MovingAhead

STREETS AND PLACES REIMAGINED

DRAFT FINAL Transportation Technical Report

Lane Transit District
City of Eugene

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

May 25, 2018

DRAFT FINAL Transportation Technical Report

MovingAhead Project

Prepared in accordance with the
National Environmental Policy Act of 1969, as amended 42 U.S.C. 4322
and the
Federal Transit Act of 1964, as amended 49 U.S.C. 1601 et seq.

May 25, 2018

Prepared for
Federal Transit Administration
Lane Transit District
City of Eugene

Prepared by
DKS Associates
CH2M HILL, Inc.

Americans with Disabilities Act (ADA) Information
If you would like copies of this document in an alternative format – large print, Braille, cassette tape, or on computer disc – or are deaf or hard of hearing, please contact
Sasha Luftig, Project Manager for the MovingAhead Project, at
(541) 682-6135 or (800) 735-2900 TTY or Sasha.Luftig@ltd.org.

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Sasha Luftig, Project Manager for the MovingAhead Project, at
(541) 682-6135 or Sasha.Luftig@ltd.org.

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Acronyms, Abbreviations, and Terms

Acronyms and Abbreviations	Definitions
AA	Alternatives Analysis
ADA	Americans with Disabilities Act
ATR	Automated Traffic Recording
BAT	business access and transit
BRT	bus rapid transit
CH2M	CH2M HILL, Inc.
DKS	DKS Associates
Draft Envision Eugene	*Draft Envision Eugene Community Vision* (Envision Eugene, 2016, July)
Draft Eugene 2035 TSP	*DRAFT Eugene 2035 Transportation System Plan* (City of Eugene, 2016a)
EB	Eastbound
EmX	Emerald Express, Lane Transit District's Bus Rapid Transit System
ESA	Endangered Species Act or Environmental Site Assessment
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FTN	Frequent Transit Network
HAWK	High-intensity Activated crosswalk
HOV	high-occupancy vehicle
I-5	Interstate 5
I-105	Interstate 105
LCC	Lane Community College
LCOG	Lane Council of Governments
LOS	level of service
LTD	Lane Transit District
Metro Plan	*Metro Plan, Eugene-Springfield Metropolitan Area General Plan* (LCOG et al., 1987, as updated on 2015, December 31)
MPO	Metropolitan Planning Organization
N	North
NB	Northbound
NEPA	National Environmental Policy Act
OAR	Oregon Administrative Rule
ODOT	Oregon Department of Transportation
ORS	Oregon Revised Statutes
ROW	right of way
RTP	*Central Lane Metropolitan Planning Organization Regional Transportation Plan* (LCOG, 2011, December)

Acronyms and Abbreviations	Definitions
S	South
SB	Southbound
sec	second(s)
TAZ	transportation analysis zone
TransPlan	*Eugene-Springfield Transportation System Plan* (City of Eugene et al., adopted in 2002, July)
TRB	Transportation Research Board
TSP	Transportation System Plan
UGB	Urban Growth Boundary
USDOT	U.S. Department of Transportation
v/c	volume-to-capacity
VHT	vehicle hours traveled
VMT	vehicle miles traveled
WB	Westbound
WEEE	West Eugene EmX Extension

Terms	Definitions
Accessibility	The extent to which facilities are barrier free and useable for all persons with or without disabilities.
Alignment	Alignment is the street or corridor that the transit project would be located within.
Alternatives Analysis	The process of evaluating the costs, benefits, and impacts of a range of transportation alternatives designed to address mobility problems and other locally-defined objectives in a defined transportation corridor, and for determining which particular investment strategy should be advanced for more focused study and development. The Alternatives Analysis (AA) process and report provides a foundation for effective decision making.
Base Period	The period between the morning and evening peak periods when transit service is generally scheduled on a constant interval. Also known as "off-peak period."
Business Access and Transit Lane (BAT)	In general, a BAT lane is a concrete lane, separated from general-purpose lanes by a paint stripe and signage. A BAT lane provides BRT priority operations, but general-purpose traffic is allowed to travel within the lane to make a turn into or out of a driveway or at an intersecting street. However, only the BRT vehicle is allowed to use the lane to cross an intersecting street.
Boarding	Boarding is a term used in transit to account for passengers of public transit systems. One person getting on a transit vehicle equals one boarding. In many cases individuals will have to transfer to an additional transit vehicle to reach their destination and may well use transit for the return trip. Therefore, a single rider may account for several transit boardings in one day.

Terms	Definitions
Bus Rapid Transit (BRT)	A transit mode that combines the quality of rail transit and the flexibility of buses. It can operate on bus lanes, high-occupancy vehicle (HOV) lanes, expressways, or ordinary streets. The vehicles are designed to allow rapid passenger loading and unloading, with more doors than ordinary buses.
Busway	Exclusive freeway lane for buses and carpools.
Capital Improvements Program	A Capital Improvement Plan or Program (CIP) is a short-range plan, usually 4 to 10 years, which identifies capital projects and equipment purchases, provides a planning schedule, and identifies options for funding projects in the program.
Categorical Exclusion	A Categorical Exclusion (CE) means a category of actions which do not individually or cumulatively have a significant effect on the human environment and for which, therefore, neither an environmental assessment nor an environmental impact statement is required.
Collector Streets	Collector streets provide a balance of both access and circulation within and between residential and commercial/industrial areas. Collectors differ from arterials in that they provide more of a citywide circulation function, do not require as extensive control of access and are located in residential neighborhoods, distributing trips from the neighborhood and local street system.
Corridor	A broad geographical band that follows a general directional flow connecting major sources of trips that may contain a number of streets, highways and transit route alignments.
Demand Responsive	Non-fixed-route service utilizing vans or buses with passengers boarding and alighting at pre-arranged times at any location within the system's service area. Also called "Dial-a-Ride."
Documented Categorical Exclusion (DCE)	A Documented Categorical Exclusion (DCE) means a group of actions that may also qualify as CEs if it can be demonstrated that the context in which the action is taken warrants a CE exclusion; i.e., that no significant environmental impact will occur. Thus, these actions are referred to as Documented Categorical Exclusions. Such actions require some NEPA documentation, but not an Environmental Assessment or a full-scale Environmental Impact Statement. DCEs documentation must demonstrate that in the context(s) in which these actions are to be performed, they will have no significant environmental impact or that such impacts will be mitigated.
Effects	Effects include ecological, aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial. Effects include: (1) direct effects that are caused by the action and occur at the same time and place, and (2) indirect effects that are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use; population density or growth rate; and related effects on air and water and other natural systems, including ecosystems (40 CFR 1508.8).
EmX	Lane Transit District's Bus Rapid Transit System, pronounced "MX," short for Emerald Express.

Terms	Definitions
Envision Eugene	The City of Eugene's Community Vision (latest draft or as adopted). Envision Eugene includes a determination of the best way to accommodate the community's projected needs over the next 20 years.
Environmental Justice	A formal federal policy on environmental justice was established in February 1994, with Executive Order 12898 (EO 12898), "Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations." There are three fundamental environmental justice principles: To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations. To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process. To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.
Evaluation Criteria	Evaluation criteria are the factors used to determine how well each of the proposed multimodal alternatives would meet the project's Goals and Objectives. The Evaluation Criteria require a mix of quantitative data and qualitative assessment. The resulting data are used to measure the effectiveness of proposed multimodal alternatives and to assist in comparing and contrasting each of the alternatives to select a preferred alternative.
Exclusive Right of Way	A roadway or other facility that can only be used by buses or other transit vehicles.
Fatal Flaw Screening	The purpose of a Fatal Flaw Screening is to identify alternatives that will not work for one reason or another (e.g., environmental, economic, community) By using a Fatal Flaw Screening process to eliminate alternatives that are not likely to be viable, a project can avoid wasting time or money studying options that are not viable and focus on alternatives and solutions that have the greatest probably of meeting the community's needs (e.g., environmentally acceptable, economically efficient, implementable).
Fixed Route	Service provided on a repetitive, fixed-schedule basis along a specific route with vehicles stopping to pick up and deliver passengers at set stops and stations; each fixed-route trip serves the same origins and destinations, unlike demand responsive and taxicabs.
Geographic Information System (GIS)	Data management software tool that enables data to be displayed geographically (i.e., as maps).
Goals and Objectives	Goals and objectives define the project's desired outcome and reflect community values. Goals and objectives build from the project's Purpose and Need Statement. Goals are overarching principles that guide decision making. Goals are broad statements. Objectives define strategies or implementation steps to attain the goals. Unlike goals, objectives are specific and measurable.
Guideway	A transit right of way separated from general purpose vehicles.
Headway	Time interval between vehicles passing the same point while moving in the same direction on a particular route.

Terms	Definitions
Hydrology	Refers to the flow of water including its volume, where it drains, and how quickly it flows.
Impacts	A term to describe the positive or negative effects upon the natural or built environments as a result of an action (i.e., project).
Key Transit Corridors	Key Transit Corridors are mapped in Envision Eugene and are anticipated to be significant transit corridors for the City and the region.
Level of Service (LOS)	Level of service (LOS) is a measure used by traffic engineers to determine the effectiveness of elements of transportation infrastructure. LOS is most commonly used to analyze highways, but the concept has also been applied to intersections, transit, and water supply.
Light Rail Transit (LRT)	Steel wheel/steel rail transit constructed on city streets, semi-private right of way, or exclusive private right of way. Formerly known as "streetcar" or "trolley car" service, LRT's major advantage is operation in mixed street traffic at grade. LRT vehicles can be coupled into trains, which require only one operator and often are used to provide express service.
linked trip	A linked trip is a one-way trip taken by a person from an origin to a destination, independent of the number of vehicles or transfers used to complete the trip.
Local Streets	Local streets have the sole function of providing direct access to adjacent land. Local streets are deliberately designed to discourage through traffic movements.
Maintenance facility	A facility along a corridor used to clean, inspect, repair and maintain bus vehicles, as well as to store them when they are not in use.
Major Arterial	Major arterial streets should serve to interconnect the roadway system of a city. These streets link major commercial, residential, industrial, and institutional areas. Major arterial streets are typically spaced about one mile apart to assure accessibility and reduce the incidence of traffic using collectors or local streets for through traffic in lieu of a well-placed arterial street. Access control, such as raised center medians, is a key feature of an arterial route. Arterials are typically multiple miles in length.
Metropolitan Planning Organization (MPO)	The organization designated by local elected officials as being responsible for carrying out the urban transportation and other planning processes for an area.
Minimum Operable Segment	A stand-alone portion of the alternative alignment that has independent utility, allowed by FTA to be considered as interim termini for a project. A minimum operable segment (MOS) provides flexibility to initiate a project with available funding while pursuing additional funding to complete the remainder of the project.
Minor Arterial	Minor arterial street system should interconnect with and augment the urban major arterial system and provide service to trips of moderate length at a somewhat lower level of travel mobility than major arterials. This system also distributes travel to geographic areas smaller than those identified with the higher system. The minor arterial street system includes facilities that allow more access and offer a lower traffic mobility. Such facilities may carry local bus routes and provide for community trips, but ideally should not be located through residential neighborhoods.
Mitigation	A means to avoid, minimize, rectify, or reduce an impact, and in some cases, to compensate for an impact.

Terms	Definitions
Mode	A particular form or method of travel distinguished by vehicle type, operation technology, and right of way separation from other traffic.
Modal Split	A term which describes how many people use different forms of transportation. Frequently used to describe the percentage of people using private automobiles as opposed to the percentage using public transportation, walking, or biking. Modal split can also be used to describe travelers using other modes of transportation. In freight transportation, modal split may be measured in mass.
MovingAhead Project	The City of Eugene and LTD are working with regional partners and the community to determine which improvements are needed on some of our most important transportation corridors for people using transit, and facilities for people walking and biking. MovingAhead will prioritize transit, walking and biking projects along these corridors so that they can be funded and built in the near-term. The project will focus on creating active, vibrant places that serve the community and accommodate future growth. During Phase 1, currently underway, the community will weigh in on preferred transportation solutions for each corridor and help prioritize corridors for implementation. When thinking about these important streets, LTD and the City of Eugene refer to them as corridors because several streets may work as a system to serve transportation needs.
Multimodal	Multimodal refers to various modes. For the MovingAhead project, multimodal refers to Corridors that support various transportation modes including vehicles, buses, walking and cycling.
National Environmental Policy Act of 1969 (NEPA)	A comprehensive federal law requiring analysis of the environmental impacts of federal actions such as the approval of grants; also requiring preparation of an Environmental Impact Statement (EIS) for every major federal action significantly affecting the quality of the human environment.
New Starts	Federal funding granted under Section 3(i) of the Federal Transit Act. These discretionary funds are made available for construction of a new fixed guideway system or extension of any existing fixed guideway system, based on cost-effectiveness, alternatives analysis results, and the degree of local financial commitment.
No Action or No-Build Alternative	An alternative that is used as the basis to measure the impacts and benefits of the other alternative(s) in an environmental assessment or other National Environmental Policy Act (NEPA) action. The No-Build alternative consists of the existing conditions, plus any improvements which have been identified in the Statewide Transportation Improvement Program (STIP).
Off-Peak Period	Non-rush periods of the day when travel activity is generally lower and less transit service is scheduled. Also called "base period."
Park and Ride	Designated parking areas for automobile drivers who then board transit vehicles from these locations.
Peak Hour	The hour of the day in which the maximum demand for transportation service is experienced (refers to private automobiles and transit vehicles).
Peak Period	Morning and afternoon time periods when transit riding is heaviest.

Terms	Definitions
Place-miles	Place-miles refers to the total carrying capacity (seated and standing) of each bus and is calculated by multiplying vehicle capacity of each bus by the number of service miles traveled each day. Place-miles highlight differences among alternatives caused by a different mix of vehicles and levels of service.
Preferred Alternative	An alternative that includes a major capital improvement project to address the problem under investigation. As part of the decision making process, the Preferred Alternative is compared against the No Action or No-Build Alternative from the standpoints of transportation performance, environmental consequences, cost-effectiveness, and funding considerations. Also referred to as a Locally Preferred Alternative (LPA).
Purpose and Need	The project Purpose and Need provides a framework for developing and screening alternatives. The purpose is a broad statement of the project's transportation objectives. The need is a detailed explanation of existing conditions that need to be changed or problems that need to be fixed.
Ridership	The number of people using a public transportation system in a given time period.
Right of Way	Publicly owned land that can be acquired and used for transportation purposes.
Scoping	A formal coordination process used to determine the scope of the project and the major issues likely to be related to the proposed action (i.e., project).
Screening Criteria	Criteria used to compare alternatives.
Sharrow	A shared-lane marking placed in a travel lane indicating where bicyclists should cycle.
Study Area	The area within which evaluation of impacts is conducted. The study area for particular resources will vary based on the decisions being made and the type of resource(s) being evaluated.
Title VI	This title declares it to be the policy of the United States that discrimination on the ground of race, color, or national origin shall not occur in connection with programs and activities receiving Federal financial assistance and authorizes and directs the appropriate Federal departments and agencies to take action to carry out this policy.
Throughput	The number of users being served at any time by the transportation system.
Transit System	An organization (public or private) providing local or regional multi-occupancy-vehicle passenger service. Organizations that provide service under contract to another agency are generally not counted as separate systems.
Transitway	A BRT priority lane generally with a concrete lane, with or without concrete tracks with grass-strip divider, and a curb separation, traversable by general-purpose vehicles at signalized intersections.
v/c ratio	Used as a principal measure of congestion. The "V" represents the volume or the number of vehicles that are using the roadway at any particular period. The "C" represents the capacity of a roadway at its adopted LOS. If the volume exceeds the capacity of the roadway (volume divided by capacity exceeds 1.00), congestion exists.
Water Quality	Refers to the characteristics of the water, such as its temperature and oxygen levels, how clear it is, and whether it contains pollutants.

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Transportation Summary

This Transportation Technical Report presents the results of transportation analyses conducted for the Lane Transit District (LTD) and City of Eugene's MovingAhead Project in Eugene, Oregon. The purpose of the MovingAhead Project is to determine which high-capacity transit corridors identified in the adopted Emerald Express (EmX) System Plan, *Lane Transit District Long-Range Transit Plan* (LTD, 2014) and the Frequent Transit Network (FTN) are ready to advance to capital improvements programming in the near term. LTD and the City of Eugene (City) initiated the MovingAhead Project in 2014 to identify and examine alternatives for improving multimodal safety, mobility, and accessibility in key transit corridors in the City. A main theme of the City's vision is to concentrate new growth along and near the City's key transit corridors and core commercial areas while protecting neighborhoods and increasing access to services for everyone. LTD and the City are jointly conducting the project to facilitate a more streamlined and cost-efficient process through concurrent planning, environmental review, and design and construction of multiple corridors.

LTD and the City of Eugene examined multimodal transit alternatives in five key transit corridors identified in the *Draft Envision Eugene Comprehensive Plan* (Envision Eugene, 2016, July) and the *DRAFT Eugene 2035 Transportation System Plan* (City of Eugene, 2016a; Draft Eugene 2035 TSP), the region's highest growth centers, and downtown Eugene:

- Highway 99 Corridor
- River Road Corridor
- 30th Avenue to Lane Community College (LCC) Corridor
- Coburg Road Corridor
- Martin Luther King, Jr. Boulevard Corridor

No-Build, Enhanced Corridor, and EmX Alternatives were developed for each corridor, except the Martin Luther King, Jr. Boulevard Corridor, for which only No-Build and Enhanced Corridor Alternatives were developed. Each proposed corridor location is shown on Figures S.1-1 and S.1-2 for the Enhanced Corridor Alternatives and the EmX Alternatives, respectively. The *MovingAhead Level 2 Definition of Alternatives* (CH2M HILL, Inc. [CH2M] et al., 2016a) contains a detailed description of the project alternatives. The following is a summary of the project alternatives evaluated.

- The **No-Build Alternatives** serve as a reference point to gauge the benefits, costs, and effects of the Enhanced Corridor and EmX Alternatives in each corridor. Each No-Build Alternative is based on the projected conditions in 2035. Capital projects are derived from the financially constrained project lists in the Draft Eugene 2035 TSP, the *Lane County Transportation System Plan* (Lane County Public Works, Engineering Division Transportation Planning, 2004, June 4, update in progress), the *Lane Transit District Capital Improvement Plan* (LTD, 2015, Amended 2015, June), and the *Lane Transit District Long-Range Transit Plan* (LTD, 2014).
- **Enhanced Corridor Alternatives** are intended to address the project's Purpose, Need, Goals, and Objectives without major transit capital investments, instead focusing on lower-cost capital improvements, operational improvements, and transit service refinements, including 15-minute service frequency. Features can include transit queue jumps (lanes for buses that allow the bus to "jump" ahead of other traffic at intersections using a separate signal phase), stop consolidation, and enhanced shelters. These features can improve reliability, reduce transit travel time, and increase passenger comfort, making transit service along the corridor more attractive.

