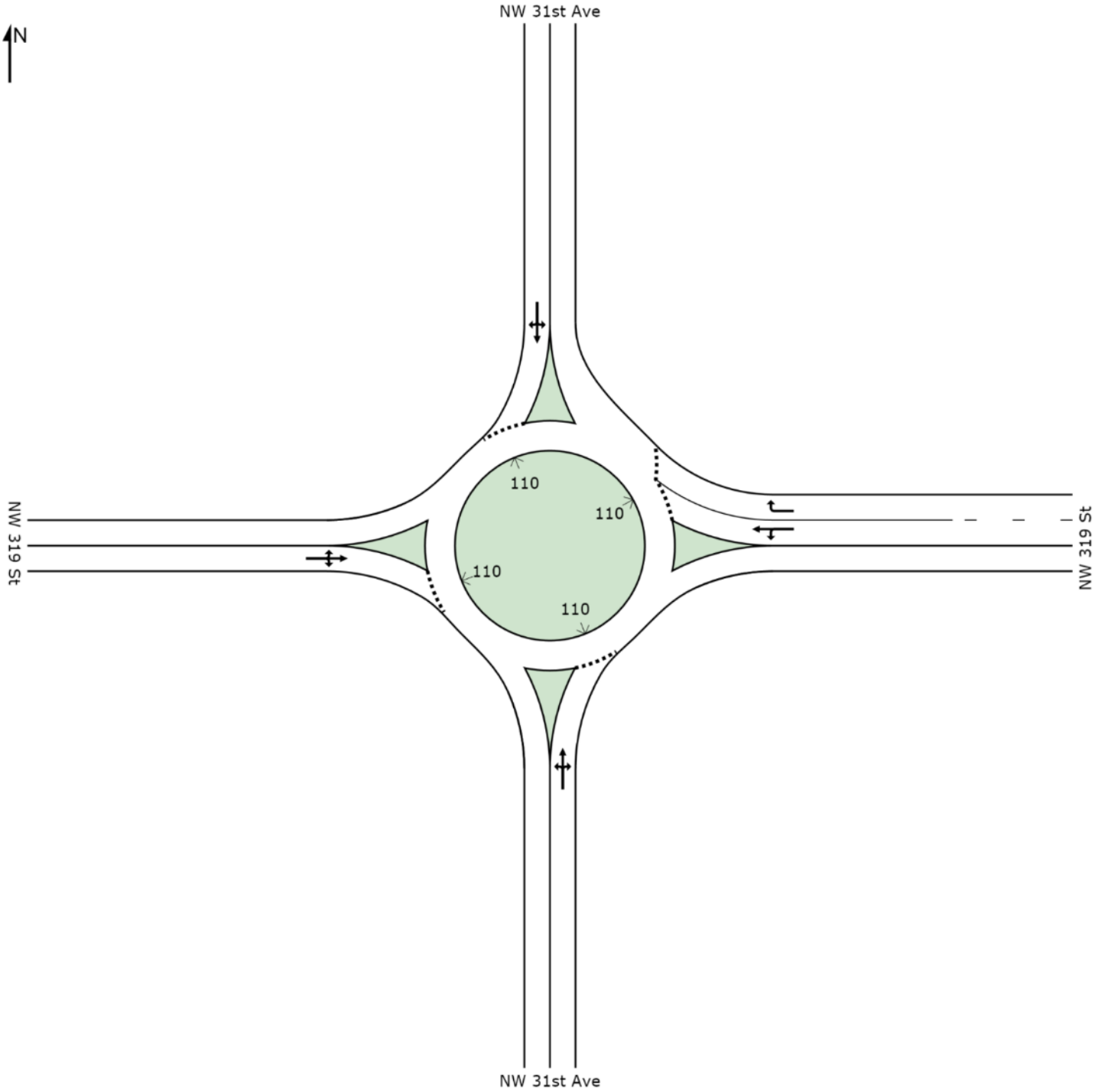
Minor Lane/Major Mvmt

Appendix W 2017 Trip Distribution Sensitivity Analysis Worksheets for 85/15 Split

SITE LAYOUT

Site: 2017 Total Build NW 319 St and NW 31st Ave Weekday AM 85/15 Split

2017 Total Traffic Weekday AM
85/15 Split Sensitivity Analysis
Roundabout



MOVEMENT SUMMARY

Site: 2017 Total Build NW 319 St and NW 31st Ave Weekday AM 85/15 Split

2017 Total Traffic Weekday AM
85/15 Split Sensitivity Analysis
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NW 31st Ave											
3	L2	5	0.0	0.117	6.0	LOS A	0.5	15.8	0.46	0.33	34.4
8	T1	5	1.0	0.117	6.0	LOS A	0.5	15.8	0.46	0.33	34.4
18	R2	78	23.0	0.117	6.0	LOS A	0.5	15.8	0.46	0.33	30.2
Approach		88	20.4	0.117	6.0	LOS A	0.5	15.8	0.46	0.33	30.7
East: NW 319 St											
1	L2	49	11.0	0.108	3.7	LOS A	0.6	14.5	0.08	0.02	33.4
6	T1	89	2.0	0.108	3.7	LOS A	0.6	14.5	0.08	0.02	32.9
16	R2	249	1.0	0.153	3.4	LOS A	0.9	21.5	0.07	0.01	32.7
Approach		387	2.5	0.153	3.5	LOS A	0.9	21.5	0.07	0.01	32.8
North: NW 31st Ave											
7	L2	187	1.0	0.182	5.0	LOS A	0.9	22.5	0.33	0.19	30.1
4	T1	5	1.0	0.182	5.0	LOS A	0.9	22.5	0.33	0.19	32.3
14	R2	1	1.0	0.182	5.0	LOS A	0.9	22.5	0.33	0.19	30.7
Approach		193	1.0	0.182	5.0	LOS A	0.9	22.5	0.33	0.19	30.1
West: NW 319 St											
5	L2	1	1.0	0.101	4.8	LOS A	0.5	12.3	0.42	0.27	35.0
2	T1	78	4.0	0.101	4.8	LOS A	0.5	12.3	0.42	0.27	33.2
12	R2	15	0.0	0.101	4.8	LOS A	0.5	12.3	0.42	0.27	34.1
Approach		94	3.3	0.101	4.8	LOS A	0.5	12.3	0.42	0.27	33.4
All Vehicles		762	4.3	0.182	4.3	LOS A	0.9	22.5	0.23	0.13	31.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2017 Total Build NW 319 St and NW 31st Ave Weekday AM 85/15 Split

2017 Total Traffic Weekday AM
85/15 Split Sensitivity Analysis
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NW 31st Ave													
Lane 1[d]	88	20.4	755	0.117	100	6.0	LOS A	0.5	15.8	Full	1600	0.0	0.0
Approach	88	20.4		0.117		6.0	LOS A	0.5	15.8				
East: NW 319 St													
Lane 1	138	5.2	1280	0.108	100	3.7	LOS A	0.6	14.5	Full	650	0.0	0.0
Lane 2[d]	249	1.0	1623	0.153	100	3.4	LOS A	0.9	21.5	Full	650	0.0	0.0
Approach	387	2.5		0.153		3.5	LOS A	0.9	21.5				
North: NW 31st Ave													
Lane 1[d]	193	1.0	1063	0.182	100	5.0	LOS A	0.9	22.5	Full	1400	0.0	0.0
Approach	193	1.0		0.182		5.0	LOS A	0.9	22.5				
West: NW 319 St													
Lane 1[d]	94	3.3	934	0.101	100	4.8	LOS A	0.5	12.3	Full	1300	0.0	0.0
Approach	94	3.3		0.101		4.8	LOS A	0.5	12.3				
Intersection	762	4.3		0.182		4.3	LOS A	0.9	22.5				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

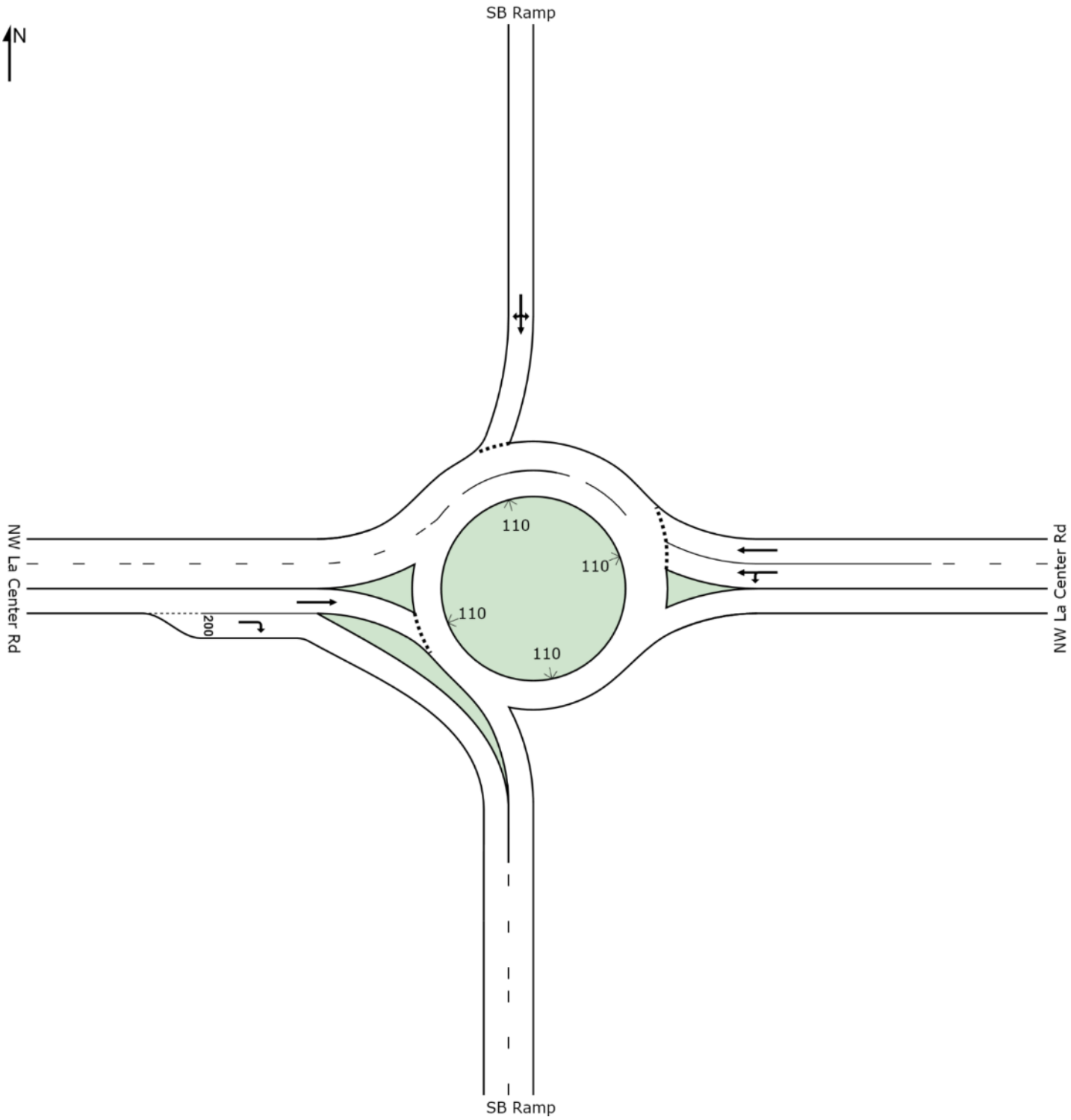
d Dominant lane on roundabout approach

SIDRA INTERSECTION 6

SITE LAYOUT

Site: 2017 Total Build NW La Center and SB Ramps Weekday AM 85_15 Split

2017 Total Traffic Weekday AM
Roundabout



MOVEMENT SUMMARY

Site: 2017 Total Build NW La Center and SB Ramps Weekday AM 85_15 Split

2017 Total Traffic Weekday AM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: NW La Center Rd											
1	L2	535	4.0	0.361	5.1	LOS A	0.0	0.0	0.00	0.00	32.9
6	T1	361	2.0	0.361	4.4	LOS A	0.0	0.0	0.00	0.00	36.6
Approach		896	3.2	0.361	4.8	LOS A	0.0	0.0	0.00	0.00	34.0
North: SB Ramp											
7	L2	118	13.0	0.273	10.5	LOS B	1.0	27.7	0.61	0.61	26.4
4	T1	4	50.0	0.273	10.5	LOS B	1.0	27.7	0.61	0.61	28.6
14	R2	25	8.0	0.273	10.5	LOS B	1.0	27.7	0.61	0.61	25.8
Approach		147	13.2	0.273	10.5	LOS B	1.0	27.7	0.61	0.61	26.4
West: NW La Center Rd											
2	T1	118	20.0	0.172	7.2	LOS A	0.9	26.3	0.67	0.60	29.0
12	R2	225	2.0	0.137	0.0	LOS A	0.0	0.0	0.00	0.00	35.9
Approach		343	8.2	0.172	2.5	LOS A	0.9	26.3	0.23	0.21	33.8
All Vehicles		1386	5.5	0.361	4.8	LOS A	1.0	27.7	0.12	0.12	32.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2017 Total Build NW La Center and SB Ramps Weekday AM 85_15 Split

2017 Total Traffic Weekday AM
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
East: NW La Center Rd													
Lane 1[d]	618	3.7	1710	0.361	100	5.1	LOS A	0.0	0.0	Full	600	0.0	0.0
Lane 2	278	2.0	1400	0.199	55[7]	4.2	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	896	3.2		0.361		4.8	LOS A	0.0	0.0				
North: SB Ramp													
Lane 1[d]	147	13.2	539	0.273	100	10.5	LOS B	1.0	27.7	Full	1300	0.0	0.0
Approach	147	13.2		0.273		10.5	LOS B	1.0	27.7				
West: NW La Center Rd													
Lane 1[d]	118	20.0	688	0.172	100	7.2	LOS A	0.9	26.3	Full	650	0.0	0.0
Lane 2	225	2.0	1642	0.137	100	0.0	LOS A	0.0	0.0	Short	200	0.0	0.0
Approach	343	8.2		0.172		2.5	LOS A	0.9	26.3				
Intersection	1386	5.5		0.361		4.8	LOS A	1.0	27.7				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

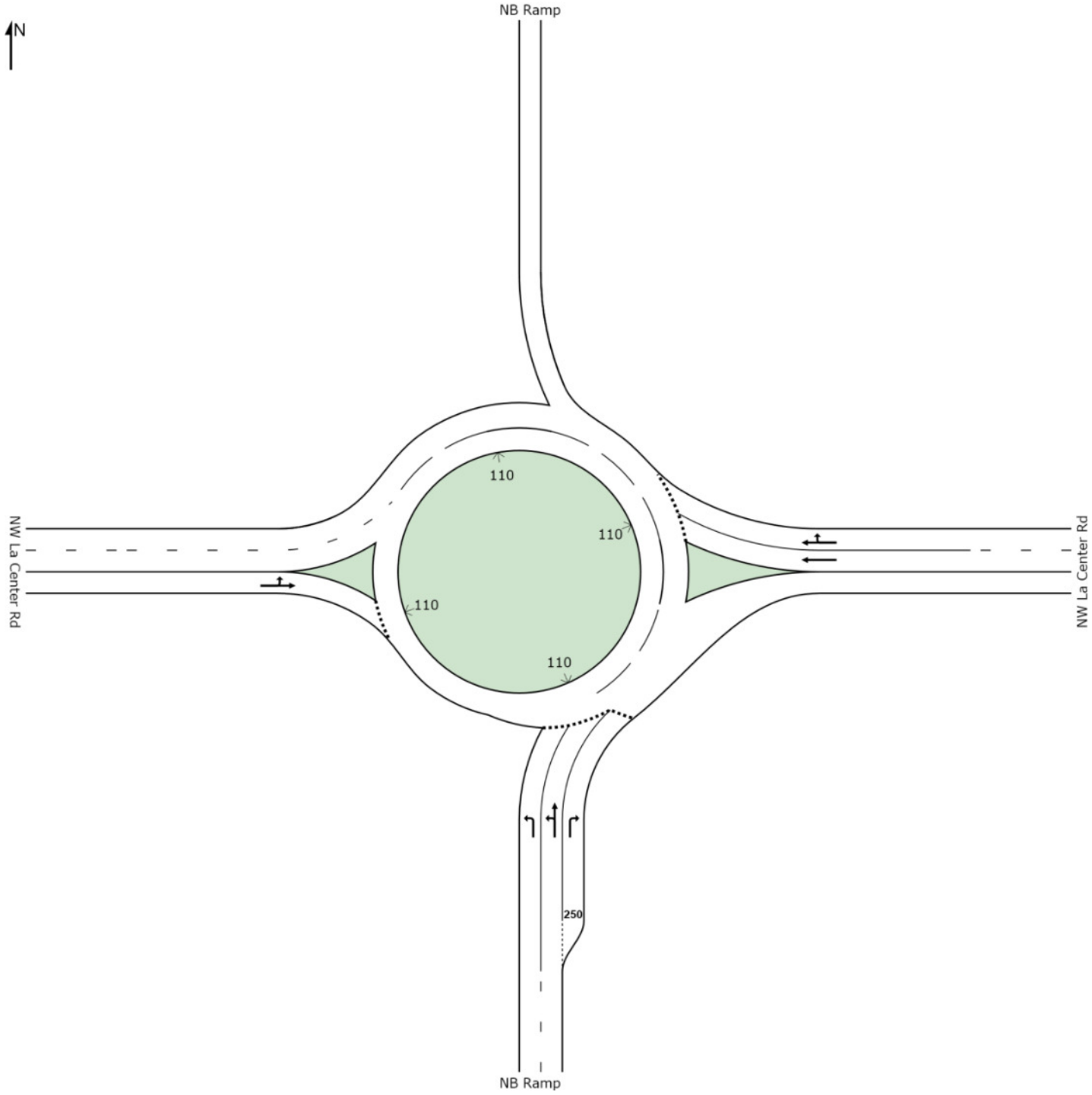
7 Lane underutilisation specified by user
d Dominant lane on roundabout approach

SIDRA INTERSECTION 6

SITE LAYOUT

Site: 2017 Total Build NW La Center and NB Ramps Weekday AM 85/15 Split

2017 Total Traffic Weekday AM
85/15 Split Sensitivity Analysis
Roundabout



MOVEMENT SUMMARY

Site: 2017 Total Build NW La Center and NB Ramps Weekday AM 85/15 Split

2017 Total Traffic Weekday AM
85/15 Split Sensitivity Analysis
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Ramp											
3	L2	292	1.0	0.231	5.7	LOS A	1.2	29.7	0.44	0.31	24.8
8	T1	4	50.0	0.231	5.7	LOS A	1.2	29.7	0.44	0.31	29.0
18	R2	321	7.0	0.292	6.1	LOS A	1.6	41.8	0.46	0.33	29.7
Approach		617	4.4	0.292	5.9	LOS A	1.6	41.8	0.45	0.32	27.1
East: NW La Center Rd											
6	T1	604	4.0	0.566	11.3	LOS B	3.7	96.7	0.61	0.57	21.1
16	R2	156	17.0	0.351	10.4	LOS B	1.6	43.5	0.55	0.52	25.7
Approach		760	6.7	0.566	11.1	LOS B	3.7	96.7	0.60	0.56	22.1
West: NW La Center Rd											
5	L2	77	17.0	0.167	3.9	LOS A	0.0	0.0	0.00	0.00	34.7
2	T1	159	17.0	0.167	3.9	LOS A	0.0	0.0	0.00	0.00	34.5
Approach		236	17.0	0.167	3.9	LOS A	0.0	0.0	0.00	0.00	34.5
All Vehicles		1613	7.3	0.566	8.1	LOS A	3.7	96.7	0.45	0.39	25.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2017 Total Build NW La Center and NB Ramps Weekday AM 85/15 Split

2017 Total Traffic Weekday AM
85/15 Split Sensitivity Analysis
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NB Ramp													
Lane 1	57	1.0	712	0.081	35[7]	5.9	LOS A	0.3	8.8	Full	1800	0.0	0.0
Lane 2	239	1.8	1034	0.231	100	5.7	LOS A	1.2	29.7	Full	1800	0.0	0.0
Lane 3[d]	321	7.0	1098	0.292	100	6.1	LOS A	1.6	41.8	Short	250	0.0	0.0
Approach	617	4.4		0.292		5.9	LOS A	1.6	41.8				
East: NW La Center Rd													
Lane 1[d]	537	4.0	949	0.566	100	11.4	LOS B	3.7	96.7	Full	600	0.0	0.0
Lane 2	223	13.1	637	0.351	62[7]	10.4	LOS B	1.6	43.5	Full	600	0.0	0.0
Approach	760	6.7		0.566		11.1	LOS B	3.7	96.7				
West: NW La Center Rd													
Lane 1[d]	236	17.0	1413	0.167	100	3.9	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	236	17.0		0.167		3.9	LOS A	0.0	0.0				
Intersection	1613	7.3		0.566		8.1	LOS A	3.7	96.7				

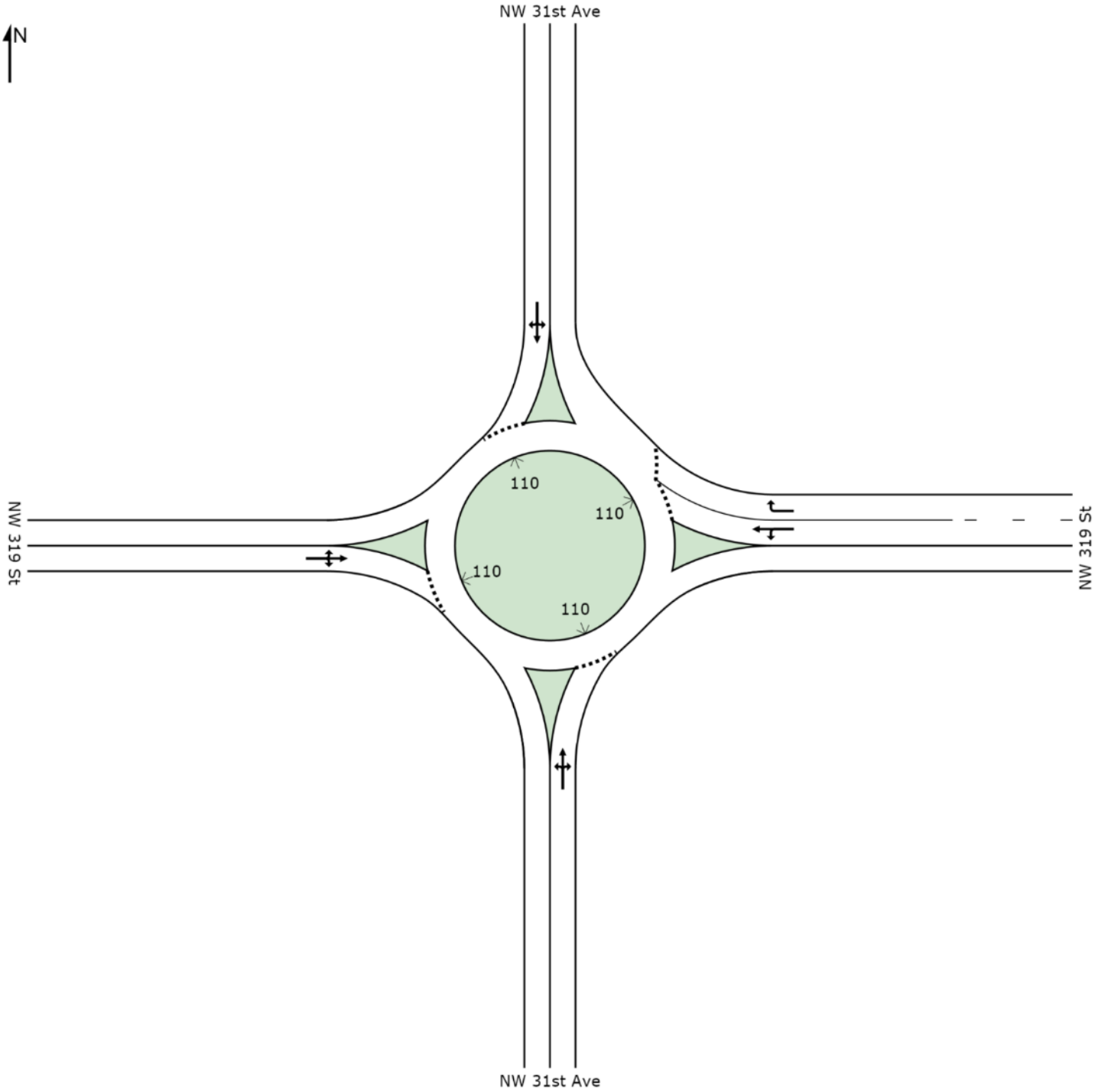
Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

7 Lane underutilisation specified by user
d Dominant lane on roundabout approach

SITE LAYOUT

Site: 2017 Total Build NW 319 St and NW 31st Ave Weekday AM 85/15 Split

2017 Total Traffic Weekday AM
85/15 Split Sensitivity Analysis
Roundabout



MOVEMENT SUMMARY

Site: 2017 Total Build NW 319 St and NW 31st Ave Weekday PM 85/15 Split

2017 Total Traffic Weekday AM
85/15 Split Sensitivity Analysis
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NW 31st Ave											
3	L2	17	0.0	0.216	9.1	LOS A	1.2	32.3	0.74	0.69	32.4
8	T1	10	10.0	0.216	9.1	LOS A	1.2	32.3	0.74	0.69	32.3
18	R2	96	7.0	0.216	9.1	LOS A	1.2	32.3	0.74	0.69	29.1
Approach		123	6.3	0.216	9.1	LOS A	1.2	32.3	0.74	0.69	29.9
East: NW 319 St											
1	L2	97	2.0	0.252	5.3	LOS A	1.6	42.5	0.17	0.06	32.7
6	T1	200	9.0	0.252	5.3	LOS A	1.6	42.5	0.17	0.06	31.5
16	R2	641	1.0	0.403	5.8	LOS A	3.3	82.4	0.18	0.06	31.0
Approach		938	2.8	0.403	5.6	LOS A	3.3	82.4	0.18	0.06	31.3
North: NW 31st Ave											
7	L2	524	1.0	0.581	12.1	LOS B	4.7	119.6	0.69	0.61	26.4
4	T1	10	10.0	0.581	12.1	LOS B	4.7	119.6	0.69	0.61	29.1
14	R2	1	0.0	0.581	12.1	LOS B	4.7	119.6	0.69	0.61	27.7
Approach		535	1.2	0.581	12.1	LOS B	4.7	119.6	0.69	0.61	26.5
West: NW 319 St											
5	L2	1	0.0	0.272	9.2	LOS A	1.6	41.3	0.74	0.69	32.6
2	T1	165	3.0	0.272	9.2	LOS A	1.6	41.3	0.74	0.69	30.2
12	R2	5	0.0	0.272	9.2	LOS A	1.6	41.3	0.74	0.69	31.8
Approach		171	2.9	0.272	9.2	LOS A	1.6	41.3	0.74	0.69	30.3
All Vehicles		1767	2.6	0.581	8.2	LOS A	4.7	119.6	0.43	0.33	29.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2017 Total Build NW 319 St and NW 31st Ave Weekday PM 85/15 Split

2017 Total Traffic Weekday AM
85/15 Split Sensitivity Analysis
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NW 31st Ave													
Lane 1[d]	123	6.3	569	0.216	100	9.1	LOS A	1.2	32.3	Full	1600	0.0	0.0
Approach	123	6.3		0.216		9.1	LOS A	1.2	32.3				
East: NW 319 St													
Lane 1	297	6.7	1180	0.252	100	5.3	LOS A	1.6	42.5	Full	650	0.0	0.0
Lane 2[d]	641	1.0	1591	0.403	100	5.8	LOS A	3.3	82.4	Full	650	0.0	0.0
Approach	938	2.8		0.403		5.6	LOS A	3.3	82.4				
North: NW 31st Ave													
Lane 1[d]	535	1.2	920	0.581	100	12.1	LOS B	4.7	119.6	Full	1400	0.0	0.0
Approach	535	1.2		0.581		12.1	LOS B	4.7	119.6				
West: NW 319 St													
Lane 1[d]	171	2.9	629	0.272	100	9.2	LOS A	1.6	41.3	Full	1300	0.0	0.0
Approach	171	2.9		0.272		9.2	LOS A	1.6	41.3				
Intersection	1767	2.6		0.581		8.2	LOS A	4.7	119.6				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

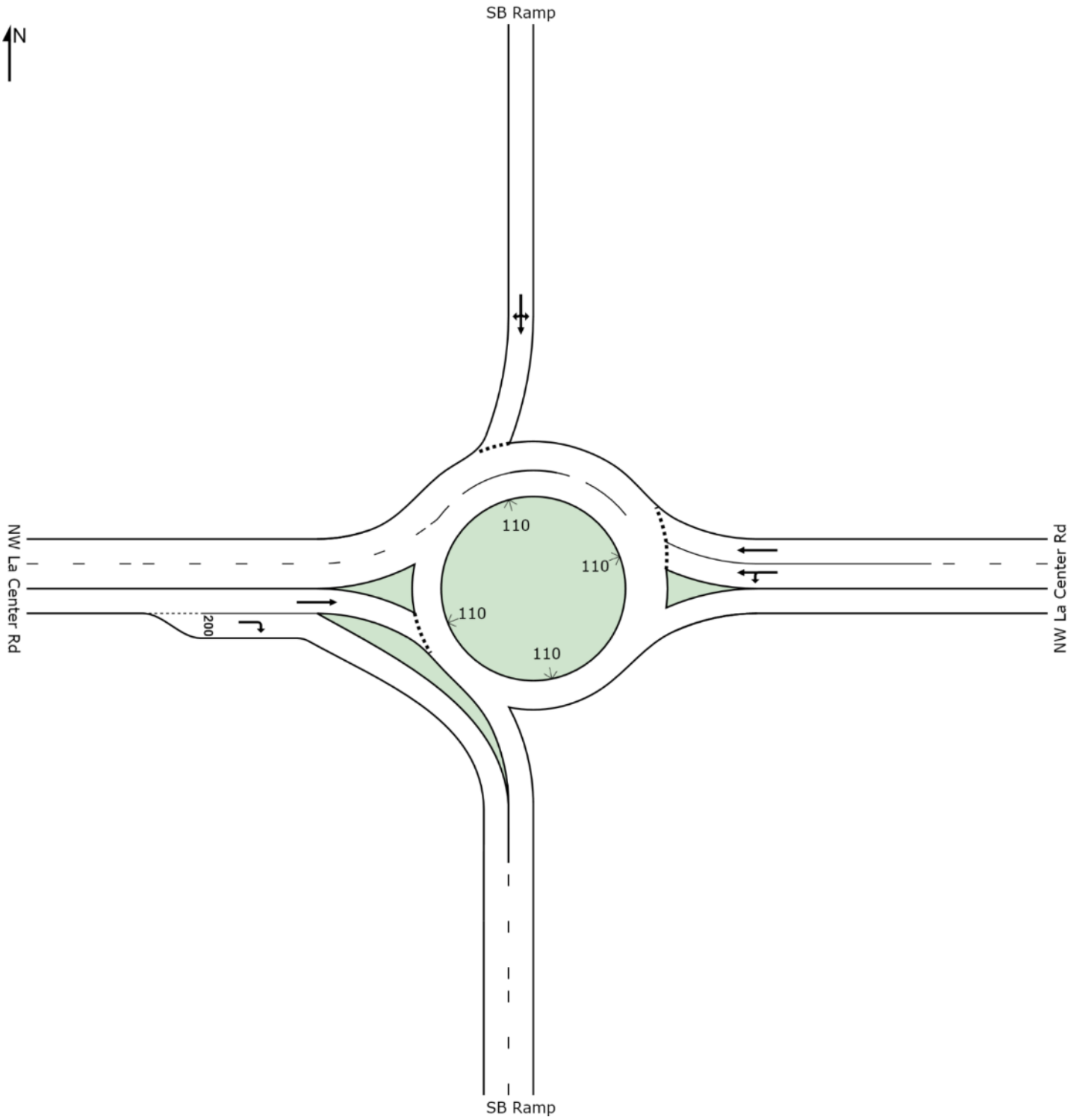
d Dominant lane on roundabout approach

SIDRA INTERSECTION 6

SITE LAYOUT

Site: 2017 Total Build NW La Center and SB Ramps Weekday AM 85_15 Split

2017 Total Traffic Weekday AM
Roundabout



MOVEMENT SUMMARY

Site: 2017 Total Build NW La Center and SB Ramps Weekday PM 85_15 Split

2017 Total Traffic Weekday PM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: NW La Center Rd											
1	L2	374	5.0	0.369	5.7	LOS A	0.0	0.0	0.00	0.00	33.7
6	T1	824	2.0	0.369	5.3	LOS A	0.0	0.0	0.00	0.00	37.2
Approach		1198	2.9	0.377	5.4	LOS A	0.0	0.0	0.00	0.00	35.7
North: SB Ramp											
7	L2	165	10.0	0.532	16.8	LOS B	2.6	68.2	0.73	0.81	24.2
4	T1	4	50.0	0.532	16.8	LOS B	2.6	68.2	0.73	0.81	26.6
14	R2	114	2.0	0.532	16.8	LOS B	2.6	68.2	0.73	0.81	23.8
Approach		283	7.3	0.532	16.8	LOS B	2.6	68.2	0.73	0.81	24.1
West: NW La Center Rd											
2	T1	185	7.0	0.214	6.4	LOS A	1.2	32.0	0.64	0.54	30.5
12	R2	600	1.0	0.362	0.0	LOS A	0.0	0.0	0.00	0.00	35.9
Approach		785	2.4	0.362	1.5	LOS A	1.2	32.0	0.15	0.13	34.8
All Vehicles		2266	3.3	0.532	5.5	LOS A	2.6	68.2	0.14	0.14	33.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2017 Total Build NW La Center and SB Ramps Weekday PM 85_15 Split

2017 Total Traffic Weekday PM
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
East: NW La Center Rd													
Lane 1	543	4.1	1471	0.369	98[7]	5.7	LOS A	0.0	0.0	Full	600	0.0	0.0
Lane 2[d]	655	2.0	1739	0.377	100	5.2	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	1198	2.9		0.377		5.4	LOS A	0.0	0.0				
North: SB Ramp													
Lane 1[d]	283	7.3	532	0.532	100	16.8	LOS B	2.6	68.2	Full	1300	0.0	0.0
Approach	283	7.3		0.532		16.8	LOS B	2.6	68.2				
West: NW La Center Rd													
Lane 1[d]	185	7.0	864	0.214	100	6.4	LOS A	1.2	32.0	Full	650	0.0	0.0
Lane 2	600	1.0	1658	0.362	100	0.0	LOS A	0.0	0.0	Short	200	0.0	0.0
Approach	785	2.4		0.362		1.5	LOS A	1.2	32.0				
Intersection	2266	3.3		0.532		5.5	LOS A	2.6	68.2				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

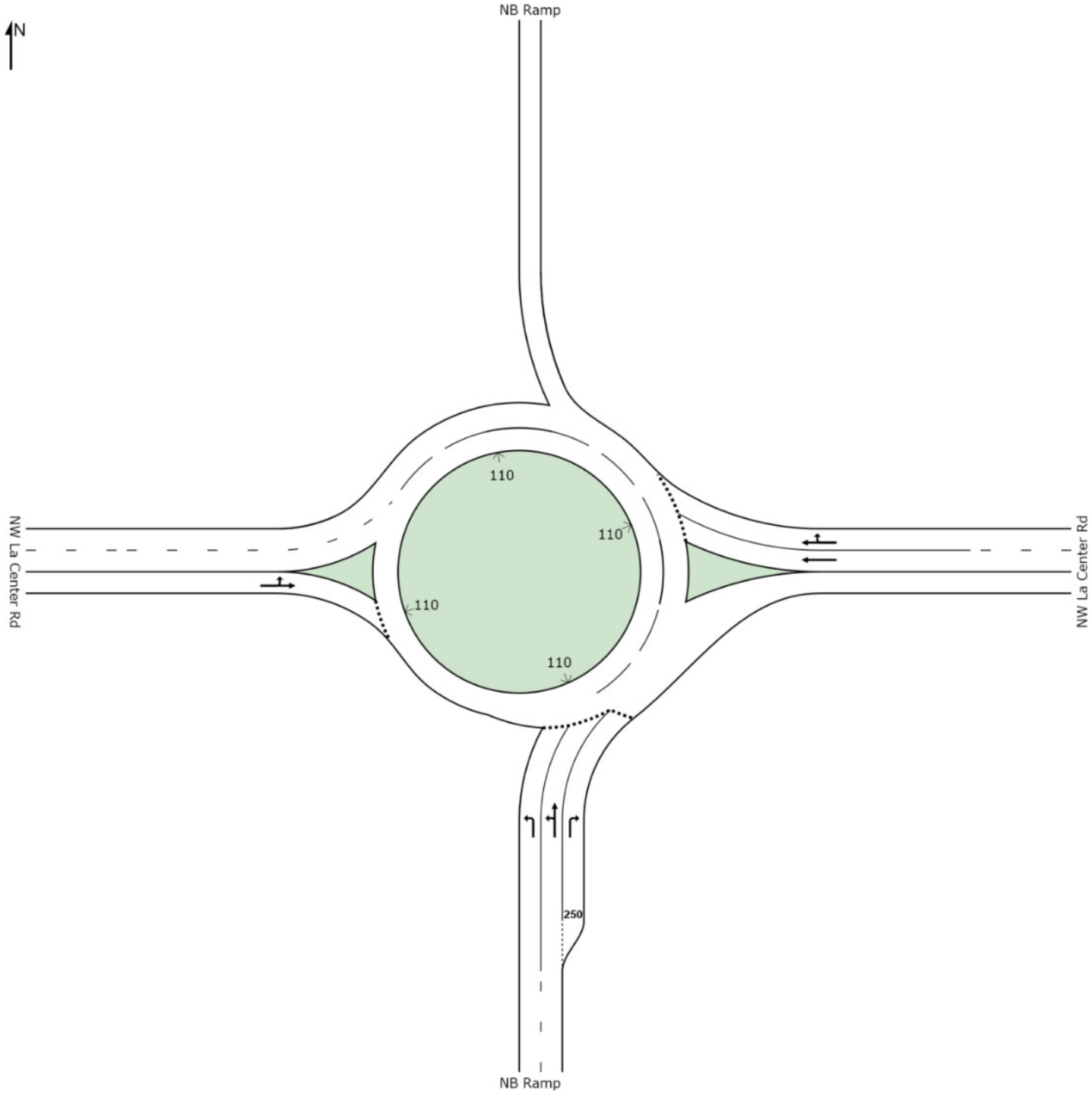
7 Lane underutilisation specified by user
d Dominant lane on roundabout approach

SIDRA INTERSECTION 6

SITE LAYOUT

Site: 2017 Total Build NW La Center and NB Ramps Weekday AM 85/15 Split

2017 Total Traffic Weekday AM
85/15 Split Sensitivity Analysis
Roundabout



MOVEMENT SUMMARY

Site: 2017 Total Build NW La Center and NB Ramps Weekday PM 85/15 Split

2017 Total Traffic Weekday PM
85/15 Split Sensitivity Analysis
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Ramp											
3	L2	747	1.0	0.561	9.7	LOS A	4.3	109.2	0.63	0.54	23.5
8	T1	8	50.0	0.561	10.1	LOS B	4.3	109.2	0.65	0.55	27.3
18	R2	591	3.0	0.591	11.6	LOS B	4.9	125.7	0.69	0.63	27.2
Approach		1346	2.2	0.591	10.6	LOS B	4.9	125.7	0.66	0.58	25.0
East: NW La Center Rd											
6	T1	451	4.0	0.535	13.4	LOS B	3.5	89.6	0.76	0.80	20.1
16	R2	119	5.0	0.358	11.8	LOS B	1.8	45.5	0.70	0.72	25.1
Approach		570	4.2	0.535	13.0	LOS B	3.5	89.6	0.75	0.79	21.2
West: NW La Center Rd											
5	L2	69	4.0	0.229	4.2	LOS A	0.0	0.0	0.00	0.00	35.8
2	T1	281	9.0	0.229	4.2	LOS A	0.0	0.0	0.00	0.00	36.0
Approach		350	8.0	0.229	4.2	LOS A	0.0	0.0	0.00	0.00	35.9
All Vehicles		2266	3.6	0.591	10.2	LOS B	4.9	125.7	0.58	0.54	25.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2017 Total Build NW La Center and NB Ramps Weekday PM 85/15 Split

2017 Total Traffic Weekday PM
85/15 Split Sensitivity Analysis
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NB Ramp													
Lane 1	134	1.0	657	0.205	37[7]	7.9	LOS A	1.0	24.3	Full	1800	0.0	0.0
Lane 2[d]	621	1.6	1106	0.561	100	10.1	LOS B	4.3	109.2	Full	1800	0.0	0.0
Lane 3	591	3.0	1000	0.591	100	11.6	LOS B	4.9	125.7	Short	250	0.0	0.0
Approach	1346	2.2		0.591		10.6	LOS B	4.9	125.7				
East: NW La Center Rd													
Lane 1[d]	371	4.0	693	0.535	100	13.7	LOS B	3.5	89.6	Full	600	0.0	0.0
Lane 2	199	4.6	557	0.358	67[7]	11.8	LOS B	1.8	45.5	Full	600	0.0	0.0
Approach	570	4.2		0.535		13.0	LOS B	3.5	89.6				
West: NW La Center Rd													
Lane 1[d]	350	8.0	1531	0.229	100	4.2	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	350	8.0		0.229		4.2	LOS A	0.0	0.0				
Intersection	2266	3.6		0.591		10.2	LOS B	4.9	125.7				

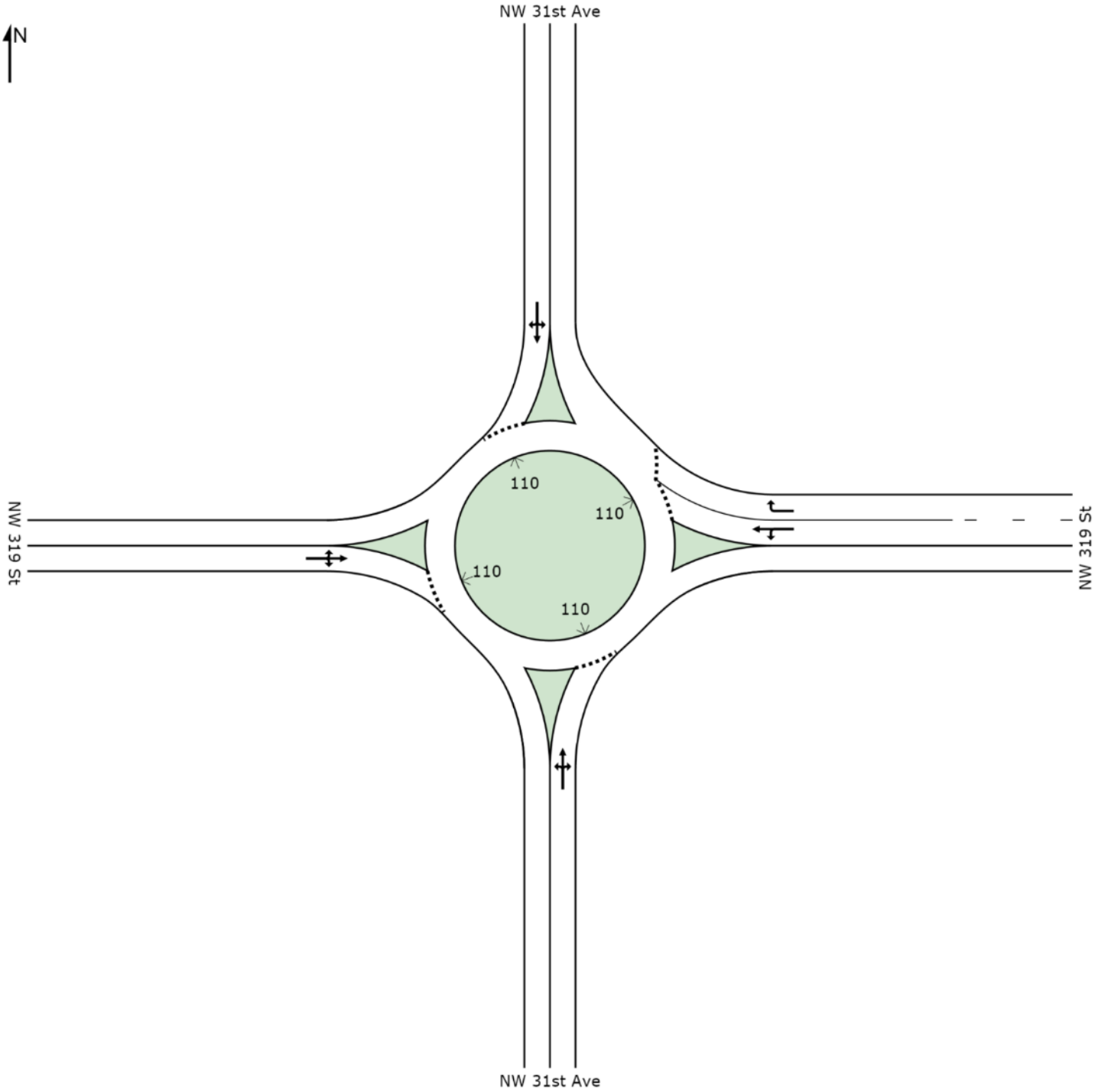
Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

7 Lane underutilisation specified by user
d Dominant lane on roundabout approach

SITE LAYOUT

Site: 2017 Total Build NW 319 St and NW 31st Ave Weekday AM 85/15 Split

2017 Total Traffic Weekday AM
85/15 Split Sensitivity Analysis
Roundabout



MOVEMENT SUMMARY

Site: 2017 Total Build NW 319 St and NW 31st Ave Weekend Peak 85/15 Split

2017 Total Traffic Weekend Peak
85/15 Split Sensitivity Analysis

Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NW 31st Ave											
3	L2	5	25.0	0.153	8.3	LOS A	0.9	22.2	0.74	0.66	30.4
8	T1	15	1.0	0.153	8.3	LOS A	0.9	22.2	0.74	0.66	33.2
18	R2	66	4.0	0.153	8.3	LOS A	0.9	22.2	0.74	0.66	30.0
Approach		86	4.7	0.153	8.3	LOS A	0.9	22.2	0.74	0.66	30.7
East: NW 319 St											
1	L2	77	6.0	0.244	5.4	LOS A	1.5	39.6	0.15	0.05	32.8
6	T1	203	2.0	0.244	5.4	LOS A	1.5	39.6	0.15	0.05	31.9
16	R2	839	1.0	0.513	7.1	LOS A	4.9	123.7	0.18	0.05	30.2
Approach		1119	1.5	0.513	6.6	LOS A	4.9	123.7	0.17	0.05	30.7
North: NW 31st Ave											
7	L2	559	1.0	0.590	11.9	LOS B	4.8	121.3	0.67	0.56	26.5
4	T1	10	1.0	0.590	11.9	LOS B	4.8	121.3	0.67	0.56	29.3
14	R2	1	1.0	0.590	11.9	LOS B	4.8	121.3	0.67	0.56	27.7
Approach		570	1.0	0.590	11.9	LOS B	4.8	121.3	0.67	0.56	26.6
West: NW 319 St											
5	L2	1	1.0	0.283	9.6	LOS A	1.7	43.5	0.76	0.71	32.2
2	T1	157	4.0	0.283	9.6	LOS A	1.7	43.5	0.76	0.71	29.8
12	R2	15	0.0	0.283	9.6	LOS A	1.7	43.5	0.76	0.71	31.6
Approach		173	3.6	0.283	9.6	LOS A	1.7	43.5	0.76	0.71	30.1
All Vehicles		1948	1.7	0.590	8.5	LOS A	4.9	123.7	0.39	0.28	29.3

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2017 Total Build NW 319 St and NW 31st Ave Weekend Peak 85/15 Split

2017 Total Traffic Weekend Peak
85/15 Split Sensitivity Analysis

Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NW 31st Ave													
Lane 1[d]	86	4.7	564	0.153	100	8.3	LOS A	0.9	22.2	Full	1600	0.0	0.0
Approach	86	4.7		0.153		8.3	LOS A	0.9	22.2				
East: NW 319 St													
Lane 1	280	3.1	1146	0.244	100	5.4	LOS A	1.5	39.6	Full	650	0.0	0.0
Lane 2[d]	839	1.0	1636	0.513	100	7.1	LOS A	4.9	123.7	Full	650	0.0	0.0
Approach	1119	1.5		0.513		6.6	LOS A	4.9	123.7				
North: NW 31st Ave													
Lane 1[d]	570	1.0	967	0.590	100	11.9	LOS B	4.8	121.3	Full	1400	0.0	0.0
Approach	570	1.0		0.590		11.9	LOS B	4.8	121.3				
West: NW 319 St													
Lane 1[d]	173	3.6	611	0.283	100	9.6	LOS A	1.7	43.5	Full	1300	0.0	0.0
Approach	173	3.6		0.283		9.6	LOS A	1.7	43.5				
Intersection	1948	1.7		0.590		8.5	LOS A	4.9	123.7				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

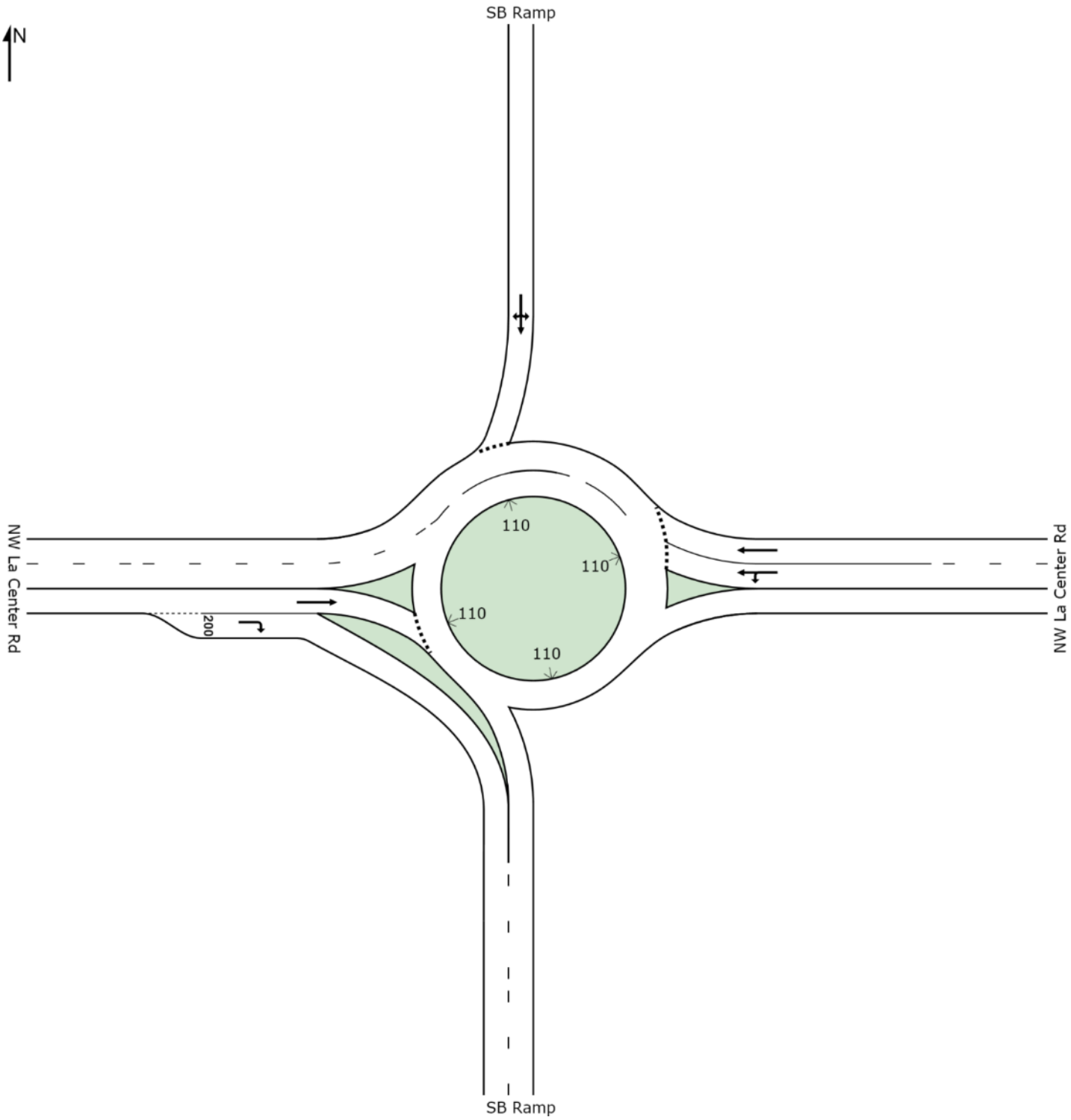
d Dominant lane on roundabout approach

SIDRA INTERSECTION 6

SITE LAYOUT

Site: 2017 Total Build NW La Center and SB Ramps Weekday AM 85_15 Split

2017 Total Traffic Weekday AM
Roundabout



MOVEMENT SUMMARY

Site: 2017 Total Build NW La Center and SB Ramps Weekend 85_15 Split

2017 Total Traffic Weekend Peak
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: NW La Center Rd											
1	L2	375	2.0	0.370	5.7	LOS A	0.0	0.0	0.00	0.00	34.2
6	T1	982	1.0	0.370	6.0	LOS A	0.0	0.0	0.00	0.00	37.5
Approach		1357	1.3	0.462	5.9	LOS A	0.0	0.0	0.00	0.00	36.2
North: SB Ramp											
7	L2	172	4.0	0.625	21.3	LOS C	3.5	92.8	0.79	0.92	22.7
4	T1	4	0.0	0.625	21.3	LOS C	3.5	92.8	0.79	0.92	25.5
14	R2	141	8.0	0.625	21.3	LOS C	3.5	92.8	0.79	0.92	22.0
Approach		317	5.7	0.625	21.3	LOS C	3.5	92.8	0.79	0.92	22.4
West: NW La Center Rd											
2	T1	146	3.0	0.159	5.5	LOS A	0.9	22.7	0.61	0.49	31.6
12	R2	636	2.0	0.387	0.0	LOS A	0.0	0.0	0.00	0.00	35.9
Approach		782	2.2	0.387	1.0	LOS A	0.9	22.7	0.11	0.09	35.2
All Vehicles		2456	2.1	0.625	6.4	LOS A	3.5	92.8	0.14	0.15	32.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2017 Total Build NW La Center and SB Ramps Weekend 85_15 Split

2017 Total Traffic Weekend Peak
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
East: NW La Center Rd													
Lane 1	545	1.7	1476	0.370	80[7]	5.7	LOS A	0.0	0.0	Full	600	0.0	0.0
Lane 2[d]	812	1.0	1757	0.462	100	6.1	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	1357	1.3		0.462		5.9	LOS A	0.0	0.0				
North: SB Ramp													
Lane 1[d]	317	5.7	507	0.625	100	21.3	LOS C	3.5	92.8	Full	1300	0.0	0.0
Approach	317	5.7		0.625		21.3	LOS C	3.5	92.8				
West: NW La Center Rd													
Lane 1[d]	146	3.0	916	0.159	100	5.5	LOS A	0.9	22.7	Full	650	0.0	0.0
Lane 2	636	2.0	1642	0.387	100	0.0	LOS A	0.0	0.0	Short	200	0.0	0.0
Approach	782	2.2		0.387		1.0	LOS A	0.9	22.7				
Intersection	2456	2.1		0.625		6.4	LOS A	3.5	92.8				

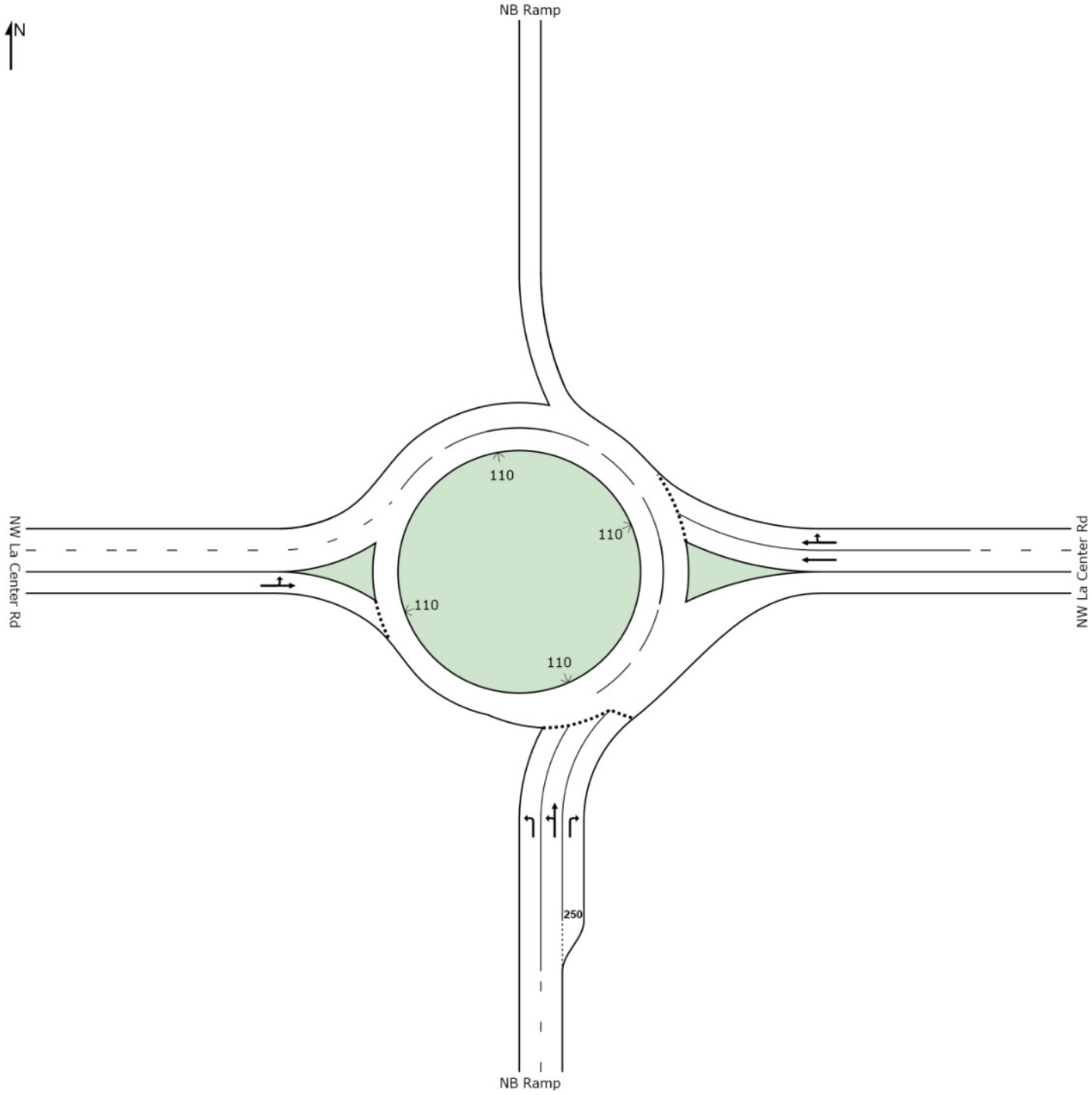
Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

7 Lane underutilisation specified by user
d Dominant lane on roundabout approach

SITE LAYOUT

Site: 2017 Total Build NW La Center and NB Ramps Weekday AM 85/15 Split

2017 Total Traffic Weekday AM
85/15 Split Sensitivity Analysis
Roundabout



MOVEMENT SUMMARY

Site: 2017 Total Build NW La Center and NB Ramps Weekend 85/15 Split

2017 Total Traffic Weekend
85/15 Split Sensitivity Analysis
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Ramp											
3	L2	927	1.0	0.670	11.7	LOS B	6.6	167.5	0.67	0.58	21.2
8	T1	4	0.0	0.670	12.4	LOS B	6.6	167.5	0.70	0.61	26.7
18	R2	564	3.0	0.574	11.3	LOS B	4.5	114.5	0.65	0.57	27.3
Approach		1495	1.8	0.670	11.6	LOS B	6.6	167.5	0.67	0.58	23.1
East: NW La Center Rd											
6	T1	430	3.0	0.617	17.9	LOS B	4.5	116.1	0.85	0.93	18.3
16	R2	124	12.0	0.425	16.7	LOS B	2.2	59.6	0.78	0.81	22.6
Approach		554	5.0	0.617	17.7	LOS B	4.5	116.1	0.83	0.90	19.3
West: NW La Center Rd											
5	L2	74	1.0	0.200	3.8	LOS A	0.0	0.0	0.00	0.00	35.7
2	T1	244	5.0	0.200	3.8	LOS A	0.0	0.0	0.00	0.00	36.0
Approach		318	4.1	0.200	3.8	LOS A	0.0	0.0	0.00	0.00	35.9
All Vehicles		2367	2.8	0.670	12.0	LOS B	6.6	167.5	0.62	0.57	23.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2017 Total Build NW La Center and NB Ramps Weekend 85/15 Split

2017 Total Traffic Weekend
85/15 Split Sensitivity Analysis
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NB Ramp													
Lane 1	146	1.0	681	0.215	32[7]	7.8	LOS A	1.0	25.7	Full	1800	0.0	0.0
Lane 2[d]	785	1.0	1171	0.670	100	12.4	LOS B	6.6	167.5	Full	1800	0.0	0.0
Lane 3	564	3.0	983	0.574	100	11.3	LOS B	4.5	114.5	Short	250	0.0	0.0
Approach	1495	1.8		0.670		11.6	LOS B	6.6	167.5				
East: NW La Center Rd													
Lane 1[d]	373	3.0	605	0.617	100	18.1	LOS B	4.5	116.1	Full	600	0.0	0.0
Lane 2	181	9.2	426	0.425	69[7]	16.7	LOS B	2.2	59.6	Full	600	0.0	0.0
Approach	554	5.0		0.617		17.7	LOS B	4.5	116.1				
West: NW La Center Rd													
Lane 1[d]	318	4.1	1589	0.200	100	3.8	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	318	4.1		0.200		3.8	LOS A	0.0	0.0				
Intersection	2367	2.8		0.670		12.0	LOS B	6.6	167.5				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

7 Lane underutilisation specified by user
d Dominant lane on roundabout approach

Appendix X 2037 Total Traffic Conditions Worksheets – Freeway Mainline

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/27/2014*
Analysis Time Period	*Weekday AM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 NB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	*2037 - with casino*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2831*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.917*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1029*	pc/h/ln
S	*75.0*	mph
D = v_p / S	*13.7*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/27/2014*
Analysis Time Period	*Weekday AM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 NB*
From/To	*SR 501 to La Center Rd*
Jurisdiction	*WSDOT*
Analysis Year	*2037 - with casino*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3252*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*18*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.917*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*1.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*3.2*	mph
FFS	*72.2*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1182*	pc/h/ln
S	*70.0*	mph
D = v_p / S	*16.9*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/27/2014*
Analysis Time Period	*Weekday AM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	*2037 - with casino*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*2900*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*16*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.926*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1044*	pc/h/ln
S	*75.0*	mph
D = v_p / S	*13.9*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS		
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h/ln
S		mph
D = v_p / S		pc/mi/ln
Required Number of Lanes, N		

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/27/2014*
Analysis Time Period	*Weekday AM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*SR 501 to La Center*
Jurisdiction	*WSDOT*
Analysis Year	*2037 - with casino*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3487*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*16*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.926*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*1.33*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*4.1*	mph
FFS	*71.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1255*	pc/h/ln
S	*70.0*	mph
D = v_p / S	*17.9*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/27/2014*
Analysis Time Period	*Weekday PM Peak Hour*

Site Information

Highway/Direction of Travel	*I-5 NB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	*2037 - with casino*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3568*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*11*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.948*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1255*	pc/h/ln
S	*74.3*	mph
D = v_p / S	*16.9*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/27/2014*
Analysis Time Period	*Weekday PM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 NB*
From/To	*SR 501 to La Center Rd*
Jurisdiction	*WSDOT*
Analysis Year	*2037 - with casino*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4680*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*11*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.948*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*1.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*3.2*	mph
FFS	*72.2*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1646*	pc/h/ln
S	*67.7*	mph
D = v_p / S	*24.3*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/27/2014*
Analysis Time Period	*Weekday PM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	*2037 - with casino*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*3534*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.939*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1255*	pc/h/ln
S	*74.3*	mph
D = v_p / S	*16.9*	pc/mi/ln
LOS	*B*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/27/204*
Analysis Time Period	*Weekday PM Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*SR 501 to La Center*
Jurisdiction	*WSDOT*
Analysis Year	*2037 - with casino*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4345*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*13*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.939*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*1.33*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*4.1*	mph
FFS	*71.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1542*	pc/h/ln
S	*68.6*	mph
D = v_p / S	*22.5*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/27/2014*
Analysis Time Period	*Weekend Peak Hour*

Site Information

Highway/Direction of Travel	*I-5 NB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	*2037 with casino*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4461*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1546*	pc/h/ln
S	*71.7*	mph
D = v_p / S	*21.6*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/27/2014*
Analysis Time Period	*Weekend Peak Period*

Site Information

Highway/Direction of Travel	*I-5 NB*
From/To	*SR 501 to La Center Rd*
Jurisdiction	*WSDOT*
Analysis Year	*2037 with casino*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5751*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*8*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.962*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*1.00*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*3.2*	mph
FFS	*72.2*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1994*	pc/h/ln
S	*62.7*	mph
D = v_p / S	*31.8*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 11-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/27/2014*
Analysis Time Period	*Weekend Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*La Center Rd to SR 503*
Jurisdiction	*WSDOT*
Analysis Year	*2037 with casino*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*4261*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*11*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.948*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*0.67*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*2.3*	mph
FFS	*73.1*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1498*	pc/h/ln
S	*72.3*	mph
D = v_p / S	*20.7*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

BASIC FREEWAY SEGMENTS WORKSHEET

General Information

Analyst	*KML*
Agency or Company	*KAI*
Date Performed	*6/27/2014*
Analysis Time Period	*Weekend Peak Period*

