MovingAhead

STREETS AND PLACES REIMAGINED

Transportation Methods and Data Report

Lane Transit District
City of Eugene

In cooperation with
City of Springfield
Lane Council of Governments
Lane County
Oregon Department of Transportation

June 2015

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1 Introduction

This report provides a description of the transportation-related methods and data to be used for the Lane Transit District (LTD) MovingAhead Project's alternatives Level 1 screening, Level 2 alternatives analysis, and subsequent transportation documentation. This report assumes that any corridors advanced for environmental review will require a documented categorical exclusion under the National Environmental Policy Act (NEPA). Any corridors requiring a higher level of environmental review would be supported by this documentation but may not be fully covered by this documentation.

This report addresses the following areas of transportation that will be analyzed for the LTD MovingAhead Project:

- Public transportation
- Traffic volumes
- Regional traffic operations
- Local traffic operations
- Safety
- Parking
- Freight truck
- Freight rail
- Bicycle and pedestrian

In general, each of these areas of the transportation analysis is addressed in the following sections of this report:

- A summary of methods to be used to prepare the analysis to be documented in the project's alternatives analysis
- Relevant laws and regulations
- Contacts and coordination
- Analysis areas
- Data sources and collection methods
- Significant thresholds

1.1 Purpose and Need

The purpose of this analysis is to identify potential benefits and impacts to the transportation system for the proposed BRT alternatives and design options. The findings of the analysis will support the ultimate selection of locally preferred alternatives for future BRT corridors.

1.2 Project Background

The MovingAhead Project is a study to determine which of the remaining high capacity transit corridors identified in the adopted EmX System Plan (Figure 1.3-1) and the Frequent

Transit Network (FTN) (Figure 1.3-2) are ready to advance to capital improvements programming. The study is being conducted jointly with local agencies to facilitate a more streamlined process that efficiently uses financial resources through concurrent planning, environmental review, design, and construction of multiple corridors.

The 6 corridors under consideration in this study are:

- Highway 99 Corridor
- River Road Corridor
- Coburg Road Corridor
- Martin Luther King, Jr. Boulevard / Centennial Boulevard Corridor
- 30th Avenue – Lane Community College Corridor
- Valley River Center Corridor

1.3 Methods

All long-term direct and indirect transportation analyses will be based on a common forecast year of 2035. Travel behavior data will, in general, be based directly or indirectly on regional travel demand forecasts developed by Lane Council of Governments (LCOG) for the Eugene TSP and the Springfield TSP.

2 Level 1 Screening

The Level 1 Screening involves developing concepts for each of the 7 corridors. In this phase, cross-section typologies for various right-of-way widths will be developed. The transportation analysis will involve the following components:

- Reviewing the existing transportation system inventory;
- Reviewing planned and programmed transportation improvements;
- Identifying congested areas that could cause service delays (based on existing Eugene and Springfield Transportation System Plan(s) analysis);
- Reviewing safety data; and
- Estimating transit ridership and demand

2.1 System Inventory

The existing transportation system inventory will be reviewed to determine where existing work can be leveraged. Data sources for this analysis could include:

City of Eugene

- Existing local turn movement count data from 2007 through 2010 during the evening (4 to 6 p.m.) peak period at approximately 25 intersections will be taken from the Eugene TSP. Additional turning movement counts may also be available from recent development proposals.
- City of Eugene Traffic Flow Map from 2013, which shows AADT on major arterials, minor arterials, major collectors, and neighborhood collectors
- City of Eugene Pedestrian and Bicycle Master Plan

- Draft Eugene Transportation System Plan (2015)

City of Springfield

- Local turn movement count data during the evening (4 to 6 p.m.) peak period at approximately 13 intersections from the City of Springfield TSP
- City of Springfield Traffic Flow Map from 2008, which shows AADT on major arterials, minor arterials, and collector streets
- Adopted Springfield Transportation System Plan (2014)

