WCE

Whipple Consulting Engineers

Spokane, WA

TRAFFIC IMPACT ANALYSIS
FOR

Latah Glen Residential Community

Spokane, Washington
Updated November, 2021
2020-2564

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Updated
November 19, 2021

W.O. No. 2020-2564

Prepared by:

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This report has been prepared by Ken Kim, E.I.T. and the staff of Whipple Consulting Engineers, Inc. under the direction of the undersigned professional engineer whose seal and signature appears hereon.

Todd R. Whipple, P.E.

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EXECUTIVE SUMMARY

Supplemental to the SEPA Process for the proposed Latah Glen Residential Community development within the City of Spokane, the following Traffic Impact Analysis applies:

1. The City of Spokane and Washington Department of Transportation (WSDOT) have established Level of Service D as the minimum acceptable level for signalized intersections and Level of Service E for unsignalized intersections.

2. The project proposes to develop 157 space manufactured home residential development on approximately 42.03 ± acres.

3. The project site has been used for multiple land uses over the years. The most recent was an auto wrecker business. The remainder of the property is undeveloped area with trees, field grass and weeds. The project site is proposed upon portions of two parcels. The project proposes to build five (5) new north-south private roads and two (2) new east-west private roads, for a total of 7 new private roads. The projects main access is proposed at the east end of the project with a connection to Inland Empire Way, and its connection to SR 195. The project also proposes a Fire Access to Marshall Road. The access is proposed to be gated per local fire requirements, thus reducing the potential for cut through traffic on private roads. Please see Figure 2 preliminary site plan.

4. The project site is currently listed on the city land use map and zoned as Residential Single Family (RSF). The subject property is located on a portion of E ½ of Section 36, T 24 N., R 42 E., W.M within the City of Spokane, Washington. The parcel numbers for the project are 25364.0001, and 25361.0004. The surrounding area is residential, commercial and rural land uses.

5. The project study area intersections were identified through conversations with the City of Spokane and WSDOT. The study also includes the level of service analysis of the AM and PM peak hours of the following intersections:

    - SR 195 & 16th Avenue
    - SR 195 & Thorpe Avenue
    - SR 195 & Inland Empire Way
    - Cheney-Spokane Road & SR 195 NB on/off Ramps
    - Cheney-Spokane Road & SR 195 SB on/off Ramps
    - SR 195 & Meadowlane Drive
    - SR 195 & Hatch Road
    - The scope also included an additional analysis of highway segment and queue length at the I-90/SR 195 EB Ramp, as well as the right turn lane warrant at the intersection of Inland Empire Way & SR 195.

6. The proposed land use is anticipated to generate 36 new trips in the AM peak hour with 10 new trips entering the site and 26 new trips exiting the site. In the PM peak hour, the proposed development is anticipated to generate 66 new trips with 42 new trips entering the site and 24 new trips exiting the site. The proposed land use is anticipated to generate

785 average daily trips to/from the project site.

7. **Conclusions**
   This Traffic Impact Analysis (TIA) has reviewed and analyzed the study area per the scope established by the City of Spokane and WSDOT. Based upon the analysis, field observations, assumptions, methodologies and results which are provided in the body of this report, it is concluded that the development of the proposed project will generate new trips on the existing transportation system and that those trips will have an impact on the transportation system. This conclusion was reached and has been documented within the body of this report.

   - Under the **existing** conditions, all intersections are currently operating at an acceptable level of service.
   - For the **year 2026 with background growth rate** scenario, all intersections are anticipated to continue to operate at an acceptable level of service except the intersections of SR 195 & 16th Avenue and SR 195 & Hatch Road. With the mitigation provided by the Spangle-Wheatland project at SR 195 & 16th Avenue (Right Out only on eastbound approach) and the painted median configuration with SB acceleration lane at SR 195 & Hatch Road, all intersections are anticipated to operate at an acceptable level of service.
   - For the **year 2026 with background growth rate plus background projects and without this project** scenario, with the mitigation provided by the Spangle-Wheatland project (Right Out only on eastbound approach) at SR 195 & 16th Avenue, and the painted median configuration with SB acceleration lane at SR 195 & Hatch Road, all intersections are anticipated to continue to operate at an acceptable level of service except the intersection of SR 195 & Meadowlane Drive. With WSDOT ½ J-Turn at SR 195 & Meadowlane Drive, all intersections are anticipated to operate at an acceptable level of service.
   - For the **year 2026 with background growth rate plus background projects and with this project** scenario, with the mitigation provided by the Spangle-Wheatland project (Right Out only on eastbound approach) at SR 195 & 16th Avenue, the painted median configuration with SB acceleration lane at SR 195 & Hatch Road, and WSDOT ½ J-Turn at SR 195 & Meadowlane Drive, all intersections are anticipated to continue to operate at an acceptable level of service. (Please see Wheatland Estates Proposed Traffic/Transportation Conditions of Approval letter in Background Project section of Appendix).

8. As shown in the Additional Analysis - Right Turn Lane Warrant Analysis section, it is concluded that the intersection of Inland Empire Way & SR 195 meets the WSDOT right turn lane warrant. However, the intersection level of service remains at an acceptable level through the buildout period. Additionally, there is also a sight distance concern associated with a dedicated right turn lane, as a vehicle within the turn lane blocks the view of oncoming traffic. We propose additional consultation with the WSDOT that this be reevaluated after the 100th home site has received an occupancy permit.

9. As shown in the additional analysis section – SR 195 Corridor Improvement Projects, it was concluded that with the EB Turn Restrictions at 16th Avenue, Flashing Beacon and Sign at Thorpe Road Exit, and Connection to Inland Empire Way at Cheney-Spokane Road Ramp projects (by other projects, yet to be approved but in the pipeline) that a significant number of trips would be redirected away the NB US 195 to EB I-90 ramp, and that the net result would be no additional trips to the I-90 Ramps.

10. As shown in the additional analysis Highway Segment LOS and Queue Analysis section, based upon the analysis provided it is concluded that the addition of the 13 AM and the 5 PM project trips will have an impact upon the SR 195 & 1-90 Interchange, by adding 4 vehicles with a calculated 107 ft addition at queue for AM and 1 vehicle with a calculated 6 ft addition at queue for PM with SR 195 Corridor Improvement Projects.

11. As shown in the additional analysis, based upon the LOS Analysis on the intersection of 23rd Avenue & Inland Empire Way, it is concluded that the addition of the project trips will have a minimal impact upon the intersection of 23rd Avenue (Thorpe Road) & Inland Empire Way, by increasing 0.1 seconds in delay for AM and 0.2 seconds in delay for PM.

12. As shown in the additional analysis, based upon the Queue Analysis on the intersection of 16th Avenue & SR 195, it is concluded that the diverted trips will have a minimal impact upon the northbound left-turn lane at the intersection of 16th Avenue and SR 195, by adding 1 vehicle (2 ft) in queue for AM and 1 vehicle (5 ft) in queue for PM.

13. ***Recommendations***

    It is recommended that the project be conditioned to participate in the Corridor Improvement projects as described within this document. The proposed conditions are as follows.

    A. *Vehicular traffic from this project is expected to add 13 AM trips and 5 PM trips to the NB US 195 to EB I-90 ramp. WSDOT has commented that no additional peak hour trips may be added to the ramp due to safety concerns. Latah Glen is therefore required to contribute funds to complete an improvement to the US 195 corridor that will reduce the impact of its traffic on NB US 195 to EB I-90 ramp ("Mitigation Project"). Latah Glen may receive plan approval after a financial commitment is in place (secured by a letter of credit or bond), which has been approved by the City, providing for the funding of the design and the construction for the Mitigation Project(s), which shall be under contract for construction within one year from issuance of the plan approval. The details of the mitigation project(s) will be agreed upon by the developers, City and WSDOT. The applicant's contributions to funding the design and construction of the mitigation project(s) will qualify for a credit against transportation impact fees per SMC 17D.075.070*
    B. *Latah Glenn may receive plan approval once a financial commitment is in place (secured by a letter of credit or bond), which has been approved by the City, providing for a.) the construction of the 16th Avenue improvements with SR 195, and b.) Cheney-Spokane Road Ramp – Connection to Inland Empire Way Improvement.*

This commitment may be defined as an agreement between several developers to fund and construct the 16th Avenue, and the Cheney-Spokane Road Ramp – Connection to Inland Empire Way Improvement projects within a specified time frame, not to exceed six years, as agreed upon by city staff and WSDOT. The applicant's contributions to funding the design and construction of the Improvement projects will qualify for a credit against transportation impact fees per SMC 17D.075.070.

i. *The 16th Avenue and SR 195, improvement project will consist of the following:*
   - *Install a raised curb island*
   - *Channelize the turn lane*
   - *Add a southbound acceleration lane.*

ii. *The Cheney-Spokane Road Ramp – Connection to Inland Empire Way Improvement project will consist of the following:*
   - *Extend the northbound ramp to Inland Empire Way,*
   - *One or Two-way connection to Inland Empire Way,*
   - *Install ramp with acceleration lane*
   - *Install ramp meter signal*
   - *Relocate existing sign bridge*

iii. *Latah Glen Financial Commitment*
*The financial commitment for Latah Glen development based upon the rate of participation is as follows for the Cheney-Spokane Road Ramp improvement with 157 PM peak hour trips at $1,910.64 per PM peak hour trip. The participation percentage is anticipated to total $299,970.48(157 trips * $1,910.64). In summary the total financial commitment due is $299,970.48 or greater depending upon final cost, less a 25% contribution to the construction of improvements at 16th and SR-195 as proposed in the Spangle-Wheatland Estate mitigation proposal.*

iv. *The applicant's contributions to funding the design and construction of the Improvement projects will qualify for a credit against transportation impact fees per SMC 17D.075.070.*

v. *It should be noted that the Latah Glen Community commitment to this improvement has been set tentatively at $299,970.48 this commitment along with the value of $776,630.48 from Marshall Creek would result in a beginning commitment of $1,076,600± to the Inland Empire Way access, Phase 1. It is understood that this is an approximated commitment may increase due to actual construction costs for the improvements proposed.*

vi. *Lastly, the current impact fee credit of $1160.64 would occur at time of building permit which results in an effective developer contribution of $750/unit ($1910.64-$1160.64).*

14. Based upon the conclusions within this study, the proposed project is recommended to complete all required conditions of approval and should be allowed to move forward without further traffic analysis, or offsite mitigation.

INTRODUCTION

Introduction, Purpose of Report and Study Area

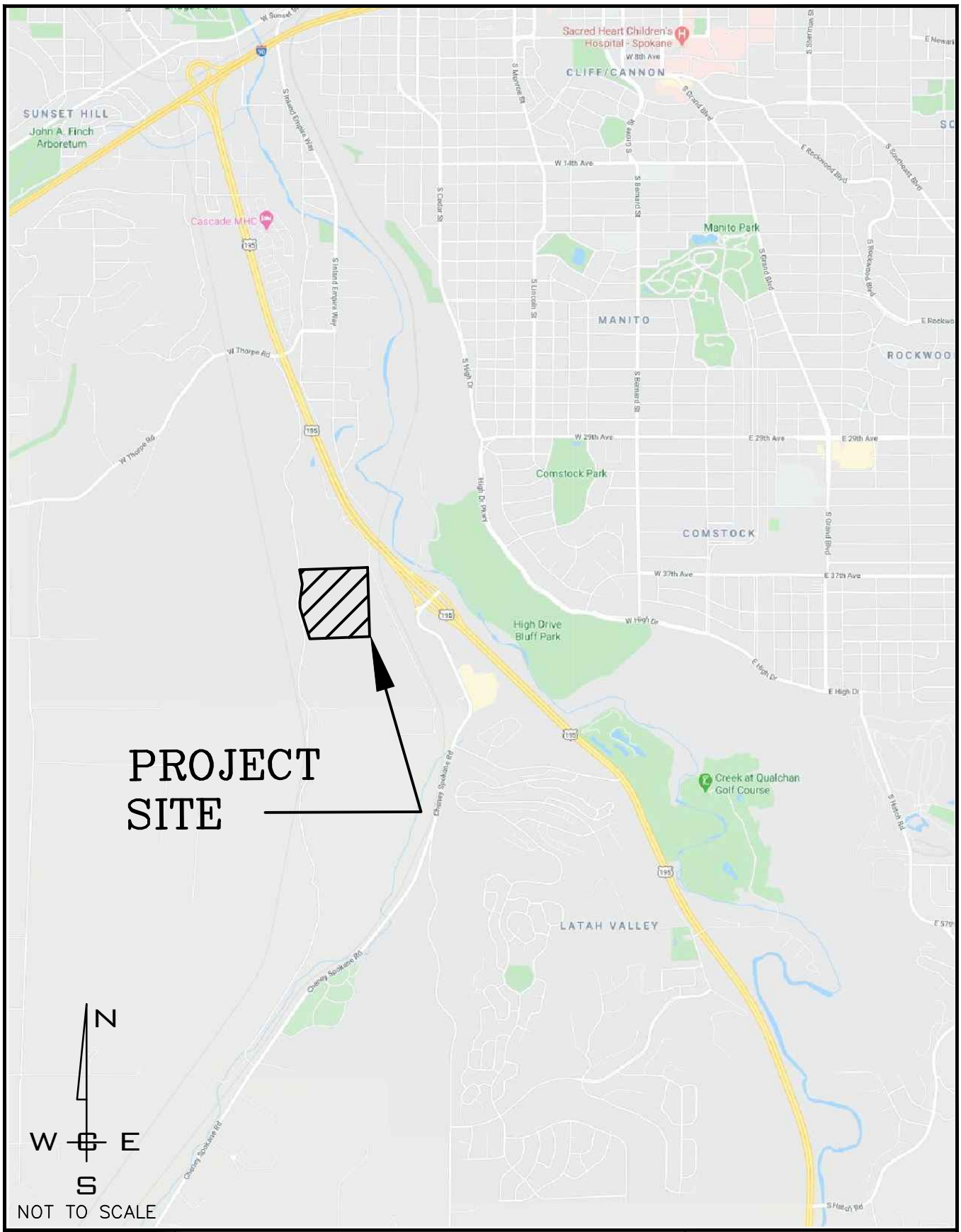
This traffic impact analysis is required by the City of Spokane as part of the SEPA process for the proposed Latah Glen Residential Community. The project proposes to develop 157 space for manufactured homes residential development on approximately 42.03 ± acres. Please see Figure 1 Vicinity Map and Figure 2 Preliminary Site Plan.

The purpose of this analysis is to review, assess, and identify the potential traffic related impacts that the proposed project may have on the transportation network and where possible minimize and/or mitigate any impact. This TIA will be completed in accordance with the current traffic guidelines from the City of Spokane and the Institute of Transportation Engineers (A Recommended Practice – Traffic Access and Impact Studies for Site Development, 2010) as well as their respective requirements.

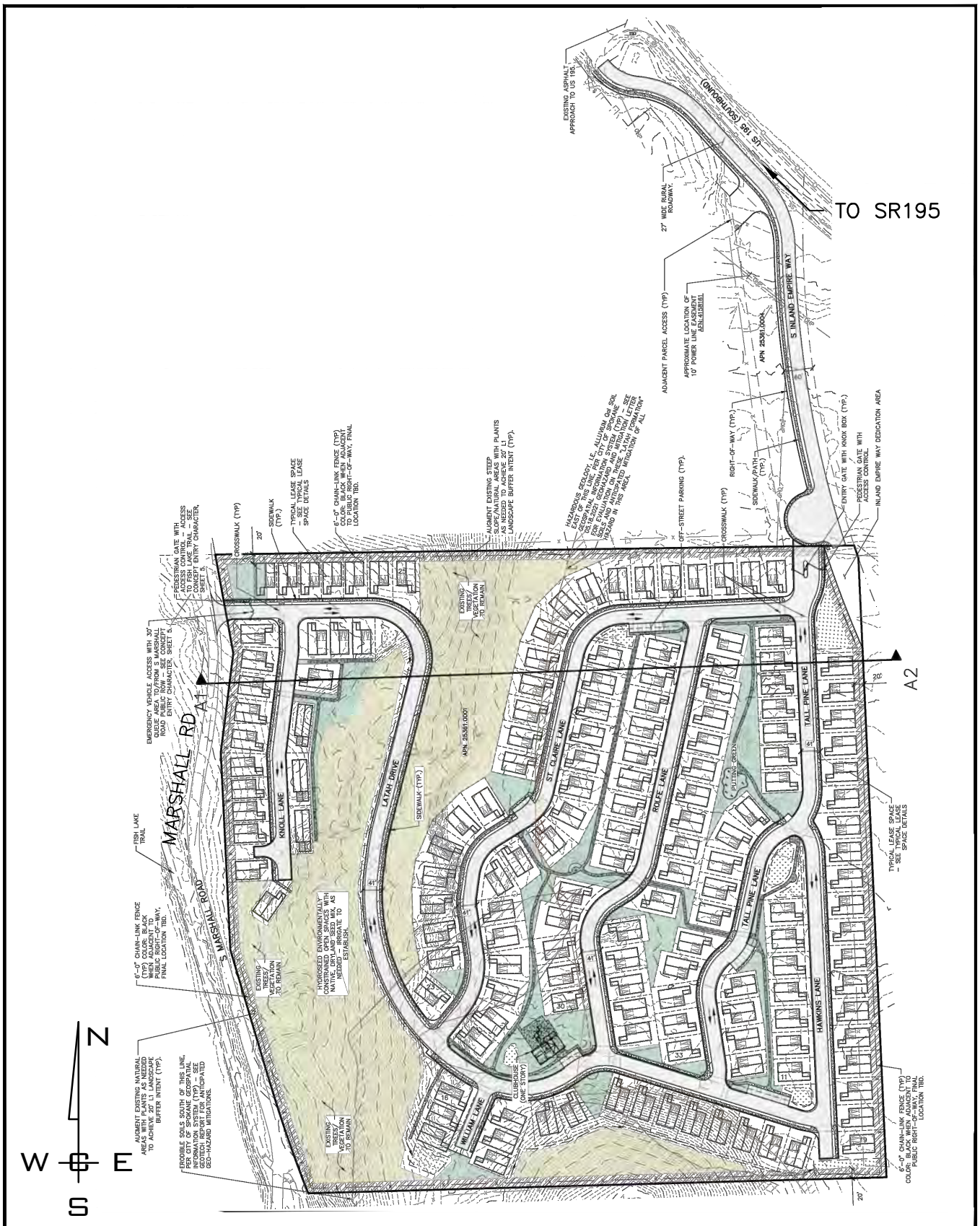
Site Location and Development Description

The subject property is located on a portion of the E ½ of Section 36, T 24 N., R 42 E., W.M. within the City of Spokane, Washington. The project proposes to develop 157 space for manufactured homes residential development on approximately 42.03 ± acres. The project site has been used for multiple land uses over the years. The most recent was an auto wrecker/ auto repair business within the 2,000 sf +/- (2.0 ksf) shop onsite. The remainder of the property is undeveloped area with trees, field grass and weeds.