Site Information

Highway/Direction of Travel	*I-5 SB*
From/To	*SR 501 to La Center*
Jurisdiction	*WSDOT*
Analysis Year	*2037 with casino*

Project Description *12393*

☑ Oper.(LOS) ☐ Des.(N) ☐ Planning Data

Flow Inputs

Volume, V	*5110*	veh/h	Peak-Hour Factor, PHF	*1.00*
AADT		veh/day	%Trucks and Buses, P_T	*11*
Peak-Hr Prop. of AADT, K			%RVs, P_R	*0*
Peak-Hr Direction Prop, D			General Terrain:	*Level*
DDHV = AADT x K x D		veh/h	Grade % Length Up/Down %	*mi*

Calculate Flow Adjustments

f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.948*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Side Lat. Clearance	*6.0*	ft
Number of Lanes, N	*3*	
Total Ramp Density, TRD	*1.33*	ramps/mi
FFS (measured)		mph
Base free-flow Speed, BFFS	*75.4*	mph

Calc Speed Adj and FFS

f_{LW}	*0.0*	mph
f_{LC}	*0.0*	mph
TRD Adjustment	*4.1*	mph
FFS	*71.3*	mph

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1797*	pc/h/ln
S	*65.9*	mph
D = v_p / S	*27.3*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

Design LOS	
v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	pc/h/ln
S	mph
D = v_p / S	pc/mi/ln
Required Number of Lanes, N	

Glossary

N - Number of lanes	S - Speed
V - Hourly volume	D - Density
v_p - Flow rate	FFS - Free-flow speed
LOS - Level of service	BFFS - Base free-flow speed
DDHV - Directional design hour volume	

Factor Location

E_R - Exhibits 11-10, 11-12	f_{LW} - Exhibit 11-8
E_T - Exhibits 10-10, 11-11, 11-13	f_{LC} - Exhibit 11-9
f_p - Page 11-18	TRD - Page 11-11
LOS, S, FFS, v_p - Exhibits 11-2, 11-3	

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Appendix Y 2037 Total Traffic Conditions Worksheets – Merge/Diverge Locations

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	2037 with Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	650	☑ No	☐ Off
L_{up} =	2500 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	834 veh/h	Freeway Volume, V_F	2496	V_D =	veh/h
		Ramp Volume, V_R	335		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2496	1.00	Level	18	0	0.917	1.00	2721
Ramp	335	1.00	Level	18	0	0.917	1.00	365
UpStream	834	1.00	Level	7	0	0.966	1.00	863
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 377.20 (Equation 13-6 or 13-7)

P_{FM} = 0.596 using Equation (Exhibit 13-6)

V_{12} = 1621 pc/h

V_3 or V_{av34} 1100 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1621 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3086	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	1986	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 16.7 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

M_S = 0.304 (Exibit 13-11)

S_R= 61.5 mph (Exhibit 13-11)

S_0= 67.8 mph (Exhibit 13-11)

S = 63.6 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	2037 with Casino - mitigated

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☐ Yes	☐ On	Ramp Number of Lanes, N	2	☑ Yes	☑ On
☑ No	☐ Off	Acceleration Lane Length, L_A		☐ No	☐ Off
L_{up} =	ft	Deceleration Lane Length L_D	250	L_{down} =	2500 ft
V_u =	veh/h	Freeway Volume, V_F	3252	V_D =	528 veh/h
		Ramp Volume, V_R	756		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3252	1.00	Level	18	0	0.917	1.00	3545
Ramp	756	1.00	Level	7	0	0.966	1.00	782
UpStream								
DownStream	528	1.00	Level	18	0	0.917	1.00	576

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.450 using Equation (Exhibit 13-7)

V_{12} = 2025 pc/h

V_3 or V_{av34} 1520 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2025 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3545	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2763	Exhibit 13-8	7200	No
V_R	782	Exhibit 13-10	4000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2025	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 14.9 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.498 (Exhibit 13-12)

S_R= 56.0 mph (Exhibit 13-12)

S_0= 74.8 mph (Exhibit 13-12)

S = 62.8 mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	2037 with Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	550	☑ No	☐ Off
L_{up} =	2500 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	427 veh/h	Freeway Volume, V_F	2592	V_D =	veh/h
		Ramp Volume, V_R	895		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2592	1.00	Level	16	0	0.926	1.00	2799
Ramp	895	1.00	Level	4	0	0.980	1.00	913
UpStream	427	1.00	Level	14	0	0.935	1.00	457
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 466.77 (Equation 13-6 or 13-7)

P_{FM} = 0.593 using Equation (Exhibit 13-6)

V_{12} = 1660 pc/h

V_3 or V_{av34} 1139 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1660 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3712	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2573	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 21.7 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.334 (Exibit 13-11)

S_R= 60.7 mph (Exhibit 13-11)

S_0= 67.7 mph (Exhibit 13-11)

S = 62.7 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	2037 with Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 2500 ft
V_u = veh/h	Deceleration Lane Length L_D: 150	V_D = 1341 veh/h
	Freeway Volume, V_F: 2900	
	Ramp Volume, V_R: 308	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	2900	1.00	Level	16	0	0.926	1.00	3132
Ramp	308	1.00	Level	14	0	0.935	1.00	330
UpStream								
DownStream	1341	1.00	Level	4	0	0.980	1.00	1368

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.667 using Equation (Exhibit 13-7)

V_{12} = 2198 pc/h

V_3 or V_{av34} 934 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3132	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	2802	Exhibit 13-8	7200	No
V_R	330	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2198	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 21.8 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.458 (Exhibit 13-12)

S_R= 57.2 mph (Exhibit 13-12)

S_0= 76.8 mph (Exhibit 13-12)

S = 61.9 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	2037_Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	400	☑ No	☐ Off
L_{up} =	2525 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	143 veh/h	Freeway Volume, V_F	3252	V_D =	veh/h
		Ramp Volume, V_R	143		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3252	1.00	Level	18	0	0.917	1.00	3545
Ramp	143	1.00	Level	100	0	0.667	1.00	214
UpStream	143	1.00	Level	100	0	0.667	1.00	214
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 410.23 (Equation 13-6 or 13-7)

P_{FM} = 0.589 using Equation (Exhibit 13-6)

V_{12} = 2087 pc/h

V_3 or V_{av34} 1458 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2087 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	3759	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2301	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 20.8 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.332 (Exibit 13-11)

S_R= 60.7 mph (Exhibit 13-11)

S_0= 66.6 mph (Exhibit 13-11)

S = 62.8 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday AM Peak Period	Analysis Year	2037_Casino

Project Description 12393

Inputs

Upstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ Off; L_{up} = ft; V_u = veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	
Deceleration Lane Length L_D	975
Freeway Volume, V_F	3252
Ramp Volume, V_R	143
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp: ☑ Yes ☑ On ☐ No ☐ Off; L_{down} = 2525 ft; V_D = 143 veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3252	1.00	Level	18	0	0.917	1.00	3545
Ramp	143	1.00	Level	100	0	0.667	1.00	214
UpStream								
DownStream	143	1.00	Level	100	0	0.667	1.00	214

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.662 using Equation (Exhibit 13-7)

V_{12} = 2418 pc/h

V_3 or V_{av34} 1127 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3545	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3331	Exhibit 13-8	7200	No
V_R	214	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2418	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 16.3 (pc/mi/ln)

LOS = B (Exhibit 13-2)

Speed Determination

D_s = 0.447 (Exhibit 13-12)

S_R= 57.5 mph (Exhibit 13-12)

S_0= 76.3 mph (Exhibit 13-12)

S = 62.4 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	2037 with Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway/Ramp		Downstream Adj Ramp	
☑ Yes	☐ On	Freeway Number of Lanes, N	3	☐ Yes	☐ On
☐ No	☑ Off	Ramp Number of Lanes, N	1	☑ No	☐ Off
L_{up} =	2500 ft	Acceleration Lane Length, L_A	650	L_{down} =	ft
V_u =	1714 veh/h	Deceleration Lane Length L_D		V_D =	veh/h
		Freeway Volume, V_F	3216		
		Ramp Volume, V_R			
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3216	1.00	Level	11	0	0.948	1.00	3393
Ramp		1.00	Level	8	0	0.962	1.00	612
UpStream	1714	1.00	Level	4	0	0.980	1.00	1748
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 573.87 (Equation 13-6 or 13-7)

P_{FM} = 0.596 using Equation (Exhibit 13-6)

V_{12} = 2021 pc/h

V_3 or V_{av34} 1372 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2021 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4005	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2633	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 21.7 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.330 (Exibit 13-11)

S_R= 60.8 mph (Exhibit 13-11)

S_0= 66.9 mph (Exhibit 13-11)

S = 62.7 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	2037 with Casino - mitigated

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 2	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 2500 ft
V_u = veh/h	Deceleration Lane Length L_D: 250	V_D = 588 veh/h
	Freeway Volume, V_F: 4680	
	Ramp Volume, V_R: 1464	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4680	1.00	Level	11	0	0.948	1.00	4937
Ramp	1464	1.00	Level	4	0	0.980	1.00	1493
UpStream								
DownStream	588	1.00	Level	8	0	0.962	1.00	612

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.450 using Equation (Exhibit 13-7)

V_{12} = 3043 pc/h

V_3 or V_{av34} 1894 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4937	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3444	Exhibit 13-8	7200	No
V_R	1493	Exhibit 13-10	4000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3043	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 23.7 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.562 (Exhibit 13-12)

S_R= 54.3 mph (Exhibit 13-12)

S_0= 73.3 mph (Exhibit 13-12)

S = 60.3 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	2037 with Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	550	☑ No	☐ Off
L_{up} =	2500 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	552 veh/h	Freeway Volume, V_F	3169	V_D =	veh/h
		Ramp Volume, V_R	1176		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3169	1.00	Level	13	0	0.939	1.00	3375
Ramp	1176	1.00	Level	5	0	0.976	1.00	1205
UpStream	552	1.00	Level	8	0	0.962	1.00	574
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 652.52 (Equation 13-6 or 13-7)

P_{FM} = 0.593 using Equation (Exhibit 13-6)

V_{12} = 2001 pc/h

V_3 or V_{av34} 1374 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2001 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4580	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3206	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 26.5 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.379 (Exibit 13-11)

S_R= 59.4 mph (Exhibit 13-11)

S_0= 66.9 mph (Exhibit 13-11)

S = 61.5 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	2037 with Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A	L_{down} = 2500 ft
V_u = veh/h	Deceleration Lane Length L_D: 150	V_D = 1216 veh/h
	Freeway Volume, V_F: 3534	
	Ramp Volume, V_R: 365	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	3534	1.00	Level	13	0	0.939	1.00	3764
Ramp	365	1.00	Level	8	0	0.962	1.00	380
UpStream								
DownStream	1216	1.00	Level	5	0	0.976	1.00	1246

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.648 using Equation (Exhibit 13-7)

V_{12} = 2574 pc/h

V_3 or V_{av34} 1190 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	3764	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	3384	Exhibit 13-8	7200	No
V_R	380	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2574	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 25.0 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.462 (Exhibit 13-12)

S_R= 57.1 mph (Exhibit 13-12)

S_0= 76.0 mph (Exhibit 13-12)

S = 61.9 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	2037_Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	400	☑ No	☐ Off
L_{up} =	2525 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	127 veh/h	Freeway Volume, V_F	4680	V_D =	veh/h
		Ramp Volume, V_R	127		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4680	1.00	Level	11	0	0.948	1.00	4937
Ramp	127	1.00	Level	100	0	0.667	1.00	190
UpStream	127	1.00	Level	100	0	0.667	1.00	190
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 702.98 (Equation 13-6 or 13-7)

P_{FM} = 0.589 using Equation (Exhibit 13-6)

V_{12} = 2906 pc/h

V_3 or V_{av34} 2031 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2906 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5127	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3096	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 27.0 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.379 (Exibit 13-11)

S_R= 59.4 mph (Exhibit 13-11)

S_0= 64.5 mph (Exhibit 13-11)

S = 61.3 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekday PM Peak Period	Analysis Year	2037_Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 2525 ft
V_u = veh/h	Deceleration Lane Length L_D: 975	V_D = 127 veh/h
	Freeway Volume, V_F: 4680	
	Ramp Volume, V_R: 127	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4680	1.00	Level	11	0	0.948	1.00	4937
Ramp	127	1.00	Level	100	0	0.667	1.00	190
UpStream								
DownStream	127	1.00	Level	100	0	0.667	1.00	190

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.628 using Equation (Exhibit 13-7)

V_{12} = 3170 pc/h

V_3 or V_{av34} 1767 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4937	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	4747	Exhibit 13-8	7200	No
V_R	190	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3170	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 22.7 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.445 (Exhibit 13-12)

S_R= 57.5 mph (Exhibit 13-12)

S_0= 73.8 mph (Exhibit 13-12)

S = 62.5 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekend Peak Period	Analysis Year	2037 with Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Freeway Number of Lanes, N	3	Downstream Adj Ramp	
☑ Yes	☐ On	Ramp Number of Lanes, N	1	☐ Yes	☐ On
☐ No	☑ Off	Acceleration Lane Length, L_A	650	☑ No	☐ Off
L_{up} =	2500 ft	Deceleration Lane Length L_D		L_{down} =	ft
V_u =	1781 veh/h	Freeway Volume, V_F	4155	V_D =	veh/h
		Ramp Volume, V_R	306		
		Freeway Free-Flow Speed, S_{FF}	70.0		
		Ramp Free-Flow Speed, S_{FR}	35.0		

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4155	1.00	Level	8	0	0.962	1.00	4321
Ramp	306	1.00	Level	9	0	0.957	1.00	320
UpStream	1781	1.00	Level	3	0	0.985	1.00	1808
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 709.97 (Equation 13-6 or 13-7)

P_{FM} = 0.596 using Equation (Exhibit 13-6)

V_{12} = 2574 pc/h

V_3 or V_{av34} 1747 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2574 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4641	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2894	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 23.8 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

M_S = 0.346 (Exibit 13-11)

S_R= 60.3 mph (Exhibit 13-11)

S_0= 65.5 mph (Exhibit 13-11)

S = 62.2 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R= mph (Exhibit 13-12)

S_0= mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekend Peak Period	Analysis Year	2037 with Casino - mitigated

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 2	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 2500 ft
V_u = veh/h	Deceleration Lane Length L_D: 250	V_D = 538 veh/h
	Freeway Volume, V_F: 5751	
	Ramp Volume, V_R: 1596	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5751	1.00	Level	8	0	0.962	1.00	5981
Ramp	1596	1.00	Level	3	0	0.985	1.00	1620
UpStream								
DownStream	538	1.00	Level	9	0	0.957	1.00	562

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.450 using Equation (Exhibit 13-7)

V_{12} = 3582 pc/h

V_3 or V_{av34} 2399 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5981	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	4361	Exhibit 13-8	7200	No
V_R	1620	Exhibit 13-10	4000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3582	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 28.3 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.574 (Exhibit 13-12)

S_R= 53.9 mph (Exhibit 13-12)

S_0= 71.3 mph (Exhibit 13-12)

S = 59.8 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB On Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekend Peak Period	Analysis Year	2037 with Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☑ Yes ☐ On	Freeway Number of Lanes, N: 3	☐ Yes ☐ On
☐ No ☑ Off	Ramp Number of Lanes, N: 1	☑ No ☐ Off
L_{up} = 2500 ft	Acceleration Lane Length, L_A: 550	L_{down} = ft
V_u = 600 veh/h	Deceleration Lane Length L_D:	V_D = veh/h
	Freeway Volume, V_F: 3848	
	Ramp Volume, V_R: 1262	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	3848	1.00	Level	11	0	0.948	1.00	4060
Ramp	1262	1.00	Level	3	0	0.985	1.00	1281
UpStream	600	1.00	Level	7	0	0.966	1.00	621
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 815.37 (Equation 13-6 or 13-7)

P_{FM} = 0.593 using Equation (Exhibit 13-6)

V_{12} = 2407 pc/h

V_3 or V_{av34} = 1653 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2407 pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5341	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3688	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 30.2 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

M_S = 0.438 (Exibit 13-11)

S_R = 57.7 mph (Exhibit 13-11)

S_0 = 65.8 mph (Exhibit 13-11)

S = 60.0 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 SB Off Ramp
Agency or Company	KAI	Junction	La Center
Date Performed	6/27/2014	Jurisdiction	WSDOT
Analysis Time Period	Weekend Peak Period	Analysis Year	2037 with Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 2500 ft
V_u = veh/h	Deceleration Lane Length L_D: 150	V_D = 1274 veh/h
	Freeway Volume, V_F: 4261	
	Ramp Volume, V_R: 413	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	4261	1.00	Level	11	0	0.948	1.00	4495
Ramp	413	1.00	Level	7	0	0.966	1.00	427
UpStream								
DownStream	1274	1.00	Level	3	0	0.985	1.00	1293

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.628 using Equation (Exhibit 13-7)

V_{12} = 2982 pc/h

V_3 or V_{av34} 1513 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4495	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	4068	Exhibit 13-8	7200	No
V_R	427	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2982	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 28.5 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

D_s = 0.466 (Exhibit 13-12)

S_R= 56.9 mph (Exhibit 13-12)

S_0= 74.8 mph (Exhibit 13-12)

S = 61.9 mph (Exhibit 13-13)

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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB On Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Friday PM Peak Period	Analysis Year	2037_Casino

Project Description 12393

Inputs

Upstream Adj Ramp

☑ Yes ☐ On

☐ No ☑ Off

L_{up} = 2525 ft

V_u = 101 veh/h

Freeway Number of Lanes, N	3
Ramp Number of Lanes, N	1
Acceleration Lane Length, L_A	400
Deceleration Lane Length L_D	
Freeway Volume, V_F	5751
Ramp Volume, V_R	101
Freeway Free-Flow Speed, S_{FF}	70.0
Ramp Free-Flow Speed, S_{FR}	35.0

Downstream Adj Ramp

☐ Yes ☐ On

☑ No ☐ Off

L_{down} = ft

V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5751	1.00	Level	8	0	0.962	1.00	5981
Ramp	101	1.00	Level	100	0	0.667	1.00	151
UpStream	101	1.00	Level	100	0	0.667	1.00	151
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = 918.05 (Equation 13-6 or 13-7)

P_{FM} = 0.589 using Equation (Exhibit 13-6)

V_{12} = 3521 pc/h

V_3 or V_{av34} 2460 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6132	Exhibit 13-8		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3672	Exhibit 13-8	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = 31.5 (pc/mi/ln)

LOS = D (Exhibit 13-2)

Speed Determination

M_S = 0.446 (Exibit 13-11)

S_R = 57.5 mph (Exhibit 13-11)

S_0 = 62.5 mph (Exhibit 13-11)

S = 59.4 mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = using Equation (Exhibit 13-7)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 13-8		
$V_{FO} = V_F - V_R$		Exhibit 13-8		
V_R		Exhibit 13-10		

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

D_s = (Exhibit 13-12)

S_R = mph (Exhibit 13-12)

S_0 = mph (Exhibit 13-12)

S = mph (Exhibit 13-13)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	KML	Freeway/Dir of Travel	I-5 NB Off Weigh Station
Agency or Company	KAI	Junction	La Center
Date Performed	6/24/2014	Jurisdiction	WSDOT
Analysis Time Period	Friday PM Peak Period	Analysis Year	2037_Casino

Project Description 12393

Inputs

Upstream Adj Ramp		Downstream Adj Ramp
☐ Yes ☐ On	Freeway Number of Lanes, N: 3	☑ Yes ☑ On
☑ No ☐ Off	Ramp Number of Lanes, N: 1	☐ No ☐ Off
L_{up} = ft	Acceleration Lane Length, L_A:	L_{down} = 2525 ft
V_u = veh/h	Deceleration Lane Length L_D: 975	V_D = 101 veh/h
	Freeway Volume, V_F: 5751	
	Ramp Volume, V_R: 101	
	Freeway Free-Flow Speed, S_{FF}: 70.0	
	Ramp Free-Flow Speed, S_{FR}: 35.0	

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	v = V/PHF x f_{HV} x f_p
Freeway	5751	1.00	Level	8	0	0.962	1.00	5981
Ramp	101	1.00	Level	100	0	0.667	1.00	151
UpStream								
DownStream	101	1.00	Level	100	0	0.667	1.00	151

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = using Equation (Exhibit 13-6)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 13-8		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 13-8		

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ V_{12} - 0.00627\ L_A$

D_R = (pc/mi/ln)

LOS = (Exhibit 13-2)

Speed Determination

M_S = (Exibit 13-11)

S_R= mph (Exhibit 13-11)

S_0= mph (Exhibit 13-11)

S = mph (Exhibit 13-13)

Diverge Areas

Estimation of v_{12}

$V_{12} = V_R + (V_F - V_R)P_{FD}$

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.604 using Equation (Exhibit 13-7)

V_{12} = 3670 pc/h

V_3 or V_{av34} 2311 pc/h (Equation 13-14 or 13-17)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5981	Exhibit 13-8	7200	No
$V_{FO} = V_F - V_R$	5830	Exhibit 13-8	7200	No
V_R	151	Exhibit 13-10	2000	No

Flow Entering Diverge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3670	Exhibit 13-8	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.009\ L_D$

D_R = 27.0 (pc/mi/ln)

LOS = C (Exhibit 13-2)

Speed Determination

D_s = 0.442 (Exhibit 13-12)

S_R= 57.6 mph (Exhibit 13-12)

S_0= 71.7 mph (Exhibit 13-12)

S = 62.4 mph (Exhibit 13-13)

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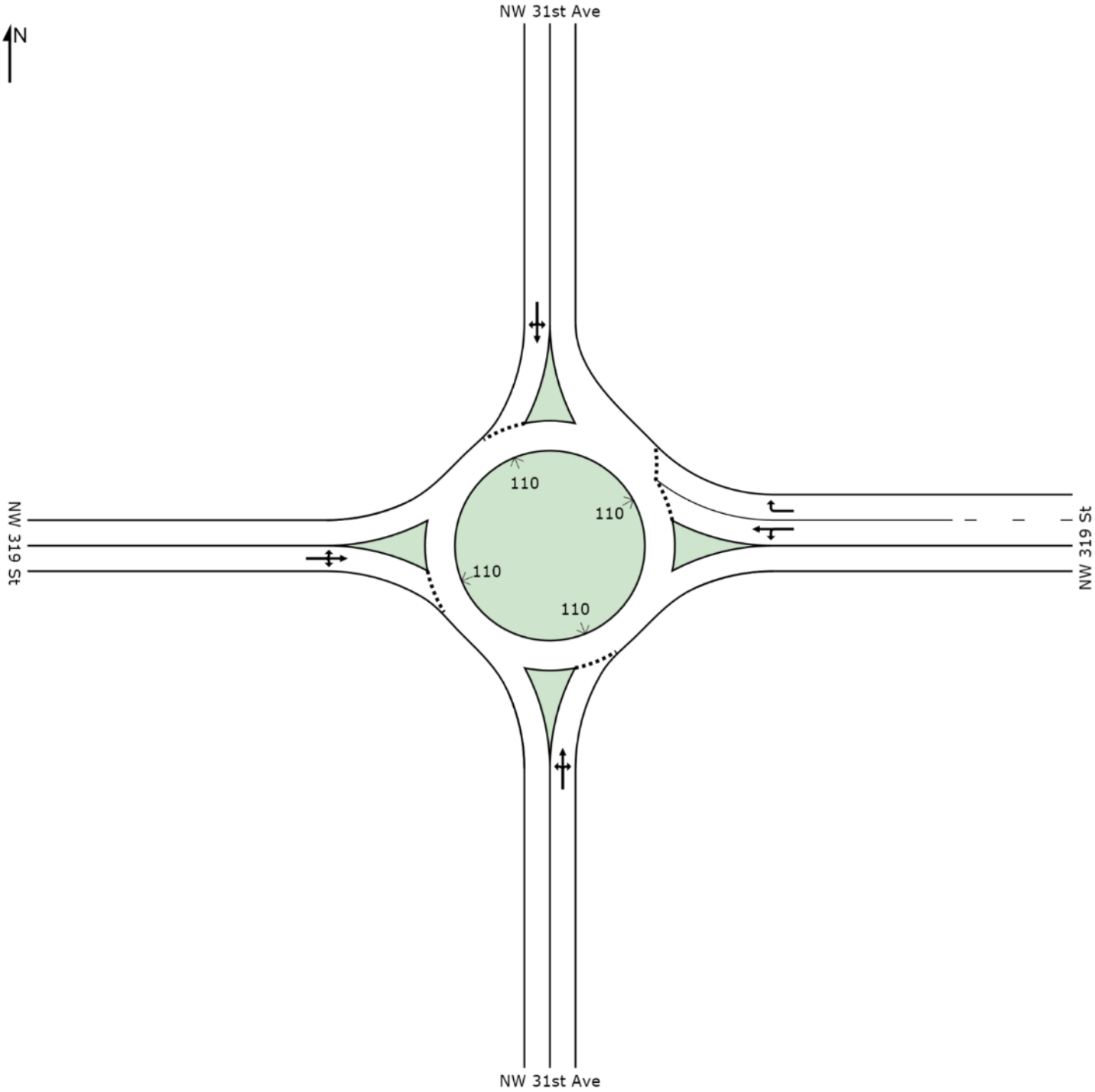
Appendix Z 2037 Total Traffic Conditions (No Build) Worksheets – Study Intersections

SITE LAYOUT

Site: 2037 Total NoBuild NW 319 St and NW 31st Ave Weekday AM

2037 No Build Weekday AM

Roundabout



MOVEMENT SUMMARY

Site: 2037 Total NoBuild NW 319 St and NW 31st Ave Weekday AM

2037 No Build Weekday AM

Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NW 31st Ave											
3	L2	5	0.0	0.226	7.0	LOS A	1.2	34.8	0.54	0.43	33.9
8	T1	5	1.0	0.226	7.0	LOS A	1.2	34.8	0.54	0.43	33.9
18	R2	168	23.0	0.226	7.0	LOS A	1.2	34.8	0.54	0.43	29.7
Approach		178	21.7	0.226	7.0	LOS A	1.2	34.8	0.54	0.43	29.9
East: NW 319 St											
1	L2	193	11.0	0.258	4.2	LOS A	1.6	43.2	0.08	0.02	32.7
6	T1	234	2.0	0.258	4.2	LOS A	1.6	43.2	0.08	0.02	32.1
16	R2	146	1.0	0.114	3.7	LOS A	0.6	15.2	0.08	0.02	32.5
Approach		573	4.8	0.258	4.1	LOS A	1.6	43.2	0.08	0.02	32.4
North: NW 31st Ave											
7	L2	110	1.0	0.124	5.0	LOS A	0.6	15.6	0.52	0.40	30.1
4	T1	5	1.0	0.124	5.0	LOS A	0.6	15.6	0.52	0.40	32.4
14	R2	1	1.0	0.124	5.0	LOS A	0.6	15.6	0.52	0.40	30.7
Approach		116	1.0	0.124	5.0	LOS A	0.6	15.6	0.52	0.40	30.3
West: NW 319 St											
5	L2	1	0.0	0.232	5.9	LOS A	1.2	31.8	0.50	0.38	34.5
2	T1	211	4.0	0.232	5.9	LOS A	1.2	31.8	0.50	0.38	32.4
12	R2	15	0.0	0.232	5.9	LOS A	1.2	31.8	0.50	0.38	33.5
Approach		227	3.7	0.232	5.9	LOS A	1.2	31.8	0.50	0.38	32.5
All Vehicles		1094	6.9	0.258	5.1	LOS A	1.6	43.2	0.29	0.20	31.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2037 Total NoBuild NW 319 St and NW 31st Ave Weekday AM

2037 No Build Weekday AM

Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NW 31st Ave													
Lane 1[d]	178	21.7	786	0.226	100	7.0	LOS A	1.2	34.8	Full	1600	0.0	0.0
Approach	178	21.7		0.226		7.0	LOS A	1.2	34.8				
East: NW 319 St													
Lane 1[d]	427	6.1	1655	0.258	100	4.2	LOS A	1.6	43.2	Full	650	0.0	0.0
Lane 2	146	1.0	1282	0.114	100	3.7	LOS A	0.6	15.2	Full	650	0.0	0.0
Approach	573	4.8		0.258		4.1	LOS A	1.6	43.2				
North: NW 31st Ave													
Lane 1[d]	116	1.0	932	0.124	100	5.0	LOS A	0.6	15.6	Full	1400	0.0	0.0
Approach	116	1.0		0.124		5.0	LOS A	0.6	15.6				
West: NW 319 St													
Lane 1[d]	227	3.7	980	0.232	100	5.9	LOS A	1.2	31.8	Full	1300	0.0	0.0
Approach	227	3.7		0.232		5.9	LOS A	1.2	31.8				
Intersection	1094	6.9		0.258		5.1	LOS A	1.6	43.2				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

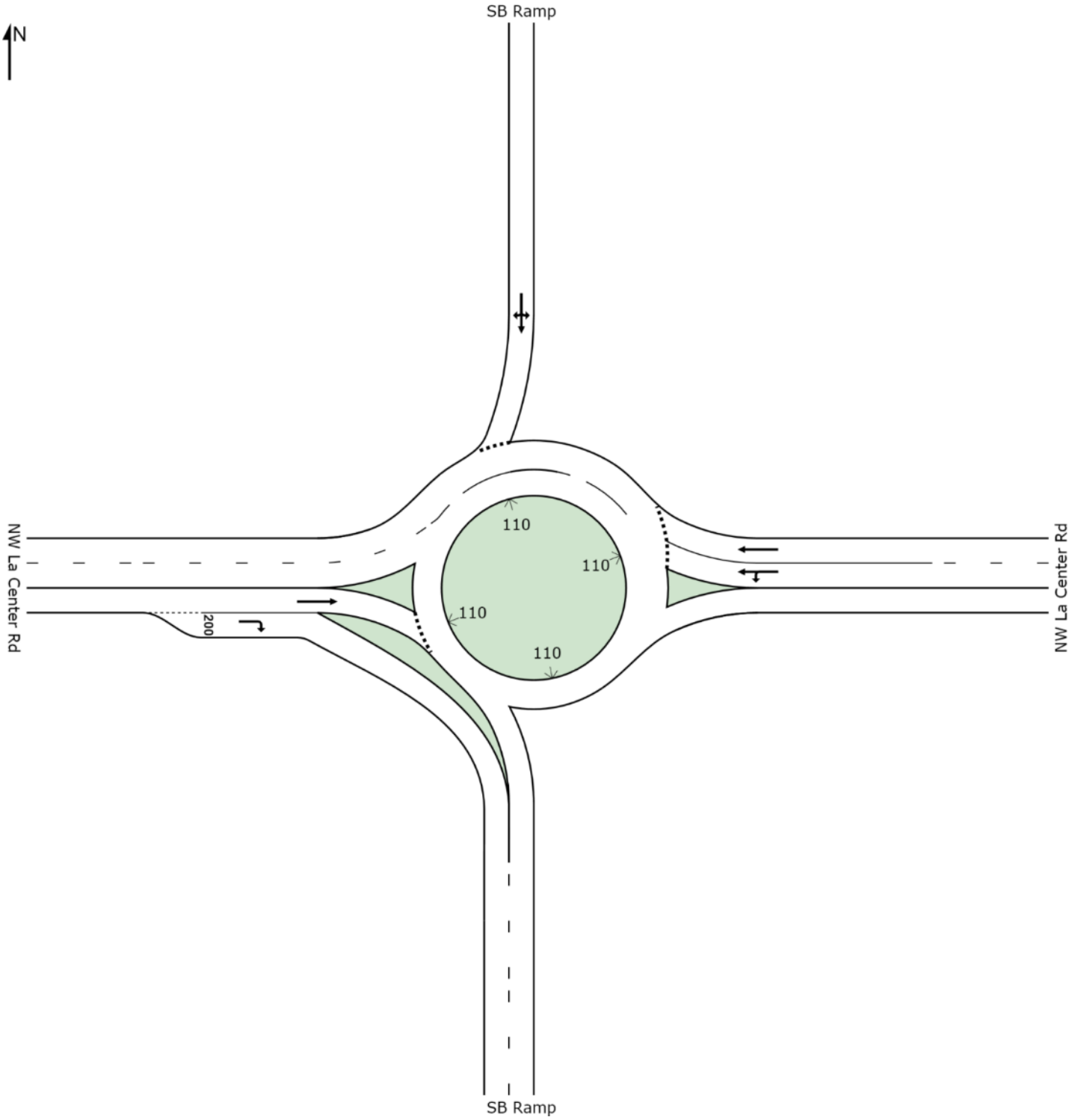
SIDRA INTERSECTION 6

SITE LAYOUT

Site: 2037 Total NoBuild NW La Center and SB Ramps Weekday AM

2037 No Build Weekday AM

Roundabout



MOVEMENT SUMMARY

Site: 2037 Total NoBuild NW La Center and SB Ramps Weekday AM

2037 No Build Weekday AM

Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: NW La Center Rd											
1	L2	627	4.0	0.413	6.1	LOS A	0.0	0.0	0.00	0.00	32.2
6	T1	445	2.0	0.324	5.5	LOS A	0.0	0.0	0.00	0.00	38.5
Approach		1072	3.2	0.413	5.8	LOS A	0.0	0.0	0.00	0.00	34.0
North: SB Ramp											
7	L2	177	13.0	0.501	14.1	LOS B	2.5	67.1	0.69	0.76	25.3
4	T1	3	50.0	0.501	14.1	LOS B	2.5	67.1	0.69	0.76	27.6
14	R2	127	8.0	0.501	14.1	LOS B	2.5	67.1	0.69	0.76	24.7
Approach		307	11.3	0.501	14.1	LOS B	2.5	67.1	0.69	0.76	25.0
West: NW La Center Rd											
2	T1	225	20.0	0.329	9.5	LOS A	2.1	60.0	0.80	0.76	27.1
12	R2	264	2.0	0.161	0.0	LOS A	0.0	0.0	0.00	0.00	35.9
Approach		489	10.3	0.329	4.4	LOS A	2.1	60.0	0.37	0.35	32.0
All Vehicles		1868	6.4	0.501	6.8	LOS A	2.5	67.1	0.21	0.22	31.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2037 Total NoBuild NW La Center and SB Ramps Weekday AM

2037 No Build Weekday AM

Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
East: NW La Center Rd													
Lane 1[d]	627	4.0	1518	0.413	100	6.1	LOS A	0.0	0.0	Full	600	0.0	0.0
Lane 2	445	2.0	1375	0.324	78[5]	5.5	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	1072	3.2		0.413		5.8	LOS A	0.0	0.0				
North: SB Ramp													
Lane 1[d]	307	11.3	613	0.501	100	14.1	LOS B	2.5	67.1	Full	1300	0.0	0.0
Approach	307	11.3		0.501		14.1	LOS B	2.5	67.1				
West: NW La Center Rd													
Lane 1[d]	225	20.0	683	0.329	100	9.5	LOS A	2.1	60.0	Full	650	0.0	0.0
Lane 2	264	2.0	1642	0.161	100	0.0	LOS A	0.0	0.0	Short	200	0.0	0.0
Approach	489	10.3		0.329		4.4	LOS A	2.1	60.0				
Intersection	1868	6.4		0.501		6.8	LOS A	2.5	67.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

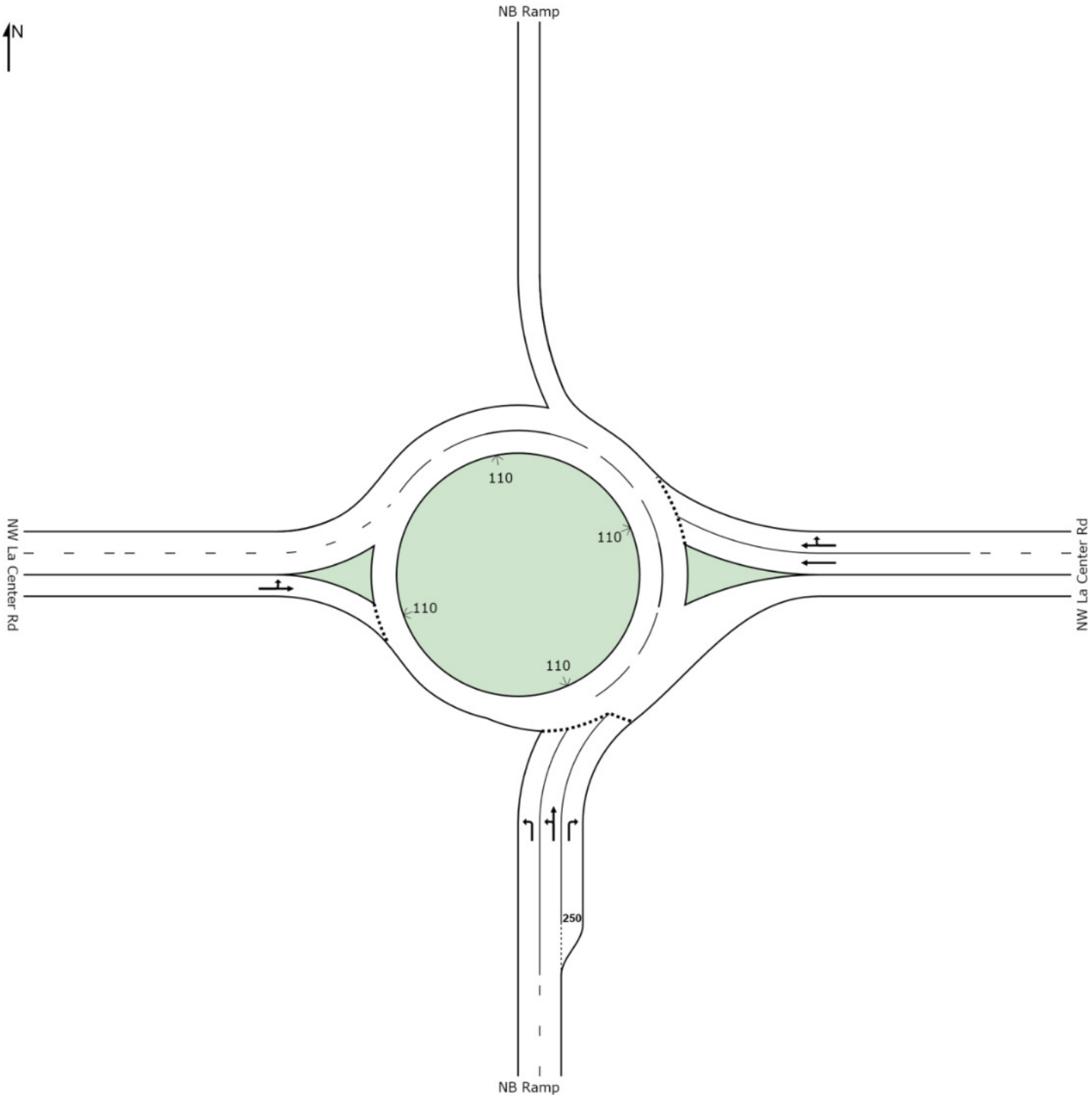
5 Lane underutilisation determined by program
d Dominant lane on roundabout approach

SIDRA INTERSECTION 6

SITE LAYOUT

Site: 2037 Total NoBuild NW La Center and NB Ramps Weekday AM

2037 No Build Weekday AM
Roundabout



SIDRA INTERSECTION 6

MOVEMENT SUMMARY

Site: 2037 Total NoBuild NW La Center and NB Ramps Weekday AM

2037 No Build Weekday AM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Ramp											
3	L2	346	1.0	0.200	6.2	LOS A	1.0	25.5	0.55	0.45	24.7
8	T1	2	50.0	0.200	6.2	LOS A	1.0	25.5	0.55	0.45	28.8
18	R2	408	7.0	0.375	7.2	LOS A	2.3	59.8	0.60	0.49	29.2
Approach		756	4.4	0.375	6.7	LOS A	2.3	59.8	0.58	0.47	26.8
East: NW La Center Rd											
6	T1	727	4.0	0.667	13.5	LOS B	5.2	135.1	0.69	0.70	20.1
16	R2	227	17.0	0.420	11.5	LOS B	2.0	57.0	0.60	0.61	25.0
Approach		954	7.1	0.667	13.0	LOS B	5.2	135.1	0.67	0.68	21.3
West: NW La Center Rd											
5	L2	106	17.0	0.274	4.7	LOS A	0.0	0.0	0.00	0.00	35.0
2	T1	297	17.0	0.274	4.7	LOS A	0.0	0.0	0.00	0.00	34.9
Approach		403	17.0	0.274	4.7	LOS A	0.0	0.0	0.00	0.00	35.0
All Vehicles		2113	8.0	0.667	9.2	LOS A	5.2	135.1	0.51	0.48	25.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2037 Total NoBuild NW La Center and NB Ramps Weekday AM

2037 No Build Weekday AM
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NB Ramp													
Lane 1	175	1.0	876	0.200	100	6.1	LOS A	1.0	25.5	Full	1800	0.0	0.0
Lane 2	173	1.6	866	0.200	100	6.2	LOS A	1.0	25.5	Full	1800	0.0	0.0
Lane 3[d]	408	7.0	1088	0.375	100	7.2	LOS A	2.3	59.8	Short	250	0.0	0.0
Approach	756	4.4		0.375		6.7	LOS A	2.3	59.8				
East: NW La Center Rd													
Lane 1[d]	679	4.0	1019	0.667	100	13.6	LOS B	5.2	135.1	Full	600	0.0	0.0
Lane 2	275	14.7	655	0.420	63[7]	11.5	LOS B	2.0	57.0	Full	600	0.0	0.0
Approach	954	7.1		0.667		13.0	LOS B	5.2	135.1				
West: NW La Center Rd													
Lane 1[d]	403	17.0	1468	0.274	100	4.7	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	403	17.0		0.274		4.7	LOS A	0.0	0.0				
Intersection	2113	8.0		0.667		9.2	LOS A	5.2	135.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

7 Lane underutilisation specified by user
d Dominant lane on roundabout approach

Intersection	
Int Delay, s/veh	104.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	96	439	170	147	728	11	78	2	52
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	250	-	-	200	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	42	13	0	25	3	20	14	0	25
Mvmt Flow	96	439	170	147	728	11	78	2	52

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	739	0	0	609	0	0	1786	1749	524
Stage 1	-	-	-	-	-	-	716	716	-
Stage 2	-	-	-	-	-	-	1070	1033	-
Critical Hdwy	4.52	-	-	4.35	-	-	7.24	6.5	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.24	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.24	5.5	-
Follow-up Hdwy	2.578	-	-	2.425	-	-	3.626	4	3.525
Pot Cap-1 Maneuver	711	-	-	867	-	-	~ 59	87	511
Stage 1	-	-	-	-	-	-	403	437	-
Stage 2	-	-	-	-	-	-	254	312	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	711	-	-	867	-	-	~ 32	62	511
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 32	62	-
Stage 1	-	-	-	-	-	-	349	378	-
Stage 2	-	-	-	-	-	-	162	259	-

Approach	EB	WB	NB
HCM Control Delay, s	1.5	1.7	$ 891.1
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	51	711	-	-	867	-	-	68
HCM Lane V/C Ratio	2.588	0.135	-	-	0.17	-	-	1.926
HCM Control Delay (s)	$ 891.1	10.9	-	-	10	-	-	$ 565.3
HCM Lane LOS	F	B	-	-	A	-	-	F
HCM 95th %tile Q(veh)	13.7	0.5	-	-	0.6	-	-	12

Notes

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

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	47	5	79
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	69	100	30
Mvmt Flow	47	5	79

Major/Minor	Minor2		
Conflicting Flow All	1771	1829	734
Stage 1	1028	1028	-
Stage 2	743	801	-
Critical Hdwy	7.79	7.5	6.5
Critical Hdwy Stg 1	6.79	6.5	-
Critical Hdwy Stg 2	6.79	6.5	-
Follow-up Hdwy	4.121	4.9	3.57
Pot Cap-1 Maneuver	~ 44	44	377
Stage 1	214	213	-
Stage 2	319	284	-
Platoon blocked, %			
Mov Cap-1 Maneuver	~ 30	32	377
Mov Cap-2 Maneuver	~ 30	32	-
Stage 1	185	177	-
Stage 2	247	246	-

Approach	SB
HCM Control Delay, s	$ 565.3
HCM LOS	F

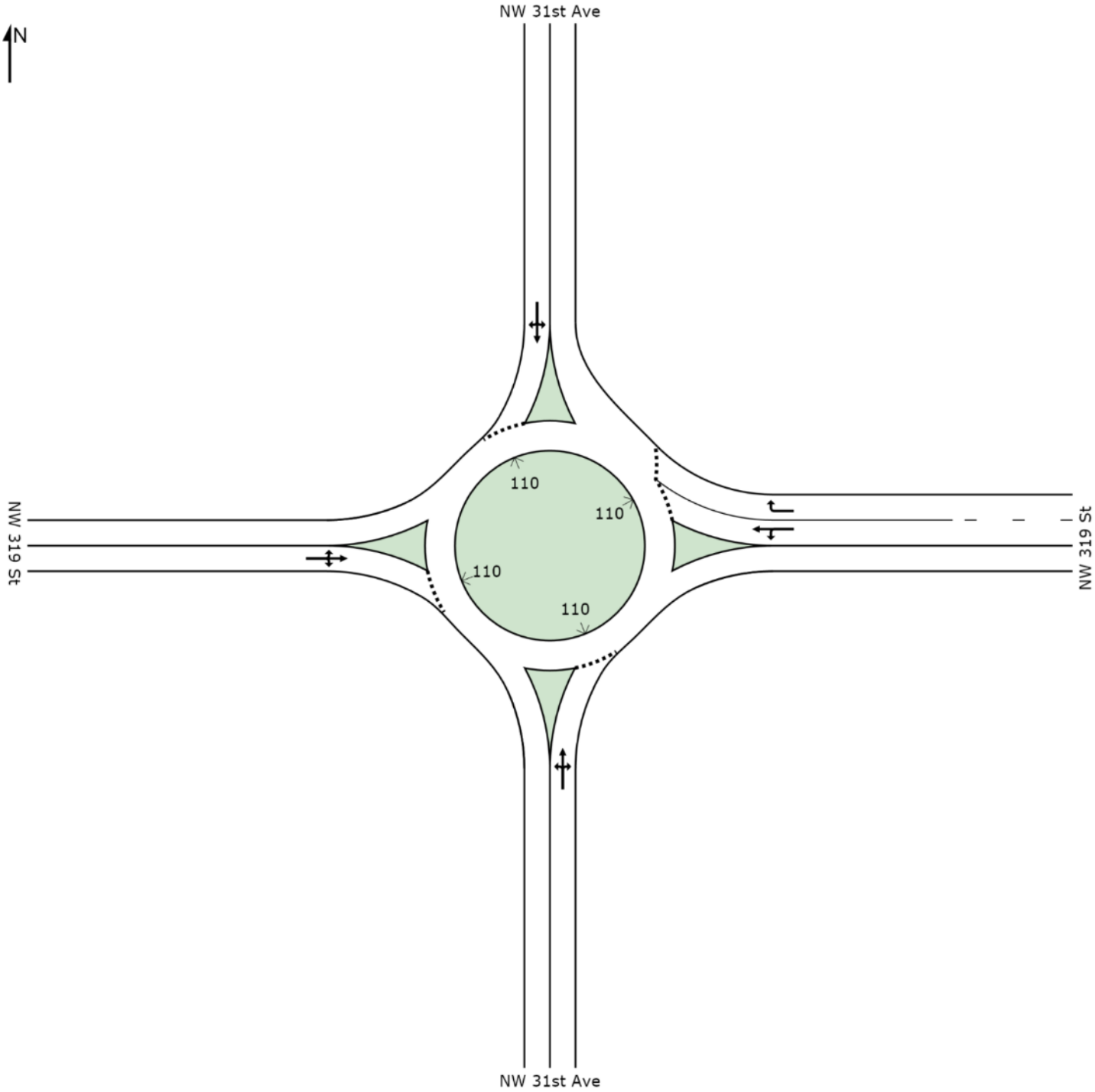
Minor Lane/Major Mvmt

SITE LAYOUT

Site: 2037 Total NoBuild NW 319 St and NW 31st Ave Weekday AM

2037 No Build Weekday AM

Roundabout



MOVEMENT SUMMARY

Site: 2037 Total NoBuild NW 319 St and NW 31st Ave Weekday PM

2037 No Build Weekday PM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NW 31st Ave											
3	L2	17	0.0	0.373	10.5	LOS B	2.4	62.0	0.79	0.76	31.9
8	T1	10	10.0	0.373	10.5	LOS B	2.4	62.0	0.79	0.76	31.8
18	R2	219	7.0	0.373	10.5	LOS B	2.4	62.0	0.79	0.76	28.6
Approach		246	6.6	0.373	10.5	LOS B	2.4	62.0	0.79	0.76	29.0
East: NW 319 St											
1	L2	183	2.0	0.423	6.0	LOS A	3.6	94.4	0.19	0.06	32.4
6	T1	487	9.0	0.423	6.0	LOS A	3.6	94.4	0.19	0.06	31.2
16	R2	377	1.0	0.275	5.0	LOS A	1.9	47.5	0.17	0.05	31.5
Approach		1047	4.9	0.423	5.7	LOS A	3.6	94.4	0.18	0.06	31.6
North: NW 31st Ave											
7	L2	308	1.0	0.433	10.7	LOS B	3.0	75.4	0.79	0.79	27.1
4	T1	10	10.0	0.433	10.7	LOS B	3.0	75.4	0.79	0.79	29.7
14	R2	1	0.0	0.433	10.7	LOS B	3.0	75.4	0.79	0.79	28.2
Approach		319	1.3	0.433	10.7	LOS B	3.0	75.4	0.79	0.79	27.2
West: NW 319 St											
5	L2	1	0.0	0.474	10.6	LOS B	3.4	87.8	0.75	0.69	31.9
2	T1	386	3.0	0.474	10.6	LOS B	3.4	87.8	0.75	0.69	29.4
12	R2	4	0.0	0.474	10.6	LOS B	3.4	87.8	0.75	0.69	31.2
Approach		391	3.0	0.474	10.6	LOS B	3.4	87.8	0.75	0.69	29.4
All Vehicles		2003	4.2	0.474	8.0	LOS A	3.6	94.4	0.46	0.38	30.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2037 Total NoBuild NW 319 St and NW 31st Ave Weekday PM

2037 No Build Weekday PM
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NW 31st Ave													
Lane 1[d]	246	6.6	660	0.373	100	10.5	LOS B	2.4	62.0	Full	1600	0.0	0.0
Approach	246	6.6		0.373		10.5	LOS B	2.4	62.0				
East: NW 319 St													
Lane 1[d]	670	7.1	1585	0.423	100	6.0	LOS A	3.6	94.4	Full	650	0.0	0.0
Lane 2	377	1.0	1369	0.275	100	5.0	LOS A	1.9	47.5	Full	650	0.0	0.0
Approach	1047	4.9		0.423		5.7	LOS A	3.6	94.4				
North: NW 31st Ave													
Lane 1[d]	319	1.3	736	0.433	100	10.7	LOS B	3.0	75.4	Full	1400	0.0	0.0
Approach	319	1.3		0.433		10.7	LOS B	3.0	75.4				
West: NW 319 St													
Lane 1[d]	391	3.0	826	0.474	100	10.6	LOS B	3.4	87.8	Full	1300	0.0	0.0
Approach	391	3.0		0.474		10.6	LOS B	3.4	87.8				
Intersection	2003	4.2		0.474		8.0	LOS A	3.6	94.4				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

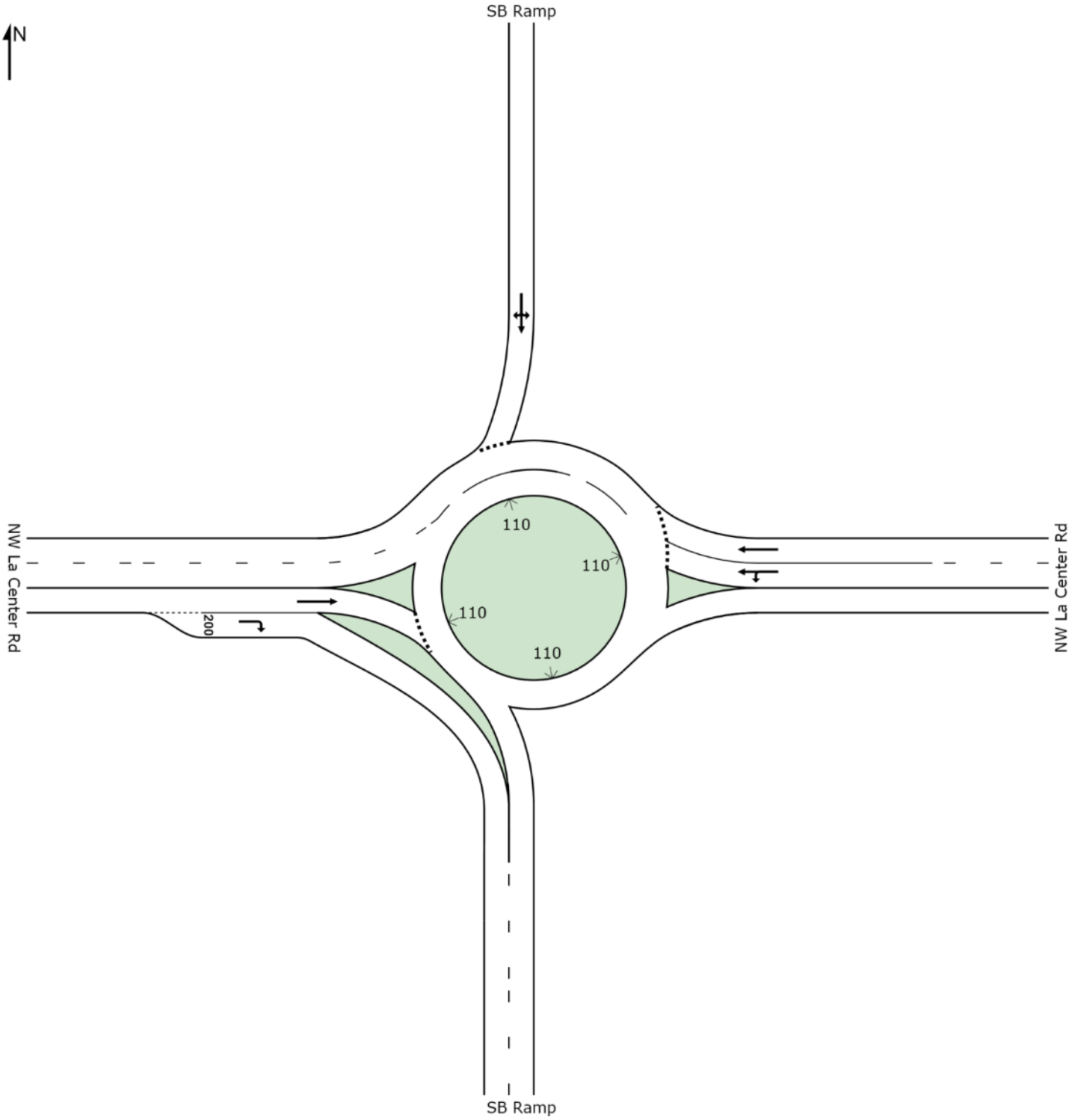
d Dominant lane on roundabout approach

SITE LAYOUT

Site: 2037 Total NoBuild NW La Center and SB Ramps Weekday AM

2037 No Build Weekday AM

Roundabout



MOVEMENT SUMMARY

Site: 2037 Total NoBuild NW La Center and SB Ramps Weekday PM

2037 No Build Weekday PM

Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: NW La Center Rd											
1	L2	564	5.0	0.499	7.6	LOS A	0.0	0.0	0.00	0.00	33.0
6	T1	902	2.0	0.499	7.2	LOS A	0.0	0.0	0.00	0.00	37.4
Approach		1466	3.2	0.499	7.4	LOS A	0.0	0.0	0.00	0.00	35.1
North: SB Ramp											
7	L2	217	10.0	0.631	19.4	LOS B	3.6	95.2	0.79	0.92	23.2
4	T1	3	50.0	0.631	19.4	LOS B	3.6	95.2	0.79	0.92	25.6
14	R2	145	2.0	0.631	19.4	LOS B	3.6	95.2	0.79	0.92	22.8
Approach		365	7.2	0.631	19.4	LOS B	3.6	95.2	0.79	0.92	23.1
West: NW La Center Rd											
2	T1	304	7.0	0.380	9.1	LOS A	2.6	69.4	0.82	0.76	28.0
12	R2	609	1.0	0.367	0.0	LOS A	0.0	0.0	0.00	0.00	35.9
Approach		913	3.0	0.380	3.1	LOS A	2.6	69.4	0.27	0.25	33.5
All Vehicles		2744	3.6	0.631	7.5	LOS A	3.6	95.2	0.20	0.21	32.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2037 Total NoBuild NW La Center and SB Ramps Weekday PM

2037 No Build Weekday PM

Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
East: NW La Center Rd													
Lane 1	694	4.4	1390	0.499	100	7.6	LOS A	0.0	0.0	Full	600	0.0	0.0
Lane 2[d]	772	2.0	1548	0.499	100	7.1	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	1466	3.2		0.499		7.4	LOS A	0.0	0.0				
North: SB Ramp													
Lane 1[d]	365	7.2	579	0.631	100	19.4	LOS B	3.6	95.2	Full	1300	0.0	0.0
Approach	365	7.2		0.631		19.4	LOS B	3.6	95.2				
West: NW La Center Rd													
Lane 1[d]	304	7.0	800	0.380	100	9.1	LOS A	2.6	69.4	Full	650	0.0	0.0
Lane 2	609	1.0	1658	0.367	100	0.0	LOS A	0.0	0.0	Short	200	0.0	0.0
Approach	913	3.0		0.380		3.1	LOS A	2.6	69.4				
Intersection	2744	3.6		0.631		7.5	LOS A	3.6	95.2				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

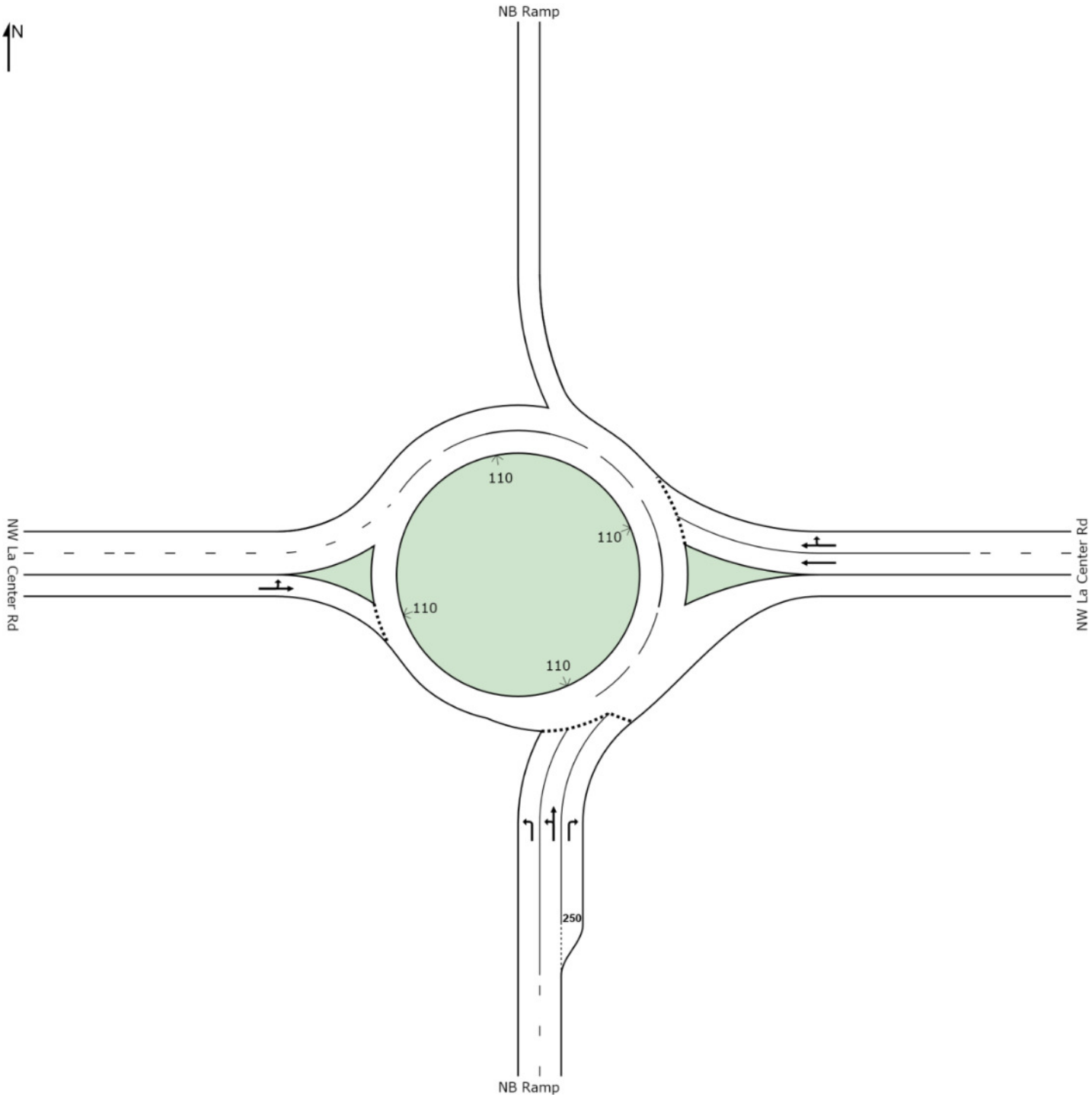
d Dominant lane on roundabout approach

SIDRA INTERSECTION 6

SITE LAYOUT

Site: 2037 Total NoBuild NW La Center and NB Ramps Weekday AM

2037 No Build Weekday AM
Roundabout



SIDRA INTERSECTION 6

MOVEMENT SUMMARY

Site: 2037 Total NoBuild NW La Center and NB Ramps Weekday PM

2037 No Build Weekday PM
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Ramp											
3	L2	812	1.0	0.460	9.8	LOS A	3.1	77.0	0.70	0.66	23.5
8	T1	4	50.0	0.460	9.8	LOS A	3.1	77.2	0.70	0.66	27.4
18	R2	648	3.0	0.597	11.1	LOS B	5.5	140.8	0.76	0.75	27.4
Approach		1464	2.0	0.597	10.4	LOS B	5.5	140.8	0.73	0.70	25.0
East: NW La Center Rd											
6	T1	654	4.0	0.805	24.6	LOS C	7.5	192.3	0.88	1.03	16.2
16	R2	171	5.0	0.427	14.3	LOS B	2.1	53.9	0.73	0.76	23.7
Approach		825	4.2	0.805	22.4	LOS C	7.5	192.3	0.85	0.97	17.6
West: NW La Center Rd											
5	L2	177	4.0	0.326	5.0	LOS A	0.0	0.0	0.00	0.00	34.9
2	T1	345	9.0	0.326	5.0	LOS A	0.0	0.0	0.00	0.00	34.8
Approach		522	7.3	0.326	5.0	LOS A	0.0	0.0	0.00	0.00	34.9
All Vehicles		2811	3.6	0.805	12.9	LOS B	7.5	192.3	0.63	0.65	23.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2037 Total NoBuild NW La Center and NB Ramps Weekday PM

2037 No Build Weekday PM
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NB Ramp													
Lane 1	410	1.0	891	0.460	100	9.7	LOS A	3.1	77.0	Full	1800	0.0	0.0
Lane 2	406	1.5	883	0.460	100	9.8	LOS A	3.1	77.2	Full	1800	0.0	0.0
Lane 3[d]	648	3.0	1085	0.597	100	11.1	LOS B	5.5	140.8	Short	250	0.0	0.0
Approach	1464	2.0		0.597		10.4	LOS B	5.5	140.8				
East: NW La Center Rd													
Lane 1[d]	607	4.0	755	0.805	100	25.3	LOS C	7.5	192.3	Full	600	0.0	0.0
Lane 2	218	4.8	510	0.427	53[7]	14.3	LOS B	2.1	53.9	Full	600	0.0	0.0
Approach	825	4.2		0.805		22.4	LOS C	7.5	192.3				
West: NW La Center Rd													
Lane 1[d]	522	7.3	1601	0.326	100	5.0	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	522	7.3		0.326		5.0	LOS A	0.0	0.0				
Intersection	2811	3.6		0.805		12.9	LOS B	7.5	192.3				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

7 Lane underutilisation specified by user
d Dominant lane on roundabout approach

Intersection	
Int Delay, s/veh	496.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	120	756	116	101	470	10	215	8	174
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	250	-	-	200	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	21	4	25	25	2	20	14	0	25
Mvmt Flow	120	756	116	101	470	10	215	8	174

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	480	0	0	872	0	0	1767	1736	814
Stage 1	-	-	-	-	-	-	1054	1054	-
Stage 2	-	-	-	-	-	-	713	682	-
Critical Hdwy	4.31	-	-	4.35	-	-	7.24	6.5	6.45
Critical Hdwy Stg 1	-	-	-	-	-	-	6.24	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.24	5.5	-
Follow-up Hdwy	2.389	-	-	2.425	-	-	3.626	4	3.525
Pot Cap-1 Maneuver	990	-	-	684	-	-	~ 61	88	345
Stage 1	-	-	-	-	-	-	259	305	-
Stage 2	-	-	-	-	-	-	404	453	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	990	-	-	684	-	-	~ 39	66	345
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 39	66	-
Stage 1	-	-	-	-	-	-	228	268	-
Stage 2	-	-	-	-	-	-	298	386	-

Approach	EB	WB	NB
HCM Control Delay, s	1.1	1.9	$ 2423.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	65	990	-	-	684	-	-	54
HCM Lane V/C Ratio	6.108	0.121	-	-	0.148	-	-	1.981
HCM Control Delay (s)	$ 2423.3	9.1	-	-	11.2	-	-	$ 621.5
HCM Lane LOS	F	A	-	-	B	-	-	F
HCM 95th %tile Q(veh)	44.8	0.4	-	-	0.5	-	-	10.5

Notes

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

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	36	5	66
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	7	100	17
Mvmt Flow	36	5	66