Regional Agencies

- LCOG Bicycle Count Report that includes hourly and daily bicycle count data
- Central Lane MPO Regional Transportation Plan
- Adopted LTD Long-Range Transit Plan (2014)
- Regional travel demand forecasts developed by Lane Council of Governments (LCOG) for the Eugene TSP and the Springfield TSP

Additional

- Physical characteristics of the existing street system will be confirmed through aerial review and/or fieldwork and include lane geometry, intersection control, driveway spacing, bus stop locations, on-street parking, pedestrian crossings, sidewalks, bike lanes and other parameters necessary to conduct traffic operations analysis

2.2 Base and Future Traffic Conditions

Data for base and future traffic conditions will be utilized from the Eugene TSP and the Springfield TSP. It is assumed that no travel demand modeling will be required beyond the prior work completed for the TSPs. For study area intersections that are not included in the TSPs, volume plots and post processed 2035 No-Build traffic volumes from LCOG will be used.

Planned and programmed transportation improvements could include projects from the following sources:

- Eugene TSP
- Springfield TSP
- Central Lane MPO Regional Transportation Plan
- City of Eugene Pedestrian and Bicycle Master Plan
- Additional improvement options identified based on intersection analysis

2.3 Vehicle Congestion

Areas of vehicle congestion will be identified along the corridors where applicable intersection operating standards are not met for existing and/or future conditions. These areas will receive particular attention when evaluating the impacts associated with adding bus rapid transit to each corridor. A qualitative assessment of traffic operations will be made

including an assessment of vehicular and freight traffic flow around transit stops and throughout state corridors on state-owned facilities.

2.4 Peak Hour

For ODOT highways, ODOT policy requires intersection operations to be analyzed using 30th Highest Hour Volumes (30th HV). The 30th HV corresponds to the hour during the year that comes in 30th place when compared with all other hours and is a typical design hour used by ODOT and the American Association of State Highway and Transportation Officials (AASHTO). The purpose of using this design hour is to ensure the intersection can operate efficiently the majority of the time while recognizing that there will be some occasions when congestion would be higher.

In urban environments, the 30th HV is generally very similar to the p.m. peak hour during a normal school and work day that falls mid-week (i.e., Tuesday, Wednesday, or Thursday while the local universities are in session). Therefore, the intersection operations analysis will focus on the P.M. peak hour (i.e., highest hour between 4-6 p.m.) of a typical midweek school and work day. This is intended to satisfy ODOT, Lane County, City of Eugene, and City of Springfield intersection operations analysis requirements.

2.5 Multimodal Safety Analysis

Intersections with potential safety issues will be identified based on a review of available crash data from the last three years. Crash data will be reviewed with a focus on location, type, and injuries and/or fatalities. The annual crash rate will be determined for study intersections, calculated by dividing the number of crashes per year by the number of annual entering vehicles. The annual crashes for selected roadway segments will be analyzed by number and type.

Crash analysis will be based on available data listed below and does not take into account conditions in the future.

- Eugene TSP
- Springfield TSP
- Oregon ARTS project
- ODOT Crash Analysis and Reporting Unit data for the study intersections
- Additional corridor specific safety analysis

A qualitative assessment of safety improvements for vehicles, pedestrians and bicyclists will be made based professional expertise and corridor safety amenities.

2.6 Transit Ridership and Demand

Elements assessed to evaluate project alternatives include ridership, ridership productivity, transit travel time, key existing and future trip generators, and the compatibility of the alternative with the BRT System Plan. LTD will provide the data necessary to conduct the following evaluations:

- Ridership, by comparing weekday ridership with the project built versus the No-Build alternative
- Ridership productivity, most commonly measured as boardings per service hour.
- Change in transit travel time with and without the project
- Transit, auto, walking, and biking trips by TAZ for all trip generators (work, other, college, school, non-home based work, non-home based non-work, shopping)
- How projects would affect the existing system plan

2.7 Transit Travel Time and Reliability

Elements assessed to evaluate project alternatives include transit travel time, and vehicle congestion in areas of mixed flow operations. LTD will provide the data necessary to conduct the following evaluations:

- Qualitative assessment of traffic operations in mixed flow traffic areas;
- Qualitative assessment of impacts on current and future year intersection level of Services (LOS) on state facilities;
- Qualitative assessment of impacts on current and future year PM peak hour auto/truck travel times on state facilities; and
- Estimate of transit travel time between Eugene Station and corridor terminus.