Figure S.1-1. Enhanced Corridor Alternatives Overview

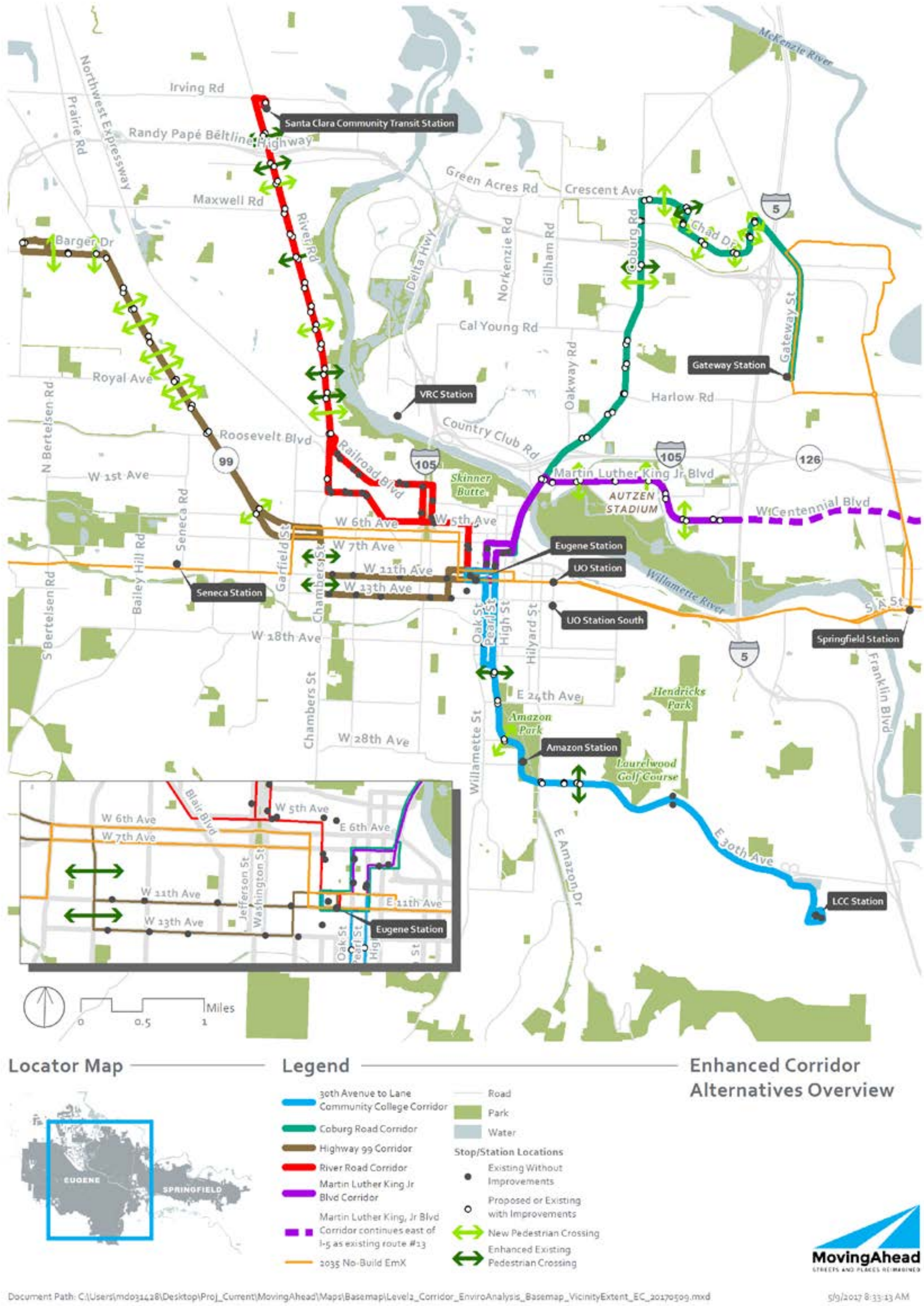
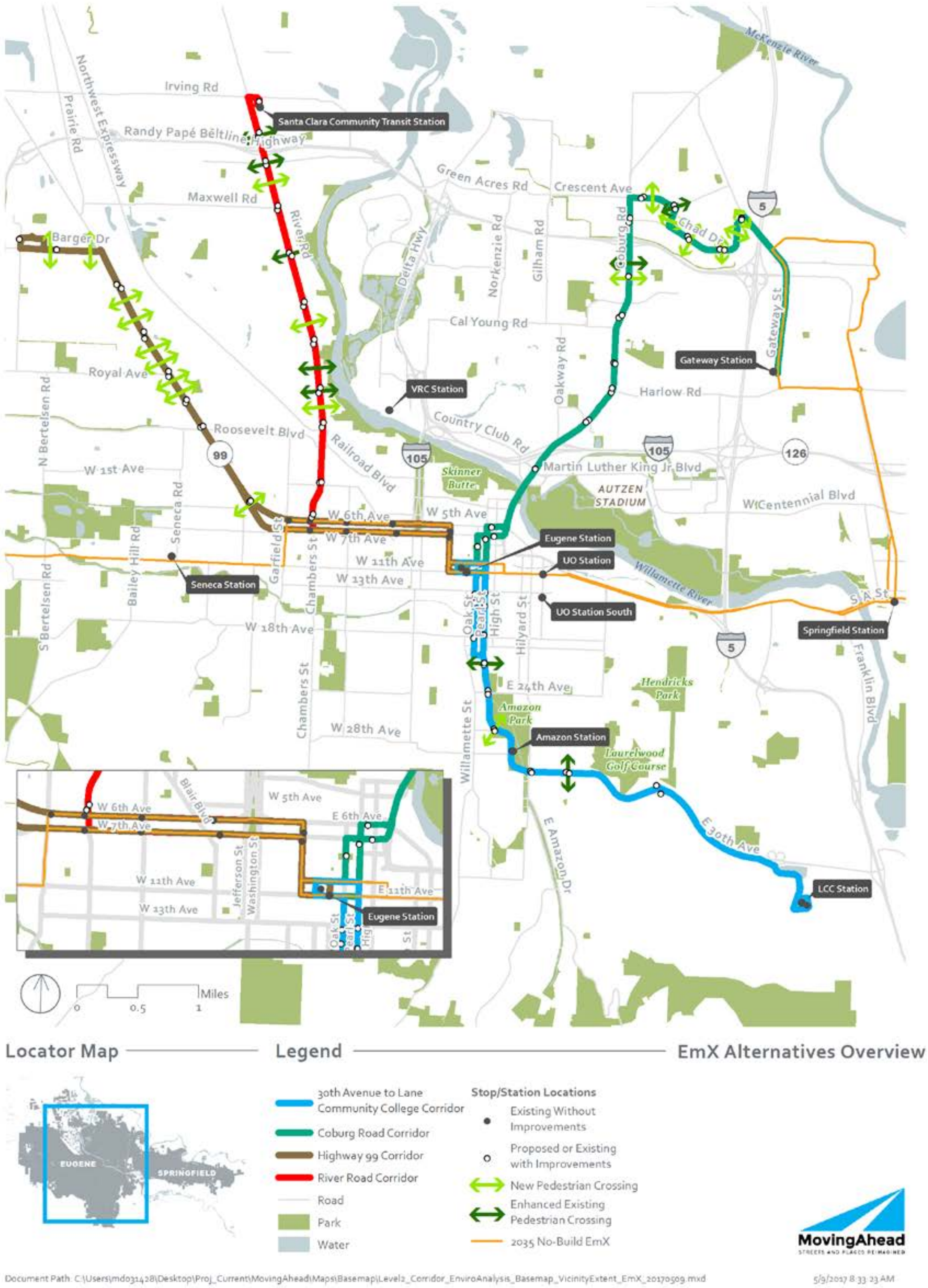


Figure S.1-2. EmX Alternatives Overview



- **EmX Alternatives** are characterized by sections of exclusive guideway, branded multi-door 60-foot-long bus rapid transit (BRT) vehicles, and enhanced stations with level boarding platforms instead of bus stops; off-board fare collection; transit signal priority; wider stop spacing; and 10-minute service frequencies. In general, EmX is a transit mode positioned between fixed-route bus service operating in mixed traffic and urban-rail service operating in a separate right of way. EmX service is intended to improve transit speed, reliability, and ridership.

Figure S.1-1 shows the proposed corridors for the Enhanced Corridor Alternatives and Figure S.1-2 shows the proposed corridors for the EmX Alternatives.

This report was prepared in compliance with the National Environmental Policy Act (NEPA), applicable state environmental policy legislation, as well as local and state planning and land use policies and design standards.

This report summarizes the findings of the multimodal transportation analysis related to the five study corridors: Highway 99, River Road, 30th Avenue to LCC, Coburg Road, and Martin Luther King, Jr. Boulevard. The No-Build, Enhanced Corridor, and EmX (BRT) Alternatives were evaluated to identify potential benefits and impacts related to the transportation system. The analysis was based on forecasted future conditions for the year 2035. The transportation analysis for the MovingAhead Project focused on several main issues, including:

- Motor Vehicle Operations
    - Local intersection motor vehicle operations
    - Planned roadway projects and connectivity to corridor projects
    - Impacts to motor vehicle circulation
    - Potential freight impacts
    - Potential mitigation measures
- Other Direct Impacts
    - On-street parking, off-street parking, and access impacts
    - Emergency vehicle flow impacts
- Pedestrian and Bicycle Evaluation
    - Existing pedestrian and bicycle conditions
    - Planned pedestrian and bicycle projects and connectivity to corridor projects
- Safety
    - Impacts for motor vehicles, bicycles, and pedestrians
    - Annualized impacts and costs associated with changes in safety, used to calculate total environmental benefit of the projects
- Transit
    - **Corridor transit service characteristics** – the amount of transit service provided in each corridor, measured by daily vehicle hours traveled, daily vehicle miles traveled, and daily place-miles of service. Place-miles refers to the total carrying capacity (seated and standing) of each bus and is calculated by multiplying vehicle capacity of each bus by the number of service miles traveled each day. Place-miles highlight differences among alternatives caused by a different mix of vehicles and levels of service
    - **Transit travel times** – In-vehicle travel time is the amount of time it takes for a transit vehicle to travel between an origin and destination; in-vehicle plus walk and wait travel time includes time spent walking to transit, initial wait time, transfer wait time (if any), in-vehicle travel time, and time walking from transit to the destination

- **Transit reliability** – the total number of new round-trip miles and the total number of exclusive/priority miles
    - **Transit ridership** – includes systemwide transit ridership, corridor ridership, and transit boardings
    - **Transit priority at traffic signals** – includes exclusive bus phases, queue jump phases, and transit signal priority (extending/truncating green phases)
- Indirect and Cumulative Effects
- Short-Term Construction Related Impacts

This report also addresses the alternatives' ability to support the City of Eugene and LTD transportation policies, particularly the ability to attract riders to transit services and away from single occupant vehicles (i.e., a reduction in regional vehicle miles traveled), as well as improving multi-modal options, safety, and livability in the region.

S.1. Affected Environment

The project's five corridors are primarily located within the City of Eugene, with a portion of the River Road Corridor and 30th Avenue to LCC Corridor located within unincorporated Lane County, and a portion of the Coburg Road Corridor located in the City of Springfield.

The goals and policies of the *Central Lane Metropolitan Planning Organization Regional Transportation Plan* (Lane Council of Governments [LCOG], 2011, December; RTP), Eugene-Springfield Metropolitan Area General Plan (LCOG et al., 1987, as updated on 2015, December 31; Metro Plan), the Draft Eugene 2035 TSP, and the Draft Envision Eugene identify the need to implement improved transportation systems. Transportation system improvements consistent with these plans include public transit, pedestrian, and bicycle improvements.

The 2035 transportation analysis was based on a future roadway network that included expected transportation improvements identified in the Draft Eugene 2035 TSP. The five primary goals of the Draft Eugene 2035 TSP are:

1. Create an integrated transportation system that is safe and efficient, supports the Metro Plan land use diagram, *Envision Eugene: A Community Vision for 2032* (Envision Eugene, 2012, March), the City of Eugene target for a 50-percent reduction in fossil fuel consumption, and other City of Eugene land use and economic development goals to reduce reliance on single-occupancy automobiles, and enhance livability

2. Advance regional sustainability by providing a transportation system that improves economic vitality, environmental health, social equity, and overall well-being

3. Strengthen community resilience to changes in climate, increases in fossil fuel prices, and economic fluctuations by making the transportation networks diverse, adaptable, and not reliant on any single mode

4. Address the transportation needs and safety of all travelers, including people of all ages, abilities, races, ethnicities, and incomes. Through transportation investments, respond to the needs of system users, be context sensitive, and distribute the benefits and impacts of transportation decisions fairly throughout the City of Eugene

5. By 2035, triple the percentage of trips made on foot, by bicycle, and by transit from 2014 levels

S.2. Environmental Consequences

The construction and operation of a transit system can have both beneficial and adverse effects on the transportation network. For each study corridor, the Enhanced Corridor and EmX Alternatives would result in increased transit ridership, with the exception of the 30th Avenue to LCC Corridor Enhanced Corridor Alternative, as shown in Table S.3-1 and Table S.3-2.

Table S.3-2 shows total EmX and Corridor boardings by alternative. The corridor boardings in the No Build reflect routes that were modified or replaced with the implementation of the project and the corridor boardings for the alternatives reflect the project route and any other new routes that would have been implemented as part of the project. For example, in the River Road Corridor Alternative, the No Build includes routes 51 and 52 which both extend north of Santa Clara Community Transit Center. In the Enhanced Corridor and EmX Alternatives, the build project routes extend to Santa Clara Community Transit Center and the area to the north of the corridor terminus is served by a new route that passengers are able to transfer to at the transit center. These boarding numbers include initial and transfer boardings. They cannot be directly used to measure ridership, which may in fact be lower even though boardings are higher, if the transit system in the alternative has created more transfers that make a trip more onerous for a passenger. Or the reverse may be true with an alternative showing higher ridership even though boardings are lower because we've removed a transfer for passengers. In the example of the Martin Luther King Jr. Blvd Alternative, we see lower boardings because we've actually provided better service in the corridor that removes the need for passengers to transfer on some trips. Even though boardings decrease, we see an increase in total transit riders in the system compared to the No Build Alternative.

For all build alternatives, annual transit vehicle miles traveled and transit vehicle capacity (place-miles) increase compared to the No-Build Alternative, with the exception of the 30th Avenue to LCC Corridor Enhanced Corridor Alternative, as shown in Table S.3-3.

For all build alternatives, in-vehicle transit travel time during the a.m. peak hour between the corridor terminus and Eugene Station decreases, as shown in Table S.3-4. In addition, the in-vehicle plus walk and wait times decrease for all alternatives except the 30th Avenue to LCC Corridor Enhanced Corridor Alternative. This metric includes travel time spent in the transit vehicle as well as walk time and one-half the wait time. One-half of the frequency for wait time is used because this is how the travel demand model treats the way passengers perceive waiting. While some people arrive right on time for a vehicle, others do not, so half the wait time is meant to be a reasonable approximation of an average wait time for passengers in the model. Part of the reason for the travel time reductions, compared to the No-Build Alternative, is due to the addition of exclusive/priority lanes for transit vehicles. The total length of new exclusive/priority lanes is shown in Table S.3-5. The only alternative not adding any exclusive transit lanes is the 30th Avenue to LCC Corridor Enhanced Corridor Alternative.

Table S.3-1. Average Weekday 2035 Systemwide Ridership by Alternative

Measure	Highway 99 Corridor[b]			River Road Corridor[c]			30th Avenue to LCC Corridor			Coburg Road Corridor			MLK, Jr. Boulevard Corridor	
	No-Build	EC	EmX	No-Build	EC	EmX	No-Build	EC	EmX	No-Build	EC	EmX	No-Build	EC
Total Systemwide Transit Trips[a]	46,410	46,780	47,300	46,410	46,520	47,230	46,410	46,310	47,070	46,410	46,620	47,270	46,410	47,030
Delta from No-Build		370	890		110	820		-100	660		210	860		620
% Change from No-Build		0.8%	1.9%		0.2%	1.8%		-0.2%	1.4%		0.5%	1.9%		1.3%

EC = Enhanced Corridor
LCC = Lane Community College
MLK = Martin Luther King
TAZ = transportation analysis zone

[a] Systemwide transit trips are defined as one-way linked trips taken by a person from the trip's origin to the trip's destination, independent of the number of vehicles or transfers used to complete the trip.

[b] Highway 99 Corridor Enhanced Corridor and EmX Alternatives have different corridors because the routing in downtown is different - the Highway 99 Corridor Enhanced Corridor Alternative extends south to 11th/13th Avenues and captures more TAZs.

[c] While the River Road Corridor Enhanced Corridor and EmX Alternatives have different alignments Downtown, the alignments are close enough together that the alternatives have the same buffer zones and TAZs.

Table S.3-2. Average Weekday 2035 System EmX and Corridor Boardings by Alternative

Measure	Highway 99 Corridor			River Road Corridor			30th Avenue to LCC Corridor			Coburg Road Corridor			MLK, Jr. Boulevard Corridor	
	No-Build	EC	EmX	No-Build	EC	EmX	No-Build	EC	EmX	No-Build	EC	EmX	No-Build	EC
Non-Project Total EmX Service	24,500	24,150	24,000	24,500	24,500	24,350	24,500	24,450	24,800	24,500	24,050	24,550	24,500	24,300
Delta from No-Build		-350	-500		0	-150		-50	300		-450	50		-200
Corridor Total	2,650	3,450	4,900	5,350	5,400	7,100	3,300	3,200	4,700	7,200	8,300	9,300	1,950	3,350
Delta from No-Build		800	2,250		50	1,700		-100	1,400		1,100	2,100		1,400
Total	27,150	27,600	28,900	29,850	29,900	31,450	27,800	27,650	29,500	31,700	32,350	33,850	26,450	27,650
Delta from No-Build		450	1,750		50	1,550		-150	1,700		650	2,150		1,200

Source: LCOG Regional Travel Demand Model Results (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

Note: For Enhanced Corridor Alternative, numbers represent EmX and Enhanced Corridor daily boardings combined.

EC = Enhanced Corridor
MLK = Martin Luther King

Table S.3-3. 2035 Systemwide Transit Service Characteristics by Alternative

Measure	Highway 99 Corridor			River Road Corridor			30th Avenue to LCC Corridor			Coburg Road Corridor			MLK, Jr. Boulevard Corridor	
	No-Build	EC	EmX	No-Build	EC	EmX	No-Build	EC	EmX	No-Build	EC	EmX	No-Build	EC
Annual EmX and Fixed Route Transit VHT[a]	278,600	277,500	292,500	278,600	277,500	285,600	278,600	277,500	282,000	278,600	274,100	282,900	278,600	285,800
Annual Transit VMT[b]	4,520,200	4,600,800	4,864,800	4,520,200	4,547,400	4,744,400	4,520,200	4,565,400	4,674,100	4,520,200	4,487,800	4,633,400	4,520,200	4,653,000
Average Weekday Transit Place - Miles[c]	37,500	78,340	142,390	104,320	138,130	192,720	57,880	69,350	104,020	160,540	177,080	223,480	26,770	80,200

Source: LCOG Regional Travel Demand Model Results. (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

EC = Enhanced Corridor
MLK = Martin Luther King

[a] VHT = Vehicle hours traveled in revenue service.
[b] VMT = Vehicle miles traveled in revenue service.
[c] Place-Miles = Transit Vehicle Capacity (seated and standing) multiplied by VMT. (Place-miles refers to the total carrying capacity (seated and standing) of each bus and is calculated by multiplying vehicle capacity of each bus by the number of service miles traveled each day. Place-miles highlight differences among alternatives caused by a different mix of vehicles and levels of service.)

Table S.3-4. 2035 Systemwide Transit Travel Times (a.m. Peak Hour) by Alternative

	Highway 99 Corridor (From Cubit/Barger)			River Road Corridor (From Santa Clara Transit Center)			30th Avenue to LCC Corridor (From Lane Community College)			Coburg Road Corridor (From Coburg Rd/Crescent Ave)			MLK, Jr. Boulevard Corridor (From Kinsrow/Commons)	
Measure	**No-Build**	**EC**	**EmX**	**No-Build**	**EC**	**EmX**	**No-Build**	**EC**	**EmX**	**No-Build**	**EC**	**EmX**	**No-Build**	**EC**
In-vehicle Travel Time to Eugene Station[a]	29	19	17	26	21	18	17	16	15	18	13	13	13	11
In-vehicle Plus Walk and Wait[b]	40	29	25	45	34	27	26	27	24	29	24	21	31	24

Source: LCOG Regional Travel Demand Model Results (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

EC = Enhanced Corridor
MLK = Martin Luther King

[a] In-vehicle one-way transit travel times represent time spent in the transit vehicle
[b] In-vehicle plus walk and wait travel time represents walk time, one-half the wait time, and in-vehicle time in minutes.

Table S.3-5. 2035 Systemwide Average Weekday Transit Reliability Measures by Alternative

Measure	Highway 99 Corridor			River Road Corridor			30th Avenue to LCC Corridor			Coburg Road Corridor			MLK, Jr. Boulevard Corridor
	EC	EmX	Delta between EmX and Enhanced Corridor	EC	EmX	Delta between EmX and Enhanced Corridor	EC	EmX	Delta between EmX and Enhanced Corridor	EC	EmX	Delta between EmX and Enhanced Corridor	EC
Total Number of New Round-Trip EmX System Miles (Miles)	0	10.5	10.5	0	10.3	10.3	0	10.2	10.2	0	13.2	13.2	0
Total Length of New Corridor Exclusive/Priority Lanes[a] (miles)	0.4	2.30	1.9	0.29	5.99	5.7	0	1.37	1.37	0.49	2.20	1.71	2.41
Percent of New Corridor that is Exclusive/Priority Lanes[a]	3.6%	21.9%	18.1%	2.8%	58.2%	55.3%	0%	13.4%	13.4%	3.7%	16.7%	13.0%	25.1%

Source: *MovingAhead Level 2 Definition of Alternatives*. (CH2M et. al., 2016a).

EC = Enhanced Corridor
MLK = Martin Luther King

[a] Exclusive/priority lanes are defined as the round-trip miles of business access and transit lanes, bus-only lanes, and queue jumps.

S.2.1. Highway 99 Corridor

S.2.1.1. No-Build Alternative

The Highway 99 Corridor No-Build Alternative would have no impacts or benefits to pedestrians, bicycles, transit, safety, or traffic operations. There would be limited potential for mode shifts away from motor vehicle travel to transit and limited potential to support locally adopted transportation policies.

S.2.1.2. Enhanced Corridor Alternative

The Highway 99 Corridor Enhanced Corridor Alternative would install 6,650 feet (1.26 miles) of new or improved sidewalks on the 11.1-mile corridor, a new pedestrian bridge over the railroad tracks adjacent to Highway 99, 10 enhanced pedestrian/bike crossings (flashing beacon, pedestrian hybrid beacon, or full traffic signal with pedestrian crossings), and two new upgraded pedestrian/bike crossings (ADA ramps and possibly median refuge islands and/or crosswalk striping). There would be proposed bus phases at four intersections and transit signal priority at all signals on the corridor. There would be moderate safety improvements due to BAT lanes and increased crossing opportunities for bikes and pedestrians.

In-vehicle transit travel time would improve by 10 minutes (one-way inbound) during the a.m. peak hour over the full length of the corridor compared to the No-Build Alternative. Average weekday systemwide transit ridership would increase by 370 (0.8 percent) one-way linked trips and average weekday boardings would increase by 450 boardings compared to the No-Build Alternative. Local traffic operations would improve at the Highway 99N/Roosevelt Boulevard intersection due to the installation of a northbound right turn lane. As described in Section 5.4, there would be a safety benefit based on mode shifts and changes in vehicle miles traveled, which could reduce fatal and serious injury crashes.

Up to 50 potential off-street parking stalls would be impacted, one residential driveway would close, and the Porky's Palace (closed) site would have internal circulation impacts (see Section 5.7.1 for mitigation measures). LTD has prepared an Addendum to the MovingAhead Alternatives Analysis Technical Reports that evaluates ways to avoid or minimize impacts at some properties. Please see this addendum for additional information on potential parking, acquisitions, and tree impacts mitigation.

S.2.1.3. EmX Alternative

The Highway 99 Corridor EmX Alternative would install 7,250 feet (1.37 miles) of new or improved sidewalks on the 10.5-mile corridor, a new pedestrian bridge over the railroad tracks adjacent to Highway 99, 21,000 feet (3.98 miles) of improved bike lanes, and nine enhanced pedestrian/bike crossings. There would be proposed bus phases at five intersections and transit signal priority at all signals on the corridor. There would be significant safety improvements due to BAT lanes, buffered bike lanes, and increased crossing opportunities for bikes and pedestrians.

In-vehicle transit travel time would improve by 12 minutes (one-way inbound) during the a.m. peak hour over the full length of the corridor compared to the No-Build Alternative. The EmX Alternative has greater potential for increased transit reliability due to a 24.3 percent increase in transit exclusive/priority lanes compared to the No-Build Alternative. Average weekday systemwide transit ridership would increase by 890 (1.9 percent) and average weekday boardings would increase by 1,750 compared to the No-Build Alternative. As described in Section 5.4, there would be a safety benefit based on mode shifts and changes in vehicle miles traveled which could reduce fatal and serious injury crashes.

Local traffic operations would improve at the Highway 99N/Roosevelt Boulevard intersection due to the installation of a dual northbound left turn lane.

