

MEMORANDUM

DATE: October 28, 2020

TO: Jennifer Hoffman, Opsis Architecture, LLP

FROM: Dana Beckwith, PE, PTOE
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SUBJECT: Oak Lodge Library and NCPRD Community Center
TIA Methodology Memorandum

P19-062

This memorandum summarizes the methodology that will be employed in developing the traffic impact analysis associated with the proposed Oak Lodge Library and NCPRD Community Center to be located at 3811 SE Concord Road in Clackamas County, Oregon. The purpose of the traffic impact analysis will be to identify potential impacts to the transportation network for the year of opening for the site, based on the standards established by Clackamas County and the Oregon Department of Transportation (ODOT).

The following intersections and site accesses will be evaluated as part of the analysis:

- OR 99E at SE Concord Road
- SE Oatfield Road at SE Concord Road
- SE Oatfield Road at SE Spaulding Avenue

The methodologies included in this memorandum will be used to analyze the transportation facilities directly impacted by this project and will be based on the ODOT Analysis Procedures Manual Version-2 (APM V-2) and Section 295 of the Clackamas County Roadway Standards.

A potential change in land use zoning (not yet determined) would require a Transportation Planning Rule change analysis for a 2040 horizon year. The analysis, if required, will assess forecasted traffic impacts to the transportation system based on maximum land use potential.

PROJECT DESCRIPTION

The proposed Oak Lodge Library and NCPRD Community Center will be located at 3811 SE Concord Road in Clackamas County, Oregon. The site fronts SE Concord Road and SE Spaulding Avenue. The site will consist of a 65,800 square foot multi-use building and associated field facilities. The library will replace the existing former Concord Elementary School and associated facilities. Figure 1 provides a vicinity map that shows the project site and the study intersections. Figure 2 shows a concept site plan.

Study Area

The study area includes Pacific Highway East (OR 99E), SE Concord Road, Oatfield Road and SE Spaulding Avenue. Figure 1 shows the extents of the study area. Additional access into the site may be provided via SE Olive Avenue. This is currently being explored by County Staff since it requires obtaining previously vacated right-of-way. The intersections directly impacted by the proposed development will be evaluated for operations and safety using current methodologies detailed in the Analysis Procedure Manual Version-2 (APM V-2).