The project site is proposed upon portions of two parcels. The project proposes to build six (6) new north-south private roads and three (3) new east-west private roads, for a total of 9 new private roads. The projects main access is proposed at the east end of the project with a connection to Inland Empire Way, and its connection to SR 195. The project also proposes a Fire Access to Marshall Road. The access is proposed to be gated per local fire requirements, thus reducing the potential for cut through traffic on private roads. Please see Figure 2 preliminary site plan.



PROJ #: 20-2564 DATE: 11/19/21 DRAWN: KMK APPROVED: TRW	TRAFFIC IMPACT ANALYSIS **LATAH GLEN RESIDENTIAL** 3504 S INLAND EMPIRE WAY SPOKANE, WASHINGTON	WCE WHIPPLE CONSULTING ENGINEERS CIVIL AND TRANSPORTATION ENGINEERING 21 SOUTH PINES ROAD SPOKANE VALLEY, WASHINGTON 99206 PH: 509-893-2617 FAX: 509-926-0227
FIGURE 1	VICINITY MAP	



PROJ #: 20-2564
DATE: 11/19/21
DRAWN: KMK
APPROVED: TRW

TRAFFIC IMPACT ANALYSIS
LATAH GLEN RESIDENTIAL
3504 S INLAND EMPIRE WAY
SPOKANE, WASHINGTON

FIGURE 2

PRELIMINARY SITE PLAN

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Existing and Proposed Conditions within the Study Area

Land Use & Zoning

The project site is currently listed on the City land use map and zoned as Residential Single Family (RSF). The subject property is located on a portion of the E ½ of Section 36, T 24 N., R 42 E., W.M within the City of Spokane, Washington. The parcel numbers for the project are 25364.0001, and 25361.0004. The surrounding area is residential, commercial and rural land uses.

Existing Roadways

The overall transportation network in this area consists of a State Route, arterials, and local access roads. The project is proposed to be accessed via Inland Empire Way. The proposed project trips are anticipated to use the following roadways:

Marshall Road is generally a two-way, 2-lane north/south, local access road. Marshall Road extends northwest from Cheney-Spokane Road and crosses over the railroad track before turning sharply northeast and passing under Fish Lake Trail. Marshall Road continues through 44th Avenue and along the west side of the project site before terminating at Thorpe Road. Marshall Road primarily serves large lot residential uses. The speed limit on Marshall Road within the study area is 25 MPH.

Inland Empire Way is generally a two-way, 2-lane north/south, local access road that extends west from SR 195 and turns sharply south along the railroad track along the east side of the project area before terminating at Victoria Lane. Inland Empire Way primarily serves rural land use. The speed limit on Inland Empire Way within the study area is 25 MPH.

State Route 195 is generally a north/south, two-way, 4-lane highway. State Route 195 extends south from Interstate 90 at Exit 279 and goes through 16th Avenue, Thorpe Road and the Cities of Spangle, Freedom, Plaza, Rosalia, Thornton, Cashup, Steptoe, Colfax, Pullman, Johnson, Colton, and Uniontown before merging with State Route 95.

Study Area Intersections (TIA Scope)

The project study area intersections were identified through public traffic scoping meeting on September 23rd, 2020 and finalized in conversations with the City of Spokane and WSDOT. The study encompasses the AM and PM peak hour analysis of the following intersections:

- SR 195 & 16th Avenue
- SR 195 & Thorpe Avenue
- SR 195 & Inland Empire Way
- Cheney-Spokane Road & SR 195 NB on/off Ramps
- Cheney-Spokane Road & SR 195 SB on/off Ramps
- SR 195 & Meadowlane Drive
- SR 195 & Hatch Road

The scope also included an additional analysis of highway segment and Queue length at the I-90/SR195 EB Ramp, as well as the Right turn lane Warrant at the intersection of Inland Empire Way & SR 195

Traffic Control and Descriptions

SR 195 & 16th Avenue is an unsignalized 4-leg two-way-stop-controlled intersection with stop control on the east and westbound approaches with the following lane configuration: the east and westbound approaches have one receiving lane and one left-through-right lane. The north and southbound approaches have two receiving lanes, a left turn lane, a through lane, and a through-right lane. With the separated highway there is space for 1 vehicle within the median

SR 195 & Thorpe Road (J-Turns) The J-turn design redirects left turns away from the central intersection and reduces conflicts. The central intersection is an unsignalized 4-leg two-way-stop-controlled intersection with stop control on the east and westbound approaches with the following lane configuration: the east and westbound approaches have one receiving lane and a right turn lane. The westbound right turn lane is channelized into an acceleration lane. The northbound approach has two receiving lanes, two through lanes, and a right turn pocket. The southbound approach has one acceleration lane, two receiving lanes, two through lanes, and a right turn lane.

SR 195 & Inland Empire Way is an unsignalized stop-controlled intersection with stop control on the eastbound approach of Inland Empire Way, with the following lane configuration: the eastbound approach has one receiving lane and one right turn lane. The northbound approach has two receiving lanes and two through lanes. The southbound approach has two receiving lanes, a through lane, and a through-right lane with a right turn taper.

Cheney-Spokane Road & SR 195 NB on/off Ramps is an unsignalized two-way-stop-controlled intersection with stop control on the north and southbound approaches, with the following lane configuration: the eastbound approach has one receiving lane and one left turn lane. The northbound approach has no receiving lane and one left-through lane. The southbound approach has one receiving lane and a right turn lane.

Cheney-Spokane Road & SR 195 SB on/off Ramps (1) is an unsignalized -stop-controlled intersection with stop control on the southbound on/off one-way ramps with the following lane configuration: the eastbound approach has one receiving lane and a through-right lane. The westbound approach has one receiving lane and a left-through lane. The northbound approach has one receiving lane. The southbound approach has one left-through-right lane.

Cheney-Spokane Road & SR 195 SB off Ramp (2) is an unsignalized -stop-controlled intersection with stop control on the westbound approach with the following lane configuration: The westbound approach has one receiving lane and a left turn lane that stops for the southbound lane. The northbound approach has one receiving lane and a channelized right turn lane. The southbound approach has one through lane.

SR 195 & Meadow Lane Road is an unsignalized two-way-stop-controlled intersection with stop control on the east and westbound approaches with the following lane configuration: the east and westbound approaches have one receiving lane and a left-through-right lane. The northbound approach has two receiving lanes, a left turn lane, a through lane, and a through-right lane. The southbound approach has two receiving lanes, a left turn lane, two through lanes and a right turn lane.

SR 195 & Hatch Road is an unsignalized one-way-stop-controlled intersection with stop control on the westbound approach with the following lane configuration: the westbound approach has one receiving lane and a left -right turn lane. The northbound approach has two receiving lanes, one through lane, and a through-right lane. The southbound approach has two receiving lanes, a left turn lane, and two through lanes.

Traffic Safety

For the intersections within the study area accident report summaries were received from the City of Spokane and WSDOT. Generally, accidents are documented by type of occurrence, such as property damage or injury. No fatalities were reported for the study intersections during the last three years.

ITE MEV Method

$$Rate\ per\ MEV = \frac{number\ of\ accidents\ in\ three\ years\ X\ 1\ million}{PM\ Peak\ hour\ volume\ X\ PM\ Peak\ Factor\ \ X\ 365\ X\ 3\ years}$$

Equation 4-2 of ITE manual of traffic engineering studies (fourth edition) (modified given the available data, for 3 years and utilizes PM peak hour volumes ~ 10% of ADT)

In this analysis accidents are measured based on frequency per million entering vehicles (MEV). This ratio is a function of the average daily traffic entering the intersection and the annual frequency of accidents. This method of analysis is also considered as an "exposure" analysis. This method of analysis is used to identify areas that need further review. A typical review threshold for accidents at an intersection is 1.00 accidents per MEV. The accident data for the intersections within the study area are shown in Table 1.

Table 1 – Accident Data for Intersections within the Study Area

ACCIDENT DATA										
Intersection	2017		2018		2019		2020		INTX	Per MEV
	PDO	INJ	PDO	INJ	PDO	INJ	PDO	INJ	ADT	
SR 195 & 16th Ave	4	3	2	0	2	2			23,100	0.514
SR 195 & Thorpe Ave(Before J-turn)*	7	2	3	5	0	2			24,150	0.761
SR 195 & Thorpe Ave(After J-turn)*							3	0	24,150	0.292
SR 195 & Inland Empire Way	1	1	0	0	0	1			14,190	0.193
Ch-Sp Rd & SR 195 NB Ramps	0	0	0	0	0	0			4,860	0
Ch-Sp Rd & SR 195 SB Ramps	0	1	0	0	0	0			11,430	0.080
SR 195 & Meadowlane Rd	0	4	3	0	1	3			17,040	0.590
SR 195 & Hatch Rd	1	3	2	1	1	1			14,730	0.558

***Per the WSDOT request, the crash analysis includes the year 2020 to reflect the recent J-turn improvement project (Before J-turn – Jan 2017 ~ Oct 2019, After J-turn – Nov 2019 ~ Dec 2020).**

As shown in the table above, all intersections within the study area do not meet or exceed the threshold for further review.

WSDOT HSM Method

The existing traffic safety assessment at the scoped intersections on State Route 195 were estimated using the methods from the *Safety Analysis Guide* published by WSDOT as implemented in HSM spreadsheet tool, version 9.0 placed at http://safetyperformance.org/tools/.

The term crash frequency refers to the number of crashes per year. Crash frequency is used to describe:

- **Observed (Table 1)** average crash frequency: the historic average of the number of crashes per year. When the HSM predictive method is used with crash history, the expected average crash frequency replaces the observed average crash frequency as a more reliable value of actual average historic performance.

- **Predicted (Based upon; Geometry & Traffic Volume)** average crash frequency is an output from the HSM predictive analysis using only geometry and existing traffic volumes. It is the average safety performance of similar intersections in crashes per year. The predicted analysis provides a base level for the intersection.

- **Expected (Based upon; Geometry, Traffic Volume & Observed Crash Data)** average crash frequency using geometry, existing traffic volumes and reported crash data. This analysis is considered a more reliable metric of existing or actual average crash performance, measured in crashes per year. This analysis uses the predicted average crash frequency, and the observed crash history as input to the empirical Bayes method in the HSM predictive methods. Results from the empirical Bayes method is calculated by weighting the observed crash history against the predicted number of crashes per year. Note that the analysis result values are averages, and should not be interpreted as point values. Values are also rounded to one decimal place.

- **Potential for Improvement (Difference between Predicted & Expected Crash Frequencies)** average crash frequency is strictly a difference between the Predicted and Expected crash frequencies to identify and determine what locations have the highest potential for improvement and the reduction of fatal and serious injury crashes, and return the greatest benefit for the cost of a safety project.

The results of the predictive analysis within the study area are shown in Table 2. The worksheets for the analysis are included in Appendix.

Table 2 - Accident Analysis for Intersections on SR 195 (Existing Volumes)

ACCIDENT ANALYSIS				
Intersection		**Crash Frequency (crashes/yr)**		
		Predicted (Geometry/Volume)	**Expected** (Geometry/Volume/ Accident history)	**Potential for Improvement** (Difference)
SR 195 & 16th Avenue	FT & INJ	0.7	1.3	0.6
	PDO	1.0	1.9	0.9
	Total	1.8	3.3	1.5
SR 195 & Thorpe Avenue	FT & INJ	0.7	2.0	1.2
	PDO	1.0	2.8	1.8
	Total	1.8	4.8	3.0
SR 195 & Inland Empire Way	FT & INJ	0.2	0.3	0.1
	PDO	0.1	0.2	0.1
	Total	0.3	0.5	0.2
Cheney-Spokane Road & SR 195 NB on/off Ramps	FT & INJ	0.2	0.1	0
	PDO	0.2	0.2	0
	Total	0.4	0.3	0
Cheney-Spokane Road & SR 195 SB on/off Ramps	FT & INJ	0.6	0.3	0
	PDO	1.0	0.6	0
	Total	1.6	0.9	0
SR 195 & Meadowlane Drive	FT & INJ	1.0	1.3	0.4
	PDO	1.5	2.0	0.6
	Total	2.4	3.4	0.9
SR 195 & Hatch Road	FT & INJ	0.6	1.0	0.4
	PDO	1.1	1.8	0.8
	Total	1.6	2.8	1.2

FT & INJ = Fatal and Injury, PDO = Property Damage Only

As shown on Table 2, based upon the HSM analysis, it is anticipated that the intersections of State Route 195 & 16th Avenue, State Route 195 & Thorpe Avenue, State Route 195 & Meadowlane Drive, and State Route 195 & Hatch Road in the study area may experience more crashes than intersections with similar roadway characteristics and traffic volumes. It is anticipated that the intersections of State Route 195 & Inland Empire Way and Cheney-Spokane Road & State Route 195 NB on/off Ramps will have a safety performance similar to other intersections that have the same roadway characteristics and traffic volumes. It is also anticipated that the intersection of Cheney-Spokane Road & State Route 195 SB on/off Ramps will experience fewer crashes than intersections with similar roadway characteristics and traffic volumes.

Note: There is currently no warrant standard established, that requires that a safety project be implemented by this analysis.

Traffic Volumes and Peak Hours of Operation

Traffic counts were collected in 2018, 2019, 2020, & 2021 under the direction of Whipple Consulting Engineers (WCE) and Idax Data Solutions (IDAX)*, at the following intersection:

- SR 195 & 16th Avenue (August 2019)
- SR 195 & Thorpe Avenue (November 2018)
- SR 195 & Inland Empire Way (January 2021)
- Cheney-Spokane Road & SR 195 NB on/off Ramps (May 2019)
- Cheney-Spokane Road & SR 195 SB on/off Ramps (May 2019)
- SR 195 & Meadowlane Drive (November 2018)
- SR 195 & Hatch Road (February 2020 - IDAX) *

The AM & PM peak hours from these counts are shown on Figures 3 & 4. The raw data for these counts are located in the technical appendix.

Traffic Counts Adjustment Factor

For the effect of the Covid Pandemic, the study area is anticipated to have experienced a decrease in traffic volumes. This effect applies to the year 2021 traffic counts at the intersection of SR 195 & Inland Empire Way. It is the intention of this study to apply a Covid Pandemic Factor to the collected traffic volume, as allowed, to adjust them to the volumes experienced before the effect of the Covid Pandemic, which would be a "normal" baseline year. Based upon the traffic counts on the intersection of SR 195 & Thorpe Avenue before the effect of the Covid Pandemic, the adjustment factors for Covid Pandemic at the intersection of SR 195 & Inland Empire Way have been calculated. The methodology has been summarized below and the calculation and analysis are included in the Traffic Adjustment Calculation of the Appendix.

The method

1. The expected volume for the year 2021 is calculated by taking the southbound traffic volume on SR 195 from a recent pre pandemic count (2018) at the intersection of SR 195 & Thorpe Avenue and multiplying it by the background growth rate for year 2021 (1.03).
2. An adjustment ratio is then calculated by dividing the expected traffic volume on SR 195 of SR 195 & Thorpe Avenue by the actual traffic volume on SR 195 of SR 195 & Inland Empire Way.
3. The adjusted volumes are then calculated by multiplying the actual volume by the adjustment ratio.

LEVEL OF SERVICE

Level of Service (LOS) is an empirical premise developed by the transportation profession to quantify driver perception for such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles afforded to drivers who utilize the transportation network. It has been defined by the Transportation Research Board in the *Highway Capacity Manual 6th Edition*. This document has quantified level of service into a range from "A" which indicates little, if any, vehicle delay, to "F" which indicates significant vehicle delay and traffic congestion that may lead to system breakdown due to volumes that may exceed capacity.

Signalized Intersections

For signalized intersections, research has determined that average stopped delay per vehicle is the best available measure of Level of Service. The following tables identify the relationships between level of service and average stopped delay per vehicle. The City of Spokane and WSDOT have adopted level of service D as the minimum acceptable level for all signalized intersections.

Level of Service Criteria and Descriptions - Signalized

LOS	Delay Range (sec)	General Description
A	10	• Very low delay at intersection. • All signal cycles clear. • No vehicles wait through more than one signal cycle.
B	10 to 20	• Operating speeds beginning to be affected by other traffic. • Short traffic delays at intersections. • Higher average intersections delays resulting from more vehicles stopping.
C	20 to 35	• Operating speeds and maneuverability closely controlled by other traffic. • Higher delays at intersections than for LOS B due to a significant number of vehicles stopping. • Not all signal cycles clear the waiting vehicles.
D	35 to 55	• Tolerable operating speeds, but long traffic delays occur at intersections • The influence of congestion is noticeable. • Many vehicles stop and the proportion of vehicles not stopping declines. • The number of signal cycle failures, for which vehicles must wait through more than one signal cycle are noticeable.
E	55 to 80	• Speeds are restricted, very long traffic delays are experienced and traffic volumes are near capacity. • Traffic flow is unstable, any interruption, no matter how minor, will cause queues to form and service to deteriorate. • Traffic signal cycle failures are frequent occurrences.
F	80	• Extreme delays resulting in long queues which may interfere with other traffic movements • Stoppages of long duration and speeds may drop to zero. • Vehicle arrival rates are greater than capacity. • Considered unacceptable by most drivers.

Unsignalized Intersections

The calculation of Level of Service (LOS) at an unsignalized one/two-way stop-controlled intersection is examined in the Transportation Research Board's *Highway Capacity Manual 6th Edition*. For unsignalized intersections, Level of Service is based on the delay experienced by each movement and approach within the intersection. The concept of delay as presented for unsignalized intersections in the Highway Capacity Manual is based on the amount of time a vehicle must spend at the intersection. Vehicles passing straight through the intersection on the major (uncontrolled) street experience no delay at the intersection. On the other hand, vehicles which are turning left from the minor street, because they must yield the right of way to all right turning vehicles, all left turning vehicles from the major street and all through vehicles on both the minor and major streets, must spend more time at the intersection. Levels of Service are assigned to individual movements within the intersection, and are based upon the delay experienced by each movement or approach.

The Transportation Research Board has determined what Levels of Service for unsignalized intersections should be, by designating Level of Service A through F, where Level of Service A represents a facility where no vehicle in any movement is delayed very long and Level of Service F which represents a facility where there is excessive delay for the average vehicle in at least one movement in the intersection. The City of Spokane and WSDOT have adopted level of service E for all unsignalized intersections within the study area.