Major/Minor	Minor2		
Conflicting Flow All	1822	1789	475
Stage 1	677	677	-
Stage 2	1145	1112	-
Critical Hdwy	7.17	7.5	6.37
Critical Hdwy Stg 1	6.17	6.5	-
Critical Hdwy Stg 2	6.17	6.5	-
Follow-up Hdwy	3.563	4.9	3.453
Pot Cap-1 Maneuver	58	47	560
Stage 1	434	331	-
Stage 2	237	191	-
Platoon blocked, %			
Mov Cap-1 Maneuver	~ 21	35	560
Mov Cap-2 Maneuver	~ 21	35	-
Stage 1	381	282	-
Stage 2	100	168	-

Approach	SB
HCM Control Delay, s	$ 621.5
HCM LOS	F

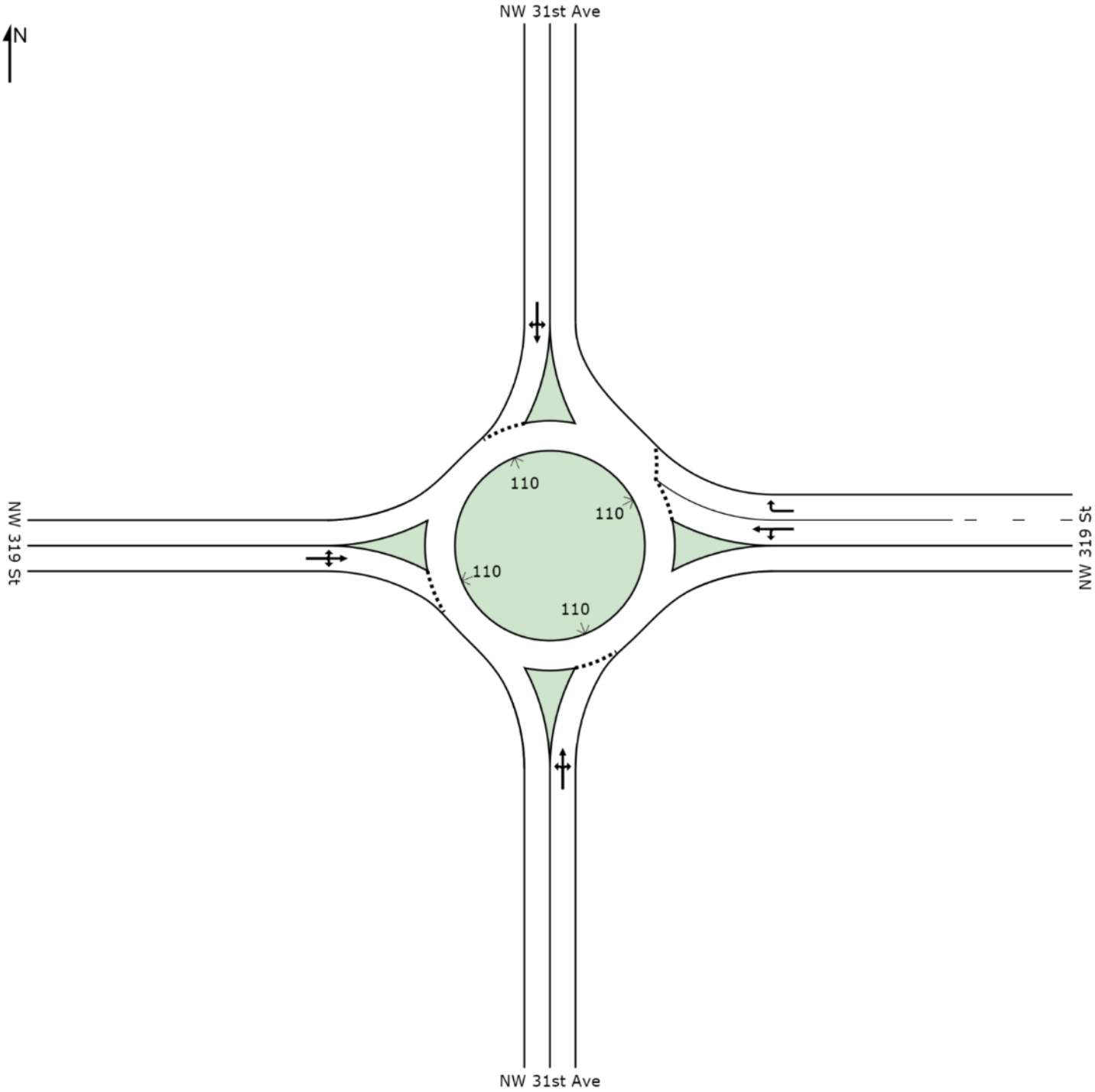
Minor Lane/Major Mvmt

SITE LAYOUT

Site: 2037 Total NoBuild NW 319 St and NW 31st Ave Weekday AM

2037 No Build Weekday AM

Roundabout



MOVEMENT SUMMARY

Site: 2037 Total NoBuild NW 319 St and NW 31st Ave Weekend

2037 No Build Weekend Peak
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NW 31st Ave											
3	L2	5	25.0	0.292	9.3	LOS A	1.8	47.0	0.79	0.74	29.9
8	T1	15	1.0	0.292	9.3	LOS A	1.8	47.0	0.79	0.74	32.7
18	R2	168	4.0	0.292	9.3	LOS A	1.8	47.0	0.79	0.74	29.5
Approach		188	4.3	0.292	9.3	LOS A	1.8	47.0	0.79	0.74	29.8
East: NW 319 St											
1	L2	149	6.0	0.431	5.9	LOS A	3.7	94.9	0.16	0.04	32.7
6	T1	573	2.0	0.431	5.9	LOS A	3.7	94.9	0.16	0.04	31.8
16	R2	493	1.0	0.345	5.6	LOS A	2.6	65.1	0.16	0.04	31.2
Approach		1215	2.1	0.431	5.8	LOS A	3.7	94.9	0.16	0.04	31.7
North: NW 31st Ave											
7	L2	329	1.0	0.463	11.4	LOS B	3.4	84.8	0.80	0.82	26.8
4	T1	10	1.0	0.463	11.4	LOS B	3.4	84.8	0.80	0.82	29.6
14	R2	1	1.0	0.463	11.4	LOS B	3.4	84.8	0.80	0.82	28.0
Approach		340	1.0	0.463	11.4	LOS B	3.4	84.8	0.80	0.82	26.9
West: NW 319 St											
5	L2	1	1.0	0.518	11.7	LOS B	4.1	105.3	0.78	0.74	31.2
2	T1	410	4.0	0.518	11.7	LOS B	4.1	105.3	0.78	0.74	28.7
12	R2	12	0.0	0.518	11.7	LOS B	4.1	105.3	0.78	0.74	30.7
Approach		423	3.9	0.518	11.7	LOS B	4.1	105.3	0.78	0.74	28.8
All Vehicles		2166	2.5	0.518	8.1	LOS A	4.1	105.3	0.44	0.36	30.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2037 Total NoBuild NW 319 St and NW 31st Ave Weekend

2037 No Build Weekend Peak
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NW 31st Ave													
Lane 1[d]	188	4.3	644	0.292	100	9.3	LOS A	1.8	47.0	Full	1600	0.0	0.0
Approach	188	4.3		0.292		9.3	LOS A	1.8	47.0				
East: NW 319 St													
Lane 1[d]	722	2.8	1677	0.431	100	5.9	LOS A	3.7	94.9	Full	650	0.0	0.0
Lane 2	493	1.0	1431	0.345	100	5.6	LOS A	2.6	65.1	Full	650	0.0	0.0
Approach	1215	2.1		0.431		5.8	LOS A	3.7	94.9				
North: NW 31st Ave													
Lane 1[d]	340	1.0	735	0.463	100	11.4	LOS B	3.4	84.8	Full	1400	0.0	0.0
Approach	340	1.0		0.463		11.4	LOS B	3.4	84.8				
West: NW 319 St													
Lane 1[d]	423	3.9	816	0.518	100	11.7	LOS B	4.1	105.3	Full	1300	0.0	0.0
Approach	423	3.9		0.518		11.7	LOS B	4.1	105.3				
Intersection	2166	2.5		0.518		8.1	LOS A	4.1	105.3				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

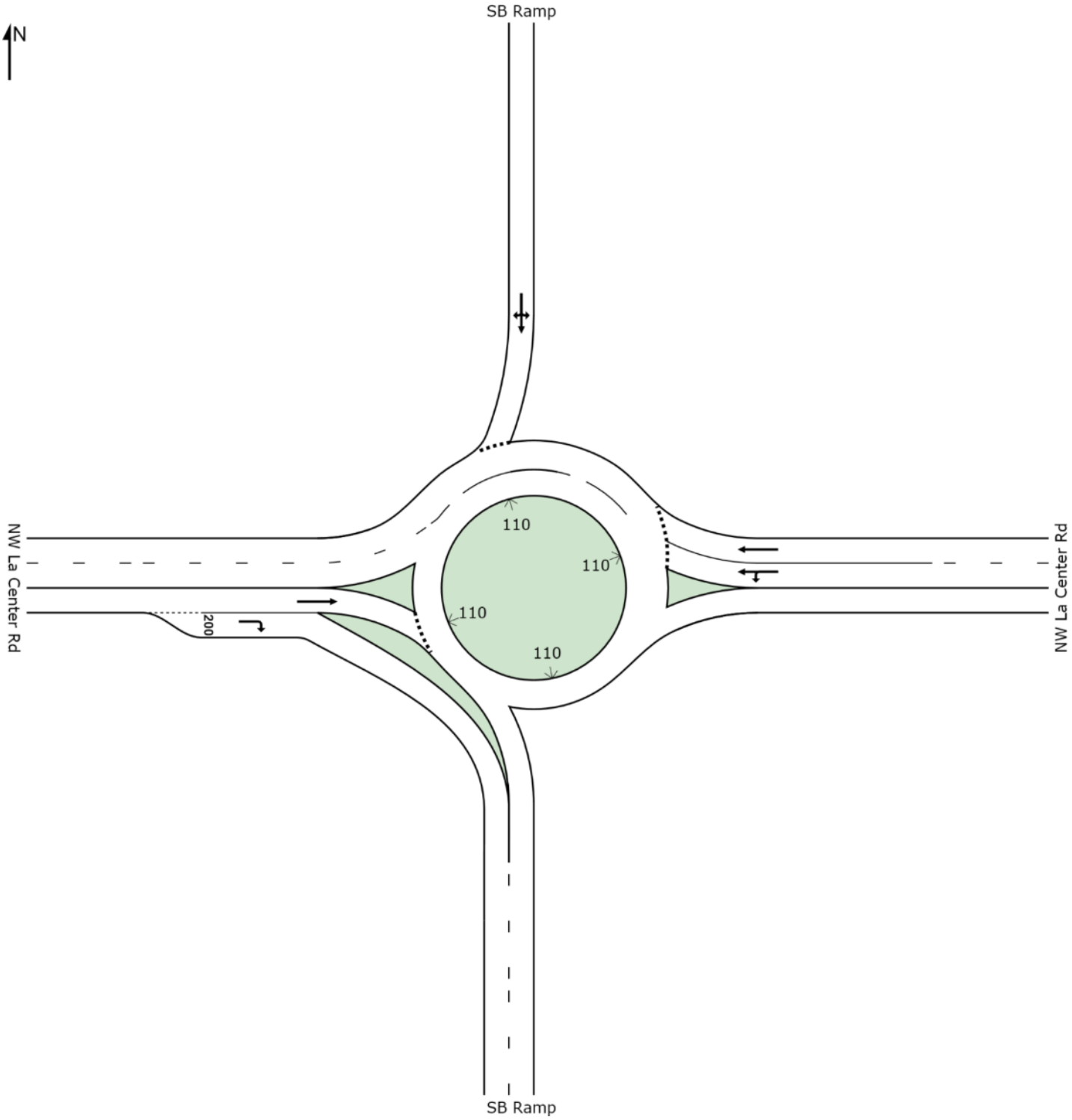
SIDRA INTERSECTION 6

SITE LAYOUT

Site: 2037 Total NoBuild NW La Center and SB Ramps Weekday AM

2037 No Build Weekday AM

Roundabout



MOVEMENT SUMMARY

Site: 2037 Total NoBuild NW La Center and SB Ramps Weekend

2037 No Build Weekend Peak

Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: NW La Center Rd											
1	L2	563	2.0	0.533	8.0	LOS A	0.0	0.0	0.00	0.00	34.0
6	T1	1034	1.0	0.533	7.7	LOS A	0.0	0.0	0.00	0.00	37.2
Approach		1597	1.4	0.533	7.8	LOS A	0.0	0.0	0.00	0.00	35.7
North: SB Ramp											
7	L2	229	4.0	0.725	24.8	LOS C	4.9	127.3	0.85	1.04	21.5
4	T1	3	0.0	0.725	24.8	LOS C	4.9	127.3	0.85	1.04	24.4
14	R2	182	8.0	0.725	24.8	LOS C	4.9	127.3	0.85	1.04	20.9
Approach		414	5.7	0.725	24.8	LOS C	4.9	127.3	0.85	1.04	21.2
West: NW La Center Rd											
2	T1	211	3.0	0.247	6.8	LOS A	1.6	42.0	0.77	0.67	30.2
12	R2	697	2.0	0.425	0.0	LOS A	0.0	0.0	0.00	0.00	35.8
Approach		908	2.2	0.425	1.6	LOS A	1.6	42.0	0.18	0.16	34.7
All Vehicles		2919	2.2	0.725	8.3	LOS A	4.9	127.3	0.18	0.20	31.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2037 Total NoBuild NW La Center and SB Ramps Weekend

2037 No Build Weekend Peak

Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
East: NW La Center Rd													
Lane 1	763	1.7	1431	0.533	100	8.0	LOS A	0.0	0.0	Full	600	0.0	0.0
Lane 2[d]	834	1.0	1564	0.533	100	7.6	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	1597	1.4		0.533		7.8	LOS A	0.0	0.0				
North: SB Ramp													
Lane 1[d]	414	5.7	571	0.725	100	24.8	LOS C	4.9	127.3	Full	1300	0.0	0.0
Approach	414	5.7		0.725		24.8	LOS C	4.9	127.3				
West: NW La Center Rd													
Lane 1[d]	211	3.0	853	0.247	100	6.8	LOS A	1.6	42.0	Full	650	0.0	0.0
Lane 2	697	2.0	1642	0.425	100	0.0	LOS A	0.0	0.0	Short	200	0.0	0.0
Approach	908	2.2		0.425		1.6	LOS A	1.6	42.0				
Intersection	2919	2.2		0.725		8.3	LOS A	4.9	127.3				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

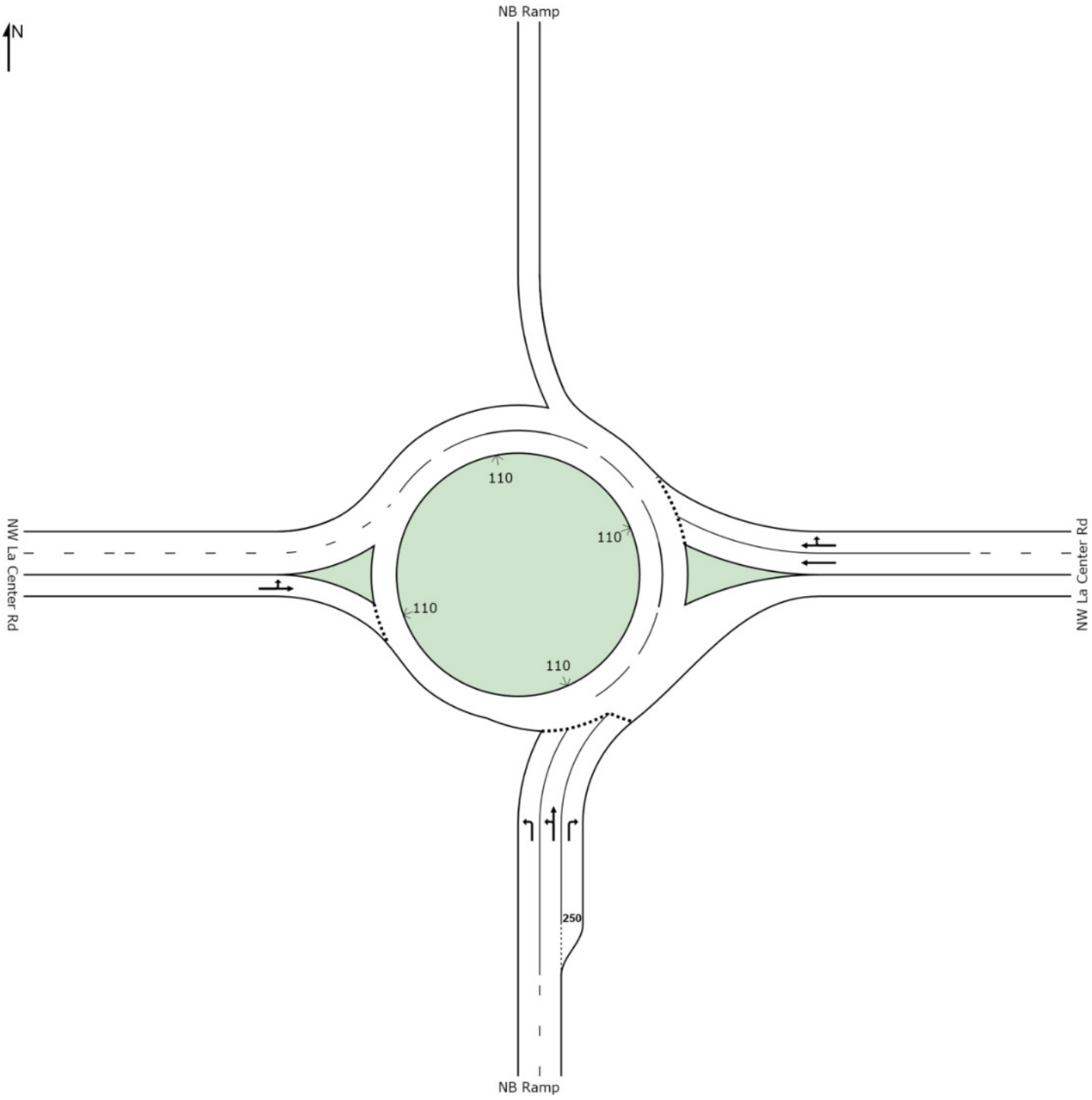
d Dominant lane on roundabout approach

SIDRA INTERSECTION 6

SITE LAYOUT

Site: 2037 Total NoBuild NW La Center and NB Ramps Weekday AM

2037 No Build Weekday AM
Roundabout



SIDRA INTERSECTION 6

MOVEMENT SUMMARY

Site: 2037 Total NoBuild NW La Center and NB Ramps Weekend

2037 No Build Weekend Peak
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Ramp											
3	L2	968	1.0	0.489	9.5	LOS A	3.3	83.7	0.66	0.58	21.7
8	T1	2	0.0	0.489	9.5	LOS A	3.3	83.7	0.66	0.58	27.7
18	R2	626	3.0	0.542	9.4	LOS A	4.2	106.5	0.67	0.58	28.2
Approach		1596	1.8	0.542	9.5	LOS A	4.2	106.5	0.66	0.58	23.8
East: NW La Center Rd											
6	T1	629	3.0	0.811	25.9	LOS C	7.4	189.1	0.89	1.04	15.8
16	R2	173	12.0	0.470	17.6	LOS B	2.3	61.8	0.76	0.80	22.1
Approach		802	4.9	0.811	24.1	LOS C	7.4	189.1	0.86	0.99	17.1
West: NW La Center Rd											
5	L2	131	1.0	0.265	4.3	LOS A	0.0	0.0	0.00	0.00	35.3
2	T1	308	5.0	0.265	4.3	LOS A	0.0	0.0	0.00	0.00	35.4
Approach		439	3.8	0.265	4.3	LOS A	0.0	0.0	0.00	0.00	35.4
All Vehicles		2837	3.0	0.811	12.8	LOS B	7.4	189.1	0.62	0.61	22.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2037 Total NoBuild NW La Center and NB Ramps Weekend

2037 No Build Weekend Peak
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NB Ramp													
Lane 1	485	1.0	991	0.489	100	9.5	LOS A	3.3	83.7	Full	1800	0.0	0.0
Lane 2	485	1.0	991	0.489	100	9.5	LOS A	3.3	83.7	Full	1800	0.0	0.0
Lane 3[d]	626	3.0	1156	0.542	100	9.4	LOS A	4.2	106.5	Short	250	0.0	0.0
Approach	1596	1.8		0.542		9.5	LOS A	4.2	106.5				
East: NW La Center Rd													
Lane 1[d]	595	3.0	733	0.811	100	26.4	LOS C	7.4	189.1	Full	600	0.0	0.0
Lane 2	207	10.5	441	0.470	58[7]	17.6	LOS B	2.3	61.8	Full	600	0.0	0.0
Approach	802	4.9		0.811		24.1	LOS C	7.4	189.1				
West: NW La Center Rd													
Lane 1[d]	439	3.8	1655	0.265	100	4.3	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	439	3.8		0.265		4.3	LOS A	0.0	0.0				
Intersection	2837	3.0		0.811		12.8	LOS B	7.4	189.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

7 Lane underutilisation specified by user
d Dominant lane on roundabout approach

Intersection	
Int Delay, s/veh	366.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	91	727	116	101	478	14	215	8	174
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	250	-	-	200	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	13	4	17	0	3	17	11	0	50
Mvmt Flow	91	727	116	101	478	14	215	8	174

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	492	0	0	843	0	0	1677	1661	785
Stage 1	-	-	-	-	-	-	967	967	-
Stage 2	-	-	-	-	-	-	710	694	-
Critical Hdwy	4.23	-	-	4.1	-	-	7.21	6.5	6.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.21	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.21	5.5	-
Follow-up Hdwy	2.317	-	-	2.2	-	-	3.599	4	3.75
Pot Cap-1 Maneuver	1017	-	-	802	-	-	~ 72	98	326
Stage 1	-	-	-	-	-	-	294	335	-
Stage 2	-	-	-	-	-	-	410	447	-
Platoon blocked, %		-	-		-	-			
Mov Cap-1 Maneuver	1017	-	-	802	-	-	~ 53	78	326
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 53	78	-
Stage 1	-	-	-	-	-	-	268	305	-
Stage 2	-	-	-	-	-	-	329	391	-

Approach	EB	WB	NB
HCM Control Delay, s	0.9	1.7	$ 1751.4
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	85	1017	-	-	802	-	-	51
HCM Lane V/C Ratio	4.671	0.089	-	-	0.126	-	-	1.588
HCM Control Delay (s)	$ 1751.4	8.9	-	-	10.1	-	-	$ 468.6
HCM Lane LOS	F	A	-	-	B	-	-	F
HCM 95th %tile Q(veh)	42.5	0.3	-	-	0.4	-	-	7.7

Notes

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

Intersection			
Int Delay, s/veh			

Movement	SBL	SBT	SBR
Vol, veh/h	36	5	40
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	-	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	100	100	100
Heavy Vehicles, %	0	0	13
Mvmt Flow	36	5	40

Major/Minor	Minor2		
Conflicting Flow All	1745	1712	485
Stage 1	687	687	-
Stage 2	1058	1025	-
Critical Hdwy	7.1	6.5	6.33
Critical Hdwy Stg 1	6.1	5.5	-
Critical Hdwy Stg 2	6.1	5.5	-
Follow-up Hdwy	3.5	4	3.417
Pot Cap-1 Maneuver	68	91	560
Stage 1	440	450	-
Stage 2	274	315	-
Platoon blocked, %			
Mov Cap-1 Maneuver	~ 25	72	560
Mov Cap-2 Maneuver	~ 25	72	-
Stage 1	401	393	-
Stage 2	113	287	-

Approach	SB
HCM Control Delay, s	$ 468.6
HCM LOS	F

Minor Lane/Major Mvmt

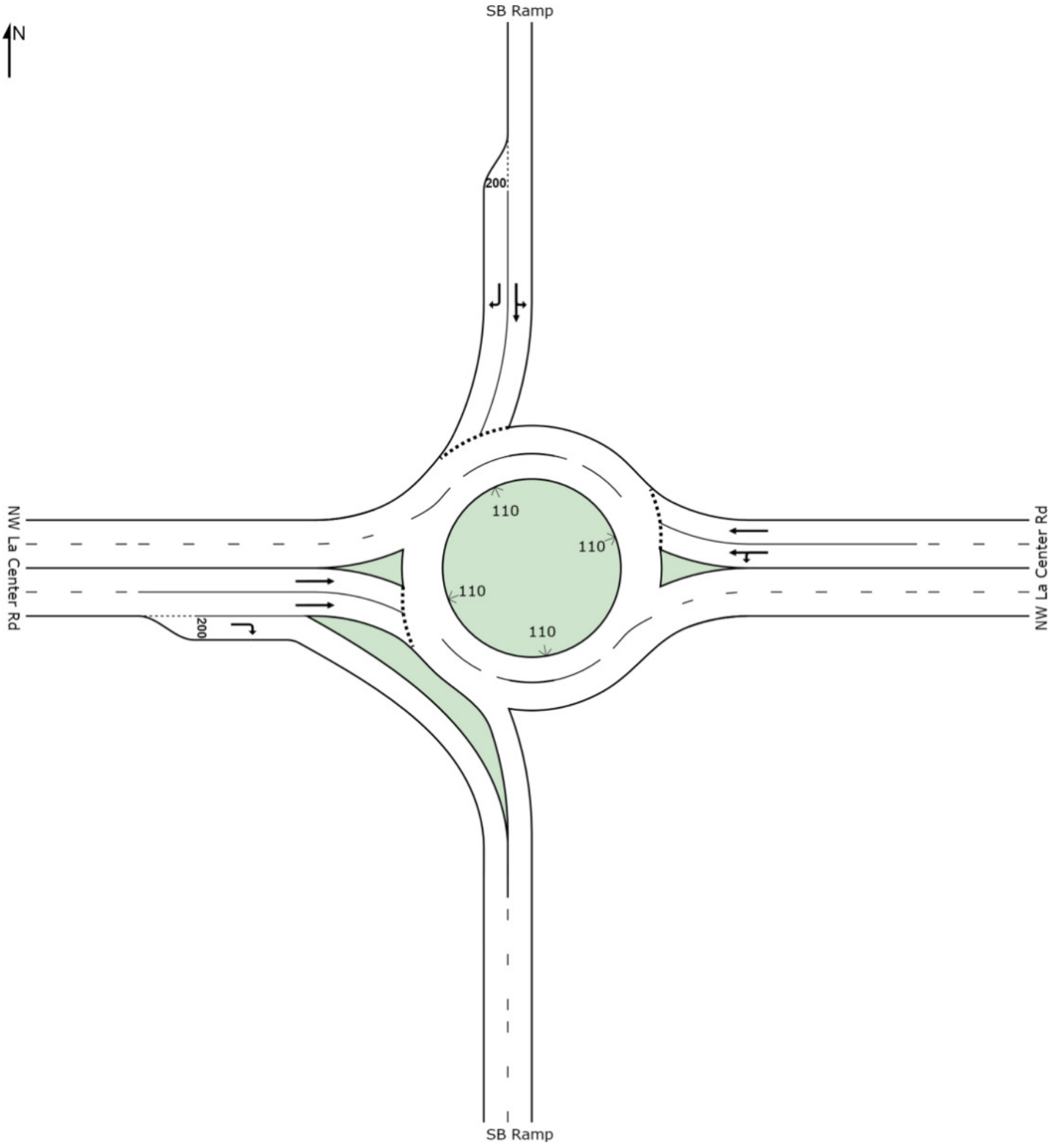
Appendix AA 2037 Total Traffic Conditions (Build) Worksheets – Study Intersections

SITE LAYOUT

Site: 2037 Total Build NW La Center and SB Ramps Weekday AM

2037 Build Weekday AM

Roundabout



MOVEMENT SUMMARY

Site: 2037 Total Build NW La Center and SB Ramps Weekday AM

2037 Build Weekday AM

Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: NW La Center Rd											
1	L2	627	4.0	0.413	6.1	LOS A	0.0	0.0	0.00	0.00	32.2
6	T1	445	2.0	0.324	5.5	LOS A	0.0	0.0	0.00	0.00	38.5
Approach		1072	3.2	0.413	5.8	LOS A	0.0	0.0	0.00	0.00	34.0
North: SB Ramp											
7	L2	177	13.0	0.233	7.2	LOS A	0.9	24.2	0.58	0.58	27.7
4	T1	3	50.0	0.233	7.2	LOS A	0.9	24.2	0.58	0.58	29.7
14	R2	127	8.0	0.187	7.5	LOS A	0.7	17.8	0.58	0.58	29.2
Approach		307	11.3	0.233	7.3	LOS A	0.9	24.2	0.58	0.58	28.3
West: NW La Center Rd											
2	T1	225	20.0	0.183	8.1	LOS A	1.1	31.1	0.74	0.69	23.6
12	R2	264	2.0	0.161	0.0	LOS A	0.0	0.0	0.00	0.00	35.6
Approach		489	10.3	0.183	3.7	LOS A	1.1	31.1	0.34	0.32	29.9
All Vehicles		1868	6.4	0.413	5.5	LOS A	1.1	31.1	0.18	0.18	31.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2037 Total Build NW La Center and SB Ramps Weekday AM

2037 Build Weekday AM

Roundabout

Lane Use and Performance	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
East: NW La Center Rd													
Lane 1[d]	627	4.0	1518	0.413	100	6.1	LOS A	0.0	0.0	Full	600	0.0	0.0
Lane 2	445	2.0	1375	0.324	78[5]	5.5	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	1072	3.2		0.413		5.8	LOS A	0.0	0.0				
North: SB Ramp													
Lane 1[d]	180	13.6	771	0.233	100	7.2	LOS A	0.9	24.2	Full	1300	0.0	0.0
Lane 2	127	8.0	678	0.187	100	7.5	LOS A	0.7	17.8	Short	200	0.0	0.0
Approach	307	11.3		0.233		7.3	LOS A	0.9	24.2				
West: NW La Center Rd													
Lane 1	99	20.0	538	0.183	100	9.1	LOS A	1.0	28.6	Full	650	0.0	0.0
Lane 2[d]	126	20.0	689	0.183	100	7.3	LOS A	1.1	31.1	Full	650	0.0	0.0
Lane 3	264	2.0	1642	0.161	100	0.0	LOS A	0.0	0.0	Short	200	0.0	0.0
Approach	489	10.3		0.183		3.7	LOS A	1.1	31.1				
Intersection	1868	6.4		0.413		5.5	LOS A	1.1	31.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

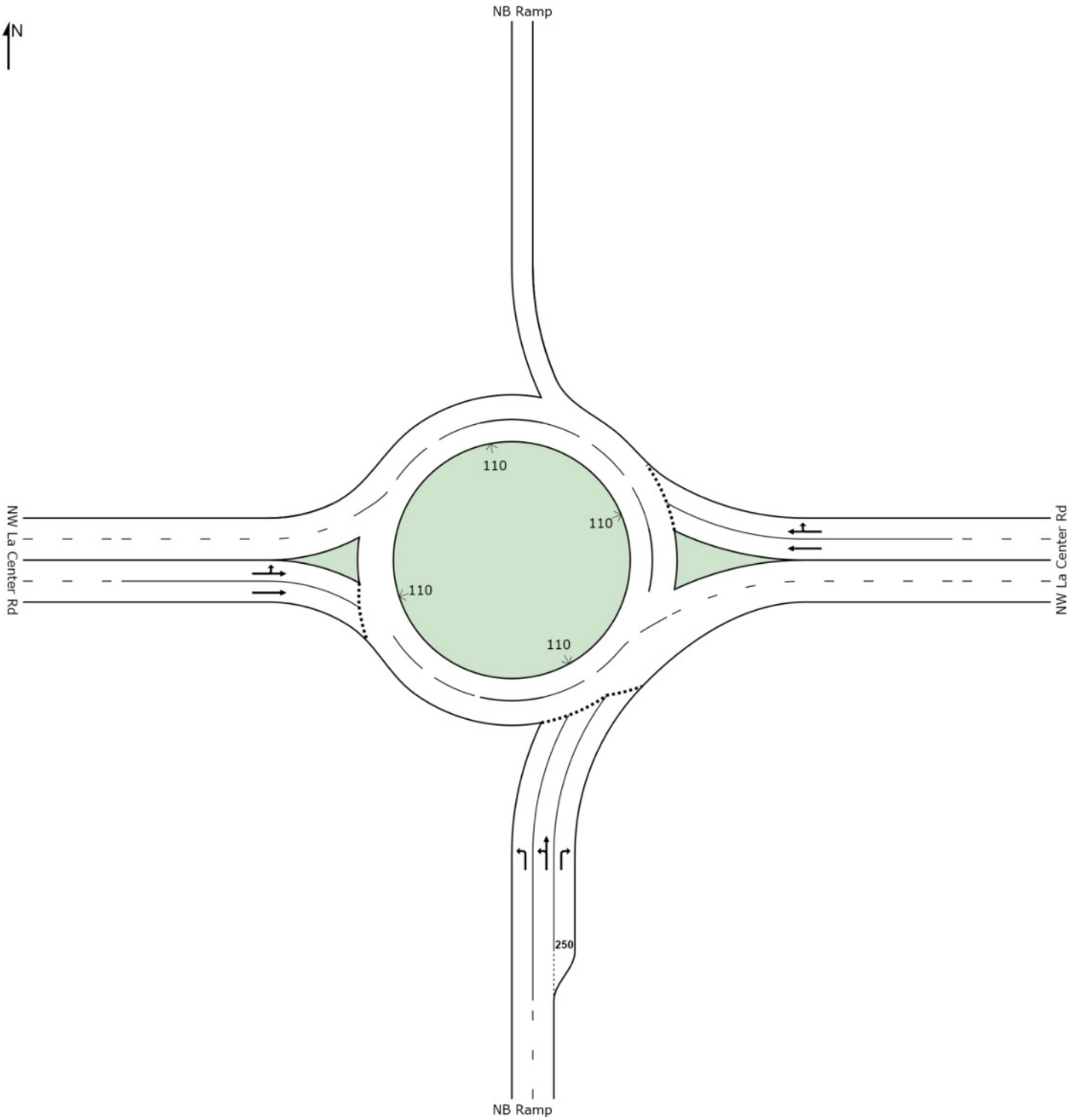
5 Lane underutilisation determined by program
d Dominant lane on roundabout approach

SIDRA INTERSECTION 6

SITE LAYOUT

Site: 2037 Total Build NW La Center and NB Ramps Weekday AM

2037 Build Weekday AM
Roundabout



MOVEMENT SUMMARY

Site: 2037 Total Build NW La Center and NB Ramps Weekday AM

2037 Build Weekday AM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Ramp											
3	L2	346	1.0	0.168	5.0	LOS A	0.6	14.9	0.40	0.33	25.2
8	T1	2	50.0	0.168	5.0	LOS A	0.6	14.9	0.40	0.33	29.3
18	R2	408	7.0	0.316	5.7	LOS A	1.3	33.8	0.42	0.35	30.0
Approach		756	4.4	0.316	5.4	LOS A	1.3	33.8	0.41	0.34	27.5
East: NW La Center Rd											
6	T1	727	4.0	0.658	13.1	LOS B	5.0	129.1	0.67	0.67	20.3
16	R2	227	17.0	0.414	11.3	LOS B	2.0	54.8	0.59	0.60	25.1
Approach		954	7.1	0.658	12.7	LOS B	5.0	129.1	0.65	0.66	21.4
West: NW La Center Rd											
5	L2	106	17.0	0.139	3.8	LOS A	0.0	0.0	0.00	0.00	33.4
2	T1	297	17.0	0.139	3.5	LOS A	0.0	0.0	0.00	0.00	32.4
Approach		403	17.0	0.139	3.6	LOS A	0.0	0.0	0.00	0.00	32.7
All Vehicles		2113	8.0	0.658	8.3	LOS A	5.0	129.1	0.44	0.42	25.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2037 Total Build NW La Center and NB Ramps Weekday AM

2037 Build Weekday AM
Roundabout

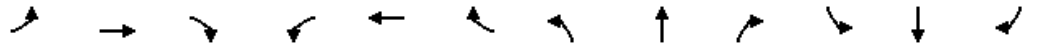
Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NB Ramp													
Lane 1	175	1.0	1043	0.168	100	5.0	LOS A	0.6	14.9	Full	1800	0.0	0.0
Lane 2	173	1.6	1033	0.168	100	5.0	LOS A	0.6	14.9	Full	1800	0.0	0.0
Lane 3[d]	408	7.0	1290	0.316	100	5.7	LOS A	1.3	33.8	Short	250	0.0	0.0
Approach	756	4.4		0.316		5.4	LOS A	1.3	33.8				
East: NW La Center Rd													
Lane 1[d]	679	4.0	1032	0.658	100	13.2	LOS B	5.0	129.1	Full	600	0.0	0.0
Lane 2	275	14.7	664	0.414	63[7]	11.3	LOS B	2.0	54.8	Full	600	0.0	0.0
Approach	954	7.1		0.658		12.7	LOS B	5.0	129.1				
West: NW La Center Rd													
Lane 1	185	17.0	1335	0.139	100	3.8	LOS A	0.0	0.0	Full	600	0.0	0.0
Lane 2[d]	218	17.0	1570	0.139	100	3.4	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	403	17.0		0.139		3.6	LOS A	0.0	0.0				
Intersection	2113	8.0		0.658		8.3	LOS A	5.0	129.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

7 Lane underutilisation specified by user
d Dominant lane on roundabout approach

SIDRA INTERSECTION 6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	250		250	200		0	250		0	100		100
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.958			0.998			0.856			0.859	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	3138	0	1752	3489	0	1752	1581	0	1641	1415	0
Flt Permitted	0.370			0.421			0.702			0.722		
Satd. Flow (perm)	676	3138	0	777	3489	0	1295	1581	0	1247	1415	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		107			3			52			79	
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		820			2615			1342			1004	
Travel Time (s)		12.4			39.6			30.5			22.8	
Lane Group Flow (vph)	96	609	0	147	739	0	78	54	0	47	84	0
v/c Ratio	0.25	0.33		0.33	0.37		0.24	0.12		0.15	0.20	
Control Delay	10.2	6.5		11.1	7.8		13.6	5.2		12.6	5.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.2	6.5		11.1	7.8		13.6	5.2		12.6	5.3	
Queue Length 50th (ft)	9	24		14	38		10	0		6	1	
Queue Length 95th (ft)	55	100		82	141		45	19		30	25	
Internal Link Dist (ft)		740			2535			1262			924	
Turn Bay Length (ft)	250			200			250			100		
Base Capacity (vph)	650	3021		747	3355		1024	1261		986	1135	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.15	0.20		0.20	0.22		0.08	0.04		0.05	0.07	

Intersection Summary	
Area Type:	Other

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	96	439	170	147	728	11	78	2	52	47	5	79
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1827	1724	1900	1845	1840	1900	1845	1847	1900	1727	1647	1900
Adj Flow Rate, veh/h	96	439	0	147	728	11	78	2	52	47	5	79
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	4	13	13	3	3	3	3	0	0	10	100	100
Cap, veh/h	498	1807	0	644	1945	29	360	11	276	382	15	241
Arrive On Green	0.55	0.55	0.00	0.55	0.55	0.55	0.18	0.18	0.18	0.18	0.18	0.18
Sat Flow, veh/h	703	3362	0	937	3526	53	1296	58	1520	1247	84	1329
Grp Volume(v), veh/h	96	439	0	147	361	378	78	0	54	47	0	84
Grp Sat Flow(s),veh/h/ln	703	1638	0	937	1748	1831	1296	0	1578	1247	0	1413
Q Serve(g_s), s	3.4	2.6	0.0	3.6	4.4	4.4	2.1	0.0	1.1	1.2	0.0	1.9
Cycle Q Clear(g_c), s	7.7	2.6	0.0	6.2	4.4	4.4	4.0	0.0	1.1	2.3	0.0	1.9
Prop In Lane	1.00		0.00	1.00		0.03	1.00		0.96	1.00		0.94
Lane Grp Cap(c), veh/h	498	1807	0	644	964	1010	360	0	287	382	0	256
V/C Ratio(X)	0.19	0.24	0.00	0.23	0.37	0.37	0.22	0.00	0.19	0.12	0.00	0.33
Avail Cap(c_a), veh/h	1085	4545	0	1427	2426	2540	1093	0	1179	1087	0	1055
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.9	4.4	0.0	6.0	4.7	4.7	15.1	0.0	13.0	14.0	0.0	13.3
Incr Delay (d2), s/veh	0.2	0.1	0.0	0.2	0.2	0.2	0.3	0.0	0.3	0.1	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	1.2	0.0	0.9	2.2	2.3	0.8	0.0	0.5	0.4	0.0	0.8
LnGrp Delay(d),s/veh	7.1	4.4	0.0	6.1	5.0	5.0	15.4	0.0	13.3	14.1	0.0	14.1
LnGrp LOS	A	A		A	A	A	B		B	B		B
Approach Vol, veh/h		535			886			132			131	
Approach Delay, s/veh		4.9			5.2			14.5			14.1	
Approach LOS		A			A			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		25.7		11.8		25.7		11.8
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0
Max Green Setting (Gmax), s		52.0		28.0		52.0		28.0
Max Q Clear Time (g_c+I1), s		9.7		4.3		8.2		6.0
Green Ext Time (p_c), s		10.9		1.3		11.0		1.2

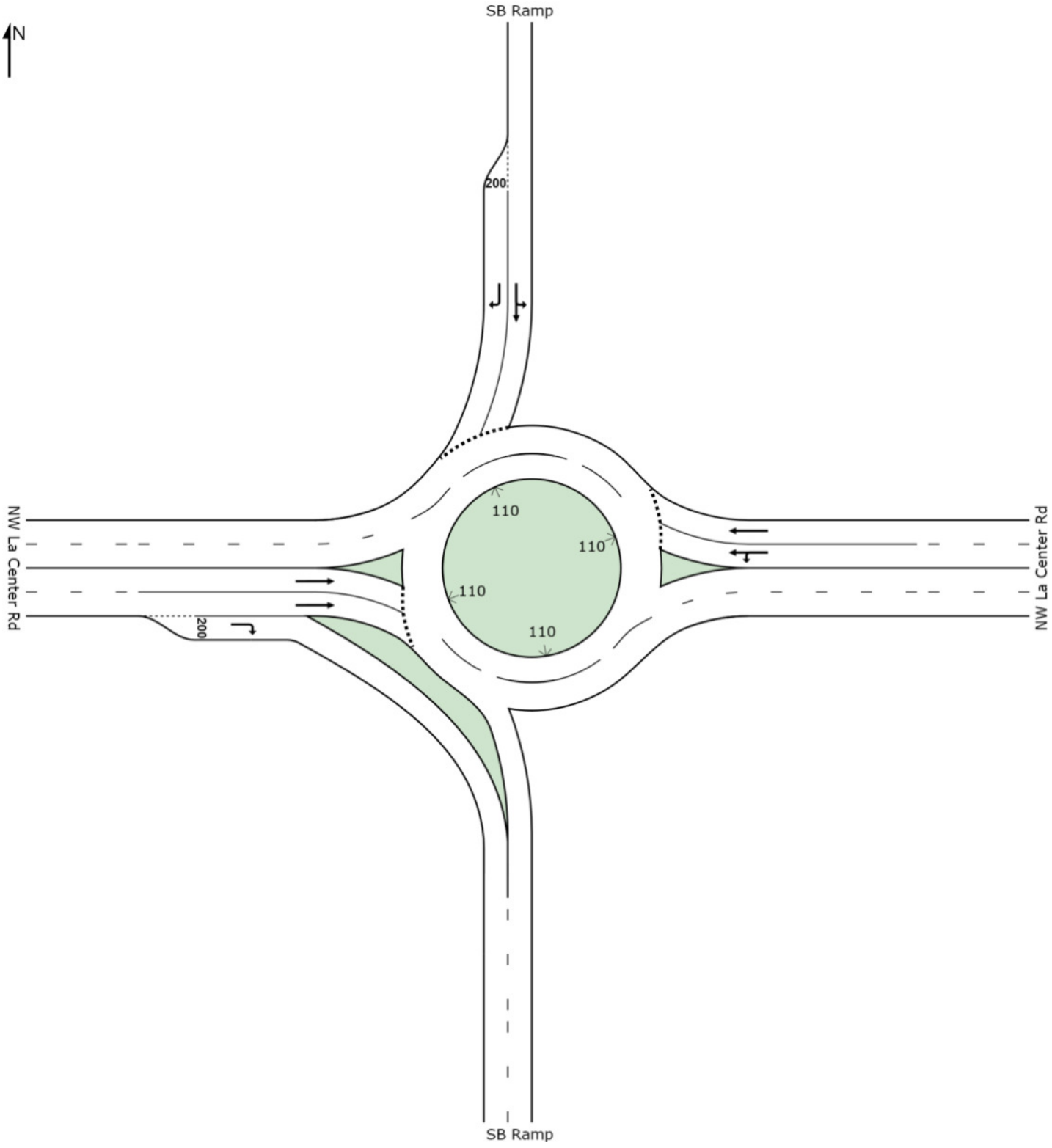
Intersection Summary	
HCM 2010 Ctrl Delay	6.5
HCM 2010 LOS	A

SITE LAYOUT

Site: 2037 Total Build NW La Center and SB Ramps Weekday AM

2037 Build Weekday AM

Roundabout



MOVEMENT SUMMARY

Site: 2037 Total Build NW La Center and SB Ramps Weekday PM

2037 Build Weekday PM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: NW La Center Rd											
1	L2	564	5.0	0.499	7.6	LOS A	0.0	0.0	0.00	0.00	33.0
6	T1	902	2.0	0.499	7.2	LOS A	0.0	0.0	0.00	0.00	37.4
Approach		1466	3.2	0.499	7.4	LOS A	0.0	0.0	0.00	0.00	35.1
North: SB Ramp											
7	L2	217	10.0	0.298	8.4	LOS A	1.2	32.0	0.65	0.65	27.3
4	T1	3	50.0	0.298	8.4	LOS A	1.2	32.0	0.65	0.65	29.1
14	R2	145	2.0	0.226	8.4	LOS A	0.8	21.0	0.63	0.63	29.0
Approach		365	7.2	0.298	8.4	LOS A	1.2	32.0	0.64	0.65	27.9
West: NW La Center Rd											
2	T1	304	7.0	0.209	7.3	LOS A	1.3	34.9	0.75	0.67	24.4
12	R2	609	1.0	0.367	0.0	LOS A	0.0	0.0	0.00	0.00	35.6
Approach		913	3.0	0.367	2.4	LOS A	1.3	34.9	0.25	0.22	31.8
All Vehicles		2744	3.6	0.499	5.9	LOS A	1.3	34.9	0.17	0.16	32.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
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Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2037 Total Build NW La Center and SB Ramps Weekday PM

2037 Build Weekday PM
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
East: NW La Center Rd													
Lane 1	694	4.4	1390	0.499	100	7.6	LOS A	0.0	0.0	Full	600	0.0	0.0
Lane 2[d]	772	2.0	1548	0.499	100	7.1	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	1466	3.2		0.499		7.4	LOS A	0.0	0.0				
North: SB Ramp													
Lane 1[d]	220	10.5	737	0.298	100	8.4	LOS A	1.2	32.0	Full	1300	0.0	0.0
Lane 2	145	2.0	641	0.226	100	8.4	LOS A	0.8	21.0	Short	200	0.0	0.0
Approach	365	7.2		0.298		8.4	LOS A	1.2	32.0				
West: NW La Center Rd													
Lane 1	134	7.0	643	0.209	100	8.1	LOS A	1.2	32.0	Full	650	0.0	0.0
Lane 2[d]	170	7.0	811	0.209	100	6.7	LOS A	1.3	34.9	Full	650	0.0	0.0
Lane 3	609	1.0	1658	0.367	100	0.0	LOS A	0.0	0.0	Short	200	0.0	0.0
Approach	913	3.0		0.367		2.4	LOS A	1.3	34.9				
Intersection	2744	3.6		0.499		5.9	LOS A	1.3	34.9				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
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HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
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HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

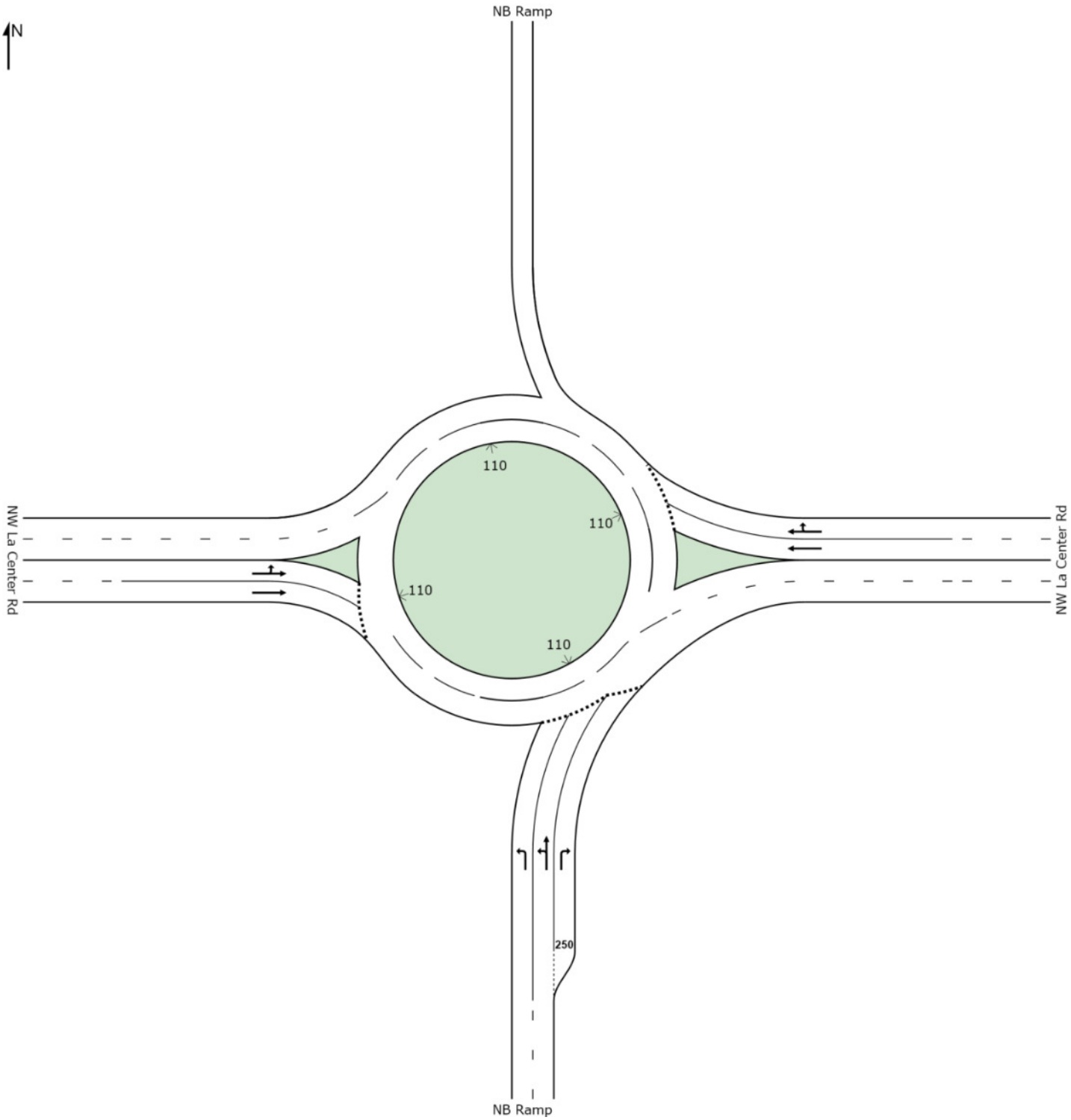
d Dominant lane on roundabout approach

SIDRA INTERSECTION 6

SITE LAYOUT

Site: 2037 Total Build NW La Center and NB Ramps Weekday AM

2037 Build Weekday AM
Roundabout



MOVEMENT SUMMARY

Site: 2037 Total Build NW La Center and NB Ramps Weekday PM

2037 Build Weekday PM
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Ramp											
3	L2	812	1.0	0.381	7.3	LOS A	1.6	40.0	0.49	0.45	24.4
8	T1	4	50.0	0.381	7.4	LOS A	1.6	40.1	0.49	0.45	28.4
18	R2	648	3.0	0.489	7.7	LOS A	2.5	62.8	0.51	0.47	29.1
Approach		1464	2.0	0.489	7.5	LOS A	2.5	62.8	0.50	0.46	26.2
East: NW La Center Rd											
6	T1	654	4.0	0.761	20.6	LOS C	6.4	166.1	0.84	0.96	17.4
16	R2	171	5.0	0.403	13.1	LOS B	1.9	48.5	0.70	0.73	24.3
Approach		825	4.2	0.761	19.0	LOS B	6.4	166.1	0.81	0.91	18.7
West: NW La Center Rd											
5	L2	177	4.0	0.165	3.7	LOS A	0.0	0.0	0.00	0.00	33.0
2	T1	345	9.0	0.165	3.4	LOS A	0.0	0.0	0.00	0.00	32.8
Approach		522	7.3	0.165	3.5	LOS A	0.0	0.0	0.00	0.00	32.8
All Vehicles		2811	3.6	0.761	10.1	LOS B	6.4	166.1	0.50	0.51	24.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2037 Total Build NW La Center and NB Ramps Weekday PM

2037 Build Weekday PM
Roundabout

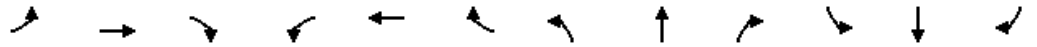
Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NB Ramp													
Lane 1	410	1.0	1074	0.381	100	7.3	LOS A	1.6	40.0	Full	1800	0.0	0.0
Lane 2	406	1.5	1065	0.381	100	7.4	LOS A	1.6	40.1	Full	1800	0.0	0.0
Lane 3[d]	648	3.0	1325	0.489	100	7.7	LOS A	2.5	62.8	Short	250	0.0	0.0
Approach	1464	2.0		0.489		7.5	LOS A	2.5	62.8				
East: NW La Center Rd													
Lane 1[d]	607	4.0	798	0.761	100	21.1	LOS C	6.4	166.1	Full	600	0.0	0.0
Lane 2	218	4.8	540	0.403	53[7]	13.1	LOS B	1.9	48.5	Full	600	0.0	0.0
Approach	825	4.2		0.761		19.0	LOS B	6.4	166.1				
West: NW La Center Rd													
Lane 1	245	5.4	1485	0.165	100	3.7	LOS A	0.0	0.0	Full	600	0.0	0.0
Lane 2[d]	277	9.0	1685	0.165	100	3.4	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	522	7.3		0.165		3.5	LOS A	0.0	0.0				
Intersection	2811	3.6		0.761		10.1	LOS B	6.4	166.1				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

7 Lane underutilisation specified by user
d Dominant lane on roundabout approach

SIDRA INTERSECTION 6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	250		200	300		0	350		0	100		100
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.980			0.997			0.857			0.861	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1492	3406	0	1752	3516	0	1752	1581	0	1687	1413	0
Flt Permitted	0.478			0.275			0.711			0.643		
Satd. Flow (perm)	751	3406	0	507	3516	0	1312	1581	0	1142	1413	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			4			174			66	
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		825			2615			1342			1004	
Travel Time (s)		12.5			39.6			30.5			22.8	
Lane Group Flow (vph)	120	872	0	101	480	0	215	182	0	36	71	0
v/c Ratio	0.35	0.56		0.44	0.30		0.53	0.30		0.10	0.15	
Control Delay	12.8	10.7		17.1	8.8		19.0	4.5		12.9	5.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	12.8	10.7		17.1	8.8		19.0	4.5		12.9	5.3	
Queue Length 50th (ft)	16	66		14	32		40	1		6	1	
Queue Length 95th (ft)	66	168		67	87		117	36		26	24	
Internal Link Dist (ft)		745			2535			1262			924	
Turn Bay Length (ft)	250			300			350			100		
Base Capacity (vph)	715	3244		483	3347		932	1173		811	1023	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.17	0.27		0.21	0.14		0.23	0.16		0.04	0.07	

Intersection Summary	
Area Type:	Other

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	120	756	116	101	470	10	215	8	174	36	5	66
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1570	1829	1900	1845	1856	1900	1845	1845	1900	1776	1641	1900
Adj Flow Rate, veh/h	120	756	0	101	470	10	215	8	174	36	5	66
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	21	4	4	3	2	2	3	3	3	7	0	0
Cap, veh/h	489	1802	0	416	1831	39	460	19	417	356	27	362
Arrive On Green	0.52	0.52	0.00	0.52	0.52	0.52	0.28	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	768	3567	0	698	3531	75	1311	69	1509	1141	99	1310
Grp Volume(v), veh/h	120	756	0	101	234	246	215	0	182	36	0	71
Grp Sat Flow(s),veh/h/ln	768	1738	0	698	1763	1843	1311	0	1578	1141	0	1410
Q Serve(g_s), s	5.0	6.5	0.0	5.1	3.6	3.6	7.3	0.0	4.6	1.3	0.0	1.9
Cycle Q Clear(g_c), s	8.6	6.5	0.0	11.6	3.6	3.6	9.2	0.0	4.6	5.9	0.0	1.9
Prop In Lane	1.00		0.00	1.00		0.04	1.00		0.96	1.00		0.93
Lane Grp Cap(c), veh/h	489	1802	0	416	914	955	460	0	436	356	0	390
V/C Ratio(X)	0.25	0.42	0.00	0.24	0.26	0.26	0.47	0.00	0.42	0.10	0.00	0.18
Avail Cap(c_a), veh/h	878	3564	0	771	1808	1890	904	0	971	742	0	867
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.9	7.2	0.0	10.8	6.5	6.5	16.9	0.0	14.4	16.8	0.0	13.4
Incr Delay (d2), s/veh	0.3	0.2	0.0	0.3	0.1	0.1	0.7	0.0	0.6	0.1	0.0	0.2
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	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	3.1	0.0	1.0	1.7	1.8	2.7	0.0	2.0	0.4	0.0	0.8
LnGrp Delay(d),s/veh	9.2	7.4	0.0	11.1	6.7	6.7	17.7	0.0	15.1	17.0	0.0	13.7
LnGrp LOS	A	A		B	A	A	B		B	B		B
Approach Vol, veh/h		876			581			397			107	
Approach Delay, s/veh		7.6			7.4			16.5			14.8	
Approach LOS		A			A			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		30.3		18.5		30.3		18.5
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0
Max Green Setting (Gmax), s		50.0		30.0		50.0		30.0
Max Q Clear Time (g_c+I1), s		10.6		7.9		13.6		11.2
Green Ext Time (p_c), s		11.9		2.4		11.7		2.3

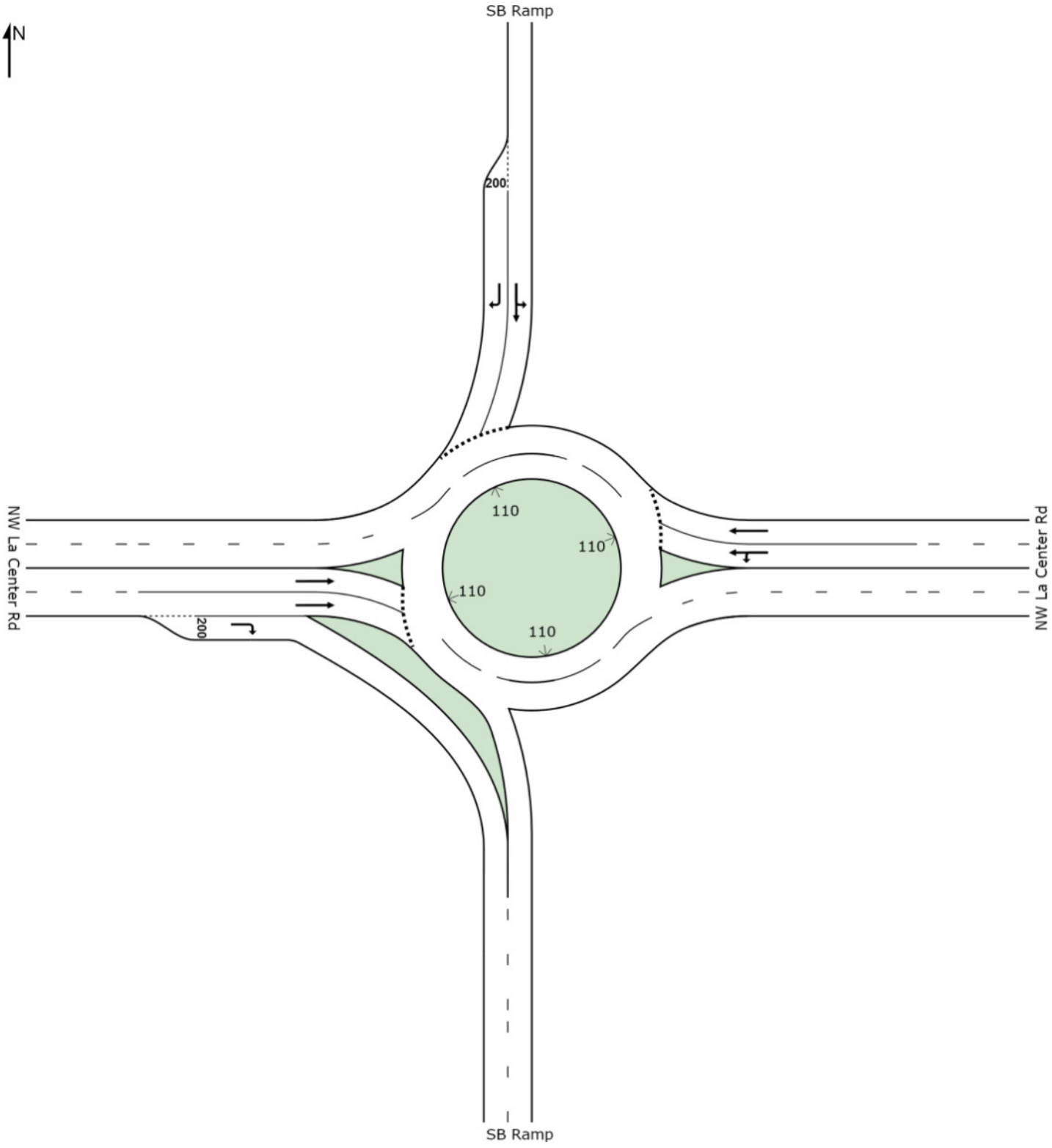
Intersection Summary	
HCM 2010 Ctrl Delay	9.8
HCM 2010 LOS	A

SITE LAYOUT

Site: 2037 Total Build NW La Center and SB Ramps Weekday AM

2037 Build Weekday AM

Roundabout



MOVEMENT SUMMARY

Site: 2037 Total Build NW La Center and SB Ramps Weekend

2037 Build Weekend Peak
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: NW La Center Rd											
1	L2	563	2.0	0.533	8.0	LOS A	0.0	0.0	0.00	0.00	34.0
6	T1	1034	1.0	0.533	7.7	LOS A	0.0	0.0	0.00	0.00	37.2
Approach		1597	1.4	0.533	7.8	LOS A	0.0	0.0	0.00	0.00	35.7
North: SB Ramp											
7	L2	229	4.0	0.295	8.0	LOS A	1.2	31.1	0.66	0.66	27.8
4	T1	3	0.0	0.295	8.0	LOS A	1.2	31.1	0.66	0.66	30.0
14	R2	182	8.0	0.318	10.8	LOS B	1.3	33.5	0.69	0.71	27.3
Approach		414	5.7	0.318	9.2	LOS A	1.3	33.5	0.67	0.68	27.6
West: NW La Center Rd											
2	T1	211	3.0	0.135	6.0	LOS A	0.8	21.5	0.72	0.61	25.3
12	R2	697	2.0	0.425	0.0	LOS A	0.0	0.0	0.00	0.00	35.6
Approach		908	2.2	0.425	1.4	LOS A	0.8	21.5	0.17	0.14	33.2
All Vehicles		2919	2.2	0.533	6.0	LOS A	1.3	33.5	0.15	0.14	33.3

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2037 Total Build NW La Center and SB Ramps Weekend

2037 Build Weekend Peak
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
East: NW La Center Rd													
Lane 1	763	1.7	1431	0.533	100	8.0	LOS A	0.0	0.0	Full	600	0.0	0.0
Lane 2[d]	834	1.0	1564	0.533	100	7.6	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	1597	1.4		0.533		7.8	LOS A	0.0	0.0				
North: SB Ramp													
Lane 1[d]	232	3.9	786	0.295	100	8.0	LOS A	1.2	31.1	Full	1300	0.0	0.0
Lane 2	182	8.0	573	0.318	100	10.8	LOS B	1.3	33.5	Short	200	0.0	0.0
Approach	414	5.7		0.318		9.2	LOS A	1.3	33.5				
West: NW La Center Rd													
Lane 1	94	3.0	692	0.135	100	6.7	LOS A	0.8	19.8	Full	650	0.0	0.0
Lane 2[d]	117	3.0	867	0.135	100	5.5	LOS A	0.8	21.5	Full	650	0.0	0.0
Lane 3	697	2.0	1642	0.425	100	0.0	LOS A	0.0	0.0	Short	200	0.0	0.0
Approach	908	2.2		0.425		1.4	LOS A	0.8	21.5				
Intersection	2919	2.2		0.533		6.0	LOS A	1.3	33.5				