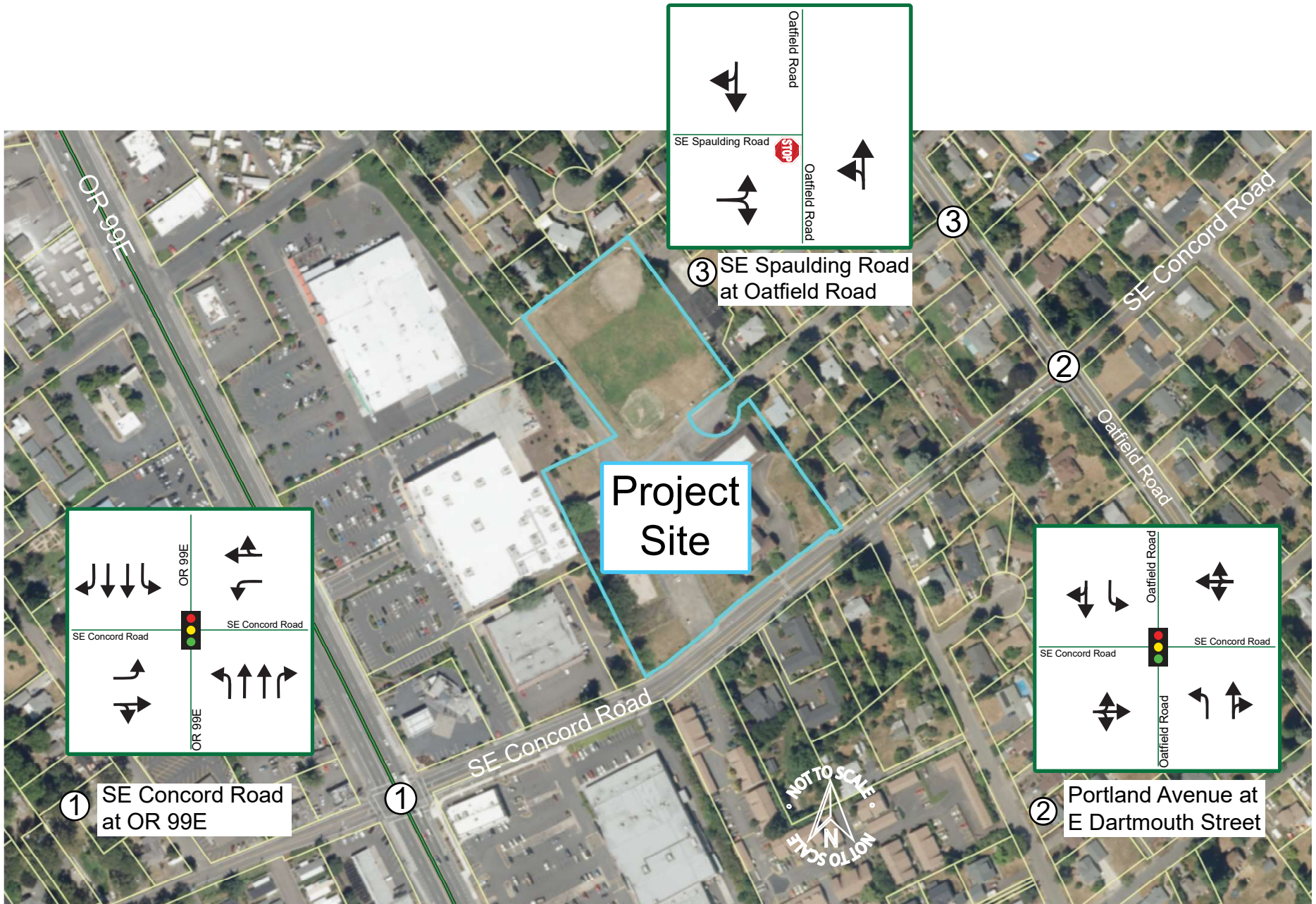


Figure 1: Vicinity Map

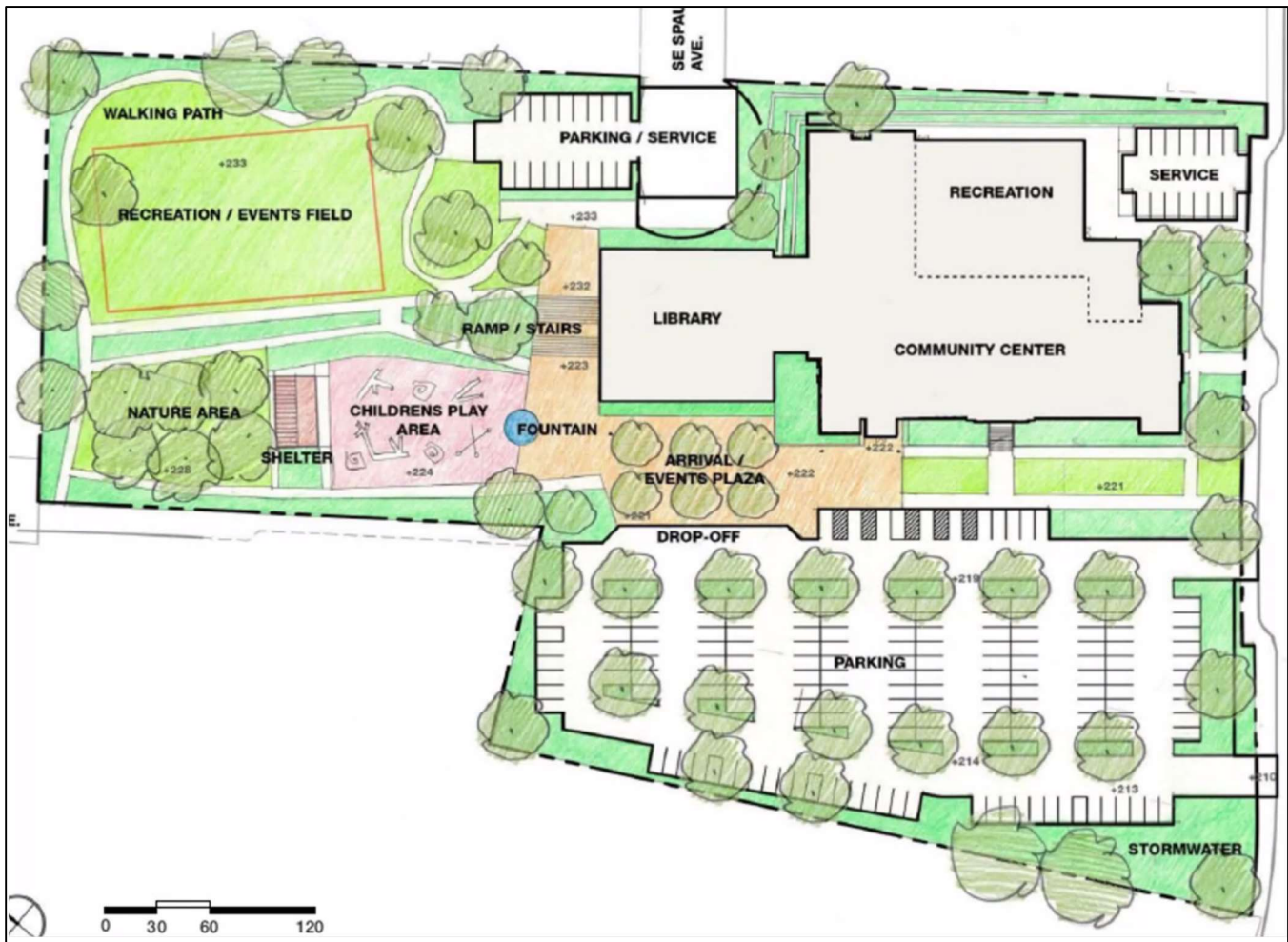


Figure 2: Preliminary Concept Site Plan

The following intersections are included in this study:

- OR 99E at SE Concord Road
- SE Concord Road at Oatfield Road
- SE Spaulding Avenue at Oatfield Road

These intersections were determined to be necessary for analysis through preliminary coordination with Clackamas County. The intersection of SE Concord Road at OR 99E is expected to meet the ODOT minimum requirements for analysis¹ based on preliminary trip generation. Coordination with ODOT will be completed to determine if the intersections of OR 99E at SE Risley Avenue and OR 99E at SE Vineyard Road also meet the requirements for analysis. Table 1 shows the existing roadway characteristics for study roadways.

¹ ODOT Development Review Guidelines, Table 3.2: TIA Thresholds and Analysis Areas
<https://www.oregon.gov/ODOT/Planning/Documents/Development-Review-Guidelines.pdf>

Table 1: Roadway Characteristics

Roadway	Functional Classification ¹	Posted Speed Limit	Sidewalks	Transit	Bike Lanes	Lane Geometry	On-Street Parking
OR 99E	Principal Arterial	40 mph	Both sides	Trimet lines 33 and 99	Both sides	Two 11'-12' lanes in each direction and a two-way left-turn lane	None
SE Concord Road	Minor Arterial	35 mph	Both sides west of SE Harold Avenue	None	Both sides	One 10'-11' lane in each direction plus a two-way left-turn lane west of Concord Elementary School	Both sides adjacent to Concord Elementary School
Outfield Road	Minor Arterial	35 mph	Both sides south of SE Spaulding Avenue	None	Both sides	One 10'-11' lane in each direction plus left turn pockets at the intersection of SE Concord Road	None