Level of Service Criteria and Descriptions - Unsignalized

LOS	Delay Range (sec)	Expected Delay to Minor Street Traffic	General Description
A	10	Little to No Delay	• Nearly all drivers find freedom of operation. • Very seldom is there more than one vehicle in the queue.
B	10 to 15	Short Traffic Delays	• Some drivers begin to consider the delay an inconvenience • Occasionally there is more than one vehicle in the queue.
C	15 to 25	Average Traffic Delays	• Many times, there is more than one vehicle in the queue. • Most drivers feel restricted, but not objectionably so.
D	25 to 35	Long Traffic Delays	• Often there is more than one vehicle in the queue. • Drivers feel quite restricted.
E	35 to 50	Very Long Traffic Delays	• Represents conditions in which, demand is near or equal capacity. • There is almost always more than one vehicle in the queue. • Drivers find the delays approaching intolerable levels.
F	50	Stop-and-Go Condition Delays Generally Longer than Acceptable	• Forced flow. • Represents an intersection failure condition that is caused by geometric and/or operational constraints external to the intersection

All Level of Service analyses described in this report were performed in accordance with the procedures described above. As a final note, the Highway Capacity Manual (HCM) analysis and procedures are based upon worst case conditions. Therefore, most of each weekday and the weekends will experience traffic conditions better than those described within this document, which are only for the peak hours of operation

Existing Level of Service and Traffic Analysis

The existing Levels of Service at the scoped intersections were calculated using the methods from the *6th Edition Highway Capacity Manual* as implemented in Synchro*, version 10 - Build 122*. The existing Levels of Service for the intersection within the study area are summarized on the following tables. The existing traffic volumes used for this report are shown on Figures 3 & 4.

Table 3 – 2021 Existing Intersections Levels of Service (Figure 3&4)

INTERSECTION **(S)ignalized (U)nsignalized**		**AM Peak Hour**		**PM Peak Hour**	
		Delay (sec)	**LOS**	**Delay (sec)**	**LOS**
SR 195 & 16th Avenue	U	39.2	E	42.9	E
SR 195 & Thorpe Avenue	U	20.6	C	18.7	C
• SR 195 & North J-Turn	U	10.4	B	17.3	C
• SR 195 & South J-Turn	U	24.7	C	11.5	B
SR 195 & Inland Empire Way	U	10.7	B	15.1	C
Ch-Sp Road & SR 195 NB on/off Ramps	U	9.0	A	9.0	A
Ch-Sp Road & SR 195 SB on/off Ramps (1)	U	21.5	C	13.7	B
Ch-Sp Road & SR 195 SB on/off Ramps (2)	U	10.7	B	15.7	C
SR 195 & Meadowlane Drive	U	31.4*	D*	31.4*	D*
SR 195 & Hatch Road	U	21.0**	C**	46.7**	E**

***Left-Turn Movement on EB Approach**

****Left-Turn Movement on WB Approach: 95th %tile Q on WB – AM: 3.6 veh (90 ft), PM: 2.7 veh (68 ft)**

The City of Spokane and WSDOT have adopted level of service D as the minimum acceptable level for signalized intersections and level of service E as the minimum acceptable level for unsignalized intersections.

As shown in Table 3, the intersections are currently operating at an acceptable level of service.

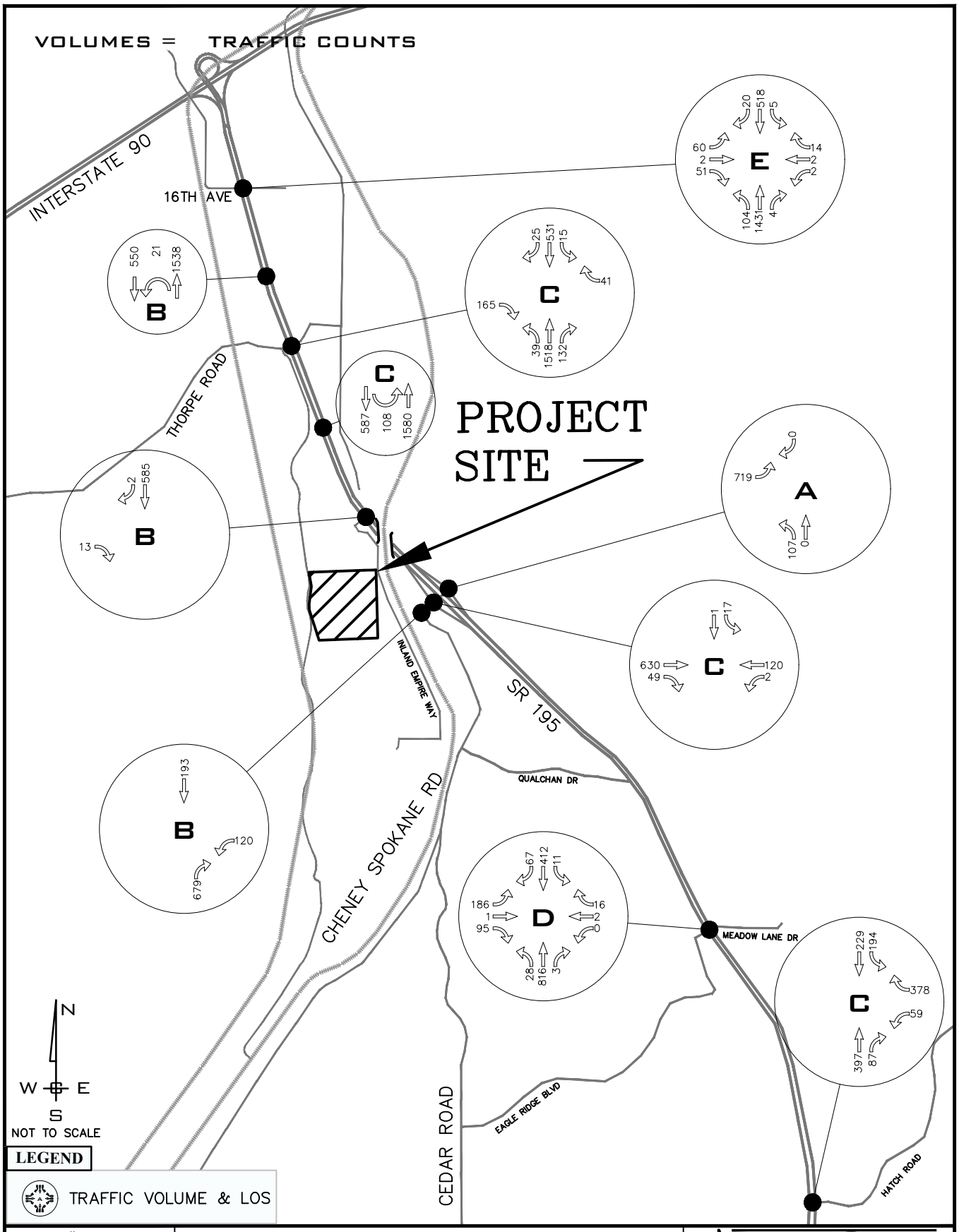

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FIGURE 3

2021 AM EXISTING TRAFFIC VOL. & LOS

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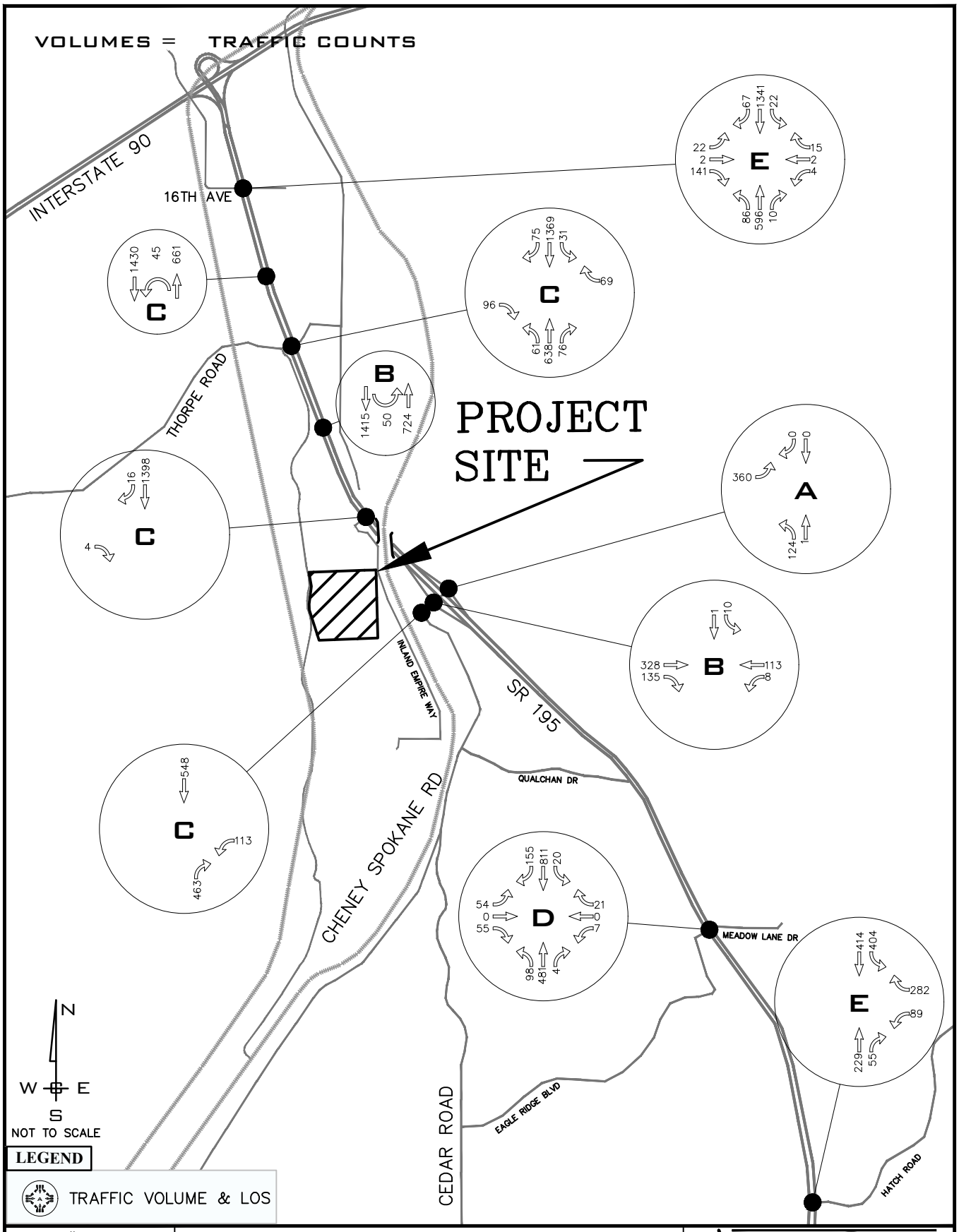

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FIGURE 4

2021 PM EXISTING TRAFFIC VOL. & LOS

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Future Year Traffic Impact Analysis

The build out year (2026) analysis are requirement, per the scope of TIA meeting. Three scenarios were examined for the build out year (2026) analysis. The first scenario assumes that the existing traffic volumes as shown on Figures 3 & 4 experience an increase above the existing volumes at the established background rate. The second scenario assumes that the development has not moved forward and analyzes the scoped intersections with the background growth rate and the background project trips as shown on Figures 7 & 8. The third scenario assumes that the development has moved forward and analyzes the scoped intersection with the background growth rate, the background projects, and the project trips as shown on Figures 11 & 12. These scenarios will allow a determination to be made as to what the future conditions may be both with/without the background project trips and with/without the project trips.

Background Traffic Growth

Background traffic growth is an anticipated increase in traffic volume from year to year. As the existing land uses that surround a transportation facility mature, an increase in traffic results and may be due to either an increase in drivers per household or a household's purchase of an additional vehicle. Many things can cause an increase in the traffic volumes of a facility. The objective of the background traffic growth rate is to anticipate what the traffic volumes may be in the future. The background traffic growth rate for an area or street is determined by means of physical counts collected by local governmental agencies. The counts are compared on a yearly basis and a rate of increase is calculated from the data.

The background growth rate was determined to be 1.0% per year. Based on a five-year build out, compounded annually, the total increase in traffic rate for the year 2026 is anticipated to be 1.051.

Public/Private Improvement Projects

Within the SR 195 Corridor there are multiple improvement projects proposed and conditioned within the decisions of the background projects. These improvements are anticipated to maintain acceptable level of service, promote the redirection of trips from the 1-90/SR 195 Eastbound ramp and also repair a bridge which will have the result of widening the roadway, which will allow for a separation of lanes. These improvement projects are listed here by position from the north to the south along the corridor:

SR 195 & 16th Avenue

As a part of the Wheatland Estates Study the intersection of SR 195 & 16th Avenue is an at grade intersection with SR 195. The improvement project proposes restricting the eastbound movement from a left-through-right lane to a channelized right turn only lane, with an acceleration lane. This project improves safety by removing competing and conflicting movements within the median, improves intersection level of service to an acceptable level and promotes the redistribution of I-90 bound trips as those trips must travel south past Thorpe Rd to the J-turn to then return to 16th Avenue and then to I-90.

SR 195 & Thorpe Rd

As a part of the Summit Development and the Tangle Ridge Development the intersection of SR 195 & Thorpe Road is an at grade intersection with SR 195 with north and south J-turns. The improvement project consists of a directional sign with flashing beacons. The sign provides drivers alternate routes to the downtown core and the South Hill. The flashing beacons are to be activated when the ramp meter signal at the I-90/SR 195 Eastbound Ramp is active, providing additional driver information prior to the Thorpe Exit. The project promotes the redirection of I-90 eastbound trips by offering alternative time saving routes.

SR 195 & Inland Empire Way

This is a temporary solution to connects the Northbound route of Cheney-Spokane Road to Inland Empire Way. This project has not been conditioned by a project yet. This improvement projects extends the SR 195 northbound onramp at Cheney-Spokane Road further along SR 195 under the railroad bridge. The on ramp is separated from SR 195 by a barrier wall. After the railroad bridge the inland Empire way Exit would be restored, thus creating the northbound link. For SR 195 bound trips they would proceed on the ramp that would then merge onto SR 195. A secondary component would be the installation of a ramp meter just before this junction. The project promotes the redistribution of downtown and south hill destination trips to the alternative route of Inland Empire Way. The installation of the ramp meter further encourages the alternate route by increasing travel time.

SR 195 & Meadowlane

As a part of the Summit and Wheatland Estates Developments, the intersection of SR 195 & Meadowlane is an at grade intersection. The improvement project is the installation of a J-turn south of the intersection. The improvement project proposes restricting the eastbound movement from a left-through-right lane to a channelized right turn only lane, with an acceleration lane. The northbound trips would be redirected as eastbound right turns, that would then utilize the J-turn to return the trips to a northbound direction. This project improves safety by removing competing and conflicting movements within the median, and improves intersection level of service to an acceptable level.

SR 195 & Hatch Road

Per the Six Year Comprehensive Street Program (2021 - 2026), the City of Spokane includes the reconstruction of the Hatch Bridge deck to perpetuate the existing functionality. The project expands the roadway width and increases the storage length of the westbound right turn lane. This improvement is anticipated to increase intersection capacity and improve intersection level of service.

Year 2026 with Background Traffic Growth

This scenario assumes that the existing traffic volumes experience an increase above the existing volumes at the established background rate. The traffic volumes for this condition include the existing traffic, as shown on Figures 3 & 4, multiplied by the background growth rate for year 2026(1.051). Please see Figures 5 & 6 for the traffic volumes used for this scenario. A summary of the Level of Service results is shown in the following table. This scenario creates a future year baseline that allows for a direct comparison of the with background project scenario.

Table 4 – Year 2026 Level of Service, with Background Traffic Growth (Figure 5&6)

INTERSECTION		**AM Peak Hour**		**PM Peak Hour**	
(S)ignalized (U)nsignalized		**Delay (sec)**	**LOS**	**Delay (sec)**	**LOS**
SR 195 & 16th Avenue	U	48.4	E	**58.6**	**F**
• RO only on EB Approach	(U)	(23.4)	(C)	(14.5)	(B)
SR 195 & Thorpe Avenue	U	22.2	C	20.1	C
• SR 195 & North J-Turn	U	10.5	B	18.3	C
• SR 195 & South J-Turn	U	28.0	D	11.7	B
SR 195 & Inland Empire Way	U	10.8	B	15.7	C
Ch-Sp Road & SR 195 NB on/off Ramps	U	9.1	A	9.1	A
Ch-Sp Road & SR 195 SB on/off Ramps (1)	U	23.0	C	14.2	B
Ch-Sp Road & SR 195 SB on/off Ramps (2)	U	10.9	B	16.6	C
SR 195 & Meadowlane Drive	U	37.5*	E*	35.1*	E*
SR 195 & Hatch Road	U	22.7**	C**	58.5**	**F****
• SR 195 Painted Median w/ Accel. Lane	(U)	(16.3)***	(C) ***	(28.4)***	(D)***

***Left-Turn Movement on EB Approach**

****Left-Turn Movement on WB Approach: 95th %tile Q on WB LT–AM:4.2 veh (105ft), PM:3.3 veh (83ft)**

***** Left-Turn Movement on WB Approach: 95th %tile Q on WB LT–AM:0.7 veh (18ft), PM:1.7 veh (43ft)**

The City of Spokane and WSDOT have adopted level of service D as the minimum acceptable level for signalized intersections and level of service E as the minimum acceptable level for unsignalized intersections.

As shown in Table 4, the intersections are anticipated to operate at an acceptable level of service except the intersections of SR 195 & 16th Avenue and SR 195 & Hatch Road. With the reconfiguration on eastbound approach to a right out only, the intersection of SR 195 & 16th Avenue is anticipated to operate at an acceptable level of service. With a painted median configuration with a SB acceleration lane, the intersection of SR 195 & Hatch Road is anticipated to operate at an acceptable level of service.

SR 195 & 16th Avenue as a part of the Wheatland Estates Study the intersection of SR 195 & 16th Avenue is an at grade intersection with SR 195. The improvement project proposes restricting the eastbound movement from a left-through-right lane to a channelized right turn only lane, with an acceleration lane. This project improves safety by removing competing and conflicting movements within the median, improves intersection level of service to an acceptable

level and promotes the redistribution of I-90 bound trips as those trips must travel south past Thorpe Rd to the J-turn to then return to 16th Avenue and then to I-90.

At Hatch Road a painted channelization configuration with a southbound acceleration lane for the westbound left turn is recommended that would allow the westbound left turn to merge into the southbound travel with reduced conflict points. Please see Exhibit 1.

Exhibit 1 – SR 195 & Hatch Road

Note: The recommended channelization is to be a painted channelization on existing pavement. No curb or obstacle is proposed.