2.8 Transit and Emergency Service Vehicles

Elements assessed to evaluate project alternatives include:

- Qualitative assessment of potential impacts to emergency service vehicle flow and access based on traffic congestion and delay, an increase in non-traversable medians, an increase in access management and a reduction in turn-around areas.

3 Level 2 Alternatives Analysis

The Level 2 Alternatives Analysis (AA) will involve a more refined analysis for up to four corridors advanced from the Level 1 Screening. These conceptual alternatives will define a mode (bus, enhanced bus, or BRT), route, stations, and transit treatment, and will define a "footprint" for the multimodal improvement to allow for environmental impacts assessments. Evaluation will be a mix of qualitative and quantitative analysis including planning-level cost estimates, ridership, environmental impacts analysis, and traffic analysis. The elements assessed could include: roadway network and circulation, regional traffic conditions, intersection operations, safety, transit, freight, pedestrian and bicycle facilities, fiscally constrained roadway projects, mitigation measures, and parking occupancy. The outcome of the Level 2 AA will be a preferred alternative for each corridor.

3.1 Roadway Network and Circulation Impacts

Impacts to the roadway network and existing circulation will be evaluated for each corridor. Examples of roadway network impacts include vehicle lane conversion, additions of turning lanes, and changes in lane widths. Examples of circulation changes include one-way to two-way conversions and installation of traffic signals.

3.2 Base and Future Regional Traffic Conditions

The regional traffic operations analysis will report the following average weekday measures for the forecast year as output from the regional travel demand forecasting model: vehicle miles of travel; vehicle hours of travel; vehicle hours of delay. The 2035 model outputs for the No-Build alternative will provide future baseline conditions for comparison with the projects selected for Level 2 AA.

Future 2035 traffic volume forecasts will be utilized from the Eugene TSP and the Springfield TSP. It is assumed that no travel demand modeling will be required beyond the prior work completed for the TSPs. For study area intersections that are not included in the TSPs, volume plots and post processed 2035 No-Build traffic volumes from LCOG will be used.

Base year 2015 and future year 2035 traffic conditions could have the following data sources:

- Central Lane MPO Regional Transportation Plan
- LCOG's regional travel demand forecasting model
- LCOG's population and employment forecasts and census GIS data
- Population and employment projections from Envision Eugene
- TransPlan, adopted by City of Eugene, City of Springfield, and Lane County
- Analysis from Draft Eugene Transportation System Plan

3.3 Intersection Operations

The local traffic operations analysis will assess: changes to operations at study intersections during the peak period using levels of service (LOS A to F) and volume-to-capacity ratios (V/C); changes to general purpose traffic patterns and/or access. The traffic operations analysis will identify the impacts and benefits based on level of service, volume-to-capacity ratio, and average vehicle delay for various alternatives. The traffic operations analysis will use various tools as appropriate, including:

- 2010 Highway Capacity Manual: Unsignalized intersections
- 2000 Highway Capacity Manual: Signalized intersections
- Operational analysis of signalized and unsignalized intersections (non-roundabouts) using guidelines described in ODOT's Analysis Procedures Manual (APM)
- Compiling existing data about base year 2015 and future year 2035 traffic conditions

- Analyzing PM peak hour LOS, delay and V/C at selected intersections
- Additional p.m. peak hour (4-6 p.m.) turn movement counts will be performed at approximately 25 key intersections on the proposed corridors
- For cases in which the Consultant feel that the analysis results do not produce realistic or meaningful information, or that the confidence level in the tool is low, they will communicate their concerns to the project team and recommend a possible approach. The project team will reach consensus, and the consultant will document what approach was taken, why, and any caveats about the results produced.