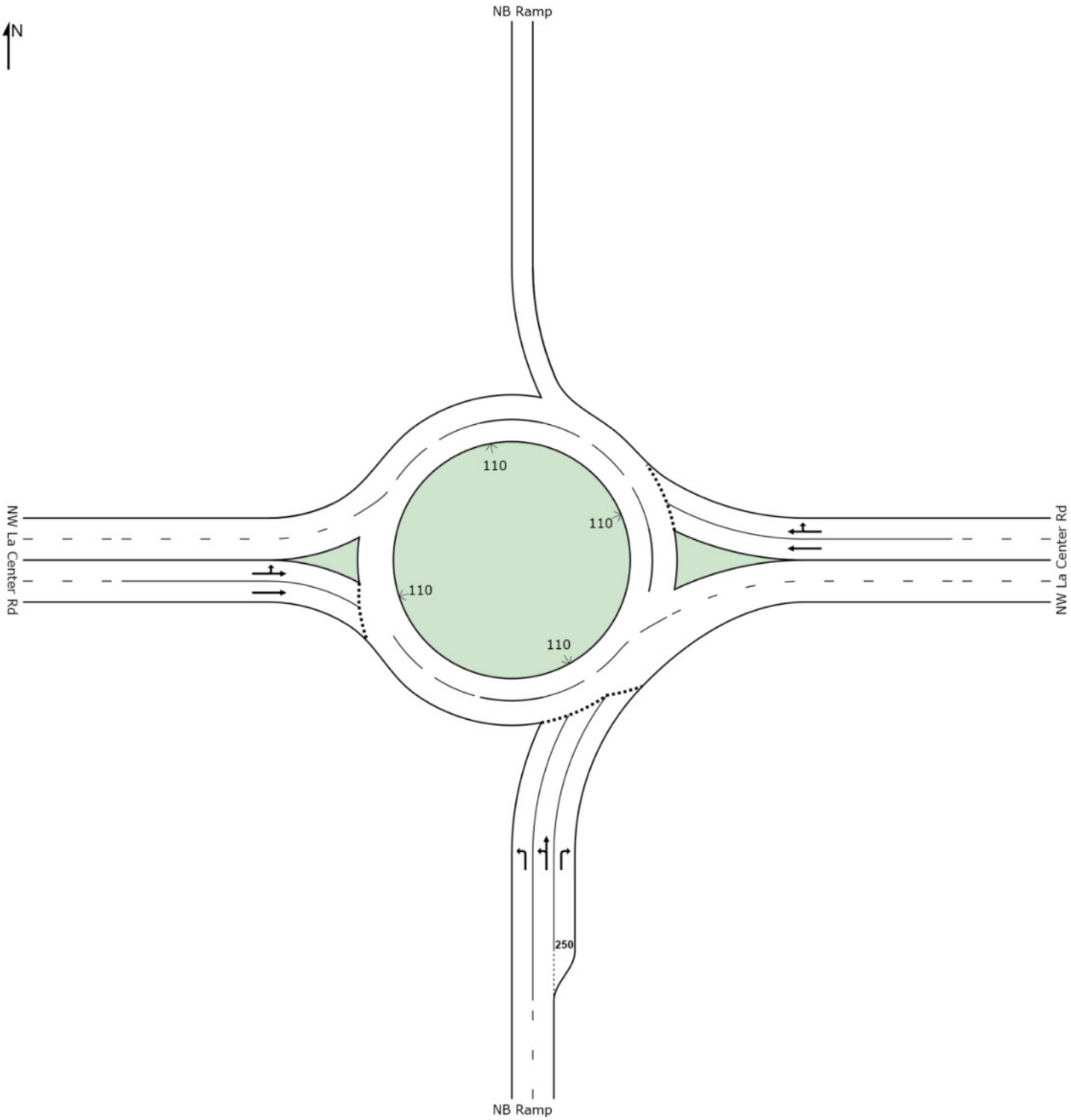
Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

SITE LAYOUT

Site: 2037 Total Build NW La Center and NB Ramps Weekday AM

2037 Build Weekday AM
Roundabout



MOVEMENT SUMMARY

Site: 2037 Total Build NW La Center and NB Ramps Weekend

2037 Build Weekend Peak
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Ramp											
3	L2	968	1.0	0.425	7.6	LOS A	1.9	47.2	0.47	0.41	22.3
8	T1	2	0.0	0.425	7.6	LOS A	1.9	47.2	0.47	0.41	28.5
18	R2	626	3.0	0.461	7.2	LOS A	2.1	54.9	0.46	0.39	29.4
Approach		1596	1.8	0.461	7.4	LOS A	2.1	54.9	0.47	0.40	24.5
East: NW La Center Rd											
6	T1	629	3.0	0.763	21.3	LOS C	6.3	161.7	0.85	0.97	17.2
16	R2	173	12.0	0.442	15.8	LOS B	2.1	55.6	0.73	0.77	22.9
Approach		802	4.9	0.763	20.1	LOS C	6.3	161.7	0.82	0.93	18.4
West: NW La Center Rd											
5	L2	131	1.0	0.134	3.4	LOS A	0.0	0.0	0.00	0.00	33.5
2	T1	308	5.0	0.134	3.1	LOS A	0.0	0.0	0.00	0.00	32.9
Approach		439	3.8	0.134	3.2	LOS A	0.0	0.0	0.00	0.00	33.1
All Vehicles		2837	3.0	0.763	10.4	LOS B	6.3	161.7	0.50	0.49	23.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
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Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2037 Total Build NW La Center and NB Ramps Weekend

2037 Build Weekend Peak
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NB Ramp													
Lane 1	485	1.0	1142	0.425	100	7.6	LOS A	1.9	47.2	Full	1800	0.0	0.0
Lane 2	485	1.0	1143	0.425	100	7.6	LOS A	1.9	47.2	Full	1800	0.0	0.0
Lane 3[d]	626	3.0	1357	0.461	100	7.2	LOS A	2.1	54.9	Short	250	0.0	0.0
Approach	1596	1.8		0.461		7.4	LOS A	2.1	54.9				
East: NW La Center Rd													
Lane 1[d]	595	3.0	780	0.763	100	21.6	LOS C	6.3	161.7	Full	600	0.0	0.0
Lane 2	207	10.5	469	0.442	58[7]	15.8	LOS B	2.1	55.6	Full	600	0.0	0.0
Approach	802	4.9		0.763		20.1	LOS C	6.3	161.7				
West: NW La Center Rd													
Lane 1	205	2.4	1527	0.134	100	3.4	LOS A	0.0	0.0	Full	600	0.0	0.0
Lane 2[d]	234	5.0	1749	0.134	100	3.0	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	439	3.8		0.134		3.2	LOS A	0.0	0.0				
Intersection	2837	3.0		0.763		10.4	LOS B	6.3	161.7				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
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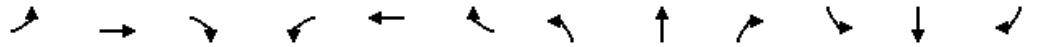
7 Lane underutilisation specified by user
d Dominant lane on roundabout approach

SIDRA INTERSECTION 6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	250		250	200		0	250		0	100		100
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.979			0.996			0.857			0.867	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1597	3403	0	1752	3477	0	1752	1583	0	1805	1477	0
Flt Permitted	0.472			0.289			0.728			0.643		
Satd. Flow (perm)	794	3403	0	533	3477	0	1343	1583	0	1222	1477	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31			5			174			40	
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		826			2615			1342			1004	
Travel Time (s)		12.5			39.6			30.5			22.8	
Lane Group Flow (vph)	91	843	0	101	492	0	215	182	0	36	45	0
v/c Ratio	0.26	0.55		0.42	0.32		0.52	0.30		0.10	0.09	
Control Delay	11.2	10.7		16.5	9.0		17.9	4.3		12.1	5.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	11.2	10.7		16.5	9.0		17.9	4.3		12.1	5.7	
Queue Length 50th (ft)	11	63		14	33		39	1		6	1	
Queue Length 95th (ft)	50	162		66	90		112	35		25	18	
Internal Link Dist (ft)		746			2535			1262			924	
Turn Bay Length (ft)	250			200			250			100		
Base Capacity (vph)	756	3243		508	3312		1007	1231		917	1118	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.12	0.26		0.20	0.15		0.21	0.15		0.04	0.04	

Intersection Summary

Area Type: Other

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	91	727	116	101	478	14	215	8	174	36	5	40
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1681	1829	1900	1845	1838	1900	1845	1847	1900	1900	1703	1900
Adj Flow Rate, veh/h	91	727	0	101	478	14	215	8	174	36	5	40
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	13	4	4	3	3	3	3	0	0	0	0	0
Cap, veh/h	517	1796	0	439	1790	52	479	18	394	361	43	342
Arrive On Green	0.52	0.52	0.00	0.52	0.52	0.52	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	813	3567	0	718	3464	101	1342	69	1511	1221	164	1309
Grp Volume(v), veh/h	91	727	0	101	241	251	215	0	182	36	0	45
Grp Sat Flow(s),veh/h/ln	813	1738	0	718	1746	1820	1342	0	1580	1221	0	1472
Q Serve(g_s), s	3.2	5.8	0.0	4.5	3.5	3.5	6.5	0.0	4.3	1.1	0.0	1.0
Cycle Q Clear(g_c), s	6.7	5.8	0.0	10.3	3.5	3.5	7.6	0.0	4.3	5.5	0.0	1.0
Prop In Lane	1.00		0.00	1.00		0.06	1.00		0.96	1.00		0.89
Lane Grp Cap(c), veh/h	517	1796	0	439	902	940	479	0	413	361	0	384
V/C Ratio(X)	0.18	0.40	0.00	0.23	0.27	0.27	0.45	0.00	0.44	0.10	0.00	0.12
Avail Cap(c_a), veh/h	982	3783	0	849	1900	1981	1053	0	1088	883	0	1014
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.0	6.6	0.0	9.8	6.1	6.1	15.6	0.0	13.9	16.2	0.0	12.7
Incr Delay (d2), s/veh	0.2	0.1	0.0	0.3	0.2	0.2	0.7	0.0	0.7	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	2.8	0.0	0.9	1.7	1.8	2.5	0.0	2.0	0.4	0.0	0.4
LnGrp Delay(d),s/veh	8.1	6.8	0.0	10.0	6.3	6.2	16.2	0.0	14.6	16.3	0.0	12.8
LnGrp LOS	A	A		B	A	A	B		B	B		B
Approach Vol, veh/h		818			593			397			81	
Approach Delay, s/veh		6.9			6.9			15.5			14.4	
Approach LOS		A			A			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		28.3		16.8		28.3		16.8
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0
Max Green Setting (Gmax), s		49.0		31.0		49.0		31.0
Max Q Clear Time (g_c+I1), s		8.7		7.5		12.3		9.6
Green Ext Time (p_c), s		11.2		2.2		11.0		2.2

Intersection Summary	
HCM 2010 Ctrl Delay	9.0
HCM 2010 LOS	A

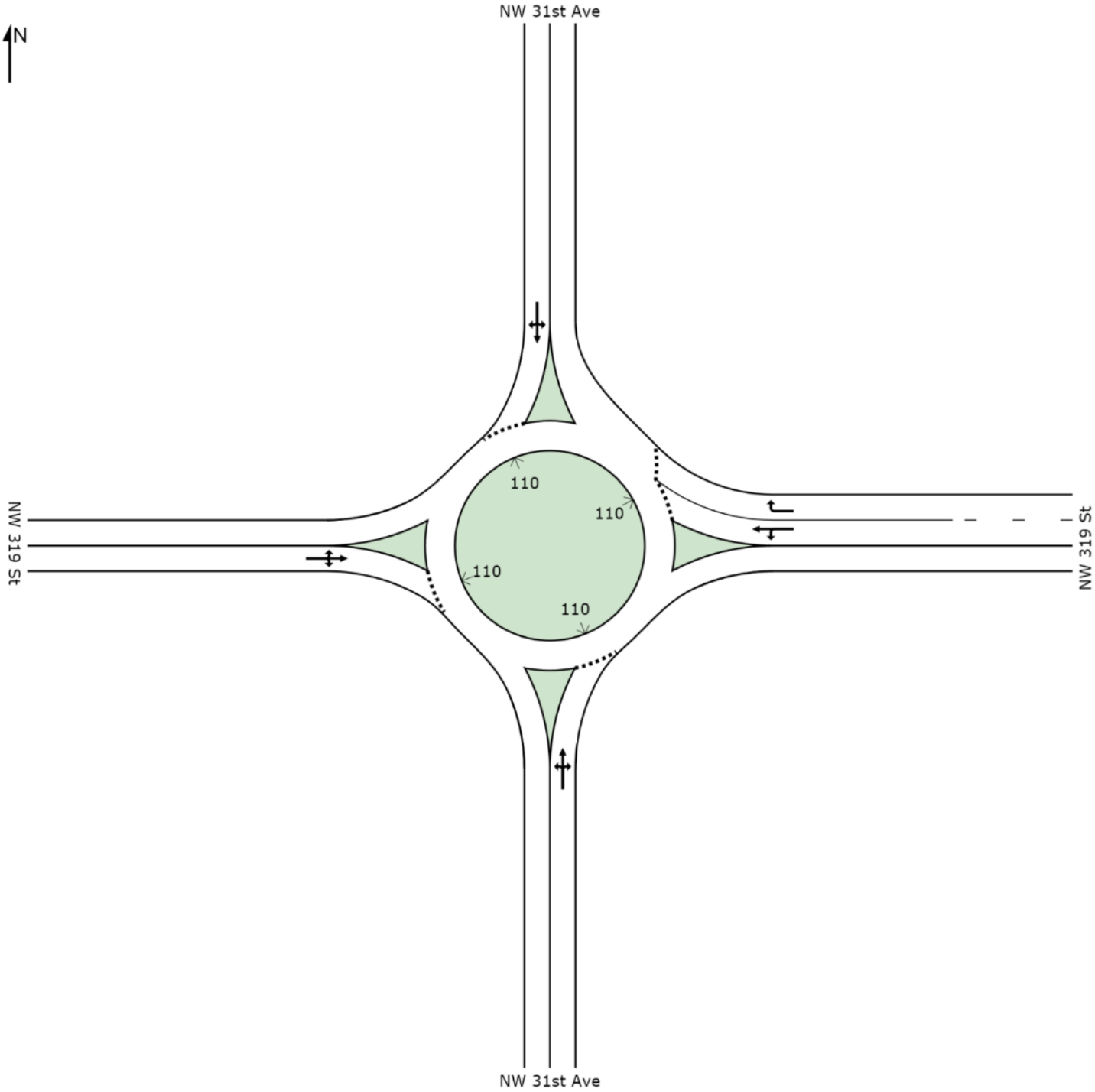
Appendix BB 2037 Trip Distribution Sensitivity Analysis Worksheets for 85/15 Split

SITE LAYOUT

Site: 2037 Total NoBuild NW 319 St and NW 31st Ave Weekday AM

2037 No Build Weekday AM

Roundabout



MOVEMENT SUMMARY

Site: 2037 Total NoBuild NW 319 St and NW 31st Ave Weekday AM

2037 No Build Weekday AM

Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NW 31st Ave											
3	L2	5	0.0	0.226	7.0	LOS A	1.2	34.8	0.54	0.43	33.9
8	T1	5	1.0	0.226	7.0	LOS A	1.2	34.8	0.54	0.43	33.9
18	R2	168	23.0	0.226	7.0	LOS A	1.2	34.8	0.54	0.43	29.7
Approach		178	21.7	0.226	7.0	LOS A	1.2	34.8	0.54	0.43	29.9
East: NW 319 St											
1	L2	193	11.0	0.258	4.2	LOS A	1.6	43.2	0.08	0.02	32.7
6	T1	234	2.0	0.258	4.2	LOS A	1.6	43.2	0.08	0.02	32.1
16	R2	146	1.0	0.114	3.7	LOS A	0.6	15.2	0.08	0.02	32.5
Approach		573	4.8	0.258	4.1	LOS A	1.6	43.2	0.08	0.02	32.4
North: NW 31st Ave											
7	L2	110	1.0	0.124	5.0	LOS A	0.6	15.6	0.52	0.40	30.1
4	T1	5	1.0	0.124	5.0	LOS A	0.6	15.6	0.52	0.40	32.4
14	R2	1	1.0	0.124	5.0	LOS A	0.6	15.6	0.52	0.40	30.7
Approach		116	1.0	0.124	5.0	LOS A	0.6	15.6	0.52	0.40	30.3
West: NW 319 St											
5	L2	1	0.0	0.232	5.9	LOS A	1.2	31.8	0.50	0.38	34.5
2	T1	211	4.0	0.232	5.9	LOS A	1.2	31.8	0.50	0.38	32.4
12	R2	15	0.0	0.232	5.9	LOS A	1.2	31.8	0.50	0.38	33.5
Approach		227	3.7	0.232	5.9	LOS A	1.2	31.8	0.50	0.38	32.5
All Vehicles		1094	6.9	0.258	5.1	LOS A	1.6	43.2	0.29	0.20	31.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2037 Total Build NW 319 St and NW 31st Ave Weekday AM 85_15 Split

2037 Build Total Traffic Weekday AM
85/15 Split Sensitivity Analysis

Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NW 31st Ave													
Lane 1[d]	178	21.7	792	0.225	100	7.0	LOS A	1.2	34.2	Full	1600	0.0	0.0
Approach	178	21.7		0.225		7.0	LOS A	1.2	34.2				
East: NW 319 St													
Lane 1[d]	325	7.3	1624	0.200	100	3.8	LOS A	1.2	31.6	Full	650	0.0	0.0
Lane 2	248	1.0	1469	0.169	100	3.8	LOS A	1.0	24.2	Full	650	0.0	0.0
Approach	573	4.6		0.200		3.8	LOS A	1.2	31.6				
North: NW 31st Ave													
Lane 1[d]	193	1.0	1004	0.192	100	5.4	LOS A	1.0	24.7	Full	1400	0.0	0.0
Approach	193	1.0		0.192		5.4	LOS A	1.0	24.7				
West: NW 319 St													
Lane 1[d]	150	3.6	922	0.163	100	5.5	LOS A	0.8	21.7	Full	1300	0.0	0.0
Approach	150	3.6		0.163		5.5	LOS A	0.8	21.7				
Intersection	1094	6.6		0.225		4.8	LOS A	1.2	34.2				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

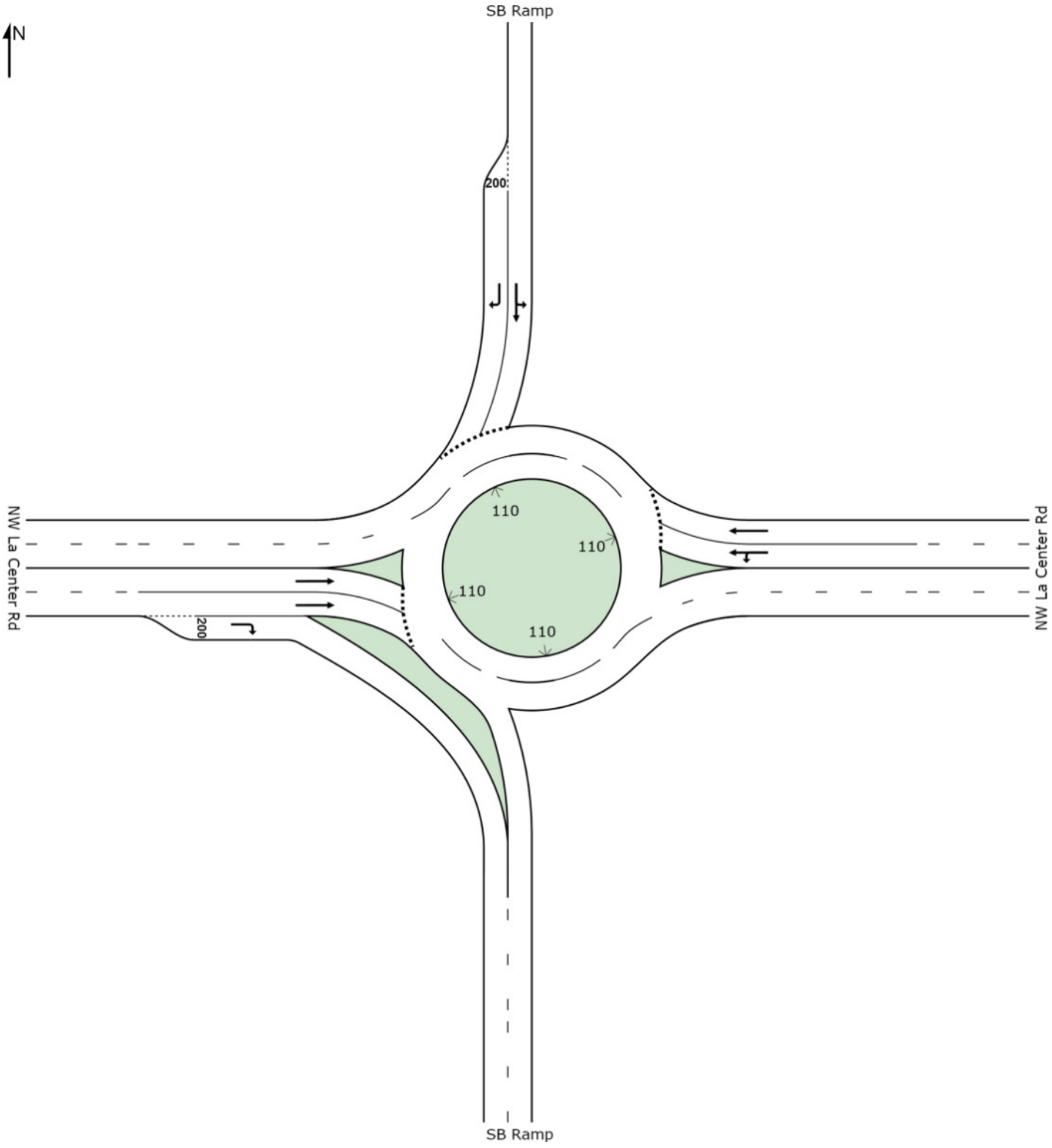
SIDRA INTERSECTION 6

SITE LAYOUT

Site: 2037 Total Build NW La Center and SB Ramps Weekday AM 85_15 Split

2037 Build Weekday AM

Roundabout



MOVEMENT SUMMARY

Site: 2037 Total Build NW La Center and SB Ramps Weekday AM 85_15 Split

2037 Build Weekday AM

Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: NW La Center Rd											
1	L2	627	4.0	0.439	6.4	LOS A	0.0	0.0	0.00	0.00	32.6
6	T1	445	2.0	0.439	5.5	LOS A	0.0	0.0	0.00	0.00	37.7
Approach		1072	3.2	0.439	6.0	LOS A	0.0	0.0	0.00	0.00	34.0
North: SB Ramp											
7	L2	177	13.0	0.236	7.3	LOS A	0.9	25.0	0.59	0.59	27.7
4	T1	3	50.0	0.236	7.3	LOS A	0.9	25.0	0.59	0.59	29.6
14	R2	127	8.0	0.189	7.6	LOS A	0.7	18.3	0.58	0.58	29.2
Approach		307	11.3	0.236	7.4	LOS A	0.9	25.0	0.59	0.59	28.3
West: NW La Center Rd											
2	T1	225	20.0	0.183	8.1	LOS A	1.1	31.2	0.74	0.69	23.6
12	R2	264	2.0	0.161	0.0	LOS A	0.0	0.0	0.00	0.00	35.6
Approach		489	10.3	0.183	3.7	LOS A	1.1	31.2	0.34	0.32	29.9
All Vehicles		1868	6.4	0.439	5.6	LOS A	1.1	31.2	0.19	0.18	31.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2037 Total Build NW La Center and SB Ramps Weekday AM 85_15 Split

2037 Build Weekday AM

Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
East: NW La Center Rd													
Lane 1[d]	667	3.9	1520	0.439	100	6.4	LOS A	0.0	0.0	Full	600	0.0	0.0
Lane 2	405	2.0	1339	0.303	69[7]	5.4	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	1072	3.2		0.439		6.0	LOS A	0.0	0.0				
North: SB Ramp													
Lane 1[d]	180	13.6	763	0.236	100	7.3	LOS A	0.9	25.0	Full	1300	0.0	0.0
Lane 2	127	8.0	671	0.189	100	7.6	LOS A	0.7	18.3	Short	200	0.0	0.0
Approach	307	11.3		0.236		7.4	LOS A	0.9	25.0				
West: NW La Center Rd													
Lane 1	99	20.0	538	0.183	100	9.1	LOS A	1.0	28.6	Full	650	0.0	0.0
Lane 2[d]	126	20.0	689	0.183	100	7.3	LOS A	1.1	31.2	Full	650	0.0	0.0
Lane 3	264	2.0	1642	0.161	100	0.0	LOS A	0.0	0.0	Short	200	0.0	0.0
Approach	489	10.3		0.183		3.7	LOS A	1.1	31.2				
Intersection	1868	6.4		0.439		5.6	LOS A	1.1	31.2				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

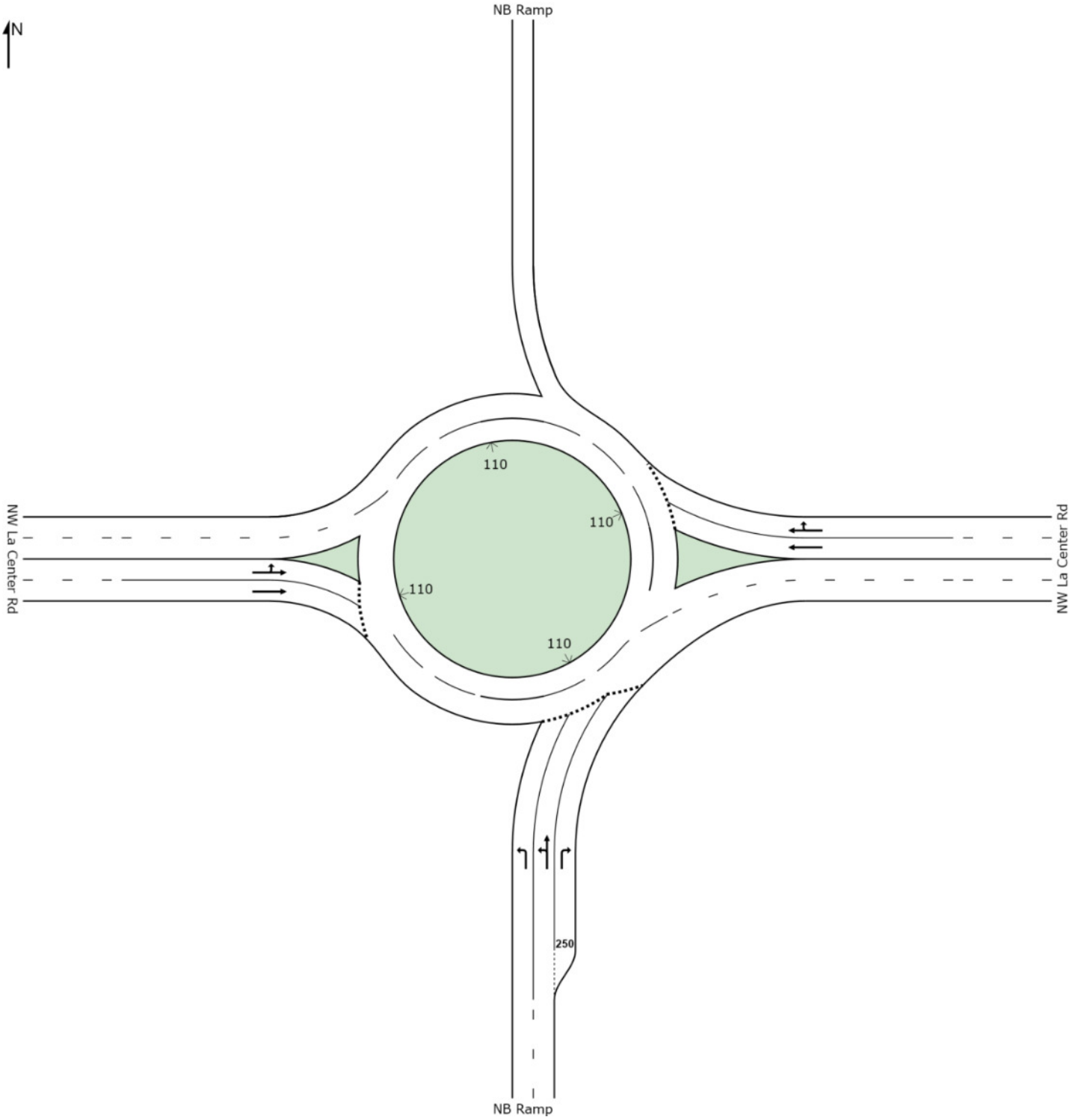
7 Lane underutilisation specified by user
d Dominant lane on roundabout approach

SIDRA INTERSECTION 6

SITE LAYOUT

Site: 2037 Total Build NW La Center and NB Ramps Weekday AM 85_15 Split

2037 Total Traffic Weekday AM
85/15 Split Sensitivity Analysis
Roundabout



MOVEMENT SUMMARY

Site: 2037 Total Build NW La Center and NB Ramps Weekday AM 85_15 Split

2037 Total Traffic Weekday AM
85/15 Split Sensitivity Analysis
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Ramp											
3	L2	346	1.0	0.243	5.3	LOS A	0.9	23.1	0.41	0.34	25.0
8	T1	2	50.0	0.243	5.5	LOS A	0.9	23.1	0.41	0.35	29.1
18	R2	408	7.0	0.316	5.7	LOS A	1.3	33.8	0.42	0.35	30.0
Approach		756	4.4	0.316	5.5	LOS A	1.3	33.8	0.41	0.34	27.4
East: NW La Center Rd											
6	T1	727	4.0	0.664	13.4	LOS B	5.4	139.7	0.69	0.69	20.2
16	R2	227	17.0	0.418	11.4	LOS B	2.1	57.7	0.60	0.61	25.1
Approach		954	7.1	0.664	12.9	LOS B	5.4	139.7	0.67	0.67	21.3
West: NW La Center Rd											
5	L2	106	17.0	0.139	3.8	LOS A	0.0	0.0	0.00	0.00	33.4
2	T1	297	17.0	0.139	3.5	LOS A	0.0	0.0	0.00	0.00	32.4
Approach		403	17.0	0.139	3.6	LOS A	0.0	0.0	0.00	0.00	32.7
All Vehicles		2113	8.0	0.664	8.5	LOS A	5.4	139.7	0.45	0.43	25.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 6

LANE SUMMARY

Site: 2037 Total Build NW La Center and NB Ramps Weekday AM 85_15 Split

2037 Total Traffic Weekday AM
85/15 Split Sensitivity Analysis
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NB Ramp													
Lane 1	78	1.0	919	0.085	35[7]	4.7	LOS A	0.3	7.1	Short	200	0.0	0.0
Lane 2	270	1.4	1109	0.243	100	5.5	LOS A	0.9	23.1	Full	1800	0.0	0.0
Lane 3[d]	408	7.0	1290	0.316	100	5.7	LOS A	1.3	33.8	Short	250	0.0	0.0
Approach	756	4.4		0.316		5.5	LOS A	1.3	33.8				
East: NW La Center Rd													
Lane 1[d]	677	4.0	1021	0.664	100	13.5	LOS B	5.4	139.7	Full	600	0.0	0.0
Lane 2	277	14.7	661	0.418	63[7]	11.4	LOS B	2.1	57.7	Full	600	0.0	0.0
Approach	954	7.1		0.664		12.9	LOS B	5.4	139.7				
West: NW La Center Rd													
Lane 1	185	17.0	1335	0.139	100	3.8	LOS A	0.0	0.0	Full	600	0.0	0.0
Lane 2[d]	218	17.0	1570	0.139	100	3.4	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	403	17.0		0.139		3.6	LOS A	0.0	0.0				
Intersection	2113	8.0		0.664		8.5	LOS A	5.4	139.7				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

7 Lane underutilisation specified by user
d Dominant lane on roundabout approach

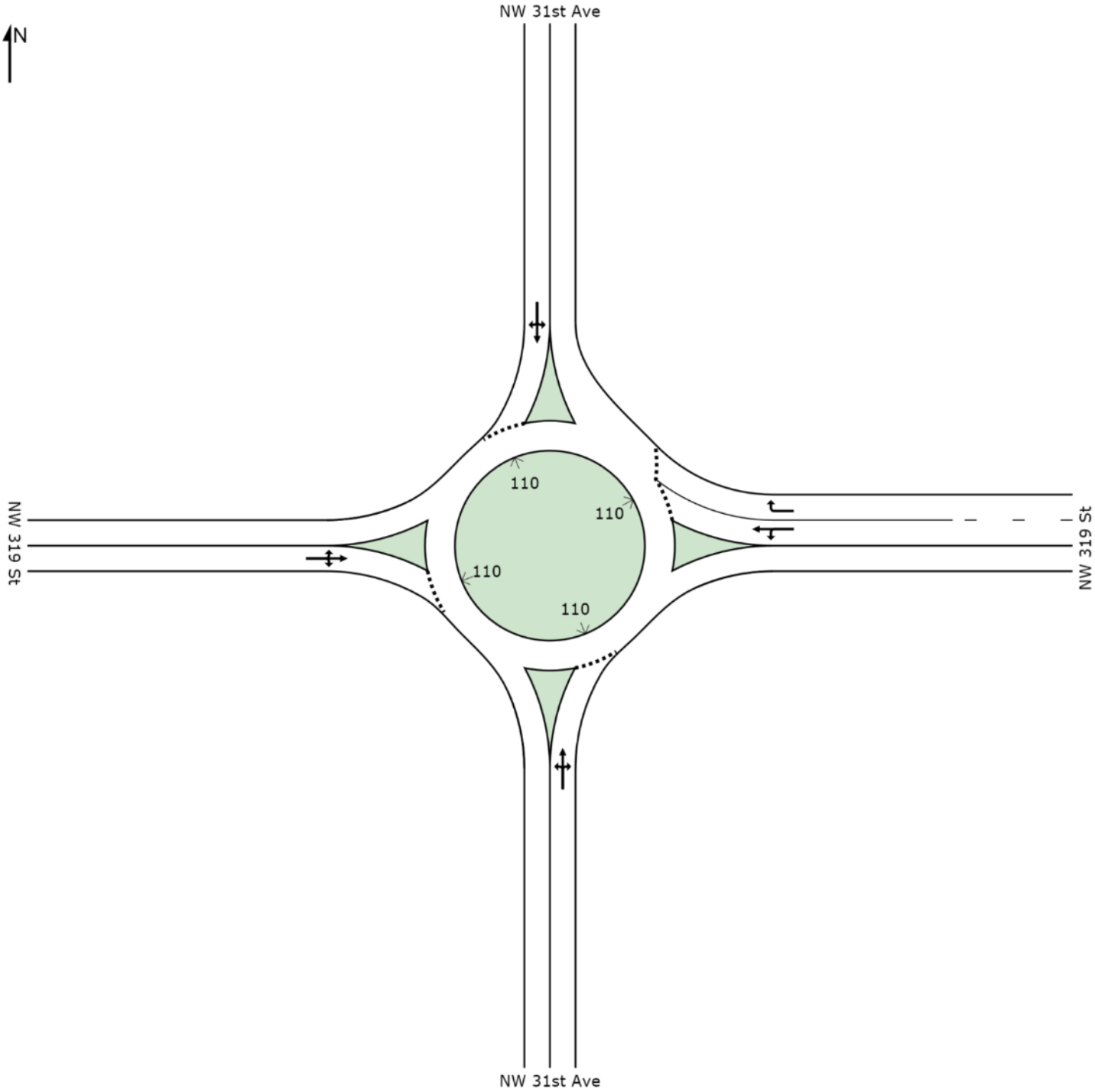
SIDRA INTERSECTION 6

SITE LAYOUT

Site: 2037 Total NoBuild NW 319 St and NW 31st Ave Weekday AM

2037 No Build Weekday AM

Roundabout



MOVEMENT SUMMARY

Site: 2037 Total Build NW 319 St and NW 31st Ave Weekday PM 85_15 Split

2037 Build Total Traffic Weekday PM
85/15 Split Sensitivity Analysis

Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NW 31st Ave											
3	L2	17	0.0	0.383	11.0	LOS B	2.5	66.2	0.81	0.78	31.7
8	T1	10	10.0	0.383	11.0	LOS B	2.5	66.2	0.81	0.78	31.6
18	R2	219	7.0	0.383	11.0	LOS B	2.5	66.2	0.81	0.78	28.3
Approach		246	6.6	0.383	11.0	LOS B	2.5	66.2	0.81	0.78	28.7
East: NW 319 St											
1	L2	183	2.0	0.305	5.4	LOS A	2.2	56.6	0.18	0.06	32.1
6	T1	223	9.0	0.305	5.4	LOS A	2.2	56.6	0.18	0.06	31.0
16	R2	641	1.0	0.382	5.4	LOS A	3.1	78.4	0.18	0.05	31.3
Approach		1047	2.9	0.382	5.4	LOS A	3.1	78.4	0.18	0.05	31.4
North: NW 31st Ave											
7	L2	524	1.0	0.575	11.9	LOS B	4.8	121.5	0.74	0.70	26.6
4	T1	10	10.0	0.575	11.9	LOS B	4.8	121.5	0.74	0.70	29.2
14	R2	1	0.0	0.575	11.9	LOS B	4.8	121.5	0.74	0.70	27.8
Approach		535	1.2	0.575	11.9	LOS B	4.8	121.5	0.74	0.70	26.6
West: NW 319 St											
5	L2	1	0.0	0.265	8.7	LOS A	1.7	42.6	0.78	0.71	32.9
2	T1	170	3.0	0.265	8.7	LOS A	1.7	42.6	0.78	0.71	30.5
12	R2	4	0.0	0.265	8.7	LOS A	1.7	42.6	0.78	0.71	32.1
Approach		175	2.9	0.265	8.7	LOS A	1.7	42.6	0.78	0.71	30.6
All Vehicles		2003	2.9	0.575	8.1	LOS A	4.8	121.5	0.46	0.37	29.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2037 Total Build NW 319 St and NW 31st Ave Weekday PM 85_15 Split

2037 Build Total Traffic Weekday PM
85/15 Split Sensitivity Analysis

Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NW 31st Ave													
Lane 1[d]	246	6.6	642	0.383	100	11.0	LOS B	2.5	66.2	Full	1600	0.0	0.0
Approach	246	6.6		0.383		11.0	LOS B	2.5	66.2				
East: NW 319 St													
Lane 1	406	5.8	1329	0.305	100	5.4	LOS A	2.2	56.6	Full	650	0.0	0.0
Lane 2[d]	641	1.0	1677	0.382	100	5.4	LOS A	3.1	78.4	Full	650	0.0	0.0
Approach	1047	2.9		0.382		5.4	LOS A	3.1	78.4				
North: NW 31st Ave													
Lane 1[d]	535	1.2	930	0.575	100	11.9	LOS B	4.8	121.5	Full	1400	0.0	0.0
Approach	535	1.2		0.575		11.9	LOS B	4.8	121.5				
West: NW 319 St													
Lane 1[d]	175	2.9	661	0.265	100	8.7	LOS A	1.7	42.6	Full	1300	0.0	0.0
Approach	175	2.9		0.265		8.7	LOS A	1.7	42.6				
Intersection	2003	2.9		0.575		8.1	LOS A	4.8	121.5				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

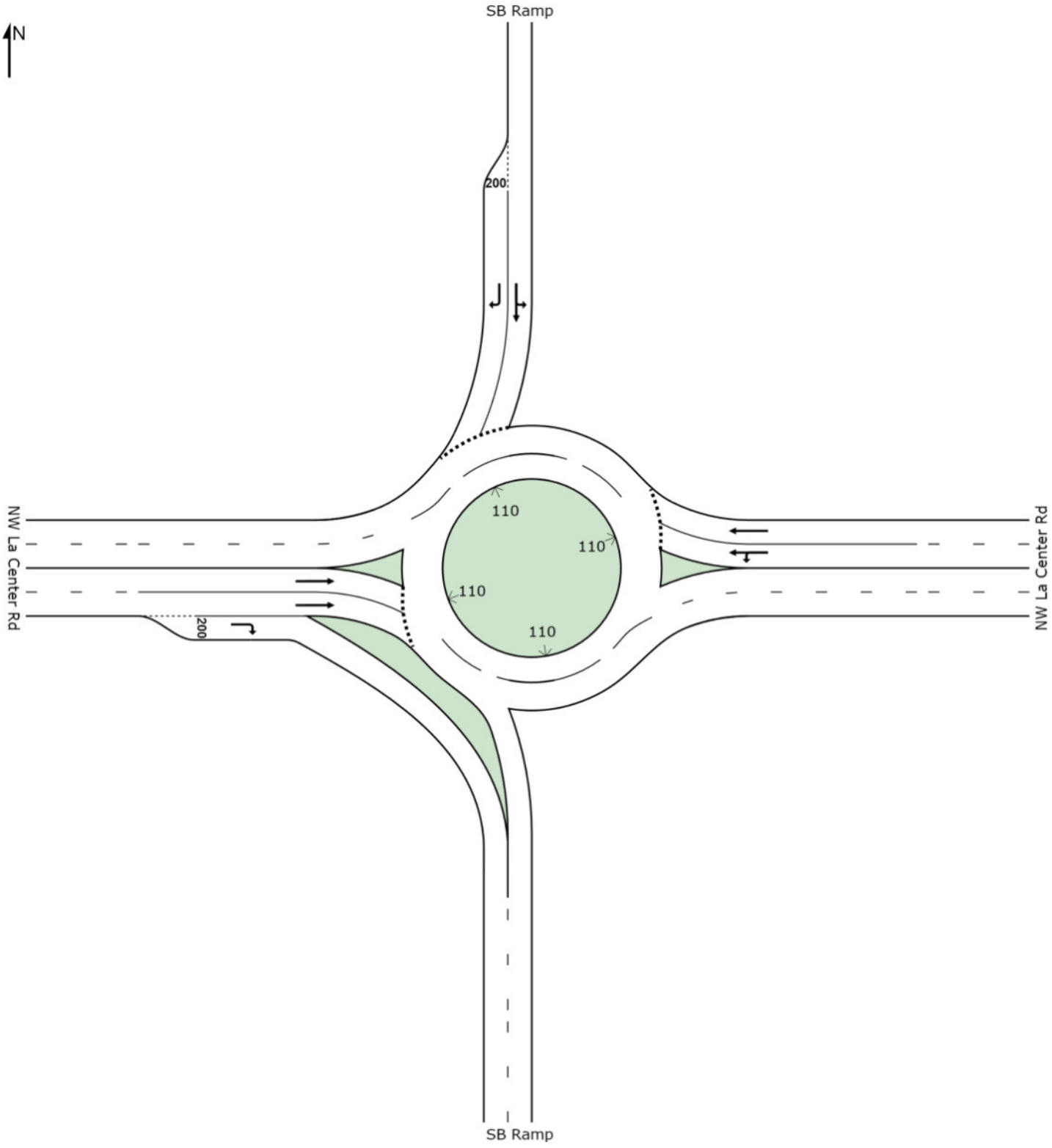
d Dominant lane on roundabout approach

SITE LAYOUT

Site: 2037 Total Build NW La Center and SB Ramps Weekday AM 85_15 Split

2037 Build Weekday AM

Roundabout



MOVEMENT SUMMARY

Site: 2037 Total Build NW La Center and SB Ramps Weekday PM 85_15 Split

2037 Build Weekday PM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: NW La Center Rd											
1	L2	564	5.0	0.487	7.5	LOS A	0.0	0.0	0.00	0.00	32.9
6	T1	902	2.0	0.487	7.3	LOS A	0.0	0.0	0.00	0.00	37.5
Approach		1466	3.2	0.513	7.4	LOS A	0.0	0.0	0.00	0.00	35.1
North: SB Ramp											
7	L2	217	10.0	0.301	8.5	LOS A	1.2	32.8	0.65	0.66	27.2
4	T1	3	50.0	0.301	8.5	LOS A	1.2	32.8	0.65	0.66	29.1
14	R2	145	2.0	0.228	8.5	LOS A	0.8	21.5	0.64	0.64	29.0
Approach		365	7.2	0.301	8.5	LOS A	1.2	32.8	0.65	0.65	27.9
West: NW La Center Rd											
2	T1	304	7.0	0.209	7.3	LOS A	1.3	35.0	0.75	0.67	24.4
12	R2	609	1.0	0.367	0.0	LOS A	0.0	0.0	0.00	0.00	35.6
Approach		913	3.0	0.367	2.4	LOS A	1.3	35.0	0.25	0.22	31.8
All Vehicles		2744	3.6	0.513	5.9	LOS A	1.3	35.0	0.17	0.16	32.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2037 Total Build NW La Center and SB Ramps Weekday PM 85_15 Split

2037 Build Weekday PM
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
East: NW La Center Rd													
Lane 1	672	4.5	1378	0.487	95[7]	7.5	LOS A	0.0	0.0	Full	600	0.0	0.0
Lane 2[d]	794	2.0	1548	0.513	100	7.3	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	1466	3.2		0.513		7.4	LOS A	0.0	0.0				
North: SB Ramp													
Lane 1[d]	220	10.5	731	0.301	100	8.5	LOS A	1.2	32.8	Full	1300	0.0	0.0
Lane 2	145	2.0	635	0.228	100	8.5	LOS A	0.8	21.5	Short	200	0.0	0.0
Approach	365	7.2		0.301		8.5	LOS A	1.2	32.8				
West: NW La Center Rd													
Lane 1	134	7.0	642	0.209	100	8.1	LOS A	1.2	32.0	Full	650	0.0	0.0
Lane 2[d]	170	7.0	811	0.209	100	6.7	LOS A	1.3	35.0	Full	650	0.0	0.0
Lane 3	609	1.0	1658	0.367	100	0.0	LOS A	0.0	0.0	Short	200	0.0	0.0
Approach	913	3.0		0.367		2.4	LOS A	1.3	35.0				
Intersection	2744	3.6		0.513		5.9	LOS A	1.3	35.0				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

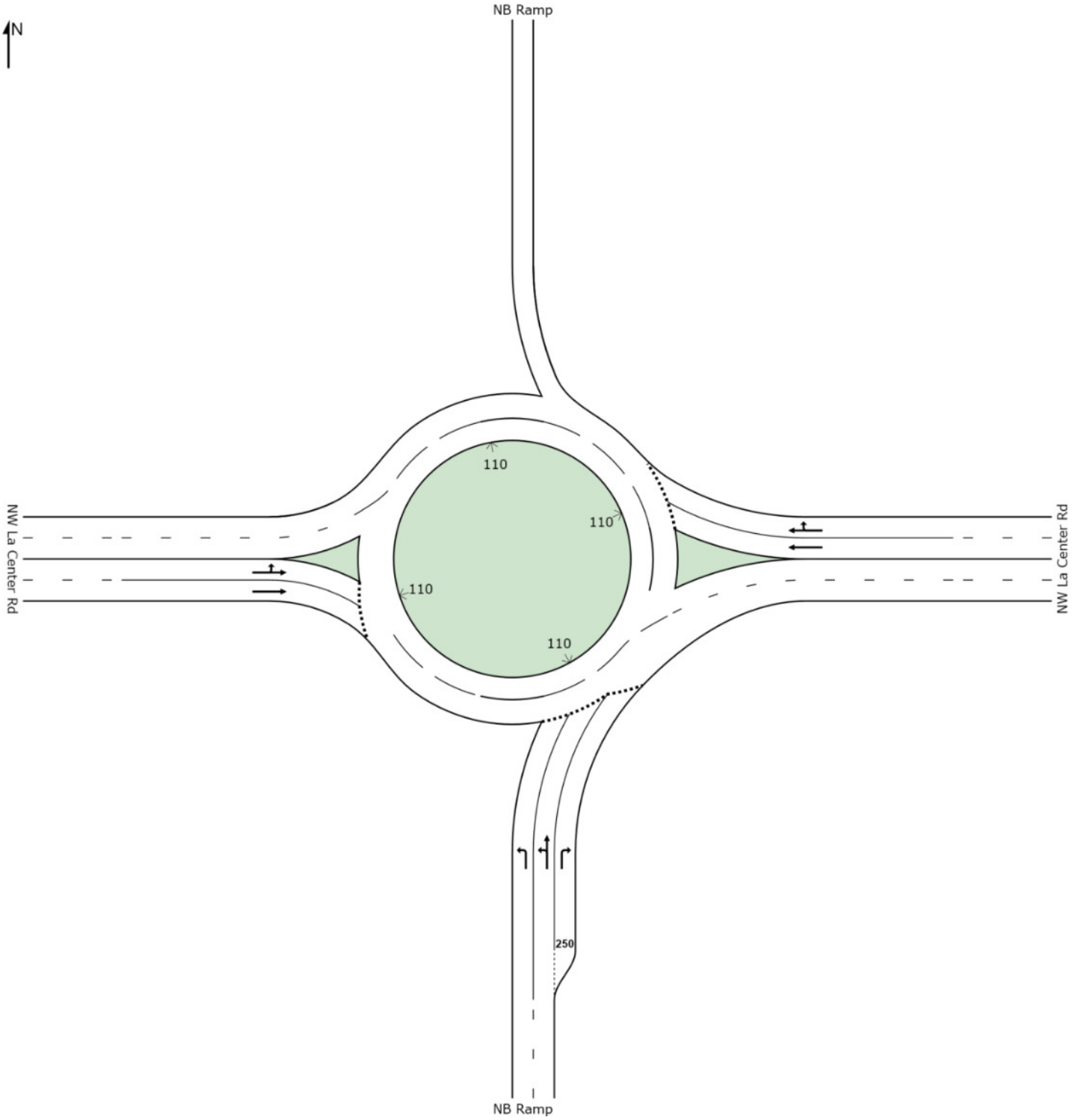
7 Lane underutilisation specified by user
d Dominant lane on roundabout approach

SIDRA INTERSECTION 6

SITE LAYOUT

Site: 2037 Total Build NW La Center and NB Ramps Weekday AM 85_15 Split

2037 Total Traffic Weekday AM
85/15 Split Sensitivity Analysis
Roundabout



MOVEMENT SUMMARY

Site: 2037 Total Build NW La Center and NB Ramps Weekday PM 85_15 Split

2037 Total Traffic Weekday PM
85/15 Split Sensitivity Analysis
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Ramp											
3	L2	812	1.0	0.579	9.5	LOS A	3.5	87.5	0.55	0.56	23.7
8	T1	4	50.0	0.579	10.4	LOS B	3.5	87.5	0.58	0.60	27.3
18	R2	648	3.0	0.489	7.7	LOS A	2.5	62.8	0.51	0.47	29.1
Approach		1464	2.0	0.579	8.7	LOS A	3.5	87.5	0.53	0.52	25.7
East: NW La Center Rd											
6	T1	654	4.0	0.830	27.3	LOS C	9.6	247.4	0.93	1.14	15.5
16	R2	171	5.0	0.440	15.0	LOS B	2.3	60.6	0.76	0.80	23.4
Approach		825	4.2	0.830	24.7	LOS C	9.6	247.4	0.90	1.07	16.9
West: NW La Center Rd											
5	L2	177	4.0	0.165	3.7	LOS A	0.0	0.0	0.00	0.00	33.0
2	T1	345	9.0	0.165	3.4	LOS A	0.0	0.0	0.00	0.00	32.8
Approach		522	7.3	0.165	3.5	LOS A	0.0	0.0	0.00	0.00	32.8
All Vehicles		2811	3.6	0.830	12.4	LOS B	9.6	247.4	0.54	0.58	23.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2037 Total Build NW La Center and NB Ramps Weekday PM 85_15 Split

2037 Total Traffic Weekday PM
85/15 Split Sensitivity Analysis
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NB Ramp													
Lane 1	169	1.0	913	0.185	32[7]	5.8	LOS A	0.7	16.4	Short	200	0.0	0.0
Lane 2	647	1.3	1118	0.579	100	10.4	LOS B	3.5	87.5	Full	1800	0.0	0.0
Lane 3[d]	648	3.0	1325	0.489	100	7.7	LOS A	2.5	62.8	Short	250	0.0	0.0
Approach	1464	2.0		0.579		8.7	LOS A	3.5	87.5				
East: NW La Center Rd													
Lane 1[d]	607	4.0	731	0.830	100	28.2	LOS C	9.6	247.4	Full	600	0.0	0.0
Lane 2	218	4.8	496	0.440	53[7]	15.0	LOS B	2.3	60.6	Full	600	0.0	0.0
Approach	825	4.2		0.830		24.7	LOS C	9.6	247.4				
West: NW La Center Rd													
Lane 1	245	5.4	1485	0.165	100	3.7	LOS A	0.0	0.0	Full	600	0.0	0.0
Lane 2[d]	277	9.0	1685	0.165	100	3.4	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	522	7.3		0.165		3.5	LOS A	0.0	0.0				
Intersection	2811	3.6		0.830		12.4	LOS B	9.6	247.4				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

7 Lane underutilisation specified by user
d Dominant lane on roundabout approach

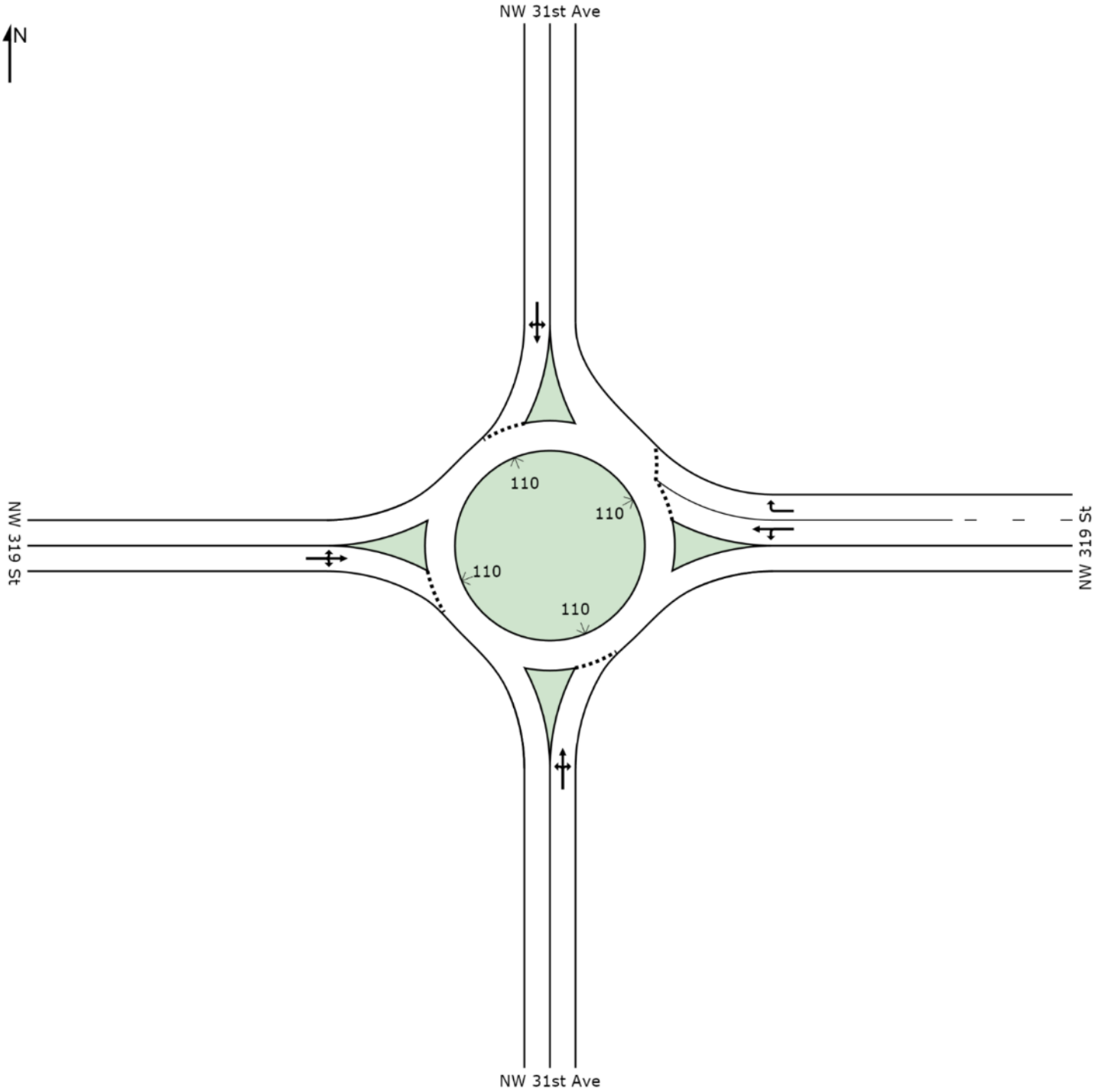
SIDRA INTERSECTION 6

SITE LAYOUT

Site: 2037 Total NoBuild NW 319 St and NW 31st Ave Weekday AM

2037 No Build Weekday AM

Roundabout



MOVEMENT SUMMARY

Site: 2037 Total Build NW 319 St and NW 31st Ave Weekend 85_15 Split

2037 Build Total Traffic Weekend Peak
85/15 Split Sensitivity Analysis

Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NW 31st Ave											
3	L2	5	25.0	0.297	9.6	LOS A	1.9	48.9	0.80	0.75	29.8
8	T1	15	1.0	0.297	9.6	LOS A	1.9	48.9	0.80	0.75	32.6
18	R2	168	4.0	0.297	9.6	LOS A	1.9	48.9	0.80	0.75	29.4
Approach		188	4.3	0.297	9.6	LOS A	1.9	48.9	0.80	0.75	29.7
East: NW 319 St											
1	L2	149	6.0	0.288	5.3	LOS A	2.0	51.2	0.15	0.04	32.4
6	T1	228	2.0	0.288	5.3	LOS A	2.0	51.2	0.15	0.04	31.5
16	R2	838	1.0	0.489	6.5	LOS A	4.6	116.4	0.17	0.05	30.5
Approach		1215	1.8	0.489	6.2	LOS A	4.6	116.4	0.17	0.05	30.9
North: NW 31st Ave											
7	L2	558	1.0	0.582	11.6	LOS B	4.9	122.6	0.71	0.65	26.7
4	T1	10	1.0	0.582	11.6	LOS B	4.9	122.6	0.71	0.65	29.5
14	R2	1	1.0	0.582	11.6	LOS B	4.9	122.6	0.71	0.65	27.9
Approach		569	1.0	0.582	11.6	LOS B	4.9	122.6	0.71	0.65	26.7
West: NW 319 St											
5	L2	1	1.0	0.299	9.4	LOS A	1.9	49.2	0.79	0.74	32.4
2	T1	181	4.0	0.299	9.4	LOS A	1.9	49.2	0.79	0.74	30.0
12	R2	12	0.0	0.299	9.4	LOS A	1.9	49.2	0.79	0.74	31.7
Approach		194	3.7	0.299	9.4	LOS A	1.9	49.2	0.79	0.74	30.2
All Vehicles		2166	2.0	0.582	8.2	LOS A	4.9	122.6	0.42	0.33	29.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2037 Total Build NW 319 St and NW 31st Ave Weekend 85_15 Split

2037 Build Total Traffic Weekend Peak
85/15 Split Sensitivity Analysis

Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NW 31st Ave													
Lane 1[d]	188	4.3	632	0.297	100	9.6	LOS A	1.9	48.9	Full	1600	0.0	0.0
Approach	188	4.3		0.297		9.6	LOS A	1.9	48.9				
East: NW 319 St													
Lane 1	377	3.6	1309	0.288	100	5.3	LOS A	2.0	51.2	Full	650	0.0	0.0
Lane 2[d]	838	1.0	1714	0.489	100	6.5	LOS A	4.6	116.4	Full	650	0.0	0.0
Approach	1215	1.8		0.489		6.2	LOS A	4.6	116.4				
North: NW 31st Ave													
Lane 1[d]	569	1.0	978	0.582	100	11.6	LOS B	4.9	122.6	Full	1400	0.0	0.0
Approach	569	1.0		0.582		11.6	LOS B	4.9	122.6				
West: NW 319 St													
Lane 1[d]	194	3.7	648	0.299	100	9.4	LOS A	1.9	49.2	Full	1300	0.0	0.0
Approach	194	3.7		0.299		9.4	LOS A	1.9	49.2				
Intersection	2166	2.0		0.582		8.2	LOS A	4.9	122.6				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

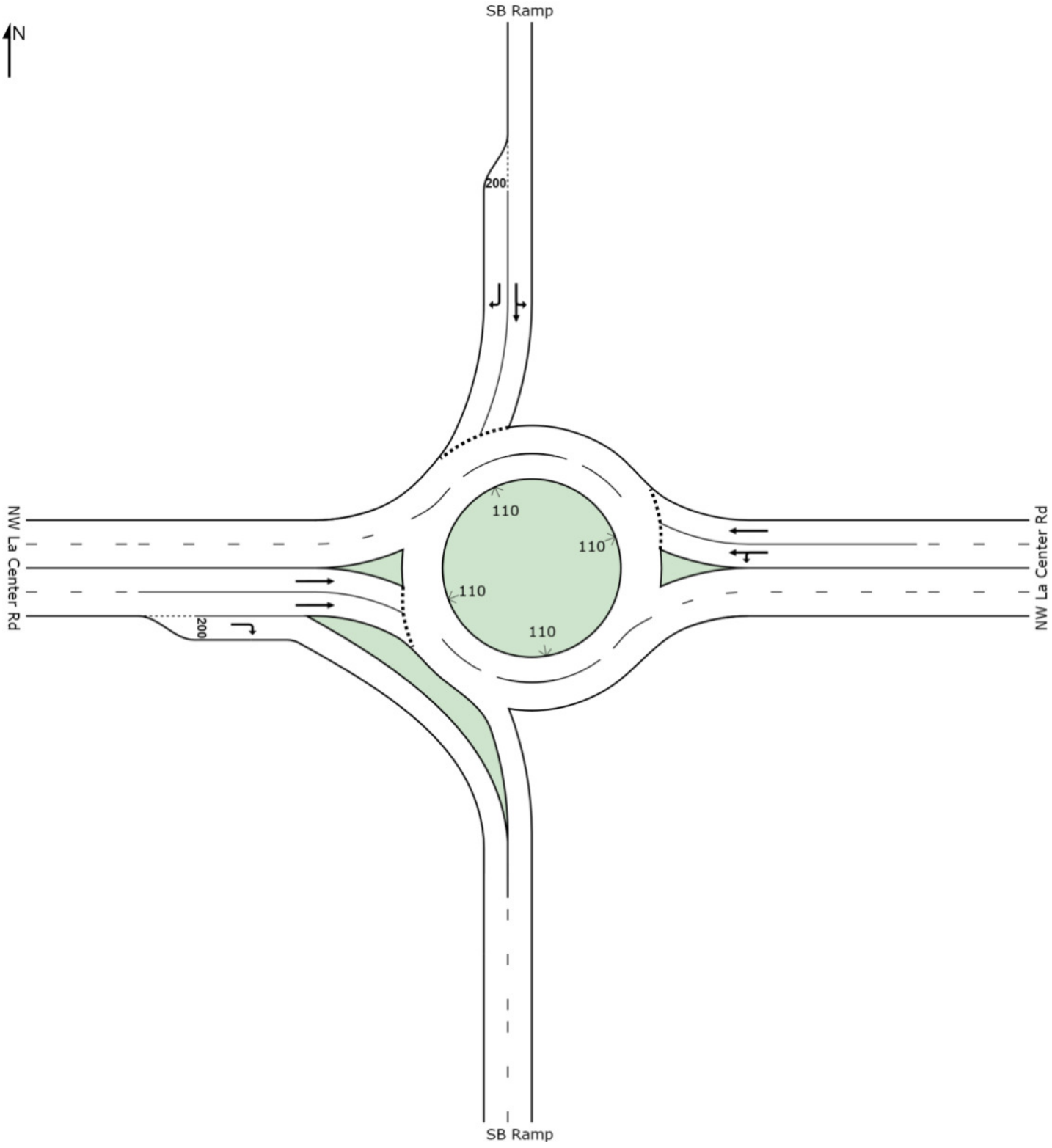
SIDRA INTERSECTION 6

SITE LAYOUT

Site: 2037 Total Build NW La Center and SB Ramps Weekday AM 85_15 Split

2037 Build Weekday AM

Roundabout



MOVEMENT SUMMARY

Site: 2037 Total Build NW La Center and SB Ramps Weekend 85_15 Split

2037 Build Weekend Peak
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: NW La Center Rd											
1	L2	563	2.0	0.503	7.7	LOS A	0.0	0.0	0.00	0.00	33.6
6	T1	1034	1.0	0.503	8.1	LOS A	0.0	0.0	0.00	0.00	37.6
Approach		1597	1.4	0.571	7.9	LOS A	0.0	0.0	0.00	0.00	35.7
North: SB Ramp											
7	L2	229	4.0	0.304	8.3	LOS A	1.3	33.4	0.68	0.68	27.7
4	T1	3	0.0	0.304	8.3	LOS A	1.3	33.4	0.68	0.68	29.9
14	R2	182	8.0	0.326	11.2	LOS B	1.3	35.7	0.70	0.72	27.1
Approach		414	5.7	0.326	9.5	LOS A	1.3	35.7	0.69	0.70	27.4
West: NW La Center Rd											
2	T1	211	3.0	0.136	6.0	LOS A	0.8	21.6	0.72	0.61	25.3
12	R2	697	2.0	0.425	0.0	LOS A	0.0	0.0	0.00	0.00	35.6
Approach		908	2.2	0.425	1.4	LOS A	0.8	21.6	0.17	0.14	33.2
All Vehicles		2919	2.2	0.571	6.1	LOS A	1.3	35.7	0.15	0.14	33.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2037 Total Build NW La Center and SB Ramps Weekend 85_15 Split

2037 Build Weekend Peak
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
East: NW La Center Rd													
Lane 1	704	1.8	1400	0.503	88[7]	7.7	LOS A	0.0	0.0	Full	600	0.0	0.0
Lane 2[d]	893	1.0	1564	0.571	100	8.2	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	1597	1.4		0.571		7.9	LOS A	0.0	0.0				
North: SB Ramp													
Lane 1[d]	232	3.9	764	0.304	100	8.3	LOS A	1.3	33.4	Full	1300	0.0	0.0
Lane 2	182	8.0	559	0.326	100	11.2	LOS B	1.3	35.7	Short	200	0.0	0.0
Approach	414	5.7		0.326		9.5	LOS A	1.3	35.7				
West: NW La Center Rd													
Lane 1	94	3.0	690	0.136	100	6.7	LOS A	0.8	19.8	Full	650	0.0	0.0
Lane 2[d]	117	3.0	866	0.136	100	5.5	LOS A	0.8	21.6	Full	650	0.0	0.0
Lane 3	697	2.0	1642	0.425	100	0.0	LOS A	0.0	0.0	Short	200	0.0	0.0
Approach	908	2.2		0.425		1.4	LOS A	0.8	21.6				
Intersection	2919	2.2		0.571		6.1	LOS A	1.3	35.7				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

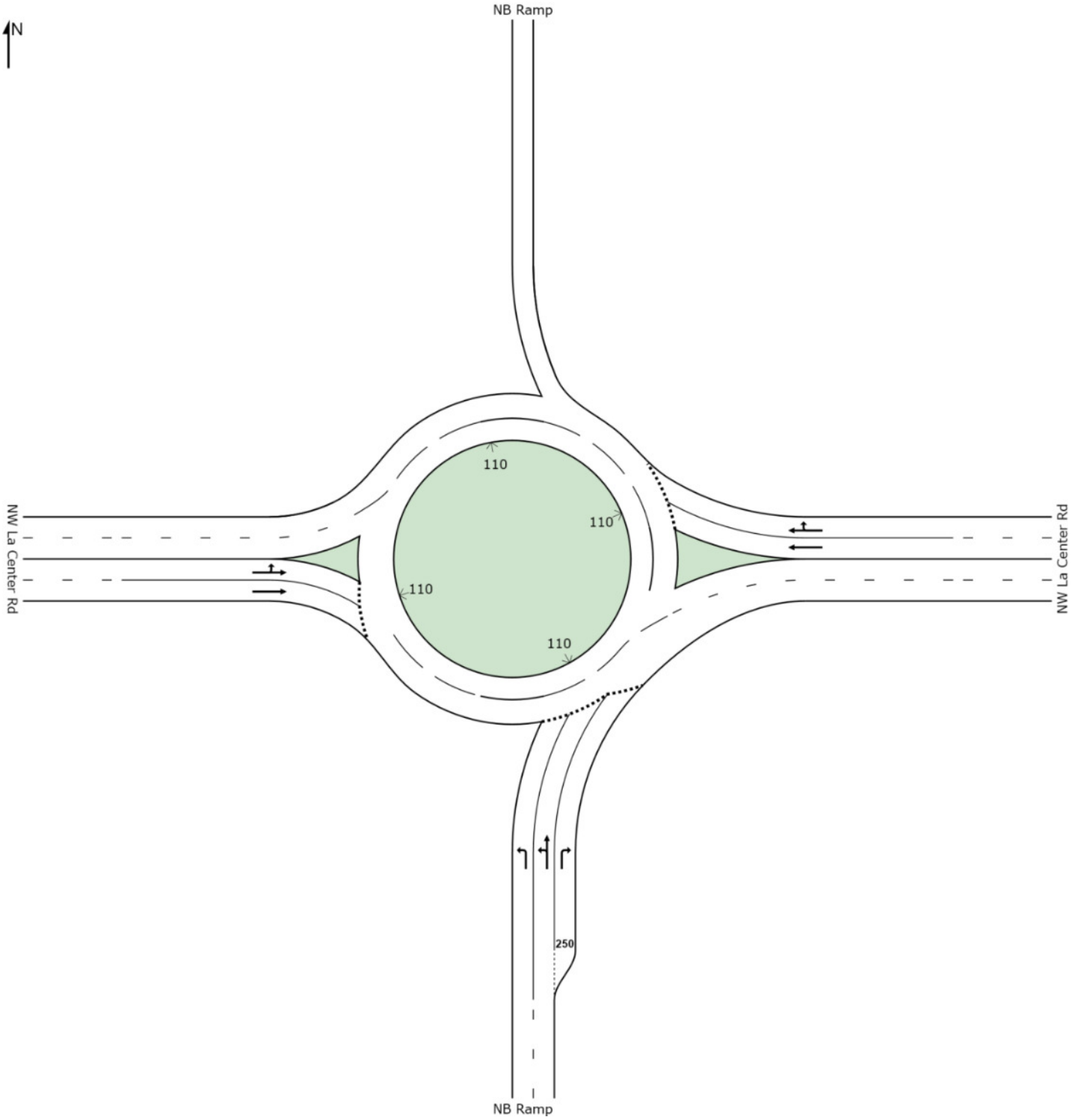
7 Lane underutilisation specified by user
d Dominant lane on roundabout approach

SIDRA INTERSECTION 6

SITE LAYOUT

Site: 2037 Total Build NW La Center and NB Ramps Weekday AM 85_15 Split

2037 Total Traffic Weekday AM
85/15 Split Sensitivity Analysis
Roundabout



MOVEMENT SUMMARY

Site: 2037 Total Build NW La Center and NB Ramps Weekend 85_15 Split

2037 Total Traffic Weekend
85/15 Split Sensitivity Analysis
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB Ramp											
3	L2	968	1.0	0.574	8.3	LOS A	3.4	84.9	0.49	0.44	22.1
8	T1	2	0.0	0.574	8.9	LOS A	3.4	84.9	0.51	0.46	28.0
18	R2	626	3.0	0.561	10.1	LOS B	3.3	83.2	0.55	0.53	28.0
Approach		1596	1.8	0.574	9.0	LOS A	3.4	84.9	0.51	0.47	24.0
East: NW La Center Rd											
6	T1	629	3.0	0.850	30.7	LOS C	10.6	271.9	0.96	1.22	14.6
16	R2	173	12.0	0.493	18.7	LOS B	2.7	74.1	0.79	0.86	21.7
Approach		802	4.9	0.850	28.1	LOS C	10.6	271.9	0.92	1.14	16.0
West: NW La Center Rd											
5	L2	131	1.0	0.134	3.4	LOS A	0.0	0.0	0.00	0.00	33.5
2	T1	308	5.0	0.134	3.1	LOS A	0.0	0.0	0.00	0.00	32.9
Approach		439	3.8	0.134	3.2	LOS A	0.0	0.0	0.00	0.00	33.1
All Vehicles		2837	3.0	0.850	13.5	LOS B	10.6	271.9	0.55	0.59	22.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 2037 Total Build NW La Center and NB Ramps Weekend 85_15 Split

2037 Total Traffic Weekend
85/15 Split Sensitivity Analysis
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: NB Ramp													
Lane 1	169	1.0	923	0.184	32[7]	5.7	LOS A	0.6	16.4	Short	200	0.0	0.0
Lane 2[d]	801	1.0	1396	0.574	100	8.9	LOS A	3.4	84.9	Full	1800	0.0	0.0
Lane 3	626	3.0	1116	0.561	100	10.1	LOS B	3.3	83.2	Short	250	0.0	0.0
Approach	1596	1.8		0.574		9.0	LOS A	3.4	84.9				
East: NW La Center Rd													
Lane 1[d]	590	3.0	694	0.850	100	31.5	LOS C	10.6	271.9	Full	600	0.0	0.0
Lane 2	212	10.3	430	0.493	58[7]	18.7	LOS B	2.7	74.1	Full	600	0.0	0.0
Approach	802	4.9		0.850		28.1	LOS C	10.6	271.9				
West: NW La Center Rd													
Lane 1	205	2.4	1527	0.134	100	3.4	LOS A	0.0	0.0	Full	600	0.0	0.0
Lane 2[d]	234	5.0	1749	0.134	100	3.0	LOS A	0.0	0.0	Full	600	0.0	0.0
Approach	439	3.8		0.134		3.2	LOS A	0.0	0.0				
Intersection	2837	3.0		0.850		13.5	LOS B	10.6	271.9				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

7 Lane underutilisation specified by user
d Dominant lane on roundabout approach

SIDRA INTERSECTION 6

Appendix CC NW La Center Road/I-5 Interchange IJR Methods & Assumptions Supplement – Collision Analysis

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
610 SW Alder Street, Suite 700, Portland, OR 97205 P 503.228.5230 F 503.273.8169

NW La Center Road/I-5 Interchange
IJR Methods & Assumptions Supplement – Collision Analysis

Date: September 15, 2014 Project #: 12393

To: Rick Keniston, John Tevis, Barb De Ste. Croix; WSDOT
Don Peterson, FHWA

From: Kelly Laustsen; Marc Butorac, PE, PTOE

Copy: Project Team (i.e., CH2MHILL, Olson Engineering, and BergerABAM)

This memorandum documents the methods and assumptions for the Collision Analysis conducted as part of Policy Point 3 for the NW La Center Road/Interstate 5 (I-5) Interchange Justification Report (IJR). It serves to supplement the *IJR Methods & Assumptions* document approved in October 2013 and provide more specific information related to the collision analysis.