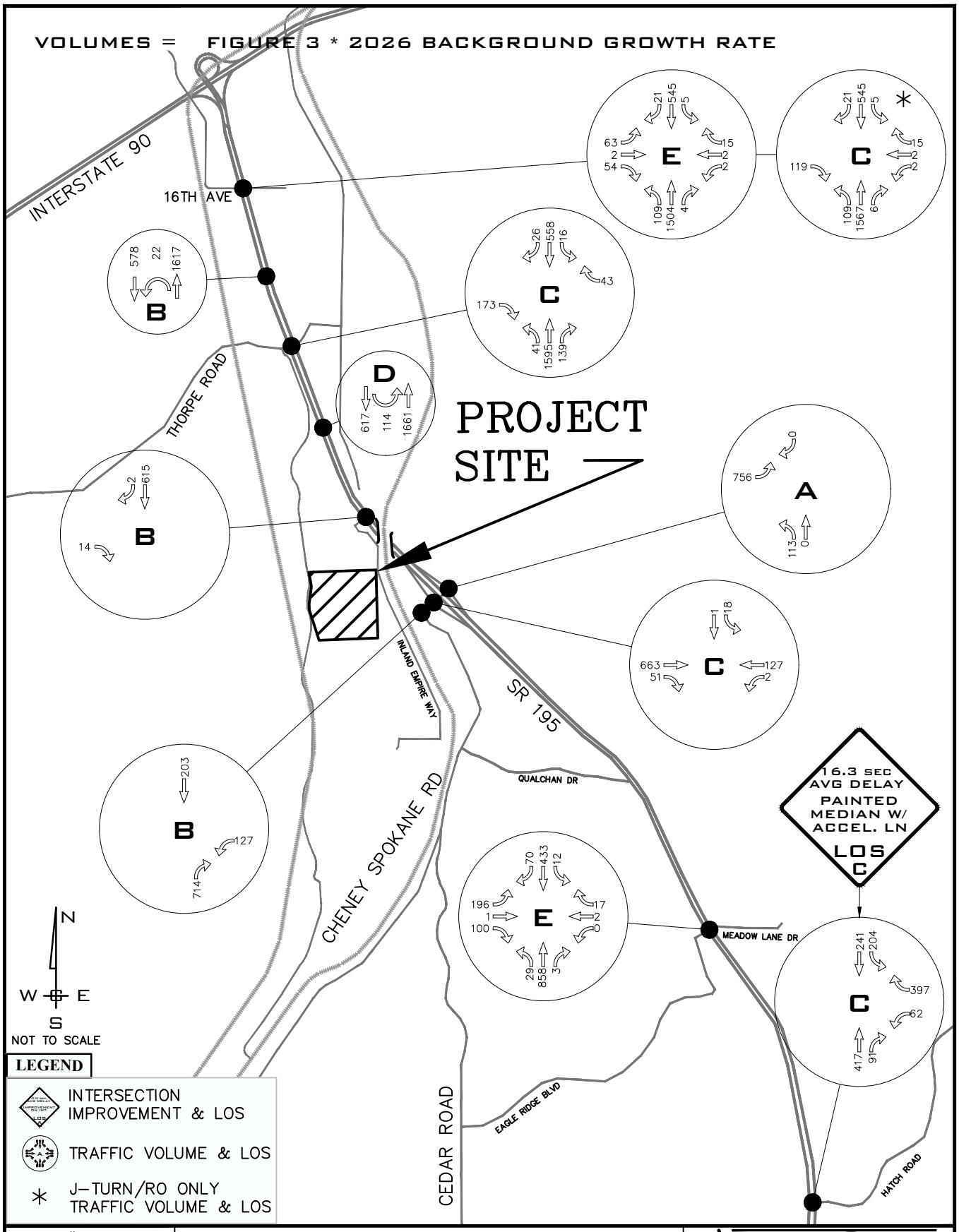

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FIGURE 5	2026 AM VOL. W GROWTH RATE & LOS

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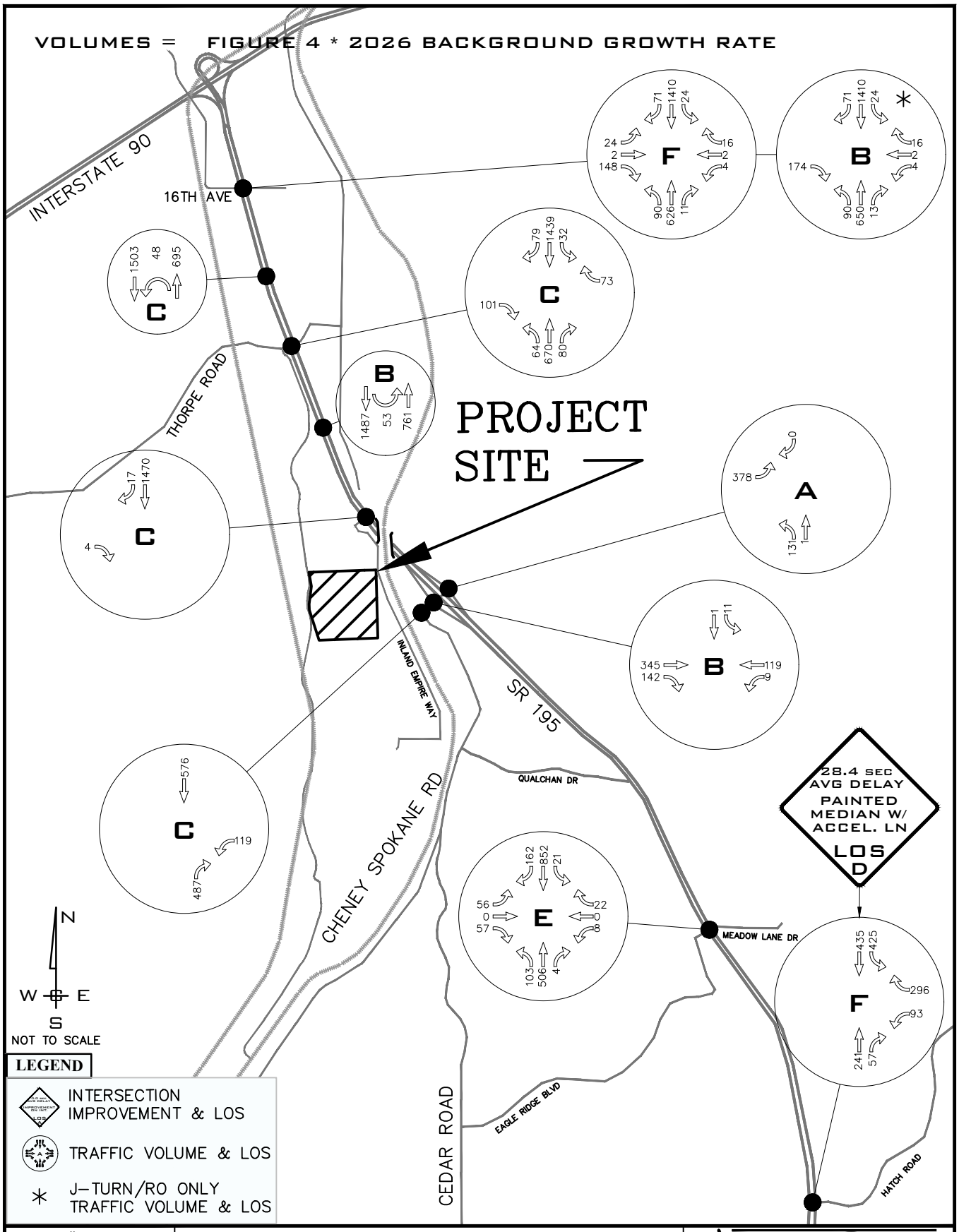

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FIGURE 6	2026 PM VOL. W GROWTH RATE & LOS

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Background Project Traffic

In addition to the natural increase in background growth, background projects that have already been approved or have made application and have been vested before this project have been included. The summary of background project traffic volumes used for this report are shown on Table 5. Please see Figures 7 & 8 for a graphical representation of this distribution.

Table 5 – Summary of the Background Project Trip Generation (Figure 7&8)

Background Projects	Land Use (ITE LUC)	Unit	AM Peak Hour Trips			PM Peak Hour Trips		
			Vol. / LUC	Directional Distribution		Vol. / LUC	Directional Distribution	
				In	Out		In	Out
Eagle Ridge 13th Addition	Single-Family (210)	104	77	19	58	103	65	38
The Summit	Single-Family (210)	99	74	19	55	99	62	37
Tangle Ridge	Single-Family (210)	45	34	8	26	45	28	17
Wheatland Estates	Single-Family (210)	200	148	37	111	198	125	73
Total			333	83	250	445	280	165

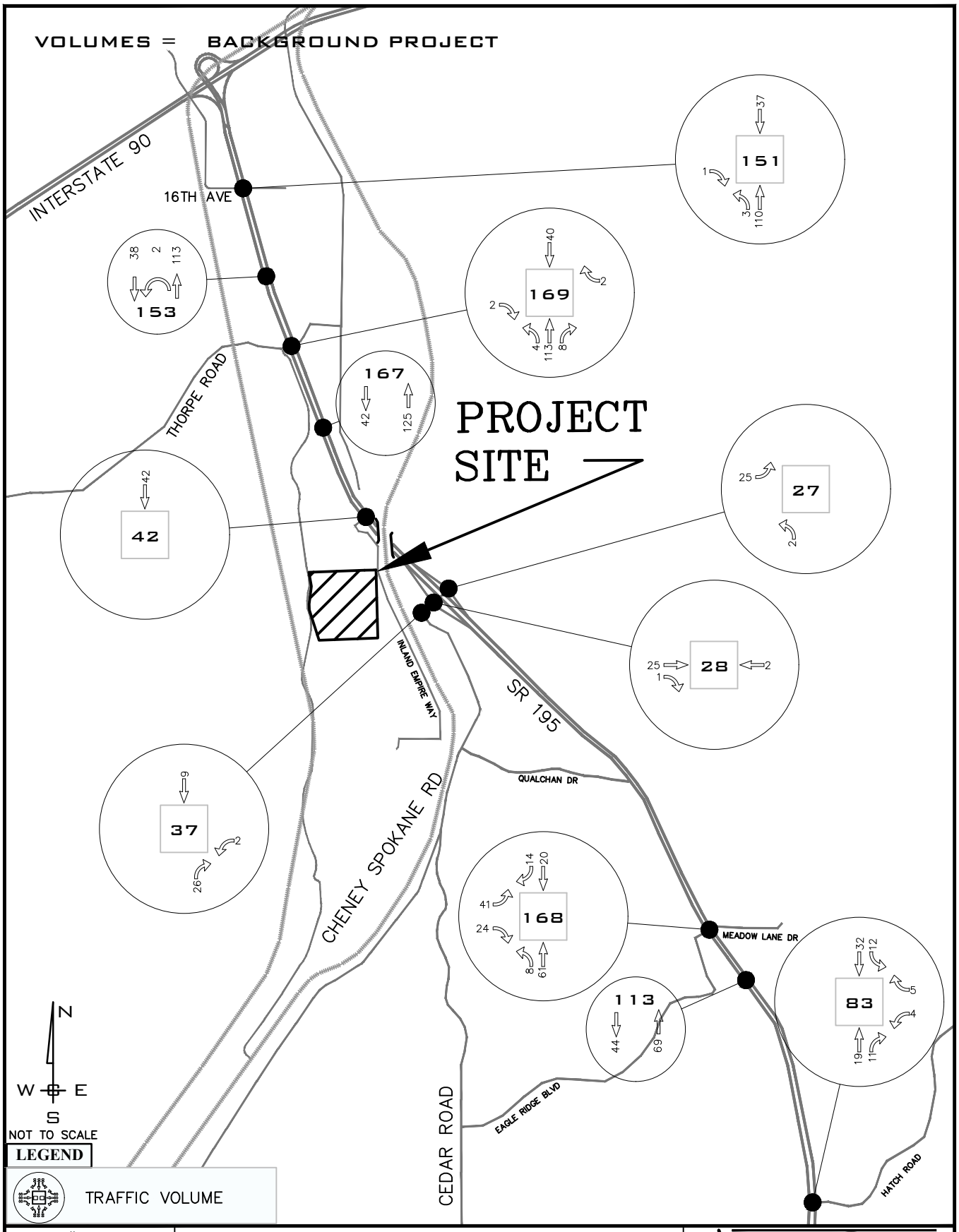

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FIGURE 7

AM BACKGROUND TRIPS

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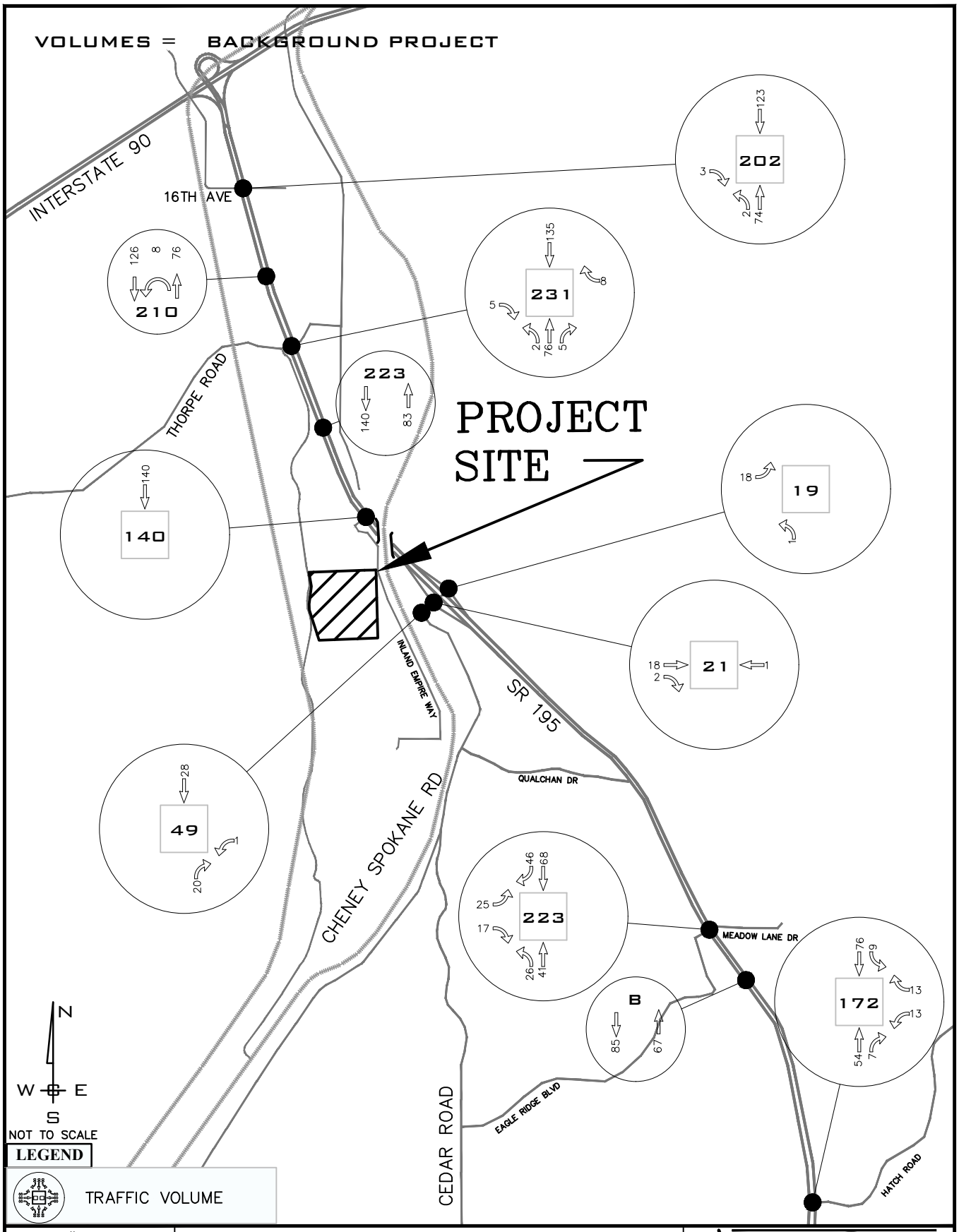

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FIGURE 8

PM BACKGROUND TRIPS

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Year 2026 with the Background Projects and without the Project

This scenario assumes that the development has not moved forward. The traffic volumes for this condition include the traffic volumes shown on Figures 5 & 6 and adds the traffic from the background projects as shown on Figures 7 & 8. Please see Figures 9 & 10 for the traffic volumes used for this scenario. A summary of the Level of Service results is shown in the following table.

Table 6 – Year 2026 LOS, with the Background Projects and without the Project (Fig. 9&10)

INTERSECTION	**(S)ignalized (U)nsignalized**	**AM Peak Hour**		**PM Peak Hour**	
		Delay (sec)	**LOS**	**Delay (sec)**	**LOS**
SR 195 & 16th Avenue	U	59.9	**F**	93.1	**F**
• RO only on EB Approach	(U)	(26.1)	(D)	(15.7)	(C)
SR 195 & Thorpe Avenue	U	24.8	C	23.2	C
• SR 195 & North J-Turn	U	10.8	B	20.7	C
• SR 195 & South J-Turn	U	32.6	D	12.3	B
SR 195 & Inland Empire Way	U	11.0	B	17.0	C
Ch-Sp Road & SR 195 NB on/off Ramps	U	9.1	A	9.1	A
Ch-Sp Road & SR 195 SB on/off Ramps (1)	U	24.1	C	14.5	B
Ch-Sp Road & SR 195 SB on/off Ramps (2)	U	11.1	B	17.4	C
SR 195 & Meadowlane Drive	U	65.2*	**F***	59.8*	**F***
• WSDOT ½ J-Turn	(U)	(14.3)	(B)	(14.6)	(B)
• WSDOT ½ J-Turn – South J-Turn	(U)	(17.6)	(C)	(11.4)	(B)
SR 195 & Hatch Road	U	25.2**	D**	88.4**	**F****
• SR 195 Painted Median w/ Accel. Lane	(U)	(17.3)***	(C)***	(33.4)***	(D)***

***Left-Turn Movement on EB Approach**
****Left-Turn Movement on WB Approach: 95th %tile Q on WB – AM: 4.4 veh(110ft), PM: 4.8 veh(120ft)**
***** Left-Turn Movement on WB Approach: 95th %tile Q on WB – AM: 0.8 veh(20ft), PM: 2.3 veh(58ft)**

The City of Spokane and WSDOT have adopted level of service D as the minimum acceptable level for signalized intersections and level of service E as the minimum acceptable level for unsignalized intersections.

As shown in Table 6, all intersections are anticipated to operate at an acceptable level of service except the intersections of SR 195 & 16th Avenue, SR 195 & Meadowlane Drive, and SR 195 & Hatch Road. As discussed in the with background traffic growth scenario, with the improvements, the intersections of SR 195 & 16th Avenue and SR 195 & Hatch Road are anticipated to operate at an acceptable level of service. With WSDOT ½ J-Turn, the intersection of SR 195 & Meadowlane Drive is anticipated to operate at an acceptable level of service.