SE Spaulding Avenue	Local Road	None	None	None	None	18' unmarked cross-section	None

Notes: ¹Based on the Clackamas County TSP

VOLUME DEVELOPMENT

2020 Base Year Volumes

Traffic counts at the study intersections will be gathered during the typical AM and PM peak traffic periods of 6:30 AM to 8:30 AM and 4:00 PM to 6:00 PM. The 2020 base year volumes will be developed using these traffic counts and adjustment factors determined in coordination with the County regarding traffic pattern disruptions due to COVID-19.

Seasonal Adjustment Factor

The collected count data will be seasonally adjusted to represent the 30th Highest Hour Volume (30HV) for existing conditions per Chapter 5 of the APM-V2. There is one permanent traffic recorder station (ATR) just south of SE Concord Road on OR 99E. A seasonal adjustment factor will be developed based on rates for this intersection in The ATR Characteristic Table. For the vicinity ATR, the peak month was determined to be August. The following formula will be used to convert the existing traffic data to the 30HV:

$$30HV = (\text{November PHV}) \times (\text{Peak Month Percent of ADT/Count Month Percent of ADT}).$$

2023 Future Year Volumes

Future 2023 volumes will be based on the 30HV and developed per Chapter 6 of the APM-V2. Coordination will be conducted with Clackamas County and ODOT staff to identify volume adjustments that should be made for in-process development traffic volumes. The 2023 total traffic volumes will be comprised of the 30HV volumes plus background growth and in-process volumes.