BACKGROUND

The Washington Department of Transportation (WSDOT) Design Manual (Reference 1) provides relevant guidance in Section 550.04(3), which details the components of Policy Point 3 for an IJR. As listed in the manual, the following are included:

- Collision Analysis – "Observed collision history": Document the observed collision history, for the most current data years, of the existing limited access freeway and the affected local roadway system. The support team will determine the number of years as well as the scope and detail of this section.
- Collision Analysis – "Proposal(s)": A collision analysis should be performed for the year of opening and design year of the existing limited access freeway and the affected local roadway system for the "no-build," "build," and possibly other scenarios as determined by the support team. The support team will also determine the year of opening and design year as well as the scope and detail of this section.

The intent of the collision analysis is to document the safety effect of the proposed interchange modifications.

OBSERVED COLLISION HISTORY

The first part of the collision analysis documents the "observed collision history." The methods and assumptions used to document the observed collision history are listed below.

Methods

- Collision data will be provided by the WSDOT Statewide Travel & Collision Data Office in excel form, containing basic information about reported crashes. The information received about each crash is listed in *Attachment A.*
- The collisions will be mapped using the following:
    - Primary trafficway (see diagram with roadway identification in *Attachment B*)
    - Milepost
    - Vehicle compass direction from/to and impact location (to assess side of roadway)
    - Vehicle action (e.g. going wrong way)
- Collisions on the mainline will be associated with the ramp merge/diverge locations based on:
    - Milepost
    - Vehicle action (if listed as merging or exiting)
- Collision on the ramps will be associated with the ramp terminals based on:
    - Junction relationship (if listed as being at an intersection)
- Collision types will be grouped in the following categories (WSDOT classification shown in parenthesis):
    - Animal (e.g., domestic animal, vehicle strikes deer, vehicle strikes all other non-domestic animal)
    - Fixed object (e.g., bridge rail, cable barrier, concrete barrier/jersey barrier, fence, guardrail, retaining wall, street light pole or base, tree or stump, wood sign post, other object)
    - Rear-end (from some direction – rear-end)
    - Sideswipe (from same or opposite direction – rear-end)
    - Vehicle overturned
    - Other
- Collisions will be summarized in tabular form by year, severity, type, and location.
- Where helpful to show observed trends, collisions will be graphed by type, severity, roadway surface condition, weather, lighting conditions, time, and/or date.

Assumptions

- Five years (1/1/09 through 12/31/13) of crash data will be assessed based on the Highway Safety Manual recommendation to use 3 to 5 years of historical crash data for predictive assessments.
- Crashes will be evaluated at the following locations, consistent with the locations for operations assessment:
    - I-5 mainline within a half-mile north and south of the NW La Center Road interchange striped ramp gores to capture the influence of the interchange
    - I-5 mainline within a half-mile north and south of the truck weigh station south of NW La Center Road
    - NW La Center Road/I-5 on- and off-ramp segments
    - IJR study intersections:
        - NW 31st Avenue/NW 319th Street;
        - I-5 Southbound Ramp/NW La Center Road;
        - I-5 Northbound Ramp/NW La Center Road; and
        - NW Paradise Park Road/NW La Center Road

PROPOSAL

Given the improvements proposed for the interchange, including reconfiguration of the ramp terminals and realignment of the frontage roads, the collision analysis will focus on the proposed condition and expected change in crash frequency. The methods and assumptions used to document the proposed condition are listed below.

Methods

- Information related to the anticipated change in crash frequency with the installation of a roundabout will be provided from the *Highway Safety Manual* (HSM, Reference 1) and *NCHRP Report 672: Roundabouts: An Informational Guide, Second Edition* (Reference 3), specifically Exhibit 5-9.
- The research presented in the final report *Safety Prediction Methodology and Analysis Tool for Freeways and Interchanges* (Project 17-45, Reference 4) will be used to assess the change in expected crash frequency with the proposed roundabout improvements at the ramp terminals.
    - This research has been approved by the *American Association of State Highway and Transportation Officials* (AASHTO) and will be incorporated in the next edition of the HSM.

  - This research was used to develop the Enhanced Interchange Safety Analysis Tool (ISATe), which can be used to evaluate freeway and interchange safety. It will be used for the assessment at the ramp terminals.

- Expected crash frequency will be presented at the study intersections for the no-build and build scenarios in 2017 (day of opening) and 2037 (design year), accounting for the installation of roundabout traffic control at the ramp terminals.
- The anticipated safety effect of the frontage road realignment and improved access spacing will be discussed qualitatively given that no crash modification factor (CMF) currently exists for such an improvement (i.e., increased intersection spacing). The ISATe tool does include an input for "distance to the next public street intersection on the outside crossroad leg," which may help account for the effect from the realignment.
- The anticipated safety effect of the freeway ramp reconstruction (e.g., improving to current standards) will be discussed qualitatively. NCHRP 17-45 and the ISATe tool will be used to assess the impact of adding a second lane on the northbound off-ramp. It also provides information on the relationship between ramp speeds and crash frequency.
- The lane configurations, alignment, and traffic volumes developed as part of the operations assessment will be utilized for the safety analysis.

Assumptions

- Average Annual Daily Traffic is assumed to grow at the same rate as the turning movement counts used in the operations analysis, for purposes of performing the Project 17-45 analysis. This equates to a 2% annual linear growth on I-5 and the ramps and 3% annual linear growth on NW 319th Street and NW La Center Road.
- The interchange is considered rural for the existing and 2017 analysis and urban for the 2037 analysis.

NEXT STEPS

Please review the Collision Analysis methods and assumption memorandum and let us know if you have any questions or comments. Any feedback will be used to inform the development of the Collision Analysis as part of Policy Point 3 for the NW La Center Road/I-5 Interchange Improvement Project.

ATTACHMENTS

A. WSDOT Crash Data Fields
B. Roadway Identification Map

REFERENCES

1. Washington Department of Transportation, *Design Manual*, July 2014.
2. American Association of State Highway and Transportation Officials. *Highway Safety Manual,* 1st Edition. 2010.
3. Rodegerdts, L., et al. *NCHRP Report 672: Roundabouts: An Informational Guide, Second Edition.* Washington, D.C., Transportation Research Board, National Research Council. 2010.
4. Bonneson, J., et al. *Safety Prediction Methodology and Analysis Tool for Freeways and Interchanges.* Washington, D.C., Transportation Research Board of the National Academies. Project No. 17-45. May 2012.

ATTACHMENT A: WSDOT CRASH DATA FIELDS

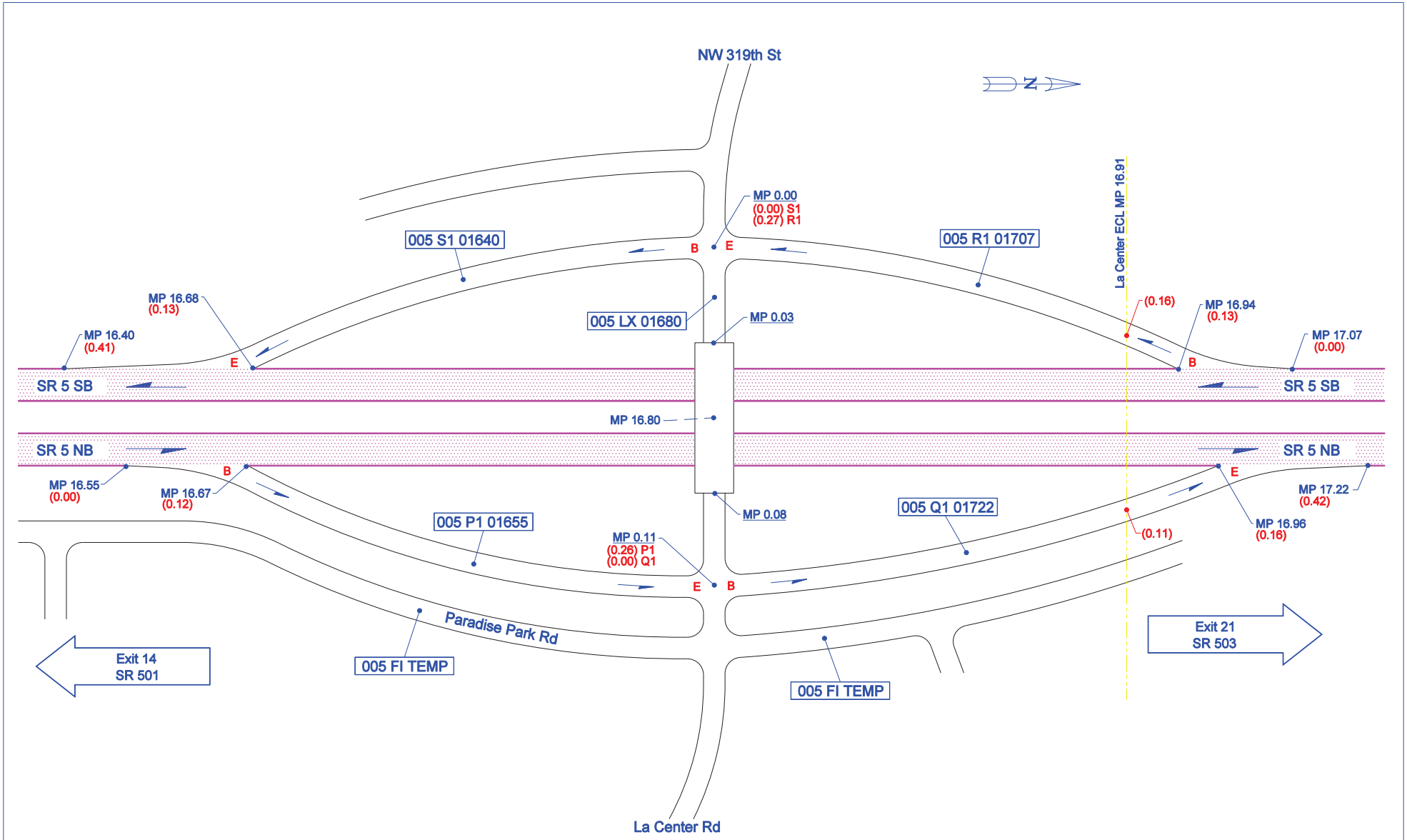
The crash data from WSDOT is provided in excel form and includes the following data fields:

- State Route Only History Indicator
- JURISDICTION
- CITY
- PRIMARY TRAFFICWAY
- BLOCK NUMBER
- MILE POST
- INTERSECTING TRAFFICWAY
- CO ONLY INTERSECTING COUNTY ROAD MILEPOST
- DIST FROM REF POINT
- MI or FT
- COMP DIR FROM REF POINT
- REFERENCE POINT NAME
- REPORT NUMBER
- DATE
- TIME
- MOST SEVERE INJURY TYPE
- # INJ
- #FAT
- #VEH
- #PEDS
- #PEDAL
- JUNCTION RELATIONSHIP
- WEATHER
- ROADWAY SURFACE CONDITIONS
- LIGHTING CONDITIONS
- FIRST COLLISION TYPE / OBJECT STRUCK
- VEHICLE 1 TYPE
- VEH 1 ACTION
- MV DRIVER CONT CIRC 1 (UNIT 1)
- MV DRIVER CONT CIRC 2 (UNIT 1)
- MV DRIVER CONT CIRC 3 (UNIT 1)
- VEH 1 COMP DIR FROM
- VEH 1 COMP DIR TO
- VEHICLE 2 TYPE
- VEH 2 ACTION
- MV DRIVER CONT CIRC 1 (UNIT 2)
- MV DRIVER CONT CIRC 2 (UNIT 2)

- MV DRIVER CONT CIRC 3 (UNIT 2)
- VEH 2 COMP DIR FROM
- VEH 2 COMP DIR TO
- PEDESTRIAN ACTION (UNIT 2)
- PEDESTRIAN CONT CIRC 1 (UNIT 2)
- PEDESTRIAN CONT CIRC 2 (UNIT 2)
- PEDCYCLIST ACTION (UNIT 1)
- PEDCYCLIST CONT CIRC 1 (UNIT 1)
- PEDCYCLIST CONT CIRC 2 (UNIT 1)
- PEDCYCLIST ACTION (UNIT 2)
- PEDCYCLIST CONT CIRC 1 (UNIT 2)
- PEDCYCLIST CONT CIRC 2 (UNIT 2)
- IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)

ATTACHMENT B: ROADWAY IDENTIFICATION DIAGRAM

(see next page)



Not To Scale

02/13/2013	KLK	WSDOT SOUTHWEST REGION	LA CENTER, CLARK COUNTY	JUNCTION NW 319TH ST/LA CENTER RD	SR 5 - EXIT 16

Appendix DD Crash Data (2009-2013)

REPORTED COLLISIONS THAT OCCURRED WITHIN THE CITIES OF RIDGEFIELD AND LA CENTER AS WELL AS ON SPECIFIC STATE ROUTES AND CLARK COUNTY ROADS (SEE COVER LETTER FOR MORE DETAILS).....2009 - 2013

UNDER 23 UNITED STATES CODE - SECTION 409, THIS DATA CANNOT BE USED IN DISCOVERY OR AS EVIDENCE AT TRIAL IN ANY ACTION FOR DAMAGES AGAINST THE WSDOT, OR ANY JURISDICTION INVOLVED IN THE DATA

State Route Only History Indicator	JURISDICTION	CITY	PRIMARY TRAFFICWAY	BLOCK NUMBER	MILE POST	INTERSECTING TRAFFICWAY	CO ONLY INTERSECTING COUNTY ROAD MILEPOST	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	#FAT	#VEH	#PEDS	#PEDAL	JUNCTION RELATIONSHIP	WEATHER	ROADWAY SURFACE CONDITIONS	LIGHTING CONDITIONS	FIRST COLLISION TYPE / OBJECT STRUCK	VEHICLE 1 TYPE	VEH 1 ACTION	MV DRIVER CONT CIRC 1 (UNIT 1)	MV DRIVER CONT CIRC 2 (UNIT 1)	MV DRIVER CONT CIRC 3 (UNIT 1)	VEH 1 COMP DIR FROM	VEH 1 COMP DIR TO	VEHICLE 2 TYPE	VEH 2 ACTION	MV DRIVER CONT CIRC 1 (UNIT 2)	MV DRIVER CONT CIRC 2 (UNIT 2)	MV DRIVER CONT CIRC 3 (UNIT 2)	VEH 2 COMP DIR FROM	VEH 2 COMP DIR TO	PEDESTRIAN ACTION (UNIT 2)	PEDESTRIAN CONT CIRC 1 (UNIT 2)	PEDESTRIAN CONT CIRC 2 (UNIT 2)	PEDCYCLIST ACTION (UNIT 1)	PEDCYCLIST CONT CIRC 1 (UNIT 1)	PEDCYCLIST CONT CIRC 2 (UNIT 1)	PEDCYCLIST ACTION (UNIT 2)	PEDCYCLIST CONT CIRC 1 (UNIT 2)	PEDCYCLIST CONT CIRC 2 (UNIT 2)	IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)
No	State Route		005		14.690							E181141	07/14/12	11:11 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	From same direction - all others	Passenger Car	Changing Lanes	Did Not Grant RW to Vehicle			North	South	Other	Going Straight Ahead	None			North	South										Lane 2 Decreasing Milepost
No	State Route		005		14.710							E015472	02/26/09	5:32 AM	Evident Injury	1	0	1	0	0	Not at Intersection and Not Related	Overcast	Ice	Dark-No Street Lights	Guardrail - Leading End	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North																	Right Shoulder Increasing Milepost
No	State Route		005		14.740							3317926	03/17/09	5:21 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	All other non-collision	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other			North	South																	Right Shoulder Decreasing Milepost
No	State Route		005		14.750							E042660	02/15/10	9:18 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Did Not Grant RW to Vehicle			South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			South	North										Lane 2 Increasing Milepost
No	State Route		005		14.800							E271084	09/03/13	12:49 AM	Evident Injury	1	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	From same direction - both going straight - both moving - sideswipe	Motorcycle	Changing Lanes	Under Influence of Alcohol	Exceeding Reas. Safe Speed		South	North	Passenger Car	Going Straight Ahead	None			South	North										Lane 2 Increasing Milepost
No	State Route		005		14.800							E240839	04/22/13	3:35 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Earth Bank or Ledge	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other			South	North																	Past Right Shoulder Increasing Milepost
No	State Route		005		14.840							E105302	05/11/11	5:37 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	Cable Barrier	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South																	In Median Decreasing Milepost
No	State Route		005		14.880							E273115	09/23/13	4:40 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	Guardrail - Leading End	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	Exceeding Reas. Safe Speed			South	North																	Right Shoulder Increasing Milepost
No	State Route		005		14.890							2705305	02/26/09	6:10 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Dawn	Cable Barrier	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North																	In Median Increasing Milepost
No	State Route		005		14.890							E262905	08/08/13	5:00 PM	Evident Injury	3	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Cable Barrier	Passenger Car	Changing Lanes	Driver Interacting with Passengers, Anim			North	South																	Past Right Shoulder Decreasing Milepost
No	State Route		005		14.900							E015475	02/26/09	5:45 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Ice	Dark-No Street Lights	From same direction - all others	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North	Passenger Car	Going Straight Ahead	None			South	North										Lane 2 Increasing Milepost
No	State Route		005		14.930							E133923	10/25/11	12:38 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	Other object	Passenger Car	Going Straight Ahead	None			North	South																	Lane 3 Decreasing Milepost
No	State Route		005		14.950							E097339	03/18/11	3:07 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Wet	Daylight	From same direction - both going straight - both moving - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Driver Interacting with Passengers, Anim	Follow Too Closely		South	North	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			South	North										Lane 1 Increasing Milepost
No	State Route		005		15.000							E025471	08/12/09	3:37 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	Vehicle overturned	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Other			North	South																	Past Right Shoulder Decreasing Milepost
No	State Route		005		15.000							E023888	07/10/09	8:22 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - all others	Truck (Flatbad,Van,etc)	Going Straight Ahead	Operating Defective Equipment			North	South	Passenger Car	Going Straight Ahead	None			North	South										Lane 2 Decreasing Milepost
No	State Route		005		15.000							E026480	08/19/09	4:10 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - all others	Passenger Car	Going Straight Ahead	None			North	South	Not Stated	Going Straight Ahead	Other			North	South										Lane 3 Decreasing Milepost
No	State Route		005		15.000							E187096	08/13/12	3:45 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Passenger Car	Changing Lanes	Did Not Grant RW to Vehicle			North	South	Passenger Car	Going Straight Ahead	None			North	South										Lane 2 Decreasing Milepost
No	State Route		005		15.000							E046055	03/11/10	11:18 PM	Possible Injury	2	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Under Influence of Alcohol			North	South	Passenger Car	Slowing	None			North	South										Lane 1 Decreasing Milepost
No	State Route		005		15.000							E050371	04/15/10	2:30 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Other	Changing Lanes	Did Not Grant RW to Vehicle			North	South	Passenger Car	Going Straight Ahead	None			North	South										Lane 3 Decreasing Milepost
No	State Route		005		15.000							2750480	04/11/09	9:48 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Wet	Dark-Street Lights On	Cable Barrier	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Under Influence of Alcohol			South	North																	In Median Increasing Milepost
No	State Route		005		15.000							E075845	11/07/10	10:45 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	Vehicle Strikes Deer	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			South	North																	Lane 2 Increasing Milepost
No	State Route		005		15.010							E289811	11/29/13	5:35 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	Guardrail - Face	Passenger Car	Going Straight Ahead	Under Influence of Drugs			South	North																	Right Shoulder Increasing Milepost
No	State Route		005		15.020							E220165	01/06/13	6:20 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Wet	Dark-No Street Lights	Cable Barrier	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Apparently Asleep			North	South																	In Median Decreasing Milepost
No	State Route		005		15.020							E018781	04/25/09	12:40 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	Vehicle overturned	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Operating Defective Equipment			South	North																	Right Shoulder Increasing Milepost
No	State Route		005		15.080							2705174	04/09/10	2:20 PM	Evident Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Earth Bank or Ledge	Passenger Car	Changing Lanes	Inattention			Northwest	Southeast																	Past Right Shoulder Decreasing Milepost
No	State Route		005		15.100							3258674	01/15/09	7:27 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Fog or Smog or Smoke	Dry	Dawn	From same direction - both going straight - both moving - sideswipe	Passenger Car	Changing Lanes	Did Not Grant RW to Vehicle			South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			South	North										Lane 2 Increasing Milepost
No	State Route		005		15.210							E059914	07/16/10	4:31 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Cable Barrier	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other			Northwest	Southeast																	In Median Decreasing Milepost
No	State Route		005		15.210							E143250	11/28/11	6:39 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Wet	Dawn	Guardrail - Leading End	Passenger Car	Going Straight Ahead	None			South	North																	Past Right Shoulder Increasing Milepost
No	State Route		005		15.250							E162801	03/31/12	11:00 PM	Unknown	0	0	1	0	0	Not at Intersection and Not Related	Unknown	Unknown	Dark-Street Lights On	Fence	Passenger Car	Going Straight Ahead	Over Center Line			West	East																	Past Right Shoulder Decreasing Milepost
No	State Route		005		15.280							E283426	11/01/13	1:30 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Blowing Sand or Dirt or Snow	Dry	Daylight	Street Light Pole or Base	Truck Tractor & Semi-Trailer	Going Straight Ahead	Inattention			South	North																	Past Right Shoulder Increasing Milepost
No	State Route		005		15.310							E015471	02/26/09	7:00 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Ice	Dawn	Cable Barrier	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North																	In Median Increasing Milepost
No	State Route		005		15.350							E226627	02/08/13	5:24 PM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dusk	Street Light Pole or Base	Passenger Car	Going Straight Ahead	Inattention			South	North																	Increasing Other Location
No	State Route		005		15.390							E062306	08/03/10	2:21 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Passenger Car	Changing Lanes	Did Not Grant RW to Vehicle			Northwest	Southeast	Passenger Car	Going Straight Ahead	None			Northwest	Southeast										Lane 3 Decreasing Milepost
No	State Route		005		15.440							E038863	12/31/09	7:30 AM	Evident Injury	1	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Dawn	From same direction - all others	Passenger Car	Going Straight Ahead	None			South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North										Lane 3 Increasing Milepost
No	State Route		005		15.440							E059442	06/23/10	1:10 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Other object	Passenger Car	Going Straight Ahead	None			Northwest	Southeast																	Lane 3 Decreasing Milepost
No	State Route		005		15.450							E015561	02/26/09	6:30 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Ice	Dawn	Cable Barrier	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North																	In Median Increasing Milepost
No	State Route		005		15.450							E097878	03/13/11	12:23 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	Concrete Barrier/Jersey Barrier - Face	Truck Tractor & Semi-Trailer	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North																	Increasing Other Location
No	State Route		005		15.450							E222832	01/14/13	6:00 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-Street Lights On	From same direction - both going straight - both moving - sideswipe	Truck - Double Trailer Combinations	Changing Lanes	Did Not Grant RW to Vehicle			Southeast	Northwest	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			Southeast	Northwest										Lane 2 Increasing Milepost
No	State Route		005		15.450							E158084	02/28/12	5:59 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	From same direction - all others	Truck Tractor & Semi-Trailer	Backing	Improper Backing			South	Vehicle Backing	Truck Tractor & Semi-Trailer	Stopped for Traffic	None			South	Vehicle Stopped										Increasing Other Location
No	State Route		005		15.470							E025703	08/03/09	12:05 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Earth Bank or Ledge	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other			North	South																	Past Right Shoulder Decreasing Milepost
No	State Route		005		15.490							E273114	09/23/13	4:00 PM	Evident Injury	1	0	1	0	0	Not at Intersection and Not Related	Raining	Standing Water	Daylight	Concrete Barrier/Jersey Barrier - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North																	Right Shoulder Increasing Milepost
No	State Route		005		15.500							E142086	12/10/11	4:49 PM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-Street Lights On	Concrete Barrier/Jersey Barrier - Face	Passenger Car	Going Straight Ahead	Other			South	North																	Right Shoulder Increasing Milepost
No	State Route		005		15.540							E099494	03/31/11	9:10 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	From same direction - all others	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Operating Defective Equipment			North	South	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			North	South										Lane 1 Decreasing Milepost
No	State Route		005		15.600							2563139	11/13/09	4:24 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Sleet or Hail or Freezing Rain	Snow/Slush	Dusk	Cable Barrier	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South																	In Median Decreasing Milepost
No	State Route		005		15.720							E161531	03/25/12	5:28 PM	Evident Injury	1	0	2	0	0	At Intersection and Related	Overcast	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	None			South	North										Lane 1 Increasing Milepost
No	State Route		005		15.720							E170823	05/16/12	12:54 PM	Evident Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Changing Lanes	Inattention			South	North	Truck Tractor & Semi-Trailer	Merging (Entering Traffic)	None			South	North										Lane 1 Increasing Milepost
No	State Route		005		15.740							E056484	06/03/10	6:40 PM	No Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet	Daylight	From same direction - both going straight - both moving - sideswipe	Truck Tractor & Semi-Trailer	Merging (Entering Traffic)	Did Not Grant RW to Vehicle			South	North	Passenger Car	Going Straight Ahead	None			South	North										Lane 1 Increasing Milepost
No	State Route		005		15.790							E131826	10/16/11	5:58 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dusk	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Did Not Grant RW to Vehicle			North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			North	South										Lane 2 Decreasing Milepost
No	State Route		005		15.800							E023711	07/11/09	1:57 AM	Dead at Scene	0	1	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	From same direction - both going straight - both moving - rear-end	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			North	South	Passenger Car	Going Straight Ahead	Exceeding Stated Speed Limit			North	South										Lane 2 Decreasing Milepost
No	State Route		005		15.800							E013562	01/02/09	7:24 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Snow/Slush	Dawn	Cable Barrier	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South																	In Median Decreasing Milepost
No	State Route		005		15.840							E098492	03/27/11	2:18 PM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	From same direction - all others	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Operating Defective Equipment			South	North	Passenger Car	Going Straight Ahead	None			South	North										Lane 2 Increasing Milepost
No	State Route		005		15.850							3318135	08/27/09	2:20 PM	Evident Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Guardrail - Through, Over or Under	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			North	South																	Median Shoulder Decreasing Milepost
No	State Route		005		15.880							E196551	10/03/12	7:48 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	From same direction - all others	Passenger Car	Changing Lanes	Exceeding Reas. Safe Speed			North	South	Passenger Car	Going Straight Ahead	None			North	South										Lane 2 Decreasing Milepost
No	State Route		005		15.900							E167445	04/21/12	5:18 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Guardrail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Driver Interacting with Passengers, Anim			North	South																	Median Shoulder Decreasing Milepost
No	State Route		005		15.990							2749997	03/07/09	1:07 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Dry	Dark-No Street Lights	From opposite direction - both going straight - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Going Wrong Way on Divided Hwy	Under Influence of Alcohol			South	North	Passenger Car	Going Straight Ahead	None			North	South										Lane 3 Decreasing Milepost
No	State Route		005		15.990							E120570	08/14/11	10:40 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Did Not Grant RW to Vehicle			South	North	Passenger Car	Going Straight Ahead	None			South	North										Lane 2 Increasing Milepost
No	State Route		005		16.000							E169794	04/29/12	3:10 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Did Not Grant RW to Vehicle			North	South	Passenger Car	Going Straight Ahead	None			North	South										Lane 2 Decreasing Milepost
No	State Route		005		16.000							E285075	11/13/13	5:45 PM	Possible Injury	1	0	3	0	0	Not at Intersection and Not Related	Overcast	Dry	Dark-No Street Lights	From same direction - both going straight - both moving - sideswipe	Passenger Car	Changing Lanes	Inattention			South	North	Truck - Double Trailer Combinations	Going Straight Ahead	None			South	North										Lane 1 Increasing Milepost
No	State Route		005		16.000							E234790	03/28/13	1:05 PM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Guardrail - Face	Passenger Car	Going Straight Ahead	Unknown Driver Distraction			North	South																	Right Shoulder Decreasing Milepost
No	State Route		005		16.000							E257138	07/11/13	9:33 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dusk	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Merging (Entering Traffic)	Did Not Grant RW to Vehicle			North	South	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			North	South										Lane 3 Decreasing Milepost
No	State Route		005		16.010							E013596	01/03/09	9:16 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	From same direction - both going straight - both moving - sideswipe	Truck Tractor & Semi-Trailer	Changing Lanes	Did Not Grant RW to Vehicle			North	South	Passenger Car	Going Straight Ahead	None			North	South										Lane 1 Decreasing Milepost
No	State Route		005		16.020							E069553	09/24/10	4:15 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	None			North	South										Lane 3 Decreasing Milepost
No	State Route		005		16.020							E263629	08/16/13	6:34 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Over Embankment - No Guardrail Present	Passenger Car	Going Straight Ahead	Driver Interacting with Passengers, Anim			North	South																	Past Right Shoulder Decreasing Milepost
No	State Route		005		16.050							E123685	08/28/11	12:45 PM	Possible Injury	2	0	3	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			North	South	Passenger Car	Slowing	Follow Too Closely			North	South										Lane 3 Decreasing Milepost
No	State Route		005		16.050							E221849	01/11/13	5:30 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Ice	Dark-No Street Lights	Guardrail - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South																	Median Shoulder Decreasing Milepost
No	State Route		005		16.910							E034501	11/26/09	8:50 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	Tree or Stump (stationary)	Passenger Car	Changing Lanes	Exceeding Reas. Safe Speed			North	South																	Past Right Shoulder Decreasing Milepost
No	State Route		005		16.940							E062929	08/08/10	6:20 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Passenger Car	Changing Lanes	Did Not Grant RW to Vehicle			South	North	Passenger Car	Going Straight Ahead	None			South	North										Lane 3 Increasing Milepost
No	State Route		005		16.990							E120151	08/12/11	5:40 PM	Evident Injury	2	0	1	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Vehicle overturned	Motorcycle	Going Straight Ahead	Operating Defective Equipment			North	South																	Lane 3 Decreasing Milepost
No	State Route		005		17.000							E198798	10/12/12	8:01 PM	No Injury	0	0	1	0	0	At Intersection and Not Related	Raining	Wet	Dark-No Street Lights	All other non-collision	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other			South	North																	Lane 2 Increasing Milepost
No	State Route		005		17.000							E020129	05/12/09	5:58 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dawn	Fire started in vehicle	Truck Tractor & Semi-Trailer	Going Straight Ahead	Operating Defective Equipment			North	South																	Lane 1 Decreasing Milepost
No	State Route		005		17.070							E208626	11/18/12	6:28 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-Street Lights On	Vehicle Strikes Deer	Passenger Car	Going Straight Ahead	None			North	South																	Lane 1 Decreasing Milepost
No	State Route		005		17.080							E264089	08/12/13	4:15 PM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	From same direction - all others	Passenger Car	Changing Lanes	Other			North	South	Passenger Car	Going Straight Ahead	None			North	South										Lane 2 Decreasing Milepost
No	State Route		005		17.190							E168022	05/01/12	8:07 PM	No Injury	0	0	1	0	0	At Intersection and Not Related	Sleet or Hail or Freezing Rain	Other	Dark-Street Lights On	Vehicle overturned	Passenger Car	Going Straight Ahead	None			South	North																	Past Right Shoulder Increasing Milepost
No	State Route		005		17.200							E247839	05/23/13	7:26 AM	Possible Injury	3	0	3	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Improper Signal	Did Not Grant RW to Vehicle	Unknown Driver Distraction	North	South	Passenger Car	Going Straight Ahead	None			North	South										Lane 3 Decreasing Milepost
No	State Route		005		17.200							E180802	07/03/12	12:43 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Guardrail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Operating Defective Equipment			North	South																	Median Shoulder Decreasing Milepost
No	State Route		005		17.300							E072827	10/16/10	1:00 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	Other object	Passenger Car	Going Straight Ahead	None			South	North																	Lane 3 Increasing Milepost
No	State Route		005		17.310							E230625	02/23/13	4:53 AM	Possible Injury	2	0	2	0	0	Not at Intersection and Not Related	Overcast	Wet	Dark-No Street Lights	From same direction - both going straight - both moving - sideswipe	Passenger Car	Going Straight Ahead	Operating Defective Equipment			North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			North	South										Lane 3 Decreasing Milepost
No	State Route		005		17.360							E034794	11/18/09	3:32 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dusk	All other non-collision	Truck (Flatbad,Van,etc)	Going Straight Ahead	Other			Southwest	Northeast	Passenger Car	Going Straight Ahead	None			Northeast	Southwest										In Median Increasing Milepost
No	State Route		005		17.500							E052582	05/09/10	1:56 PM	Possible Injury	2	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Vehicle overturned	Passenger Car	Going Straight Ahead	Driver Distractions Outside Vehicle			South	North																	In Median Increasing Milepost
No	State Route		005		17.510							E185069	08/02/12	11:12 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Passenger Car	Changing Lanes	Inattention			North	South	Truck - Double Trailer Combinations	Going Straight Ahead	None			North	South										Lane 1 Decreasing Milepost
No	State Route		005		17.540							E244549	05/16/13	8:05 AM	Possible Injury	2	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Passenger Car	Changing Lanes	Other	Inattention		South	North	Passenger Car	Going Straight Ahead	None			South	North										Lane 5 Increasing Milepost
No	State Route		005		17.630							E020019	05/12/09	2:31 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Wet	Dark-No Street Lights	Vehicle Strikes Deer	Passenger Car	Going Straight Ahead	None			South	North																	Lane 1 Increasing Milepost
No	State Route		005		17.770							E155651	02/22/12	7:39 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	Earth Bank or Ledge	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South																	In Median Decreasing Milepost
No	State Route		005		17.800							E276128	09/29/13	6:56 AM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	From same direction - both going straight - both moving - sideswipe	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			South	North										Lane 2 Increasing Milepost
No	State Route		005		17.800							E141155	12/06/11	6:24 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	Vehicle Strikes Deer	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			South	North																	Lane 1 Increasing Milepost
No	State Route		005		17.850							E086835	01/07/11	7:58 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	All other non-collision	Truck & Trailer	Going Straight Ahead	Operating Defective Equipment			South	North																	Lane 1 Increasing Milepost
No	State Route		005		17.920							E021264	05/30/09	9:59 AM	Possible Injury	3	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Guardrail - Face	Passenger Car	Going Straight Ahead	Driver Distractions Outside Vehicle			South	North																	Right Shoulder Increasing Milepost
No	State Route		005		17.970							E021031	05/29/09	10:07 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Truck & Trailer	Going Straight Ahead	None			South	North	Passenger Car	Going Straight Ahead	Other			South	North										Lane 1 Increasing Milepost
No	State Route		005		18.000							E025061	08/11/09	9:45 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	Cable Barrier	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Operating Defective Equipment			South	North																	In Median Increasing Milepost
No	State Route		005		18.000							E150588	01/18/12	5:01 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Raining	Snow/Slush	Dark-No Street Lights	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			Southeast	Northwest										Lane 1 Increasing Milepost
No	State Route		005		18.000							E112357	06/26/11	3:34 PM	Evident Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Vehicle overturned	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other			Southeast	Northwest																	Past Right Shoulder Increasing Milepost
No	State Route		005		18.060							E179558	06/29/12	3:39 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	All other non-collision	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other	Exceeding Reas. Safe Speed		Southeast	Northwest																	Lane 1 Increasing Milepost
No	State Route		005		18.100							E019077	05/04/09	6:56 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	All other non-collision	Bus or Motor Stage	Slowing	Operating Defective Equipment			South	North																	Lane 1 Increasing Milepost
No	State Route		005		18.100							E015479	02/26/09	6:25 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Dawn	From same direction - both going straight - both moving - sideswipe	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North	Truck & Trailer	Going Straight Ahead	None			South	North										Lane 2 Increasing Milepost
No	State Route		005		18.110							E218901	01/01/13	12:54 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Ice	Dark-No Street Lights	Guardrail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Exceeding Reas. Safe Speed			Northwest	Southeast																	Median Shoulder Decreasing Milepost
No	State Route		005		18.130							E222265	01/18/13	4:49 PM	Evident Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	Guardrail - Face	Truck & Trailer	Going Straight Ahead	Apparently Ill			Northwest	Southeast																	Right Shoulder Decreasing Milepost
No	State Route		005		18.140							E143082	12/09/11	4:46 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Dark-No Street Lights	Guardrail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			Northwest	Southeast																	Median Shoulder Decreasing Milepost
No	State Route		005		18.150							E252694	06/17/13	5:22 PM	Serious Injury	3	0	3	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Inattention	Follow Too Closely		South	North	Passenger Car	Going Straight Ahead	None			South	North										Lane 4 Increasing Milepost
No	State Route		005		18.150							2678154	03/22/12	9:55 AM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Overcast	Wet	Daylight	Guardrail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest																	Median Shoulder Increasing Milepost
No	State Route		005		18.190							E186948	08/15/12	4:30 AM	Possible Injury	3	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	None			Southeast	Northwest	Not Stated	Going Straight Ahead	Inattention	Exceeding Reas. Safe Speed		Southeast	Northwest										Lane 1 Increasing Milepost
No	State Route		005		18.200							E275007	09/29/13	9:31 AM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	Bridge Rail - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South																	Median Shoulder Decreasing Milepost
No	State Route		005		18.200							E201881	10/28/12	5:47 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	Guardrail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other			Southeast	Northwest																	Median Shoulder Increasing Milepost
No	State Route		005		18.210							E100291	04/07/11	4:02 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	All other non-collision	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other			Southeast	Northwest																	Lane 2 Increasing Milepost
No	State Route		005		18.210							E142119	12/09/11	4:46 AM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Dark-No Street Lights	Bridge Rail - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Northwest	Southeast																	Right Shoulder Decreasing Milepost
No	State Route		005		18.210							3318444	11/20/11	6:40 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Dark-No Street Lights	From same direction - both going straight - both moving - sideswipe	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Northwest	Southeast	Passenger Car	Going Straight Ahead	None			Northwest	Southeast										Lane 2 Decreasing Milepost
No	State Route		005		18.210							E100387	04/13/11	2:20 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Vehicle overturned	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Operating Defective Equipment	Exceeding Reas. Safe Speed		Southeast	Northwest																	Lane 1 Increasing Milepost
No	State Route		005		18.220							3318445	11/20/11	6:45 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Dark-No Street Lights	Bridge Rail - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Northwest	Southeast																	Right Shoulder Decreasing Milepost
No	State Route		005		18.220							E024020	07/24/09	1:16 PM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Vehicle overturned	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			South	North																	Lane 2 Increasing Milepost
No	State Route		005		18.220							E025704	08/01/09	1:20 PM	Serious Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Bridge Rail - Face	Motorcycle	Going Straight Ahead	Operating Defective Equipment			South	North																	Median Shoulder Increasing Milepost
No	State Route		005		18.220							E121251	08/13/11	10:18 PM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Wet	Dark-Street Lights On	Bridge Rail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Under Influence of Alcohol	Under Influence of Drugs		Southeast	Northwest																	Median Shoulder Increasing Milepost
No	State Route		005		18.220							E013802	01/14/09	8:38 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Bridge Rail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Other			South	North																	Median Shoulder Increasing Milepost
No	State Route		005		18.240							2994524	03/05/12	6:57 AM	Evident Injury	2	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Dawn	Concrete Barrier/Jersey Barrier - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Southwest	Northeast																	Median Shoulder Increasing Milepost
No	State Route		005		18.250							E138358	11/20/11	5:00 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Dark-No Street Lights	Bridge Rail - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Northwest	Southeast																	Median Shoulder Decreasing Milepost
No	State Route		005		18.250							E013804	01/14/09	8:39 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dawn	From same direction - both going straight - both moving - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	None			South	North										Lane 2 Increasing Milepost
No	State Route		005		18.260							E155641	02/09/12	10:05 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Bridge Rail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Operating Defective Equipment	Exceeding Reas. Safe Speed		Southeast	Northwest																	Right Shoulder Increasing Milepost
No	State Route		005		18.270							E208625	11/23/12	7:10 PM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	Guardrail - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest																	Median Shoulder Increasing Milepost
No	State Route		005		18.290							E075350	11/01/10	3:12 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Standing Water	Daylight	Bridge Rail - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Northwest	Southeast																	Right Shoulder Decreasing Milepost
No	State Route		005		18.290							E023889	07/14/09	4:43 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	All other non-collision	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North																	Lane 1 Increasing Milepost
No	State Route		005		18.290							E025462	08/12/09	12:49 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	Bridge Rail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Exceeding Reas. Safe Speed			South	North																	Median Shoulder Increasing Milepost
No	State Route		005		18.300							E246142	05/23/13	2:06 AM	Serious Injury	1	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Inattention	Exceeding Reas. Safe Speed		South	North	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			South	North										Lane 1 Increasing Milepost

State Route Only History Indicator	JURISDICTION	CITY	PRIMARY TRAFFICWAY	BLOCK NUMBER	MILE POST	INTERSECTING TRAFFICWAY	CO ONLY INTERSECTING COUNTY ROAD MILEPOST	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	#FAT	#VEH	#PEDS	#PEDAL	JUNCTION RELATIONSHIP	WEATHER	ROADWAY SURFACE CONDITIONS	LIGHTING CONDITIONS	FIRST COLLISION TYPE / OBJECT STRUCK	VEHICLE 1 TYPE	VEH 1 ACTION	MV DRIVER CONT CIRC 1 (UNIT 1)	MV DRIVER CONT CIRC 2 (UNIT 1)	MV DRIVER CONT CIRC 3 (UNIT 1)	VEH 1 COMP DIR FROM	VEH 1 COMP DIR TO	VEHICLE 2 TYPE	VEH 2 ACTION	MV DRIVER CONT CIRC 1 (UNIT 2)	MV DRIVER CONT CIRC 2 (UNIT 2)	MV DRIVER CONT CIRC 3 (UNIT 2)	VEH 2 COMP DIR FROM	VEH 2 COMP DIR TO	PEDESTRIAN ACTION (UNIT 2)	PEDESTRIAN CONT CIRC 1 (UNIT 2)	PEDESTRIAN CONT CIRC 2 (UNIT 2)	PEDCYCLIST ACTION (UNIT 1)	PEDCYCLIST CONT CIRC 1 (UNIT 1)	PEDCYCLIST CONT CIRC 2 (UNIT 1)	PEDCYCLIST ACTION (UNIT 2)	PEDCYCLIST CONT CIRC 1 (UNIT 2)	PEDCYCLIST CONT CIRC 2 (UNIT 2)	IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)
No	State Route		005		18.300							2680800	10/01/13	3:26 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	Bridge Rail - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South																	Median Shoulder Decreasing Milepost
No	State Route		005		18.300							E218902	01/01/13	12:19 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Fog or Smog or Smoke	Ice	Dark-No Street Lights	Bridge Rail - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South																	Right Shoulder Decreasing Milepost
No	State Route		005		18.300							E234273	03/15/13	2:48 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Guardrail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	Inattention	Exceeding Reas. Safe Speed		Southeast	Northwest																	Median Shoulder Increasing Milepost
No	State Route		005		18.300							E146055	12/30/11	2:12 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	Bridge Rail - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest																	Right Shoulder Increasing Milepost
No	State Route		005		18.310							3254278	10/24/10	1:43 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	Bridge Rail - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest																	Median Shoulder Increasing Milepost
No	State Route		005		18.320							E268814	09/06/13	7:05 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	Bridge Rail - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			South	North										Median Shoulder Increasing Milepost
No	State Route		005		18.330							E163654	04/09/12	7:37 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Apparently Asleep			Southeast	Northwest	Passenger Car	Going Straight Ahead	None			Southeast	Northwest										Lane 3 Increasing Milepost
No	State Route		005		18.340							E245842	05/17/13	5:22 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Wet	Dark-No Street Lights	Bridge Rail - Face	Truck (Flatbad,Van,etc)	Going Straight Ahead	Apparently Asleep	Inattention		North	South																	Right Shoulder Decreasing Milepost
No	State Route		005		18.350							E019178	05/06/09	2:24 PM	Evident Injury	1	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	From same direction - all others	Passenger Car	Going Straight Ahead	Driver Distractions Outside Vehicle	Exceeding Reas. Safe Speed		South	North	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			South	North										Lane 1 Increasing Milepost
No	State Route		005		18.350							3467768	12/01/12	12:40 AM	Possible Injury	2	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	Bridge Rail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest																	Median Shoulder Increasing Milepost
No	State Route		005		18.350							2750458	05/19/09	1:38 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	Bridge Rail - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North																	Median Shoulder Increasing Milepost
No	State Route		005		18.350							2958784	02/23/09	11:05 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	Bridge Rail - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North																	Right Shoulder Increasing Milepost
No	State Route		005		18.350							E115186	07/02/11	12:45 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Bridge Rail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other			Southeast	Northwest																	Right Shoulder Increasing Milepost
No	State Route		005		18.370							E245949	05/21/13	1:56 PM	Evident Injury	1	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	Bridge Rail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North																	Right Shoulder Increasing Milepost
No	State Route		005		18.380							E095668	03/10/11	4:35 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	Concrete Barrier/Jersey Barrier - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest																	Right Shoulder Increasing Milepost
No	State Route		005		18.380							E074194	10/09/10	2:55 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	Concrete Barrier/Jersey Barrier - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest																	Right Shoulder Increasing Milepost
No	State Route		005		18.390							E210388	12/02/12	3:02 AM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	Concrete Barrier/Jersey Barrier - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest																	Right Shoulder Increasing Milepost
No	State Route		005		18.400							3254355	03/26/11	5:49 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Standing Water	Dark-No Street Lights	Concrete Barrier/Jersey Barrier - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest																	Right Shoulder Increasing Milepost
No	State Route		005		18.400							E096691	03/09/11	2:17 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	Tree or Stump (stationary)	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North																	In Median Increasing Milepost
No	State Route		005		18.400							E222266	01/18/13	4:49 PM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	All other non-collision	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			Northwest	Southeast																	Lane 2 Decreasing Milepost
No	State Route		005		18.400							E019019	05/04/09	6:49 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Raining	Standing Water	Dark-No Street Lights	From same direction - both going straight - both moving - sideswipe	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			South	North										Lane 2 Increasing Milepost
No	State Route		005		18.400							E038862	01/04/10	10:49 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Snow/Slush	Daylight	Cable Barrier	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest																	In Median Increasing Milepost
No	State Route		005		18.410							E185097	07/29/12	1:40 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Changing Lanes	Other			Southeast	Northwest	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			Southeast	Northwest										Lane 2 Increasing Milepost
No	State Route		005		18.410							2750457	05/04/09	7:07 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	Cable Barrier	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North																	In Median Increasing Milepost
No	State Route		005		18.430							2704865	01/04/09	7:25 PM	Possible Injury	4	0	2	0	0	Not at Intersection and Not Related	Snowing	Snow/Slush	Dark-No Street Lights	From same direction - all others	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			North	South										Lane 3 Decreasing Milepost
No	State Route		005		18.430							E022987	06/12/09	8:07 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	Cable Barrier	Passenger Car	Going Straight Ahead	Apparently Asleep			South	North																	In Median Increasing Milepost
No	State Route		005		18.470							3318169	06/25/10	6:38 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Vehicle overturned	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	Exceeding Reas. Safe Speed			West	East																	Lane 1 Increasing Milepost
No	State Route		005		18.470							E229489	02/23/13	1:00 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Sleet or Hail or Freezing Rain	Other	Daylight	Guardrail - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Northwest	Southeast																	Right Shoulder Decreasing Milepost
No	State Route		005		18.470							E056991	06/17/10	2:40 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Vehicle overturned	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other			South	North																	Lane 2 Increasing Milepost
No	State Route		005		18.490							E090411	01/31/11	2:24 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	Cable Barrier	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Apparently Ill			Northwest	Southeast																	In Median Decreasing Milepost
No	State Route		005		18.500							3318031	05/03/09	12:40 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Earth Bank or Ledge	Passenger Car	Going Straight Ahead	Other			South	North																	Past Right Shoulder Increasing Milepost
No	State Route		005		18.500							E218903	01/01/13	12:04 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Ice	Dark-Street Lights On	Guardrail - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest																	Median Shoulder Increasing Milepost
No	State Route		005		18.500							E284156	11/10/13	7:32 PM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	Earth Bank or Ledge	Passenger Car	Going Straight Ahead	None			South	North																	Past Right Shoulder Increasing Milepost
No	State Route		005		18.500							E229487	02/23/13	12:59 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	Cable Barrier	Passenger Car	Going Straight Ahead	Other			Southeast	Northwest																	In Median Increasing Milepost
No	State Route		005		18.500							E091631	02/15/11	9:08 AM	Evident Injury	1	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	Cable Barrier	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Northwest	Southeast																	In Median Decreasing Milepost
No	State Route		005		18.570							E229486	02/23/13	12:59 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	Cable Barrier	Passenger Car	Going Straight Ahead	Inattention			Southeast	Northwest																	In Median Increasing Milepost
No	State Route		005		18.570							E014643	01/30/09	7:23 AM	No Injury	0	0	5	0	0	Not at Intersection and Not Related	Fog or Smog or Smoke	Wet	Dawn	From same direction - both going straight - both moving - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Making U-Turn	Under Influence of Alcohol	Improper U-Turn		North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely			North	South										Lane 3 Decreasing Milepost
No	State Route		005		18.600							E186580	08/14/12	12:24 PM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Roadway Ditch	Passenger Car	Going Straight Ahead	Apparently Asleep			Southeast	Northwest																	Past Right Shoulder Increasing Milepost
No	State Route		005		18.670							2704866	01/04/09	8:30 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Snowing	Snow/Slush	Dark-No Street Lights	Cable Barrier	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South																	In Median Decreasing Milepost
No	State Route		005		18.690							E229483	02/19/13	2:59 PM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Inattention	Follow Too Closely		Southeast	Northwest	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	Other			Southeast	Northwest										Lane 2 Increasing Milepost
No	State Route		005		18.740							3317959	09/17/09	7:45 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-Street Lights Off	Vehicle overturned	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other			South	North																	Lane 2 Increasing Milepost
No	State Route		005		18.780							E229488	02/23/13	1:00 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Sleet or Hail or Freezing Rain	Standing Water	Daylight	From same direction - all others	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	None			Southeast	Northwest										Lane 3 Increasing Milepost
No	State Route		005		18.800							E121883	08/22/11	8:40 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	Vehicle Strikes Deer	Passenger Car	Going Straight Ahead	None			Southeast	Northwest																	Lane 1 Increasing Milepost
No	State Route		005		18.840							E258155	07/21/13	12:20 PM	Evident Injury	1	0	1	0	1	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Vehicle - Pedalcyclist	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Driver Not Distracted			South	North															Cyclist Turned Into Path of Vehicle - Same Direction	Inattention	Unknown Driver Distraction	Lane 1 Increasing Milepost
No	State Route		005		18.900							E220169	01/05/13	12:42 PM	Evident Injury	1	0	1	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	Cable Barrier	Passenger Car	Changing Lanes	Other			Southeast	Northwest																	Median Shoulder Increasing Milepost
No	State Route		005		18.980							E030538	10/18/09	8:57 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Wet	Daylight	From same direction - both going straight - both moving - sideswipe	Passenger Car	Going Straight Ahead	Apparently Asleep			South	North	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			South	North										Lane 1 Increasing Milepost
No	State Route		005		19.000							E212297	12/06/12	3:55 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dusk	Cable Barrier	Passenger Car	Going Straight Ahead	Apparently Asleep			Southeast	Northwest																	In Median Increasing Milepost
No	State Route		005		19.000							E155707	02/20/12	3:56 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	Other object	Passenger Car	Going Straight Ahead	None			Southeast	Northwest	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other			Southeast	Northwest										Lane 3 Increasing Milepost
No	State Route		005		19.030							E260168	07/23/13	9:53 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	From same direction - both going straight - one stopped - rear-end	Truck Tractor & Semi-Trailer	Backing	Improper Backing			North	Vehicle Backing	Passenger Car	Stopped for Traffic	None			North	Vehicle Stopped										Lane 2 Decreasing Milepost
No	State Route		005		19.060							2746529	02/23/13	1:00 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Sleet or Hail or Freezing Rain	Wet	Daylight	Cable Barrier	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest																	In Median Increasing Milepost
No	State Route		005		19.080							E132399	10/17/11	4:38 PM	Possible Injury	1	0	3	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely			Northwest	Southeast	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	None			Northwest	Southeast										Lane 3 Decreasing Milepost
No	State Route		005		19.200							E181140	07/16/12	7:55 AM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Apparently Asleep			Southeast	Northwest	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			Southeast	Northwest										Lane 1 Increasing Milepost
No	State Route		005		19.200							E046059	03/11/10	10:05 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Raining	Standing Water	Dark-No Street Lights	From same direction - all others	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Northwest	Southeast	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			Northwest	Southeast										Lane 1 Decreasing Milepost
No	State Route		005		19.300							E235075	03/29/13	3:45 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Slowing	Exceeding Reas. Safe Speed	Follow Too Closely		North	South	Passenger Car	Slowing	None			North	South										Lane 3 Decreasing Milepost
No	State Route		005		19.300							2750113	01/19/09	11:40 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Fire started in vehicle	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Operating Defective Equipment			North	South																	Lane 3 Decreasing Milepost
No	State Route		005		19.370							E092501	02/19/11	6:17 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Dark-No Street Lights	Cable Barrier	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest																	In Median Increasing Milepost
No	State Route		005		19.390							E106665	05/26/11	11:39 PM	Evident Injury	1	0	1	0	0	Not at Intersection and Not Related	Overcast	Wet	Dark-No Street Lights	Cable Barrier	Truck (Flatbad,Van,etc)	Going Straight Ahead	Apparently Asleep			Northwest	Southeast																	In Median Decreasing Milepost
No	State Route		005		19.400							2673706	10/11/12	3:11 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Truck Tractor & Semi-Trailer	Merging (Entering Traffic)	Did Not Grant RW to Vehicle	Inattention		Southeast	Northwest	Truck (Flatbad,Van,etc)	Going Straight Ahead	None			Southeast	Northwest										Lane 2 Increasing Milepost
No	State Route		005		19.420							E027908	09/12/09	4:10 PM	Evident Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Cable Barrier	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Operating Defective Equipment			South	North																	In Median Increasing Milepost
No	State Route		005		19.440							E274537	09/27/13	1:59 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	From same direction - both going straight - both moving - sideswipe	Passenger Car	Going Straight Ahead	Apparently Asleep	Under Influence of Drugs		North	South	Passenger Car	Going Straight Ahead	None			North	South										Lane 1 Decreasing Milepost
No	State Route		005		19.440							2750367	11/10/09	7:01 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Wet	Dawn	Cable Barrier	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South																	In Median Decreasing Milepost
No	State Route		005		19.460							E033769	11/21/09	10:59 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	Cable Barrier	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South																	In Median Decreasing Milepost
No	State Route		005		19.500							3317962	10/24/09	12:56 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			North	South	Passenger Car	Slowing	None			North	South										Lane 3 Decreasing Milepost
No	State Route		005		19.500							E171004	05/18/12	8:50 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	Guardrail - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Northwest	Southeast																	Right Shoulder Decreasing Milepost
No	State Route		005		19.500							E019668	05/13/09	10:59 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	Vehicle Strikes Deer	Passenger Car	Going Straight Ahead	None			North	South																	Lane 3 Decreasing Milepost
No	State Route		005		19.510							E155439	02/11/12	12:21 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	From same direction - all others	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other			Southeast	Northwest	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			Southeast	Northwest										Lane 1 Increasing Milepost
No	State Route		005		19.550							3318587	12/08/11	12:45 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Guardrail - Face	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			Northwest	Southeast																	Right Shoulder Decreasing Milepost
No	State Route		005		19.550							E256135	07/05/13	5:33 AM	Possible Injury	2	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dawn	Guardrail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Operating Defective Equipment			North	South																	Right Shoulder Decreasing Milepost
No	State Route		005		19.550							E030535	10/24/09	12:06 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Other	Dry	Daylight	From same direction - all others	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			North	South										Lane 2 Decreasing Milepost
No	State Route		005		19.600							E218203	12/31/12	7:46 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Dry	Dark-No Street Lights	Retaining Wall (concrete, rock, brick, etc.)	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Operating Defective Equipment			Southeast	Northwest																	Right Shoulder Increasing Milepost
No	State Route		005		19.610							E025344	08/15/09	5:04 PM	Serious Injury	1	0	1	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	Cable Barrier	Motorcycle	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North																	In Median Increasing Milepost
No	State Route		005		19.620							E108402	05/29/11	2:45 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Cable Barrier	Passenger Car	Going Straight Ahead	Driver Operating Handheld Telecommunicat			Southeast	Northwest																	In Median Increasing Milepost
No	State Route		005		19.630							2750453	01/30/09	3:27 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Fog or Smog or Smoke	Dry	Dark-No Street Lights	Cable Barrier	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North																	In Median Increasing Milepost
No	State Route		005		19.630							2704939	06/22/09	7:37 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Cable Barrier	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North																	In Median Increasing Milepost
No	State Route		005		19.650							3318057	12/30/09	2:09 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Snowing	Snow/Slush	Dark-No Street Lights	Cable Barrier	Passenger Car	Going Straight Ahead	Under Influence of Alcohol	Under Influence of Drugs		South	North																	In Median Increasing Milepost
No	State Route		005		19.680							E016921	03/24/09	4:41 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	Other object	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			North	South																	Lane 2 Decreasing Milepost
No	State Route		005		19.700							E171943	05/21/12	6:02 PM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	Cable Barrier	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest																	In Median Increasing Milepost
No	State Route		005		19.700							E111631	06/13/11	4:22 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			Northwest	Southeast	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Follow Too Closely			Northwest	Southeast										Lane 1 Decreasing Milepost
No	State Route		005		19.710							3318357	11/07/09	4:15 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Dusk	From same direction - both going straight - both moving - sideswipe	Passenger Car	Going Straight Ahead	Under Influence of Alcohol			South	North	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			South	North										Lane 1 Increasing Milepost
No	State Route		005		19.730							E261618	08/06/13	11:50 AM	Dead at Scene	1	1	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	Under Influence of Drugs	Inattention	Follow Too Closely	North	South	Truck Tractor & Semi-Trailer	Slowing	None			North	South										Lane 2 Decreasing Milepost
No	State Route		005		19.740							E221176	01/14/13	10:23 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	Other object	Passenger Car	Going Straight Ahead	None			Northwest	Southeast																	Lane 1 Decreasing Milepost
No	State Route		005		19.760							2750159	01/02/09	5:07 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Snowing	Snow/Slush	Dark-No Street Lights	Guardrail - Face	Passenger Car	Changing Lanes	Exceeding Reas. Safe Speed			North	South																	Right Shoulder Decreasing Milepost
No	State Route		005		19.770							E128326	09/29/11	5:32 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely			Southeast	Northwest	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			Southeast	Vehicle Stopped										Lane 3 Increasing Milepost
No	State Route		005		19.800							E056992	06/18/10	12:17 PM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Vehicle overturned	Motorcycle	Going Straight Ahead	Operating Defective Equipment			Northwest	Southeast																	Right Shoulder Decreasing Milepost
No	State Route		005		19.810							E094638	02/22/11	5:20 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	From same direction - both going straight - both moving - rear-end	Truck Tractor & Semi-Trailer	Slowing	None			Northwest	Southeast	Truck - Double Trailer Combinations	Slowing	None			Northwest	Southeast										Lane 2 Decreasing Milepost
No	State Route		005		19.830							E127219	09/14/11	2:42 AM	Dead at Scene	0	1	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	Bridge Rail - Leading End	Passenger Car	Going Wrong Way on Divided Hwy	Under Influence of Alcohol			Southeast	Northwest																	Median Shoulder Decreasing Milepost
No	State Route		005		19.830							E127614	09/21/11	1:49 PM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Did Not Grant RW to Vehicle			South	North	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			South	North										Lane 1 Increasing Milepost
No	State Route		005		19.830							3254251	08/12/10	11:30 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other			Northwest	Southeast	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			Northwest	Southeast										Lane 1 Decreasing Milepost
No	State Route		005		19.840							E115762	07/15/11	10:20 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Other object	Passenger Car	Going Straight Ahead	None			Northwest	Southeast																	Lane 3 Decreasing Milepost
No	State Route		005		19.840							E115763	07/15/11	10:20 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Other object	Passenger Car	Going Straight Ahead	None			Northwest	Southeast																	Lane 2 Decreasing Milepost
No	State Route		005		19.850							E161094	03/22/12	6:45 AM	No Injury	0	0	3	0	0	Not at Intersection and Not Related	Snowing	Snow/Slush	Dark-No Street Lights	From same direction - all others	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest	Passenger Car	Going Straight Ahead	None			Southeast	Northwest										Lane 2 Increasing Milepost
No	State Route		005		19.850							3317984	11/07/10	3:41 PM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Overcast	Wet	Daylight	Bridge Rail - Face	Passenger Car	Going Straight Ahead	Operating Defective Equipment			Southeast	Northwest																	Right Shoulder Increasing Milepost
No	State Route		005		19.900							E106664	05/16/11	9:25 PM	Dead at Scene	2	1	4	4	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	From same direction - both going straight - one stopped - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North	Passenger Car	Stopped in Roadway	Other			South	Vehicle Stopped										Median Shoulder Increasing Milepost
No	State Route		005		19.900							2750248	02/15/11	10:30 AM	No Injury	0	0	3	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			Northwest	Southeast	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			Northwest	Vehicle Stopped										Lane 3 Decreasing Milepost
No	State Route		005		19.900							E155421	02/22/12	6:10 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-Street Lights On	Bridge Rail - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest																	Right Shoulder Increasing Milepost
No	State Route		005		19.900							E169318	05/05/12	3:24 AM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	Bridge Rail - Face	Passenger Car	Going Straight Ahead	Apparently Asleep			Southeast	Northwest																	Median Shoulder Increasing Milepost
No	State Route		005		19.900							E125767	09/12/11	9:30 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Bridge Rail - Face	Passenger Car	Going Straight Ahead	Operating Defective Equipment			Southwest	Northeast																	Median Shoulder Increasing Milepost
No	State Route		005		19.900							E161100	03/14/12	3:50 PM	No Injury	0	0	3	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Did Not Grant RW to Vehicle			Southeast	Northwest	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			Southeast	Northwest										Lane 2 Increasing Milepost
No	State Route		005		19.900							E062922	07/23/10	4:40 PM	No Injury	0	0	3	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Passenger Car	Changing Lanes	Exceeding Reas. Safe Speed			Northwest	Southeast	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			Northwest	Southeast										Lane 2 Decreasing Milepost
No	State Route		005		19.940							3318009	06/20/12	3:18 PM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			Northwest	Southeast	Passenger Car	Slowing	None			Northwest	Southeast										Lane 2 Decreasing Milepost
No	State Route		005		19.950							E064942	08/12/10	11:14 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Other object	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			Northwest	Southeast																	Lane 3 Decreasing Milepost
No	State Route		005		19.950							E115917	05/16/11	9:25 PM	Serious Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	Bridge Rail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Under Influence of Alcohol			South	North																	Median Shoulder Increasing Milepost
No	State Route		005		19.960							E069977	10/03/10	1:58 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Bridge Rail - Face	Passenger Car	Going Straight Ahead	Operating Defective Equipment			Southwest	Northeast																	Median Shoulder Increasing Milepost
No	State Route		005		19.970							E287913	11/22/13	8:36 AM	No Injury	0	0	7	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	All other non-collision	Truck (Flatbad,Van,etc)	Going Straight Ahead	Operating Defective Equipment			South	North	Passenger Car	Going Straight Ahead	None			South	North										Lane 3 Increasing Milepost
No	State Route		005		19.970							E107734	05/31/11	4:48 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed	Follow Too Closely		North	South	Passenger Car	Stopped for Traffic	None			North	Vehicle Stopped										Lane 3 Decreasing Milepost
No	State Route		005		19.970							E031852	10/24/09	12:10 PM	Possible Injury	1	0	3	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			North	Vehicle Stopped										Lane 3 Decreasing Milepost
No	State Route		005		19.970							E058839	06/17/10	8:05 PM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Bridge Rail - Face	Passenger Car	Going Straight Ahead	Operating Defective Equipment			Southwest	Northeast																	Median Shoulder Increasing Milepost
No	State Route		005		20.000							E289166	11/22/13	8:25 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Other object	Truck Tractor	Going Straight Ahead	Operating Defective Equipment			South	North	Passenger Car	Going Straight Ahead	None			South	North										Lane 1 Increasing Milepost
No	State Route		005		20.000							E122633	08/28/11	8:49 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Bridge Rail - Face	Passenger Car	Changing Lanes	Inattention			South	North																	Median Shoulder Increasing Milepost
No	State Route		005		20.000							E126525	09/16/11	2:20 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Truck (Flatbad,Van,etc)	Going Straight Ahead	Follow Too Closely			Northwest	Southeast	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	None			Northwest	Southeast										Lane 2 Decreasing Milepost
No	State Route		005		20.000							E275010	09/29/13	12:59 PM	No Injury	0	0	3	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	From same direction - both going straight - both moving - rear-end	Not Stated	Going Straight Ahead	Other			South	North	Passenger Car	Slowing	Driver Not Distracted			South	North										Lane 3 Increasing Milepost
No	State Route		005		20.000							E059700	07/15/10	5:30 AM	Evident Injury	2	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Bridge Rail - Face	Passenger Car	Going Straight Ahead	Other			Southwest	Northeast																	Right Shoulder Increasing Milepost
No	State Route		005		20.010							E031846	10/24/09	12:10 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely			North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			North	Vehicle Stopped										Lane 3 Decreasing Milepost
No	State Route		005		20.050							E200173	10/12/12	10:24 AM	Evident Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	All other non-collision	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed	Other		South	North																	Lane 3 Increasing Milepost
No	State Route		005		20.050							2750469	04/11/10	4:17 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Wet	Dark-No Street Lights	Bridge Rail - Face	Passenger Car	Going Straight Ahead	Exceeding Stated Speed Limit	Apparently Asleep		Southwest	Northeast																	Median Shoulder Increasing Milepost
No	State Route		005		20.060							E283560	11/04/13	5:17 PM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	Bridge Rail - Face	Passenger Car	Going Straight Ahead	None			South	North																	Right Shoulder Increasing Milepost
No	State Route		005		20.070							2750172	07/28/09	7:25 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Bridge Rail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South																	Right Shoulder Decreasing Milepost
No	State Route		005		20.070							E095298	02/15/11	10:40 AM	Possible Injury	1	0	3	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			Northwest	Southeast	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	None			Northwest	Southeast										Lane 3 Decreasing Milepost
No	State Route		005		20.080							E265886	08/23/13	11:00 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other			North	South	Other	Going Straight Ahead	None			North	South										Lane 3 Decreasing Milepost
No	State Route		005		20.080							E017622	04/03/09	1:44 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Sleet or Hail or Freezing Rain	Wet	Daylight	From same direction - both going straight - both moving - sideswipe	Passenger Car	Changing Lanes	Exceeding Reas. Safe Speed			North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	Other			North	South										Lane 3 Decreasing Milepost
No	State Route		005		20.090							E062611	08/09/10	3:00 PM	No Injury	0	0	3	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Apparently Asleep			Northwest	Southeast	Passenger Car	Going Straight Ahead	None			Northwest	Southeast										Lane 1 Decreasing Milepost
No	State Route		005		20.100							E261968	08/04/13	1:38 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Under Influence of Alcohol	Exceeding Reas. Safe Speed	Did Not Grant RW to Vehicle	South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			South	North										Lane 1 Increasing Milepost
No	State Route		005		20.100							E026658	08/17/09	11:37 AM	No Injury	0	0	3	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			North	South	Passenger Car	Slowing	None			North	South										Lane 3 Decreasing Milepost
No	State Route		005		20.100							3318036	05/10/09	4:55 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-Street Lights Off	Guardrail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Under Influence of Alcohol			North	South																	Right Shoulder Decreasing Milepost
No	State Route		005		20.100							E100187	04/08/11	11:30 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Guardrail - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Northwest	Southeast																	Median Shoulder Decreasing Milepost
No	State Route		005		20.110							3254450	03/22/12	5:45 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Snowing	Snow/Slush	Dark-No Street Lights	Cable Barrier	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Northwest	Southeast																	In Median Decreasing Milepost
No	State Route		005		20.110							E125116	09/10/11	12:40 PM	No Injury	0	0	3	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - all others	Passenger Car	Going Straight Ahead	None			Southeast	Northwest	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other			Southeast	Northwest										Lane 2 Increasing Milepost
No	State Route		005		20.120							E275008	09/29/13	12:59 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	Other object	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			South	North																	Lane 3 Increasing Milepost