At Meadowlane Road a ½ J turn is proposed that would redirect the eastbound left turns to turn right and travel a distance before crossing over the median into an acceleration lane located to the far right. These trips would then accelerate and travel north through the intersection, similar to the J turns installed at Thorpe Road & SR 195.

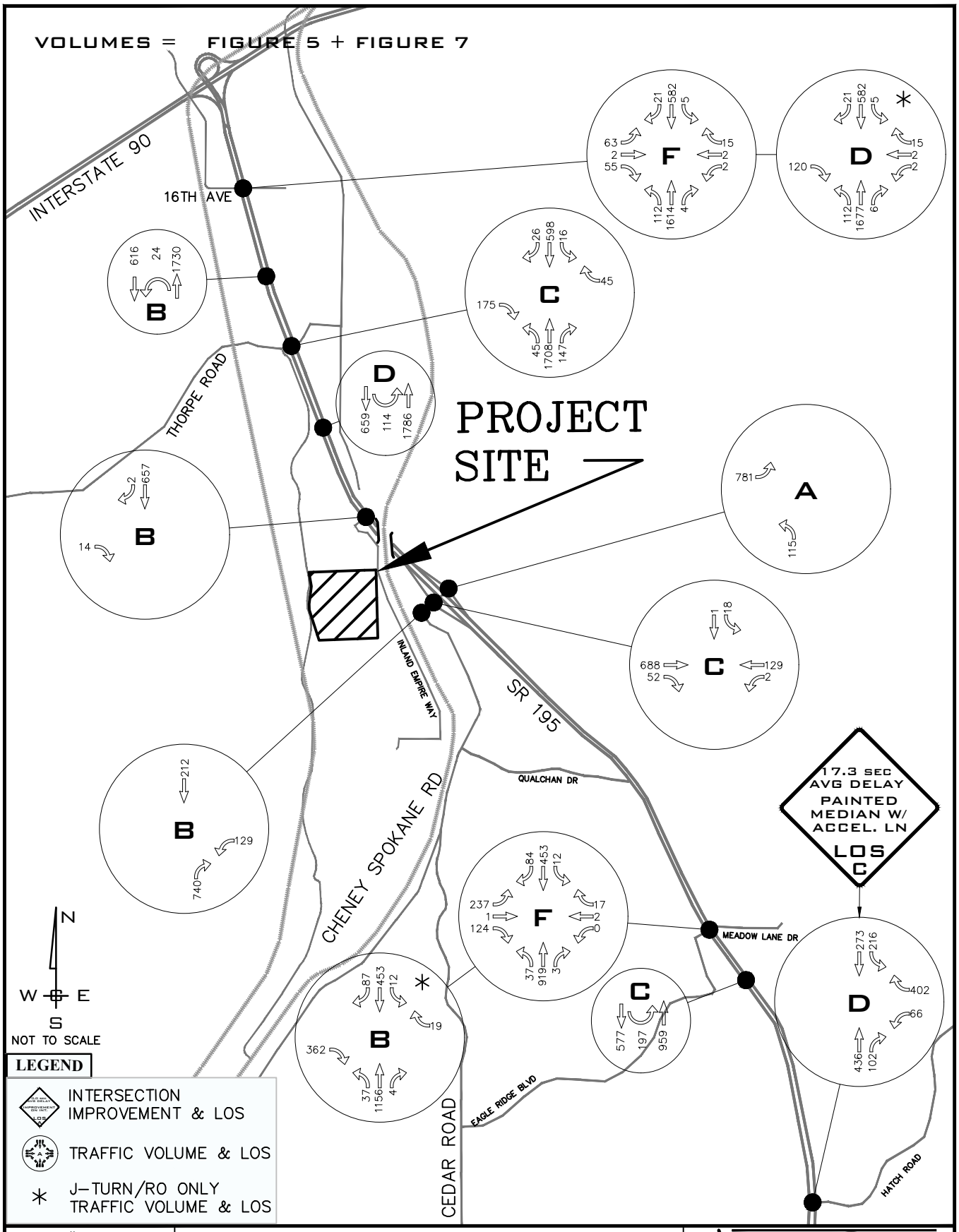

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FIGURE 9

2026 AM VOL. W/ BACKGROUND
W-O PROJECT & LOS

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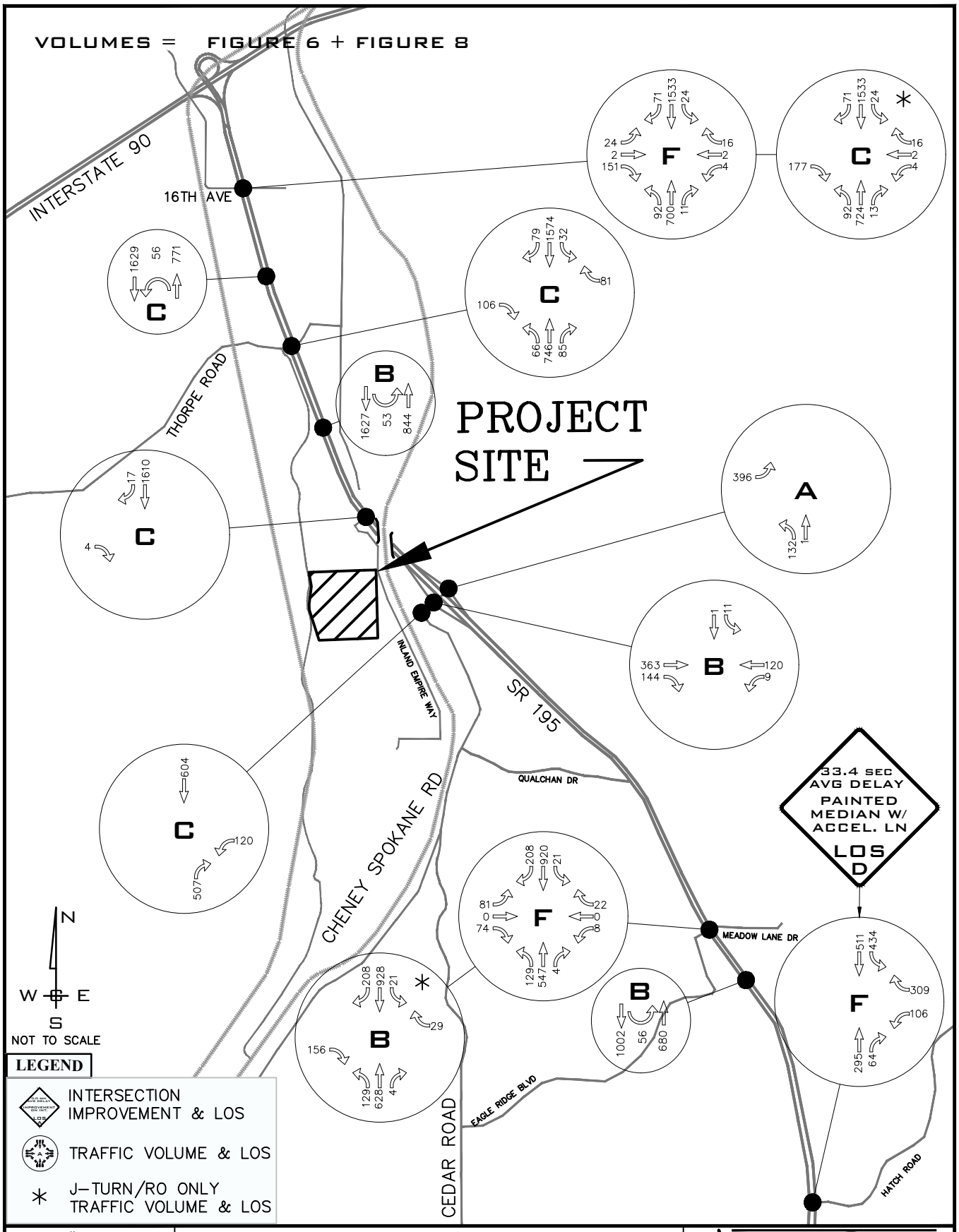

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FIGURE 10	2026 PM VOL. W/ BACKGROUND W-O PROJECT & LOS	

Trip Generation and Distribution

As noted earlier, trip generation rates for the AM and PM peak hours are determined by the use of the *Trip Generation Manual, 10th Edition* published by the Institute of Transportation Engineers (ITE). The purpose of the *Trip Generation Manual* is to compile and quantify empirical data into trip generation rates for specific land uses within the US, UK and Canada.

Existing Land Use

For the existing former salvage yard, a recommended average rate by the City of Spokane was used to establish the number of potential trips generated by the existing land use. The trip generation rates and the anticipated number of AM and PM peak hour trips for the existing land use are shown on Table 7.

Table 7 **-Trip Generation Rates – Former Salvage Yard**

KSF	AM Peak Hour Trips			PM Peak Hour Trips		
	Vol. @ 1.00 trips per Unit	Directional Distribution		Vol. @ 1.00 trips per Unit	Directional Distribution	
		50% In	50% Out		50% In	50% Out
2.0	2	1	1	2	1	1

Average Daily Trip Ends (ADT)			Per the TIA Comments Dated April 6, 2021, the Average Rate Was Recommended by the City of Spokane
Units	Average Rate	ADT	
2.0	-	-	

Proposed Land Use

For the proposed 157 units of a manufactured housing development, Land Use Code (LUC) #240, Mobile Home Park was used to establish the number of potential trips generated by the proposed land use. The trip generation rates and the anticipated number of AM and PM peak hour trips for the land use are shown on Table 8.

Table 8 **-Trip Generation Rates for LUC # 240 – Mobile Home Park**

Dwelling Units	AM Peak Hour Trips			PM Peak Hour Trips		
	Vol. @ 0.26 trips/units	Directional Distribution		Vol. @ 0.46 trips / Units	Directional Distribution	
		31% In	69% Out		62% In	38% Out
157	41	13	28	73	45	28

Average Daily Trip Ends (ADT)		
Units	Rate	ADT
157	5.00	785

Trip Generation Summary

Since the existing automobile care center use is proposed to be replaced by the proposed project, the existing land use subtracted from the proposed land use with the difference in trips generated is shown on Table 9.

Table 9 **- Trip Generation Summary (Figure 11 & 12)**

Land Use Code (LUC)	AM Peak Hour			PM Peak Hour		
	Vol. per LUC	Directional Distribution		Vol. per LUC	Directional Distribution	
		In	Out		In	Out
LUC 240 Mobile Home Park (Proposed)	41	13	28	73	45	28
LUC 942 Automobile Care Center (Existing)	<2>	<1>	<1>	<2>	<1>	<1>
New Trips	**39**	**12**	**27**	**71**	**44**	**27**

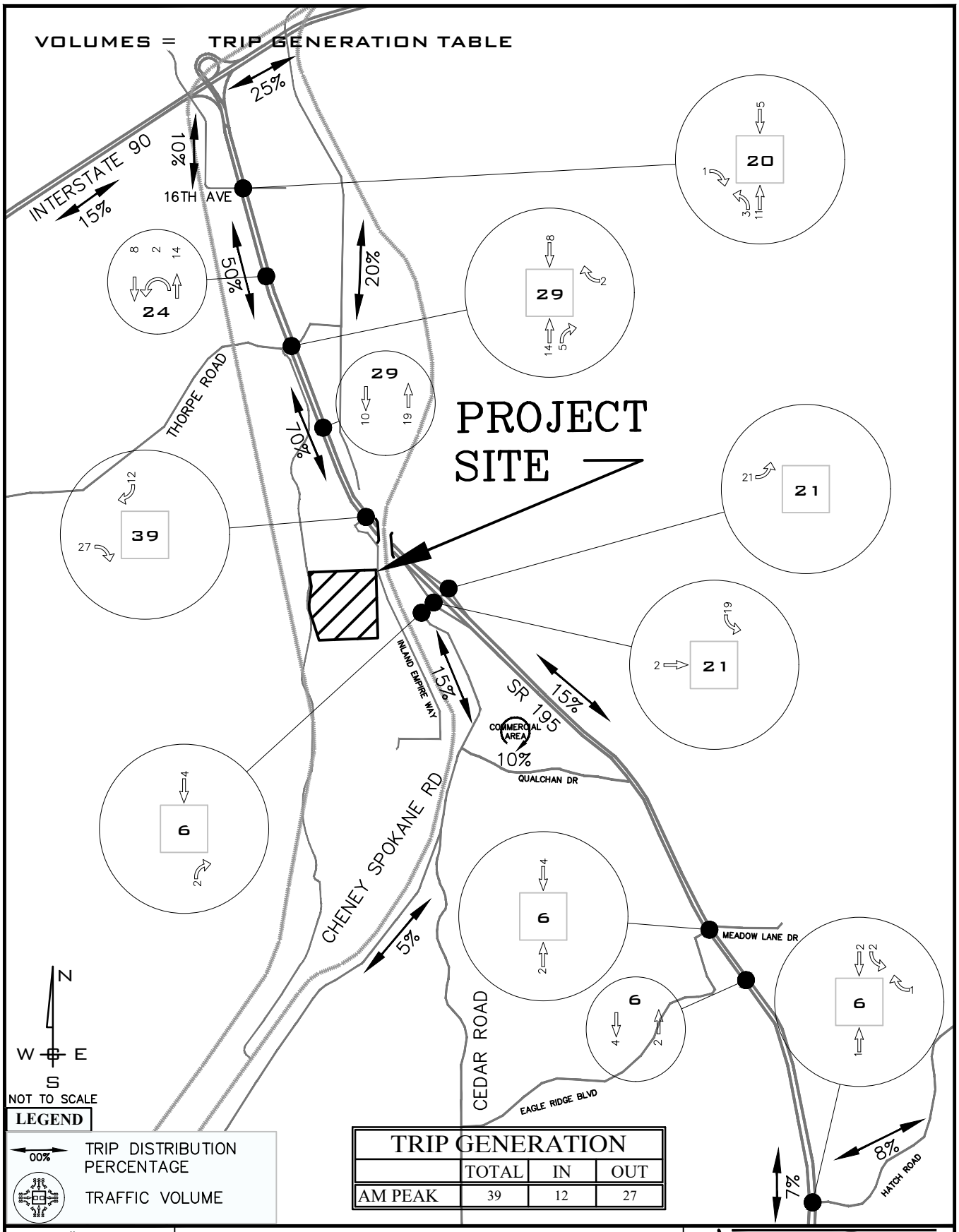
Average Daily Trip Ends (ADT)		
Land Use Code (LUC)	**Rate**	**ADT**
LUC 240 Mobile Home Park (Proposed)		785
LUC 942 Automobile Care Center (Existing)		-
New Trips		**-**

< > indicates Subtraction of number

As shown in Table 9, the proposed land use is anticipated to generate 36 additional trips in the AM peak hour with 10 additional trips entering the site and 26 additional trips exiting the site. In the PM peak hour, the proposed land use is anticipated to generate a total of 66 additional trips, with 42 additional trips entering the site and 24 additional trips exiting the site. Please see Figure 11 & 12 for Trip Distribution.

Trip Distribution Characteristics of the Proposed Project

Considering many factors such as the surrounding transportation facilities, typical commuting patterns, existing development in the area, and Average Daily Traffic counts, traffic for the proposed development is anticipated as follows: 70% of trips will go to/from the north via SR 195, 15% of trips will go to/from the south via SR 195, and 15% of trips will go to/from the southwest via Cheney Spokane Road. Of the 70% trips to/from the north via SR 195, 20% of these trips will go to/from the east and north via Thorpe Road, 10% of these trips will go to/from the west and north via 16th Avenue, 15% of these trips will go to/from the west via I-90 and 25% of these trips will go to/from the east via I-90. Of the 15% of trips to/from the south via SR 195, 8% of trips will travel to/from the east via Hatch Road and 7% of trips will travel to/from the south via SR 195. Of the 15% to/from the southwest on Cheney-Spokane Road, 10% of trips will get captured by the shopping areas along Cheney-Spokane Road and 5% of trips will continue to/from the southwest via Cheney-Spokane Road.



TRIP GENERATION			
	TOTAL	IN	OUT
AM PEAK	39	12	27

PROJ #: 20-2564
DATE: 11/19/21
DRAWN: KMK
APPROVED: TRW

TRAFFIC IMPACT ANALYSIS
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FIGURE 11

AM PROJECT TRIP DISTRIBUTION

WCE
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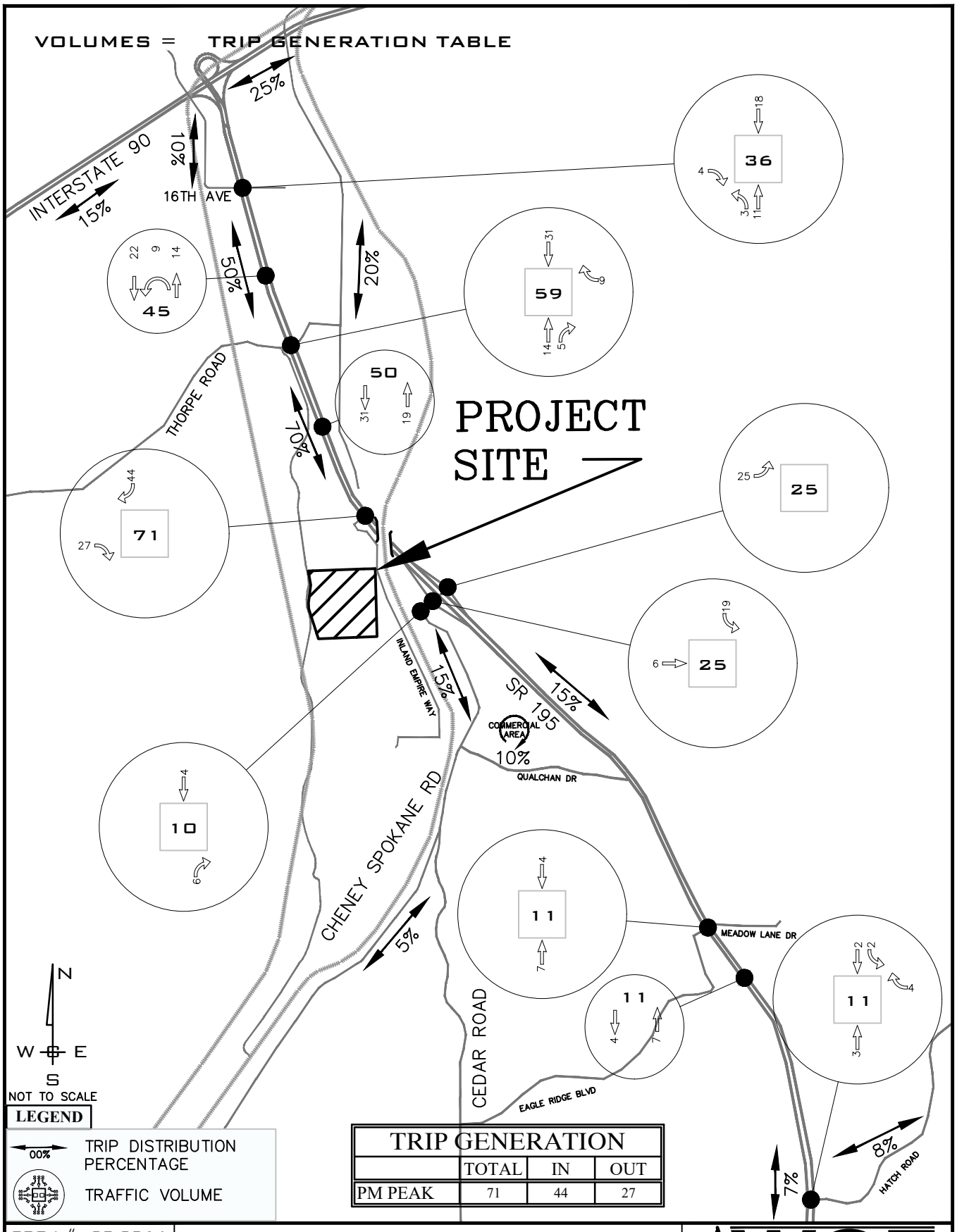
CIVIL AND TRANSPORTATION ENGINEERING
21 SOUTH PINES ROAD
SPOKANE VALLEY, WASHINGTON 99206
PH: 509-893-2617 FAX: 509-926-0227



TRIP GENERATION			
	TOTAL	IN	OUT
PM PEAK	71	44	27

PROJ #: 20-2564
DATE: 11/19/21
DRAWN: KMK
APPROVED: TRW

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SPOKANE, WASHINGTON

FIGURE 12

PM PROJECT TRIP DISTRIBUTION

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Year 2026 with the Background Projects and the Project

This scenario assumes that the project has moved forward and is added to the previously established baseline. The traffic volume for this condition includes the traffic volumes shown on Figures 9 & 10 and adds the project trips as shown on Figures 11 & 12. Please see Figures 13 & 14 for the traffic volumes used for this scenario. A summary of the Level of Service results is shown in the following table.