Up to 54 potential off-street parking stalls would be impacted and the Porky's Palace (closed) site would have internal circulation impacts (mitigation is available for the Porky's Palace impact) (see Section 5.7.1 for mitigation measures). LTD has prepared an Addendum to the MovingAhead Alternatives Analysis Technical Reports that evaluates ways to avoid or minimize impacts at some properties. Please see this addendum for additional information on potential parking, acquisitions, and tree impacts mitigation.

S.2.2. River Road Corridor

S.2.2.1. No-Build Alternative

The River Road Corridor No-Build Alternative would have no impacts or benefits to pedestrians, bicycles, transit, safety, or traffic operations. There would be limited potential for mode shifts away from motor vehicle travel to transit and limited potential to support locally adopted transportation policies.

S.2.2.2. Enhanced Corridor Alternative

The River Road Corridor Enhanced Corridor Alternative would install 4,000 feet (0.76 mile) of new or improved sidewalks on the 10.3-mile corridor, six enhanced pedestrian/bike crossings (flashing beacon, pedestrian hybrid beacon, or full traffic signal with pedestrian crossings), and replace one existing enhanced crossing. There would be proposed bus phases at one intersection and transit signal priority at all signals on the corridor. There would be moderate safety improvements due to BAT lanes and increased crossing opportunities for bikes and pedestrians.

In-vehicle transit travel time would improve by 5 minutes (one-way inbound) during the a.m. peak hour over the full length of the corridor compared to the No-Build Alternative. Average weekday systemwide transit ridership would increase by 110 (0.2 percent) one-way linked trips and average weekday boardings would increase by 50 boardings compared to the No-Build Alternative. As described in Section 6.4, there would be a safety benefit based on mode shifts and changes in vehicle miles traveled, which could reduce fatal and serious injury crashes.

Up to two potential off-street parking stalls would be impacted, four drive-throughs would be closed, 13 driveways, alleys, or side streets would be impacted by reduced left turn lane lengths or elimination of two-stage left turns (see Section 6.7.1 for mitigation measures). LTD has prepared an Addendum to the MovingAhead Alternatives Analysis Technical Reports that evaluates ways to avoid or minimize impacts at some properties. Please see this addendum for additional information on potential parking, acquisitions, and tree impacts mitigation.

S.2.2.3. EmX Alternative

The River Road Corridor EmX Alternative would install 6,740 feet (1.28 miles) of new or improved sidewalks on the 10.3-mile corridor, 26,580 feet (5.03 miles) of improved bike lanes, four enhanced pedestrian/bike crossings (flashing beacon, pedestrian hybrid beacon, or full traffic signal with pedestrian crossings), and replace one existing enhanced pedestrian/bike crossing. There would be proposed bus phases at one intersection and transit signal priority at all signals on the corridor. There would be significant safety improvements due to BAT lanes and increased crossing opportunities for bikes and pedestrians.

In-vehicle transit travel time would improve by 8 minutes (one-way inbound) during the a.m. peak hour over the full length of the corridor compared to the No-Build Alternative. Average weekday systemwide transit ridership would increase by 820 (1.8 percent) one-way linked trips and average weekday boardings would increase by 1,550 boardings compared to the No-Build Alternative.

Up to 31 potential off-street parking stalls would be impacted, six drive-throughs would be closed, and two-stage left turns would be eliminated on two side streets (see Section 6.7.1 for mitigation measures). LTD has prepared an Addendum to the MovingAhead Alternatives Analysis Technical Reports that evaluates ways to avoid or minimize impacts at some properties. Please see this addendum for additional information on potential parking, acquisitions, and tree impacts mitigation.

S.2.3. 30th Avenue to Lane Community College Corridor

S.2.3.1. No-Build Alternative

The 30th Avenue to LCC Corridor No-Build Alternative would have no impacts or benefits to pedestrians, bicycles, transit, safety, or traffic operations. There would be limited potential for mode shifts away from motor vehicle travel to transit and limited potential to support locally adopted transportation policies.

S.2.3.2. Enhanced Corridor Alternative

The 30th Avenue to LCC Corridor Enhanced Corridor Alternative would install 3,500 feet (0.66 mile) of new or improved sidewalks on the 10.2-mile corridor, 6,650 feet (1.26 miles) of new or improved bike facilities, one enhanced pedestrian / bike crossing (flashing beacon, pedestrian hybrid beacon, or full traffic signal with pedestrian crossings), and replace two existing enhanced pedestrian / bike crossings. Transit signal priority would be installed at all traffic signals on the corridor. There would be safety improvements due to the installation of a buffered bicycle lane on Oak Street, the addition of a buffer to the existing bicycle lane on Pearl Street, and increased crossing opportunities for bikes and pedestrians.

In-vehicle transit travel time would improve by 1 minute (one-way inbound) during the a.m. peak hour over the full length of the corridor compared to the No-Build Alternative. Average weekday systemwide transit ridership would decrease by 100 (-0.2 percent) one-way linked trips and average weekday boardings would decrease by 150 boardings compared to the No-Build Alternative. Up to 101 on-street parking spaces would be affected over twelve block faces on Oak Street and Pearl Street. Mitigation measures could add up to 32 parking spaces on nearby streets, thus reducing the loss of on-street parking to 69 spaces (mitigation measures are covered in Section 7.7.1). LTD has prepared an Addendum to the MovingAhead Alternatives Analysis Technical Reports that evaluates ways to avoid or minimize impacts at some properties. Please see this addendum for additional information on potential parking, acquisitions, and tree impacts mitigation. Additionally, eastbound left turns would be prohibited at the Amazon Parkway/Hilyard Street intersection. Additionally, eastbound left turns would be prohibited at the Amazon Parkway/Hilyard Street intersection.

S.2.3.3. EmX Alternative

The 30th Avenue to LCC Corridor EmX Alternative would install 2,900 feet (0.55 mile) of new or improved sidewalks on the 10.2-mile corridor, 7,000 feet (1.33 miles) of new or improved bike facilities, and eight enhanced pedestrian/bike crossings (flashing beacon , pedestrian hybrid beacon, or full traffic signal with pedestrian crossings), and replace two existing enhanced pedestrian / bike crossings. There would be a proposed bus phase at one intersection and transit signal priority would be installed at all traffic signals on the corridor. There would be safety improvements due to the installation of a two-way cycle track on High Street, BAT lanes on Pearl Street, and increased crossing opportunities for bikes and pedestrians.

In-vehicle transit travel time would improve by 2 minutes (one-way inbound) during the a.m. peak hour over the full length of the corridor compared to the No-Build Alternative. Average weekday systemwide transit ridership would increase by 660 (1.4 percent) one-way linked trips and average weekday boardings would increase by 1,700 boardings compared to the No-Build Alternative.

Up to 147 on-street total parking spaces would be affected on Oak Street between 12th Avenue and 20th Avenue, on Pearl Street between 12th Street and 19th Avenue, and on High Street between E. 10th Avenue and E. 19th Avenue. Mitigation measures could add up to seven parking spaces on nearby streets, thus reducing the loss of on-street parking to 140 spaces (mitigation measures are covered in Section 7.7.1). Additionally, up to 16 off-street parking stalls on two parcels and three driveways would be impacted. LTD has prepared an Addendum to the MovingAhead Alternatives Analysis Technical Reports that evaluates ways to avoid or minimize impacts at some properties. Please see this addendum for additional information on potential parking, acquisitions, and tree impacts mitigation. Eastbound left turns would be prohibited at the Amazon Parkway/Hilyard Street intersection.

S.2.4. Coburg Road Corridor

S.2.4.1. No-Build Alternative

The Coburg Road Corridor No-Build Alternative would have no impacts or benefits to pedestrians, bicycles, transit, safety, or traffic operations. There would be limited potential for mode shifts away from motor vehicle travel to transit and limited potential to support locally adopted transportation policies.

S.2.4.2. Enhanced Corridor Alternative

The Coburg Road Corridor Enhanced Corridor Alternative would install 7,750 feet (1.43 miles) of new or improved sidewalks on the 11.2-mile corridor, seven enhanced pedestrian/bike crossings (flashing beacon, pedestrian hybrid beacon, or full traffic signal with pedestrian crossings), and two upgraded pedestrian / bike crossing (ADA ramps and possibly median refuge islands and/or crosswalk striping). There would be proposed bus phases at two intersections and transit signal priority at all signals on the corridor. There would be moderate safety improvements due to new BAT lanes, new right turn lanes, and increased crossing opportunities for bikes and pedestrians.

In-vehicle transit travel time would improve by 5 minutes (one-way inbound) during the a.m. peak hour over the full length of the corridor compared to the No-Build Alternative. Average weekday systemwide transit ridership would increase by 210 (0.5 percent) one-way linked trips and average weekday boardings would increase by 650 boardings compared to the No-Build Alternative. As described in Section 8.4, there would be a safety benefit based on mode shifts and changes in vehicle miles traveled, which could reduce fatal and serious injury crashes.

Up to 67 potential off-street parking stalls would be impacted, and four driveways would be converted to right-in/right-out access. LTD has prepared an Addendum to the MovingAhead Alternatives Analysis Technical Reports that evaluates ways to avoid or minimize impacts at some properties. Please see this addendum for additional information on potential parking, acquisitions, and tree impacts mitigation.

S.2.4.3. EmX Alternative

The Coburg Road Corridor EmX Alternative would install 14,800 feet (2.80 miles) of new or improved sidewalks on the 11.2-mile corridor, nine enhanced pedestrian/bike crossings (flashing beacon, pedestrian hybrid beacon, or full traffic signal with pedestrian crossings), and two upgraded pedestrian/bike crossings (ADA ramps and possibly median refuge islands and/or crosswalk striping). There would be proposed bus phases at four intersections and transit signal priority at all signals on the corridor. There would be safety improvements due to new BAT lanes, new right turn lanes, and increased crossing opportunities for bikes and pedestrians.

In-vehicle transit travel time would improve by 5 minutes (one-way inbound) during the a.m. peak hour over the full length of the corridor compared to the No-Build Alternative. Average weekday systemwide transit ridership would increase by 860 (1.9 percent) one-way linked trips and average weekday boardings would increase by 2,150 boardings compared to the No-Build Alternative. As described in Section 8.4, there would be a safety benefit based on mode shifts and changes in vehicle miles traveled, which could reduce fatal and serious injury crashes.

Up to 128 potential off-street parking stalls would be impacted, two drive-throughs would be closed, seven driveways would be converted to right-in/right-out access, and five locations would have shortened left turn lanes or elimination of two-stage left turns. LTD has prepared an *Addendum to the MovingAhead Alternatives Analysis Technical Reports Memorandum* (CH2M, 2017b) that evaluates ways to avoid or minimize impacts at some properties. Please see this addendum for additional information on potential parking, acquisitions, and tree impacts mitigation.

S.2.5. Martin Luther King, Jr. Boulevard Corridor

S.2.5.1. No-Build Alternative

The Martin Luther King, Jr. Boulevard Corridor No-Build Alternative would have no impacts or benefits to pedestrians, bicycles, transit, safety, or traffic operations. There would be limited potential for mode shifts away from motor vehicle travel to transit and limited potential to support locally adopted transportation policies.

S.2.5.2. Enhanced Corridor Alternative

The Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative would install 2,380 feet (0.45 mile) of new or improved sidewalks on the 1.8-mile corridor and four enhanced pedestrian/bike crossings (flashing beacon, pedestrian hybrid beacon, or full traffic signal with pedestrian crossings). Transit signal priority would be installed at all signals on the corridor. There would be moderate safety improvements due to new BAT lanes and increased crossing opportunities for bikes and pedestrians.

In-vehicle transit travel time would improve by 2 minutes (one-way inbound) during the a.m. peak hour over the full length of the corridor compared to the No-Build Alternative. Average weekday systemwide transit ridership would increase by 620 (1.3 percent) one-way linked trips and average weekday boardings would increase by 1,200 boardings compared to the No-Build Alternative. As described in Section 5.4, there would be a safety benefit based on mode shifts and changes in vehicle miles traveled, which could reduce fatal and serious injury crashes.

There would be no impacts to on-street or off-street parking, and two-stage left turns would be eliminated in two locations.

S.3. Mitigation Measures

In fall 2016 and winter 2017, LTD and the City evaluated the potential effects of proposed alternatives being studied in the MovingAhead Project; these evaluations and potential effects were documented in discipline-specific technical reports. After review of the technical report findings, LTD and the City determined that additional mitigation options should be considered by policy makers when selecting preferred alternatives for each of the project corridors. These are documented in an *Addendum to the MovingAhead Alternatives Analysis Technical Reports Memorandum* (CH2M, 2017b) that evaluates ways to avoid or minimize impacts at some properties. Please see this addendum for additional information on potential parking, acquisitions, and tree impacts mitigation.

S.3.1. Highway 99 Corridor

S.3.1.1. No-Build Alternative

No mitigation measures are proposed for the Highway 99 Corridor No-Build Alternative.

S.3.1.2. Enhanced Corridor Alternative

The former Porky's Palace on-site circulation would be impacted with the installation of a southbound bus pullout on Highway 99N just south of Royal Avenue. In order to mitigate this impact, it is recommended that the bus pullout be located approximately 40 feet south of where it is currently shown. This would maintain full on-site circulation. Opportunities to further reduce or avoid impacts will be evaluated in more detail during LPA design refinement.

Mitigation measures would be needed during construction, and would require early, frequent, and ongoing communication among LTD, the City of Eugene, contractors, and affected property owners/ tenants. Construction timing, staging, and signage would be coordinated by the LTD-designated staff liaison in consultation with the affected property owners/tenants to minimize business and residential disruptions. Speed zone reductions within the construction zone, closed or narrow lanes, and temporary driveway relocation would also be considered to mitigate construction impacts. Variable message signs, the LTD website, and local news sources could also be used to provide roadway users with advance notice of current or pending construction activities and alternate routes. All required mitigation measures would be specified in LTD construction contracting documents.

S.3.1.3. EmX Alternative

The former Porky's Palace on-site circulation would be impacted with the installation of a southbound bus pullout on Highway 99N just south of Royal Avenue. In order to mitigate this impact, it is recommended that the bus pullout be located approximately 40 feet south of where it is currently shown. This would maintain full on-site circulation. Opportunities to further reduce or avoid impacts will be evaluated in more detail during LPA design refinement.

Mitigation measures would be needed during construction, and would require early, frequent, and ongoing communication among LTD, the City of Eugene, contractors, and affected property owners/tenants. Construction timing, staging, and signage would be coordinated by the LTD-designated staff liaison in consultation with the affected property owners/tenants to minimize business and residential disruptions. Speed zone reductions within the construction zone, closed or narrow lanes, and temporary driveway relocation would also be considered to mitigate construction impacts. Variable message signs, the LTD website, and local news sources could also be used to provide roadway users with advance notice of current or pending construction activities and alternate routes. All required mitigation measures would be specified in LTD construction contracting documents.

S.3.2. River Road Corridor

S.3.2.1. No-Build Alternative

No mitigation measures are proposed for the River Road Corridor No-Build Alternative.

S.3.2.2. Enhanced Corridor Alternative

No mitigation measures for impacts to off-street parking, circulation, or drive-throughs are proposed. Opportunities to further reduce or avoid impacts will be evaluated in more detail during LPA design refinement.

Mitigation measures would be needed during construction, and would require early, frequent, and ongoing communication among LTD, the City of Eugene, contractors, and affected property owners/tenants. Construction timing, staging, and signage would be coordinated by the LTD-designated staff liaison in consultation with the affected property owners/tenants to minimize business and residential disruptions. Speed zone reductions within the construction zone, closed or narrow lanes, and temporary driveway relocation would also be considered to mitigate construction impacts. Variable message signs, the LTD website, and local news sources could also be used to provide roadway users with advance notice of current or pending construction activities and alternate routes. All required mitigation measures would be specified in LTD construction contracting documents.

S.3.2.3. EmX Alternative

No mitigation measures for impacts to off-street parking, circulation, or drive-throughs are proposed. Opportunities to further reduce or avoid impacts will be evaluated in more detail during LPA design refinement.

Mitigation measures would be needed during construction, and would require early, frequent, and ongoing communication among LTD, the City of Eugene, contractors, and affected property owners/tenants. Construction timing, staging, and signage would be coordinated by the LTD-designated staff liaison in consultation with the affected property owners/tenants to minimize business and residential disruptions. Speed zone reductions within the construction zone, closed or narrow lanes, and temporary driveway relocation would also be considered to mitigate construction impacts. Variable message signs, the LTD website, and local news sources could also be used to provide roadway users with advance notice of current or pending construction activities and alternate routes. All required mitigation measures would be specified in LTD construction contracting documents.

S.3.3. 30th Avenue to Lane Community College Corridor

S.3.3.1. No-Build Alternative

No mitigation measures are proposed for the 30th Avenue to LCC Corridor No-Build Alternative.

S.3.3.2. Enhanced Corridor Alternative

Mitigation measures due to loss of on-street parking on Oak Street and Pearl Street between E. 12th Avenue and E. 20th Avenue are shown in Table S.4-1. As a mitigation measure, parking could be added along portions of both Oak Street and Pearl Street by installing curb cuts for on-street parking.

Table S.4-1. 30th Avenue to Lane Community College Corridor Enhanced Corridor Alternative On-Street Parking Mitigation Measures

Alternative	Potential Loss of On-street Parking on Oak Street and Pearl Street	Number of On-Street Parking Spaces Added for Mitigation on Oak Street and Pearl Street	Net Loss of On-Street Parking Spaces[a]
30th Avenue to LCC Corridor Enhanced Corridor Alternative	101	32	69

Source: DKS Associates (DKS) Transportation Analysis. (2016).

[a] Enhanced Corridor Alternative would add or remove existing parking spaces on each block.

No mitigation measures for impacts to off-street parking, circulation, or drive-throughs are proposed. Opportunities to further reduce or avoid impacts will be evaluated in more detail during LPA design refinement.

Mitigation measures would be needed during construction, and would require early, frequent, and ongoing communication among LTD, the City of Eugene, contractors, and affected property owners/tenants. Construction timing, staging, and signage would be coordinated by the LTD-designated staff liaison in consultation with the affected property owners/tenants to minimize business and residential disruptions. Speed zone reductions within the construction zone, closed or narrow lanes, and temporary driveway relocation would also be considered to mitigate construction impacts. Variable message signs, the LTD website, and local news sources could also be used to provide roadway users with advance notice of current or pending construction activities and alternate routes. All required mitigation measures would be specified in LTD construction contracting documents.

S.3.3.3. EmX Alternative

Mitigation measures would be required at the Pearl Street/E. 11th Avenue intersection under the 30th Avenue to LCC Corridor EmX Alternative. The mitigation measures should bring the intersection operations up to the No-Build Alternative condition or better. The proposed mitigation measures are shown in Table S.4-2. Mitigation measures are not needed in locations not meeting operating standards where the No-Build Alternative condition also does not meet operating standards.

Mitigation measures due to loss of on-street parking on Oak Street and Pearl Street between E. 12th Avenue and E. 20th Avenue on the 30th Avenue Corridor for the 30th Avenue to LCC Corridor Enhanced Corridor Alternative are shown in Table S.4-3.

Table S.4-2 30th Avenue to Lane Community College Corridor EmX Alternative Mitigation Measures Required

Alternative	Study Intersection Number	Study Intersection	Mitigation	No-Build LOS	No-Build Delay (sec)	No-Build v/c	Mitigated Operations LOS	Mitigated Operations Delay (sec)	Mitigated Operations v/c
30th Avenue to Lane Community College EmX Alternative	19	Pearl St./E. 11th Ave[a]	Change southbound lane configuration from 1 right only/1 through-right to 1 through only/1 through-right; continue to 200 feet downstream of intersection	C	23.3	0.83	C	23.3	0.83

Source: DKS Transportation Analysis. (2016).

Delay = Average Intersection Delay in seconds
LOS = Level of Service
v/c = volume-to-capacity

[a] Mitigation required only under current operating standards. No mitigation required under proposed operating standards.

Table S.4-3. 30th Avenue to Lane Community College Corridor EmX Alternative On-Street Parking Mitigation Measures

Alternative	Potential Loss of On-street Parking on Oak, Pearl, and High Streets	Number of On-Street Parking Spaces Added for Mitigation on Oak Street and Pearl Street	Net Loss of On-Street Parking Spaces[a]
30th Avenue to LCC Corridor EmX Alternative	147	7	140

Source: DKS Transportation Analysis. (2016).

[a] EmX Alternative would add or remove existing parking spaces on each block.

No mitigation measures for impacts to off-street parking, circulation, or drive-throughs are proposed. Opportunities to further reduce or avoid impacts would be evaluated in more detail during LPA design refinement.

Mitigation measures would be needed during construction, and would require early, frequent, and ongoing communication among LTD, the City of Eugene, contractors, and affected property owners/tenants. Construction timing, staging, and signage would be coordinated by the LTD-designated staff liaison in consultation with the affected property owner/tenants to minimize business and residential disruptions. Speed zone reductions within the construction zone, closed or narrow lanes, and temporary driveway relocation would also be considered to mitigate construction impacts. Variable message signs, the LTD website, and local news sources could also be used to provide roadway users with advance notice of current or pending construction activities and alternate routes. All required mitigation measures would be specified in LTD construction contracting documents.

S.3.4. Coburg Road Corridor

S.3.4.1. No-Build Alternative

No mitigation measures are proposed for the Coburg Road Corridor No-Build Alternative.

S.3.4.2. Enhanced Corridor Alternative

Mitigation measures due to access closures would be required on the Coburg Road Corridor for the Enhanced Corridor Alternative. These mitigation measures are shown in Table S.4-4.

Table S.4-4. Coburg Road Corridor Enhanced Corridor Alternative Access Mitigation Measures

Roadway Improvement Location	Impacted Business Location	Side of Street	Mitigation Measures
Coburg Road: Elysium Avenue to Randy Papé Beltline EB Onramp	Quality Research Associates	East	Provide southbound U-turn movement at Coburg Road/Elysium Avenue intersection Provide at least 150-foot southbound left turn lane at Coburg Road/Elysium Avenue to accommodate U-turn volume
	Vacant Lot	East	
	Trauma Healing Project	West	Provide northbound U-turn movement at Coburg Road/Randy Papé Beltline WB Onramp intersection
	Our Saviour's Lutheran Church	West	

Source: DKS Transportation Analysis. (2016).