State Route Only History Indicator	JURISDICTION	CITY	PRIMARY TRAFFICWAY	BLOCK NUMBER	MILE POST	INTERSECTING TRAFFICWAY	CO ONLY INTERSECTING COUNTY ROAD MILEPOST	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	#FAT	#VEH	#PEDS	#PEDAL	JUNCTION RELATIONSHIP	WEATHER	ROADWAY SURFACE CONDITIONS	LIGHTING CONDITIONS	FIRST COLLISION TYPE / OBJECT STRUCK	VEHICLE 1 TYPE	VEH 1 ACTION	MV DRIVER CONT CIRC 1 (UNIT 1)	MV DRIVER CONT CIRC 2 (UNIT 1)	MV DRIVER CONT CIRC 3 (UNIT 1)	VEH 1 COMP DIR FROM	VEH 1 COMP DIR TO	VEHICLE 2 TYPE	VEH 2 ACTION	MV DRIVER CONT CIRC 1 (UNIT 2)	MV DRIVER CONT CIRC 2 (UNIT 2)	MV DRIVER CONT CIRC 3 (UNIT 2)	VEH 2 COMP DIR FROM	VEH 2 COMP DIR TO	PEDESTRIAN ACTION (UNIT 2)	PEDESTRIAN CONT CIRC 1 (UNIT 2)	PEDESTRIAN CONT CIRC 2 (UNIT 2)	PEDCYCLIST ACTION (UNIT 1)	PEDCYCLIST CONT CIRC 1 (UNIT 1)	PEDCYCLIST CONT CIRC 2 (UNIT 1)	PEDCYCLIST ACTION (UNIT 2)	PEDCYCLIST CONT CIRC 1 (UNIT 2)	PEDCYCLIST CONT CIRC 2 (UNIT 2)	IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)
No	State Route		005		20.140							2741471	04/28/09	1:19 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Wet	Daylight	From same direction - all others	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other			South	North	Passenger Car	Going Straight Ahead	None			South	North										Lane 3 Increasing Milepost
No	State Route		005		20.140							E141158	12/03/11	9:53 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Fog or Smog or Smoke	Dry	Daylight	Fence	Passenger Car	Changing Lanes	Exceeding Reas. Safe Speed	Follow Too Closely		North	South																	Past Right Shoulder Decreasing Milepost
No	State Route		005		20.180							E017634	04/03/09	1:43 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Other	Other	Daylight	From same direction - both going straight - both moving - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely			Southeast	Northwest	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	None			Southeast	Northwest										Lane 3 Increasing Milepost
No	State Route		005		20.180							E017636	04/03/09	1:43 PM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Other	Other	Daylight	Cable Barrier	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South																	In Median Decreasing Milepost
No	State Route		005		20.270							E134059	10/26/11	7:06 AM	Evident Injury	1	0	3	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dawn	From same direction - all others	Truck Tractor & Semi-Trailer	Going Straight Ahead	Operating Defective Equipment			Southeast	Northwest	Passenger Car	Going Straight Ahead	None			Southeast	Northwest										Lane 2 Increasing Milepost
No	State Route		005		20.270							E094832	03/01/11	5:55 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Snowing	Snow/Slush	Dark-No Street Lights	From same direction - all others	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest	Passenger Car	Going Straight Ahead	None			Southeast	Northwest										Lane 2 Increasing Milepost
No	State Route		005		20.280							E263109	08/09/13	6:01 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dawn	From same direction - all others	Passenger Car	Going Straight Ahead	None			South	North	Truck Tractor & Semi-Trailer	Going Straight Ahead	Operating Defective Equipment			South	North										Lane 2 Increasing Milepost
No	State Route		005		20.300							E218136	12/30/12	9:24 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Fire started in vehicle	Passenger Car	Going Straight Ahead	Operating Defective Equipment			Southeast	Northwest																	Lane 3 Increasing Milepost
No	State Route		005		20.410							E293547	12/12/13	11:30 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	Other object	Passenger Car	Going Straight Ahead	Under Influence of Alcohol	Exceeding Reas. Safe Speed		South	North																	Lane 3 Increasing Milepost
No	State Route		005		20.490							E281531	10/14/13	1:35 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Other object	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			North	South																	Lane 1 Decreasing Milepost
No	State Route		005		20.500							E257124	07/15/13	1:25 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Changing Lanes	Other			North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other			North	South										Lane 3 Decreasing Milepost
No	State Route		005		20.510							E054173	05/25/10	8:35 AM	Possible Injury	2	0	3	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South	Passenger Car	Stopped for Traffic	None			North	Vehicle Stopped										Lane 3 Decreasing Milepost
No	State Route		005		20.570							E064484	08/22/10	1:16 PM	Evident Injury	4	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	None			South	North										Median Shoulder Increasing Milepost
No	State Route		005		20.580							E243906	05/08/13	6:54 AM	Possible Injury	1	0	3	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Passenger Car	Going Straight Ahead	Apparently Asleep			Southeast	Northwest	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			Southeast	Northwest										Lane 2 Increasing Milepost
No	State Route		005		20.580							E082553	12/09/10	3:15 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Raining	Standing Water	Daylight	From same direction - all others	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed	Operating Defective Equipment		Northwest	Southeast	Truck (Flatbad,Van,etc)	Going Straight Ahead	None			Northwest	Southeast										Lane 1 Decreasing Milepost
No	State Route		005		20.580							E081739	11/28/10	9:27 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Wet	Daylight	Cable Barrier	Pickup,Panel Truck or Vanette under 10,000 lb	Backing	Improper Backing			Southeast	Vehicle Backing																	In Median Increasing Milepost
No	State Route		005		20.670							E024372	08/02/09	7:01 PM	Evident Injury	3	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - all others	Passenger Car	Going Straight Ahead	Operating Defective Equipment			Northwest	Southeast	Passenger Car	Going Straight Ahead	None			Northwest	Southeast										Lane 2 Decreasing Milepost
No	State Route		005		20.700							E285594	11/15/13	8:40 PM	No Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet	Dark-No Street Lights	From same direction - both going straight - both moving - sideswipe	Passenger Car	Merging (Entering Traffic)	Inattention			North	South	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			North	South										Lane 1 Decreasing Milepost
No	State Route		005		20.700							E215947	12/22/12	11:06 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	Cable Barrier	Passenger Car	Going Straight Ahead	Operating Defective Equipment			Southeast	Northwest																	In Median Increasing Milepost
No	State Route		005		20.700							E178293	06/25/12	2:11 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Did Not Grant RW to Vehicle			North	South	Passenger Car	Going Straight Ahead	None			North	South										Lane 3 Decreasing Milepost
No	State Route		005		20.700							3124706	01/26/10	9:16 AM	Evident Injury	3	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - all others	Passenger Car	Going Straight Ahead	Exceeding Stated Speed Limit	Under Influence of Drugs		North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			North	South										Lane 2 Decreasing Milepost
No	State Route		005		20.700							E016843	03/23/09	6:40 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Dry	Dawn	Cable Barrier	Passenger Car	Going Straight Ahead	Inattention			North	South																	In Median Decreasing Milepost
No	State Route		005		20.700							E025866	08/16/09	7:03 PM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Changing Lanes	Follow Too Closely			North	South	Passenger Car	Slowing	None			North	South										Lane 2 Decreasing Milepost
No	State Route		005		20.710							E273568	09/16/13	12:02 AM	No Injury	0	0	1	0	0	At Intersection and Not Related	Raining	Wet	Dark-Street Lights On	Fence	Passenger Car	Changing Lanes	Exceeding Reas. Safe Speed			North	South																	Past Right Shoulder Decreasing Milepost
No	State Route		005		20.740							E063687	08/04/10	12:38 PM	Evident Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Motorcycle	Merging (Entering Traffic)	Follow Too Closely			Northwest	Southeast	Motorcycle	Merging (Entering Traffic)	None			Northwest	Southeast										Lane 1 Decreasing Milepost
No	State Route		005		20.770							E209268	11/28/12	6:49 AM	No Injury	0	0	2	0	0	At Intersection and Not Related	Overcast	Dry	Dark-No Street Lights	From same direction - both going straight - both moving - sideswipe	Passenger Car	Going Straight Ahead	None			North	South	Not Stated	Changing Lanes	Did Not Grant RW to Vehicle			North	South										Lane 3 Decreasing Milepost
No	State Route		005S102071		0.320							3511113	02/24/11	9:25 PM	No Injury	0	0	1	0	0	At Intersection and Related	Overcast	Wet	Dark-Street Lights On	Over Embankment - No Guardrail Present	Pickup,Panel Truck or Vanette under 10,000 lb	Merging (Entering Traffic)	Follow Too Closely			North	South																	Past Right Shoulder On Ramp Decreasing Milepost Side of Mainline
	City Street	La Center	ASPEN AV	1800				800	F	N	E 18 ST	2427330	12/29/09	6:08 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Snowing	Snow/Slush	Dark-Street Lights On	One parked--one moving	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			East	South	Passenger Car	Legally Parked, Unoccupied															
	City Street	La Center	E 14TH CIR	1300				237	F	E	E HEITMAN AVE	E251136	06/07/13	10:35 AM	No Injury	0	0	1	0	0	At Driveway	Clear or Partly Cloudy	Dry	Daylight	Street Light Pole or Base	Pickup,Panel Truck or Vanette under 10,000 lb	Backing	Inattention			Vehicle Backing	Vehicle Backing																	Past the Outside Shoulder of Primary Trafficway
	City Street	La Center	E 4 WAY	1600						W	E 17 PL	2427218	08/09/09	11:19 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	One parked--one moving	Pickup,Panel Truck or Vanette under 10,000 lb	Legally Parked, Unoccupied						Not Stated	Backing	Other			East	Vehicle Backing										
	City Street	La Center	E 4TH ST	100				109	F	E	ASPEN AVE	2427349	08/18/11	6:19 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely	Other Driver Distractions Inside Vehicle		East	West	Passenger Car	Stopped for Traffic	None			East	Vehicle Stopped										Lane of Primary Trafficway
	City Street	La Center	E 4TH ST	300				50	F	E	E CEDAR AVE	E241218	04/30/13	5:15 PM	Possible Injury	2	0	2	0	0	Driveway Related but Not at Driveway	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Stopped for Traffic	None			West	Vehicle Stopped	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Inattention	Follow Too Closely		West	East										Lane of Primary Trafficway
	City Street	La Center	E 4TH ST	700				500	F	W	NE IVY AVE	E197930	10/10/12	6:15 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Inattention	Follow Too Closely		West	East	Passenger Car	Stopped for Traffic	None			West	Vehicle Stopped										Lane of Primary Trafficway
	City Street	La Center	E 4TH ST	1000				30	F	W	NE LOCKWOOD CREEK RD	2737465	02/03/12	10:48 AM	No Injury	0	0	2	0	0	At Driveway	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			West	East	Passenger Car	Making Left Turn	Did Not Grant RW to Vehicle			South	West										Lane of Primary Trafficway
	City Street	La Center	E ELM AVE	500				125	F	N	E 5TH ST	E275042	09/27/13	6:19 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dusk	Retaining Wall (concrete, rock, brick, etc.)	Passenger Car	Going Straight Ahead	Exceeding Stated Speed Limit	Exceeding Reas. Safe Speed		West	North																	Past the Outside Shoulder of Primary Trafficway
	City Street	La Center	NE 79 AVE	34117				684	F	N	NE 339 ST	3166178	06/08/09	4:15 PM	Evident Injury	2	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Vehicle overturned	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Driver Distractions Outside Vehicle			North	South																	
	City Street	La Center	NE HIGHLAND AVE	500				0.13	M	NE	E 4TH ST	E239817	04/23/13	2:50 PM	No Injury	0	0	2	0	0	At Driveway	Clear or Partly Cloudy	Dry	Daylight	Same direction -- both turning right -- both moving -- rear end	Pickup,Panel Truck or Vanette under 10,000 lb	Making Right Turn	Follow Too Closely			East	North	Passenger Car	Making Right Turn	None			East	North										Lane of Primary Trafficway
	City Street	La Center	NE HIGHLAND RD	1400				300	F	E	NE 124 AVE	2427326	07/30/09	6:36 PM	Serious Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Vehicle overturned	Motorcycle	Going Straight Ahead	Other			West	East																	
	City Street	La Center	NE LOCKWOOD CREEK RD	1600				600	F	W	E 18 PL	2427353	09/13/11	2:24 AM	Evident Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	Culvert and/or other Appurtenance in Ditch	Passenger Car	Going Straight Ahead	Under Influence of Alcohol	Exceeding Reas. Safe Speed		East	West																	Past the Outside Shoulder of Primary Trafficway
	City Street	La Center	NE LOCKWOOD CREEK RD	1900				367	F	SE	E 18TH PL	E257485	07/16/13	11:23 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - all others	Passenger Car	Going Straight Ahead	Operating Defective Equipment	Over Center Line		West	East	Passenger Car	Going Straight Ahead	None			East	West										Lane of Primary Trafficway
	City Street	La Center	NE LOCKWOOD CREEK RD	2300				81	F	NW	NE 24TH AVE	2427339	09/04/10	9:26 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	Over Embankment - No Guardrail Present	Passenger Car	Going Straight Ahead	Over Center Line			East	West																	Past the Outside Shoulder of Primary Trafficway
	City Street	La Center	NE LOCKWOOD CRK RD					0	F	E	E 18 PL	2427217	08/01/09	10:30 AM	No Injury	0	0	2	0	0	Intersection Related but Not at Intersection	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			East	Vehicle Stopped	Passenger Car	Going Straight Ahead	Driver Interacting with Passengers, Anim			East	West										
	City Street	La Center	NE NORTH FORK RD	35200								3166400	04/11/09	1:37 AM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	Vehicle overturned	Passenger Car	Going Straight Ahead	Under Influence of Alcohol	Under Influence of Drugs		South	North																	
	City Street	La Center	NW 319TH ST	600				0.11	M	W	NW POLLOCK RD	2427289	02/24/12	10:43 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-Street Lights On	Earth Bank or Ledge	Pickup,Panel Truck or Vanette under 10,000 lb	Overtaking and Passing	Under Influence of Alcohol	Under Influence of Drugs	Exceeding Stated Speed Limit	West	East																	Past the Outside Shoulder of Primary Trafficway
	City Street	La Center	NW LACENTER RD	1000								2427302	03/16/12	10:36 PM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	Earth Bank or Ledge	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Under Influence of Alcohol	Over Center Line		South	North																	Past the Outside Shoulder of Primary Trafficway
	City Street	La Center	NW LACENTER RD	32600								2427293	06/23/12	1:00 PM	No Injury	0	0	2	0	0	At Driveway	Overcast	Wet	Daylight	From same direction - one left turn - one straight	Pickup,Panel Truck or Vanette under 10,000 lb	Making Left Turn	Improper Turn			South	West	Passenger Car	Overtaking and Passing	Improper Passing			South	North										Lane of Primary Trafficway
	City Street	La Center	NW LACENTER RD	1700								2427283	12/09/11	4:34 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Fog or Smog or Smoke	Ice	Dark-No Street Lights	Vehicle Strikes Deer	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			East	West																	Lane of Primary Trafficway
	City Street	La Center	NW LACENTER RD	1800				500	F	W	NW 18TH AVE	E288196	11/21/13	7:50 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Daylight	Guardrail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			West	East																	Outside Shoulder of Primary Trafficway
	City Street	La Center	NW LACENTER RD	1800				165	F	W	NW 18TH AVE	2447245	12/24/11	1:03 PM	Evident Injury	2	0	3	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Under Influence of Alcohol	Under Influence of Drugs	Follow Too Closely	East	West	Passenger Car	Going Straight Ahead	None			East	West										Lane of Primary Trafficway
	City Street	La Center	NW LACENTER RD	1800				0.14	M	W	NW 18TH AVE	2427285	01/09/12	8:16 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	Guardrail - Face	Passenger Car	Going Straight Ahead	Other			West	East																	Outside Shoulder of Primary Trafficway
	City Street	La Center	NW LACENTER RD	2700				356	F	E	NW 319TH ST	E089212	01/19/11	6:15 AM	Evident Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Dark-No Street Lights	Vehicle overturned	Motorcycle	Going Straight Ahead	None			East	West																	Lane of Primary Trafficway
	City Street	La Center	NW LACENTER RD	32100				309	F	NE	NW 9TH AVE	E219022	01/02/13	11:40 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Daylight	Roadway Ditch	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Operating Defective Equipment			Northeast	Southwest																	Past the Outside Shoulder of Primary Trafficway
	City Street	La Center	NW LACENTER RD	1700				100	F	W	NW EAGLE CREST DR	E247502	05/29/13	10:43 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Wet	Dark-No Street Lights	Metal Sign Post	Passenger Car	Going Straight Ahead	Driver Eating or Drinking	Driver Interacting with Passengers, Anim		East	West																	Past the Outside Shoulder of Primary Trafficway
	City Street	La Center	NW LACENTER RD	1000						W	NW TIMMEN RD	E288194	11/20/13	7:35 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Daylight	Roadway Ditch	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			Northeast	Southwest																	Past the Outside Shoulder of Primary Trafficway
	City Street	La Center	NW LACENTER RD	32000				500	F	SW	NW TIMMEN RD	2427290	06/11/12	5:45 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Fog or Smog or Smoke	Dry	Dawn	Tree or Stump (stationary)	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Apparently Ill			Northeast	Southwest																	Past the Outside Shoulder of Primary Trafficway
	City Street	La Center	NW LACENTER RD	32000				249	F	SW	NW TIMMEN RD	E288238	11/26/13	5:16 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Dark-No Street Lights	Guardrail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			East	West																	Outside Shoulder of Primary Trafficway
	City Street	La Center	NW LACENTER RD	32100				0.25	M	NE	NW TIMMEN RD	E288195	11/23/13	6:02 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Dark-No Street Lights	Roadway Ditch	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			East	West																	Past the Outside Shoulder of Primary Trafficway
	City Street	La Center	NW NORTH FORK AVE	34700				56	F	SW	NE NORTH FORK AVE	2427226	07/23/10	10:52 PM	Possible Injury	5	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	Vehicle overturned	Passenger Car	Going Straight Ahead	Exceeding Stated Speed Limit	Other Driver Distractions Inside Vehicle		East	West																	Past the Outside Shoulder of Primary Trafficway
	City Street	La Center	NW PACIFIC HWY	34300				376	F	NW	NW LARSEN DR	2427342	09/04/10	2:24 AM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Exceeding Stated Speed Limit			Northwest	Southeast	Passenger Car	Going Straight Ahead	Follow Too Closely			Northwest	Southeast										Lane of Primary Trafficway
	City Street	La Center	NW PACIFIC HWY	900				50	F	SE	W 10TH ST	2427288	01/20/12	11:13 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Starting in Traffic Lane	Other			Northwest	Southeast	Passenger Car	Overtaking and Passing	Improper Passing			Northwest	Southeast										Lane of Primary Trafficway
	City Street	La Center	NW PACIFIC HWY	600				100	F	N	W 5 ST	2427215	06/09/09	11:45 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	One parked--one moving	Pickup,Panel Truck or Vanette under 10,000 lb	Legally Parked, Unoccupied						Not Stated	Other*	Other														
	City Street	La Center	NW PARADISE PARK RD	30507								E303139	12/27/13	7:29 PM	Serious Injury	1	0	1	1	0	Not at Intersection and Not Related	Fog or Smog or Smoke	Wet	Dark-No Street Lights	Vehicle going straight hits pedestrian	Passenger Car	Going Straight Ahead	Under Influence of Alcohol	Exceeding Reas. Safe Speed		South	North								Walking in Roadway Opposite Traffic	Other								Lane of Primary Trafficway
	City Street	La Center	NW POLLOCK RD	31900				257	F	E	NW 4TH CT	2427294	07/03/12	2:24 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-Street Lights Off	Earth Bank or Ledge	Passenger Car	Going Straight Ahead	Under Influence of Alcohol	Over Center Line		West	East																	Past the Outside Shoulder of Primary Trafficway
	City Street	La Center	NW SPENCER RD	31206						W	NW 5	2427282	11/27/11	1:58 AM	Evident Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	Utility Box	Passenger Car	Going Straight Ahead	Over Center Line			Southwest	Northeast																	Past the Outside Shoulder of Primary Trafficway
	City Street	La Center	NW SPENCER RD	31000				0.1	M	S	NW TIMMEN RD	E293550	11/30/13	12:35 AM	Possible Injury	2	0	1	0	0	Not at Intersection and Not Related	Overcast	Wet	Dark-No Street Lights	Roadway Ditch	Passenger Car	Slowing	Other			West	East																	Past the Outside Shoulder of Primary Trafficway
	City Street	La Center	W 12 WY AT W D AV	498								2427347	07/21/11	4:30 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	One parked--one moving	Pickup,Panel Truck or Vanette under 10,000 lb	Illegally Parked, Unoccupied	None					Not Stated	Other*	Other														Outside Shoulder of Primary Trafficway
	City Street	La Center	W 3RD ST	400				259	F	W	E 3RD ST	2427337	08/10/10	2:19 PM	No Injury	0	0	2	0	0	At Driveway	Clear or Partly Cloudy	Dry	Daylight	One parked--one moving	Pickup,Panel Truck or Vanette under 10,000 lb	Making Right Turn	Driver Interacting with Passengers, Anim	Improper Turn		North	West	Pickup,Panel Truck or Vanette under 10,000 lb	Legally Parked, Unoccupied															Outside Shoulder of Primary Trafficway
	City Street	La Center	W 4TH ST	300				100	F	W	NW PACIFIC HWY	E202632	10/16/12	12:11 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Wet	Daylight	One car leaving parked position	Passenger Car	Backing	Did Not Grant RW to Vehicle			Northeast	Vehicle Backing	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			North	South										Lane of Primary Trafficway
	City Street	La Center	W 5TH ST	200				125	F	E	NW PACIFIC HWY	E261134	08/03/13	1:59 PM	Serious Injury	1	0	1	1	0	At Driveway	Clear or Partly Cloudy	Dry	Daylight	Vehicle going straight hits pedestrian	Passenger Car	Going Straight Ahead	None			East	West								Playing in Roadway	Did Not Grant RW to Vehicle								Lane of Primary Trafficway
	City Street	La Center	NE JOHN STORM AVE			E 1ST ST						E234833	03/24/13	1:45 PM	No Injury	0	0	1	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Fence	Pickup,Panel Truck or Vanette under 10,000 lb	Making U-Turn	Under Influence of Alcohol	Improper U-Turn		North	North																	Past the Outside Shoulder of Primary Trafficway
	City Street	La Center	ASPEN			E 4 ST						2737463	06/05/09	9:00 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dusk	Entering at angle	Passenger Car	Making Left Turn	Did Not Grant RW to Vehicle			North	East	Passenger Car	Going Straight Ahead	None			East	West										
	City Street	La Center	NE HIGHLAND AVE			E 4 ST						2427148	01/04/09	5:20 PM	No Injury	0	0	1	0	0	At Intersection and Not Related	Snowing	Snow/Slush	Dark-Street Lights On	Street Light Pole or Base	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			Northeast	South																	
	City Street	La Center	NE HIGHLAND AVE	400		E 4TH ST						2427331	03/24/10	2:50 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped at Signal or Stop Sign	None			North	Vehicle Stopped	Passenger Car	Going Straight Ahead	Follow Too Closely			North	South										Lane of Primary Trafficway
	City Street	La Center	NE HIGHLAND AVE	400		E 4TH ST						E237901	04/14/13	11:30 AM	No Injury	0	0	1	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Street Light Pole or Base	Passenger Car	Going Straight Ahead	Exceeding Stated Speed Limit	Over Center Line		North	South																	Past the Outside Shoulder of Primary Trafficway
	City Street	La Center	E FIR AVE	717		E 7TH ST						2427280	11/24/11	4:45 PM	No Injury	0	0	2	0	0	At Driveway within Major Intersection	Raining	Wet	Dark-Street Lights Off	One parked--one moving	Pickup,Panel Truck or Vanette under 10,000 lb	Illegally Parked, Unoccupied	Improper Parking Location					Passenger Car	Backing	Improper Backing			West	Vehicle Backing										Outside Shoulder of Primary Trafficway
	City Street	La Center	NE LOCKWOOD CREEK RD	1300		NE JOHN STORM AVE						2427303	04/14/12	12:07 AM	No Injury	0	0	1	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	Curb, Raised Traffic Island or Raised Median Curb	Passenger Car	Making Right Turn	Under Influence of Alcohol	Exceeding Stated Speed Limit	Improper Turn	West	South																	Outside Shoulder of Primary Trafficway
	City Street	La Center	NW LACENTER RD	1800		NW 18TH AVE						E196407	10/04/12	12:58 PM	No Injury	0	0	1	0	0	At Driveway	Clear or Partly Cloudy	Dry	Daylight	Roadway Ditch	Passenger Car	Making Right Turn	Improper Turn			West	South																	Past the Outside Shoulder of Primary Trafficway
	City Street	La Center	NW PARADISE PARK RD	32100		NW 319TH ST						E293424	12/06/13	12:35 PM	Possible Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped at Signal or Stop Sign	Driver Not Distracted			Vehicle Stopped	Vehicle Stopped	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other Driver Distractions Inside Vehicle			North	South										Lane of Primary Trafficway
	City Street	La Center	NW PARADISE PARK RD	32100		NW 319TH ST						E277843	10/02/13	1:30 PM	No Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet	Daylight	Entering at angle	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Driver Not Distracted			South	North	Passenger Car	Going Straight Ahead	None			East	West										Lane of Primary Trafficway
	City Street	La Center	NW 14TH AVE	34700		NW BOLEN ST						E212001	12/10/12	8:54 AM	No Injury	0	0	1	0	0	At Intersection and Not Related	Raining	Wet	Daylight	Tree or Stump (stationary)	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South																	Past the Outside Shoulder of Primary Trafficway
	City Street	La Center	NW LACENTER RD			NW PACIFIC HWY						E182173	07/16/12	4:57 PM	Evident Injury	1	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - both going straight - sideswipe	Passenger Car	Going Straight Ahead	Driver Adjusting Audio or Entertainment	Apparently Fatigued	Over Center Line	South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			North	South										Lane of Primary Trafficway
	City Street	La Center	W 4TH ST	200		NW PACIFIC HWY						E230384	03/01/13	8:02 AM	Possible Injury	2	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Wet	Daylight	Entering at angle	Passenger Car	Making Left Turn	Did Not Grant RW to Vehicle			East	South	Passenger Car	Going Straight Ahead	None			South	North										Lane of Primary Trafficway
	City Street	La Center	W 4TH ST	200		NW PACIFIC HWY						2427295	07/18/12	7:25 AM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Stopped at Signal or Stop Sign	None			East	Vehicle Stopped	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Inattention			East	West										Lane of Primary Trafficway
	City Street	La Center	NW 319TH ST			NW PARADISE PARK RD						2427379	04/13/13	7:04 PM	Evident Injury	1	0	2	0	0	At Intersection and Related	Overcast	Dry	Daylight	From same direction - one left turn - one straight	Pickup,Panel Truck or Vanette under 10,000 lb	Overtaking and Passing	Improper Passing			East	West	Passenger Car	Making Left Turn	None			East	South										Lane of Primary Trafficway
	City Street	La Center	NW LACENTER RD	32000		NW TIMMEN RD						2427298	08/17/12	12:30 AM	Possible Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	Entering at angle	Passenger Car	Making Left Turn	Did Not Grant RW to Vehicle			Southeast	Southwest	Passenger Car	Going Straight Ahead	None			Southwest	Northeast										Lane of Primary Trafficway
	City Street	La Center	NW LACENTER RD	32000		NW TIMMEN RD						E273026	09/26/13	2:04 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Slowing	None			South	North	Passenger Car	Going Straight Ahead	Inattention	Follow Too Closely		South	North										Lane of Primary Trafficway
	City Street	La Center	ASPEN AVE	900		W 10TH ST						2427340	09/11/10	12:40 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Passenger Car	Making Left Turn	None			East	South	Passenger Car	Going Straight Ahead	Disregard Stop Sign - Flashing Red			North	South										Lane of Primary Trafficway
	City Street	La Center	NW PACIFIC HWY			W 3 ST						2427224	12/12/09	7:50 PM	No Injury	0	0	2	0	0	At Intersection and Related	Raining	Ice	Dark-Street Lights On	Entering at angle	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed	Disregard Stop Sign - Flashing Red		West	East	Pickup,Panel Truck or Vanette under 10,000 lb	Making Left Turn	None			South	West										
	City Street	La Center	NW PACIFIC HWY	400		W 4 ST						2427221	11/15/09	12:09 PM	No Injury	0	0	2	0	0	At Intersection and Related	Overcast	Wet	Daylight	Entering at angle	Pickup,Panel Truck or Vanette under 10,000 lb	Making Left Turn	Did Not Grant RW to Vehicle			East	South	Passenger Car	Going Straight Ahead	None			South	North										
	City Street	La Center	NW PACIFIC HWY	400		W 4TH ST						2427345	12/14/10	5:09 PM	Serious Injury	1	0	1	1	0	At Intersection and Related	Raining	Wet	Dark-Street Lights On	Vehicle going straight hits pedestrian	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Fail to Yield Row to Pedestrian			South	North								Xing at Intersection - No Signal	None								Lane of Primary Trafficway
No	State Route	La Center	005		16.100							E047896	03/26/10	12:58 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Tree or Stump (stationary)	Truck (Flatbad,Van,etc)	Going Straight Ahead	Driver Eating or Drinking			South	North																	Past Right Shoulder Increasing Milepost
No	State Route	La Center	005		16.150							E133536	10/12/11	5:50 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-Street Lights On	From same direction - both going straight - both moving - sideswipe	Passenger Car	Changing Lanes	Did Not Grant RW to Vehicle			North	South	Passenger Car	Going Straight Ahead	None			North	South										Lane 2 Decreasing Milepost
No	State Route	La Center	005		16.190							E016361	03/10/09	10:19 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other	Exceeding Stated Speed Limit		North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Other	Did Not Grant RW to Vehicle		North	South										Lane 3 Decreasing Milepost
No	State Route	La Center	005		16.200							E054755	05/28/10	9:05 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	Over Embankment - No Guardrail Present	Passenger Car	Going Straight Ahead	Apparently Ill			Northwest	Southeast																	In Median Decreasing Milepost
No	State Route	La Center	005		16.300							E253706	06/24/13	9:01 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dusk	Vehicle Strikes Deer	Passenger Car	Going Straight Ahead	None			South	North																	Lane 1 Increasing Milepost
No	State Route	La Center	005		16.380							E020131	05/14/09	3:40 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Did Not Grant RW to Vehicle			North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			North	South										Lane 3 Decreasing Milepost
No	State Route	La Center	005		16.380							E182975	07/16/12	11:27 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	Other object	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other			Northwest	Southeast	Passenger Car	Going Straight Ahead	None			Northwest	Southeast										Lane 2 Decreasing Milepost
No	State Route	La Center	005		16.390							E203963	11/02/12	2:21 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Inattention	Follow Too Closely		North	South	Truck (Flatbad,Van,etc)	Going Straight Ahead	None			North	South										Lane 1 Decreasing Milepost
No	State Route	La Center	005		16.400							E247901	05/31/13	2:57 PM	Serious Injury	3	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - all others	Passenger Car	Merging (Entering Traffic)	Exceeding Reas. Safe Speed			North	South	Passenger Car	Going Straight Ahead	None			North	South										Lane 2 Decreasing Milepost
No	State Route	La Center	005		16.410							E015476	02/26/09	7:00 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Ice	Dawn	Cable Barrier	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South																	In Median Decreasing Milepost
No	State Route	La Center	005		16.450							E255375	07/06/13	6:09 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Cable Barrier	Passenger Car	Going Straight Ahead	Other			South	North																	In Median Increasing Milepost
No	State Route	La Center	005		16.500							E283558	11/02/13	6:46 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	From same direction - both going straight - both moving - rear-end	Not Stated	Changing Lanes	Other			South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			South	North										Lane 2 Increasing Milepost
No	State Route	La Center	005		16.500							E228179	02/12/13	1:16 PM	Serious Injury	1	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			South	North	Passenger Car	Slowing	Operating Defective Equipment			South	North										Lane 2 Increasing Milepost
No	State Route	La Center	005		16.500							E073009	10/19/10	12:31 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Cable Barrier	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other Driver Distractions Inside Vehicle			South	North																	In Median Increasing Milepost
No	State Route	La Center	005		16.700							E064753	08/25/10	4:43 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	Domestic animal other (cat, dog, etc)	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			North	South																	Lane 2 Decreasing Milepost
No	State Route	La Center	005		16.750							E288221	11/07/13	5:03 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	Vehicle Strikes Deer	Passenger Car	Going Straight Ahead	None			North	South																	Lane 2 Decreasing Milepost
No	State Route	La Center	005		16.780							3318436	11/11/12	5:06 PM	Evident Injury	2	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Under Influence of Alcohol			South	North	Passenger Car	Going Straight Ahead	None			South	North										Lane 2 Increasing Milepost
No	State Route	La Center	005		16.820							E157719	02/27/12	5:23 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dusk	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Did Not Grant RW to Vehicle			South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			South	North										Lane 2 Increasing Milepost
No	State Route	La Center	005		16.840							E047885	03/28/10	8:26 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Wet	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely	Exceeding Reas. Safe Speed		South	North	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			South	North										Lane 1 Increasing Milepost
No	State Route	La Center	005		16.880							3318130	08/01/09	10:35 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	Vehicle overturned	Passenger Car	Going Straight Ahead	None			South	North																	In Median Increasing Milepost
No	State Route	La Center	005		16.900							E058835	06/25/10	5:55 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			Northwest	Southeast	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	None			Northwest	Southeast										Lane 3 Decreasing Milepost
No	State Route	La Center	005		16.900							E199092	10/12/12	8:01 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			South	Vehicle Stopped										Lane 3 Increasing Milepost
No	State Route	La Center	005		16.900							E039911	01/12/10	5:10 AM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Overcast	Wet	Dark-No Street Lights	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Apparently Asleep			South	North	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			South	North										Lane 2 Increasing Milepost

State Route Only History Indicator	JURISDICTION	CITY	PRIMARY TRAFFICWAY	BLOCK NUMBER	MILE POST	INTERSECTING TRAFFICWAY	CO ONLY INTERSECTING COUNTY ROAD MILEPOST	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	#FAT	#VEH	#PEDS	#PEDAL	JUNCTION RELATIONSHIP	WEATHER	ROADWAY SURFACE CONDITIONS
No	State Route	La Center	005		16.900							E058845	06/29/10	5:26 PM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	La Center	005LX01680		0.110							3168930	05/04/09	8:54 AM	Serious Injury	3	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry
No	State Route	La Center	005LX01680		0.110							3318549	10/06/10	9:17 AM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry
No	State Route	La Center	005LX01680		0.110							2427297	07/24/12	5:49 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry
No	State Route	La Center	005LX01680		0.110							E257122	07/14/13	5:32 AM	Possible Injury	1	0	1	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry
No	State Route	La Center	005LX01680		0.110							E222930	01/25/13	5:35 PM	No Injury	0	0	2	0	0	At Intersection and Related	Overcast	Wet
No	State Route	La Center	005LX01680		0.110							E127067	09/02/11	6:36 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry
No	State Route	La Center	005LX01680		0.110							E233684	03/22/13	5:57 PM	Possible Injury	2	0	2	0	0	At Intersection and Related	Overcast	Wet
No	State Route	La Center	005LX01680		0.110							E124803	09/10/11	4:28 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry
No	State Route	La Center	005P101655		0.160							E265940	08/23/13	7:15 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	La Center	005P101655		0.260							E094822	02/25/11	8:01 AM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry
No	State Route	La Center	005P101655		0.260							E153005	01/29/12	5:58 PM	Possible Injury	1	0	2	0	0	At Intersection and Related	Raining	Wet
No	State Route	La Center	005P101655		0.260							E238410	04/13/13	3:53 PM	No Injury	0	0	2	0	0	At Intersection and Related	Overcast	Wet
No	State Route	La Center	005P101655		0.260							2680799	09/10/13	4:07 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry
No	State Route	La Center	005P101655		0.260							E045846	03/15/10	8:55 AM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry
No	State Route	La Center	005R101707		0.230							E115187	07/05/11	12:45 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	La Center	005S101640		0.040							E277391	10/08/13	8:49 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Wet
No	State Route	La Center	005S101640		0.110							E015477	02/26/09	6:12 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Ice
	City Street	Ridgefield	N 4TH AVE	400				299	F	S	NW DIVISION ST	2447188	06/03/10	7:56 PM	No Injury	0	0	3	0	0	Not at Intersection and Not Related	Raining	Wet
	City Street	Ridgefield	N 5TH WAY	2100				27	F	W	N 22ND CT	2447231	07/03/11	10:49 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
	City Street	Ridgefield	N 65TH AVE	500				433	F	N	NW 11TH AVE	2447052	06/08/13	1:35 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
	City Street	Ridgefield	N FALCON DR	1800				197	F	E	N 18TH PL	2447181	03/10/10	8:14 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Wet
	City Street	Ridgefield	N HERON DR	600				297	F	NW	N 7TH PL	E219390	01/08/13	7:46 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Sand/Mud/Dirt
	City Street	Ridgefield	N MAIN AVE	900				300	F	S	N DEPOT ST	E278758	10/19/13	7:00 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
	City Street	Ridgefield	N REIMAN RD	400				2,000	F	S	N 5 WAY	2447310	09/13/09	8:25 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
	City Street	Ridgefield	N REIMAN RD	600				80	F	S	N 5TH WAY	2447186	05/09/10	8:09 PM	Serious Injury	3	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
	City Street	Ridgefield	NE 10TH AVE	27400				0.25	M	S	NE 279TH ST	2447207	01/15/11	2:06 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Standing Water
	City Street	Ridgefield	NE 10TH AVE	27700				0.14	M	S	NE 279TH ST	2447202	01/06/11	3:58 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Fog or Smog or Smoke	Wet
	City Street	Ridgefield	NW 31ST AVE	22900				237	F	S	NW 229TH ST	E187995	08/11/12	8:36 PM	Serious Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
	City Street	Ridgefield	NW 31ST AVE	22800				82	F	S	NW 229TH ST	E224715	01/29/13	11:12 AM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Raining	Wet
	City Street	Ridgefield	NW COOK ST	0				112	F	E	N RAILROAD AVE	2447180	02/07/10	2:45 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Dry
	City Street	Ridgefield	NW HILLHURST RD	23100				250	F	NW	NW 229TH ST	2447204	01/13/11	11:32 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Wet
	City Street	Ridgefield	NW HILLHURST RD	22900						NW	NW 229TH ST	2447224	01/11/12	7:38 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice
	City Street	Ridgefield	NW HILLHURST RD	23500				387	F	NW	NW CARTY RD	E278775	10/19/13	3:30 PM	Unknown	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
	City Street	Ridgefield	PIONEER ST	6300				50	F	W	N 65 AVE	2737710	03/29/09	7:55 AM	Possible Injury	2	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Wet
	City Street	Ridgefield	S 12 PL AT S 4 WAY									2447315	12/12/09	11:16 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Ice
	City Street	Ridgefield	S 25 PL AT S 4 WY	400								2737707	02/06/09	6:33 PM	Serious Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
	City Street	Ridgefield	S 31ST CT	2100				354	F	N	S 23RD WAY	E271210	09/07/13	4:30 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Fog or Smog or Smoke	Wet
	City Street	Ridgefield	S 35TH PL					65	F	S	S 3RD WAY	E165023	03/26/12	11:28 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Dry
	City Street	Ridgefield	S 45TH AVE					100.6	F	S	PIONEER ST	2446977	05/06/12	10:00 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
	City Street	Ridgefield	S 45TH AVE	600				371	F	S	S 5TH WAY	2447002	12/02/12	12:20 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet
	City Street	Ridgefield	S 56TH PL	600				47	F	N	S 6TH WAY	E298973	12/06/13	11:00 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Ice
	City Street	Ridgefield	S 5TH ST	6900				200	F	W	S UNION RIDGE PKWY	E281213	10/28/13	1:40 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
	City Street	Ridgefield	S 5TH ST	6900				255	F	W	S UNION RIDGE PKWY	2447225	03/16/12	1:16 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Wet
	City Street	Ridgefield	S 8TH AVE	100				30	F	S	N HIGHLAND ST	2446976	07/17/11	12:39 PM	No Injury	0	0	2	0	0	At Driveway	Raining	Wet
	City Street	Ridgefield	S CEDAR RIDGE DR	3159				100	F	W	S 32 PL	2427164	12/12/09	9:10 PM	No Injury	0	0	1	0	0	Driveway Related but Not at Driveway	Sleet or Hail or Freezing Rain	Ice
	City Street	Ridgefield	S HILLHURST RD	3600								2447308	07/10/09	2:45 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
	City Street	Ridgefield	S UNION RIDGE PARKWAY	8400								2447275	07/01/09	2:34 AM	Possible Injury	1	0	1	0	0	At Driveway	Clear or Partly Cloudy	Dry
	City Street	Ridgefield	SIMONS ST	200				87	F	E	N MAIN AVE	2446986	10/02/13	8:15 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Raining	Wet
	City Street	Ridgefield	N 5TH WAY	2100		N 22ND CT						2447009	03/17/13	1:45 AM	Evident Injury	1	0	1	0	0	At Intersection and Not Related	Unknown	Unknown
	City Street	Ridgefield	N 1ST CIR	6300		N 65TH AVE						2447244	11/22/11	11:58 AM	No Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet
	City Street	Ridgefield	N 10 ST			N 85 AVE						2447236	08/11/11	2:15 PM	Possible Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry
	City Street	Ridgefield	N MAIN AVE	400		N ASH ST						2737712	03/01/10	3:34 PM	No Injury	0	0	2	0	0	At Intersection and Not Related	Overcast	Dry
	City Street	Ridgefield	N MAIN AV			N DIVISION ST						2447309	09/12/09	4:28 PM	Serious Injury	2	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry
	City Street	Ridgefield	S 9TH AVE /S HILLHURST RD	100		N HIGHLAND ST						2446978	06/01/12	2:30 PM	No Injury	0	0	1	0	0	At Intersection and Not Related	Clear or Partly Cloudy	Dry
	City Street	Ridgefield	S 85TH AVE			NE 259TH ST						E251532	06/18/13	9:51 AM	Possible Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry
	City Street	Ridgefield	S 65TH AVE	0		PIONEER ST						2737720	10/15/10	8:30 AM	No Injury	0	0	2	0	0	At Intersection and Related	Fog or Smog or Smoke	Dry
	City Street	Ridgefield	S 32ND PL	0		S 1ST ST						2447241	11/09/11	8:30 AM	No Injury	0	0	2	0	0	At Intersection and Not Related	Clear or Partly Cloudy	Dry
	City Street	Ridgefield	S 85TH AVE	700		S 5TH ST						2447199	09/08/10	12:42 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry
	City Street	Ridgefield	S 85TH AVE	700		S 5TH ST						2447217	06/02/11	10:01 AM	No Injury	0	0	2	0	0	At Intersection and Related	Overcast	Wet
	City Street	Ridgefield	S 85TH AVE	700		S 5TH ST						2447319	02/08/10	10:19 AM	Possible Injury	1	0	3	0	0	At Driveway within Major Intersection	Fog or Smog or Smoke	Dry
	City Street	Ridgefield	S UNION RIDGE PKWY			S 5TH ST						2447183	04/10/10	10:06 PM	No Injury	0	0	1	0	0	At Intersection and Related	Overcast	Dry
	City Street	Ridgefield	NW HILLHURST RD	23800		S ROYLE RD						2447215	04/21/11	6:50 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry
	City Street	Ridgefield	S 11TH ST	6400		S TIMM RD						2447010	04/06/13	5:03 AM	No Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet
	City Street	Ridgefield	S 5TH ST	7300		S UNION RIDGE PKWY						2447185	05/04/10	9:46 AM	Evident Injury	2	0	3	0	0	At Intersection and Related	Raining	Wet
	City Street	Ridgefield	S 85 AVE			S UNION RIDGE PKWY						2447214	04/14/11	4:59 PM	No Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet
	City Street	Ridgefield	S 85TH AVE	900		S UNION RIDGE PKWY						E174486	06/09/12	9:26 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry
	City Street	Ridgefield	SE 164TH AVE			SE MCGILLIVRAY BLVD						3598334	05/23/13	8:45 PM	Serious Injury	4	0	2	0	0	At Intersection and Related	Raining	Wet
No	State Route	Ridgefield	005		13.110							E024015	07/26/09	6:00 AM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		13.110							3254276	10/21/10	6:55 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Dry
No	State Route	Ridgefield	005		13.170							E264210	08/07/13	6:08 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		13.170							E183438	07/23/12	3:20 PM	No Injury	0	0	3	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		13.210							E039904	01/10/10	7:40 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		13.210							E251355	06/16/13	7:10 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		13.290							E288469	11/21/13	10:27 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		13.300							E171273	05/15/12	12:25 PM	Evident Injury	1	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		13.320							E169797	05/14/12	2:30 AM	Unknown	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		13.380							E294402	12/20/13	4:09 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Dry
No	State Route	Ridgefield	005		13.400							E220603	01/11/13	5:25 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice
No	State Route	Ridgefield	005		13.400							E222235	01/11/13	5:25 AM	Unknown	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice
No	State Route	Ridgefield	005		13.400							E288452	11/14/13	4:28 PM	Possible Injury	1	0	3	0	0	Not at Intersection and Not Related	Raining	Wet
No	State Route	Ridgefield	005		13.400							2750330	01/02/09	8:50 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Snow/Slush
No	State Route	Ridgefield	005		13.400							E260879	07/27/13	12:45 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		13.420							E121255	08/20/11	7:05 AM	Evident Injury	1	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		13.440							E089820	01/29/11	11:45 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		13.450							E120673	08/14/11	10:45 PM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		13.460							E206936	11/12/12	6:52 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet
No	State Route	Ridgefield	005		13.500							2447209	02/23/11	11:56 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Sleet or Hail or Freezing Rain	Ice
No	State Route	Ridgefield	005		13.500							E073846	10/18/10	7:53 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		13.520							E244253	05/04/13	11:38 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		13.620							2750241	03/28/10	3:03 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Raining	Wet
No	State Route	Ridgefield	005		13.680							E149266	01/11/12	11:39 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		13.710							E052972	05/20/10	5:45 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Dry
No	State Route	Ridgefield	005		13.760							E293746	12/11/13	5:18 AM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Fog or Smog or Smoke	Wet
No	State Route	Ridgefield	005		13.770							E147634	12/31/11	7:06 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Ice
No	State Route	Ridgefield	005		13.780							3318588	12/09/11	6:50 AM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice
No	State Route	Ridgefield	005		13.800							E098908	03/27/11	3:17 PM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Overcast	Wet
No	State Route	Ridgefield	005		13.800							E175379	06/05/12	10:33 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet
No	State Route	Ridgefield	005		13.800							E015431	02/23/09	6:36 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Wet
No	State Route	Ridgefield	005		13.950							E094629	02/23/11	7:39 AM	Possible Injury	1	0	2	0	0	At Intersection and Related	Snowing	Snow/Slush
No	State Route	Ridgefield	005		13.950							2750501	02/26/09	6:22 AM	Serious Injury	1	0	2	0	0	Not at Intersection and Not Related	Overcast	Ice
No	State Route	Ridgefield	005		14.000							E171468	05/15/12	1:06 PM	Evident Injury	1	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		14.000							E293747	12/11/13	5:37 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Fog or Smog or Smoke	Wet
No	State Route	Ridgefield	005		14.010							E181069	07/13/12	7:23 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		14.020							E020240	05/21/09	5:55 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		14.020							E143076	12/09/11	3:45 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		14.030							E198563	10/15/12	2:27 AM	Unknown	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet
No	State Route	Ridgefield	005		14.050							E058846	06/27/10	8:06 PM	Evident Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		14.060							E252408	05/31/13	4:33 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		14.060							E098896	03/27/11	2:47 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Wet
No	State Route	Ridgefield	005		14.080							E111641	06/21/11	4:35 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		14.120							3254361	07/13/11	2:10 PM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		14.130							E228731	02/21/13	11:26 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Raining	Wet
No	State Route	Ridgefield	005		14.130							2741869	11/08/10	2:08 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		14.140							E098907	03/27/11	2:49 PM	Possible Injury	2	0	5	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Wet
No	State Route	Ridgefield	005		14.160							E251674	06/14/13	9:20 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		14.190							3318532	03/16/10	1:43 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry
No	State Route	Ridgefield	005		14.200							E035936	12/12/09	9:14 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry

REPORT NUMBER	LIGHTING CONDITIONS	FIRST COLLISION TYPE / OBJECT STRUCK	VEHICLE 1 TYPE	VEH 1 ACTION	MV DRIVER CONT CIRC 1 (UNIT 1)	MV DRIVER CONT CIRC 2 (UNIT 1)	MV DRIVER CONT CIRC 3 (UNIT 1)	VEH 1 COMP DIR FROM	VEH 1 COMP DIR TO	VEHICLE 2 TYPE	VEH 2 ACTION	MV DRIVER CONT CIRC 1 (UNIT 2)	MV DRIVER CONT CIRC 2 (UNIT 2)	MV DRIVER CONT CIRC 3 (UNIT 2)	VEH 2 COMP DIR FROM	VEH 2 COMP DIR TO
E058845	Daylight	Other object	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			Northwest	Southeast							
3168930	Daylight	From opposite direction - one left turn - one straight	Passenger Car	Making Left Turn	Did Not Grant RW to Vehicle			West	North	Passenger Car	Going Straight Ahead	None			East	West
3318549	Daylight	Entering at angle	Pickup,Panel Truck or Vanette under 10,000 lb	Making Left Turn	Did Not Grant RW to Vehicle			South	West	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			West	East
2427297	Daylight	From same direction - both going straight - both moving - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely			West	East	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	None			West	East
E257122	Daylight	Vehicle overturned	Pickup,Panel Truck or Vanette under 10,000 lb	Making Right Turn	Under Influence of Alcohol			East	North							
E222930	Dark-Street Lights Off	Entering at angle	Passenger Car	Going Straight Ahead	Did Not Grant RW to Vehicle			South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			East	West
E127067	Daylight	From opposite direction - one left turn - one straight	Pickup,Panel Truck or Vanette under 10,000 lb	Making Left Turn	Driver Operating Other Electronic Device	Did Not Grant RW to Vehicle		West	North	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			East	West
E233684	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			West	Vehicle Stopped	Passenger Car	Going Straight Ahead	Inattention	Follow Too Closely		West	East
E124803	Daylight	From opposite direction - one left turn - one straight	Passenger Car	Making Left Turn	Did Not Grant RW to Vehicle			West	North	Passenger Car	Going Straight Ahead	None			East	West
E265940	Daylight	Roadway Ditch	Motorcycle	Slowing	Driver Not Distracted			South	North							
E094822	Daylight	From same direction - one right turn - one straight	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Making Right Turn	None			South	East
E153005	Dark-Street Lights On	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely	Unknown Driver Distraction		South	North	Passenger Car	Stopped at Signal or Stop Sign	None			South	Vehicle Stopped
E238410	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			South	North	Passenger Car	Starting in Traffic Lane	None			South	North
2680799	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely			South	North	Passenger Car	Stopped at Signal or Stop Sign	None			South	Vehicle Stopped
E045846	Dawn	From same direction - all others	Pickup,Panel Truck or Vanette under 10,000 lb	Backing	Did Not Grant RW to Vehicle			South	Vehicle Backing	Truck Tractor & Semi-Trailer	Making Right Turn	Failing to Signal			South	East
E115187	Daylight	Guardrail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	Other			North	South							
E277391	Daylight	Fence	Passenger Car	Other*	Exceeding Reas. Safe Speed			West	South							
E015477	Dawn	Vehicle overturned	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			Northwest	Southeast							
2447188	Daylight	One parked--one moving	Passenger Car	Going Straight Ahead	Under Influence of Alcohol	Under Influence of Drugs	Apparently Asleep	South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Legally Parked, Unoccupied					
2447231	Dark-Street Lights On	Other object	Passenger Car	Going Straight Ahead	Under Influence of Alcohol	Over Center Line	Exceeding Reas. Safe Speed	East	West							
2447052	Dark-Street Lights Off	Roadway Ditch	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Under Influence of Alcohol	Inattention		North	Northeast							
2447181	Daylight	From opposite direction - both moving - head-on	Passenger Car	Going Straight Ahead	Over Center Line			South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Over Center Line			North	West
E219390	Dawn	Tree or Stump (stationary)	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			East	West							
E278758	Dark-Street Lights On	One parked--one moving	Passenger Car	Going Straight Ahead	Inattention			North	South	Passenger Car	Legally Parked, Unoccupied					
2447310	Dark-No Street Lights	Tree or Stump (stationary)	Passenger Car	Going Straight Ahead	Under Influence of Alcohol	Had Taken Medication	Driver Operating Handheld Telecommunicat	South	North							
2447186	Daylight	Vehicle overturned	Passenger Car	Going Straight Ahead	Exceeding Stated Speed Limit			North	South							
2447207	Daylight	Utility Pole	Passenger Car	Going Straight Ahead	Under Influence of Alcohol	Over Center Line		South	North							
2447202	Dark-No Street Lights	Roadway Ditch	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Driver Distractions Outside Vehicle			North	South							
E187995	Dark-No Street Lights	Fence	Motorcycle	Going Straight Ahead	Under Influence of Alcohol	Exceeding Reas. Safe Speed	Over Center Line	North	South							
E224715	Daylight	Roadway Ditch	Passenger Car	Going Straight Ahead	Driver Distractions Outside Vehicle			South	North							
2447180	Dark-Street Lights On	One parked--one moving	Passenger Car	Backing	Under Influence of Alcohol	Improper Backing		West	Vehicle Backing	Passenger Car	Illegally Parked, Unoccupied	None				
2447204	Daylight	Roadway Ditch	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North							
2447224	Daylight	Roadway Ditch	Passenger Car	Going Straight Ahead	Over Center Line			South	North							
E278775	Daylight	Roadway Ditch	Passenger Car	Going Straight Ahead	Other			North	South							
2737710	Daylight	From opposite direction - both moving - head-on	Passenger Car	Going Straight Ahead	Apparently Asleep			West	Southeast	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			Southeast	West
2447315	Dark-Street Lights On	Roadway Ditch	Passenger Car	Going Straight Ahead	Under Influence of Alcohol	Exceeding Reas. Safe Speed		East	West							
2737707	Dark-No Street Lights	Fence	Other	Going Straight Ahead	Operating Defective Equipment			South	West							
E271210	Dark-Street Lights On	Street Light Pole or Base	Passenger Car	Going Straight Ahead	Under Influence of Alcohol			Southeast	Northwest							
E165023	Daylight	Curb, Raised Traffic Island or Raised Median Curb	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Driver Interacting with Passengers, Anim			North	South							
2446977	Daylight	Wood Sign Post	Passenger Car	Going Straight Ahead	Other			North	South							
2447002	Dark-No Street Lights	Tree or Stump (stationary)	Passenger Car	Going Straight Ahead	Driver Distractions Outside Vehicle			South	North							
E298973	Daylight	From opposite direction - both moving - head-on	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			East	North	Passenger Car	Going Straight Ahead	None			North	South
E281213	Dark-Street Lights On	Roadway Ditch	Truck Tractor & Semi-Trailer	Going Straight Ahead	Driver Interacting with Passengers, Anim			North	West							
2447225	Daylight	Roadway Ditch	Truck Tractor & Semi-Trailer	Going Straight Ahead	Driver Reading or Writing			East	West							
2446976	Daylight	Entering at angle	Pickup,Panel Truck or Vanette under 10,000 lb	Making Left Turn	Did Not Grant RW to Vehicle			West	North	Passenger Car	Going Straight Ahead	None			North	South
2427164	Dark-Street Lights On	Street Light Pole or Base	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	None			Northeast	Southwest							
2447308	Daylight	Utility Pole	Truck (Flatbad,Van,etc)	Slowing	Other			South	North							
2447275	Dark-Street Lights On	Vehicle overturned	Motorcycle	Making Left Turn	Operating Defective Equipment			North	East							
2446986	Dark-No Street Lights	One parked--one moving	Pickup,Panel Truck or Vanette under 10,000 lb	Legally Parked, Unoccupied						Not Stated	Going Straight Ahead	Inattention			West	East
2447009	Dark-Street Lights On	Street Light Pole or Base	Passenger Car	Going Straight Ahead	Apparently Asleep			East	West							
2447244	Daylight	Entering at angle	Passenger Car	Slowing	Disregard Stop Sign - Flashing Red			North		Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			East	West
2447236	Daylight	Entering at angle	Pickup,Panel Truck or Vanette under 10,000 lb	Starting in Traffic Lane	Did Not Grant RW to Vehicle			West	East	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			North	South
2737712	Daylight	One parked--one moving	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Apparently Fatigued			South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Legally Parked, Unoccupied					
2447309	Daylight	Entering at angle	Passenger Car	Going Straight Ahead	None			North	South	Passenger Car	Going Straight Ahead	Disregard Stop Sign - Flashing Red			East	West
2446978	Daylight	Tree or Stump (stationary)	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Over Center Line	Operating Defective Equipment		South	North							
E251532	Daylight	Entering at angle	Passenger Car	Going Straight Ahead	Did Not Grant RW to Vehicle			East	West	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			North	South
2737720	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely			South	North	Passenger Car	Stopped at Signal or Stop Sign	None			South	Vehicle Stopped
2447241	Daylight	One parked--one moving	Pickup,Panel Truck or Vanette under 10,000 lb	Starting From Parked Position	Over Center Line			South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Legally Parked, Unoccupied					
2447199	Daylight	Entering at angle	Passenger Car	Going Straight Ahead	None			North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Starting in Traffic Lane	Did Not Grant RW to Vehicle			West	East
2447217	Daylight	Entering at angle	Passenger Car	Starting in Traffic Lane	Did Not Grant RW to Vehicle			West	East	Passenger Car	Going Straight Ahead	None			North	South
2447319	Daylight	Entering at angle	Pickup,Panel Truck or Vanette under 10,000 lb	Starting in Traffic Lane	Did Not Grant RW to Vehicle			West	East	Passenger Car	Going Straight Ahead	None			South	North
2447183	Dark-Street Lights On	Roadway Ditch	Passenger Car	Making Left Turn	Disregard Stop Sign - Flashing Red			South	West							
2447215	Daylight	From same direction - all others	School Bus	Backing	Improper Backing	Inattention		North	Vehicle Backing	Passenger Car	Going Straight Ahead	None			North	South
2447010	Dark-Street Lights On	Fence	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Under Influence of Alcohol	Disregard Stop Sign - Flashing Red	Exceeding Reas. Safe Speed	West	East	Passenger Car	Overtaking and Passing	Exceeding Stated Speed Limit	Improper Passing	Disregard Stop Sign - Flashing Red	West	East
2447185	Daylight	Entering at angle	Passenger Car	Going Straight Ahead	None			West	East	Passenger Car	Making Left Turn	Did Not Grant RW to Vehicle			South	West
2447214	Daylight	Entering at angle	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Under Influence of Alcohol	Disregard Stop Sign - Flashing Red		West	East	Passenger Car	Going Straight Ahead	None			South	North
E174486	Dark-Street Lights On	Entering at angle	Passenger Car	Going Straight Ahead	Disregard Stop Sign - Flashing Red			North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			West	East
3598334	Dark-Street Lights On	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Unknown Driver Distraction			North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped at Signal or Stop Sign	Driver Not Distracted			Vehicle Backing	Vehicle Stopped
E024015	Dawn	Vehicle overturned	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Unknown Driver Distraction			North	South							
3254276	Dark-Street Lights On	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Overtaking and Passing	Under Influence of Alcohol	Under Influence of Drugs	Improper Passing	North	South	Passenger Car	Going Straight Ahead	None			North	South
E264210	Daylight	From same direction - both going straight - both moving - sideswipe	Truck Tractor & Semi-Trailer	Changing Lanes	Other			South	North	Passenger Car	Going Straight Ahead	None			South	North
E183438	Daylight	From same direction - all others	Other	Going Straight Ahead	Operating Defective Equipment			North	South	Passenger Car	Going Straight Ahead	None			North	South
E039904	Dawn	Cable Barrier	Passenger Car	Going Straight Ahead	Apparently Asleep			Southeast	Northwest							
E251355	Daylight	Cable Barrier	Passenger Car	Going Straight Ahead	Apparently Fatigued			South	North							
E288469	Dark-Street Lights On	Guardrail - Face	Passenger Car	Going Straight Ahead	Inattention	Exceeding Reas. Safe Speed		North	South							
E171273	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Changing Lanes	Inattention			North	South	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			North	South
E169797	Dark-Street Lights On	Cable Barrier	Passenger Car	Going Straight Ahead	Other			South	North							
E294402	Dark-No Street Lights	Guardrail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Under Influence of Drugs			South	North							
E220603	Dark-Street Lights On	Cable Barrier	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North							
E222235	Dark-Street Lights On	Cable Barrier	Truck (Flatbad,Van,etc)	Going Straight Ahead	Other			South	North							
E288452	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Other			South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	None			South	North
2750330	Daylight	Cable Barrier	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North							
E260879	Dark-No Street Lights	Other object	Passenger Car	Going Straight Ahead	Inattention	Over Center Line		South	North							
E121255	Daylight	From same direction - both going straight - both moving - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Apparently Asleep	Exceeding Reas. Safe Speed		North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			North	South
E089820	Daylight	Guardrail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Operating Defective Equipment			South	North							
E120673	Dark-Street Lights On	Guardrail - Face	Passenger Car	Going Straight Ahead	Driver Interacting with Passengers, Anim			South	North							
E206936	Dark-Street Lights On	Vehicle Strikes Deer	Passenger Car	Going Straight Ahead	None			South	North							
2447209	Dark-Street Lights Off	From same direction - all others	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			South	North
E073846	Dark-Street Lights On	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	None			North	South	Passenger Car	Going Straight Ahead	Other			North	South
E244253	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Did Not Grant RW to Vehicle			North	South	Passenger Car	Going Straight Ahead	Did Not Grant RW to Vehicle			North	South
2750241	Dark-Street Lights Off	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			North	South	Truck & Trailer	Going Straight Ahead	None			North	South
E149266	Dark-Street Lights On	Earth Bank or Ledge	Passenger Car	Going Straight Ahead	Under Influence of Alcohol			North	South							
E052972	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	None			South	North
E293746	Dark-Street Lights On	Guardrail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South							
E147634	Dawn	Concrete Barrier/Jersey Barrier - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North							
3318588	Dawn	Guardrail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North							
E098908	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Overtaking and Passing	Improper Passing			South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			South	North
E175379	Daylight	Cable Barrier	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Apparently Ill			South	North							
E015431	Dark-No Street Lights	Cable Barrier	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Exceeding Reas. Safe Speed			North	South							
E094629	Daylight	From same direction - all others	Passenger Car	Merging (Entering Traffic)	Exceeding Reas. Safe Speed	Operating Defective Equipment		North	South	Passenger Car	Changing Lanes	None			North	South
2750501	Dark-Street Lights On	From same direction - all others	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North	Passenger Car	Going Straight Ahead	None			South	North
E171468	Daylight	From same direction - both going straight - both moving - rear-end	Truck Tractor & Semi-Trailer	Slowing	Follow Too Closely			North	South	Truck Tractor & Semi-Trailer	Slowing	Follow Too Closely			North	South
E293747	Dark-Street Lights On	From same direction - all others	Truck Tractor	Going Straight Ahead	Other			North	South	Truck - Double Trailer Combinations	Going Straight Ahead	None			North	South
E181069	Daylight	Cable Barrier	Passenger Car	Going Straight Ahead	Follow Too Closely			South	North							
E020240	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Did Not Grant RW to Vehicle			North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			North	South
E143076	Daylight	Concrete Barrier/Jersey Barrier - Face	Passenger Car	Going Straight Ahead	Other Driver Distractions Inside Vehicle			North	South							
E198563	Dark-Street Lights On	Cable Barrier	Passenger Car	Going Straight Ahead	Other			North	South							
E058846	Dark-Street Lights On	Construction Materials	Motorcycle	Changing Lanes	Inattention			South	North							
E252408	Daylight	Guardrail - Leading End	Passenger Car	Going Straight Ahead	None			North	South							
E098896	Daylight	Guardrail - Leading End	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North							
E111641	Daylight	Vehicle overturned	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Operating Defective Equipment			South	North							
3254361	Daylight	From same direction - all others	Passenger Car	Going Straight Ahead	Operating Defective Equipment			South	North	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			South	North
E228731	Daylight	From same direction - both going straight - both moving - sideswipe	Truck Tractor & Semi-Trailer	Changing Lanes	Did Not Grant RW to Vehicle			North	South	Passenger Car	Going Straight Ahead	None			North	South
2741869	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely			South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			South	Vehicle Stopped
E098907	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			South	Vehicle Stopped
E251674	Dark-Street Lights On	Vehicle Strikes Deer	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			North	South							
3318532	Dark-Street Lights On	From same direction - both going straight - both moving - sideswipe	Truck Tractor & Semi-Trailer	Changing Lanes	Did Not Grant RW to Vehicle			North	South	Passenger Car	Going Straight Ahead	None			North	South
E035936	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Did Not Grant RW to Vehicle			Northwest	Southeast	Passenger Car	Going Straight Ahead	None			Northwest	Southeast

REPORT NUMBER	PEDESTRIAN ACTION (UNIT 2)	PEDESTRIAN CONT CIRC 1 (UNIT 2)	PEDESTRIAN CONT CIRC 2 (UNIT 2)	PEDCYCLIST ACTION (UNIT 1)	PEDCYCLIST CONT CIRC 1 (UNIT 1)	PEDCYCLIST CONT CIRC 2 (UNIT 1)	PEDCYCLIST ACTION (UNIT 2)	PEDCYCLIST CONT CIRC 1 (UNIT 2)	PEDCYCLIST CONT CIRC 2 (UNIT 2)	IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)
E058845										Lane 2 Decreasing Milepost
3168930										Lane 1 LX Decreasing Milepost
3318549										Lane 1 LX Increasing Milepost (Prior to 2002 Impact Location Code was not lane specific)
2427297										Lane 1 LX Increasing Milepost (Prior to 2002 Impact Location Code was not lane specific)
E257122										Left Shoulder On Ramp Increasing Milepost Side of Mainline
E222930										Lane 1 LX Decreasing Milepost
E127067										Lane 1 LX Decreasing Milepost
E233684										Lane 1 LX Increasing Milepost (Prior to 2002 Impact Location Code was not lane specific)
E124803										Lane 1 LX Decreasing Milepost
E265940										Past Left Shoulder Off Ramp Increasing Milepost Side of Mainline
E094822										Lane 1 Off Ramp Increasing Milepost Side of Mainline
E153005										Lane 1 Off Ramp Increasing Milepost Side of Mainline
E238410										Lane 1 Off Ramp Increasing Milepost Side of Mainline
2680799										Lane 1 Off Ramp Increasing Milepost Side of Mainline
E045846										Lane 1 Off Ramp Increasing Milepost Side of Mainline
E115187										Right Shoulder Off Ramp Decreasing Milepost Side of Mainline
E277391										Past Right Shoulder On Ramp Decreasing Milepost Side of Mainline
E015477										Past Right Shoulder On Ramp Decreasing Milepost Side of Mainline
2447188										Outside Shoulder of Primary Trafficway
2447231										Outside Shoulder of Primary Trafficway
2447052										Past the Outside Shoulder of Primary Trafficway
2447181										Lane of Primary Trafficway
E219390										Past the Outside Shoulder of Primary Trafficway
E278758										Outside Shoulder of Primary Trafficway
2447310										
2447186										Past the Outside Shoulder of Primary Trafficway
2447207										Past the Outside Shoulder of Primary Trafficway
2447202										Past the Outside Shoulder of Primary Trafficway
E187995										Past the Outside Shoulder of Primary Trafficway
E224715										Past the Outside Shoulder of Primary Trafficway
2447180										Outside Shoulder of Primary Trafficway
2447204										Past the Outside Shoulder of Primary Trafficway
2447224										Past the Outside Shoulder of Primary Trafficway
E278775										Past the Outside Shoulder of Primary Trafficway
2737710										
2447315										
2737707										
E271210										Past the Outside Shoulder of Primary Trafficway
E165023										Outside Shoulder of Primary Trafficway
2446977										Past the Outside Shoulder of Primary Trafficway
2447002										Past the Outside Shoulder of Primary Trafficway
E298973										Lane of Primary Trafficway
E281213										Past the Outside Shoulder of Primary Trafficway
2447225										Past the Outside Shoulder of Primary Trafficway
2446976										Lane of Primary Trafficway
2427164										
2447308										
2447275										
2446986										Outside Shoulder of Primary Trafficway
2447009										Past the Outside Shoulder of Primary Trafficway
2447244										Lane of Primary Trafficway
2447236										Lane of Primary Trafficway
2737712										Outside Shoulder of Primary Trafficway
2447309										
2446978										Past the Outside Shoulder of Primary Trafficway
E251532										Lane of Primary Trafficway
2737720										Lane of Primary Trafficway
2447241										Outside Shoulder of Primary Trafficway
2447199										Lane of Primary Trafficway
2447217										Lane of Primary Trafficway
2447319										Lane of Primary Trafficway
2447183										Past the Outside Shoulder of Primary Trafficway
2447215										Lane of Primary Trafficway
2447010										Past the Outside Shoulder of Primary Trafficway
2447185										Lane of Primary Trafficway
2447214										Lane of Primary Trafficway
E174486										Lane of Primary Trafficway
3598334										Lane of Primary Trafficway
E024015										Past Right Shoulder Decreasing Milepost
3254276										Lane 3 Decreasing Milepost
E264210										Lane 1 Increasing Milepost
E183438										Lane 2 Decreasing Milepost
E039904										In Median Increasing Milepost
E251355										In Median Increasing Milepost
E288469										Right Shoulder Decreasing Milepost
E171273										Lane 1 Decreasing Milepost
E169797										In Median Increasing Milepost
E294402										Right Shoulder Increasing Milepost
E220603										In Median Increasing Milepost
E222235										In Median Increasing Milepost
E288452										Lane 3 Increasing Milepost
2750330										In Median Increasing Milepost
E260879										Median Shoulder Increasing Milepost
E121255										Lane 1 Decreasing Milepost
E089820										Right Shoulder Increasing Milepost
E120673										Right Shoulder Increasing Milepost
E206936										Lane 2 Increasing Milepost
2447209										Lane 1 Increasing Milepost
E073846										Lane 2 Decreasing Milepost
E244253										Lane 4 Decreasing Milepost
2750241										Lane 2 Decreasing Milepost
E149266										Past Right Shoulder Decreasing Milepost
E052972										Lane 2 Increasing Milepost
E293746										Right Shoulder Decreasing Milepost
E147634										Right Shoulder Off Ramp Increasing Milepost Side of Mainline
3318588										Right Shoulder Off Ramp Increasing Milepost Side of Mainline
E098908										Lane 3 Increasing Milepost
E175379										In Median Increasing Milepost
E015431										In Median Decreasing Milepost
E094629										Lane 3 Decreasing Milepost
2750501										Lane 2 Increasing Milepost
E171468										Lane 2 Decreasing Milepost
E293747										Lane 3 Decreasing Milepost
E181069										Past Right Shoulder Increasing Milepost
E020240										Lane 3 Decreasing Milepost
E143076										Right Shoulder Decreasing Milepost
E198563										In Median Decreasing Milepost
E058846										Past Right Shoulder Increasing Milepost
E252408										Right Shoulder Decreasing Milepost
E098896										Median Shoulder Increasing Milepost
E111641										Past Right Shoulder Increasing Milepost
3254361										Lane 1 Increasing Milepost
E228731										Lane 2 Decreasing Milepost
2741869										Lane 3 Increasing Milepost
E098907										Lane 3 Increasing Milepost
E251674										Lane 2 Decreasing Milepost
3318532										Lane 3 Decreasing Milepost
E035936										Lane 2 Decreasing Milepost

State Route Only History Indicator	JURISDICTION	CITY	PRIMARY TRAFFICWAY	BLOCK NUMBER	MILE POST	INTERSECTING TRAFFICWAY	CO ONLY INTERSECTING COUNTY ROAD MILEPOST	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	#FAT	#VEH	#PEDS	#PEDAL	JUNCTION RELATIONSHIP	WEATHER	ROADWAY SURFACE CONDITIONS	LIGHTING CONDITIONS	FIRST COLLISION TYPE / OBJECT STRUCK	VEHICLE 1 TYPE	VEH 1 ACTION	MV DRIVER CONT CIRC 1 (UNIT 1)	MV DRIVER CONT CIRC 2 (UNIT 1)	MV DRIVER CONT CIRC 3 (UNIT 1)	VEH 1 COMP DIR FROM	VEH 1 COMP DIR TO	VEHICLE 2 TYPE	VEH 2 ACTION	MV DRIVER CONT CIRC 1 (UNIT 2)	MV DRIVER CONT CIRC 2 (UNIT 2)	MV DRIVER CONT CIRC 3 (UNIT 2)	VEH 2 COMP DIR FROM	VEH 2 COMP DIR TO	PEDESTRIAN ACTION (UNIT 2)	PEDESTRIAN CONT CIRC 1 (UNIT 2)	PEDESTRIAN CONT CIRC 2 (UNIT 2)	PEDCYCLIST ACTION (UNIT 1)	PEDCYCLIST CONT CIRC 1 (UNIT 1)	PEDCYCLIST CONT CIRC 2 (UNIT 1)	PEDCYCLIST ACTION (UNIT 2)	PEDCYCLIST CONT CIRC 1 (UNIT 2)	PEDCYCLIST CONT CIRC 2 (UNIT 2)	IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)
No	State Route	Ridgefield	005		14.200							E029386	10/09/09	1:13 PM	No Injury	0	0	3	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Slowing	None			South	North	Passenger Car	Going Straight Ahead	Follow Too Closely			South	North										Lane 1 Increasing Milepost
No	State Route	Ridgefield	005		14.200							2705306	03/01/12	4:50 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Snowing	Snow/Slush	Dark-Street Lights On	Guardrail - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed	Operating Defective Equipment		North	South																	Median Shoulder Decreasing Milepost
No	State Route	Ridgefield	005		14.210							3317988	11/08/10	1:52 PM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Exceeding Stated Speed Limit	Follow Too Closely		South	North	Truck & Trailer	Going Straight Ahead	None			South	North										Lane 2 Increasing Milepost
No	State Route	Ridgefield	005		14.230							E295748	12/06/13	9:52 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Blowing Sand or Dirt or Snow	Snow/Slush	Daylight	From same direction - all others	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			North	South										Lane 1 Decreasing Milepost
No	State Route	Ridgefield	005		14.250							E046057	03/10/10	6:00 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Dry	Dark-Street Lights On	From same direction - both going straight - both moving - rear-end	Passenger Car	Changing Lanes	Under Influence of Alcohol			North	South	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			North	South										Lane 2 Decreasing Milepost
No	State Route	Ridgefield	005		14.250							2849077	02/26/09	1:20 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Ice	Dark-No Street Lights	Cable Barrier	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest																	In Median Decreasing Milepost
No	State Route	Ridgefield	005		14.290							E227513	02/16/13	4:08 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	From same direction - both going straight - both moving - sideswipe	Passenger Car	Changing Lanes	Did Not Grant RW to Vehicle			South	North	Passenger Car	Going Straight Ahead	None			South	North										Lane 2 Increasing Milepost
No	State Route	Ridgefield	005		14.300							E292228	12/06/13	9:05 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Snowing	Snow/Slush	Daylight	Cable Barrier	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South																	In Median Decreasing Milepost
No	State Route	Ridgefield	005		14.310							3308146	02/26/09	6:13 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Snowing	Ice	Dark-No Street Lights	Cable Barrier	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North																	In Median Increasing Milepost
No	State Route	Ridgefield	005		14.310							E062305	07/26/10	1:08 PM	Possible Injury	3	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely			South	North	Passenger Car	Slowing	None			South	North										Lane 3 Increasing Milepost
No	State Route	Ridgefield	005		14.370							E260455	07/29/13	12:20 PM	Possible Injury	2	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North	Passenger Car	Stopped for Traffic	None			South	Vehicle Stopped										Lane 3 Increasing Milepost
No	State Route	Ridgefield	005		14.370							E292411	12/10/13	3:00 AM	Possible Injury	2	0	2	0	0	Not at Intersection and Not Related	Overcast	Wet	Dark-Street Lights On	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	None			North	South										Lane 2 Decreasing Milepost
No	State Route	Ridgefield	005		14.370							2651748	12/06/13	9:30 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Snow/Slush	Daylight	Cable Barrier	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South																	In Median Decreasing Milepost
No	State Route	Ridgefield	005		14.380							E046327	03/20/10	4:35 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Vehicle overturned	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Apparently Asleep			North	South																	Past Right Shoulder Decreasing Milepost
No	State Route	Ridgefield	005		14.500							E292225	12/06/13	8:00 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Snowing	Snow/Slush	Daylight	Cable Barrier	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South																	In Median Decreasing Milepost
No	State Route	Ridgefield	005		14.500							E021118	06/10/09	3:50 PM	No Injury	0	0	1	0	0	At Intersection and Related	Overcast	Dry	Daylight	Other object	Pickup,Panel Truck or Vanette under 10,000 lb	Merging (Entering Traffic)	Did Not Grant RW to Vehicle			Southeast	Northwest																	Lane 1 Increasing Milepost
No	State Route	Ridgefield	005		14.600							E068516	09/23/10	1:32 AM	Serious Injury	1	0	3	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	From same direction - all others	Passenger Car	Changing Lanes	Under Influence of Alcohol	Exceeding Reas. Safe Speed		South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			South	North										Lane 3 Increasing Milepost
No	State Route	Ridgefield	005		14.610							E073639	10/25/10	4:59 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Wet	Daylight	Rock Bank or Ledge	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Exceeding Reas. Safe Speed			South	North																	Past Right Shoulder Increasing Milepost
No	State Route	Ridgefield	005LX01417		0.020							E238856	04/16/13	6:50 AM	No Injury	0	0	2	0	0	At Intersection and Related	Overcast	Wet	Daylight	Entering at angle	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Disregard Stop and Go Light			East	West	Pickup,Panel Truck or Vanette under 10,000 lb	Making Left Turn	None			South	West										Lane 2 LX Decreasing Milepost
No	State Route	Ridgefield	005LX01417		0.020							2737723	11/17/10	6:06 PM	No Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet	Dark-Street Lights On	Entering at angle	Passenger Car	Going Straight Ahead	None			West	East	Pickup,Panel Truck or Vanette under 10,000 lb	Making Left Turn	Did Not Grant RW to Vehicle			South	West										Lane 1 LX Increasing Milepost (Prior to 2002 Impact Location Code was not lane specific)
Yes	State Route	Ridgefield	005LX01421		0.050							2447299	04/29/09	11:35 AM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Stopped for Traffic	None			Northeast	Vehicle Stopped	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely			Northeast	Southwest										Lane 1 LX Decreasing Milepost
Yes	State Route	Ridgefield	005LX01421		0.050							E022769	06/22/09	12:30 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Other	Going Straight Ahead	Operating Defective Equipment	Disregard Stop and Go Light		Southeast	Northwest	Passenger Car	Going Straight Ahead	None			Southwest	Northeast										Lane 1 LX Increasing Milepost (Prior to 2002 Impact Location Code was not lane specific)
No	State Route	Ridgefield	005S101337		0.200							E286025	11/16/13	8:30 PM	Possible Injury	1	0	1	0	0	Intersection Related but Not at Intersection	Clear or Partly Cloudy	Dry	Dark-Street Lights On	Vehicle Strikes Deer	Passenger Car	Going Straight Ahead	None			North	South																	Lane 1 On Ramp Decreasing Milepost Side of Mainline
No	State Route	Ridgefield	501		16.910							2447273	05/24/09	10:22 AM	Possible Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	One parked--one moving	Moped	Making Left Turn	Improper Turn			North	East	Pickup,Panel Truck or Vanette under 10,000 lb	Legally Parked, Unoccupied															Right Shoulder Increasing Milepost
No	State Route	Ridgefield	501		16.940							2446985	05/08/13	4:30 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	One parked--one moving	Pickup,Panel Truck or Vanette under 10,000 lb	Legally Parked, Unoccupied						Not Stated	Going Straight Ahead	Other			West	East										Right Shoulder Increasing Milepost
No	State Route	Ridgefield	501		16.940							3318073	09/10/13	10:03 AM	No Injury	0	0	2	0	0	At Driveway	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Pickup,Panel Truck or Vanette under 10,000 lb	Making Left Turn	Did Not Grant RW to Vehicle	Inattention		South	West	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			East	West										Lane 1 Decreasing Milepost
No	State Route	Ridgefield	501		16.970							2447177	12/04/09	3:27 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - all others	Pickup,Panel Truck or Vanette under 10,000 lb	Backing	Improper Backing			North	Vehicle Backing	Passenger Car	Stopped for Traffic	None			North	Vehicle Stopped										Intersecting Road Decreasing Milepost
No	State Route	Ridgefield	501		17.240							2447198	09/07/10	7:42 AM	No Injury	0	0	2	0	0	At Driveway	Raining	Wet	Daylight	Entering at angle	Passenger Car	Going Straight Ahead	None			East	West	Passenger Car	Backing	Improper Backing			North	Vehicle Backing										Lane 1 Decreasing Milepost
No	State Route	Ridgefield	501		17.270							2447203	01/12/11	7:50 AM	Possible Injury	1	0	1	1	0	At Intersection and Related	Overcast	Wet	Daylight	Vehicle turning right hits pedestrian	Passenger Car	Making Right Turn	Fail to Yield Row to Pedestrian			South	East								Xing at Intersection - No Signal	None								Intersecting Road Increasing Milepost
No	State Route	Ridgefield	501		17.300							E187299	06/20/12	7:31 PM	No Injury	0	0	1	0	0	At Driveway	Clear or Partly Cloudy	Dry	Daylight	Fence	Passenger Car	Making Right Turn	Improper Turn	Exceeding Reas. Safe Speed		East	North																	Past Right Shoulder Decreasing Milepost
No	State Route	Ridgefield	501		17.320							2447227	06/05/11	11:18 AM	Possible Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped at Signal or Stop Sign	None			Southeast	Vehicle Stopped	Passenger Car	Going Straight Ahead	Driver Interacting with Passengers, Anim			West	East										Intersecting Road Increasing Milepost
No	State Route	Ridgefield	501		17.540							2447051	05/15/13	6:52 AM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dawn	Guardrail - Face	Passenger Car	Going Straight Ahead	Apparently Asleep			East	West																	Right Shoulder Decreasing Milepost
No	State Route	Ridgefield	501		17.580							2447295	01/02/09	9:12 PM	No Injury	0	0	1	0	0	At Driveway but Not Related	Overcast	Ice	Dark-Street Lights On	Utility Pole	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			West	East																	Past Right Shoulder Increasing Milepost
No	State Route	Ridgefield	501		17.590							2447296	01/03/09	11:30 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Ice	Dark-Street Lights On	Tree or Stump (stationary)	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			West	East																	Past Right Shoulder Decreasing Milepost
No	State Route	Ridgefield	501		17.600							2737708	02/20/09	6:19 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Other	Dark-Street Lights On	Vehicle overturned	Passenger Car	Going Straight Ahead	Exceeding Stated Speed Limit			West	East																	Past Right Shoulder Increasing Milepost
No	State Route	Ridgefield	501		17.600							2447192	06/05/10	12:07 PM	Serious Injury	3	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - all others	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			West	East	Passenger Car	Going Straight Ahead	Over Center Line			East	West										Lane 1 Increasing Milepost
No	State Route	Ridgefield	501		17.620							2447221	12/09/11	3:41 AM	Evident Injury	1	0	1	0	0	At Intersection and Not Related	Clear or Partly Cloudy	Ice	Dark-Street Lights On	Utility Pole	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed	Driver Operating Handheld Telecommunicat		West	East																	Past Right Shoulder Increasing Milepost
No	State Route	Ridgefield	501		17.630							2446980	09/06/12	6:05 PM	Evident Injury	1	0	1	0	1	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Vehicle - Pedalcyclist	Passenger Car	Going Straight Ahead	None			East	West														Cyclist Turned Into Path of Vehicle - Same Direction	Did Not Grant RW to Vehicle		Lane 1 Decreasing Milepost
No	State Route	Ridgefield	501		17.870							2447317	12/30/09	9:33 AM	Serious Injury	3	0	2	0	0	Not at Intersection and Not Related	Overcast	Snow/Slush	Daylight	One parked--one moving	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			East	West	Pickup,Panel Truck or Vanette under 10,000 lb	Legally Parked, Unoccupied															Right Shoulder Decreasing Milepost
No	State Route	Ridgefield	501		17.920							2737719	10/15/10	8:53 PM	No Injury	0	0	2	0	0	At Intersection and Related	Unknown	Unknown	Unknown	Entering at angle	Passenger Car	Making Left Turn	Other			North	East	Passenger Car	Going Straight Ahead	Other			West	East										Lane 1 Increasing Milepost
No	State Route	Ridgefield	501		17.920							2447184	04/22/10	3:50 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Passenger Car	Making Left Turn	Did Not Grant RW to Vehicle			North	East	Truck (Flatbad,Van,etc)	Going Straight Ahead	None			West	East										Lane 1 Increasing Milepost
No	State Route	Ridgefield	501		17.920							2737717	09/18/10	11:58 PM	Evident Injury	2	0	1	0	0	At Intersection and Not Related	Raining	Wet	Dark-Street Lights On	Earth Bank or Ledge	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Under Influence of Alcohol	Over Center Line		West	East																	Past Right Shoulder Decreasing Milepost
No	State Route	Ridgefield	501		17.930							E233127	03/19/13	6:41 PM	No Injury	0	0	1	0	0	At Intersection and Related	Raining	Wet	Dusk	Vehicle overturned	Pickup,Panel Truck or Vanette under 10,000 lb	Making Right Turn	Operating Defective Equipment			East	North																	Past Right Shoulder Decreasing Milepost
No	State Route	Ridgefield	501		17.930							2446982	10/26/12	3:08 PM	No Injury	0	0	1	0	0	At Intersection and Related	Raining	Wet	Daylight	Culvert and/or other Appurtenance in Ditch	Pickup,Panel Truck or Vanette under 10,000 lb	Making Right Turn	Exceeding Reas. Safe Speed			East	North																	Past Right Shoulder Decreasing Milepost
No	State Route	Ridgefield	501		18.030							E259677	07/24/13	9:19 PM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	Vehicle overturned	Passenger Car	Going Straight Ahead	Driver Distractions Outside Vehicle			East	West																	Past Right Shoulder Decreasing Milepost
No	State Route	Ridgefield	501		18.030							E262857	07/31/13	9:02 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dusk	Guardrail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Under Influence of Alcohol	Driver Operating Handheld Telecommunicat		East	West																	Right Shoulder Increasing Milepost
No	State Route	Ridgefield	501		18.170							2447226	05/31/11	10:20 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	Guardrail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed	Over Center Line		West	East																	Right Shoulder Increasing Milepost
No	State Route	Ridgefield	501		18.250							2427351	09/05/11	1:10 PM	No Injury	0	0	3	0	0	Intersection Related but Not at Intersection	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			West	East	Passenger Car	Stopped for Traffic	None			West	Vehicle Stopped										Lane 1 Increasing Milepost
No	State Route	Ridgefield	501		18.260							2447229	07/16/11	1:33 PM	No Injury	0	0	2	0	0	At Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			West	East	Passenger Car	Stopped for Traffic	None			West	Vehicle Stopped										Lane 1 Increasing Milepost
No	State Route	Ridgefield	501		18.410							2447007	02/07/13	5:29 PM	Possible Injury	2	0	2	0	0	Intersection Related but Not at Intersection	Clear or Partly Cloudy	Dry	Dusk	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Under Influence of Alcohol	Follow Too Closely		East	West	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			East	Vehicle Stopped										Lane 1 Decreasing Milepost
No	State Route	Ridgefield	501		18.420							2447208	02/19/11	7:11 AM	No Injury	0	0	1	0	0	At Intersection and Not Related	Overcast	Ice	Daylight	Street Light Pole or Base	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			West	East																	Past Right Shoulder Increasing Milepost
No	State Route	Ridgefield	501		18.550							E258891	07/06/13	10:02 PM	No Injury	0	0	1	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	Tree or Stump (stationary)	Passenger Car	Making Right Turn	Exceeding Reas. Safe Speed			West	South																	Past Right Shoulder Increasing Milepost
No	State Route	Ridgefield	501		18.560							2446984	04/29/13	10:40 AM	No Injury	0	0	2	0	0	At Intersection and Related	Overcast	Dry	Daylight	Same direction -- both turning left -- both moving -- sideswipe	Passenger Car	Making Left Turn	None			South	West	Truck Tractor & Semi-Trailer	Making Left Turn	Improper Turn			South	West										Lane 1 Decreasing Milepost
No	State Route	Ridgefield	501		18.590							2447220	12/09/11	8:00 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Daylight	Street Light Pole or Base	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			West	East																	Past Right Shoulder Increasing Milepost
No	State Route	Ridgefield	501		18.710							2447311	09/15/09	7:32 AM	Evident Injury	1	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dawn	From same direction - both going straight - both moving - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			West	East	Pickup,Panel Truck or Vanette under 10,000 lb	Starting in Traffic Lane	None			West	East										Lane 1 Increasing Milepost
No	State Route	Ridgefield	501		18.730							2447223	01/10/12	6:21 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Dark-No Street Lights	Mailbox	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			West	East																	Past Right Shoulder Increasing Milepost
No	State Route	Ridgefield	501		18.800							2447056	09/30/13	11:45 AM	Possible Injury	1	0	2	0	0	At Intersection and Not Related	Overcast	Wet	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped in Roadway	Other			West	East	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely			West	East										Lane 1 Increasing Milepost
No	State Route	Ridgefield	501		19.040							2447182	03/31/10	11:45 AM	No Injury	0	0	2	0	0	Entering Roundabout	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			North	Vehicle Stopped	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely			North	South										Intersecting Road Decreasing Milepost
No	State Route	Ridgefield	501		19.040							2447313	09/25/09	7:59 PM	Serious Injury	1	0	1	0	0	Entering Roundabout	Clear or Partly Cloudy	Dry	Dark-Street Lights On	Retaining Wall (concrete, rock, brick, etc.)	Passenger Car	Going Straight Ahead	Under Influence of Alcohol	Exceeding Stated Speed Limit		North	South																	Decreasing Other Location
No	State Route	Ridgefield	501		19.050							E255707	06/29/13	6:40 PM	No Injury	0	0	1	0	0	Entering Roundabout	Clear or Partly Cloudy	Dry	Daylight	Metal Sign Post	Passenger Car	Going Straight Ahead	Under Influence of Alcohol	Disregard Yield Sign - Flashing Yellow	Exceeding Stated Speed Limit	East	East																	Past Right Shoulder Decreasing Milepost
No	State Route	Ridgefield	501		19.190							2446981	10/10/12	5:30 PM	Evident Injury	2	0	3	0	0	Driveway Related but Not at Driveway	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Driver Adjusting Audio or Entertainment			West	East	Passenger Car	Stopped for Traffic	None			West	Vehicle Stopped										Lane 1 Increasing Milepost
No	State Route	Ridgefield	501		19.390							2447304	02/26/09	8:05 AM	Evident Injury	1	0	2	0	0	Driveway Related but Not at Driveway	Overcast	Ice	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			East	West	Passenger Car	Stopped for Traffic	None			East	Vehicle Stopped										Lane 1 Decreasing Milepost
No	State Route	Ridgefield	501		19.490							2447210	02/24/11	3:13 PM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Truck (Flatbad,Van,etc)	Going Straight Ahead	Follow Too Closely			East	West	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			East	Vehicle Stopped										Lane 1 Decreasing Milepost
No	State Route	Ridgefield	501		19.630							2447222	12/18/11	12:30 PM	No Injury	0	0	1	0	0	At Intersection and Not Related	Overcast	Wet	Daylight	Utility Pole	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Driver Interacting with Passengers, Anim	Other Driver Distractions Inside Vehicle		East	West																	Past Right Shoulder Decreasing Milepost
No	State Route	Ridgefield	501		19.630							2447001	11/23/12	5:40 PM	No Injury	0	0	2	0	0	Entering Roundabout	Unknown	Wet	Dark-Street Lights On	From opposite direction - one left turn - one straight	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			West	East	Pickup,Panel Truck or Vanette under 10,000 lb	Making Left Turn	Did Not Grant RW to Vehicle			East	South										Lane 1 Increasing Milepost
No	State Route	Ridgefield	501		19.630							2447196	08/26/10	8:42 AM	No Injury	0	0	1	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Utility Pole	Truck - Double Trailer Combinations	Going Straight Ahead	None			East	West																	Lane 1 Decreasing Milepost
No	State Route	Ridgefield	501		19.640							2447054	06/24/13	5:50 PM	No Injury	0	0	2	0	0	Circulating Roundabout	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Passenger Car	Going Straight Ahead	None			East	West	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Inattention			East	West										Lane 2 Decreasing Milepost
No	State Route	Ridgefield	501		19.680							E281212	10/28/13	12:38 PM	No Injury	0	0	2	0	0	At Driveway	Clear or Partly Cloudy	Dry	Daylight	From same direction - one right turn - one straight	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other Driver Distractions Inside Vehicle	Did Not Grant RW to Vehicle		East	West	Truck & Trailer	Making Right Turn	Driver Not Distracted			East	North										Lane 1 Decreasing Milepost
No	State Route	Ridgefield	501		19.710							3318068	01/23/11	2:49 AM	No Injury	0	0	1	0	0	At Driveway	Clear or Partly Cloudy	Dry	Dark-Street Lights On	Utility Pole	Pickup,Panel Truck or Vanette under 10,000 lb	Making Left Turn	Exceeding Reas. Safe Speed			East	South																	Intersecting Road Increasing Milepost
No	State Route	Ridgefield	501		19.720							2447314	09/28/09	7:56 PM	Possible Injury	2	0	1	0	0	At Driveway	Raining	Wet	Dark-Street Lights On	Vehicle overturned	Motorcycle	Making Left Turn	Improper Turn			East	South																	Lane 1 Increasing Milepost
No	State Route	Ridgefield	501		19.790							E283013	11/02/13	11:10 AM	Possible Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Inattention			East	West	Pickup,Panel Truck or Vanette under 10,000 lb	Making Left Turn	None			North	East										Lane 1 Decreasing Milepost
No	State Route	Ridgefield	501		19.790							2446983	04/27/13	4:19 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Same direction -- both turning left -- both moving -- sideswipe	Passenger Car	Making Left Turn	Exceeding Reas. Safe Speed			North	East	Pickup,Panel Truck or Vanette under 10,000 lb	Making Left Turn	None			North	East										Lane 2 Increasing Milepost
No	State Route	Ridgefield	501		19.790							2737716	09/17/10	10:14 PM	No Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet	Dark-Street Lights On	From opposite direction - one left turn - one straight	Passenger Car	Going Straight Ahead	Disregard Stop Sign - Flashing Red			West	East	Pickup,Panel Truck or Vanette under 10,000 lb	Making Left Turn	None			East	South										Lane 1 Increasing Milepost
No	State Route	Ridgefield	501		19.790							2447243	11/14/11	8:42 AM	No Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet	Daylight	Entering at angle	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Disregard Stop and Go Light			East	West	Passenger Car	Making Left Turn	None			North	East										Lane 2 Decreasing Milepost
No	State Route	Ridgefield	501		19.870							2447193	07/18/10	9:56 AM	Evident Injury	2	0	1	0	2	At Driveway	Overcast	Dry	Daylight	Vehicle - Pedalcyclist	Pickup,Panel Truck or Vanette under 10,000 lb	Making Left Turn	Fail to Yield Row to Pedestrian			North	East														Riding with Traffic	None		Lane 1 Decreasing Milepost
No	State Route	Woodland	005		20.780							E114368	07/08/11	2:10 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely			Southeast	Northwest	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	None			Southeast	Northwest										Lane 3 Increasing Milepost
No	State Route	Woodland	005		20.780							3515644	07/05/13	3:24 PM	Evident Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Motorcycle	Merging (Entering Traffic)	Other			North	South	Passenger Car	Changing Lanes	Other			North	South										Lane 2 Decreasing Milepost
No	State Route	Woodland	005		20.880							E026233	08/24/09	1:45 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Did Not Grant RW to Vehicle			Northwest	Southeast	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			Northwest	Southeast										Lane 2 Decreasing Milepost
No	State Route	Woodland	005		20.880							E025101	08/07/09	6:10 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Did Not Grant RW to Vehicle			North	South	Passenger Car	Going Straight Ahead	None			North	South										Lane 2 Decreasing Milepost
No	State Route	Woodland	005		20.910							E274277	10/01/13	12:30 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Operating Defective Equipment	Exceeding Reas. Safe Speed		North	South	Not Stated	Going Straight Ahead	None			North	South										Lane 2 Decreasing Milepost
No	State Route	Woodland	005		20.920							E153186	02/04/12	4:56 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Other object	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other			North	South	Passenger Car	Going Straight Ahead	None			North	South										Lane 3 Decreasing Milepost
No	State Route	Woodland	005		20.920							E114369	07/08/11	1:55 PM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Concrete Barrier/Jersey Barrier - Face	Passenger Car	Going Straight Ahead	Inattention			North	South																	Median Shoulder Decreasing Milepost
No	State Route	Woodland	005		21.000							E198936	10/05/12	6:26 AM	Evident Injury	1	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dawn	From same direction - both going straight - both moving - sideswipe	Passenger Car	Going Straight Ahead	Did Not Grant RW to Vehicle			North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			North	South										Lane 1 Increasing Milepost
No	State Route	Woodland	005		21.000							E262168	08/05/13	2:00 PM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Apparently Asleep	Driver Interacting with Passengers, Anim		North	South	Passenger Car	Going Straight Ahead	Driver Not Distracted			North	South										Lane 2 Decreasing Milepost
No	State Route	Woodland	005		21.060							E025470	08/16/09	1:30 PM	No Injury	0	0	5	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Driver Interacting with Passengers, Anim	Follow Too Closely		North	South	Passenger Car	Slowing	None			North	South										Lane 2 Decreasing Milepost
No	State Route	Woodland	005		21.060							E025468	08/16/09	12:55 PM	No Injury	0	0	3	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			Northwest	Southeast	Passenger Car	Slowing	None			Northwest	Southeast										Lane 2 Decreasing Milepost
No	State Route	Woodland	005		21.070							E143848	12/13/11	6:45 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Dawn	Concrete Barrier/Jersey Barrier - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			North	South																	Median Shoulder Decreasing Milepost
No	State Route	Woodland	005		21.100							2680619	11/21/10	7:37 AM	Evident Injury	1	0	1	0	0	Not at Intersection and Not Related	Fog or Smog or Smoke	Ice	Dawn	Bridge Rail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			Northwest	Southeast																	Median Shoulder Decreasing Milepost
No	State Route	Woodland	005		21.130							E156958	03/01/12	5:22 AM	Possible Injury	1	0	1	0	0	Not at Intersection and Not Related	Other	Wet	Dark-No Street Lights	Concrete Barrier/Jersey Barrier - Face	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Northwest	Southeast																	Median Shoulder Decreasing Milepost
No	State Route	Woodland	005		21.130							E017662	04/06/09	6:08 PM	Possible Injury	2	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Concrete Barrier/Jersey Barrier - Face	Passenger Car	Going Straight Ahead	None			Southeast	Northwest																	Median Shoulder Increasing Milepost
No	State Route	Woodland	005		21.200							E018868	05/01/09	5:30 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	Guardrail - Face	Passenger Car	Going Straight Ahead	Driver Distractions Outside Vehicle			Northwest	Southeast																	Right Shoulder Decreasing Milepost
No	State Route	Woodland	005		21.280							E232331	03/03/13	4:45 PM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Under Influence of Alcohol			Southeast	Northwest	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			Southeast	Northwest										Lane 2 Increasing Milepost
No	State Route	Woodland	005		21.300							E053979	05/28/10	6:32 PM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Apparently Asleep			South	North	Truck Tractor & Semi-Trailer	Going Straight Ahead	Other			South	North										Lane 1 Increasing Milepost
No	State Route	Woodland	005		21.300							E112793	06/28/11	6:40 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - all others	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			Southeast	Northwest	Not Stated	Going Straight Ahead	Other			Northwest	Southeast										Lane 3 Increasing Milepost
No	State Route	Woodland	005		21.310							E251083	06/14/13	5:32 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dawn	Concrete Barrier/Jersey Barrier - Face	Passenger Car	Going Straight Ahead	None			North	South																	Median Shoulder Decreasing Milepost
No	State Route	Woodland	005		21.340							E054611	06/02/10	5:03 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	Concrete Barrier/Jersey Barrier - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North																	Median Shoulder Increasing Milepost
No	State Route	Woodland	005		21.380							E143639	12/13/11	1:33 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Fence	Passenger Car	Going Straight Ahead	Inattention			Southeast	Northwest																	Past Right Shoulder Increasing Milepost
No	State Route	Woodland	005		21.390							3204692	07/30/10	2:50 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Fire started in vehicle	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Operating Defective Equipment			Northwest	Southeast																	Lane 1 Decreasing Milepost
No	State Route	Woodland	005		21.400							E085972	01/04/11	6:30 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Dark-No Street Lights	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Did Not Grant RW to Vehicle			North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			North	South										Lane 2 Decreasing Milepost
No	State Route	Woodland	005		21.400							E291801	12/09/13	11:35 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	Guardrail - Face	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Operating Defective Equipment			North	South																	Right Shoulder Decreasing Milepost
No	State Route	Woodland	005		21.400							E281387	10/29/13	11:59 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	Vehicle Strikes Deer	Passenger Car	Going Straight Ahead	None			South	North																	Lane 1 Increasing Milepost
No	State Route	Woodland	005		21.400							E084457	12/25/10	12:16 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Wet	Daylight	Concrete Barrier/Jersey Barrier - Face	Passenger Car	Going Straight Ahead	Other			South	North																	Median Shoulder Increasing Milepost
No	State Route	Woodland	005		21.410							3124306	03/06/12	4:45 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Dark-Street Lights Off	Cable Barrier	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North																	In Median Increasing Milepost
No	State Route	Woodland	005		21.500							E126467	09/16/11	4:05 PM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	None			Northwest	Southeast	Passenger Car	Going Straight Ahead	Follow Too Closely	Apparently Fatigued		Northwest	Southeast										Lane 2 Decreasing Milepost
No	State Route	Woodland	005		21.500							E184532	08/05/12	12:07 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Under Influence of Alcohol			Northwest	Southeast	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			Northwest	Southeast										Lane 1 Decreasing Milepost
No	State Route	Woodland	005		21.500							E090119	01/31/11	10:45 AM	Unknown	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Other object	Not Stated	Going Straight Ahead	Other			South	North																	Right Shoulder Increasing Milepost
No	State Route	Woodland	005		21.500							E202278	10/24/12	10:38 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Overcast	Wet	Daylight	Cable Barrier	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Apparently Asleep			Northwest	Southeast																	In Median Decreasing Milepost
No	State Route	Woodland	005		21.500							E229255	02/16/13	5:21 AM	Dead at Scene	1	1	2	0	0	Not at Intersection and Not Related	Overcast	Dry	Dark-Street Lights On	From opposite direction - both moving - head-on	Passenger Car	Going Wrong Way on Divided Hwy	Under Influence of Alcohol			Northwest	Southeast	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			Southeast	Northwest										Lane 3 Increasing Milepost
No	State Route	Woodland	005		21.500							E249261	06/08/13	11:47 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Concrete Barrier/Jersey Barrier - Face	Passenger Car	Going Straight Ahead	Other			North	South																	Median Shoulder Decreasing Milepost
No	State Route	Woodland	005		21.500							E150320	01/18/12	4:30 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Wet	Dusk	Cable Barrier	Passenger Car	Going Straight Ahead	Operating Defective Equipment			Southeast	Northwest																	In Median Increasing Milepost
No	State Route	Woodland	005		21.500							E179230	07/04/12	11:04 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	Domestic animal other (cat, dog, etc)	Passenger Car	Going Straight Ahead	None			Northwest	Southeast																	Lane 3 Decreasing Milepost
No	State Route	Woodland	005		21.510							E296118	12/21/13	2:26 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Wet	Dark-No Street Lights	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			North	South	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			North	South										Lane 2 Decreasing Milepost
No	State Route	Woodland	005		21.530							E072183	10/15/10	10:10 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Did Not Grant RW to Vehicle			Northwest	Southeast	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			Northwest	Southeast										Lane 2 Decreasing Milepost
No	State Route	Woodland	005		21.580							E024373	07/20/09	11:59 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Passenger Car	Changing Lanes	Did Not Grant RW to Vehicle			Northwest	Southeast	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Did Not Grant RW to Vehicle			Northwest	Southeast										Lane 3 Decreasing Milepost