3.4 Safety

Safety impacts will be further assessed. In addition to the crash analysis from the Level 1 Screening, the selected corridors will be analyzed for future safe designs by determining how the proposed bus alignment could affect motor vehicle, bicycle, and pedestrian safety along the project corridors. The Highway Safety Manual will be used where applicable to predict safety improvements or degradations based on preliminary alternatives.

3.5 Transit

Following are the methodologies that will be used to address affects that the alternatives would have on public transit:

- **Corridor Transit Service Characteristics** – Average weekday transit vehicle miles and hours traveled (an output of the regional travel demand forecasting model) will be calculated by bus and bus rapid transit (BRT). In addition, weekday revenue vehicle miles will be analyzed. This is what the model uses to calculate transit service and ridership for a typical weekday for the benchmark year 2035.
- **Transit Coverage.** A ½-mile buffer will be drawn around each transit line and that buffer will be applied to base year (2015) population and employment data in the project's GIS system to calculate actual and percentage transit coverage for all alternatives. The ½ mile buffer will be drawn based on roadway connectivity rather than distance as the crow flies. Streets cut off by a barrier, such as a river, freeway, or railroad tracks, will not be included unless they are within ½ mile via the existing roadway network connections
- **Transit and Passenger Vehicle Travel Times.** The regional travel demand forecasting model will be used to calculate select average weekday peak and off-peak travel times in minutes (total and in-vehicle) in the forecast year between approximately three to six origins and destinations (yet-to-be-determined). Level of service may be determined by looking at service headways for peak and off peak periods and multiplying the number of trips by the revenue cycle time, based on projected operating speeds.

- **Reliability.** The reliability of the alternatives will be assessed by calculating the length and percentage of the trunk line route that will be within a separated right-of-way and the number and percentage of intersections that will receive transit priority treatment.

- **Ridership.** Transit ridership will be assessed by calculating average weekday system wide person trips (linked trips) and corridor and trunk line boardings (unlinked trips) as output from the regional travel demand forecasting model and percent change from the No-Build Alternative.

- **Comfort.** The analysis of comfort will qualitatively address the following areas: ride quality and exposure at access/transfer points.

- **Work/Non-Work Transit Trips and Transit Mode Share.** The analysis of work/non-work transit trips and transit mode share will use regional travel demand forecast model output to calculate average weekday person trips in the corridor that are work and non-work related and as a percentage of all work and non-work trips.

- **Transit Signal Priority.** The amount of traffic signal green time needed to accommodate a single transit vehicle movement through an intersection will be determined (each direction if applicable) based on existing signal operations with these types of applications currently serving LTD or other comparable transit operators (e.g. TriMet). Transit service frequency will determine the number of transit vehicle events per hour per direction. This required green time per event, combined with the number of signal cycles per hour, will be used to calculate the total time to be allocated for transit vehicle service over the peak hour. In the Synchro operation models, this hourly transit vehicle service time will be added to the lost time at the impacted intersections to approximate the overall effect on intersection capacity over a peak hour. This methodology has been applied to past studies approved by the Federal Transit Administration (FTA).

3.6 Freight

Impacts to freight truck movement that would result from the alternatives will be assessed by examining the project's conceptual designs to determine:

- proposed changes in truck travel patterns and/or access to and from commercial and industrial centers; and
- the number and percentage of truck loading zones that would be displaced and/or moved.

Impacts to freight rail will be based on an assessment of whether and how the alternatives under study would:

- Result in new crossings of existing freight rail line;
- Close an existing freight rail line; or

- Result in any improvements to existing street crossings of existing freight rail lines.

No passenger rail lines would be affected (crossed) by any of the alternatives under consideration.

3.7 Pedestrian Facilities Network

City staff will provide a gap analysis of pedestrian facilities in each corridor. Pedestrian improvements will be proposed for both linear and corridor crossings based on the gap analysis. Additionally, pedestrian LOS will be determined using factors such as sidewalk width, lateral separation from vehicle traffic, and vehicle volumes and speed. Frequency of crossings and sidewalk connectivity will also be evaluated.