EB = eastbound
WB = westbound

No other mitigation measures for impacts to off-street parking, circulation, or drive-throughs are proposed. Opportunities to further reduce or avoid impacts would be evaluated in more detail during LPA design refinement.

Mitigation measures would be needed during construction, and would require early, frequent, and ongoing communication among LTD, the City of Eugene, contractors, and affected property owners/tenants. Construction timing, staging, and signage would be coordinated by the LTD-designated staff liaison in consultation with the affected property owners/tenants to minimize business and residential disruptions. Speed zone reductions within the construction zone, closed or narrow lanes, and temporary driveway relocation would also be considered to mitigate construction impacts. Variable message signs, the LTD website, and local news sources could also be used to provide roadway users with advance notice of current or pending construction activities and alternate routes. All required mitigation measures would be specified in LTD construction contracting documents.

S.3.4.3. EmX Alternative

Mitigation measures would be required at the Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard and the Coburg Road/Cedarwood Drive/I-105 Onramp intersections under the EmX Alternative. The mitigation measures should bring the intersection operations to approximately the No-Build condition. The proposed mitigation measures are shown in Table S.4-5 Mitigation measures are not needed in locations not meeting operating standards where the No-Build condition also does not meet operating standards.

Table S.4-5. Coburg Road Corridor EmX Alternative Mitigation Measures Required

Alternative	Study Intersection Number	Study Intersection	Mitigation	No-Build			Mitigated Operations		
				LOS	Delay (sec)	v/c	LOS	Delay (sec)	v/c
Coburg Road EmX Alternative	30	Coburg Road/ Country Club Road/Martin Luther King, Jr. Boulevard	Convert northbound general purpose lane to BAT lane for bus and vehicles turning left at Oakway Road	E	55.5	1.10	E	55.3	1.09
Coburg Road EmX Alternative	31	Coburg Road/ Cedarwood Drive/I-105 Onramp	Convert northbound general purpose lane to BAT lane for bus and vehicles turning left at Oakway Road	D	36.0	0.96	D	36.6	0.95

Source: DKS Transportation Analysis. (2016).

Delay = Average Intersection Delay in seconds
LOS = Level of Service
v/c = volume-to-capacity

In addition, mitigation measures due to access closures would be required on the Coburg Road Corridor for the EmX Alternative. These mitigation measures are shown in Table S.4-6.

No other mitigation measures for impacts to off-street parking, circulation, or drive-throughs are proposed. Opportunities to further reduce or avoid impacts would be evaluated in more detail during LPA design refinement.

Mitigation measures would be needed during construction, and would require early, frequent, and ongoing communication among LTD, the City of Eugene, contractors, and affected property owners/tenants. Construction timing, staging, and signage would be coordinated by the LTD-designated staff liaison in consultation with the affected property owners/tenants to minimize business and residential disruptions. Speed zone reductions within the construction zone, closed or narrow lanes, and temporary driveway relocation would also be considered to mitigate construction impacts. Variable message signs, the LTD website, and local news sources could also be used to provide roadway users with advance notice of current or pending construction activities and alternate routes. All required mitigation measures would be specified in LTD construction contracting documents.

Table S.4-6. Coburg Road Corridor EmX Alternative Access Mitigation Measures

Roadway Improvement Location	Impacted Business Location	Side of Street	Mitigation Measures
Coburg Road: Elysium Avenue to Randy Papé Beltline EB Onramp	Quality Research Associates	East	Provide southbound U-turn movement at Coburg Road/Elysium Avenue intersection Provide at least 150-foot southbound left turn lane at Coburg Road/Elysium Avenue to accommodate U-turn volume
	Vacant Lot	East	
	Trauma Healing Project	West	Provide northbound U-turn movement at Coburg Road/Randy Papé Beltline WB Onramp intersection
	Our Saviour's Lutheran Church	West	

Source: DKS Transportation Analysis. (2016).

EB = eastbound
WB = westbound

S.3.5. Martin Luther King, Jr. Boulevard Corridor

S.3.5.1. No-Build Alternative

No mitigation measures are proposed for the Martin Luther King, Jr. Boulevard Corridor No-Build Alternative.

Enhanced Corridor Alternative

No mitigation measures for impacts to off-street parking, circulation, or drive-throughs are proposed. Opportunities to further reduce or avoid impacts would be evaluated in more detail during LPA design refinement.

Mitigation measures would be needed during construction, and would require early, frequent, and ongoing communication among LTD, the City of Eugene, contractors, and affected property owners/tenants. Construction timing, staging, and signage would be coordinated by the LTD-designated staff liaison in consultation with the affected property owners/tenants to minimize business and residential disruptions. Speed zone reductions within the construction zone, closed or narrow lanes, and temporary driveway relocation would also be considered to mitigate construction impacts. Variable message signs, the LTD website, and local news sources could also be used to provide roadway users with advance notice of current or pending construction activities and alternate routes. All required mitigation measures would be specified in LTD construction contracting documents.

S.4. Conclusions

Overall, the Enhanced Corridor Alternatives and EmX Alternatives are expected to improve transit ridership, transit VMT, transit travel times, and transit reliability for all build alternatives, with the exception of the 30th Avenue to LCC Corridor Enhanced Corridor Alternative, which removes service and transit frequency from the corridor compared to the No-Build Alternative. In addition, pedestrian and bicycle facilities under the build alternatives would be improved compared to the No-Build Alternative The build alternatives that would require mitigation measures for impacting motor vehicle operations are the 30th Avenue to LCC Corridor EmX Alternative (only if evaluated under current operating standards), the Coburg Road Corridor Enhanced Corridor Alternative (only if evaluated under current operating standards), and the Coburg Road Corridor EmX Alternative (mitigation measures needed for current and proposed operating standards). Table S.5-1 provides a full summary of each corridor alternative.

Table S.5-1. Summary of Transportation Consequences by Corridor and Alternative

Alternative	Temporary/Short-Term Construction-Related Impacts/ Benefits	Long-Term Direct Impacts/Benefits	Indirect/Cumulative Effects	Mitigation Measures	Unavoidable Adverse Effects
Highway 99 Corridor					
Highway 99 No-Build Alternative	No roadway capacity changes	• No benefit or impact to roadway capacity • No benefit or impact to safety or circulation	• Limited potential for mode shifts away from motor vehicle travel to transit to reduce single occupancy vehicle trips • Limited potential to support locally adopted transportation policies • Limited potential to improve connectivity to bicycle or pedestrian facilities	None	None
Highway 99 Enhanced Corridor Alternative	Construction-related vehicle delay and bicycle and pedestrian detours	• Improved in-vehicle transit travel time[a] by 10 minutes during the a.m. peak hour over the full length of the corridor compared to No-Build • Increased average weekday systemwide transit ridership by 370 (0.8%) compared to No-Build • Increased average weekday corridor boardings by 450 compared to No-Build • Local traffic operations would improve at 1 intersection • Installation of 6,650 feet (1.26 miles) of new or improved sidewalks on the 11.1-mile corridor, a new pedestrian bridge over heavy rail tracks, 10 enhanced pedestrian/bike crossings, and 2 upgraded pedestrian/bike crossings • Proposed bus phases at 4 intersections and transit signal priority at all signals on corridor • Moderate safety improvements due to BAT lanes and increased crossing opportunities for bikes and pedestrians • Up to 50 potential off-street parking stalls impacted, 1 residential driveway closure, and internal circulation impacts at the Porky's Palace (closed) site (mitigation is available for Porky's Palace impacts) • Annual cost savings due to reductions in fatal and serious injury crashes	• Some potential for mode shifts away from motor vehicle travel to transit to reduce single occupancy vehicle trips • Increased connectivity to transit from bicycling, walking, or other transit services compared to No-Build • Increased accessibility and mobility	• Relocate bus pullout to avoid/reduce impact to former Porky's Palace site • Opportunities to reduce or avoid impacts to off-street parking, circulation, or drive-throughs will be evaluated during LPA design refinement	None

Table S.5-1. Summary of Transportation Consequences by Corridor and Alternative

Alternative	Temporary/Short-Term Construction-Related Impacts/ Benefits	Long-Term Direct Impacts/Benefits	Indirect/Cumulative Effects	Mitigation Measures	Unavoidable Adverse Effects
Highway 99 EmX Alternative	Construction-related vehicle delay and bicycle and pedestrian detours	• Improved in-vehicle transit travel time[a] by 12 minutes during the a.m. peak hour over the full length of the corridor compared to No-Build • Greatest potential for increased transit reliability due to 24.3% increase in transit exclusive/priority lanes[b] compared to No-Build • Increased average weekday systemwide transit ridership by 890 (1.9%) compared to No-Build • Increased average weekday corridor boardings by 1,750 compared to No-Build • Local traffic operations would improve at 1 intersection • Installation of 7,250 feet (1.37 miles) of new or improved sidewalks on the 10.5-mile corridor, a new pedestrian bridge over heavy rail tracks, 21,000 feet (3.98 miles) of improved bike lanes, and 9 enhanced pedestrian/bike crossings • Proposed bus phases at 5 intersections and transit signal priority at all signals on corridor • Greatest safety improvements due to BAT lanes, buffered bike lanes, and increased crossing opportunities for bikes and pedestrians • Up to 54 potential off-street parking stalls impacted and internal circulation impacts at Porky's Palace (mitigation is available for Porky's Palace impacts) • Annual cost savings due to reductions in fatal and serious injury crashes	• Greater potential for mode shifts away from motor vehicle travel to transit to reduce single occupancy vehicle trips • Increased connectivity to transit from bicycling, walking, or other transit services compared to No-Build • Increased accessibility and mobility	• Relocate bus pullout to avoid/reduce impact to former Porky's Palace site • Opportunities to reduce or avoid impacts to off-street parking, circulation, or drive-throughs will be evaluated during LPA design refinement	None

Table S.5-1. Summary of Transportation Consequences by Corridor and Alternative

Alternative	Temporary/Short-Term Construction-Related Impacts/ Benefits	Long-Term Direct Impacts/Benefits	Indirect/Cumulative Effects	Mitigation Measures	Unavoidable Adverse Effects
River Road Corridor					
River Road No-Build Alternative	No roadway capacity changes	• No impacts or benefits to roadway capacity • No benefit or impact to safety or circulation	• Limited potential for mode shifts away from motor vehicle travel to transit to reduce single occupancy vehicle trips • Limited potential to support locally adopted transportation policies • Limited potential to improve connectivity to bicycle or pedestrian facilities	None	None
River Road Enhanced Corridor Alternative	Construction-related vehicle delay and bicycle and pedestrian detours	• Improved in-vehicle transit travel time[a] by 5 minutes during the a.m. peak hour over the full length of the corridor compared to No-Build • Increased average weekday systemwide transit ridership by 110 (0.2%) compared to No-Build • Increased average weekday corridor boardings by 50 compared to No-Build • Installation of 4,000 feet (0.76 mile) of new or improved sidewalks on 10.3-mile corridor and 6 enhanced pedestrian/bike crossings • Proposed bus phases at 1 intersection and transit signal priority at all signals on corridor • Moderate safety improvements to motor vehicles, bikes, and pedestrians • Up to 2 potential off-street parking spaces impacted, 4 drive-through closures, and impacts to left turn lane lengths or two-stage left turns at 14 driveways, alleys, or side streets • Annual cost savings due to reductions in fatal and serious injury crashes	• Some potential for mode shifts away from motor vehicle travel to transit to reduce single occupancy vehicle trips • Increased connectivity to transit from bicycling, walking, or other transit services compared to No-Build • Increased accessibility and mobility	• Opportunities to reduce or avoid impacts to off-street parking, circulation, or drive-throughs will be evaluated during LPA design refinement	None

Table S.5-1. Summary of Transportation Consequences by Corridor and Alternative

Alternative	Temporary/Short-Term Construction-Related Impacts/ Benefits	Long-Term Direct Impacts/Benefits	Indirect/Cumulative Effects	Mitigation Measures	Unavoidable Adverse Effects
River Road EmX Alternative	Construction-related vehicle delay and bicycle and pedestrian detours	• Improved in-vehicle transit travel time[a] by 8 minutes during the a.m. peak hour over the full length of the corridor compared to No-Build • Potential for increased transit reliability due to 22.1% increase in transit exclusive/priority lanes[b] compared to No-Build • Increased average weekday systemwide transit ridership by 820 (1.8%) compared to No-Build • Increased average weekday corridor boardings by 1,550 compared to No-Build • Installation of 6,740 feet (1.28 miles) of new or improved sidewalks, 26,580 feet (5.03 miles) of improved bike lanes, and 4 enhanced bike/pedestrian crossings on 10.3-mile corridor • Proposed bus phases at 1 intersection and transit signal priority at all signals on corridor • Greatest safety improvements to motor vehicles, bikes, and pedestrians • Up to 31 potential off-street parking spaces impacted, 6 drive-through closures, and impacts to 2 stage left turns from 2 side streets	• Greater potential for mode shifts away from motor vehicle travel to transit to reduce single occupancy vehicle trips • Increased connectivity to transit from bicycling, walking, or other transit services compared to No-Build • Increased accessibility and mobility	• Opportunities to reduce or avoid impacts to off-street parking, circulation, or drive-throughs will be evaluated during LPA design refinement	None
30th Avenue to Lane Community College Corridor					
30th Avenue to LCC No-Build Alternative	No roadway capacity changes	• No impacts or benefits to roadway capacity • No benefit or impact to safety or circulation	• Limited potential for mode shifts away from motor vehicle travel to transit to reduce single occupancy vehicle trips • Limited potential to support locally adopted transportation policies • Limited potential to improve connectivity to bicycle or pedestrian facilities	None	None

Table S.5-1. Summary of Transportation Consequences by Corridor and Alternative

Alternative	Temporary/Short-Term Construction-Related Impacts/ Benefits	Long-Term Direct Impacts/Benefits	Indirect/Cumulative Effects	Mitigation Measures	Unavoidable Adverse Effects
30th Avenue to LCC Enhanced Corridor Alternative	Construction-related vehicle delay and bicycle and pedestrian detours	• Decreased average weekday systemwide transit ridership by 100 (-0.2%) compared to No-Build • Decreased average weekday corridor boardings by 150 compared to No-Build • Local traffic operations would degrade at 1 intersection • Installation of 3,500 feet (0.66 mile) of new or improved sidewalks, 6,650 feet (1.26 miles) of new or improved bike facilities, decommissioning of a pedestrian bridge, 1 enhanced pedestrian/bike crossings on 10.2-mile corridor • Installation of transit signal priority at all signals on corridor • Moderate safety improvements to motor vehicles, bikes, and pedestrians • Impacts to circulation include 4 new traffic signals, 2 new blocks of roadway, and an eastbound left turn prohibition at Amazon Parkway/Hilyard Street • On-street parking impacts to 12 block faces (total loss of 101 parking spaces)	• Limited potential for mode shifts away from motor vehicle travel to transit to reduce single occupancy vehicle trips • Decreased connectivity to transit from bicycling, walking, or other transit services compared to No-Build • Decreased accessibility and mobility	• Install 32 new on-street parking spaces on Oak Street and Pearl Street to mitigate for lost on-street parking spaces between E 12th Avenue and E 20th Avenue • Opportunities to reduce or avoid impacts to off-street parking, circulation, or drive-throughs will be evaluated during LPA design refinement	None

Table S.5-1. Summary of Transportation Consequences by Corridor and Alternative

Alternative	Temporary/Short-Term Construction-Related Impacts/ Benefits	Long-Term Direct Impacts/Benefits	Indirect/Cumulative Effects	Mitigation Measures	Unavoidable Adverse Effects
30th Avenue to LCC EmX Alternative	Construction-related vehicle delay and bicycle and pedestrian detours	• Potential for increased transit reliability due to 13.4% increase in transit exclusive/priority lanes[b] compared to No-Build • Increased average weekday systemwide transit ridership by 660 (1.4%) compared to No-Build • Increased average weekday corridor boardings by 1,700 compared to No-Build • Local traffic operations would degrade at Pearl Street/E. 11th Avenue • Installation of 2,900 feet (0.55 mile) of new or improved sidewalks, 7,000 feet (1.33 miles) of new or improved bike facilities, decommissioning of a pedestrian bridge, and 8 enhanced pedestrian/bike crossings on 10.2-mile corridor • Proposed bus phases at 1 intersection and transit signal priority at all signals on corridor • Additional safety improvements to motor vehicles, bikes, and pedestrians over the No-Build Alternative • Impacts to circulation include 4 new traffic signals, 2 new blocks of roadway, and an eastbound left turn prohibition at Amazon Parkway/Hilyard Street • On-street parking impacts to 12 block faces (net loss of 147 parking spaces) • Impacts to 3 driveways	• Greater potential for mode shifts away from motor vehicle travel to transit to reduce single occupancy vehicle trips • Increased connectivity to transit from bicycling, walking, or other transit services compared to No-Build • Increased accessibility and mobility	• Reconfigure lanes at Pearl Street/E. 11th Avenue to meet current operational standards; no mitigation needed if meeting proposed operational standards • Install 7 new on-street parking spaces on Oak Street and Pearl Street to mitigate for lost on-street parking spaces between E 12th Avenue and E 20th Avenue • Opportunities to reduce or avoid impacts to off-street parking, circulation, or drive-throughs will be evaluated during LPA design refinement	None

Table S.5-1. Summary of Transportation Consequences by Corridor and Alternative

Alternative	Temporary/Short-Term Construction-Related Impacts/ Benefits	Long-Term Direct Impacts/Benefits	Indirect/Cumulative Effects	Mitigation Measures	Unavoidable Adverse Effects
Coburg Road Corridor					
Coburg Road No-Build Alternative	No roadway capacity changes	• No impacts or benefits to roadway capacity • No benefit or impact to safety or circulation	• Limited potential for mode shifts away from motor vehicle travel to transit to reduce single occupancy vehicle trips • Limited potential to support locally adopted transportation policies • Limited potential to improve connectivity to bicycle or pedestrian facilities	None	None
Coburg Road Enhanced Corridor Alternative	Construction-related vehicle delay and bicycle and pedestrian detours	• Improved in-vehicle transit travel time[a] by 5 minutes during the a.m. peak hour from the Coburg Road/Crescent Avenue intersection to Eugene Station compared to No-Build • Increased average weekday systemwide transit ridership by 210 (0.5%) compared to No-Build • Increased average weekday corridor boardings by 650 compared to No-Build • Local traffic operations would improve at 2 intersections • Installation of 7,550 feet (1.43 miles) of new or improved sidewalks, a new sidewalk connection, 7 enhanced pedestrian/bike crossings, and 2 upgraded pedestrian/bike crossings on 11.2-mile corridor • Proposed bus phases at 2 intersections and transit signal priority at all signals on corridor • Moderate safety improvements to motor vehicles, bikes, and pedestrians • Moderate improvement in roadway circulation • Up to 67 potential off-street parking spaces impacted • Annual cost savings due to reductions in fatal and serious injury crashes • Enhances connections from Eugene Station to Gateway EmX line, Gateway Mall, and VA Clinic	• Some potential for mode shifts away from motor vehicle travel to transit to reduce single occupancy vehicle trips • Increased connectivity to transit from bicycling, walking, or other transit services compared to No-Build • Increased accessibility and mobility	• Opportunities to reduce or avoid impacts to off-street parking, circulation, or drive-throughs will be evaluated during LPA design refinement	None

Table S.5-1. Summary of Transportation Consequences by Corridor and Alternative

Alternative	Temporary/Short-Term Construction-Related Impacts/ Benefits	Long-Term Direct Impacts/Benefits	Indirect/Cumulative Effects	Mitigation Measures	Unavoidable Adverse Effects
Coburg Road EmX Alternative	Construction-related vehicle delay and bicycle and pedestrian detours	• Improved in-vehicle transit travel time[a] by 5 minutes during the a.m. peak hour from the Coburg Road/Crescent Avenue intersection to Eugene Station compared to No-Build • Greatest potential for increased transit reliability due to 16.3% increase in transit exclusive/priority lanes[b] compared to No-Build • Increased average weekday systemwide transit ridership by 860 (1.9%) compared to No-Build • Increased average weekday corridor boardings by 2,150 compared to No-Build • Local traffic operations would degrade at 2 intersections • Installation of 14,800 feet (2.80 miles) of new or improved sidewalks, including a new sidewalk connection, 9 enhanced pedestrian/bike crossings, and 2 upgraded pedestrian/bike crossings on 11.2-mile corridor • Proposed bus phases at 4 intersections and transit signal priority at all signals on corridor • Greatest safety improvements to motor vehicles, bikes, and pedestrians • Small improvement in roadway circulation • Up to 128 potential off-street parking spaces impacted, 2 drive-through closures, 9 driveways converted to right-in/right-out, and shortened left turn lanes or elimination of 2 stage left turns at 5 locations • Annual cost savings due to reductions in fatal and serious injury crashes • Enhances connections from Eugene Station to Gateway EmX line, Gateway Mall, and VA Clinic	• Greater potential for mode shifts away from motor vehicle travel to transit to reduce single occupancy vehicle trips • Increased connectivity to transit from bicycling, walking, or other transit services compared to No-Build • Increased accessibility and mobility	• Capacity improvements would be needed at 2 intersections (Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard and Coburg Road/Cedarwood Drive/I-105) in order to operate no worse than the No-Build conditions (to meet both current and proposed standards) • Opportunities to reduce or avoid impacts to off-street parking, circulation, or drive-throughs will be evaluated during LPA design refinement	None

Table S.5-1. Summary of Transportation Consequences by Corridor and Alternative

Alternative	Temporary/Short-Term Construction-Related Impacts/ Benefits	Long-Term Direct Impacts/Benefits	Indirect/Cumulative Effects	Mitigation Measures	Unavoidable Adverse Effects
Martin Luther King, Jr. Boulevard Corridor					
Martin Luther King, Jr. Boulevard No-Build Alternative	No roadway capacity changes	• No impacts or benefits to roadway capacity • No benefit or impact to safety or circulation	• Limited potential for mode shifts away from motor vehicle travel to transit to reduce single occupancy vehicle trips • Limited potential to support locally adopted transportation policies • Limited potential to improve connectivity to bicycle or pedestrian facilities	None	None
Martin Luther King, Jr. Boulevard Enhanced Corridor Alternative	Construction-related vehicle delay and bicycle and pedestrian detours	• Potential for increased transit reliability due to 25.1% increase in transit priority lanes[b] compared to No-Build • Increased average weekday systemwide transit ridership by 620 (1.3%) compared to No-Build • Increased average weekday corridor boardings by 1,200 compared to No-Build • Local traffic operations would improve at 1 intersection • Installation of 2,380 feet (0.45 mile) of new or improved sidewalks and 4 enhanced pedestrian/bike crossings on 1.8-mile corridor • Annual cost savings due to reductions in fatal and serious injury crashes • Installation of transit signal priority at all signals on corridor • Moderate safety improvements to motor vehicles, bikes, and pedestrians	• Some potential for mode shifts away from motor vehicle travel to transit to reduce single occupancy vehicle trips • Increased accessibility and mobility	• Opportunities to reduce or avoid impacts to off-street parking, circulation, or drive-throughs will be evaluated during LPA design refinement	None

BAT = Business Access and Transit

[a] Transit exclusive/priority lanes are defined as the round-trip miles of BAT lanes, bus-only lanes, and queue jumps associated with each alternative.