Table 10 – Year 2026 LOS, with the Background Projects and with the Project (Fig. 13&14)

INTERSECTION		**AM Peak Hour**		**PM Peak Hour**	
(S)ignalized (U)nsignalized		**Delay (sec)**	**LOS**	**Delay (sec)**	**LOS**
SR 195 & 16th Avenue	U	64.5	F	102.3	**F**
• RO only on EB Approach	(U)	(26.3)	(D)	(15.9)	(C)
SR 195 & Thorpe Avenue	U	25.4	D	24.0	C
• SR 195 & North J-Turn	U	10.8	B	21.8	C
• SR 195 & South J-Turn	U	33.4	D	12.4	B
SR 195 & Inland Empire Way	U	11.4	B	18.2	C
Spring Creek Lane & Inland Empire Way	U	9.3	A	8.8	A
Access & Inland Empire Way	U	8.7	A	8.7	A
Ch-Sp Road & SR 195 NB on/off Ramps	U	9.1	A	9.1	A
Ch-Sp Road & SR 195 SB on/off Ramps (1)	U	26.9	D	15.2	C
Ch-Sp Road & SR 195 SB on/off Ramps (2)	U	11.1	B	17.5	C
SR 195 & Meadowlane Drive	U	65.9*	**F***	60.6*	**F***
• WSDOT ½ J-Turn	(U)	(14.3)	(B)	(14.7)	(B)
• WSDOT ½ J-Turn – South J-Turn	(U)	(17.5)	(C)	(11.3)	(B)
SR 195 & Hatch Road****	U	25.5**	D**	91.4**	**F****
• SR 195 Painted Median w/ Accel. Lane	(U)	(17.4)***	(C)***	(33.8)***	(D)***

***Left-Turn Movement on EB Approach**

****Left-Turn Movement on WB Approach: 95th %tile Q on WB – AM: 4.5 veh(113ft), PM: 4.9 veh(123ft)**

*****Left-Turn Movement on WB Approach: 95th %tile Q on WB – AM: 0.8 veh(20ft), PM: 2.3 veh(58ft)**

****** The LOS results by HCS 7 are LOS B (14.6 sec) for AM and LOS B (12.0 sec) for PM.**

The City of Spokane and WSDOT have adopted level of service D as the minimum acceptable level for signalized intersections and level of service E as the minimum acceptable level for unsignalized intersections.

As shown in Table 10, with the improvements at SR 195 & 16th Avenue, SR 195 & Meadowlane Drive, and SR 195 & Hatch Road, all intersections are anticipated to operate at an acceptable level of service.

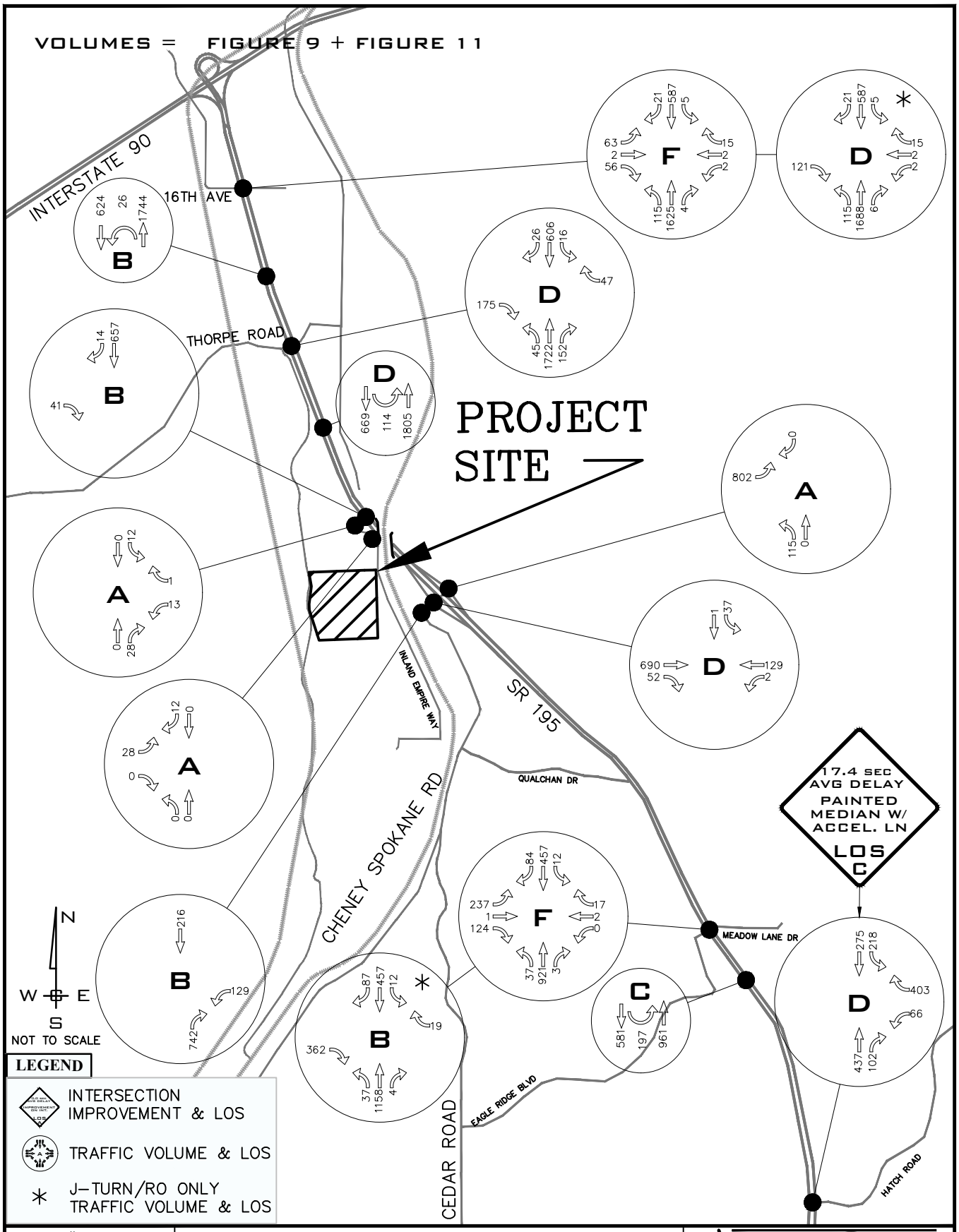

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FIGURE 13

2026 AM VOL. W/ BACKGROUND W/ PROJECT & LOS

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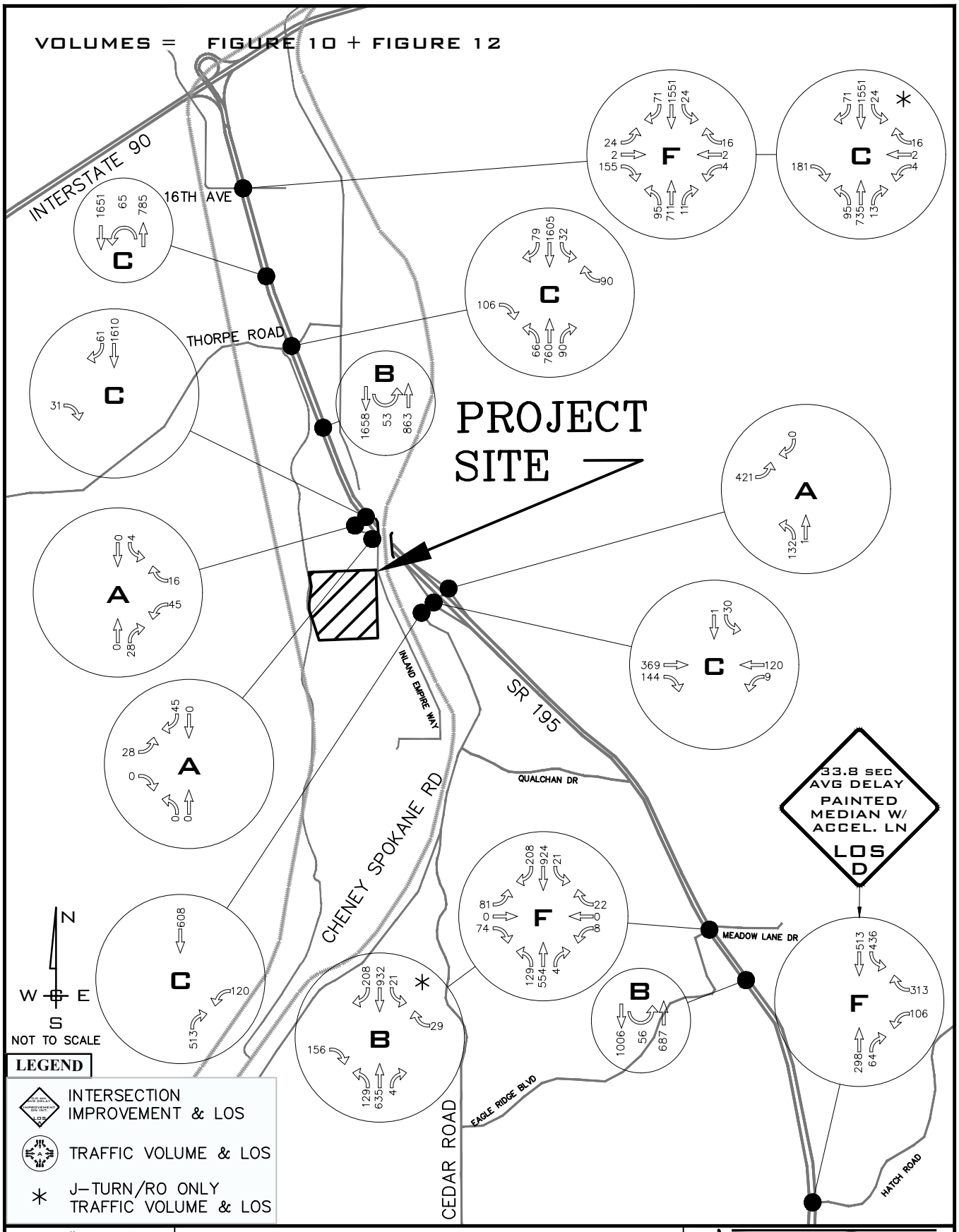

PROJ #: 20-2564
DATE: 11/19/21
DRAWN: KMK
APPROVED: TRW

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FIGURE 14

2026 PM VOL. W/ BACKGROUND W/ PROJECT & LOS

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Right-Turn Lane Warrant Analysis

Per the request of WSDOT, we have analyzed the intersection of Inland Empire Way & SR 195 to determine if a right turn is warranted based upon the WSDOT design manual Exhibit 1310-7a and Exhibit 1310-11. The results are summarized here and the exhibits are shown in the appendix:

Future Traffic Volumes with the Project

For right-turn lane warrant analysis, the traffic volumes for 2026 with background projects and project scenario as shown in Figure 13 & 14 have been used. The summary of traffic volumes for 2021 & 2026 scenarios are shown in following tables.

***Table 11* - Existing Traffic Volumes on SR 195 Southbound**

Time	Southbound (Veh/hour)		
	Through	Right-Turn	Right-lane (Through + Right) *
AM Peak Hour	492	2	-
PM Peak Hour	1038	12	774

***Per 1310.03 Right-Turn Lanes in WSDOT Design Manual, for multilane, high-speed highways (posted speed 45 mph or above), it is noted to use the right-lane peak hour approach volume (through + right-turn). Since the traffic volumes in PM peak hour for the project trips and existing traffic volumes are the most critical, only traffic volumes for right-lane in PM peak hour have been counted.**

***Table 12* - Summary of 2026 Southbound Traffic Volumes at Inland Empire Way & SR 195**

Time	Southbound (Veh/hour)		
	Through	Right-Turn	Right-lane (Through + Right) *
AM Peak Hour	657	14	-
PM Peak Hour	1610	61	1,232

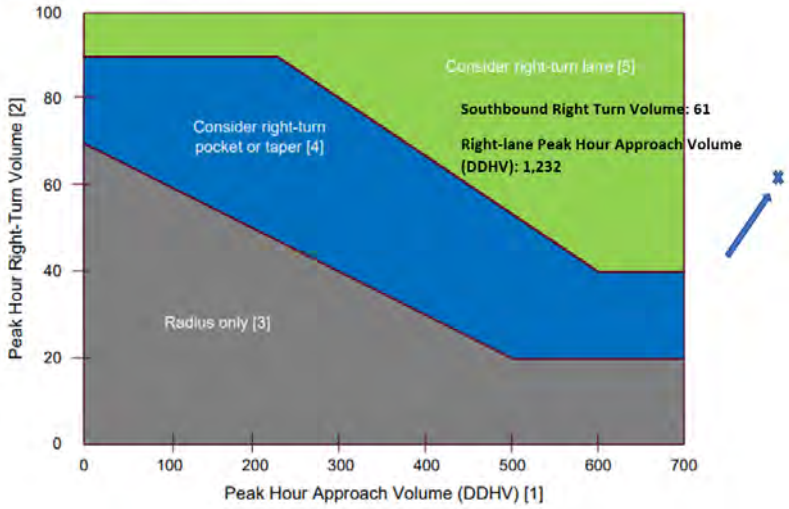
***Based upon the 2021 ratio between the total SB volumes and right-lane volumes (774/ (1,038+12) =0.737), 2026 right-lane volume has been calculated ((1,610+61) x 0.737 = 1,232).**

Right-Turn Lane Warrant Analysis

Per 1310.03 Right-Turn Lanes in WSDOT Design Manual, the intersection of Inland Empire Way & SR 195 has been analyzed to determine if a right turn lane is warranted. The result and exhibit are shown below:

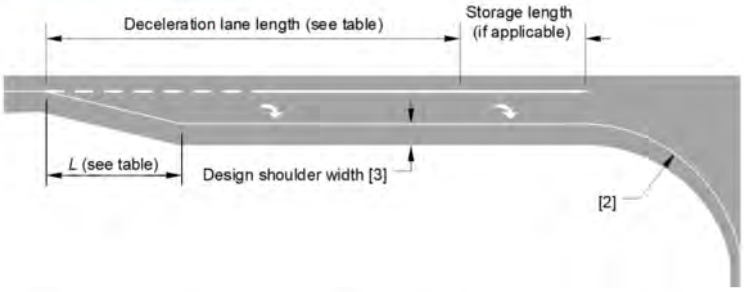
Intersection:	Results
SR 195 & Inland Empire Way • Right Turn Lane Warrant Analysis	Plots above the line – The right-turn lane warrant is met

Exhibit 1310-11 Right-Turn Lane Guidelines



[5] For right-turn lane design, see Exhibit 1310-13.

Exhibit 1310-13 Right-Turn Lane



Highway Design Speed (mph)	Deceleration Lane Length (ft)
30	160 [1]
35	220
40	275
45	350
50	425
55	515
60	605
65	715
70	820

Minimum Deceleration Lane Length (ft)

Posted Speed Limit	L
Below 40 mph	40 ft
40 mph or above	100 ft

Grade	Upgrade	Downgrade
3% to less than 5%	0.9	1.2
5% or more	0.8	1.35

Adjustment Multiplier for Grades 3% or Greater

Notes:
[1] When adjusting for grade, do not reduce the deceleration lane to less than 150 ft.
[2] For right-turn corner design, see Exhibit 1310-6.
[3] See 1310.03(6) and Chapter 1230.

Conclusion

Based upon the right-turn lane warrant analysis provided, it is concluded that the intersection meets the WSDOT right turn lane warrant. However, the intersection level of service remains at an acceptable level through the buildout period. Additionally, there is also a sight distance concern associated with a dedicated right turn lane, as a vehicle within the turn lane blocks the view of oncoming traffic. We propose additional consultation with the WSDOT that this be reevaluated after the 100th homesite.

SR 195 Corridor Improvement Projects.

Within the SR 195 Corridor for the past two years development projects have been conditioned by WSDOT to construct an improvement project(s) along the corridor with the goal to achieve a net zero balance in trips at the I-90/SR 195 Eastbound on ramp. The projects would essentially redirect existing and future traffic from the mainline, or as in the case of 16th Avenue redirect trips before they even get onto SR 195. This redirection of trips would reduce traffic volumes so that there would be room for the future I-90 Eastbound trips. Typically, those trips that have a destination to the east of the City of Spokane, and is truly an intra state trip.