3.8 Bicycle Facilities Network

City staff will provide a gap analysis of bicycle facilities in each corridor. Bicycle improvements will be proposed for both linear and corridor crossings based on the gap analysis. Additionally, bicycle LOS will be determined using factors such as outside lane width, vehicle volume and speed, heavy truck volume, and pavement quality. Additionally, frequency of crossings and bike route connectivity will also be evaluated.

3.9 RTP Fiscally Constrained Roadway Projects

The RTP fiscally constrained roadway projects are projects that can be implemented using current and known revenue sources. RTP-funded projects that would result in capacity improvements along LTD project corridors will be considered in the evaluation process.

3.10 Range of Mitigation Measures

The range of mitigation measures to consider include changes to intersection geometry or lane widths, adding vehicle or bike lanes, traffic signal control, curb extensions, marked crosswalks, midblock pedestrian/bike crossing treatments, off-street pedestrian/bike facilities, parallel bike facilities in place of facilities along the arterial roadway, stormwater facilities or other traffic calming features, improving traffic signal timing, or enhancing sidewalk facilities.

3.11 Parking Occupancy

Parking occupancy for the corridors that have on-street parking will be collected on two different days at hourly intervals over a four-hour period that is tailored to the highest parking demand time for the particular corridors (i.e. evening in a residential corridor, during business hours in a commercial corridor).

4 NEPA Documentation

The NEPA documentation will include additional analysis needed for the NEPA process based on refined conceptual designs for each preferred corridor alternative advanced from the Level 2 Alternatives Analysis.

4.1 Parking Impacts

On- and off-street parking impacts will be evaluated. An assessment will be made of current inventories; the amount and percentage that would be displaced and/or moved; and general utilization rates. Where the removal of on-street parking is proposed, availability of nearby off-street parking spaces will be evaluated.

4.2 Access Impacts

Potential impacts to property access for each alternative will be assessed. The number and location of impacts, such as driveway relocations or closures, could be used as a basis for analysis of property access impacts.

4.3 Possible Mitigation Measures

The range of mitigation measures to consider include changes to intersection geometry or lane widths, adding vehicle or bike lanes, traffic signal control, curb extensions, marked crosswalks, midblock pedestrian/bike crossing treatments, off-street pedestrian/bike facilities, parallel bicycle facilities, stormwater facilities or other traffic calming features, improving traffic signal timing, or enhancing sidewalk facilities.

4.4 Corridor Analysis

The corridor analysis will include: vehicle queuing analysis at key locations, operations analysis of critical signalized intersections in the project area, and additional procedures outlined in the ODOT Analysis Procedures Manual.

- **Vehicle Queues.** Queuing is the process where a line of vehicles is waiting to be served by a signalized intersection. The speed of vehicles serviced within the queue is determined by the rate of flow at the front of the queue. The queue (or back up) of traffic can affect the design of facilities to properly account for this storage activity.

  The Poisson distribution model will be used to help estimate queuing impacts through random arrival. The Poisson model accounts for the non-uniformity of flow by assuming a random arrival rate for vehicles to a signalized intersection. This random arrival rate better estimates existing (or future) transportation conditions.

  If it is determined that queuing analysis is necessary, analysis tools could be used that will estimate the 95th percentile queue for each approach at signalized intersections under the Poisson distribution. This 95th percentile queue is representative of 95 percent of the peak fifteen-minute vehicular queues during the peak hour at that intersection**.**

  These queuing results do not take into account arrival of vehicles during the queue clearance, adjustments for over saturated conditions, and upstream metering. For the purpose of analysis, queuing estimates will be based on an average vehicle length

of 25 feet per vehicle. This length takes into account buffer space in front of and behind a queued vehicle.

- **Operations Analysis.** For traffic analysis, measures that could be looked at include delay, V/C, and LOS. See Section 9.0 for more details.