[b] In-vehicle transit travel time includes only the amount of time it takes for a transit vehicle to travel between an origin and destination. For buses, this measure reflects roadway speed limits, congestion, and stop dwell time.

1. Introduction

1.1. MovingAhead Technical Reports

A total of 20 technical reports have been prepared for the MovingAhead Project. The technical reports have been prepared to support the selection of preferred alternatives for the MovingAhead Project and subsequent environmental documentation. The technical reports assume 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 the technical evaluation but might not be fully covered by the technical evaluation.

Technical reports have been prepared for the following disciplines:

- Acquisitions and Displacements
- Air Quality
- Capital Cost Estimating
- Community Involvement, Agency and Tribal Coordination
- Community, Neighborhood, and Environmental Justice
- Cultural Resources
- Ecosystems (Biological, Fish Ecology, Threatened and Endangered Species, Wetlands and Waters of the U.S. and State)
- Energy and Sustainability
- Geology and Seismic
- Hazardous Materials
- Land Use and Prime Farmlands
- Noise and Vibration
- Operating and Maintenance Costs
- Parklands, Recreation Areas, and Section 6(f)
- Section 4(f)
- Street and Landscape Trees
- Transportation
- Utilities
- Visual and Aesthetic Resources
- Water Quality, Floodplain, and Hydrology

In general, each technical report includes the following information for identifying effects:

- Relevant laws and regulations
- Contacts and coordination
- Summary of data sources and analysis methods described in the *MovingAhead Environmental Disciplines Methods and Data Report* (CH2M HILL, Inc. [CH2M] et al., 2015)
- Affected environment
- Adverse and beneficial effects including short-term, direct, indirect and cumulative
- Mitigation measures
- Permits and approvals
- References

1.2. Transportation Technical Report and Purpose

This technical report presents the results of the transportation analysis for the MovingAhead corridor alternatives. This analysis consists of evaluating motor vehicle operations; bicycle and pedestrian facilities; safety; transit ridership; transit travel times and reliability; parking and access impacts; potential freight impacts; emergency vehicle access; and circulation. The effects of the build alternatives on roadway operations and possible mitigation measures are considered in the selection of corridor preferred alternatives.

1.3. Discipline Experts

Table 1.3-1 identifies those discipline experts who contributed to the preparation of this report, including their areas of expertise, affiliated organizations, titles, and years of experience.

Table 1.3-1. Discipline Experts

Discipline	Technical Expert	Affiliated Organization	Title/Years of Experience
Transportation	Scott Mansur	DKS Associates	Senior Transportation Engineer/19 years
	Peter Coffey	DKS Associates	Senior Transportation Engineer/31 years
	Kate Petak	DKS Associates	Transportation Associate/4 years
	Jennifer John	CH2M	Senior Technologist/23 years
	Randy Parker	John Parker Consulting, LLC	Principal/24 years
Editors	Ryan Farncomb	CH2M	Senior Transportation Planner/7 years
	Scott Richman	CH2M	Senior Transportation Planner/24 years
	Lynda Wannamaker	Wannamaker Consulting	President/33 years
	Zach Galloway	City of Eugene	Senior Planner/10 years
	Chris Henry	City of Eugene	Transportation Planning Engineer/ 18 years
	Matt Rodrigues	City of Eugene	Traffic Engineer/12 years
	Rob Inerfeld	City of Eugene	Transportation Planning Manager/12 years
	Kelly Hoell	LTD	Development Planner/12 years

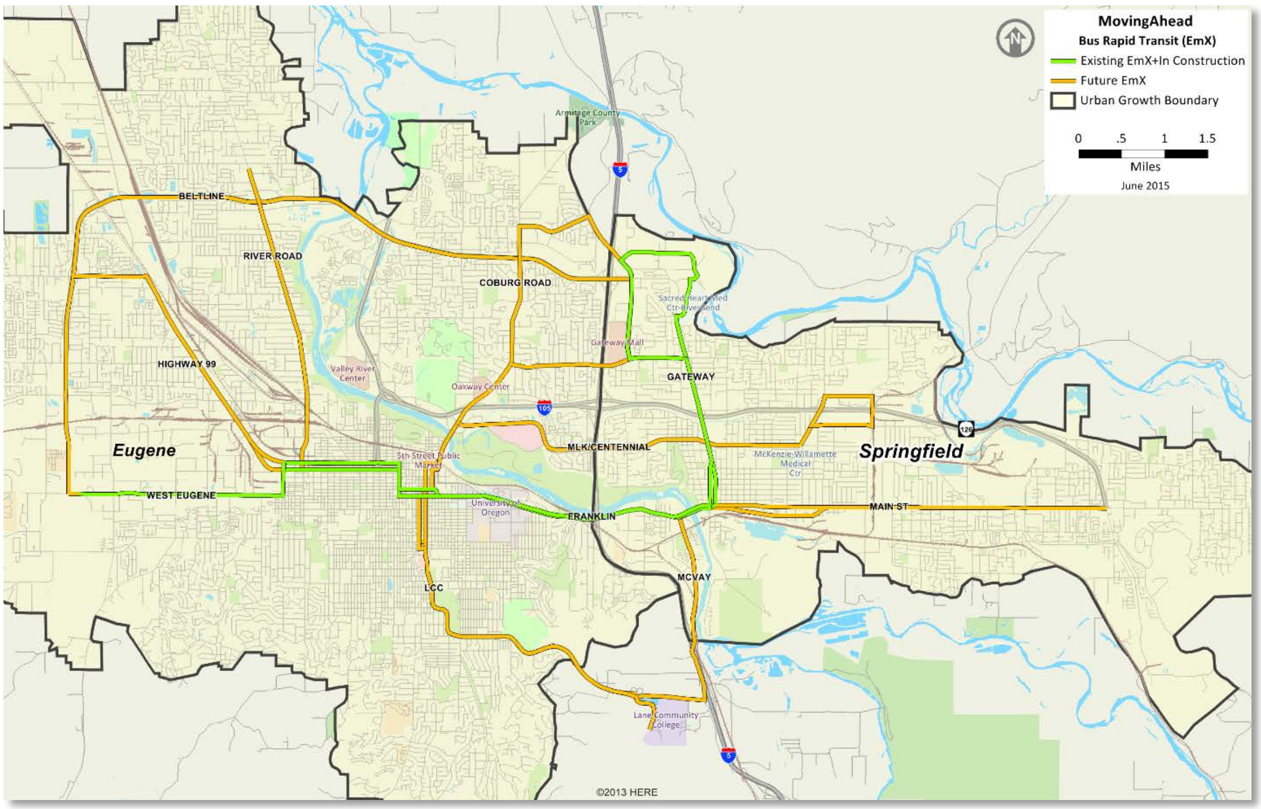
Source: MovingAhead Project Team. (2017).

1.4. Study Background

The purpose of the MovingAhead Project is to determine which high-capacity transit corridors identified in the adopted *Central Lane Metropolitan Planning Organization Regional Transportation Plan* (Lane Council of Governments [LCOG], 2011, December; RTP) and the *Lane Transit District Long Range Transit Plan* (Lane Transit District [LTD], 2014) as part of the Frequent Transit Network (FTN) are ready to advance to capital improvements programming in the near term. The study is being conducted jointly with the City of Eugene and LTD to facilitate a streamlined and cost-efficient process through concurrent planning, environmental review, and design and construction of multiple corridors. The study area includes Eugene and portions of unincorporated Lane County.

The *Lane Transit District Long-Range Transit Plan* (LTD, 2014) identifies the full Martin Luther King, Jr. Boulevard/Centennial Boulevard Corridor as a future part of the FTN. Initially, MovingAhead considered options on Centennial Boulevard to serve Springfield as part of this corridor. Because Springfield does not have the resources available to consider transit enhancements on Centennial Boulevard at this time, MovingAhead will only develop Emerald Express (EmX) and Enhanced Corridor Alternatives within Eugene. Figure 1.4-1 presents LTD's existing and future bus rapid transit (BRT) system.

Figure 1.4-1. Lane Transit District's Bus Rapid Transit (BRT) System



Source: LTD. (2015, Amended 2015, June).

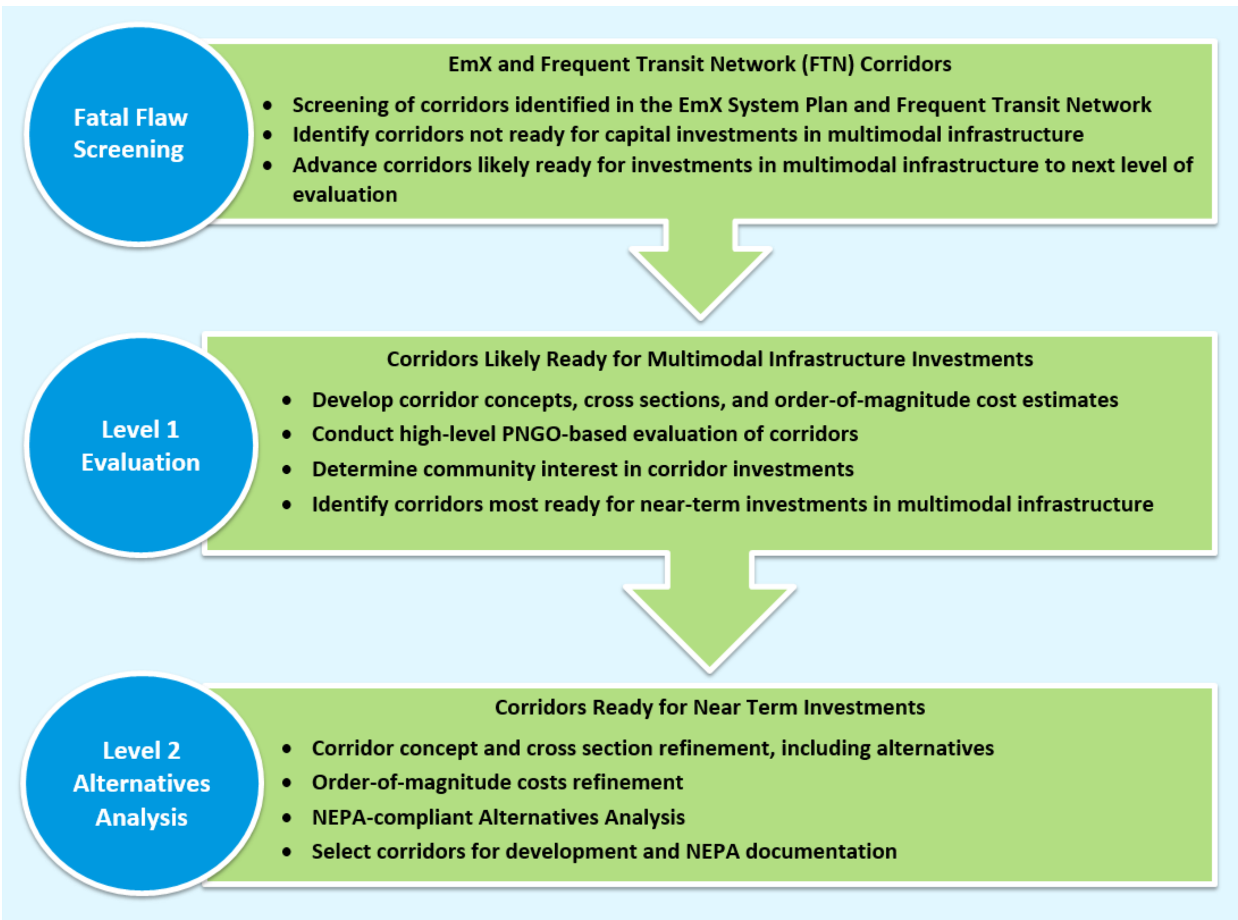
1.5. Screening and Evaluation of Multimodal Options

The MovingAhead Project process includes two phases. This first phase has three discrete but closely related tasks: identifying transit improvements; identifying improvements for bicyclists, pedestrians, and users of mobility devices; and preparing a NEPA-compliant evaluation of alternatives focused on the region's transportation system. Corridor options identified as part of the first phase were developed using multimodal cross sections that include variations on automobile, truck, and bus travel lanes; bicycle lanes; landscaping strips; and sidewalks. At the end of the first phase, the City of Eugene and LTD will select the corridors that are most ready for near-term capital improvements and prioritize improvements for funding. The selected corridors will be advanced to the second phase, which will focus on preparing NEPA environmental reviews (Documented Categorical Exclusions), and initiating the Federal Transit Administration (FTA) project development process.

1.5.1. Fatal Flaw Screening

The project team conducted a fatal flaw screening in February 2015 to identify which of the 10 corridors should not move forward to the Level 1 Screening Evaluation (Figure 1.5-1). This high-level evaluation used criteria based on MovingAhead's Purpose, Need, Goals, and Objectives (LTD, 2015, Amended 2015, June) and existing data to determine which corridors were not ready for capital investment in BRT or multimodal infrastructure in the next 10 years. The screening was conducted with local, regional, and state agency staff. Of the 10 corridors identified, the following three corridors were not advanced from the fatal flaw screening to the Level 1 Screening Evaluation: 18th Avenue, Bob Straub Parkway, and Randy Papé Beltline Highway. Table 1.5-1 shows the results of the fatal flaw screening.

Figure 1.5-1. MovingAhead Phase 1 Steps



Source: Wannamaker Consulting. (2015).

Although originally advanced from the fatal flaw screening, the Main Street-McVay Highway Corridor was also not advanced to the Level 1 Screening Evaluation because the Springfield City Council (on May 18, 2015) and LTD Board (on May 20, 2015) determined that the corridor is ready to advance to a study to select a locally preferred transit solution. At the time (May 2015), the Main Street-McVay Highway Corridor was on a schedule ahead of the MovingAhead Project schedule. If the Main Street-McVay Highway Corridor study schedule is delayed and its progress coincides with this project, the corridor could be reincorporated back into MovingAhead.

Table 1.5-1. Results of the Fatal Flaw Screening

Corridor	Advanced to Level 1	Consider Later
Highway 99	✓	
River Road	✓	
Randy Papé Beltline		✓
18th Avenue		✓
Coburg Road	✓	
Martin Luther King Jr. Boulevard/Centennial Boulevard	✓	
30th Avenue to Lane Community College	✓	
Main Street-McVay Highway	✓	
Valley River Center	✓	
Bob Straub Parkway		✓

Source: LTD and City of Eugene. (2015, June).

The six remaining multimodal corridors were advanced to the Level 1 Screening Evaluation to determine how they compared with each other in meeting the Purpose, Need, Goals, and Objectives.

1.5.2. Level 1 Screening Evaluation

The Level 1 Screening Evaluation assessed how each corridor would perform according to the Purpose, Need, Goals, and Objectives of MovingAhead. The Level 1 Screening Evaluation used existing studies and readily available data to evaluate each corridor. Based on community input and technical analysis, the following corridors and alternatives were advanced from the Level 1 Screening Evaluation to the Level 2 Alternatives Analysis (AA) (Table 1.5-2):

- No-Build Alternatives: all corridors
- Enhanced Corridor and EmX Alternatives:
  - Highway 99 Corridor
  - River Road Corridor
  - 30th Avenue to Lane Community College (LCC) Corridor
  - Coburg Road Corridor
- Enhanced Corridor Alternative:
  - Martin Luther King Jr. Boulevard Corridor

The Valley River Center Corridor received the least public support during public outreach and was not carried forward to the Level 2 AA.

Table 1.5-2. **Corridors and Transit Alternatives Advanced to the Level 2 Alternatives Analysis**

Corridor	No-Build	Enhanced Corridor	EmX
Highway 99	✓	✓	✓
River Road	✓	✓	✓
30th Avenue to Lane Community College	✓	✓	✓
Coburg Road	✓	✓	✓
Martin Luther King, Jr. Boulevard	✓	✓	

Source: CH2M. (2016a).

For a detailed discussion of alternatives and design options considered for each corridor, but not carried forward to the Level 2 AA, please refer to the *Alternatives and Design Options Considered but Eliminated Technical Memorandum* (CH2M, 2016a).

1.5.3. Level 2 Alternatives Analysis

To guide the Level 2 AA, LTD prepared new ridership forecasts and related evaluation measures using the LCOG regional model. Base-year and future-year forecasts were prepared for corridor alternatives based upon updated inputs and transit networks specific to each corridor. The planning horizon year used for the Level 2 AA is 2035. The built and natural environments, transit operations, traffic, finance, historical resources, and other areas were also evaluated as part of the Level 2 AA. The findings from the Level 2 AA will aid LTD and the City of Eugene in determining how corridors should be prioritized for capital investments over the next 5 years. Selected corridors will be advanced to Phase 2.

1.6. Purpose and Need

The prioritization of capital investments in multimodal transit corridors is a powerful tool for implementing local and regional comprehensive land use and transportation plans, agency strategic plans, and other community planning documents. Capital investments in multimodal transit corridors can have a substantial impact on patterns of growth and development. By coordinating the timing of, and prioritizing the funding for, strategic multimodal capital investments, the MovingAhead Project (a multimodal transit corridor study) helps ensure that future development is consistent with our region's plans and vision.

The Purpose and Need Statement was refined based on public and agency input.

1.6.1. Purpose

The purpose of the MovingAhead Project is to:

- Develop a Capital Improvements Program that forecasts and matches projected revenues and capital needs over a 10-year period
    - o Balance desired multimodal transit corridor improvements with the community's financial resources
    - o Ensure the timely and coordinated construction of multimodal transit corridor infrastructure
    - o Eliminate unanticipated, poorly planned, or unnecessary capital expenditures

- Identify the most economical means of financing multimodal transit corridor capital improvements
- Establish partnerships between LTD, City of Eugene, and other local agencies that prioritize multimodal transit infrastructure needs and promote interagency cooperation
- Ensure that multimodal transit corridor investments are consistent with local comprehensive land use and transportation plans

1.6.2. Need

The need for the MovingAhead Project is based on the following factors:

- LTD's and the region's commitment to implementing the region's vision for BRT in the next 20 years consistent with the RTP that provides the best level of transit service in a cost-effective and sustainable manner.
- Need for streamlined environmental reviews to leverage systemwide analysis.
- Need to build public support for implementation of the systemwide vision.
- Selection of the next EmX/FTN corridors is based on long-range operational and financial planning for LTD's service.

1.6.3. Goals and Objectives

Goal 1: Improve multimodal transit corridor service

Objective 1.1: Improve transit travel time and reliability

Objective 1.2: Provide convenient transit connections that minimize the need to transfer

Objective 1.3: Increase transit ridership and mode share in the corridor

Objective 1.4: Improve access for people walking and bicycling, and to transit

Objective 1.5: Improve the safety of pedestrians and bicyclists accessing transit, traveling in and along the corridor, and crossing the corridor

Goal 2: Meet current and future transit demand in a cost-effective and sustainable manner

Objective 2.1: Control the increase in transit operating cost to serve the corridor

Objective 2.2: Increase transit capacity to meet current and projected ridership demand

Objective 2.3: Implement corridor improvements that provide an acceptable return on investment

Objective 2.4: Implement corridor improvements that minimize impacts to the environment and, where possible, enhance the environment

Objective 2.5: Leverage funding opportunities to extend the amount of infrastructure to be constructed for the least amount of dollars

Goal 3: Support economic development, revitalization, and land use redevelopment opportunities for the corridor

Objective 3.1: Support development and redevelopment as planned in other adopted documents

Objective 3.2: Coordinate transit improvements with other planned and programmed pedestrian and bicycle projects

Objective 3.3: Coordinate transit improvements with other planned and programmed roadway projects

Objective 3.4: Minimize adverse impacts to existing businesses and industry

Objective 3.5: Support community vision for high capacity transit in each corridor

Objective 3.6: Improve transit operations on state facilities in a manner that is mutually beneficial to vehicular and freight traffic flow around transit stops and throughout the corridor

Objective 3.7: Improve transit operations in a manner that is mutually beneficial to vehicular traffic flow for emergency service vehicles

1.6.4. Evaluation Criteria

Evaluation criteria will be used during the Trade-off Analysis, which is part of the Level 2 AA, to aid in determining how well each of the corridor alternatives would meet the project's Purpose, Need, Goals, and Objectives. The evaluation criteria require a mix of quantitative data and qualitative assessment. The resulting data will be used to measure the effectiveness of each proposed corridor alternative and to assist in comparing and contrasting the alternatives and options. In Table 1.6-1, evaluation criteria are listed for each of the project's objectives. Some objectives have only one criterion for measuring effectiveness, while others require several criteria.