As shown in the previous analysis section the Northbound SR 195 to Eastbound I-90 Ramp it was concluded that the project trips would have a minimal impact on the ramp as the capacity of the ramp, with the ramp meter has been reached. So, these improvement projects would have an additional improvement to the operation of the corridor as a whole. The following are descriptions of the improvement projects:

16th Avenue – EB Turn restrictions. The improvement project places a raised island, that channelizes all eastbound trips as a right turn, southbound movement onto SR 195. The project also includes an acceleration lane before a merge section. By restricting the eastbound left turn movement, a portion of the trips that originate from the intersection of Sunset Highway & Government Way and 14th Avenue & Lindke Street, would by an increase in time and effort would be redirected toward sunset highway or seek I-90 connections outside of the downtown core. This improvement project has currently been included as a condition in the Wheatland Estates project.

Thorpe Road Exit – Flashing Beacon and Sign. The improvement project places a directional sign before the Thorpe Road Northbound Exit. The Sign provides direction toward the City Center and the South Hill via Inland Empire Way. There is also a flashing beacon sign that is activated when the ramp meter signal is operating. The flashing beacon provides drivers with advance warning of additional delay. It is believed that with advance warning, drivers bound for the City Center or the South Hill would opt to exit at Thorpe Road and take this alternate route to their destination. It is anticipated that the presence and operation of this improvement would redirect **5%** of traffic volumes from the mainline volumes. This improvement project is a condition of the Summit and Tangle Ridge Projects, the project has been privately funded, with an approved WSDOT design. The improvement is scheduled to be completed in the spring of 2021.

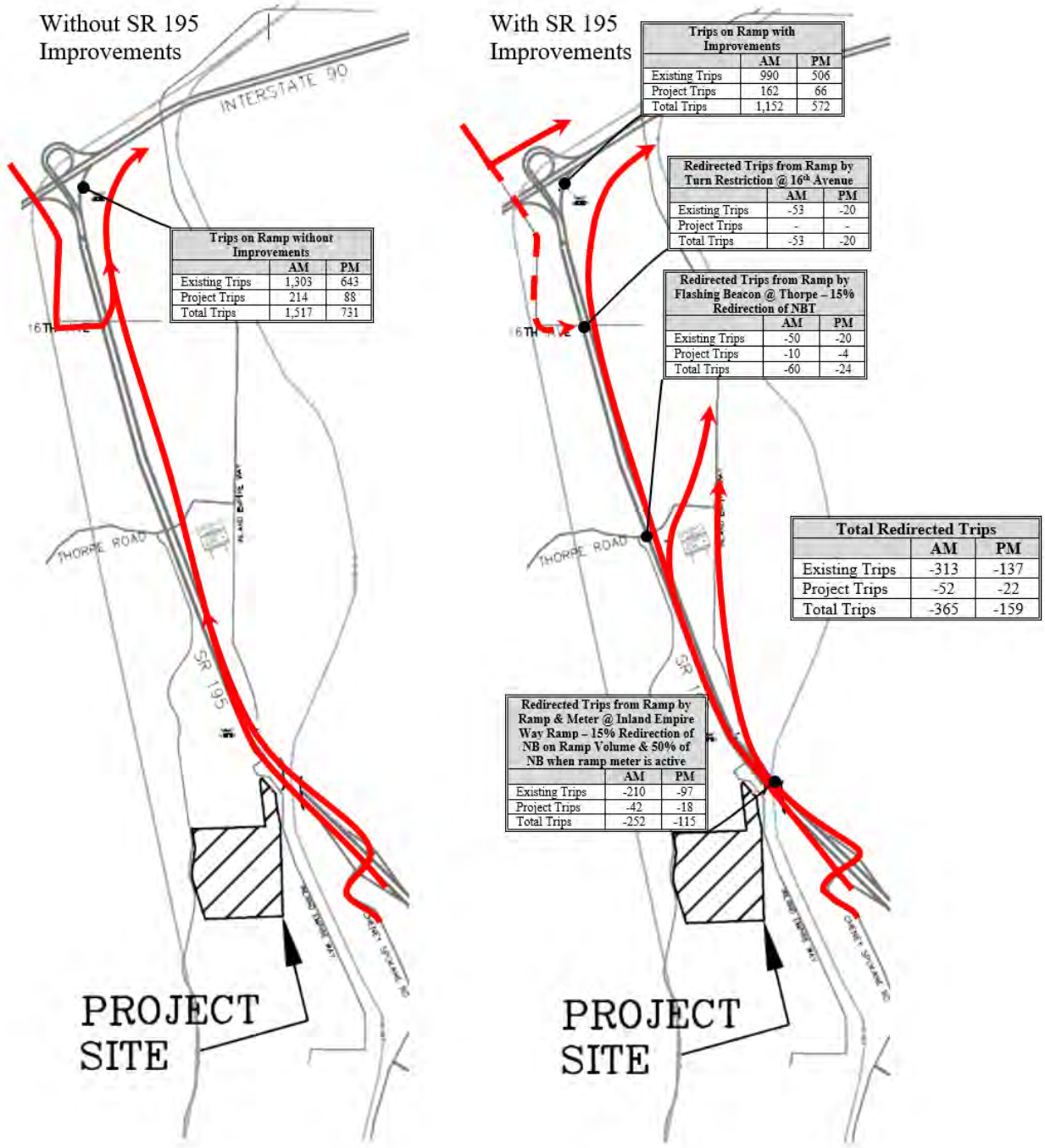
Cheney-Spokane Road Ramp – Connection to Inland Empire Way. This improvement project proposes to extend the northbound ramp further north along SR 195, underneath the existing railroad bridge to the original Inland Empire Way & Sr 195 intersection. From the original intersection the northbound on ramp will begin. For the extension SR 195 and the ramp will be separated by a WSDOT approved barrier wall. At the old intersection the connection to Inland Empire Way would be reestablished, providing an alternate route for traffic. It is anticipated that the presence of the route with appropriate signage would redirect **20%** of traffic volumes from the on-ramp volumes.

In addition to the connection, it is proposed that a ramp meter signal be installed at the ramp with an appropriate queue length. Like the ramp meter at I-90, the additional time delay would redirect drivers bound for the City Center or the South Hill to the alternative route of Inland Empire Way. The improvement is anticipated to create better local connections and preserve the state facilities for intra City travel (City to City) as opposed to inter City travel (travel within the City) It is anticipated that the presence and operation of the ramp meter redirect **50%** of traffic volumes from the on-ramp volumes when in operation. It is anticipated that the ramp meter would operate at similar times as the ramp meter at I-90, thus preserving the capacity of both. As the Thorpe Road Sign project establishes a virtual link for operations, the two meters could be tied together to provide drivers with additional advance warning.

There has also been discussion of utilizing the WSDOT reader board to provide additional driver information. The sign is currently north of the Cheney Spokane Road Interchange. Its relocation south of the interchange may redirect trips bound for the City Center and the South Hill to exit at Cheney Spokane Road.

The following is an Exhibit of the anticipated trips that would be redirected by these improvement projects.

Exhibit 2 – Redirected Trips



As shown in the Exhibit based upon the anticipated percentages of redistribution, the three improvement projects have the potential to remove 363 existing AM peak hour and 157 PM peak hour trips from the I-90/ SR 195 Northbound to Eastbound Ramp. This redirection of trips forms the basis for no additional trips on the ramp. For convenience the anticipated trips from this project (Latah Glen Residential) that may be redirected is highlighted in yellow.

***Table 13* – Corridor Project Trip Summary – With Improvement Credit**

	Original Trips on Ramp		Redirected Trips from Ramp by SR 195 Projects								Trips on Ramp after Redirection	
			Turn Restriction @ 16th		Flashing Beacon @ Thorpe		Inland Empire Way Ramp & Meter		Total			
	AM	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Existing Trips on Ramp	1,303	643	-53	-20	-50	-20	-210	-97	**-313**	**-137**	990	506
Summit	22	17	-	-	-1	-1	-4	-3	-5	-4	17	13
Wheatland	50	9	-	-	-2	0	-10	-2	-12	-2	38	7
Tangle Ridge	10	7	-	-	-1	0	-2	-1	-3	-1	7	6
Latah Glen	13	5	-	-	-1	0	-3	-1	-4	-1	9	4
Qualchan View	42	14	-	-	-2	-1	-8	-3	-10	-4	32	10
Greens @ Meadowlane	5	3	-	-	0	0	-1	-1	-1	-1	4	2
Marshall Creek	72	33	-	-	-3	-2	-14	-7	-17	-9	55	24
Project Total	214	88	0	0	-10	-4	-42	-18	-52	-22	**162**	**66**
Total	1,517	731	-53	-20	-60	-24	-252	-115	-365	-159	1,152	572
Difference between Redirected Existing Trips & Total Project Trips on Ramp after Redirection											**-151**	**-71**

As shown in Table 13 the corridor projects after redirection from the improvement projects are anticipated to total 162 AM Trips and 66 PM peak hour trips. With the credit from the improvement projects there would no additional trips on the ramps and also still be additional capacity for future projects within the corridor.

Improvement Project Timing

In regard to the timing of each improvement project a separate report is anticipated to be completed. This report would consider the corridor projects buildout schedule by year, the anticipated credit of each improvement, and when each improvement project would need to be implemented to maintain no additional trips on the ramp.

Conclusion

It is concluded that with the improvement projects that a significant number of trips would be redirected away from the NB US 195 to EB I-90 ramp, and that the net result would be no additional trips to the ramp.

Highway Segment LOS and Queue Analysis

WSDOT has requested within the scope that an analysis of the SR 195 NB Ramp and I-90 Interchange be included. For a highway interchange there is not a single level of service model like a standard intersection but the analysis of multiple elements, and then the review by a transportation professional to determine acceptance and/or impact. These elements include the ramp queue length, the ramp merge area, and the I-90 freeway segment. These elements have been analyzed for the current condition, the future year 2026 without the project with the 1.0% background growth rate and the background projects, and the future year 2026 with the project, with the 1.0% background growth rate and the background projects.

NB SR 195 Ramp Configurations

NB SR 195 Ramp has 2-lanes, each with 500 ft (20 vehicles per lane) of storage. The vehicle release method is alternating green phases. The WSDOT recommended maximum hourly rate and minimum hourly rate to avoid ramp queuing on NB SR 195 Ramp are maximum of 1200 vph (AM) & 800 vhp (PM) and minimum of 800 vph (AM) & 300 vph (PM).

Traffic Volumes Statement

With WSDOT's Open Bid to install Ramp Meters along I-90 at Hwy 2 as well as other ramps within the downtown core. These projected volumes are subject to change, to an unpredictable value. Also, with the change in volumes all analysis that utilizes these volumes will also be subject to change.

Traffic volumes for the year 2019 conditions were provided by WSDOT. Traffic volumes for the year 2021 existing conditions assumed that the 2019 traffic volumes experience an increase above the 2019 traffic volumes at the established background rate. Two scenarios were examined for the year 2026 analysis. The first scenario assumes that the development has not moved forward and analyzes the scoped intersections with the background growth rate & background projects (Amazon, The Summit, Tangle Ridge, Latah Glen, Greens at Meadowlane, Qualchan View, & Wheatland Estates). The second scenario assumes the same, but adds the project trips. These scenarios will allow a determination to be made as to what the future conditions may be both with and without the project. The redirection of traffic volumes from SR 195 EB ramp by SR 195 Corridor Improvement projects were also included for the with project and the without project scenarios. The volumes used for this analysis are shown on the following Tables.

Table 14 – AM Traffic Volumes (vehicles per hour)

	2021 Existing*		2026 W/ Background Projects**		Latah Glen Project	2026 W/ Background Projects & This Project**	
	W/O SR 195 Corridor IMP	W/ SR 195 Corridor IMP	W/O SR 195 Corridor IMP	W/ SR 195 Corridor IMP		W/O SR 195 Corridor IMP	W/ SR 195 Corridor IMP
I-90 Main	3,627	3,627	3,821	3,821	-	3,821	3,821
SR 195 EB	1,303	990	1,570	1,193	13	1,583	1,202

Table 15 – PM Traffic Volumes (vehicles per hour)

	2021 Existing*		2026 W/ Background Projects**		Latah Glen Project	2026 W/ Background Projects & This Project**	
	W/O SR 195 Corridor IMP	W/ SR 195 Corridor IMP	W/O SR 195 Corridor IMP	W/ SR 195 Corridor IMP		W/O SR 195 Corridor IMP	W/ SR 195 Corridor IMP
I-90 Main	4,409	4,409	5,353	5,353	-	5,353	5,353
SR 195 EB	643	506	758	594	5	763	598

*** Please see Table 9 for 2021 existing volumes on SR 195 EB**
**** 2026 traffic volumes adjusted from year 2021 to year 2026 via eastablish background growth rate(1.051)**

NB SR 195 Ramp Queue Length Analysis without SR 195 Corridor Improvement Projects

Based upon the spreadsheet provided by WSDOT, the queue length analysis on NB SR 195 Ramp for the without SR 195 Corridor Improvement Projects scenario has been updated. The summary of this scenario is shown in Table 16.

Table 16 - EB SR 195 Ramps-Queue length analysis without SR 195 IMP

Scenario			A 2021 Existing	B 2026 without Project	C 2026 with Project	C - B
Traffic Volumes* (VPH)		AM	1,303	1,570	1,583	13
		PM	643	758	763	5
WSDOT Ramp Existing Metering Rate (VPH) {Future Meter Rate}		AM	1,200	1,200	1,200	-
		PM	800	800 {500}	800 {500}	-
Vehicles in the Queue / Max. Queue Length/ Queue Exceedance/ Times of Exceedance	AM	Max. Vehicles in Queue (Veh)	135	446	466	20
		Max. Queue Length (ft)	3,377	11,146	11,646	500
		Queue Length Available (ft)	1,000	1,000	1,000	-
		Excess Queue Length (ft)	2,377	10,146	10,646	500
		Time of Day 1,000 ft Queue Length is Exceeded (Max. Time of Exceedance)	7:35 AM – 8:29 AM (7:54 AM)	6:46 AM – 8:59 AM (8:18 AM)	6:46 AM – 8:59 AM (8:18 AM)	-
	PM (Metering Rate: 800 VPH)	Max. Vehicles in Queue (Veh)	12	24	24	1
		Max. Queue Length (ft)	304	600	611	11
		Queue Length Available (ft)	1,000	1,000	1,000	-
		Excess Queue Length (ft)	0	0	0	0
		Time of Day 1,000 ft Queue Length is Exceeded (Max. Time of Exceedance))	-	-	-	-
	PM (Metering Rate: 500 VPH)	Max. Vehicles in Queue (Veh)	-	661	675	14
		Max. Queue Length (ft)	-	16,520	16,887	367
		Queue Length Available (ft)	1,000	1,000	1,000	-
		Excess Queue Length (ft)	-	15,520	15,887	367
		Time of Day 1,000 ft Queue Length is Exceeded (Max. Time of Exceedance)	-	3:12 PM – 5:59 PM (5:59 PM or After)	3:11 PM – 5:59 PM (5:59 PM or After)	-

***Traffic volumes without SR 195 IMP from Table 14 & 15**

As shown in Table 16, the maximum queue length for all scenarios without SR 195 Improvement Project in AM peak are anticipated to exceed the current storage space (1,000 ft) and the durations with queue beyond the storage for all scenarios are anticipated to continue to after AM peak hour. In PM peak, maximum queue length for all scenarios are anticipated to stay within the current storage space (1,000 ft), however, with 500 vph metering rate (to improve LOS on I-90 segment), the maximum queue length for all future scenarios in PM peak are anticipated to exceed the current storage space and the durations with queue beyond the storage for all future scenarios in PM peak are anticipated to continue to after PM peak hour, as the demand volumes used for the future year are only a projection of future traffic volumes, we recommend that the volumes and the queue length be monitored over time.

NB SR 195 Ramp Queue Length Analysis with SR 195 Corridor Improvement Projects

Based upon the spreadsheet provided by WSDOT, the queue length analysis on NB SR 195 Ramp for the with SR 195 Corridor Improvement Projects scenario has been updated. The summary of this scenario is shown in Table 17.

Table 17 - EB SR 195 Ramps-Queue length analysis with SR 195 IMP

Scenario			A	B	C	C - B
			2021 Existing	2026 without Project	2026 with Project	
Traffic Volumes* (VPH)		AM	990	1,193	1,202	9
		PM	506	594	598	4
WSDOT Ramp Existing Metering Rate (VPH) {Future Meter Rate}		AM	1,200	1,200	1,200	-
		PM	800	800 {500}	800 {500}	-
Vehicles in the Queue / Max. Queue Length/ Queue Exceedance/ Times of Exceedance	AM	Max. Vehicles in Queue (Veh)	8	76	80	4
		Max. Queue Length (ft)	196	1,903	2,010	107
		Queue Length Available (ft)	1,000	1,000	1,000	-
		Excess Queue Length (ft)	-	903	1,010	107
		Time of Day 1,000 ft Queue Length is Exceeded (Max. Time of Exceedance)	-	7:47 AM – 8:02 AM (7:53 AM)	7:43 AM – 8:05 AM (7:53 AM)	-
	PM (Metering Rate: 800 VPH)	Max. Vehicles in Queue (Veh)	8	11	11	1
		Max. Queue Length (ft)	190	281	287	6
		Queue Length Available (ft)	1,000	1,000	1,000	-
		Excess Queue Length (ft)	-	0	0	0
		Time of Day 1,000 ft Queue Length is Exceeded (Max. Time of Exceedance))	-	-	-	-
	PM (Metering Rate: 500 VPH)	Max. Vehicles in Queue (Veh)	-	193	206	13
		Max. Queue Length (ft)	-	4,826	5,147	321
		Queue Length Available (ft)	1,000	1,000	1,000	-
		Excess Queue Length (ft)	-	3,826	4,147	321
		Time of Day 1,000 ft Queue Length is Exceeded (Max. Time of Exceedance)	-	3:36 PM – 5:59 PM (5:59 PM or After)	3:36 PM – 5:59 PM (5:59 PM or After)	-

***Traffic volumes with SR 195 IMP from Table 14 & 15**

As shown in Table 17, the maximum queue length for the 2026 with & without project scenarios with SR 195 Improvement Project in AM peak are anticipated to exceed the current storage space (1,000 ft) and the durations with queue beyond the storage are anticipated to be 15 minutes (7:47 AM – 8:02 AM) for the 2026 without project scenario and 22 minutes (7:43 AM – 8:05 AM) for the 2026 with project scenario. In PM peak, maximum queue length for all scenarios are anticipated to stay within the current storage space (1,000 ft), however, with 500 vph metering rate (to improve LOS on I-90 segment), the maximum queue length for all future scenarios in PM peak are anticipated to exceed the current storage space and the durations with queue beyond the storage for all future scenarios in PM peak are anticipated to continue to after PM peak hour, as the demand volumes used for the future year are only a projection of future traffic volumes, we recommend that the volumes and the queue length be monitored over time.