5 Relevant Laws and Regulations

This section summarizes the relevant laws and regulations that will affect the transportation analysis.

5.1 Public Transit

All transit facilities and vehicles will be designed to comply with Federal Americans with Disability Act requirements. All alternatives will be evaluated for conformance with appropriate sections of the LTD Long Range Transit Plan, Central Lane MPO Regional Transportation Plan and *TransPlan,* the Eugene-Springfield Transportation System Plan.

5.2 Regional and Local Traffic

The regional and local traffic analysis will comply with applicable roadway design and operating standards from the City of Eugene, City of Springfield, Lane County and the Oregon Department of Transportation (ODOT). In particular, Level of Service (LOS) standards of evaluation and impact will be used for facilities owned by the City of Eugene, City of Springfield, and Lane County and V/C standards of evaluation and impact will be used for ODOT-owned roadways.

Analysis of local traffic impacts will be guided by the policy direction established in the numerous transportation plans and policy documents adopted by jurisdictions within the Corridor. These include, but are not limited to:

- *Oregon Transportation Plan*, ODOT (Adopted September 20, 2006); *Oregon Highway Plan*, ODOT (1999, amended January 2006);
- Oregon Transportation Planning Rule (OAR Chapter 660, Division 12) with its provisions for bicycle parking and bicycle and pedestrian access to stations and performance standard guidance;
- OAR 734-020 and OAR 734-051 relating to traffic control and access spacing as required by the Oregon Highway Plan.
- 2007-2031 Regional Transportation Plan, LCOG, adopted December 8, 2011
- TransPlan, adopted by City of Eugene, City of Springfield, and Lane County in July 2002
- City of Springfield Transportation System Plan (2014)
- ODOT modal plans (e.g., freight route designations, freight rail lines)
- FRA documentation of existing freight rail lines (location, ownership, etc.) and street observations

5.3 Parking

All on-street parking facilities that would be changed or created by the alternatives would be designed to comply with the applicable design standards of the owner of the roadway. OAR 340.20.129(1)(c) and OAR 340.20.129(1)(e) related to the evaluation of park and ride lots as required by the Oregon Department of Environmental Quality (DEQ).

5.4 Truck Freight

All freight parking facilities that would be changed or created by the alternatives would be designed to comply with the applicable design standards of the owner of the roadway.

The ODOT Reduction of Vehicle Carrying Capacity (ORS 366.215) states that the Oregon Transportation Commission may not permanently reduce the vehicle-carrying capacity of an identified freight route. Street markings such as bike lane striping or on street parking are not considered a reduction of vehicle carrying capacity. If the project has the potential for a reduction of vehicle-carrying capacity, a stakeholder forum will be convened to review the project description and provide advice to ODOT, which will be taken into consideration. Two of the LTD Key Corridors could be impacted by this rule, as both the Randy Pape Beltline and OR99W have been identified as Reduction Review Routes under this ORS code.

5.5 Rail Freight

All proposed new crossings and proposed modifications or closures of existing crossings of existing freight rail lines would fall under the jurisdiction of the State of Oregon's Rail Division and the Federal Rail Authority. Further, all new, modified or closed crossings would require the approval of the owner and operator of the affected freight rail line.

5.6 Bicycle and Pedestrian

All bicycle and pedestrian facilities that would be changed or created by the alternatives would be designed to comply with the applicable design standards of the owner of the roadway. Oregon Transportation Planning Rule (OAR Chapter 660, Division 12) with its provisions for bicycle parking and bicycle and pedestrian access to stations and performance standard guidance would apply.

6 Contacts and Coordination

- Public Transit – LTD.
- Regional and Local Traffic – City of Eugene, City of Springfield, Lane County, ODOT.
- Parking – City of Eugene, City of Springfield, Lane County.
- Truck Freight – City of Eugene, City of Springfield, Lane County, ODOT.
- Freight Rail – ODOT and freight owner/operators
- Bicycle and pedestrian – City of Eugene, City of Springfield, Lane County, LCOG, ODOT.