Table 1.6-1. Evaluation Criteria

Goals and Objectives		Evaluation Criteria
Goal 1: Improve multimodal transit corridor service		
Objective 1.1:	Improve transit travel time and reliability	• Round trip p.m. peak transit travel time between select origins and destinations • On-time performance (no more than 4 minutes late) of transit service
Objective 1.2:	Provide convenient transit connections that minimizes the need to transfer	• Number of transfers required between heavily used origin-destination pairs
Objective 1.3:	Increase transit ridership and mode share in the corridor	• Average weekday boardings on corridor routes • Transit mode share along the corridor • Population within 0.5 mile of transit stop • Employment within 0.5 mile of transit stop
Objective 1.4:	Improve access for people walking and bicycling, and to transit	• Connectivity to existing pedestrian facilities • Connectivity to existing bicycle facilities
Objective 1.5:	Improve the safety of pedestrians and bicyclists accessing transit, traveling in and along the corridor, and crossing the corridor	• Opportunity to provide a safe and comfortable environment for pedestrians and bicyclists in the corridor
Goal 2: Meet current and future transit demand in a cost-effective and sustainable manner		
Objective 2.1:	Control the increase in transit operating cost to serve the corridor	• Cost per trip • Impact on LTD operating cost • Cost to local taxpayers
Objective 2.2:	Increase transit capacity to meet current and projected ridership demand	• Capacity of transit service relative to the current and projected ridership
Objective 2.3:	Implement corridor improvements that provide an acceptable return on investment	• Benefit/cost assessment of planned improvements
Objective 2.4:	Implement corridor improvements that minimize impacts to the environment and, where possible, enhance the environment	• Results of screening-level assessment of environmental impacts of transit solutions
Objective 2.5:	Leverage funding opportunities to extend the amount of infrastructure to be constructed for the least amount of dollars	• Number and dollar amount of funding opportunities that could be leveraged • Meet the FTA's Small Starts funding requirements

Table 1.6-1. Evaluation Criteria

Goals and Objectives		Evaluation Criteria
Goal 3:	**Support economic development, revitalization and land use redevelopment opportunities for the corridor**	
Objective 3.1:	Support development and redevelopment as planned in other adopted documents	• Consistent with the Long Range Transit Plan (LTD, 2014) and FTN concept • Consistent with the *Regional Transportation System Plan* (Central Lane Metropolitan Planning Organization [MPO], 2007) • Consistent with local comprehensive land use plans
Objective 3.2:	Coordinate transit improvements with other planned and programmed pedestrian and bicycle projects	• Capability of transit improvement to coordinate with other planned and programmed pedestrian and bicycle projects identified in adopted plans and Capital Improvements Programs
Objective 3.3:	Coordinate transit improvements with other planned and programmed roadway projects	• Capability of transit improvement to coordinate with other planned and programmed roadway projects identified in adopted plans and Capital Improvements Programs
Objective 3.4:	Minimize adverse impacts to existing businesses and industry	• Impacts to businesses along the Corridor measured in number and total acres of properties acquired, parking displacements, and access impacts. • Impact on freight and delivery operations for Corridor businesses
Objective 3.5:	Support community vision for high capacity transit in corridor	• Community vision includes high capacity transit in corridor
Objective 3.6:	Improve transit operations on state facilities in a manner that is mutually beneficial to vehicular and freight traffic flow around transit stops and throughout the corridor	• Impact on current and future year intersection level of service (LOS) on state facilities • Impact on current and future year p.m. peak hour auto/truck travel times on state facilities
Objective 3.7:	Improve transit operations in a manner that is mutually beneficial to vehicular traffic flow for emergency service vehicles	• Qualitative assessment of potential impacts to emergency service vehicle traffic flow and access

Source: LTD and City of Eugene. (2015).

LOS = level of service

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2. Alternatives Considered

This section briefly reviews the major features of the alternatives considered in the Level 2 AA. For full details on each alternative and the five corridors described in this technical report – Highway 99, River Road, 30th Avenue to LCC, Coburg Road, and Martin Luther King, Jr. Boulevard – refer to the *MovingAhead Level 2 Definition of Alternatives* (CH2M et al., 2016). Each corridor location is shown on Figures 2.1-1 and 2.1-2 for the Enhanced Corridor Alternatives and the EmX Alternatives, respectively.

Figure 2.1-1. Enhanced Corridor Alternatives Overview

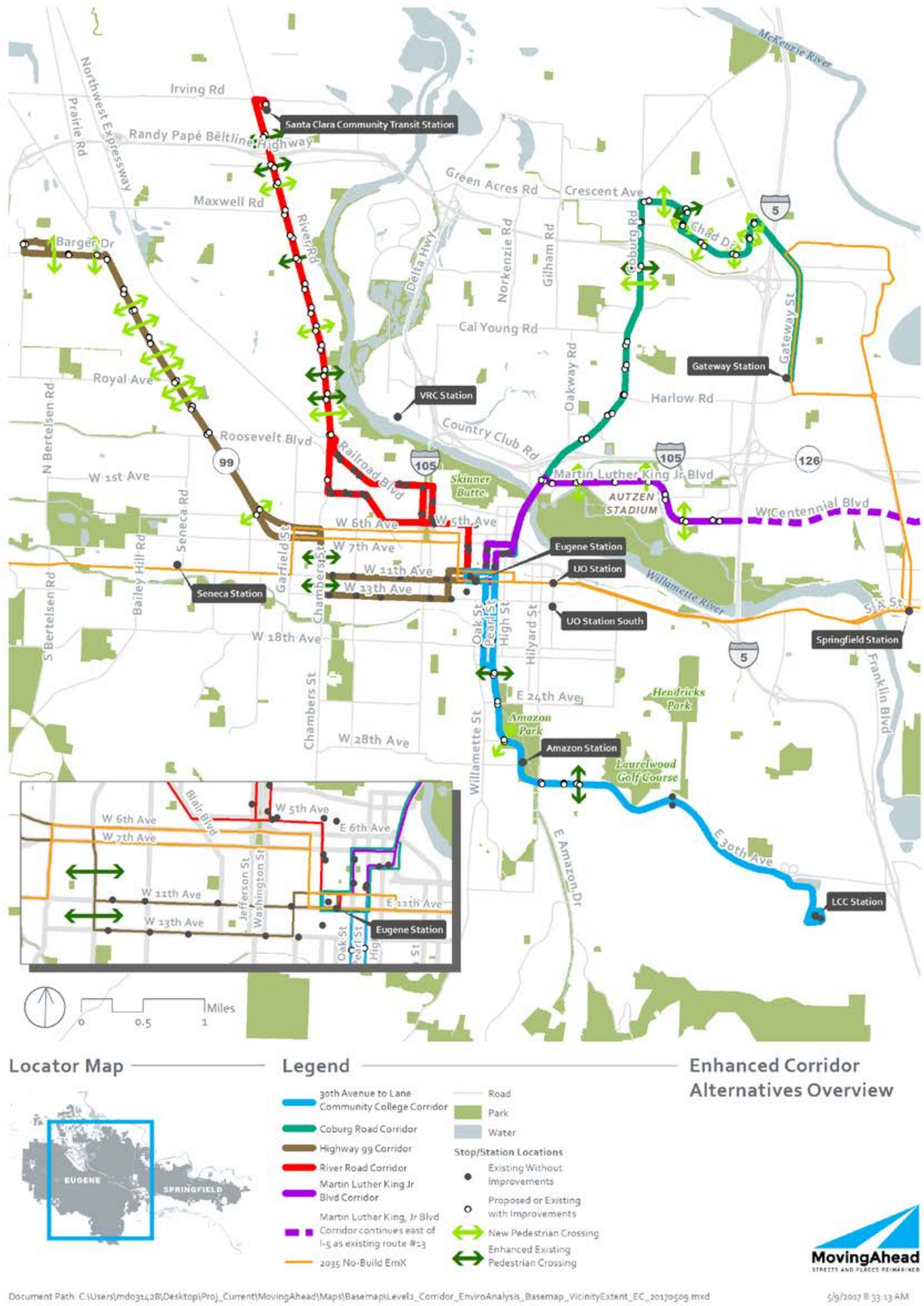
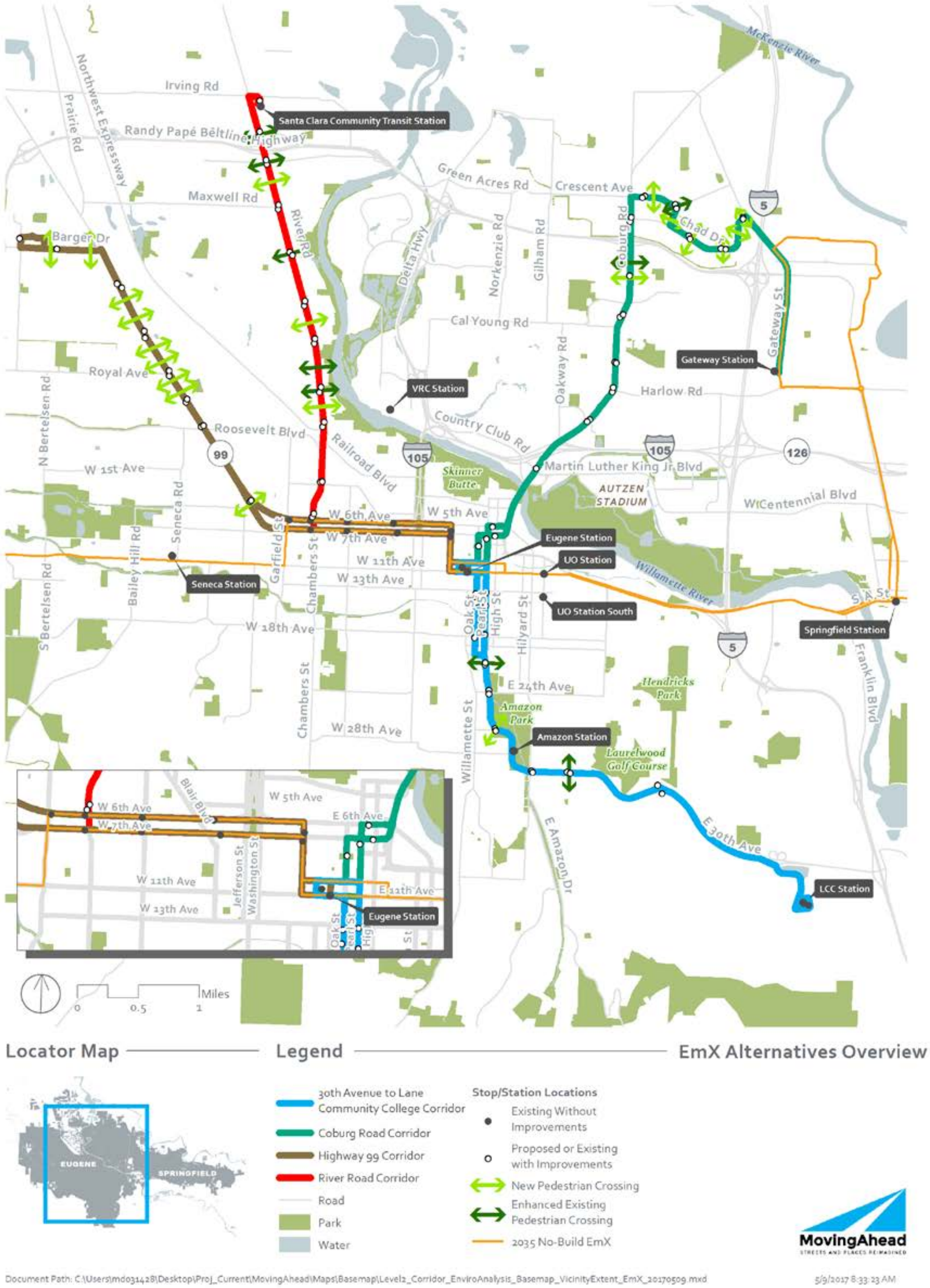


Figure 2.1-2. EmX Alternatives Overview



2.1. No-Build Alternative Transit Network

This section describes the No-Build Alternative transit network, which is based on projected conditions in the year 2035, the project's environmental forecast year. For each corridor, the No-Build Alternative serves as a reference point to gauge the benefits, costs, and effects of the build alternatives.

2.1.1. Capital Improvements

Under the No-Build Alternative, the following capital improvements are anticipated by 2035:

- **West Eugene EmX Extension**. Currently under construction, the West Eugene EmX Extension (WEEE) project and its associated capital improvements will be completed in 2017.
- **Santa Clara Community Transit Center**. The existing River Road Station is located at the southeast corner of the River Road/Randy Papé Beltline Highway interchange between the eastbound on-ramp and River Avenue. To meet growing demand and avoid the impacts of increasing congestion, LTD plans to relocate the River Road Station to a site north of the Randy Papé Beltline Highway at the southeast corner of River Road and Hunsaker Lane. Once relocated to the new site, the River Road Station would be renamed the Santa Clara Community Transit Center. This new transit center is planned to include a mix of uses including a park and ride lot, residential housing, community space, and commercial uses. The River Road Station relocation to the new site is anticipated to be completed by the end of 2018.
- **Main Street EmX Extension**. Included in the RTP and currently under study, the extension of the existing Franklin EmX line on Main Street from Springfield Station to Thurston Station and associated capital improvements (e.g., stations, bicycle and pedestrian facilities, and signal modifications) is anticipated to be completed within the 20-year planning horizon (2035). The No-Build Alternative transit network assumes EmX service on Main Street. However, the outcome of this study, and the ultimate improvements chosen, are uncertain at this time.
- **McVay Highway Enhanced Corridor**. Included in the RTP and currently under study, Enhanced Corridor service from Springfield Station on McVay Highway to LCC and associated capital improvements (e.g., improved stops, transit queue jumps, and improved bicycle and pedestrian crossings) is anticipated to be completed within the 20-year planning horizon (2035).

2.1.2. Transit Operations

The No-Build Alternatives for each corridor include changes to transit service anticipated as a result of the WEEE project, Main Street EmX Extension project, development of the Santa Clara Community Transit Center, and other changes to fixed route service. The following changes to the existing 2016 fixed route services are anticipated by 2035:

- Eliminated routes:
    - Route 11 (replaced by Main Street EmX service)
    - Route 32 (replaced by WEEE service)
    - Route 76 (replaced by WEEE service)
    - Route 85 (replaced by Enhanced Corridor service on the McVay Highway)
    - Route 43 (replaced by WEEE service)
- Other route modifications:
    - Add WEEE service (replaces Route 43 service on W. 11th Avenue) as extension of existing EmX service
    - Add Main Street EmX service from Springfield Station to Thurston Station
    - Add Route 2 with service from Barger Drive/Echo Hollow Road to Eugene Airport

- Add Route 16 to connect north and south of Main Street with EmX service
- Add Enhanced Corridor service on McVay Highway from Springfield Station to LCC (replaces Route 85)
- Reroute Route 33 and extend to Amazon Parkway
- Reroute Route 36 to extend north of W. 11th Avenue to Barger Drive (replaces Route 43)
- Reroute Route 41 via Highway 99/Royal Avenue/W. 11th Avenue
- Reroute Route 40 via Royal Avenue/Elmira Road/Roosevelt Boulevard/Chambers Street/W. 2nd Avenue/Oak and Pearl Streets
- Add Route 44 paralleling Route 40 above to serve West Eugene
- Reroute Route 55 to extend to Santa Clara Community Transit Center
- Reroute Route 93 with service continuing to Eugene Station via Seneca Station and service terminating at the WEEE terminus

- Change in service frequencies:
  - Increase service on Route 24 from 30-minute peak frequencies to 15-minute peak frequencies
  - Increase service on Route 28 from approximately 30-minute peak frequencies (varying 20- to 30-minute intervals) to 15-minute peak frequencies
  - Increase service on Route 41 from 30- and 15-minute peak frequencies to 15-minute peak frequencies
  - Increase service on Route 51 from 60-minute off-peak frequencies to 30-minute off-peak frequencies
  - Increase service on Route 52 from 60-minute off-peak frequencies to 30-minute off-peak frequencies
  - Increase service on Route 66 from 30- and 15-minute weekday a.m. peak, off-peak, and p.m. peak frequencies to 15-minute weekday a.m. peak, off-peak, and p.m. peak frequencies
  - Increase service on Route 67 from approximately 30-minute weekday a.m. peak, off-peak, and p.m. peak frequencies to 15-minute weekday a.m. peak, off-peak, and p.m. peak frequencies
  - Increase service on Route 78 from approximately 60-minute frequencies from 8 a.m. to 6 p.m. to 30-minute weekday a.m. peak, off-peak, and p.m. peak frequencies
  - Increase service on Route 79x from 30-minute peak frequencies to 10-minute peak frequencies, and modify off peak frequencies to 15 minutes from between 10 and 30 minutes currently
  - Decrease a.m. peak service on Route 93 from 60-minute frequencies to 120-minute frequencies during a.m. peak hours, and increase from no service between Veneta and the WEEE terminus to 120-minute frequencies during p.m. peak hours (off-peak service is 120-minute frequencies between Veneta and the WEEE terminus)
  - Decrease a.m. peak service on Route 96 from 30-minute frequencies to 60-minute frequencies, and increase off-peak service from no service between 8:20 a.m. and 3:40 p.m. to 60-minute off-peak frequencies

Key transportation improvements specific to each corridor are described under each corridor’s No-Build Alternative.

2.2. Enhanced Corridor Alternatives

Enhanced Corridor Alternatives are intended to address the project’s Purpose, Need, Goals, and Objectives without major transit capital investments, instead focusing on lower-cost capital improvements, operational improvements, and transit service refinements. Features could include transit queue jumps (lanes for buses that allow the bus to “jump” ahead of other traffic at intersections using a separate signal phase), stop consolidation, enhanced shelters, and redesigned service to improve cross-town connectivity. These features improve reliability, reduce transit travel time, and increase passenger comfort.

Enhanced Corridor service would run from 6:45 a.m. to 11:30 p.m. weekdays, 7 a.m. to 11 p.m. Saturdays, and 8 a.m. to 8 p.m. Sundays. Service frequencies are assumed to be 15 minutes during all periods.

2.3. EmX Alternatives

EmX (BRT) Alternatives are characterized by exclusive guideways (business access and transit lanes [BAT] or bus-only lanes); branded, multi-door 60-foot-long BRT vehicles; enhanced stations with level boarding platforms instead of stops; off-board fare collection; signal priority; wider stop spacing; and frequent and redesigned service to improve cross-town connectivity.

EmX service is assumed to run from 6:45 a.m. to 11:30 p.m. weekdays, 7 a.m. to 11 p.m. Saturdays, and 8 a.m. to 8 p.m. Sundays. Service frequencies are assumed to be 10 minutes during all periods.

2.4. Highway 99 Corridor

The Highway 99 Corridor begins at the Eugene Station, travels through downtown, then extends northwest along Highway 99 to Barger Drive, turning west at Barger Drive to terminate on Cubit Street north of the intersection of Barger Drive and Cubit Street east of the Randy Papé Beltline Highway. This corridor is approximately 10.5 round-trip miles.

2.4.1. No-Build Alternative

The Highway 99 Corridor No-Build Alternative includes existing roadway, bicycle, pedestrian, and transit facilities in the corridor, as well as planned improvements in the *DRAFT Eugene 2035 Transportation System Plan* (City of Eugene, 2016; Draft Eugene 2035 TSP). The No-Build Alternative would not include capital improvements on Highway 99. As part of the Draft Eugene 2035 TSP, the following transportation improvements are planned along or adjacent to the corridor:

- Upgrade Bethel Drive, from Highway 99 to Roosevelt Boulevard, to a two-lane urban facility with sidewalks on both sides of the road, bicycle lanes, and planting strips
- Widen Barger Drive immediately west of the Randy Papé Beltline Highway interchange to include an additional travel lane in each direction
- Add a shared-use path on the west side of Highway 99 from Roosevelt Boulevard south to the intersection of W. 7th Avenue and Garfield Street (the section of this project from Roosevelt to W. 5th Avenue has been completed)
- Add bicycle lanes on Garfield Street from Roosevelt Boulevard south to W. 6th Avenue
- Add a bicycle lane on W. 6th Avenue from Garfield Street to W. 5th Avenue
- Complete the sidewalk network on Highway 99 from Roosevelt Boulevard south to Garfield Street
- Add a shared-use path on Roosevelt Boulevard from Maple Street to Highway 99
- Add a bicycle lane on Roosevelt Boulevard from Highway 99 east to railroad tracks

Under the No-Build Alternative, Highway 99 Corridor service would remain at 15-minute headways during peak periods and 30-minute headways during off-peak periods and evenings. Under the No-Build Alternative, a slight change is also made to Route 93, which would stop at the Pearl Buck Center in the absence of Route 44.

2.4.2. Enhanced Corridor Alternative

Capital improvements under the Highway 99 Corridor Enhanced Corridor Alternative would include enhanced bicycle and pedestrian crossings; improvements to existing bus stops and the construction of new stops; construction of queue jumps at some intersections; traffic signal reconstruction; construction of bus-only left turn lanes; and roadway widening at some locations in the corridor.

Existing conventional fixed-service routes would remain the same as with the No-Build Alternative, with the exception of the elimination of Route 41. Service west of WinCo would also remain the same or be improved.

2.4.3. EmX Alternative

The Highway 99 Corridor EmX Alternative would include creating BAT lanes on segments of W. 7th Avenue and Highway 99; reconstructing the Highway 99/Roosevelt Boulevard intersection (traffic signal, turn lanes, and queue jump); completing other intersection modifications in the corridor; roadway widening at some locations; and constructing nine new enhanced pedestrian and bicycle crossings, new sidewalks, and a pedestrian bridge across the railroad line from Highway 99 to the Trainsong neighborhood. Four existing bus stop locations would be improved to EmX stations, in addition to constructing new stations. Some existing EmX stations would be used for the Highway 99 Corridor EmX service.

Route 44 is a conventional service line added to this alternative only, providing coverage on 11th and 13th Avenues as well as service to the Pearl Buck Center on W. 1st Avenue, with 30-minute headways during all periods. This would be a decrease in service for the 11th and 13th Avenue corridors that currently have 15-minute peak service. Route 44 is primarily intended to replace conventional service lost with the removal of the existing Route 41. Route 41 would be replaced with the Highway 99 Corridor EmX service described in this alternative.

2.5. River Road Corridor

The River Road Corridor begins at the Eugene Transit Center, travels through downtown and then north to the Santa Clara Community Transit Center (intersection of Hunsaker Lane and River Road). This corridor is approximately 10.3 round-trip miles.

2.5.1. No-Build Alternative

The River Road Corridor No-Build Alternative would include existing roadway, bicycle, pedestrian, and transit facilities in the corridor, as well as planned improvements in the Draft Eugene 2035 TSP. There would be no additional major bus capital improvements under the No-Build Alternative.