Site Trip Generation and Distribution

Coordination with Clackamas County and ODOT officials and the Transportation Engineer's (ITE) Trip

Generation Manual, 10th Edition will be used to identify appropriate trip generation rates for the proposed development based on the land use. Rated average or fitted curve equations as recommended by Chapter 4 of the ITE *Trip Generation Handbook* will be utilized in the trip generation development. Estimates will be developed for AM peak hour, PM peak hour, and Average Daily Trips (ADT).

The proposed development will be a multi-use building offering approximately 46,180 square feet of space split between a library, a community center, and offices to support those services. In review of ITE land use codes, the trips generated by the new development will most closely be represented by the ITE Land Use Code 590 (Library), 495 (Recreational Community Center), General Office Building (710). Table 2 summarizes an estimate of the average rates per 1000 square feet of gross floor area:

Table 2: Oak Lodge Library and NCPRD Community Center Trip Generation Summary

ITE Land Use Code	Size (ksf)	Peak Hour Rate		AM Peak Hour			PM Peak Hour			Weekday Daily Total
		AM	PM	Total	In	Out	Total	In	Out	
590	14.26	1.0	8.16	14	10	4	116	55	61	1027
495	26.67	1.76	2.31	47	31	16	62	29	33	769
730	5.25	1.16	1.15	6	5	1	6	1	5	51
Net New Site Trips				67	46	21	184	85	99	1847

The peak hour turning movement counts obtained at study intersections will be used to distribute site generated vehicle traffic.

TRAFFIC ANALYSIS

Intersection Operational Standards

The intersection operational analysis will follow ODOT standards² for ODOT facilities and Clackamas County standards³ for County facilities. The Volume-to-Capacity (v/c) ratio will be used as the standard measure of intersection operations. The analysis will be conducted utilizing the Synchro analysis software. Existing signal timing will be acquired from Clackamas County and/or ODOT for all study area signalized intersections for use in the analysis. Standards and Targets to be used in the analysis are listed in Table 3.

Table 3: LOS Standards and V/C ratio Targets

Jurisdiction	Roadway Types	Standards and Targets	
		LOS	OHP* Statewide
ODOT	Non-MPO Outside of STAs where nonfreeway posted speed <= 35 mph, or a Designated UBA	D and above	0.90
Clackamas County	Corridors Neighborhoods Employment Areas Industrial Areas Regionally Significant Industrial Areas All Other Areas Outside of City Limits	-	0.99

* Oregon Highway Plan

² Outlined in Table 6 (revised May 2015) of the Oregon Highway Plan (OHP).

³ Section 295.8 of the Clackamas County Roadway Standards.

Analysis Parameters

Parameters for use in the traffic analysis will be gathered using varying sources and methodologies. The Clackamas County TSP will be used as the main source. Data needed that is not available in the TSP will be gathered via aerial photos and site visits. Table 4 lists the various data sources.

Operational Analysis

Both existing and future conditions will be analyzed using Synchro 10 and SimTraffic analysis software. Queues determined by SimTraffic will be 95th percentile queues and volume to capacity (v/c) ratios calculated will be reported as the average v/c for the intersection. Synchro and SimTraffic changes from default for analysis will follow ODOT’s Chapter 7 of the APM-V1.

Existing Conditions (2020)

For existing 2020 conditions, information identified in Table 4 will be gathered from field visits and historical data. This information along with 30HV traffic volumes will be used in developing the baseline operations for study intersections.

Table 4: Analysis Parameters

Parameter	Descriptions	Source
Intersection and roadway geometry	Number of lanes, lane configuration and cross-sectional information	TSP, Aerial photos and field measurements
Operational Data	Existing sight distance, posted speed limits, intersection control, parking and, transit service	TSP, GIS data, aerial photos, and field visit
Traffic Volumes	Peak hour volumes, AADT	Obtained from new AM and PM Peak Hour Turn Movement Volume. Available historic data may also be used.
Peak Hour Factor	PHF	Obtained from a new count or historic data.
Traffic Operations	v/c, LOS	Synchro 10 analysis using HCM 6 th Edition.
Queueing	95 th percentile	SimTraffic 10.

Year of Opening (2023)

The 2023 year of opening operational analysis will include any state and local transportation improvements that will be affected by the proposed site development. The 2023 background and total traffic volumes will be utilized in the analysis. Default values for the Synchro and SimTraffic analyses will follow the requirements of Section 7.3.5 of the APM-V1. For all un-signalized intersections with v/c ratios meeting or exceeding mobility targets, traffic signal warrants will be evaluated to determine if any intersection control improvements are recommended. The need for two-way stop, all-way stop, right/left turn channelization, signals, and roundabouts will be explored based on analysis results and traffic signal warrant analysis. Access standards shall be analyzed per Section 220 of the Clackamas County Roadway Standards. Truck circulation will be analyzed for the proposed development.