Based upon the analysis provided in Tables 16 and 17, it is anticipated that the SR 195 Corridor Improvement Project will improve NB SR 195 Ramp metering operation, by reducing 386 vehicles (466 vehicles – 80 vehicles) in maximum queue for AM and 13 vehicles (24 vehicles – 11 vehicles) in maximum queue for PM peak.

I-90 Segments LOS Analysis

The future Levels of Service at the freeway segments were calculated using the methods from the *Highway Capacity Manual 6th Edition* as implemented in *HCS7*, version 7.7. The Levels of Service for I-90 segments within the study area for both of the with and without SR 195 Corridor Improvement Projects scenario are summarized on the following tables.

Table 18- I-90 Freeway Levels of Service without SR 195 IMP (AM: 1,200 vph, PM: 800 vph)

I-90 SEGMENT		2021 Existing		2026 W/O Project		2026 W/ Project	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
Ramp Merge Area	AM	37.4	E	39.8	E	39.8	E
(NB SR 195 to EB I-90)	PM	37.1	E	Exceed 50.0 (47.3)	**F** (E)	Exceed 50.0 (47.3)	**F** (E)
• With 500 vph metering rate at PM							
Basic Area	AM	34.7	D	36.8	E	36.8	E
(NB SR 195 to Walnut St.)	PM	34.5	D	Exceed 45.0 (44.0)	**F** (E)	Exceed 45.0 (44.0)	**F** (E)
• With 500 vph metering rate at PM							
Ramp Diverge Area	AM	25.3	C	26.4	C	26.4	C
(EB I-90 to Walnut St.)	PM	24.3	C	29.8	C	29.8	C

Table 19- I-90 Freeway Levels of Service with SR 195 IMP (AM: 1,200 vph, PM: 800 vph)

I-90 SEGMENT		2021 Existing		2026 W/O Project		2026 W/ Project	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
Ramp Merge Area	AM	34.9	E	39.8	E	39.8	E
(NB SR 195 to EB I-90)	PM	35.6	E	Exceed 50.0 (47.3)	**F** (E)	Exceed 50.0 (47.3)	**F** (E)
• With 500 vph metering rate at PM							
Basic Area	AM	32.7	D	36.7	E	36.8	E
(NB SR 195 to Walnut St.)	PM	33.3	D	Exceed 45.0 (44.0)	**F** (E)	Exceed 45.0 (44.0)	**F** (E)
• With 500 vph metering rate at PM							
Ramp Diverge Area	AM	24.1	C	26.3	C	26.4	C
(EB I-90 to Walnut St.)	PM	23.6	B	28.9	C	29.0	C

As shown in Table 18 & 19, the change of the density & level of Service on I-90 segments by adding new trips of the project were minimal considering. For 2026 PM peak hour at current metering rates, the level of service at Ramp Merge area and Basic area is anticipated to operate at "F". With 500 vph ramp metering rates in PM peak hour, it is anticipated to operate at level of service "E".

Conclusion

Based upon the analysis provided it is concluded that the addition of the project trips will have an impact upon the SR 195 & 1-90 Interchange, by adding 4 vehicles (107 ft) in queue for AM and 1 vehicle (6 ft) in queue for PM.

LOS Analysis on the Intersection of 23rd Avenue (Thorpe Road) & Inland Empire Way

Per the WSDOT comments dated on May 28, 2021, the additional analysis at the intersection of 23rd Avenue (Thorpe Road) & Inland Empire Way has been performed. Seven scenarios were considered for this analysis;

1. 2021 existing
2. 2026 with background growth rate and without SR 195 IMP projects
3. 2026 with background growth rate and with SR 195 IMP projects
4. 2026 with background projects, without this project (Qualchan View Estates), and without SR 195 IMP projects
5. 2026 with background projects, without this project, and with SR 195 IMP
6. 2026 with background projects, with this project, and without SR 195 IMP
7. 2026 with background projects, with this project, and with SR 195 IMP

A summary of the Level of Service results is shown in the following table.

Table 20 – LOS on the Intersection of 23rd Avenue (Thorpe Road) & Inland Empire Way

Scenario **(A)ll way stop control** **(T)wo way stop control**		**AM Peak Hour**		**PM Peak Hour**	
		Delay (sec)	**LOS**	**Delay (sec)**	**LOS**
2021 Existing Condition	A	8.0	A	7.5	A
2026 w/ Growth Rate w/o SR 195 IMP Projects	A	8.1	A	7.5	A
2026 w/ Growth Rate w/ SR 195 IMP Projects • Stop Control on 23rd Avenue (Thorpe Road)*	A (T)	10.1 (12.8)	B (B)	8.1 (10.4)	A (B)
2026 w/o Project w/o SR 195 IMP Projects	A	8.1	A	7.5	A
2026 w/o Project w/ SR 195 IMP Projects • Stop Control on 23rd Avenue (Thorpe Road)*	A (T)	10.6 (13.6)	B (B)	8.1 (10.5)	A (B)
2026 w/ Project w/o SR 195 IMP Projects	A	8.2	A	7.6	A
2026 w/ Project w/ SR 195 IMP Projects • Stop Control on 23rd Avenue (Thorpe Road)*	A (T)	10.7 (13.8)	B (B)	8.3 (10.7)	A (B)

***In case of the predomination of traffic volume on Inland Empire Way, the intersection has been analyzed based upon the stop control on 23rd Avenue only.**

As shown Table 20, the intersection of Thorpe Road (23rd Avenue) & SR 195 is anticipated to operate at an acceptable level of service with all scenarios.

Conclusion

Based upon the analysis provided, it is concluded that the addition of the project trips will have a minimal impact upon the intersection of 23rd Avenue (Thorpe Road) & Inland Empire Way, by increasing 0.1 seconds in delay for AM and 0.2 seconds in delay for PM.

Queue Analysis on the Intersection of 16th Avenue & SR 195

Per the WSDOT comments dated on May 28, 2021, the Northbound Left-Turn queue length at the intersection of 16th Avenue & SR 195 has been analyzed. The methodology for this analysis is as shown below:

1. Using WSDOT Ramp Queuing Analysis spreadsheet, evaluate the maximum volumes on SR 195 NB Ramp with the current storage length (2-lanes, each with 500 ft (20 vehicle per lane – total of 40 vehicle)).
2. Calculate the overflow traffic volumes (2026 Projected traffic volumes on SR 195 NB Ramp – the Maximum volumes on SR 195 NB Ramp)
3. Based upon the calculated overflow traffic volumes, modify the 2026 projected traffic volumes on the intersection of 16th Avenue & SR 195 (NB Thru Traffic Volume: 2026 projected traffic volume – the overflow traffic volume, NB Left-Turn Traffic Volume: 2026 projected traffic volume + the overflow traffic volume).
4. Evaluate the queue length (NB Left-Turn) and LOS at the intersection.

The summary of this analysis is shown below tables.

Table 21 – 2026 Diverted Traffic Volume from SR 195 NB Ramp to 16th NB LT by Queuing

Scenario	Peak Hour	Metering Rate (Veh/hr)	Storage Capacity (ft)	A. Maximum Supportable Traffic Volume (Veh/hr)**	B. 2026 Traffic Volume (Veh/hr)***		C. Overflow Traffic B-A (Veh/hr)	
					WO Project	W Project	WO Project	W Project
WO SR 195 IMP	AM	1,200	1,000 (40 veh)	1,108	1,570	1,583	462	475
	PM	500*	1,000 (40 veh)	521	758	763	237	242
W SR 195 IMP	AM	1,200	1,000 (40 veh)	1,108	1,193	1,202	85	94
	PM	500*	1,000 (40 veh)	521	594	598	73	77

500 vph Metering (to improve LOS on I-90 segment)
Evaluated by WSDOT Ramp Queuing Analysis Spreadsheet
****2026 Traffic Volumes with SR 195 IMP Projects (Tables 14 & 15)***

Table 22 – Queue & LOS Analysis for NB Left-turn for 2026 without Project Scenario

Scenario	Peak	Movement	2026 without Diversion				2026 with Diversion			
			D. Vol. (Veh/hr)	95th Queue (ft)	LOS - Delay (s)	Int. LOS&Delay (s)	Vol. (Veh/hr)*	95th Queue(ft)	LOS - Delay (s)	Int.LOS &Delay (s) **
WO SR 195 IMP	AM	NB LT	112	13 (1veh)	A-9.5	D-26.1	574	143(6veh)	C-16.9	**F-67.5**
		NB TH	1,677	-	-		1,215	-	-	
	PM	NB LT	92	25 (1veh)	C-17.6	C-17.6	329	**233 (10veh)**	**F-58.3**	**F-140.7**
		NB TH	724	-	-		487	-	-	
W SR 195 IMP	AM	NB LT	112	13 (1veh)	A-9.5	D-26.1	197	23(1veh)	B-10.1	D-27.5
		NB TH	1,677	-	-		1,592	-	-	
	PM	NB LT	92	25 (1veh)	C-17.6	C-17.6	165	58(3veh)	C-22.0	C-18.2
		NB TH	724	-	-		651	-	-	

NB LT: D (Table 22: NB LT) + C (Table 21), NB TH: D (Table 22: NB TH) – C (Table 21)
****Intersection LOS & Delay based upon Critical Movement***

Table 23 – Queue & LOS Analysis for NB Left-turn for 2026 with Project Scenario

Scenario	Peak	Movement	2026 without Diversion				2026 with Diversion			
			D. Vol. (Veh/hr)	95th Queue (ft)	LOS - Delay (s)	Int. LOS&Delay (s)	Vol. (Veh/hr)*	95th Queue(ft)	LOS - Delay (s)	Int.LOS &Delay (s) **
WO SR 195 IMP	AM	NB LT	115	13 (1veh)	A-9.5	D-26.3	590	155(7veh)	C-17.7	**F-83.3**
		NB TH	1,688	-	-		1,213	-	-	
	PM	NB LT	95	28 (2veh)	C-18.0	C-18.0	337	**255 (11veh)**	**F-66.2**	**F-66.2**
		NB TH	735	-	-		493	-	-	
W SR 195 IMP	AM	NB LT	115	13 (1veh)	A-9.5	D-26.3	209	25(1veh)	B-10.2	D-28.1
		NB TH	1,688	-	-		1,594	-	-	
	PM	NB LT	95	28 (2veh)	C-18	C-18.0	172	63(3veh)	D-23.1	D-23.1
		NB TH	735	-	-		658	-	-	

NB LT: D (Table 19: NB LT) + C (Table 17), NB TH: D (Table 19: NB TH) – C (Table 17)
****Intersection LOS & Delay based upon Critical Movement***

As shown in Table 22 & 23, with the diversion traffic volume caused by queueing on SR 195 NB Ramp, it is anticipated that the NB left-turn queue length will exceed the available storage (240 ft) for PM peak hour and the intersection will operate at an unacceptable level of service for both AM & PM peak hours. With the SR 195 Improvements projects, it is anticipated that the NB left-turn queue length will stay within the available storage and the intersection will operate at an acceptable level of service.

Conclusion

Based upon the analysis provided, it is concluded that the diverted trips will have a minimal impact upon the northbound left-turn lane at the intersection of 16th Avenue and SR 195, by adding 1 vehicle (2 ft) in queue for AM and 1 vehicle (5 ft) in queue for PM.

Conclusions

This Traffic Impact Analysis (TIA) has reviewed and analyzed the study area per the scope established by the City of Spokane and WSDOT. Based upon the analysis, field observations, assumptions, methodologies and results which are provided in the body of this report, it is concluded that the development of the proposed project will generate new trips on the existing transportation system and that those trips will have an impact on the transportation system. This conclusion was reached and has been documented within the body of this report.

- Under the **existing** conditions, all intersections are currently operating at an acceptable level of service.

- For the **year 2026 with background growth rate** scenario, all intersections are anticipated to continue to operate at an acceptable level of service except the intersections of SR 195 & 16th Avenue and SR 195 & Hatch Road. With the mitigation provided by the Spangle-Wheatland project at SR 195 & 16th Avenue (Right Out only on eastbound approach) and the painted median configuration with SB acceleration lane at SR 195 & Hatch Road, all intersections are anticipated to operate at an acceptable level of service.

- For the **year 2026 with background growth rate plus background projects and without this project** scenario, with the mitigation provided by the Spangle-Wheatland project (Right Out only on eastbound approach) at SR 195 & 16th Avenue, and the painted median configuration with SB acceleration lane at SR 195 & Hatch Road, all intersections are anticipated to continue to operate at an acceptable level of service except the intersection of SR 195 & Meadowlane Drive. With WSDOT ½ J-Turn at SR 195 & Meadowlane Drive, all intersections are anticipated to operate at an acceptable level of service.

- For the **year 2026 with background growth rate plus background projects and with this project** scenario, with the mitigation provided by the Spangle-Wheatland project (Right Out only on eastbound approach) at SR 195 & 16th Avenue, the painted median configuration with SB acceleration lane at SR 195 & Hatch Road, and WSDOT ½ J-Turn at SR 195 & Meadowlane Drive, all intersections are anticipated to continue to operate at an acceptable level of service. (Please see Wheatland Estates Proposed Traffic/Transportation Conditions of Approval letter in Background Project section of Appendix).

As shown in the Additional Analysis - Right Turn Lane Warrant Analysis section, it is concluded that the intersection of Inland Empire Way & SR 195 meets the WSDOT right turn lane warrant. However, the intersection level of service remains at an acceptable level through the buildout period. Additionally, there is also a sight distance concern associated with a dedicated right turn lane, as a vehicle within the turn lane blocks the view of oncoming traffic. We propose additional

consultation with the WSDOT that this be reevaluated after the 100th home site has received an occupancy permit.

As shown in the additional analysis section – SR 195 Corridor Improvement Projects, it was concluded that with the EB Turn Restrictions at 16th Avenue, Flashing Beacon and Sign at Thorpe Road Exit, and Connection to Inland Empire Way at Cheney-Spokane Road Ramp projects (by other projects, yet to be approved but in the pipeline) that a significant number of trips would be redirected away the NB US 195 to EB I-90 ramp, and that the net result would be no additional trips to the I-90 Ramps.

As shown in the additional analysis Highway Segment LOS and Queue Analysis section, based upon the analysis provided it is concluded that the addition of the 13 AM and the 5 PM project trips will have an impact upon the SR 195 & 1-90 Interchange, by adding 4 vehicles with a calculated 107 ft addition at queue for AM and 1 vehicle with a calculated 6 ft addition at queue for PM with SR 195 Corridor Improvement Projects.

As shown in the additional analysis, based upon the LOS Analysis on the intersection of 23rd Avenue & Inland Empire Way, it is concluded that the addition of the project trips will have a minimal impact upon the intersection of 23rd Avenue (Thorpe Road) & Inland Empire Way, by increasing 0.1 seconds in delay for AM and 0.2 seconds in delay for PM.

As shown in the additional analysis, based upon the Queue Analysis on the intersection of 16th Avenue & SR 195, it is concluded that the diverted trips will have a minimal impact upon the northbound left-turn lane at the intersection of 16th Avenue and SR 195, by adding 1 vehicle (2 ft) in queue for AM and 1 vehicle (5 ft) in queue for PM.

Recommendations

It is recommended that the project be conditioned to participate in the Corridor Improvement projects as described within this document. The proposed conditions are as follows.

A. *Vehicular traffic from this project is expected to add 13 AM trips and 5 PM trips to the NB US 195 to EB I-90 ramp. WSDOT has commented that no additional peak hour trips may be added to the ramp due to safety concerns. Latah Glen is therefore required to contribute funds to complete an improvement to the US 195 corridor that will reduce the impact of its traffic on NB US 195 to EB I-90 ramp ("Mitigation Project"). Latah Glen may receive plan approval after a financial commitment is in place (secured by a letter of credit or bond), which has been approved by the City, providing for the funding of the design and the construction for the Mitigation Project(s), which shall be under contract for construction within one year from issuance of the plan approval. The details of the mitigation project(s) will be agreed upon by the developers, City and WSDOT. The applicant's contributions to funding the design and construction of the mitigation project(s) will qualify for a credit against transportation impact fees per SMC 17D.075.070*
B. *Latah Glenn may receive plan approval once a financial commitment is in place (secured by a letter of credit or bond), which has been approved by the City,*

providing for a.) the construction of the 16th Avenue improvements with SR 195, and b.) Cheney-Spokane Road Ramp – Connection to Inland Empire Way Improvement. This commitment may be defined as an agreement between several developers to fund and construct the 16th Avenue, and the Cheney-Spokane Road Ramp – Connection to Inland Empire Way Improvement projects within a specified time frame, not to exceed six years, as agreed upon by city staff and WSDOT. The applicant's contributions to funding the design and construction of the Improvement projects will qualify for a credit against transportation impact fees per SMC 17D.075.070.

i. *The 16th Avenue and SR 195, improvement project will consist of the the following:*
   - *Install a raised curb island*
   - *Channelize the turn lane*
   - *Add a southbound acceleration lane.*

ii. *The Cheney-Spokane Road Ramp – Connection to Inland Empire Way Improvement project will consist of the following:*
   - *Extend the northbound ramp to Inland Empire Way,*
   - *One or Two-way connection to Inland Empire Way,*
   - *Install ramp with acceleration lane*
   - *Install ramp meter signal*
   - *Relocate existing sign bridge*

iii. *Latah Glen Financial Commitment*
*The financial commitment for Latah Glen development based upon the rate of participation is as follows for the Cheney-Spokane Road Ramp improvement with 157 PM peak hour trips at $1,910.64 per PM peak hour trip. The participation percentage is anticipated to total $299,970.48(157 trips * $1,910.64). In summary the total financial commitment due is $299,970.48 or greater depending upon final cost, less a 25% contribution to the construction of improvements at 16th and SR-195 as proposed in the Spangle-Wheatland Estate mitigation proposal.*

iv. *The applicant's contributions to funding the design and construction of the Improvement projects will qualify for a credit against transportation impact fees per SMC 17D.075.070.*

v. *It should be noted that the Latah Glen Community commitment to this improvement has been set tentatively at $299,970.48 this commitment along with the value of $776,630.48 from Marshall Creek would result in a beginning commitment of $1,076,600± to the Inland Empire Way access, Phase 1. It is understood that this is an approximated commitment may increase due to actual construction costs for the improvements proposed.*

vi. *Lastly, the current impact fee credit of $1160.64 would occur at time of building permit which results in an effective developer contribution of $750/unit ($1910.64-$1160.64).*

Based upon the conclusions within this study, the proposed project is recommended to complete all required conditions of approval and should be allowed to move forward without further traffic analysis, or offsite mitigation.