As part of the Draft Eugene 2035 TSP, the following transportation improvements are planned adjacent to and along the River Road Corridor:

- Upgrade the Hunsaker Lane/Beaver Street intersection to urban collector standards, including two travel lanes, a center turn lane, bicycle lanes, sidewalks on both sides of the road, and planting strips from River Road to Division Avenue
- Provide bicycle boulevards on Ruby Avenue, Horn Lane, Arbor Drive, and Park Avenue
- Include sidewalks on Hunsaker Lane, Howard Avenue, and Hilliard Lane
- Provide protected bicycle lanes on River Road from the Northwest Expressway to Division Avenue

Under the No-Build Alternative, River Road Corridor service would remain at 30-minute headways for both Routes 51 and 52 (which together effectively provide 15-minute service during peak periods) and off-peak periods. After 6:15 p.m., there is no longer a combined 15-minute frequency, and headways return to 30 minutes.

2.5.2. Enhanced Corridor Alternative

Capital improvements constructed as part of the River Road Corridor Enhanced Corridor Alternative would include BAT lanes on River Road approaching the Randy Papé Beltline Highway and other roadway improvements, like traffic signal reconstruction at certain locations along the corridor. Improvements to existing bus stops and the construction of new stops would also occur.

Routes 51 and 52 would be eliminated, and Enhanced Corridor service for River Road includes a split alignment in order to serve portions covered by those routes at 30-minute headways. In this arrangement, the area from Railroad Boulevard to W. 1st Avenue is served by one Enhanced Corridor service as a replacement for the Route 51 service, while the area along Blair Boulevard and W. 2nd Avenue is served by the other alignment to replace service lost with removal of Route 52. Those alignments meet at Railroad Boulevard and River Road to serve the River Road Corridor with consistent 15-minute headways.

2.5.3. EmX Alternative

New construction under the River Road Corridor EmX Alternative would include lane repurposing on River Road for BAT lanes; constructing short sections of exclusive bus lanes near the Randy Papé Beltline Highway; reconstructing traffic signals and intersections at several locations; constructing new bicycle and pedestrian crossings; improving existing stops to EmX stations; and constructing new stations. Some existing EmX stations would be used with the River Road Corridor EmX service.

Transit service changes would also include modifying headways on Route 40 during the a.m. and p.m. peak hours to 15 minutes, developing a new Route 50 “River Road Connector” with 30-minute headways all day, and eliminating Routes 51, 52, and 55. These replacements ensure no loss in existing coverage or service.

2.6. 30th Avenue to Lane Community College Corridor

The 30th Avenue to LCC Corridor begins at Eugene Station and travels south along Pearl Street (outbound) to Amazon Parkway, then on E. 30th Avenue to its terminus at the LCC Station. The return trip travels on Oak Street (inbound), which is the northbound couplet to Pearl Street. This corridor is approximately 10.2 round-trip miles.

2.6.1. No-Build Alternative

The 30th Avenue to LCC Corridor No-Build Alternative would include existing roadway, bicycle, pedestrian, and transit facilities in the corridor, as well as planned improvements in the Draft Eugene 2035 TSP. There would be no additional major bus capital improvements to the 30th Avenue to LCC Corridor under the No-Build Alternative.

The Draft Eugene 2035 TSP identifies the following transportation improvements along or adjacent to the corridor:

- Bicycle boulevard on Alder Drive

For the portion of E. 30th Avenue in unincorporated Lane County, Lane County does not plan to improve bicycle facilities along the road.

Under the No-Build Alternative, 30th Avenue to LCC Corridor service would remain at 30-minute headways on Route 81. The Route 82 service would remain at 10-minute headways during the a.m. peak, 15-minute headways during off-peak periods, and 20-minute headways during the p.m. peak, with no weekend service.

2.6.2. Enhanced Corridor Alternative

Capital improvements as part of the 30th Avenue to LCC Corridor Enhanced Corridor Alternative would include the construction of new bus stops, capital improvements to some existing bus stops, a new traffic signal on Amazon Parkway at E. 20th Avenue, and new bike facilities on Oak and Pearl Streets.

Under the 30th Avenue to LCC Corridor Enhanced Corridor Alternative, service to LCC provided by Routes 81 and 82 would be eliminated and replaced by Enhanced Corridor service. The direct connection between LCC and the University of Oregon Station along Route 81 would be eliminated. It would be replaced by connecting the 30th Avenue to LCC Corridor Enhanced Corridor Alternative to the Franklin EmX line with a transfer at Eugene Station.

2.6.3. EmX Alternative

The 30th Avenue to LCC Corridor EmX Alternative would include repurposing parking and general-purpose lanes to BAT lanes on Oak and Pearl Streets, constructing queue jumps, extending E. 20th Avenue, adding a new traffic signal on Amazon Parkway, and adding a new cycle track on High Street. In addition to constructing new EmX stations, existing bus stops would be improved to EmX stations in certain locations.

Service to LCC provided by Routes 81 and 82 would be replaced with EmX service. The direct connection between LCC and the University of Oregon Station along Route 81 would be eliminated. It would be replaced by connecting the 30th Avenue to LCC Corridor EmX Alternative to the Franklin EmX line with a transfer at Eugene Station.

2.7. Coburg Road Corridor

The Coburg Road Corridor begins at Eugene Station and continues to Coburg Road using the Ferry Street Bridge. The corridor continues north on Coburg Road to Crescent Avenue, east on Crescent Avenue and Chad Drive to N. Game Farm Road, and south on N. Game Farm Road and Gateway Street to the existing Gateway Station at the Gateway Mall. Although service extends from N. Game Farm Road to the Gateway Station, capital improvements for the corridor terminate at Interstate 5 (I-5). This corridor is approximately 11.2 round-trip miles.

2.7.1. No-Build Alternative

The Coburg Road Corridor No-Build Alternative includes existing roadway, bicycle, pedestrian, and transit facilities in the corridor, as well as planned improvements in the Draft Eugene 2035 TSP. There would be no additional major transportation improvements to the Coburg Road Corridor under the No-Build Alternative.

Under the No-Build Alternative, the Coburg Road Corridor service would remain at 15-minute headways on Routes 66 and 67 at all weekday times, 30-minute headways on Saturdays, and 60-minute headways on Sundays.

2.7.2. Enhanced Corridor Alternative

The Coburg Road Corridor Enhanced Corridor Alternative would include new traffic signal construction, intersection reconstruction at several locations on Coburg Road, the addition of queue jumps, and the addition of BAT lanes south of the Interstate 105 (I-105) interchange. New crossings for bicyclists and pedestrians would be constructed. Existing bus stops would be improved and new stops would also be constructed.

Route 12 would be altered to serve Valley River Center and Marcola Road. A new route (Route 60) would be added to serve Valley River Center, and Routes 66 and 67 would be eliminated. This change would provide new service and coverage to the Cal Young neighborhood and along Hayden Bridge Way in Springfield. It would require current passengers along Harlow Road to transfer in order to get downtown.

2.7.3. EmX Alternative

Improvements to the corridor under the Coburg Road Corridor EmX Alternative would include construction of exclusive transit lanes at several locations on Coburg Road and intersection reconstruction at multiple locations. New bicycle and pedestrian crossings and EmX stations would be constructed, and some existing bus stops would be improved to EmX stations.

As in the Coburg Road Corridor Enhanced Corridor Alternative, Route 12 would be altered to serve Valley River Center and Marcola Road, and Route 60 would be added to serve Valley River Center, while Routes 66 and 67 would be eliminated. This change would provide new service and coverage to the Cal Young neighborhood and along Hayden Bridge Way in Springfield. It would require current passengers along Harlow Road to transfer in order to get downtown.

2.8. Martin Luther King, Jr. Boulevard Corridor

The Martin Luther King, Jr. Boulevard Corridor begins at Eugene Station and travels through downtown Eugene on Oak and Pearl Streets and on 7th and 8th Avenues. The corridor uses the Ferry Street Bridge to reach Martin Luther King, Jr. Boulevard and continues east on Martin Luther King, Jr. Boulevard past Autzen Stadium to Centennial Boulevard. Although transit service continues along Centennial Boulevard, capital improvements for the corridor terminate at I-5. The corridor is approximately 6 round-trip miles.

2.8.1. No-Build Alternative

The Martin Luther King, Jr. Boulevard Corridor No-Build Alternative includes existing roadway, bicycle, pedestrian, and transit facilities in the corridor, as well as planned improvements in the Draft Eugene 2035 TSP. The Draft Eugene 2035 TSP identifies the following transportation improvements along or adjacent to the Martin Luther King, Jr. Corridor:

- Add a center turn lane along sections of Martin Luther King, Jr. Boulevard from Club Road to Leo Harris Parkway

Under the No-Build Alternative, the Martin Luther King, Jr. Boulevard Corridor service would remain at 30-minute headways.

2.8.2. Enhanced Corridor Alternative

Capital improvements associated with the Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative would include reconstructing traffic signals at the intersections of Coburg Road and Martin Luther King, Jr. Boulevard and of Martin Luther King, Jr. Boulevard and Centennial Loop; repurposing existing outside general-purpose lanes to BAT lanes on Martin Luther King, Jr. Boulevard; adding a new traffic signal at the intersection of Martin Luther King, Jr. Boulevard and Leo Harris Parkway; enhancing pedestrian crossings; constructing new bus stops; and improving existing bus stops. Existing Route 13 would be eliminated.

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3. Methods and Data

3.1. Introduction

This section provides a description of the transportation-related methods and data used for the LTD and City of Eugene MovingAhead Project technical report. This report assumed that any corridors advanced for environmental review would require a Documented Categorical Exclusion under NEPA. Any corridors requiring a higher level of environmental review would be supported by this documentation but may not be fully covered.

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

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

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

- Methods and Data
- Relevant laws and regulations
- Contacts and coordination
- Analysis areas
- Data sources and collection methods
- Significance thresholds

3.1.1. Analysis Purpose

The purpose of this analysis was to identify potential benefits and impacts to the transportation system for the proposed No-Build, Enhanced Corridor, and EmX Alternatives. The findings of the analysis support the ultimate selection of locally preferred alternatives for key transportation corridors.

3.1.2. 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 2.1-2) and the Enhanced Corridor Alternatives (Figure 2.1-1) are ready to advance to capital improvements programming. The study is 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 five corridors under consideration in this study are:

- Highway 99 Corridor
- River Road Corridor
- 30th Avenue to LCC Corridor
- Coburg Road Corridor
- Martin Luther King, Jr. Boulevard Corridor

3.1.3. Methods

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

3.2. Level 2 Alternatives Analysis

The Level 2 AA included a refined analysis of five corridors advanced from the Level 1 Screening. These conceptual alternatives defined a mode (bus, enhanced bus, or EmX), route, stations, and transit treatment, and a "footprint" for the multimodal improvement to allow for environmental impacts assessments. Evaluation was a mix of qualitative and quantitative analysis including planning-level cost estimates, ridership, environmental impacts analysis, and transportation analysis. The elements assessed included: 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 is comparative information to support selection of a preferred alternative for each corridor.

3.2.1. Plan Consistency

The No-Build, Enhanced Corridor, and EmX Alternatives were evaluated for consistency with local plans, including the transit policies outlined in LTD's Long-Range Transit Plan and the goals outlined in the Draft Eugene 2035 TSP.

The *Lane Transit District Long Range Transit Plan* (LTD, 2014) identifies a current and proposed FTN for the Eugene-Springfield region and outlines the following characteristics for FTN corridors:

- Enables a well-connected network that provides regional circulation
- Compatible with and supportive of adjacent urban design goals
- Operates 7 days a week in select corridors
- Service hours are appropriate for the economic and social context of the area served
- Coverage consists of at least 16 hours a day, and area riders trip origins or destinations are within ¼ mile straight line distance
- Average frequency of 15 minutes or better
- Transit service is reliable and runs on schedule
- Transit stations are high quality with amenities, including bicycle and pedestrian connections to stations and end-of-trip facilities, such as bike parking and bike share

The *Long-Range Transit Plan* identifies elements of a Bus Rapid Transit (BRT) plan, defining it as the "highest level of service available within the FTN, and is a permanent, integrated system that uses buses or specialized vehicles on roadways or dedicated lanes to efficiently transport passengers" (LTD, 2014). BRT system elements include branded multi-door 60-foot-long BRT vehicles, enhanced stations with level boarding platforms instead of bus stops, off-board fare collection, transit signal priority, wider stop spacing, and 10-minute service frequencies. BRT service is intended to improve transit speed, reliability, and ridership (CH2M, 2016a).

The five primary goals of the Draft Eugene 2035 TSP are:

1. Create an integrated transportation system that is safe and efficient, supports the *Metro Plan, Eugene-Springfield Metropolitan Area General Plan* (LCOG et al., 1987, as updated on 2015, December 31; Metro Plan) land use diagram; *Envision Eugene: A Community Vision for 2032* (Envision Eugene, 2012, March); the City of Eugene's target for a 50-percent reduction in fossil fuel consumption (as outlined in City of Eugene Climate Recovery Ordinance, Council Ordinance No. 20567, adopted July 27, 2016); and other City of Eugene land use and economic development goals to reduce reliance on single-occupancy automobiles, and enhance livability
2. Advance regional sustainability by providing a transportation system that improves economic vitality, environmental health, social equity, and overall well-being
3. Strengthen community resilience to changes in climate, increases in fossil fuel prices, and economic fluctuations by making the transportation network diverse, adaptable, and not reliant on any single mode
4. Address the transportation needs and safety of all travelers, including people of all ages, abilities, races, ethnicities, and incomes. Through transportation investments, respond to the needs of system users, be context sensitive, and distribute the benefits and impacts of transportation decisions fairly throughout the City of Eugene
5. By 2035, triple the percentage of trips made on foot, by bicycle, and by transit from 2014 levels

Beginning in 2010 with a robust community visioning effort, Eugene embarked on a 5-year planning and strategy refinement process to adopt a unique comprehensive plan to support the community's vision and local planning goals consistent with statewide regulations. Eugene is anticipated to grow by 34,000 people and 37,000 jobs by 2032 (*Draft Envision Eugene Community Vision* [Envision Eugene, 2016, July; Draft Envision Eugene]). The City of Eugene will need approximately 900 acres of land to accommodate this projected population and employment growth.

The Draft Envision Eugene outlines a path forward to meet current and future needs under one unified community vision. This vision consists of seven pillars that reflect Eugene's community values. These pillars are economic opportunities, affordable housing, climate change/energy resiliency, compact urban development and efficient transportation options, neighborhood livability, natural resources, and adaptable/flexible/collaborative implementation. The City of Eugene identified investment in public transportation along Key Transit Corridors as an opportunity to assist in achieving its vision.

The City of Eugene will adopt the Draft Envision Eugene plan and its community vision in four phases to implement local goals and policies. The first phase, which will expand the City of Eugene's Urban Growth Boundary (UGB) in the Santa Clara community and Clear Lake area, includes nearly 1,000 acres of land for new employment opportunities, district schools, and community parks. The UGB expansion will also include adopted overlay zones to support public health, stormwater quality, and wetland preservation. Once adopted, Envision Eugene will replace the Metro Plan) as the City of Eugene's local comprehensive plan.

3.2.2. Base and Future Regional Traffic Conditions

The regional traffic operations analysis reported vehicle miles traveled (VMT) for the forecast year as output from the regional travel demand forecasting model. The 2035 model outputs for the No-Build Alternative provided future baseline conditions for comparison with the build alternatives selected for Level 2 AA.

Future 2035 traffic volume forecasts were utilized from the Draft Eugene 2035 TSP.

The LCOG regional travel demand model was the primary source of VMT data used in the transportation analysis. The model generated estimates of regional travel behavior for the base 2011 scenario and future year 2035 alternatives. The model used household travel survey data, land use estimates that consider population growth and expected development, and representations of the transportation network and programmed transportation improvements as inputs. The outputs of the travel demand model included travel times between origins and destinations across the region, expected mode choices (e.g., traveling by bus or car) and traffic volumes on the regional roadway network. These traffic volumes were used to calculate regional VMT for cars, trucks, and buses, which served as the basis for estimated transportation impacts.

Base year 2015 and future year 2035 traffic conditions used the following data sources and collection methods for analysis:

- Intersection vehicle turn movement count data and pedestrian/bicycle crossing data collected during the p.m. (4:00 p.m. to 6:00 p.m.) peak period at 52 intersections, collected between May 2010 and January 2016 (2016)
- Local 24-hour vehicle volume counts conducted at four locations within the study area, collected in August 2010 (2010)
- Historical average daily traffic data for the study area from the City of Eugene 2013 Traffic Flow Map, collected by City of Eugene (2013)
- Oregon Department of Transportation (ODOT) Crash Analysis and Reporting Unit data for the study intersections and segments, collected from January 2010 to December 2014 (data accessed 2016)
- Traffic signal timing and signal phasing from City of Eugene (2016)
- Physical characteristics of the existing street system including lane geometry, intersection control, driveway spacing, bus stop locations, on-street parking, pedestrian crossings and other parameters necessary to conduct traffic operations analysis (2016)
- Traffic control data, including existing roadway and intersection control (posted speeds, traffic signals, stop signs), that were identified based on available operations models and verified with field observations
- LTD's *MovingAhead Detailed Definition of Alternatives Report and Conceptual Engineering Plan Set* (2016)
- LCOG's regional travel demand forecasting model (2016)
- LCOG's population and employment forecasts and census GIS data (2016)
- *Central Lane Metropolitan Planning Organization Regional Transportation Plan*, adopted by City of Eugene, City of Springfield, and Lane County (LCOG, 2011, December)
- Draft Eugene 2035 TSP
- Queuing: peak hour queue lengths were not evaluated because there were not any study intersections where turning pocket storage space would decrease for any design alternative

3.2.3. Existing Traffic Volumes

Traffic volumes in the Eugene region were reviewed to determine how typical weekday traffic flows vary throughout typical weekdays throughout the year. Peak traffic volumes occur during weekday p.m. peak hours (4:00 p.m. to 6:00 p.m.) while school is in session. This time period is representative of when people travel to and from work, run errands, and participate in social activities. The existing conditions analyses (presented in Chapters 5 through 9) were based on motor vehicle turn movement counts collected between 2010 and 2016. The design hour volumes were determined based on an assessment of traffic count data and volume balancing efforts.

3.2.4. Future 2035 Volumes

Future 2035 volumes were based on regional travel demand forecasts prepared by LCOG. Data sources for the transportation analyses included:

- LCOG's regional travel demand forecasting model, calibrated to reflect current automated passenger count data collected by LTD
- LCOG's population and employment forecasts and census GIS data
- Population and employment projections from Draft Envision Eugene

3.2.4.1. Motor Vehicle Volumes

Future traffic analysis was based on a common forecast year of 2035. Regional travel demand forecasts were prepared by LCOG. LCOG maintains and applies the Lane County regional travel demand model, which is used for all of the region's transportation planning projects.

The model generated estimates of regional travel behavior for the base 2011 scenario and future year 2035 alternatives. The model used household travel survey data, land use estimates that consider population growth and expected development, and representations of the transportation network and programmed transportation improvements as inputs. The outputs of the travel demand model included travel times between origins and destinations across the region, expected mode choices (e.g., traveling by bus or car) and traffic volumes on the regional roadway network. These traffic volumes were used to calculate regional VMT for cars, trucks, and buses, as well as motor vehicle turning movement volumes at study intersections, during the p.m. peak hour for No-Build, Enhanced Corridor, and EmX Alternatives. This information served as the basis for estimated transportation impacts.

The Draft Eugene 2035 TSP incorporated analyses of 16 of the same study intersections for 2035 that were analyzed under the MovingAhead Project. These 16 intersections are listed below:

- Highway 99 Corridor
  - Highway 99/Barger Drive
  - Highway 99/Roosevelt Boulevard
  - W. 7th Avenue/W. 5th Avenue
  - W. 7th Avenue/Garfield Street
  - W. 6th Avenue/Garfield Street
- River Road Corridor
  - River Road/Irving Road
  - Chambers Street/Northwest Expressway
  - W. 7th Avenue/Chambers Street
  - W. 6th Avenue/Chambers Street
- 30th Avenue to LCC Corridor
  - Oak Street/E. 18th Avenue

    - Pearl Street/E. 18th Avenue
    - E. 30th Avenue/Amazon Parkway/Hilyard Street
- Coburg Road Corridor
    - Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard
    - Coburg Road/Harlow Road
    - Coburg Road/Cal Young Road
    - Coburg Road/Crescent Avenue

The forecasted 2035 p.m. peak hour traffic volumes for these 16 intersections were obtained from the Draft Eugene 2035 TSP in order to maintain consistency between this project and the Draft Eugene 2035 TSP. The traffic volumes for these intersections were independently forecasted and post-processed for the MovingAhead Project, and were determined to be similar to the volumes documented in the Draft Eugene 2035 TSP. The 2035 forecasted traffic volumes at the study intersections are provided on figures in Chapter 5 through Chapter 9.

3.2.4.2. Pedestrian Volumes

For the No-Build Alternatives' motor vehicle capacity analysis, pedestrian volumes were scaled up by an amount to account for an expected increase in pedestrian mode share due to planned growth and development along the study corridors.

For the motor vehicle capacity analysis for the Enhanced Corridor and EmX Alternatives, pedestrian volumes were based on the No-Build Alternative and were increased on all legs of intersections with new transit stops/stations according to Table 3.2-1.

Table 3.2-1. P.M. Peak Hour Pedestrian Volumes at Signalized Intersections Near Enhanced Corridor Alternative Stops/EmX Alternative Stations

No-Build Pedestrian Volume	Enhanced Corridor Alternative Pedestrian Volume (all legs of signalized intersections near new stops)	EmX Alternative Pedestrian Volume (all legs of signalized intersections near new stations)
0	20	30
< 10	30	40
10 to 20	40	50
20 to 35	50	60

Source: DKS Transportation Analysis. (2016).

3.2.4.3. Other Modes

For the motor vehicle capacity analysis, heavy vehicle percentages were kept the same as in the existing conditions because none of the major streets on the MovingAhead corridors would change functional classification according to the Draft Eugene 2035 TSP. Bicycle volumes were scaled up by an amount from existing year volumes for all alternatives to account for an expected increase in bicycle mode share due to planned growth and development along the study corridors.