7 Analysis Areas

The analysis areas for the transportation analyses includes: 1) the Eugene/Springfield metropolitan area (for the regional traffic analyses); 2) the LTD system (for the system-wide transit analyses); 3) the Level 2 AA corridors; and 4) the proposed new, closed or modified crossings of existing freight rail lines will be the analysis area for the freight rail assessment.

8 Data Sources and Collection Methods

The following data will be collected by the Consultant to facilitate the traffic analysis task:

- **Roadway Geometry Data** – The existing geometrics including number of lanes, roadway segment lengths, on-street parking locations, and transit facilities will be identified based on available operations models and verified with field observations.
- **Traffic Control Data** – Existing roadway and intersection control (posted speeds and signs) will be identified based on available operations models and verified with field observations. Current traffic signal timing and detection will be provided by ODOT and local jurisdictions.
- **Traffic Volume Data** – Available turning movement counts and vehicle classification counts will be provided by LCOG, ODOT, and other jurisdictions. Intersection count data will also include volumes for pedestrians, bicycles, transit and heavy vehicles. Peak hour turn movement counts from the Eugene TSP and the Springfield TSP will be used, and new counts will be ordered at other key intersections on the proposed corridors.
- **Travel Time Data** – Available TomTom and/or INRIX travel time data will be provided by ODOT to help identify current congestion/queue lengths and calibrate the operations model.
- **Queuing Data** – Peak hour queue lengths at select locations that could be identified based on existing traffic operations and field observations

8.1 Future Travel Demand Forecasting

Travel demand data will be based on regional travel demand forecasts to be prepared by LCOG. Data sources for the transportation analyses include:

- LCOG's regional travel demand forecasting model, calibrated to reflect current automated passenger count data and the 2007 on-board origin and destination survey data, both collected by LTD
- LCOG's population and employment forecasts and census GIS data
- Population and employment projections from Envision Eugene

9 Significance Thresholds

Level of service (LOS) and volume-to-capacity (V/C) ratios are commonly used thresholds

for intersection operation and are often incorporated into agency mobility standards.

- The intersection **level of service (LOS)** is similar to a "report card" rating based upon average vehicle delay. Level of service A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. Level of service D and E are progressively worse operating conditions. Level of service F represents conditions where average vehicle delay has become excessive and demand has exceeded capacity. This condition is typically evident in long queues and delays.
- The **volume-to-capacity (V/C) ratio** represents the level of saturation of the intersection or turning movement and is given as a numeric decimal. It is determined by dividing the peak hour traffic volume by the maximum hourly capacity of an intersection or turn movement. When the V/C ratio approaches 1.0, operations become unstable and small disruptions can cause the traffic flow to break down, as seen by the formation of excessive queues.

For local traffic analysis, the working standard for the threshold of significance is level of service for the City of Eugene and City of Springfield and volume-to-capacity for ODOT. All study intersections are located within the Eugene-Springfield Metropolitan Area. Some of the study area intersections are on Oregon Department of Transportation (ODOT) facilities classified as Statewide Highways (OR 99 and OR 126), and the remaining intersections are under City jurisdiction. According to the *1999 Oregon Highway Plan* (*OHP*), ODOT mobility standards are given as V/C ratios and are based on the highway category.[1] For the City of Eugene, all intersections outside the Central Area Transportation System (CATS) area must meet a Level of service D standard and all intersections inside the Central Area Transportation System (CATS) area must meet a Level of service E standard.

The standard for mitigation of a significant local traffic impact for City/County signalized intersections is to return the intersections to No-Build conditions or better based on LOS and for ODOT signalized intersections to return them to No-Build conditions or better based on V/C. Proposed permanent closure of an existing freight line would be considered a significant impact.

[1] 1999 Oregon Highway Plan, Oregon Department of Transportation, 1999; Table 6 in Policy 1F displays the maximum allowable V/C ratios for areas outside of the Portland Metropolitan Area.