Year 2040 (Transportation Planning Rule)

If a zone change and/or Comprehensive Plan amendment is proposed to accommodate the proposed development, a long-range analysis will be performed. Horizon year link volume estimates will be

acquired from Clackamas County Engineering staff or Metro for use in this analysis, per Section 295.6 of the Clackamas County Roadway Standards.

SAFETY EVALUATION

Site Access

Access onto the site is currently proposed via SE Concord Road and SE Spaulding Avenue with potential of additional access via SE Olive Avenue. Each site access will be evaluated for intersection and stopping sight distance and crash history.

Additionally, the current concept design has three site accesses along SE Concord Road. One of these will specifically provide maintenance access to the site. Two additional access points will provide access into the main parking area. Access spacing will be evaluated per Clackamas County requirements along with left turn lane warrants for eastbound traffic along SE Concord Road.

Sight Distance Evaluation

An evaluation of intersection and stopping sight distance for each approach of the proposed driveway will be conducted to identify any safety concerns due to vertical or horizontal alignments of roadway approaches to study intersections. Evaluation criteria will follow the appropriate intersection sight distance conditions as outlined in the American Association of State Highway and Transportation Officials' (AASHTO), *A Policy on Geometric Design of Highway and Streets*.

Crash Analysis

Traffic safety analysis will be conducted for state and non-state roadways as part of the existing conditions summary. The most recent five years of available crash data will be reviewed and analyzed for potential crash patterns. Average Daily Traffic volumes developed for traffic analysis will be used in the crash analysis calculations. The following analysis will be conducted:

- An overall assessment of crash types, severities, and trends will be reviewed and documented.
- The safety analysis will be conducted based on the Highway Safety Manual (HSM) predictive methods. Locations flagged by the HSM method will be flagged as a potential safety issue.
- The last three years of the Safety Priority Index System (SPIS) will be analyzed to determine if any Top 5% or 10% sites exist within the project area. Locations within the Top 5% or 10% SPIS sites will be flagged as a potential safety issue.
- Intersection crash rates will be compared to the published intersection 90th percentile crash rates in APM-V2 Exhibit 4-1. Rates that are close to the 90th percentile rate will be further analyzed for crash patterns and contributing factors. Locations exceeding the 90th percentile crash rate for intersections, will be flagged as a potential safety issue.
- Segment crash rates will be compared to Table II of the currently published statewide crash rates for similar facilities, summarized in the ODOT State Highway Crash Rate Tables. This analysis will be conducted over a ¼ mile roadway segment from the project site. Locations exceeding Table II rates for segments will be flagged as a potential safety issue.

Identified safety issues and ODOT SPIS sites will be mapped and crash patterns will be identified and mitigation measures recommended as applicable.

PARKING EVALUATION

A parking evaluation will be performed to determine the parking needs of the Oak Lodge Library and NCPRD Community Center. The latest editing of the ITE Parking Generation Manual will be used to determine parking demand for the site. This study will tie in to the queueing and site circulation analyses. Shared parking will be examined for different peak demand periods for each proposed land use.

SUMMARY

The traffic impact analysis will consist of the following elements based on Section 295 of the Clackamas County Roadway Standards:

- Executive Summary
- Project and Study Area Description
 - Project Site Description
 - Off-Site Inventory and Existing Conditions Analysis
 - Off-Site Inventory
 - Crash Analysis
 - Sight Distance evaluations
- Off-Site Traffic Analysis
 - Project Travel Demand Analysis
 - Trip Generation
 - Trip Distribution
 - Off-Site Traffic Impact Analysis
 - 2020 Existing Conditions
 - 2023 Background Conditions
 - 2023 Buildout Conditions
 - Queueing Analysis
 - Neighborhood Impacts Analysis
- Warrants Analysis
 - Traffic Signal Warrants
 - Turn Lane Warrants
- On-Site Traffic Evaluation
 - Access Standards
 - Circulation Analysis
- Parking Evaluation
- Mitigations
- Conclusions and Recommendations
- Appendix

Each element will be evaluated as detailed either in this Methodology Memorandum or in Section 295 of the Roadway Standards and will comply with the requirements of ODOT and Clackamas County.