State Route Only History Indicator	JURISDICTION	CITY	PRIMARY TRAFFICWAY	BLOCK NUMBER	MILE POST	INTERSECTING TRAFFICWAY	CO ONLY INTERSECTING COUNTY ROAD MILEPOST	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	#FAT	#VEH	#PEDS	#PEDAL	JUNCTION RELATIONSHIP	WEATHER	ROADWAY SURFACE CONDITIONS	LIGHTING CONDITIONS	FIRST COLLISION TYPE / OBJECT STRUCK	VEHICLE 1 TYPE	VEH 1 ACTION	MV DRIVER CONT CIRC 1 (UNIT 1)	MV DRIVER CONT CIRC 2 (UNIT 1)	MV DRIVER CONT CIRC 3 (UNIT 1)	VEH 1 COMP DIR FROM	VEH 1 COMP DIR TO	VEHICLE 2 TYPE	VEH 2 ACTION	MV DRIVER CONT CIRC 1 (UNIT 2)	MV DRIVER CONT CIRC 2 (UNIT 2)	MV DRIVER CONT CIRC 3 (UNIT 2)	VEH 2 COMP DIR FROM	VEH 2 COMP DIR TO	PEDESTRIAN ACTION (UNIT 2)	PEDESTRIAN CONT CIRC 1 (UNIT 2)	PEDESTRIAN CONT CIRC 2 (UNIT 2)	PEDCYCLIST ACTION (UNIT 1)	PEDCYCLIST CONT CIRC 1 (UNIT 1)	PEDCYCLIST CONT CIRC 2 (UNIT 1)	PEDCYCLIST ACTION (UNIT 2)	PEDCYCLIST CONT CIRC 1 (UNIT 2)	PEDCYCLIST CONT CIRC 2 (UNIT 2)	IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)
No	State Route	Woodland	005		21.580							E295786	12/19/13	8:45 AM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - all others	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Inattention	Exceeding Reas. Safe Speed		North	South	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			North	South										Lane 1 Decreasing Milepost
No	State Route	Woodland	005		21.580							E293079	12/12/13	6:53 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Dark-No Street Lights	Cable Barrier	Passenger Car	Going Straight Ahead	Exceeding Stated Speed Limit			North	South																	In Median Decreasing Milepost
No	State Route	Woodland	005		21.600							E087456	01/08/11	3:00 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Dark-No Street Lights	Fence	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			South	North																	Past Right Shoulder Increasing Milepost
No	State Route	Woodland	005		21.600							E030411	10/24/09	12:46 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Fog or Smog or Smoke	Dry	Dark-No Street Lights	Vehicle Strikes All Other Non-Domestic Animal	Passenger Car	Going Straight Ahead	None			Southeast	Northwest																	Lane 2 Increasing Milepost
No	State Route	Woodland	005		21.650							E044704	02/27/10	1:26 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Wet	Dark-Street Lights On	From same direction - both going straight - both moving - sideswipe	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Did Not Grant RW to Vehicle			North	South										Lane 2 Decreasing Milepost
No	State Route	Woodland	005		21.680							3556665	02/07/11	11:19 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-No Street Lights	Fence	Passenger Car	Going Straight Ahead	None			Southeast	Northwest																	Past Right Shoulder Increasing Milepost
No	State Route	Woodland	005		21.770							E150000	01/18/12	12:50 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Snowing	Snow/Slush	Dark-Street Lights On	Guardrail - Face	Truck Tractor & Semi-Trailer	Going Straight Ahead	Exceeding Reas. Safe Speed			Northwest	Southeast																	Right Shoulder Decreasing Milepost
No	State Route	Woodland	005		21.800							E293076	12/12/13	6:50 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Dark-No Street Lights	Cable Barrier	Passenger Car	Going Straight Ahead	Inattention	Exceeding Reas. Safe Speed		North	South																	In Median Decreasing Milepost
No	State Route	Woodland	005		21.830							E021268	06/12/09	5:45 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Other object	Passenger Car	Going Straight Ahead	None			Northwest	Southeast																	Lane 3 Decreasing Milepost
No	State Route	Woodland	005		21.840							E210234	12/02/12	5:34 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Raining	Wet	Dark-Street Lights On	Street Light Pole or Base	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Northwest	Southeast																	Past Right Shoulder Decreasing Milepost
No	State Route	Woodland	005		21.860							E158479	03/06/12	6:01 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Dawn	Wood Sign Post	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest																	Past Right Shoulder Increasing Milepost
No	State Route	Woodland	005		21.870							E229562	02/27/13	11:14 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Dry	Dark-Street Lights On	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest	Passenger Car	Slowing	None			Southeast	Northwest										Lane 1 Increasing Milepost
No	State Route	Woodland	005		21.890							E172968	06/02/12	6:08 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Other object	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			Southeast	Northwest																	Lane 1 Increasing Milepost
No	State Route	Woodland	005		21.900							E283574	11/05/13	2:56 AM	Unknown	0	0	1	0	0	At Intersection and Not Related	Raining	Wet	Dark-No Street Lights	Tree or Stump (stationary)	Passenger Car	Other*	Unknown Driver Distraction			South	North																	Past Right Shoulder Increasing Milepost
No	State Route	Woodland	005		21.900							E256846	07/14/13	4:45 PM	No Injury	0	0	2	0	0	At Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Passenger Car	Changing Lanes	Other			South	North	Passenger Car	Going Straight Ahead	None			South	North										Lane 3 Increasing Milepost
No	State Route	Woodland	005		21.900							3124699	01/08/11	2:15 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Dark-Street Lights On	Cable Barrier	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Northwest	Southeast																	In Median Decreasing Milepost
No	State Route	Woodland	005		21.900							E154038	02/11/12	5:34 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Fog or Smog or Smoke	Wet	Dark-No Street Lights	Cable Barrier	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Apparently Asleep			Northwest	Southeast																	In Median Decreasing Milepost
No	State Route	Woodland	005		21.950							E148711	01/10/12	2:15 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Passenger Car	Going Straight Ahead	None			Northwest	Southeast	Passenger Car	Changing Lanes	Did Not Grant RW to Vehicle			Northwest	Southeast										Lane 2 Decreasing Milepost
No	State Route	Woodland	005		21.980							E143641	12/12/11	9:19 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Daylight	From same direction - all others	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			Southeast	Northwest										Lane 1 Increasing Milepost
No	State Route	Woodland	005		22.000							E176646	06/20/12	4:59 PM	Possible Injury	2	0	4	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			Northwest	Southeast	Passenger Car	Stopped for Traffic	None			Northwest	Vehicle Stopped										Lane 2 Decreasing Milepost
No	State Route	Woodland	005		22.000							E278674	10/20/13	2:10 AM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	From same direction - both going straight - both moving - sideswipe	Passenger Car	Going Straight Ahead	None			South	North	Not Stated	Changing Lanes	Other			Northwest	South										Lane 2 Increasing Milepost
No	State Route	Woodland	005		22.000							E172816	05/30/12	2:15 PM	Possible Injury	2	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Did Not Grant RW to Vehicle			Northwest	Southeast	Truck (Flatbad,Van,etc)	Going Straight Ahead	None			Northwest	Southeast										Lane 1 Decreasing Milepost
No	State Route	Woodland	005		22.000							E180702	07/11/12	7:28 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Northeast	Southwest	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			Northeast	Vehicle Stopped										Lane 1 Decreasing Milepost
No	State Route	Woodland	005		22.000							E214471	12/18/12	5:45 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Snowing	Snow/Slush	Dark-No Street Lights	From same direction - all others	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Northwest	Southeast	Truck Tractor & Semi-Trailer	Going Straight Ahead	None			Northwest	Southeast										Lane 1 Decreasing Milepost
No	State Route	Woodland	005		22.010							E025429	08/17/09	1:05 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Stopped for Traffic	None			Northwest	Vehicle Stopped	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely			Northwest	Southeast										Lane 3 Decreasing Milepost
No	State Route	Woodland	005		22.090							E179896	07/10/12	1:54 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Did Not Grant RW to Vehicle			Northwest	Southeast	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			Northwest	Southeast										Lane 3 Decreasing Milepost
No	State Route	Woodland	005		22.100							E044497	02/10/10	3:02 PM	Possible Injury	1	0	3	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	From same direction - both going straight - both moving - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely	Driver Operating Handheld Telecommunicat		South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	None			South	North										Lane 4 Increasing Milepost
No	State Route	Woodland	005		22.100							2674397	09/14/09	1:19 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Fire started in vehicle	Passenger Car	Going Straight Ahead	Operating Defective Equipment			North	South																	Lane 1 Decreasing Milepost
No	State Route	Woodland	005		22.140							E065142	08/22/10	12:41 PM	Serious Injury	1	0	2	0	0	At Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Under Influence of Alcohol	Did Not Grant RW to Vehicle		South	North	Passenger Car	Going Straight Ahead	None			South	North										Lane 1 Increasing Milepost
No	State Route	Woodland	005		22.180							E038357	12/29/09	4:11 PM	No Injury	0	0	2	0	0	At Intersection and Related	Snowing	Snow/Slush	Other	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Merging (Entering Traffic)	Exceeding Reas. Safe Speed	Operating Defective Equipment		Southeast	Northwest	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			Southeast	Northwest										Lane 2 Increasing Milepost
No	State Route	Woodland	005		22.200							E172960	05/29/12	8:44 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dusk	Vehicle Strikes Deer	Passenger Car	Going Straight Ahead	None			Southeast	Northwest																	Lane 2 Increasing Milepost
No	State Route	Woodland	005		22.200							E095828	03/07/11	12:55 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Fire started in vehicle	Passenger Car	Going Straight Ahead	Operating Defective Equipment			South	North																	Lane 1 Increasing Milepost
No	State Route	Woodland	005FD02108		0.070							E075267	11/01/10	5:09 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Raining	Wet	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed	Follow Too Closely	Operating Defective Equipment	North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			North	Vehicle Stopped										Lane 1 Decreasing Milepost
No	State Route	Woodland	005FD02108		0.110							E195403	09/30/12	1:39 PM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			South	North	Passenger Car	Stopped for Traffic	None			South	Vehicle Stopped										Lane 1 Increasing Milepost
No	State Route	Woodland	005FD02108		0.120							E189131	08/27/12	1:33 PM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely			North	South	Passenger Car	Stopped for Traffic	None			North	Vehicle Stopped										Lane 1 Decreasing Milepost
No	State Route	Woodland	005FD02108		0.130							E088292	01/20/11	11:42 AM	No Injury	0	0	2	0	0	At Driveway	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Passenger Car	Making Left Turn	Did Not Grant RW to Vehicle			West	North	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			North	South										Lane 1 Decreasing Milepost
No	State Route	Woodland	005FD02108		0.150							E020366	05/29/09	5:39 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Pickup,Panel Truck or Vanette under 10,000 lb	Making Right Turn	Disregard Stop Sign - Flashing Red			Southwest	Southeast	Passenger Car	Going Straight Ahead	None			Northwest	Southeast										Lane 1 Decreasing Milepost
No	State Route	Woodland	005FD02108		0.150							E124907	09/12/11	5:00 PM	Possible Injury	2	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			South	North	Passenger Car	Making Left Turn	Did Not Grant RW to Vehicle			West	North										Lane 1 Increasing Milepost
No	State Route	Woodland	005FD02108		0.150							E206422	11/16/12	5:07 PM	Possible Injury	1	0	2	0	0	At Intersection and Not Related	Raining	Wet	Dark-Street Lights On	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Inattention	Follow Too Closely		North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			North	Vehicle Stopped										Lane 1 Decreasing Milepost
No	State Route	Woodland	005FD02108		0.210							E080931	12/04/10	12:36 PM	Possible Injury	1	0	3	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			South	Vehicle Stopped										Lane 1 Increasing Milepost
No	State Route	Woodland	005FD02108		0.210							2505915	03/27/09	4:30 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Wet	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Under Influence of Alcohol	Follow Too Closely		North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			North	Vehicle Stopped										Lane 1 Decreasing Milepost
No	State Route	Woodland	005FD02108		0.220							E204999	11/11/12	1:05 PM	No Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet	Daylight	Entering at angle	Passenger Car	Making Left Turn	Did Not Grant RW to Vehicle			South	Northwest	Truck & Trailer	Going Straight Ahead	None			Southeast	Northwest										Lane 1 Increasing Milepost
No	State Route	Woodland	005FD02108		0.220							E048152	04/03/10	12:05 PM	No Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Driver Distractions Outside Vehicle	Follow Too Closely		South	North	Passenger Car	Stopped for Traffic	None			South	Vehicle Stopped										Lane 1 Increasing Milepost
No	State Route	Woodland	005FD02108		0.220							E063592	08/13/10	3:45 PM	Possible Injury	2	0	3	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Passenger Car	Making Left Turn	Did Not Grant RW to Vehicle			Southwest	Northwest	Passenger Car	Going Straight Ahead	None			Southeast	Northwest										Lane 1 Increasing Milepost
No	State Route	Woodland	005FD02108		0.260							E084201	12/24/10	10:42 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Wet	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			North	Vehicle Stopped	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely			North	South										Lane 1 Decreasing Milepost
No	State Route	Woodland	005FD02108		0.280							E272339	09/23/13	9:24 AM	Possible Injury	1	0	5	0	0	At Intersection and Related	Overcast	Wet	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Inattention	Follow Too Closely		South	North	Passenger Car	Stopped for Traffic	None			Vehicle Stopped	Vehicle Stopped										Lane 1 Increasing Milepost
No	State Route	Woodland	005FD02108		0.280							2505917	10/15/09	3:53 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest	Passenger Car	Stopped for Traffic	None			Southeast	Vehicle Stopped										Lane 1 Increasing Milepost
No	State Route	Woodland	005FD02108		0.280							E099332	04/02/11	12:15 PM	No Injury	0	0	2	0	0	At Intersection and Not Related	Raining	Wet	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			South	North	Passenger Car	Stopped for Traffic	None			South	Vehicle Stopped										Lane 1 Increasing Milepost
No	State Route	Woodland	005FD02108		0.370							E296892	12/28/13	10:30 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Inattention	Follow Too Closely		South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			Vehicle Stopped	Vehicle Stopped										Lane 1 Increasing Milepost
No	State Route	Woodland	005FD02108		0.410							E018185	04/17/09	9:36 AM	No Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet	Daylight	Entering at angle	Passenger Car	Making Right Turn	Driver Distractions Outside Vehicle	Improper Turn		Northwest	Southwest	Pickup,Panel Truck or Vanette under 10,000 lb	Slowing	None			Southwest	Northeast										Intersecting Road Decreasing Milepost
No	State Route	Woodland	005FD02108		0.410							E095754	03/10/11	11:57 AM	No Injury	0	0	1	0	0	At Intersection and Related	Raining	Wet	Daylight	Fence	Passenger Car	Making Left Turn	Exceeding Reas. Safe Speed			Southwest	Northwest																	Past Right Shoulder Increasing Milepost
No	State Route	Woodland	005FD02108		0.450							E020443	06/01/09	8:41 AM	No Injury	0	0	2	0	0	At Driveway	Clear or Partly Cloudy	Dry	Daylight	Same direction -- both turning right -- both moving -- sideswipe	Truck Tractor & Semi-Trailer	Making Right Turn	Failing to Signal			Northwest	Southwest	Passenger Car	Making Right Turn	None			Northwest	Southwest										Lane 1 Decreasing Milepost
No	State Route	Woodland	005FD02108		0.500							E272728	09/25/13	1:52 PM	Possible Injury	1	0	2	0	0	At Driveway	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Passenger Car	Making Left Turn	Inattention			Southwest	Northwest	Passenger Car	Going Straight Ahead	None			Northwest	Southeast										Lane 1 Decreasing Milepost
No	State Route	Woodland	005FD02108		0.500							E058055	07/02/10	10:38 AM	No Injury	0	0	2	0	0	At Driveway	Overcast	Wet	Daylight	Entering at angle	Pickup,Panel Truck or Vanette under 10,000 lb	Making Right Turn	Driver Interacting with Passengers, Anim	Did Not Grant RW to Vehicle		West	South	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			North	South										Lane 1 Decreasing Milepost
No	State Route	Woodland	005FD02108		0.590							E263669	08/16/13	4:59 PM	No Injury	0	0	2	0	0	At Driveway	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			Vehicle Stopped	Vehicle Stopped										Lane 1 Increasing Milepost
No	State Route	Woodland	005FD02108		0.610							E180365	07/11/12	12:01 PM	Possible Injury	1	0	2	0	0	At Driveway	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - one left turn - one straight	Passenger Car	Making Left Turn	Did Not Grant RW to Vehicle			Southeast	Southwest	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			Northwest	Southeast										Lane 1 Decreasing Milepost
No	State Route	Woodland	005FD02108		0.630							E258542	07/22/13	6:54 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	Fence	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Apparently Asleep			South	North																	Past Right Shoulder Increasing Milepost
No	State Route	Woodland	005FD02108		0.660							E020150	05/26/09	3:05 PM	Possible Injury	1	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	One parked--one moving	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed	Apparently Asleep		Northwest	Southeast	Pickup,Panel Truck or Vanette under 10,000 lb	Legally Parked, Occupied															Right Shoulder Decreasing Milepost
No	State Route	Woodland	005FD02108		0.720							E212420	12/11/12	4:35 PM	Evident Injury	1	0	2	0	0	At Intersection and Related	Raining	Wet	Dark-Street Lights On	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely	Inattention		Southwest	Northeast	Passenger Car	Stopped at Signal or Stop Sign	None			Southwest	Vehicle Stopped										Intersecting Road Decreasing Milepost
No	State Route	Woodland	005FD02108		0.720							E127908	09/29/11	12:25 PM	Possible Injury	2	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Same direction -- both turning right -- one stopped -- rear end	Truck (Flatbad,Van,etc)	Making Right Turn	Inattention	Follow Too Closely		West	South	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			West	Vehicle Stopped										Intersecting Road Decreasing Milepost
No	State Route	Woodland	005FI02108		0.080							E201458	10/27/12	7:37 PM	No Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet	Dark-Street Lights On	Entering at angle	Pickup,Panel Truck or Vanette under 10,000 lb	Making Left Turn	Did Not Grant RW to Vehicle			East	South	Passenger Car	Going Straight Ahead	None			South	North										Lane 1 Increasing Milepost
No	State Route	Woodland	005FI02108		0.130							E140645	12/04/11	1:42 PM	No Injury	0	0	2	0	0	At Driveway	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			North	Vehicle Stopped										Lane 1 Decreasing Milepost
No	State Route	Woodland	005FI02108		0.160							E045163	03/08/10	2:52 PM	No Injury	0	0	2	0	0	At Driveway	Sleet or Hail or Freezing Rain	Unknown	Daylight	Entering at angle	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed	Operating Defective Equipment		South	North	Passenger Car	Making Right Turn	None			East	North										Lane 1 Increasing Milepost
No	State Route	Woodland	005FI02108		0.180							E016729	03/23/09	12:20 PM	Possible Injury	2	0	2	0	0	At Driveway	Raining	Wet	Daylight	Entering at angle	Passenger Car	Making Left Turn	Did Not Grant RW to Vehicle			Northeast	Southeast	Passenger Car	Going Straight Ahead	None			Southeast	Northwest										Lane 1 Increasing Milepost
No	State Route	Woodland	005FI02108		0.330							E078168	11/21/10	8:04 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Fog or Smog or Smoke	Ice	Unknown	Fence	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed	Over Center Line		South	North																	Past Right Shoulder Decreasing Milepost
No	State Route	Woodland	005FI02108		0.700							E162944	04/05/12	9:00 AM	Possible Injury	2	0	2	0	0	At Intersection and Related	Raining	Wet	Daylight	From opposite direction - all others	Passenger Car	Going Straight Ahead	Driver Distractions Outside Vehicle	Over Center Line		South	East	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Disregard Stop Sign - Flashing Red			East	South										Lane 1 Decreasing Milepost
No	State Route	Woodland	005LX02108		0.000							E087542	01/13/11	1:11 PM	No Injury	0	0	2	0	0	At Intersection and Not Related	Raining	Wet	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Driver Grooming			Southwest	Northeast	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			Southwest	Vehicle Stopped										Lane 2 LX Increasing Milepost (Prior to 2002 Impact Location Code was not lane specific)
No	State Route	Woodland	005LX02108		0.000							E055695	06/07/10	10:15 PM	Possible Injury	1	0	3	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely			Northeast	Southwest	Passenger Car	Stopped for Traffic	None			Northeast	Vehicle Stopped										Left Turn Lane LX Decreasing Milepost
No	State Route	Woodland	005LX02108		0.000							E219576	01/09/13	7:00 PM	No Injury	0	0	2	0	0	At Intersection and Related	Overcast	Wet	Dark-Street Lights On	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Inattention			Southwest	Northeast	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped at Signal or Stop Sign	None			Southwest	Vehicle Stopped										Lane 1 LX Increasing Milepost (Prior to 2002 Impact Location Code was not lane specific)
No	State Route	Woodland	005LX02108		0.000							E258541	07/20/13	10:44 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	From opposite direction - one left turn - one straight	Passenger Car	Making Left Turn	Inattention			West	North	Passenger Car	Going Straight Ahead	None			East	West										Lane 1 LX Decreasing Milepost
No	State Route	Woodland	005LX02108		0.000							E295815	12/26/13	8:19 AM	Evident Injury	1	0	2	0	0	At Intersection and Related	Overcast	Dry	Daylight	From opposite direction - one left turn - one straight	Passenger Car	Making Left Turn	Did Not Grant RW to Vehicle			East	South	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			West	East										Lane 2 LX Increasing Milepost (Prior to 2002 Impact Location Code was not lane specific)
No	State Route	Woodland	005LX02108		0.000							E257205	07/13/13	10:17 AM	Possible Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - one left turn - one straight	Passenger Car	Making Left Turn	Did Not Grant RW to Vehicle			West	South	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Driver Not Distracted			West	East										Lane 1 LX Increasing Milepost (Prior to 2002 Impact Location Code was not lane specific)
No	State Route	Woodland	005LX02108		0.000							E290828	12/04/13	7:58 AM	No Injury	0	0	2	0	0	At Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Passenger Car	Changing Lanes	Inattention			East	West	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			East	West										Lane 2 LX Decreasing Milepost
No	State Route	Woodland	005LX02108		0.000							E084715	12/27/10	4:10 PM	Evident Injury	1	0	2	0	0	At Intersection and Related	Raining	Wet	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely			Northeast	Southwest	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped at Signal or Stop Sign	None			Northeast	Vehicle Stopped										Left Turn Lane LX Decreasing Milepost
No	State Route	Woodland	005LX02108		0.000							E155808	02/19/12	7:24 PM	No Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet	Dark-Street Lights On	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Under Influence of Drugs			Northeast	Southwest	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped at Signal or Stop Sign	None			Northeast	Vehicle Stopped										Left Turn Lane LX Decreasing Milepost
No	State Route	Woodland	005LX02108		0.000							E045021	03/06/10	10:02 AM	Possible Injury	5	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			Northeast	Southwest	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped at Signal or Stop Sign	None			Northeast	Vehicle Stopped										Lane 2 LX Decreasing Milepost
No	State Route	Woodland	005LX02108		0.000							E050454	04/28/10	12:54 PM	Possible Injury	1	0	2	0	0	At Intersection and Related	Raining	Wet	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely	Other Driver Distractions Inside Vehicle		Northeast	Southwest	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			Northeast	Vehicle Stopped										Lane 2 LX Decreasing Milepost
No	State Route	Woodland	005LX02108		0.000							E273471	09/29/13	7:03 AM	No Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet	Dawn	From opposite direction - one left turn - one straight	Pickup,Panel Truck or Vanette under 10,000 lb	Making Left Turn	Improper Turn			East	South	Passenger Car	Going Straight Ahead	None			West	East										Lane 1 LX Increasing Milepost (Prior to 2002 Impact Location Code was not lane specific)
No	State Route	Woodland	005LX02108		0.000							E063591	08/14/10	11:42 AM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Pickup,Panel Truck or Vanette under 10,000 lb	Making Left Turn	Improper Turn	Inattention		Northwest	Northeast	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			Southwest	Vehicle Stopped										Lane 2 LX Increasing Milepost (Prior to 2002 Impact Location Code was not lane specific)
No	State Route	Woodland	005LX02108		0.000							E266805	08/30/13	5:20 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - one left turn - one right turn	Passenger Car	Making Left Turn	None			Northeast	South	Pickup,Panel Truck or Vanette under 10,000 lb	Making Right Turn	Did Not Grant RW to Vehicle			Southwest	South										Lane 1 LX Increasing Milepost (Prior to 2002 Impact Location Code was not lane specific)
No	State Route	Woodland	005LX02108		0.030							E053836	05/26/10	3:25 PM	No Injury	0	0	2	0	0	Intersection Related but Not at Intersection	Raining	Wet	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely			Northeast	Southwest	Passenger Car	Stopped for Traffic	None			Northeast	Vehicle Stopped										Lane 2 LX Decreasing Milepost
No	State Route	Woodland	005P102085		0.090							3258614	01/16/09	5:35 PM	Possible Injury	2	0	3	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-No Street Lights	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Apparently Asleep			South	North	Passenger Car	Stopped for Traffic	None			South	Vehicle Stopped										Lane 1 Off Ramp Increasing Milepost Side of Mainline
No	State Route	Woodland	005P102085		0.120							E248581	06/01/13	4:40 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Dawn	Tree or Stump (stationary)	Passenger Car	Going Straight Ahead	None			South	North																	Past Right Shoulder Off Ramp Decreasing Milepost Side of Mainline
No	State Route	Woodland	005P102085		0.200							E017663	04/06/09	4:25 PM	Evident Injury	3	0	2	0	0	Intersection Related but Not at Intersection	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Driver Adjusting Audio or Entertainment	Follow Too Closely		South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			South	Vehicle Stopped										Lane 1 Off Ramp Increasing Milepost Side of Mainline
No	State Route	Woodland	005P102085		0.230							E232917	03/17/13	7:35 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Overcast	Dry	Dusk	From same direction - both going straight - both moving - sideswipe	Passenger Car	Going Straight Ahead	Other			South	North	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other			South	North										Lane 1 Off Ramp Increasing Milepost Side of Mainline
No	State Route	Woodland	005P102085		0.230							E257640	07/18/13	2:24 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Inattention			South	North	Truck (Flatbad,Van,etc)	Stopped for Traffic	None			South	Vehicle Stopped										Lane 1 Off Ramp Increasing Milepost Side of Mainline
No	State Route	Woodland	005P102085		0.250							E127251	09/13/11	7:00 AM	Evident Injury	1	0	1	0	1	At Intersection and Related	Unknown	Unknown	Daylight	Vehicle - Pedalcyclist	Passenger Car	Making Right Turn	Fail to Yield Row to Pedestrian			Southeast	Northeast															Xing or Entering Trafficway	Disregard Stop and Go Light		Lane 1 Off Ramp Increasing Milepost Side of Mainline
No	State Route	Woodland	005Q102219		0.090							2680618	11/21/10	5:45 AM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Fog or Smog or Smoke	Ice	Dark-No Street Lights	Over Embankment - No Guardrail Present	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Exceeding Reas. Safe Speed			Southeast	Northwest																	Past Right Shoulder On Ramp Increasing Milepost Side of Mainline
No	State Route	Woodland	005R102199		0.210							3124305	03/02/12	12:25 PM	No Injury	0	0	2	0	0	At Intersection and Related	Overcast	Wet	Daylight	From opposite direction - one left turn - one straight	Passenger Car	Making Left Turn	Disregard Yield Sign - Flashing Yellow			South	West	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			North	South										Lane 1 Off Ramp Decreasing Milepost Side of Mainline
No	State Route	Woodland	005R102199		0.210							E018210	04/20/09	11:33 AM	Possible Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - one left turn - one straight	Passenger Car	Making Left Turn	Inattention	Did Not Grant RW to Vehicle		Southeast	Southwest	Passenger Car	Going Straight Ahead	None			Northwest	Southeast										Lane 1 Off Ramp Decreasing Milepost Side of Mainline
No	State Route	Woodland	005R102199		0.210							E021765	06/21/09	6:28 PM	Possible Injury	1	0	4	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Fence	Pickup,Panel Truck or Vanette under 10,000 lb	Making Right Turn	Exceeding Reas. Safe Speed			Northwest	Southwest																	Decreasing Other Location
No	State Route	Woodland	005S102071		0.170							E293749	12/11/13	12:00 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Passenger Car	Going Straight Ahead	None			North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			North	South										Lane 1 On Ramp Decreasing Milepost Side of Mainline
No	State Route	Woodland	005S102071		0.250							E223947	01/29/13	9:40 AM	No Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet	Daylight	From same direction - both going straight - both moving - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Merging (Entering Traffic)	Inattention	Follow Too Closely		North	South	Pickup,Panel Truck or Vanette under 10,000 lb	Merging (Entering Traffic)	None			North	South										Lane 1 On Ramp Decreasing Milepost Side of Mainline
No	State Route	Woodland	005S102215		0.090							E218205	12/30/12	8:25 PM	No Injury	0	0	1	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Dark-No Street Lights	Vehicle overturned	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Other			Northwest	Southeast																	Past Left Shoulder On Ramp Decreasing Milepost Side of Mainline
No	State Route	Woodland	503		54.310							E088161	01/18/11	6:45 PM	No Injury	0	0	2	0	0	At Intersection and Not Related	Raining	Wet	Dark-Street Lights On	From same direction - both going straight - both moving - sideswipe	Passenger Car	Changing Lanes	Did Not Grant RW to Vehicle			Southwest	Northeast	Passenger Car	Going Straight Ahead	None			Southwest	Northeast										Lane 1 Decreasing Milepost
No	State Route	Woodland	503		54.310							E101600	04/22/11	3:39 PM	Possible Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Starting in Traffic Lane	Inattention			Northeast	Southwest	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped at Signal or Stop Sign	None			Northeast	Vehicle Stopped										Lane 1 Increasing Milepost
No	State Route	Woodland	503		54.310							E127252	09/23/11	6:58 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dusk	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely			Southwest	Northeast	Passenger Car	Stopped at Signal or Stop Sign	None			Southwest	Vehicle Stopped										Lane 1 Decreasing Milepost
No	State Route	Woodland	503		54.310							E172302	05/29/12	8:34 AM	No Injury	0	0	2	0	0	At Driveway within Major Intersection	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Passenger Car	Making Right Turn	Did Not Grant RW to Vehicle			Northeast	Northwest	Passenger Car	Overtaking and Passing	Improper Passing			Southeast	Northwest										Intersecting Road Decreasing Milepost
No	State Route	Woodland	503		54.310							E170176	05/17/12	3:05 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Stopped at Signal or Stop Sign	None			Southeast	Vehicle Stopped	Truck (Flatbad,Van,etc)	Slowing	Follow Too Closely			Southeast	Northwest										Intersecting Road Decreasing Milepost
No	State Route	Woodland	503		54.310							3260907	01/07/09	1:59 PM	No Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Other Driver Distractions Inside Vehicle			Southwest	Northeast	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped at Signal or Stop Sign	None			Southwest	Vehicle Stopped										Lane 1 Decreasing Milepost
No	State Route	Woodland	503		54.310							E280239	10/26/13	8:50 PM	Evident Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dark-Street Lights On	From same direction - both going straight - one stopped - rear-end	Passenger Car	Stopped at Signal or Stop Sign	None			Vehicle Stopped	Vehicle Stopped	Passenger Car	Going Straight Ahead	Inattention			East	West										Left Turn Lane Increasing Milepost
No	State Route	Woodland	503		54.320							E019441	05/10/09	2:43 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Did Not Grant RW to Vehicle	Other	Failing to Signal	Northeast	Southwest	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			Northeast	Southwest										Lane 1 Increasing Milepost
No	State Route	Woodland	503		54.320							E100111	04/12/11	8:15 AM	No Injury	0	0	4	0	0	Intersection Related but Not at Intersection	Overcast	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely	Other Driver Distractions Inside Vehicle		Southwest	Northeast	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			Southwest	Vehicle Stopped										Lane 2 Decreasing Milepost
No	State Route	Woodland	503		54.330							E013706	01/15/09	12:01 AM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely			Southwest	Northeast	Passenger Car	Stopped at Signal or Stop Sign	None			Southwest	Vehicle Stopped										Left Turn Lane Increasing Milepost
No	State Route	Woodland	503		54.330							2505922	03/09/12	3:55 PM	No Injury	0	0	3	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Follow Too Closely			Northeast	Southwest	Passenger Car	Slowing	None			Northeast	Southwest										Lane 2 Increasing Milepost
No	State Route	Woodland	503		54.330							E035134	12/07/09	9:46 AM	Possible Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed			Northeast	Southwest	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped at Signal or Stop Sign	None			Northeast	Vehicle Stopped										Lane 2 Increasing Milepost
No	State Route	Woodland	503		54.330							E136468	11/11/11	7:26 AM	No Injury	0	0	2	0	0	At Intersection and Not Related	Fog or Smog or Smoke	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Changing Lanes	Did Not Grant RW to Vehicle			Southwest	Northeast	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	None			Southwest	Northeast										Lane 2 Increasing Milepost
No	State Route	Woodland	503		54.330							E122028	08/25/11	6:38 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - sideswipe	Pickup,Panel Truck or Vanette under 10,000 lb	Starting in Traffic Lane	Other			Southwest	Northeast	Passenger Car	Changing Lanes	None			Southwest	Northeast										Left Turn Lane Decreasing Milepost
No	State Route	Woodland	503		54.330							E110856	06/19/11	4:10 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup,Panel Truck or Vanette under 10,000 lb	Going Straight Ahead	Operating Defective Equipment			Northeast	Southwest	Passenger Car	Stopped at Signal or Stop Sign	None			Northeast	Vehicle Stopped										Lane 2 Increasing Milepost
No	State Route	Woodland	503		54.330							E197744	10/11/12	3:45 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From same direction - all others	Pickup,Panel Truck or Vanette under 10,000 lb	Backing	Under Influence of Alcohol	Improper Backing		Northeast	Vehicle Backing	Pickup,Panel Truck or Vanette under 10,000 lb	Stopped for Traffic	None			Northeast	Vehicle Stopped										Left Turn Lane Decreasing Milepost
No	State Route	Woodland	503		54.330							E013431	01/11/09	7:35 AM	No Injury	0	0	2	0	0	At Intersection and Related	Raining	Wet	Dawn	From opposite direction - one left turn - one right turn	Pickup,Panel Truck or Vanette under 10,000 lb	Making Right Turn	Did Not Grant RW to Vehicle			Northwest	Northeast	Passenger Car	Making Left Turn	None			Southeast	Northeast										Lane 1 Increasing Milepost
No	State Route	Woodland	503		54.330							E257001	07/13/13	9:11 AM	Evident Injury	1	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - one left turn - one straight	Pickup,Panel Truck or Vanette under 10,000 lb	Making Left Turn	Did Not Grant RW to Vehicle	Driver Distractions Outside Vehicle		East	North	Motorcycle	Going Straight Ahead	Driver Not Distracted			East	West										Lane 1 Increasing Milepost

State Route Only History Indicator	JURISDICTION	CITY	PRIMARY TRAFFICWAY	BLOCK NUMBER	MILE POST	INTERSECTING TRAFFICWAY	CO ONLY INTERSECTING COUNTY ROAD MILEPOST	DIST FROM REF POINT	MI or FT	CDMP DIR FROM REF POINT	REFERENCE POINT NAME	ROSENT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# INJ	# FAT	# SUSI	# POSS	# PEDAL	JUNCTION RELATIONSHIP	WEATHER	ROADWAY SURFACE CONDITIONS	LIGHTING CONDITIONS	FIRST COLLISION TYPE / OBJECT STRUCK	VEH CLE 1 TYPE	VEH 1 ACTION	MV DRIVER CDNT CIRC 1 (UNIT 1)	MV DRIVER CDNT CIRC 2 (UNIT 1)	MV DRIVER CDNT CIRC 3 (UNIT 1)	VEH 1 CDMP DIR FROM	VEH 1 CDMP DIR TO	VEHICLE 2 TYPE	VEH 2 ACTION	MV DRIVER CDNT CIRC 1 (UNIT 2)	MV DRIVER CDNT CIRC 2 (UNIT 2)	MV DRIVER CDNT CIRC 3 (UNIT 2)	VEH 2 CDMP DIR FROM	VEH 2 CDMP DIR TO	PEDESTRIAN ACTION (UNIT 2)	PEDESTRIAN CDNT CIRC 1 (UNIT 2)	PEDESTRIAN CDNT CIRC 2 (UNIT 2)	PEDCYCLIST ACTION (UNIT 1)	PEDCYCLIST CDNT CIRC 1 (UNIT 1)	PEDCYCLIST CDNT CIRC 2 (UNIT 1)	PEDCYCLIST ACTION (UNIT 2)	PEDCYCLIST CDNT CIRC 1 (UNIT 2)	PEDCYCLIST CDNT CIRC 2 (UNIT 2)	IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)
No	State Route	Woodland	503		54.330							3392668	10/28/12	2:54 PM	Serious Injury	2	0	1	0	0	At Intersection and Related	Raining	Wet	Daylight	From opposite direction - one stopped - head-on	Passenger Car	Going Straight Ahead	Exceeding Reas. Safe Speed	Over Center Line		Northeast	Southwest	Passenger Car	Stopped for Traffic	None																			left Turn Lane Decreasing Milepost
No	State Route	Woodland	503		54.330							4282896	10/31/13	5:02 PM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Passenger Car	Changing Lanes	Other			North	South	Pickup/Panel Truck or Vanette - under 10,000 lb	Making Right Turn	None				West	South																Lane 1 Increasing Milepost
No	State Route	Woodland	503		54.330							3381708	12/09/12	7:32 AM	Possible Injury	1	0	1	0	0	At Intersection and Related	Raining	Wet	Daylight	From same direction - both going straight - one stopped - rear-end	Passenger Car	Going Straight Ahead	Follow Too Closely			Northeast	Southwest	Pickup/Panel Truck or Vanette - under 10,000 lb	Stopped for Traffic	None				Northeast	Vehicle Stopped																Lane 1 Increasing Milepost
No	State Route	Woodland	503		54.350							3278858	10/21/13	7:07 AM	No Injury	0	0	2	0	0	At Intersection and Related	Clear or Partly Cloudy	Dry	Dawn	From same direction - both going straight - both moving - sideswipe	Passenger Car	Changing Lanes	Did Not Grant ROW to Vehicle			East	West	Pickup/Panel Truck or Vanette - under 10,000 lb	Going Straight Ahead	None				East	West																Lane 2 Increasing Milepost
No	State Route	Woodland	503		54.360							3290827	12/04/13	8:20 AM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Ice	Daylight	From same direction - both going straight - one stopped - rear-end	Pickup/Panel Truck or Vanette - under 10,000 lb	Going Straight Ahead	Follow Too Closely			East	West	Pickup/Panel Truck or Vanette - under 10,000 lb	Stopped for Traffic	None				Vehicle Stopped	Vehicle Stopped																Lane 1 Increasing Milepost
	County Road	259th and 41st	42520		2.810	42570	0.000					2576840	07/05/10	7:00 PM	No Injury	0	0	2	0	0	Not at Intersection and Not Related	Clear or Partly Cloudy	Dry	Daylight	From opposite direction - both going straight - sideswipe	Pickup/Panel Truck or Vanette - under 10,000 lb	Going Straight Ahead	Other			West	East	Pickup/Panel Truck or Vanette - under 10,000 lb	Going Straight Ahead	Other				East	West																Lane of Primary Trafficway
	County Road	Vernon and Spencer	84450		5.020	42570	2.500					3103233	04/04/13	7:30 AM	No Injury	0	0	1	0	0	At Intersection and Related	Raining	Wet	Daylight	Guardrail - Face	Truck Tractor & Semi-Trailer	Backing	Improper Backing			South	Vehicle Backing																											Past the Outside Shoulder of Primary Trafficway
	County Road	Jo Center Rd and Timmen	84450		5.380	86040	0.000					3352431	01/31/13	7:01 PM	Evident Injury	1	0	2	0	0	At Intersection and Related	Raining	Wet	Dark-No Street Lights	Entering at angle	Passenger Car	Going Straight Ahead	None			North	South	Pickup/Panel Truck or Vanette - under 10,000 lb	Making Right Turn	Improper Turn				East	North																Lane of Primary Trafficway
	County Road	Jo Center Rd and Timmen	84450		5.380							3315800	01/13/09	12:42 AM	Evident Injury	1	0	1	0	0	Not at Intersection and Not Related	Fog or Smog or Smoke	Dry	Dark-No Street Lights	Earth Bank or Ledge	Passenger Car	Going Straight Ahead	Inattention			South	North																											
	County Road	Jo Center Rd and Timmen	86040		0.010							2422776	10/16/13	1:18 AM	No Injury	0	0	1	0	0	At Intersection and Not Related	Clear or Partly Cloudy	Dry	Dark-Street Lights Off	Vehicle Strikes Deer	Passenger Car	Going Straight Ahead	None			East	West																											Lane of Primary Trafficway

Appendix EE Predictive Crash Assessment Worksheets

Crash Frequency Assessment at Ramp Terminals with Improvements

Intersection	Observed Crashes (2009-2013)	Observed Crash Rate (/year)	Expected Crash Frequency (/year)					
			2017 No Build	*2017 Build (ISATe)*	2017 Build (w roundabout CMF)	2037 No Build	*2017 Build (ISATe)*	2017 Build (w roundabout CMF)
NW La Center Rd/ I-5 SB Ramps	0	0	0.7	*0.702*	0.39	0.979	*1.074*	0.60
NW La Center Rd/ I-5 NB Ramps	13	2.6	3.1	*2.868*	1.61	5.546	*5.112*	2.86
Total	**13**	**2.6**	**3.8**	***3.57***	**2.00**	**6.525**	***6.186***	**3.46**

Build (ISATe) presents results from ISATe tool, accounting for change in distance to the frontage road intersections

Build (w roundabout CMF) applies CMF from NCHRP 972 to assess impact of roundabout control at intersection

Roundabouts expected to reduce crashes by 44%

CMF 0.56 (NCHRP 972)

2017 No Build Scenario

Input Worksheet for Crossroad Ramp Terminals

Clear | Echo Input Values (View results in Column T) | Check Input Values (View results in Advisory Messages)

			Terminal 1		Terminal 2	
			Crash Period	**Study Period**	**Crash Period**	**Study Period**
Basic Intersection Data						
Ramp terminal configuration:			D4	D4	D4	D4
Ramp terminal description:			SB ramps at La Center		NB ramps at La Center	
Ramp terminal traffic control type:			One stop	One stop	One stop	One stop
Is a non-ramp public street leg present at the terminal (I_{ps})?:						
Alignment Data						
Exit ramp skew angle (I_{sk}), degrees:			0	0	0	0
Distance to the next public street intersection on the outside crossroad leg (L_{str}), mi:			0.021	0.021	0.024	0.024
Distance to the adjacent ramp terminal (L_{rmp}), mi:			0.104	0.104	0.104	0.104
Traffic Control						
Left-Turn Operational Mode						
Crossroad	Inside approach	Protected-only mode ($I_{p,lt,in}$)?:				
	Outside approach	Protected-only mode ($I_{p,lt,out}$)?:				
Right-Turn Control Type						
Ramp	Exit ramp approach	Right-turn control type:	Stop	Stop	Stop	Stop
Cross Section Data						
Crossroad median width (W_m), ft:			0	0	0	0
Number of Lanes						
Crossroad	Both approaches	Lanes serving through vehicles (n_{th}):	2	2	2	2
	Inside approach	Lanes serving through vehicles ($n_{th,in}$):				
	Outside approach	Lanes serving through vehicles ($n_{th,out}$):				
Ramp	Exit ramp approach	All lanes (n_{ex}):	1	1	1	1
Right-Turn Channelization		see note: →				
Crossroad	Inside approach	Channelization present ($I_{ch,in}$)?:				
	Outside approach	Channelization present ($I_{ch,out}$)?:				
Ramp	Exit ramp approach	Channelization present ($I_{ch,ex}$)?:				
Left-Turn Lane or Bay						
Crossroad	Inside approach	Lane or bay present ($I_{bay,lt,in}$)?:	No	No	No	No
		Width of lane or bay ($W_{b,in}$), ft:				
	Outside approach	Lane or bay present ($I_{bay,lt,out}$)?:				
		Width of lane or bay ($W_{b,out}$), ft:				
Right-Turn Lane or Bay						
Crossroad	Inside approach	Lane or bay present ($I_{bay,rt,in}$)?:				
	Outside approach	Lane or bay present ($I_{bay,rt,out}$)?:	No	No	No	No
Access Data						
Number of driveways on the outside crossroad leg (n_{dw}):						
Number of public street approaches on the outside crossroad leg (n_{ps}):			2	2	2	2

Traffic Data	**Year**		
Inside Crossroad Leg Data	2009		
Average daily traffic ($AADT_{in}$) by year, veh/d:	2010		
(enter data only for those years for which	2011		
it is available, leave other years blank)	2012	6306	6306
	2013		
	2014		
	2015		
	2016		
	2017	7252	7252

2017 No Build Scenario

Input Worksheet for Crossroad Ramp Terminals

Clear | Echo Input Values (View results in Column T) | Check Input Values (View results in Advisory Messages)

		Terminal 1		Terminal 2	
		Crash Period	**Study Period**	**Crash Period**	**Study Period**
	2018				
	2019				
	2020				
	2021				
	2022				
	2023				
	2024				
	2025				
	2026				
	2027				
	2028				
	2029				
	2030				
	2031				
	2032				
Outside Crossroad Leg Data	2009				
Average daily traffic ($AADT_{out}$) by year, veh/d:	2010				
(enter data only for those years for which	2011				
it is available, leave other years blank)	2012	1724		10887	
	2013				
	2014				
	2015				
	2016				
	2017	1983		12520	
	2018				
	2019				
	2020				
	2021				
	2022				
	2023				
	2024				
	2025				
	2026				
	2027				
	2028				
	2029				
	2030				
	2031				
	2032				
Exit Ramp Data	2009				
Average daily traffic ($AADT_{ex}$) by year, veh/d:	2010				
(enter data only for those years for which	2011				
it is available, leave other years blank)	2012	1703		4983	
	2013				
For a B4 terminal configuration, enter the AADT for the	2014				
diagonal exit ramp (not the loop exit ramp).	2015				
	2016				
	2017	1873		5481	
	2018				
	2019				
	2020				

2017 No Build Scenario

Input Worksheet for Crossroad Ramp Terminals

Clear | Echo Input Values (View results in Column T) | Check Input Values (View results in Advisory Messages)

		Terminal 1		Terminal 2	
		Crash Period	**Study Period**	**Crash Period**	**Study Period**
	2021				
	2022				
	2023				
	2024				
	2025				
	2026				
	2027				
	2028				
	2029				
	2030				
	2031				
	2032				
Entrance Ramp Data	2009				
Average daily traffic ($AADT_{en}$) by year, veh/d:	2010				
(enter data only for those years for which	2011				
it is available, leave other years blank)	2012	4768		1881	
	2013				
For an A4 terminal configuration, enter the AADT for the	2014				
diagonal entrance ramp (not the loop entrance ramp).	2015				
	2016				
	2017	5245		2069	
	2018				
	2019				
	2020				
	2021				
	2022				
	2023				
	2024				
	2025				
	2026				
	2027				
	2028				
	2029				
	2030				
	2031				
	2032				

Crash Data	**Year**		Ramp Terminal Crashes -->			
Count of Fatal-and-Injury (FI) Crashes by Year						
($N_{o,w,ac,at,fi}$)	2009				1	
	2010					
	2011					
	2012				1	
	2013				2	
Count of Property-Damage-Only (PDO) Crashes by Year						
($N_{o,w,ac,at,pdo}$)	2009					
	2010				2	
	2011				3	
	2012				1	
	2013				3	

Output Worksheet for Crossroad Ramp Terminals					
Signal = signalized intersection model Unsig = unsignalized intersection model		Terminal 1		Terminal 2	
	Applicable Models	**Crash Period**	**Study Period**	**Crash Period**	**Study Period**
Crash Severity Distribution (during Study Period)					
Fatal crash frequency ($N^*_{e,w,x,at,K}$), crashes:			0.002		0.014
Incapacitating injury crash freq. ($N^*_{e,w,x,at,A}$), crashes:			0.011		0.072
Non-incapacitating inj. crash freq. ($N^*_{e,w,x,at,B}$), crashes:			0.037		0.238
Possible injury crash freq. ($N^*_{e,w,x,at,C}$), crashes:			0.129		0.836
Total fatal-and-injury crash freq. ($N^*_{e,w,x,at,fi}$), crashes:			0.179		1.160
Property-damage-only crash freq. ($N^*_{e,w,x,at,pdo}$), crashes:			0.449		1.908
Total crash frequency ($N^*_{e,w,x,at,as}$), crashes:			0.628		3.069

2017 Build Scenario

Input Worksheet for Crossroad Ramp Terminals

Clear | Echo Input Values (View results in Column T) | Check Input Values (View results in Advisory Messages)

			Terminal 1		Terminal 2	
			Crash Period	**Study Period**	**Crash Period**	**Study Period**
Basic Intersection Data						
Ramp terminal configuration:			D4	D4	D4	D4
Ramp terminal description:			SB ramps at La Center		NB ramps at La Center	
Ramp terminal traffic control type:			One stop	One stop	One stop	One stop
Is a non-ramp public street leg present at the terminal (I_{ps})?:						
Alignment Data						
Exit ramp skew angle (I_{sk}), degrees:			0	0	0	0
Distance to the next public street intersection on the outside crossroad leg (L_{str}), mi:			0.021	0.114	0.024	0.085
Distance to the adjacent ramp terminal (L_{rmp}), mi:			0.104	0.104	0.104	0.104
Traffic Control						
Left-Turn Operational Mode						
Crossroad	Inside approach	Protected-only mode ($I_{p,lt,in}$)?:				
	Outside approach	Protected-only mode ($I_{p,lt,out}$)?:				
Right-Turn Control Type						
Ramp	Exit ramp approach	Right-turn control type:	Stop	Stop	Stop	Stop
Cross Section Data						
Crossroad median width (W_m), ft:			0	0	0	0
Number of Lanes						
Crossroad	Both approaches	Lanes serving through vehicles (n_{th}):	2	2	2	2
	Inside approach	Lanes serving through vehicles ($n_{th,in}$):				
	Outside approach	Lanes serving through vehicles ($n_{th,out}$):				
Ramp	Exit ramp approach	All lanes (n_{ex}):	1	1	1	1
Right-Turn Channelization		see note: →				
Crossroad	Inside approach	Channelization present ($I_{ch,in}$)?:				
	Outside approach	Channelization present ($I_{ch,out}$)?:				
Ramp	Exit ramp approach	Channelization present ($I_{ch,ex}$)?:				
Left-Turn Lane or Bay						
Crossroad	Inside approach	Lane or bay present ($I_{bay,lt,in}$)?:	No	No	No	No
		Width of lane or bay ($W_{b,in}$), ft:				
	Outside approach	Lane or bay present ($I_{bay,lt,out}$)?:				
		Width of lane or bay ($W_{b,out}$), ft:				
Right-Turn Lane or Bay						
Crossroad	Inside approach	Lane or bay present ($I_{bay,rt,in}$)?:				
	Outside approach	Lane or bay present ($I_{bay,rt,out}$)?:	No	No	No	No
Access Data						
Number of driveways on the outside crossroad leg (n_{dw}):						
Number of public street approaches on the outside crossroad leg (n_{ps}):			2		2	

Traffic Data	**Year**		
Inside Crossroad Leg Data	2009		
Average daily traffic ($AADT_{in}$) by year, veh/d:	2010		
(enter data only for those years for which	2011		
it is available, leave other years blank)	2012	6306	6306
	2013		
	2014		
	2015		
	2016		
	2017	7252	7252

2017 Build Scenario

Input Worksheet for Crossroad Ramp Terminals

Clear | Echo Input Values (View results in Column T) | Check Input Values (View results in Advisory Messages)

		Terminal 1		Terminal 2	
		Crash Period	**Study Period**	**Crash Period**	**Study Period**
	2018				
	2019				
	2020				
	2021				
	2022				
	2023				
	2024				
	2025				
	2026				
	2027				
	2028				
	2029				
	2030				
	2031				
	2032				
Outside Crossroad Leg Data	2009				
Average daily traffic ($AADT_{out}$) by year, veh/d:	2010				
(enter data only for those years for which	2011				
it is available, leave other years blank)	2012	1724		10887	
	2013				
	2014				
	2015				
	2016				
	2017	1983		12520	
	2018				
	2019				
	2020				
	2021				
	2022				
	2023				
	2024				
	2025				
	2026				
	2027				
	2028				
	2029				
	2030				
	2031				
	2032				
Exit Ramp Data	2009				
Average daily traffic ($AADT_{ex}$) by year, veh/d:	2010				
(enter data only for those years for which	2011				
it is available, leave other years blank)	2012	1703		4983	
	2013				
For a B4 terminal configuration, enter the AADT for the	2014				
diagonal exit ramp (not the loop exit ramp).	2015				
	2016				
	2017	1873		5481	
	2018				
	2019				
	2020				

2017 Build Scenario

Input Worksheet for Crossroad Ramp Terminals

Clear | Echo Input Values (View results in Column T) | Check Input Values (View results in Advisory Messages)

		Terminal 1		Terminal 2	
		Crash Period	**Study Period**	**Crash Period**	**Study Period**
	2021				
	2022				
	2023				
	2024				
	2025				
	2026				
	2027				
	2028				
	2029				
	2030				
	2031				
	2032				
Entrance Ramp Data	2009				
Average daily traffic ($AADT_{en}$) by year, veh/d:	2010				
(enter data only for those years for which	2011				
it is available, leave other years blank)	2012	4768		1881	
	2013				
For an A4 terminal configuration, enter the AADT for the	2014				
diagonal entrance ramp (not the loop entrance ramp).	2015				
	2016				
	2017	5245		2069	
	2018				
	2019				
	2020				
	2021				
	2022				
	2023				
	2024				
	2025				
	2026				
	2027				
	2028				
	2029				
	2030				
	2031				
	2032				

Crash Data	**Year**		Ramp Terminal Crashes -->			
Count of Fatal-and-Injury (FI) Crashes by Year						
($N_{o,w,ac,at,fi}$)	2009				1	
	2010					
	2011					
	2012				1	
	2013				2	
Count of Property-Damage-Only (PDO) Crashes by Year						
($N_{o,w,ac,at,pdo}$)	2009					
	2010				2	
	2011				3	
	2012				1	
	2013				3	

Output Worksheet for Crossroad Ramp Terminals					
Signal = signalized intersection model Unsig = unsignalized intersection model		Terminal 1		Terminal 2	
	Applicable Models	**Crash Period**	**Study Period**	**Crash Period**	**Study Period**
Crash Severity Distribution (during Study Period)					
Fatal crash frequency ($N^*_{e,w,x,at,K}$), crashes:			0.003		0.011
Incapacitating injury crash freq. ($N^*_{e,w,x,at,A}$), crashes:			0.016		0.060
Non-incapacitating inj. crash freq. ($N^*_{e,w,x,at,B}$), crashes:			0.052		0.197
Possible injury crash freq. ($N^*_{e,w,x,at,C}$), crashes:			0.183		0.692
Total fatal-and-injury crash freq. ($N^*_{e,w,x,at,fi}$), crashes:			0.254		0.960
Property-damage-only crash freq. ($N^*_{e,w,x,at,pdo}$), crashes:			0.449		1.908
Total crash frequency ($N^*_{e,w,x,at,as}$), crashes:			0.702		2.868

Output Worksheet for Crossroad Ramp Terminals					
Signal = signalized intersection model		Terminal 1		Terminal 2	
Unsig = unsignalized intersection model	**Applicable Models**	**Crash Period**	**Study Period**	**Crash Period**	**Study Period**

Input Worksheet for Crossroad Ramp Terminals

Clear | Echo Input Values (View results in Column T) | Check Input Values (View results in Advisory Messages)

			Terminal 1		Terminal 2	
			Crash Period	**Study Period**	**Crash Period**	**Study Period**
Basic Intersection Data						
Ramp terminal configuration:			D4	D4	D4	D4
Ramp terminal description:			SB ramps at La Center		NB ramps at La Center	
Ramp terminal traffic control type:			One stop	One stop	One stop	One stop
Is a non-ramp public street leg present at the terminal (I_{ps})?:						
Alignment Data						
Exit ramp skew angle (I_{sk}), degrees:			0	0	0	0
Distance to the next public street intersection on the outside crossroad leg (L_{str}), mi:			0.021	0.021	0.024	0.024
Distance to the adjacent ramp terminal (L_{rmp}), mi:			0.104	0.104	0.104	0.104
Traffic Control						
Left-Turn Operational Mode						
Crossroad	Inside approach	Protected-only mode ($I_{p,lt,in}$)?:				
	Outside approach	Protected-only mode ($I_{p,lt,out}$)?:				
Right-Turn Control Type						
Ramp	Exit ramp approach	Right-turn control type:	Stop	Stop	Stop	Stop
Cross Section Data						
Crossroad median width (W_m), ft:			0	0	0	0
Number of Lanes						
Crossroad	Both approaches	Lanes serving through vehicles (n_{th}):	2	2	2	2
	Inside approach	Lanes serving through vehicles ($n_{th,in}$):				
	Outside approach	Lanes serving through vehicles ($n_{th,out}$):				
Ramp	Exit ramp approach	All lanes (n_{ex}):	1	1	1	1
Right-Turn Channelization		see note: →				
Crossroad	Inside approach	Channelization present ($I_{ch,in}$)?:				
	Outside approach	Channelization present ($I_{ch,out}$)?:				
Ramp	Exit ramp approach	Channelization present ($I_{ch,ex}$)?:				
Left-Turn Lane or Bay						
Crossroad	Inside approach	Lane or bay present ($I_{bay,lt,in}$)?:	No	No	No	No
		Width of lane or bay ($W_{b,in}$), ft:				
	Outside approach	Lane or bay present ($I_{bay,lt,out}$)?:				
		Width of lane or bay ($W_{b,out}$), ft:				
Right-Turn Lane or Bay						
Crossroad	Inside approach	Lane or bay present ($I_{bay,rt,in}$)?:				
	Outside approach	Lane or bay present ($I_{bay,rt,out}$)?:	No	No	No	No
Access Data						
Number of driveways on the outside crossroad leg (n_{dw}):						
Number of public street approaches on the outside crossroad leg (n_{ps}):			2	2	2	2

Traffic Data	**Year**		
Inside Crossroad Leg Data	2009		
Average daily traffic ($AADT_{in}$) by year, veh/d:	2010		
(enter data only for those years for which	2011		
it is available, leave other years blank)	2012	6306	6306
	2013		
	2014		
	2015		
	2016		
	2017		

Output Worksheet for Crossroad Ramp Terminals					
Signal = signalized intersection model Unsig = unsignalized intersection model		Terminal 1		Terminal 2	
	Applicable Models	**Crash Period**	**Study Period**	**Crash Period**	**Study Period**
Crash Severity Distribution (during Study Period)					
Fatal crash frequency ($N^*_{e,w,x,at,K}$), crashes:			0.001		0.013
Incapacitating injury crash freq. ($N^*_{e,w,x,at,A}$), crashes:			0.007		0.066
Non-incapacitating inj. crash freq. ($N^*_{e,w,x,at,B}$), crashes:			0.043		0.427
Possible injury crash freq. ($N^*_{e,w,x,at,C}$), crashes:			0.187		1.870
Total fatal-and-injury crash freq. ($N^*_{e,w,x,at,fi}$), crashes:			0.238		2.375
Property-damage-only crash freq. ($N^*_{e,w,x,at,pdo}$), crashes:			0.741		3.171
Total crash frequency ($N^*_{e,w,x,at,as}$), crashes:			0.979		5.546

Input Worksheet for Crossroad Ramp Terminals

Clear | Echo Input Values (View results in Column T) | Check Input Values (View results in Advisory Messages)

			Terminal 1		Terminal 2	
			Crash Period	**Study Period**	**Crash Period**	**Study Period**
Basic Intersection Data						
Ramp terminal configuration:			D4	D4	D4	D4
Ramp terminal description:			SB ramps at La Center		NB ramps at La Center	
Ramp terminal traffic control type:			One stop	One stop	One stop	One stop
Is a non-ramp public street leg present at the terminal (I_{ps})?:						
Alignment Data						
Exit ramp skew angle (I_{sk}), degrees:			0	0	0	0
Distance to the next public street intersection on the outside crossroad leg (L_{str}), mi:			0.021	0.114	0.024	0.085
Distance to the adjacent ramp terminal (L_{rmp}), mi:			0.104	0.104	0.104	0.104
Traffic Control						
Left-Turn Operational Mode						
Crossroad	Inside approach	Protected-only mode ($I_{p,lt,in}$)?:				
	Outside approach	Protected-only mode ($I_{p,lt,out}$)?:				
Right-Turn Control Type						
Ramp	Exit ramp approach	Right-turn control type:	Stop	Stop	Stop	Stop
Cross Section Data						
Crossroad median width (W_m), ft:			0	0	0	0
Number of Lanes						
Crossroad	Both approaches	Lanes serving through vehicles (n_{th}):	2	2	2	2
	Inside approach	Lanes serving through vehicles ($n_{th,in}$):				
	Outside approach	Lanes serving through vehicles ($n_{th,out}$):				
Ramp	Exit ramp approach	All lanes (n_{ex}):	1	1	1	1
Right-Turn Channelization		see note: →				
Crossroad	Inside approach	Channelization present ($I_{ch,in}$)?:				
	Outside approach	Channelization present ($I_{ch,out}$)?:				
Ramp	Exit ramp approach	Channelization present ($I_{ch,ex}$)?:				
Left-Turn Lane or Bay						
Crossroad	Inside approach	Lane or bay present ($I_{bay,lt,in}$)?:	No	No	No	No
		Width of lane or bay ($W_{b,in}$), ft:				
	Outside approach	Lane or bay present ($I_{bay,lt,out}$)?:				
		Width of lane or bay ($W_{b,out}$), ft:				
Right-Turn Lane or Bay						
Crossroad	Inside approach	Lane or bay present ($I_{bay,rt,in}$)?:				
	Outside approach	Lane or bay present ($I_{bay,rt,out}$)?:	No	No	No	No
Access Data						
Number of driveways on the outside crossroad leg (n_{dw}):						
Number of public street approaches on the outside crossroad leg (n_{ps}):			2		2	

Traffic Data	**Year**		
Inside Crossroad Leg Data	2009		
Average daily traffic ($AADT_{in}$) by year, veh/d:	2010		
(enter data only for those years for which	2011		
it is available, leave other years blank)	2012	6306	6306
	2013		
	2014		
	2015		
	2016		
	2017		

Input Worksheet for Crossroad Ramp Terminals

Clear | Echo Input Values (View results in Column T) | Check Input Values (View results in Advisory Messages)

		Terminal 1		Terminal 2	
		Crash Period	**Study Period**	**Crash Period**	**Study Period**
	2018				
	2019				
	2020				
	2021				
	2022				
	2023				
	2024				
	2025				
	2026				
	2027				
	2028				
	2029				
	2030				
	2031				
	2032	11036		11036	
Outside Crossroad Leg Data	2009				
Average daily traffic ($AADT_{out}$) by year, veh/d:	2010				
(enter data only for those years for which	2011				
it is available, leave other years blank)	2012	1724		10887	
	2013				
	2014				
	2015				
	2016				
	2017				
	2018				
	2019				
	2020				
	2021				
	2022				
	2023				
	2024				
	2025				
	2026				
	2027				
	2028				
	2029				
	2030				
	2031				
	2032	3017		19052	
Exit Ramp Data	2009				
Average daily traffic ($AADT_{ex}$) by year, veh/d:	2010				
(enter data only for those years for which	2011				
it is available, leave other years blank)	2012	1703		4983	
	2013				
For a B4 terminal configuration, enter the AADT for the	2014				
diagonal exit ramp (not the loop exit ramp).	2015				
	2016				
	2017				
	2018				
	2019				
	2020				

Input Worksheet for Crossroad Ramp Terminals

Clear | Echo Input Values (View results in Column T) | Check Input Values (View results in Advisory Messages)

		Terminal 1		Terminal 2	
		Crash Period	**Study Period**	**Crash Period**	**Study Period**
	2021				
	2022				
	2023				
	2024				
	2025				
	2026				
	2027				
	2028				
	2029				
	2030				
	2031				
	2032	2555		7475	
Entrance Ramp Data	2009				
Average daily traffic ($AADT_{en}$) by year, veh/d:	2010				
(enter data only for those years for which	2011				
it is available, leave other years blank)	2012	4768		1881	
	2013				
For an A4 terminal configuration, enter the AADT for the	2014				
diagonal entrance ramp (not the loop entrance ramp).	2015				
	2016				
	2017				
	2018				
	2019				
	2020				
	2021				
	2022				
	2023				
	2024				
	2025				
	2026				
	2027				
	2028				
	2029				
	2030				
	2031				
	2032	7152		2963	

Crash Data	**Year**		Ramp Terminal Crashes -->			
Count of Fatal-and-Injury (FI) Crashes by Year						
($N_{o,w,ac,at,fi}$)	2009				1	
	2010					
	2011					
	2012				1	
	2013				2	
Count of Property-Damage-Only (PDO) Crashes by Year						
($N_{o,w,ac,at,pdo}$)	2009					
	2010				2	
	2011				3	
	2012				1	
	2013				3	

Output Worksheet for Crossroad Ramp Terminals					
Signal = signalized intersection model Unsig = unsignalized intersection model		Terminal 1		Terminal 2	
	Applicable Models	**Crash Period**	**Study Period**	**Crash Period**	**Study Period**
Crash Severity Distribution (during Study Period)					
Fatal crash frequency ($N^*_{e,w,x,at,K}$), crashes:			0.002		0.010
Incapacitating injury crash freq. ($N^*_{e,w,x,at,A}$), crashes:			0.009		0.054
Non-incapacitating inj. crash freq. ($N^*_{e,w,x,at,B}$), crashes:			0.060		0.349
Possible injury crash freq. ($N^*_{e,w,x,at,C}$), crashes:			0.262		1.528
Total fatal-and-injury crash freq. ($N^*_{e,w,x,at,fi}$), crashes:			0.333		1.941
Property-damage-only crash freq. ($N^*_{e,w,x,at,pdo}$), crashes:			0.741		3.171
Total crash frequency ($N^*_{e,w,x,at,as}$), crashes:			1.074		5.112

Output Worksheet for Crossroad Ramp Terminals					
Signal = signalized intersection model		Terminal 1		Terminal 2	
Unsig = unsignalized intersection model	**Applicable Models**	**Crash Period**	**Study Period**	**Crash Period**	**Study Period**

Appendix FF Truck Speed Study

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Date: 10/21/2014
Start Time: 10:45 AM
End Time 1:55 PM
Surveyor: JR, Sara, Brian and Bill

Heavy Vehicle Spot Speed Survey

			Average Speeds	41	44	55	56
Item	Time	Truck Description	Truck Class	Merge Point	1000 Feet	2000 Feet	3000 Feet
1	10:45:22	Blue Bud Light-T	10	42	40	53	51
2	10:46:39	Grey Blue-T	10	37	42	53	57
3	10:47:43	White Garbage	9	48	39	64	61
4	10:48:55	White White-T	8	47	48	67	57
5	10:50:00	Red Green-T	10	38	52	51	54
6	10:51:42	Wideload	10	37	42	51	57
7	10:52:46	Wideload	10	42	53	55	57
8	10:53:41	Red White-T	10	43	47	58	61
9	10:56:17	White White-T	9	45	57	60	61
10	10:57:27	White Red-T	9	39	52	57	61
11	10:58:28	Small White Truck	9	41	56	57	54
12	11:00:06	Red w/combine	5	35	55	54	54
13	11:01:04	Baby Blue W-T	10	34	41	49	54
14	11:02:10	White w/Red Stripe	9	45	44	58	61
15	11:03:51	Gas Truck	9	45	58	58	61
16	11:04:39	Car Carrier	10	41	53	55	57
17	11:05:57	White W/C	9	44	45	60	57
18	11:07:20	White Tubing-T	10	38	39	49	51
19	11:08:14	Red GT on T	12	44	44	61	57
20	11:09:21	White w/wood	10	33	30	41	48
21	11:10:07	Black Black-T	13	32	49	61	57
22	11:11:30	Gas Truck	9	45	45	61	57
23	11:12:31	Small Red Truck	13	49	37	60	57
24	11:13:43	Red White-T	5	48	40	62	54
25	11:14:50	Lime Green	9	27	40	59	61
26	11:15:44	White w/Yellow Sign on-T	10	40	40	57	61
27	11:17:01	White Log T	9	33	35	47	46
28	11:18:46	Red White-T	9	32	43	55	61
29	11:19:47	Purple Red	10	38	53	59	57
30	11:20:45	White Gas DBL-T	13	36	38	47	51
31	11:22:08	Gray Metal-T	9	45	44	53	51
32	11:23:25	Fedex	6	49	46	59	57
33	11:24:48	Red Metal Coils	10	33	35	49	51
34	11:25:54	White w/white skirt	9	36	42	54	61
35	11:27:00	White Red H	9	44	46	57	61
36	11:28:07	Green White Canopy	13	38	40	52	54
37	11:28:58	Purple w/Canopy	9	44	53	53	57
38	11:29:53	Light Brown White-T	10	32	54	50	54
39	11:32:45	Red White-T	9	42	42	56	54
40	11:34:37	Black Chemical Tanks	13	37	29	48	48
41	11:36:39	Small Ladder Truck	6	48	47	51	57
42	11:38:30	Small White Truck	5	33	55	52	70
43	11:44:11	Gray White-T	10	32	44	50	54
44	11:44:55	Small Red Truck	5	55	43	62	61
45	11:45:50	White GT	9	40	42	54	54
46	11:47:08	Light Blue White-T	9	39	54	50	54
47	11:48:01	Blue Empty T	9	41	43	53	51

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Date: 10/21/2014
Start Time: 10:45 AM
End Time 1:55 PM
Surveyor: JR, Sara, Brian and Bill

Heavy Vehicle Spot Speed Survey

			Average Speeds	41	44	55	56
Item	Time	Truck Description	Truck Class	Merge Point	1000 Feet	2000 Feet	3000 Feet
48	11:49:18	Yellow Penske	5	43	44	58	54
49	11:50:10	Pickup Truck Equipment	8	34	43	54	57
50	11:51:14	Purple	10	34	42	49	51
51	11:52:05	White White-T	9	41	35	56	54
52	11:53:05	White White-T	9	38	37	53	54
53	11:54:06	Baby Blue	13	37	59	53	51
54	11:55:09	Black Red-T	9	41	48	54	57
55	11:56:18	White White-T	9	40	48	53	57
56	11:57:32	White & Blue	9	42	46	55	57
57	11:58:28	Red White-T	9	47	59	56	57
58	11:59:35	Dark Gray White-T	10	36	58	49	51
59	12:00:50	Blue Wide Load	10	36	42	49	51
60	12:01:37	Blue Black-T	9	40	50	55	54
61	12:02:24	Rite Aid	13	40	52	53	57
62	12:03:38	Carson Oil	6	43	45	55	51
63	12:05:08	White White-T	8	35	50	53	51
64	12:05:35	White McKinney	9	43	51	55	54
65	12:07:02	Green Construction	13	38	43	51	54
66	12:07:55	White no T	6	44	50	59	65
67	12:08:43	White Tank-T	9	42	40	57	61
68	12:09:39	Gray	9	44	45	57	61
69	12:10:51	Gray Orange-T	10	34	47	50	51
70	12:11:59	Orange Orange-T	9	36	48	55	57
71	12:13:13	Red Logger	9	36	47	52	51
72	12:14:14	White Green	10	35	36	52	54
73	12:15:21	Thermo King White	5	49	45	48	54
74	12:16:15	White Rite Aid	13	38	36	52	54
76	12:18:37	Tan Oil	8	42	37	53	57
77	12:19:31	White Oil	8	38	30	52	57
78	12:20:39	Orange Logger	10	40	45	53	61
79	12:21:42	White Black-T	10	42	42	51	57
80	12:22:44	White Train Wheels	9	30	29	55	57
82	12:25:16	Purple White-T	9	48	49	58	54
83	12:26:13	Red White-T	9	42	36	51	48
84	12:26:57	Red Empty-T	9	40	45	57	61
85	12:28:13	White Tow Truck	5	49	40	55	57
86	12:29:09	White Gray-T	10	36	44	53	48
88	12:31:15	Red White-T	9	33	39	60	61
89	12:32:26	Rite Aid	13	34	40	60	61
90	12:33:06	Red White	9	44	47	58	61
91	12:34:01	Black White-T	9	47	41	59	57
92	12:34:57	Yellow Penske	5	50	54	62	70
93	12:36:14	Gray Red	9	50	49	63	65
94	12:37:08	Red White Stripe	9	45	45	58	57
95	12:38:01	White White-T	9	34	32	56	61
96	12:38:48	Red Dump 2xT	10	46	47	58	48
97	12:42:45	Black Septic-T	6	31	60	61	57

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Date: 10/21/2014
Start Time: 10:45 AM
End Time 1:55 PM
Surveyor: JR, Sara, Brian and Bill

Heavy Vehicle Spot Speed Survey

			Average Speeds	41	44	55	56
Item	Time	Truck Description	Truck Class	Merge Point	1000 Feet	2000 Feet	3000 Feet
98	12:43:36	White White-T	9	39	46	48	54
99	12:44:29	Red Red-T	9	41	40	55	54
100	12:45:20	Yellow Colored-T	9	41	32	55	54
101	12:47:47	Yellow White-T	8	39	35	53	61
102	12:49:22	Blue Logger	10	43	32	55	51
104	12:51:48	Green White-T	10	48	48	54	54
105	12:52:44	Red White-T	9	39	50	55	57
106	12:53:39	White White-T	10	44	44	56	57
107	12:56:20	Black White-T	9	30	28	51	54
108	12:57:48	Black Orange	10	34	27	49	54
109	12:59:06	Blue White	9	42	41	50	57
110	1:00:54	White White-T	9	43	36	59	57
111	1:02:17	White Swift	9	40	41	48	54
112	1:03:15	Gray Construction	13	38	31	50	54
113	1:04:32	White White-T	9	37	37	54	54
114	1:05:55	Small Uhaul	5	51	52	59	61
115	1:06:57	Red Logger	6	40	38	61	61
116	1:08:03	White empty-T	9	42	40	60	57
117	1:09:27	Green McKinney	9	43	45	59	54
118	1:10:35	Black Logger	9	37	36	56	57
119	1:11:20	Small Red	5	56	42	64	61
120	1:12:35	Small White Mayflower	5	48	52	58	57
121	1:14:21	White GT White-T	10	53	48	60	54
122	1:15:50	White White-T	9	37	40	53	57
123	1:16:53	Red Logger	10	36	31	50	61
124	1:18:29	Red Logger empty	9	47	53	59	61
125	1:20:54	Blue White-T	10	40	46	50	51
126	1:21:51	ABF Truck	9	44	50	55	57
127	1:22:58	White White-T	9	42	36	58	57
128	1:23:46	White Sound Beverage	10	35	44	49	57
130	1:26:28	Tan Oil	9	40	45	52	61
131	1:28:02	Tan White-T	9	38	41	53	65
132	1:29:05	Gray Gray-T	9	29	49	52	61
133	1:29:55	Red Green-T	10	35	51	50	54
134	1:30:52	Purple Blue White-T	9	43	38	55	54
135	1:32:29	White White-T	9	39	51	56	57
136	1:33:23	White no-T	6	43	46	52	65
137	1:34:14	Blue no-T	6	46	52	50	54
138	1:36:45	Blue White-T	9	46	43	56	61
139	1:37:40	Red White-T	9	46	41	59	61
140	1:38:43	Small White Truck	5	49	51	58	41
141	1:39:36	White	9	42	53	63	65
142	1:41:05	Tan Scrap Metal	10	38	42	51	51
143	1:41:54	Car Carrier Large	9	38	45	55	57
144	1:42:58	Red White-T	9	45	49	60	65
145	1:43:53	Red White-T	9	40	53	56	61
146	1:44:55	White White-T	9	42	51	59	61

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Date: 10/21/2014
Start Time: 10:45 AM
End Time 1:55 PM
Surveyor: JR, Sara, Brian and Bill

Heavy Vehicle Spot Speed Survey

			Average Speeds	41	44	55	56
Item	Time	Truck Description	Truck Class	Merge Point	1000 Feet	2000 Feet	3000 Feet
147	1:45:39	Gray w/metal load	10	45	52	68	54
148	1:46:39	GMC Black	5	37	44	58	57
150	1:48:37	Whtie Car Carrier	9	35	42	56	57
151	1:49:22	Red White-T	9	44	48	59	57
152	1:51:25	Green Gray-T	10	38	46	59	51
153	1:52:24	Blue Empty	10	52	51	62	61
154	1:53:54	White Blue-T	10	35	51	46	54
155	1:54:53	White Canvas	10	35	44	48	57

All classes	149			
Average	41	44	55	56
Minimum	27	27	41	41
Maximum	56	60	68	70
Median	40	44	55	57

Appendix GG Design Criteria

NW La Center Road/I-5 Interchange Improvement Project Design Criteria

Interstate Interchange Areas

Matrix **2** ***Row*** **11**

This checklist is to confirm interpretation of design criteria. Your project may require that additional/different/or fewer Design Elements be addressed.

Design Class	Class I-1 (Exh. 1140-5)
Functional Class	INTERSTATE (I-5)
Design Year	2016
Design Speed	Ramp Range: 70mph – 25mph (Exh. 1360-4, based on I-5 design speed of 80mph) Cross Road: 45mph
ADT	
Truck Percentage	
Right of Way Width	

DESIGN ELEMENT	**Design Level (B/M/F)**	**Criteria**	***REFERENCE & COMMENTS***
Ramps & Collector Distributors			
Horizontal Alignment	F		
Stopping Sight Distance		730ft	Exh. 1260-1
Max. Superelevation		10%	1250.04 (Exh. 1250-4a)
Vertical Alignment	F		
Maximum Grade		5%/3%	Exh. 1360-5 (5% max., 3% desirable)
Stopping Sight Distance		730ft/ 155ft	Exh. 1260-1 (Vd=70mph/Vd=25mph)
Passing Sight Distance		N/A	
Decision Sight Distance		N/A	
Lane Width	F		
Number of Lanes		1/2/3	Exh. 1360-6: NB - 2 at gore, 3 at intersection; SB – 1 at gore, 2 at intersection
Lane Width		15ft/25ft /12ft	Exh. 1360-6: single-lane ramp/two-lane ramp/aux lane
Turning Roadway Width		25ft	Exh. 1240-2a (R = 1,000’ to 2,999’)

DESIGN ELEMENT	Design Level (B/M/F)	Criteria	REFERENCE & COMMENTS
Shoulder Width	F		
Shoulder Width-Left		2ft/4ft	Exh. 1360-6: single-lane/ two-lane (plus 2' shy at barriers)
Shoulder Width-Right		8ft/10ft	Exh. 1360-6: ramp/Exh. 1360-13c aux lane (plus 2' shy at barriers)
Lane Transition			
Channelization Tapers	F		
		70/1	Exh. 1210-1 Min. angle w/out curve = 0°49' at 70mph
On/Off Connections	F		
On Connection		Single-lane, tapered	Exh. 1360-13a
Off Connection		Two-lane, tapered	Exh. 1360-14d
Cross Slope Lane	F		
		2%	Section 1230.04
Cross Slope Shoulder	F		
		2%	Section 1230.04.
Fill/Ditch Slopes	F		
Fill Slopes		6H:1V	Exh. 1230-4a or 4b – 6H:1V max (0'-10' height of fill, depth of ditch), 4H:1H max (10'-20')
Ditch In-slopes		6H:1V	Exh. 1230-4a or 4b – 6H:1V max (0'-10' height of fill, depth of ditch), 4H:1H max (10'-20')
Limited Access	F		
Clear Zone	F		
		Varies	Exh. 1600-2
Signing	F		
		*	Provide Permanent signing in accordance with WSDOT Standard Plans, Section M – Roadway Delineation and WSDOT Design Manual Chapter 1020
Delineation	F		
		*	Provide Permanent signing in accordance with WSDOT Standard Plans, Section M – Roadway Delineation nd WSDOT Design Manual Chapter 1030
Illumination	F		
		Varies 0.6 to 0.9	(footcandles) Exh. 1040-25 Section 1040.05
ITS	F		

DESIGN ELEMENT	Design Level (B/M/F)	Criteria	REFERENCE & COMMENTS
Basic Safety			
		N/A	Exh. 1100-3 (does not apply for FULL design)
Vertical Clearance	F		
Bridge #		16.5ft	Exh. 720-1
Bike and Pedestrian	F		
Ramp Terminals	F		
Design Vehicle		WB-67	Exh. 1310-12 –WB-67 is desirable
Turn Radii	F		
Intersection Radii - Left		70ft	Exh. 1310-14 (Assume A = 90°)
Intersection Radii - Right		70ft	Exh. 1310-14 (Assume A = 90°)
Intersection Angle	F		
		60° - 120°	1310.03(9)
Intersection Sight Distance	F		
			1310.06 – Signalized intersections – provide sight distance for right-turning vehicles
Barriers			
Terminals & Transition Section	F		
Standard Run	F		
Bridge Rail	F		
Cross Roads			
Lane Width	F		
Number of Lanes		4	(6 future)
Lane Width		12ft	Exh. 1140-8
Turning Roadway Width		27ft	(for R = 1,000ft) Exh. 1240-1a. AASHTO Exh. 3-15 (page 147) to get min. Radius

DESIGN ELEMENT	Design Level (B/M/F)	Criteria	REFERENCE & COMMENTS
Shoulder Width	F		
		8ft	Exh. 1140-8 (C-2 – DHV > 501)
Fill/Ditch Slopes	F		
Fill Slopes		6H:1V	Exh. 1230-3 – Assume 0-5 height of fill/depth of ditch
Ditch In-slopes		6H:1V	Exh. 1230-3 – Assume 0-5 height of fill/depth of ditch
Limited Access	F		
		300ft min	530.03(3)(c) full control limited access for min. distance of 300' beyond the the centerline of the ramp. Additional 130' along frontage rd if frontage rd is within 350' of ramp.
Clear Zone	F		
		varies	Exh. 1600-2
Signing	F		
		*	Provide Permanent signing in accordance with WSDOT Standard Plans, Section M – Roadway Delineation
Delineation	F		
		*	Provide Permanent signing in accordance with WSDOT Standard Plans, Section M – Roadway Delineation
Illumination	F		
		0.8, 1.0	(footcandles) Exh. 1040-25. 0.8 for mainline, 1.0 for intersection (Medium Level)
ITS	F		
Vertical Clearance	F		
Bridge #		16.5ft	Exh. 720-1
Bike and Pedestrians	F		
Bikes		8ft	Exh 1520-5 5ft min. with curb or barrier (8ft shld shared)
Pedestrians		5ft	Exh. 1510-7 5ft min. (from back of curb)
Barriers			
Terminals & Transition Section	F		
Standard Run	F		

DESIGN ELEMENT	Design Level (B/M/F)	Criteria	*REFERENCE & COMMENTS*
Bridge Rail	F		