3.2.5. Local Traffic Operations

The local traffic operations analysis assessed changes to operations at study intersections during the peak period using levels of service (LOS A to F) and volume-to-capacity (v/c) ratios; changes to general purpose traffic patterns and/or access; and specific impacts from signal timing changes (including bus queue jumps and traffic signal phasing changes). The traffic operations analysis identified the impacts and benefits based on level of service, volume-to-capacity ratio, and average vehicle delay for various alternatives. The traffic operations analysis used various tools as appropriate, including:

- Using the 2000 *Highway Capacity Manual* (TRB, 2000): Signalized intersections
- Providing an operational analysis of signalized and unsignalized intersections (non-roundabouts) using guidelines described in ODOT's *Analysis Procedures Manual* (ODOT, 2016, September)
- Compiling existing data about base year 2015 and future year 2035 traffic conditions
- Analyzing p.m. peak hour LOS, delay, and v/c at selected intersections
- Collecting additional p.m. peak hour (4–6 p.m.) turn movement counts at 30 key intersections on the proposed corridors

3.2.6. Connectivity to Roadway, Bike, and Pedestrian Facilities

The project team identified planned transportation improvement projects from the Draft Eugene 2035 TSP that would feasibly be installed by 2035 and would therefore be included in the future No-Build Alternatives. The corridor-specific projects are listed in each corridor chapter.

3.2.7. Transit Priority at Signalized Intersections

The MovingAhead conceptual design drawings (CH2M, 2016b) were used to identify traffic signals with exclusive prioritized bus signal phasing for the Enhanced Corridor and EmX Alternatives.

3.2.8. Safety

The total annualized costs, according to FTA-provided factors and changes in VMT, associated with changes in safety (fatalities and serious injuries), were incorporated into a total environmental benefit analysis using data from the *MovingAhead Air Quality Technical Report* (Michael Minor and Associates, Inc. and CH2M, 2017), *MovingAhead Energy and Sustainability Technical Report* (DKS Associates [DKS] and CH2M, 2017), *MovingAhead Capital Cost Estimating Technical Report* (CH2M, 2017a), and *MovingAhead Operating and Maintenance Costs Report* (LTD and City of Eugene, 2017).

The annual cost savings due to potential serious injury and fatality reductions for each alternative was estimated based on changes in automobile, truck, and bus VMT based on FTA factors (FTA, 2013, August). Automobile and truck VMTs for each alternative were obtained from the travel model. Bus VMT for each alternative was obtained from LTD. Table 3.2-2 provides information about fatality and serious injury factors per million VMT by mode.

Table 3.2-2. Fatality and Serious Injury Factors Per Million Vehicle Miles Traveled by Mode

Mode	Fatalities/Million VMT	Serious Injuries/Million VMT
Automobile	0.013	0.195
Heavy Truck[a]	0.004[a]	1.824[a]
Bus – Diesel	0.004	1.824
Bus – Electric	0.004	1.458

Source: *New and Small Starts Evaluation and Rating Process Final Policy Guidance* (FTA, 2013, August).

[a] Heavy Truck factors were not provided, and were assumed to be the same as diesel bus factors.

The safety costs were developed using the following cost factors from the *New Starts and Small Starts Evaluation and Rating Process Final Policy Guidance* (FTA, 2013, August):

- $9.1 million for each fatality
- $490,000 for each serious injury

An annualization factor[1] of 342 was used to estimate annual automobile and heavy truck VMT based on average weekday VMT data. LTD provided annualized bus VMT.

3.2.9. Transit

The following methodologies were used to address effects that the alternatives would have on public transit:

- **Corridor Transit Service Characteristics** – Year 2035 average weekday (referred to as "daily") transit vehicle miles and hours traveled (an output of the regional travel demand forecasting model) were calculated for fixed-route bus, Enhanced Corridor bus, and EmX. In addition, weekday revenue vehicle miles were analyzed. The amount of transit service provided in each corridor was measured by daily vehicle hours traveled (VHT), daily VMT, and daily place-miles of service. Daily vehicle hours were the cumulative time that transit vehicles were in service and daily vehicle miles were the distance they traveled, independent of the size of the vehicle. Place-miles refers to the total carrying capacity (seated and standing) of each bus and was calculated by multiplying vehicle capacity of each bus by the number of service miles traveled each day. Place-miles highlighted differences among alternatives caused by a different mix of vehicles and levels of service.
- **Transit and Passenger Vehicle Travel Times.** The regional travel demand forecasting model (LCOG. 2016) was used to calculate select average weekday a.m. peak travel times in minutes (total and in-vehicle) in the forecast year (2035) between the corridor termini and downtown Eugene. In-vehicle transit travel time included only the amount of time it took for a transit vehicle to travel between an origin and destination. For buses, this measure reflected roadway speed limits, congestion, and stop dwell time. In-vehicle plus walk and wait travel time included time spent walking to transit, initial wait time, transfer wait time (if any), in-vehicle time and time walking from transit to the destination.
- **Reliability.** The reliability of the alternatives was assessed by calculating the length and percentage of the alternative's route that would be within a separated right-of-way and the number and percentage of intersections that would receive transit priority treatment.
- **Ridership.** Transit ridership was assessed by calculating average weekday system-wide person trips (linked trips) and corridor boardings (unlinked trips) as output from the regional travel demand forecasting model and percent change from the No-Build Alternative.
- **Transit Signal Priority.** Transit service frequency determined the number of transit vehicles per hour per direction at signalized intersections with bus only phases. This required green signal phase time per transit vehicle, combined with the number of signal cycles per hour, was 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 was added to the lost time (time lost during a signal cycle due to startup, yellow, and red time for each phase) at the impacted intersections to approximate the overall effect on intersection capacity over a peak hour. This methodology has been applied to past studies and FTA has approved it.

[1] The annualization factor was calculated based on 2015 traffic volume data from ODOT's Automated Traffic Recording (ATR) stations. An average value was applied based on the six ATR stations located in the Eugene-Springfield region.

3.2.10. Roadway Circulation

Impacts to the roadway circulation were evaluated for each corridor. Examples of circulation changes include one-way to two-way conversions, installation of traffic signals, and new roadway construction.

3.2.11. Freight and Rail

Impacts to freight truck movement that would result from the alternatives were 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
- The number and percentage of truck loading zones that would be displaced and/or moved

Impacts to rail that would result from the alternatives were assessed by examining the project's conceptual designs to determine any proposed facilities that would cross the existing rail lines.

3.2.12. Parking and Access

All on-street parking facilities that would be impacted by the alternatives were identified. An assessment was made of current on-street parking utilization rates in locations where the design would impact on-street parking. In order to measure these parking utilization rates, parking occupancy was collected on two different days at hourly intervals over a four-hour period that was tailored to the highest parking demand time for the particular corridors (i.e., during evening in a residential corridor, during business hours in a commercial corridor).

Off-street parking impacts, drive through impacts or closures, and parking-lot circulation impacts were identified for each corridor based on the preliminary design drawings.

Access impacts, including driveway closures or driveway conversions to right-in/right-out only were identified for each corridor. In addition, driveways, side streets, or alleys that would have a reduced left turn deceleration area or impacts to a two-stage left turn due to the installation of median islands were identified for each corridor.

3.2.13. Emergency Vehicle Flow and Access

The project team coordinated with emergency service providers to determine any issues related to emergency vehicle flow and access.

3.2.14. Pedestrian Facilities Network

Pedestrian improvements were analyzed for both linear and corridor crossings, and for connections to existing pedestrian facilities. In addition, a qualitative assessment of pedestrian facilities was performed, based on procedures outlined in ODOT's *Analysis Procedures Manual* (ODOT, 2016, September). Factors such as sidewalk width, lateral separation from vehicle traffic, number of driveways, and vehicle speeds were used to evaluate the quality of the pedestrian facilities. Frequency of crossings and sidewalk connectivity were also evaluated.

3.2.15. Bicycle Facilities Network

Bicycle improvements were analyzed for both linear and corridor crossings, and for connections to existing bicycle facilities. In addition, a qualitative assessment of bicycle facilities was performed, based on procedures outlined in ODOT's *Analysis Procedures Manual* (ODOT, 2016, September). Factors such as bike lane width, presence of a buffer, outside vehicle lane width, vehicle volume and speed, heavy truck volume, and pavement quality were used to evaluate the quality of the bicycle facilities.

3.2.16. Range of Mitigation Measures

A range of mitigation measures were considered, including changes to intersection geometry, traffic signal control, traffic signal timing, or adding vehicle or bike lanes. LTD has prepared an *Addendum to the MovingAhead Alternatives Analysis Technical Reports Memorandum* (CH2M, 2017b) that evaluates ways to avoid or minimize impacts at some properties. Please see this addendum for additional information on potential parking, acquisitions, and tree impacts mitigation.

3.2.17. Short-Term Construction-Related Impacts

Short-term construction related transportation impacts were identified for the alternative route and major intersecting side streets. The anticipated construction truck traffic levels, types of lane closures, detour routes, and sidewalk and bike lane impacts were identified.

Construction truck traffic was anticipated to be moderate in locations where traffic signals were being constructed or modified, where there was roadway widening or median construction, or where new bicycle/pedestrian enhanced crossings were being constructed. Construction truck traffic was anticipated to be limited in locations where minor signal modifications or sidewalk reconstruction would be occurring.

On side streets, lane closures were anticipated to be limited to intersections with the mainline. For the mainline, lane closures were anticipated to be limited to intersections for locations with signal modifications. Short lane closures were anticipated on mainline locations where new bus stations and other scattered improvements would be constructed. Long lane closures were anticipated for mainline locations where corridor restriping, BAT lanes, or exclusive transitways were being constructed.

Detour routes were not necessary because full road closures were not anticipated during construction of any corridor.

Sidewalks and bike lanes were anticipated to be impacted in the construction area on both the mainline and side streets.

3.3. Relevant Laws and Regulations

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

3.3.1. Public Transit

All transit facilities and vehicles will be designed to comply with federal Americans with Disability Act (ADA) requirements. All alternatives were evaluated for conformance with appropriate sections of the *LTD Long Range Transit Plan* (LTD, 2014), *Central Lane MPO Regional Transportation Plan* (LCOG, 2011, December), and the *Eugene-Springfield Transportation System Plan* (City of Eugene et al., adopted in 2002, July; TransPlan).

3.3.2. Regional and Local Traffic

The regional and local traffic analysis complied with applicable roadway design and operating standards from the City of Eugene, Lane County, and ODOT. In particular, LOS standards of evaluation and impact were used for facilities owned by the City of Eugene and Lane County and v/c standards of evaluation and impact were used for ODOT-owned roadways. Traffic analysis was not conducted on City of Springfield roadways because no capital improvements are proposed in Springfield.

Analysis of local traffic impacts was guided by the policy direction established in the numerous transportation plans and policy documents adopted by jurisdictions within the Corridor. These included the following:

- *Oregon Transportation Plan* (ODOT, adopted 2006, September 20)
- *Oregon Highway Plan* (ODOT, 1999, amended 2006, January)
- Oregon Transportation Planning Rule (Oregon Administrative 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 *Central Lane Metropolitan Planning Organization Regional Transportation Plan* (LCOG, adopted 2011, December 8)
- TransPlan (City of Eugene, City of Springfield, and Lane County, adopted in 2002, July)
- *City of Springfield Transportation System Plan* (2014)
- ODOT modal plans (e.g., freight route designations, freight rail lines)
- Federal Railroad Administration documentation of existing freight rail lines (location, ownership, etc.) and street observations
- City of Eugene Code, Chapter 9 (2016)

3.3.3. Parking and Access

On-street parking facilities would need 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.

3.3.4. Truck Freight

All freight-carrying facilities that the alternatives would change would be designed to comply with the design standards of the owner of the roadway.

The ODOT Reduction of Vehicle Carrying Capacity (Oregon Revised Statutes [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 had the potential for a reduction of vehicle-carrying capacity, a stakeholder forum would be convened after identification of the LPA to review the project description and provide advice to ODOT, which would be taken into consideration. The Highway 99 Corridor would be impacted by this rule, as the W. 6th Avenue, W. 7th Avenue, and Highway 99 portions of the corridor have been identified as Reduction Review Routes under this ORS code.

3.3.5. Rail Freight

All proposed new crossings and proposed modifications or closures of existing freight rail line crossings would fall under the jurisdiction of the ODOT Rail Division and the Federal Railroad Administration. Further, all new, modified or closed crossings would require the approval of the owner and operator of the affected freight rail line.

3.3.6. 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.

3.4. Contacts and Coordination

Project staff coordinated with LTD for annualized factors for bus VMT and with the City of Eugene for traffic signal timing data.

3.5. Analysis Areas

The analysis areas for the transportation analyses included: (1) the Eugene/Springfield metropolitan area (for the regional traffic analyses); (2) the LTD system (for the system-wide transit analyses); and (3) the Level 2 AA corridors. Study intersections were selected on each corridor based on level of congestion, location, and spacing of traffic signals, and location of Draft Eugene 2035 TSP study intersections.

3.6. Significance Thresholds

3.6.1. Intersection Operations

LOS and 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.

The current operating standards are LOS D for City of Eugene intersections, LOS F for City of Eugene intersections within the Eugene Downtown Traffic Impact Analysis Exempt Area[2], and 0.85 v/c ratio for ODOT intersections. According to the Draft Eugene 2035 TSP, the City of Eugene citywide operating conditions for signalized intersections is proposed to become LOS E. Within the Eugene Downtown Traffic Impact Analysis Exempt Area, the operating standard would remain LOS F. Operating conditions for some ODOT signalized intersections in Eugene could become 1.00 v/c, as the City of Eugene is seeking an amendment of the Oregon Highway Plan to include alternative mobility standards. Because the Draft Eugene 2035 TSP has not been adopted yet, the study intersections were evaluated under both sets of standards.

The following project-related intersections and segments are ODOT facilities where the proposed operating standards would be changed from a 0.85 v/c ratio to a 1.00 v/c ratio if adopted:

- Highway 99 from Roosevelt to Downtown
- Coburg Road at I-105 Interchange
- W. 7th Avenue/Chambers Street
- W. 7th Avenue/Jefferson Street
- W. 7th Avenue/Washington Street
- W. 6th Avenue/Chambers Street
- W. 6th Avenue/Garfield Street
- River Road at Randy Papé Beltline Highway Interchange
- Coburg Road at Randy Papé Beltline Highway Interchange, and from Harlow Road into Downtown

A significant impact to v/c ratio occurs when the v/c ratio changes by more than 0.02.

3.6.2. Safety Factors

The FTA provides guidance for estimating the environmental benefits of a project. Safety is a factor used in this measure, along with air quality benefits (provided in the *MovingAhead Air Quality Technical Report* [Michael Minor and Associates, Inc. and CH2M, 2017]), energy benefits (provided in the *MovingAhead Energy and Sustainability Technical Report* [DKS and CH2M, 2017]), operations and maintenance costs (provided in the *MovingAhead Operating and Maintenance Costs Technical Report* [LTD and City of Eugene, 2017]), and capital costs (provided in the *MovingAhead Capital Cost Estimating Technical Report* [CH2M, 2017a]).

To monetize the estimated changes in safety, FTA uses U.S. Department of Transportation (USDOT) guidance on the value of a statistical life and injuries. According to the most recent guidance, the current USDOT value of a statistical life is $9.1 million. The value FTA uses for a disabling injury for both transit and automobiles is $490,000. FTA does not attempt to capture the changes in pedestrian or bicyclist crashes because of the difficulty in accounting for such changes using readily available national data.

The change in safety factor for the 20-year horizon (2035), shown below in Table 3.6-1, was multiplied by the VMT for each build alternative and by the cost per injury/fatality.

[2] The Eugene Downtown Traffic Impact Analysis Exempt Area is bounded by Shelton McMurphey Boulevard to the north, Lincoln Street to the west, E. 13th Avenue between Lincoln Street and High Street to the south, E. 11th Avenue between High Street and Hilyard Street to the south, and Hilyard Street to the east.

Table 3.6-1. 2035 Safety Factors

Mode	Fatalities/Million VMT	Injuries/Million VMT
Automobile	0.013	0.195
Bus – Hybrid	0.004	1.824
Heavy Truck[a]	0.004	1.824

Source: FTA. (2013, August).

[a] Heavy Truck factors, not reported by FTA, were assumed to be the same as bus factors.

Once this cost is combined with the air quality, energy, operations and maintenance, and capital cost estimates, the environmental benefit is determined by comparing the total to the following thresholds provided by FTA for New and Small Starts projects (Table 3.6-2).

Table 3.6-2. Federal Transit Administration Environmental Benefits Thresholds

Rating	Range
High	>10%
Medium-High	5 to 10%
Medium	0 to 5%
Low-Medium	0 to -10%
Low	<-10%

Source: FTA. (2013, August).

Since the safety benefits only represent a piece of these total percentages, significance ratings cannot be determined from this report alone.

4. System-Level Consequences

A summary of the system-level consequences and key findings is provided below. The key findings are as follows:

- In general, in-vehicle transit travel times and in-vehicle plus walk and wait travel times for both Enhanced Corridor and EmX Alternatives are better than under the No-Build Alternative in every corridor except under the 30th Avenue to LCC Corridor Enhanced Corridor Alternative (see Section 4.3.2 for travel time discussion).
- All of the EmX Alternatives would have some level of exclusive or priority operating lanes compared to the No-Build Alternative. The highest percentage would be EmX operations in the River Road Corridor, with 22 percent of the new corridor lanes being prioritized for transit vehicles (see Section 4.3.3 for reliability discussion).
- The Enhanced Corridor Alternatives would result in a slight increase of less than 1 percent in systemwide transit trips compared to the No-Build Alternatives, and the EmX Alternatives would result in nearly a 2 percent increase in systemwide transit trips compared to the No-Build Alternatives (see Section 4.3.4 for ridership discussion).

4.1. Affected Environment

The Transportation Technical Report presents the findings and details of the analysis conducted for the MovingAhead Project. The project evaluated the transportation impacts associated with different transit alternatives on five corridors in Eugene. The analysis was based on forecasted future conditions for the year 2035. The transportation analysis focused on local motor vehicle operations, transit characteristics, pedestrian facilities, bicycle facilities, access, safety, parking impacts, and circulation.

4.2. Long-Term Direct Impacts

The study intersection performances for the 2035 p.m. peak hour No-Build, Enhanced Corridor, and EmX Alternatives are shown in Table 4.2-1.

When evaluated under current operating standards, the number of study intersections failing to meet mobility standards during the p.m. peak hour would increase from three (existing conditions) to nine in 2035 for No-Build, Enhanced Corridor, and EmX Alternatives. When evaluated under proposed operating standards, the number of study intersections failing to meet operating standards during the p.m. peak hour would increase from zero (existing conditions) to three in 2035 for the Enhanced Corridor Alternatives and four in 2035 for the No-Build and EmX Alternatives. The Coburg Road/Eastbound Randy Papé Beltline Onramp would improve for the Coburg Road Enhanced Corridor Alternative compared to the No-Build Alternative due to the installation of a northbound right turn lane.

Table 4.2-1. P.M. Peak Hour Study Intersection Performance

Study Intersection Number	Study Intersection	Operating Standard[a]	2015 Existing			2035 No-Build Alternative			2035 Enhanced Corridor Alternative			2035 EmX Alternative		
			LOS	Delay (sec)	v/c	LOS	Delay (sec)	v/c	LOS	Delay (sec)	v/c	LOS	Delay (sec)	v/c
1	Hwy 99N/Barger Drive (Highway 99 Corridor, River Road Corridor)	0.85/0.85	C	20.2	0.68	C	25.7	0.77	C	26.0	0.77	C	26.8	0.80
2	Hwy 99N/Fairfield Avenue (Highway 99 Corridor, River Road Corridor)	0.85/0.85	A	7.2	0.57	B	13.8	0.56	B	14.2	0.57	B	14.0	0.57
3	Hwy 99N/Royal Avenue (Highway 99 Corridor, River Road Corridor)	0.85/0.85	A	9.4	0.55	B	11.0	0.64	B	11.9	0.64	B	11.9	0.64
4	Hwy 99N/Roosevelt Boulevard (Highway 99 Corridor, River Road Corridor)	0.85/1.00	D	42.3	0.83	**F**	**88.9**	**1.03**	**E**	**79.2**	**1.03**	*E*	*71.5*	*0.94*
5	W. 7th Avenue/W. 5th Avenue (Highway 99 Corridor)	0.85/1.00	B	18.4	0.37	B	19.6	0.59	B	19.9	0.60	C	20.6	0.61
6	W. 6th Avenue/Garfield Street (Highway 99 Corridor)	0.85/1.00	B	14.2	0.77	*C*	*32.8*	*0.98*	*C*	*27.9*	*0.95*	*C*	*27.0*	*0.95*
7	W. 7th Avenue/Garfield Street (Highway 99 Corridor)	0.85/1.00	C	22.2	0.71	C	23.2	0.82	C	23.1	0.80	C	23.0	0.81
8	River Road/Irving Road/Hunsaker Lane (River Road Corridor)	LOS D/LOS E	C	21.7	0.72	D	37.0	0.95	D	38.0	0.96	D	40.4	1.00
9	River Road/Ruby Avenue/Division Avenue (River Road Corridor)	LOS D/LOS E	C	29.7	0.71	C	34.1	0.82	C	28.6	0.84	D	35.3	0.81
10	River Road/Randy Papé Beltline WB Onramp (River Road Corridor)	0.85/1.00	C	24.3	0.57	C	23.4	0.65	C	21.0	0.65	C	26.0	0.59
11	River Road/Randy Papé Beltline EB Onramp (River Road Corridor)	0.85/1.00	C	27.1	0.64	C	24.7	0.73	C	32.7	0.80	D	41.0	0.77
12	River Road/Silver Lane/River Avenue (River Road Corridor)	LOS D/LOS E	C	24.5	0.64	C	28.0	0.71	C	26.5	0.65	C	25.5	0.69
13	River Road/Maxwell Road/E. Rosewood Avenue (River Road Corridor)	LOS D/LOS E	B	10.8	0.57	B	16.4	0.66	B	16.6	0.67	C	31.6	0.85
14	River Road/Horn Lane/Arbor Drive (River Road Corridor)	LOS D/LOS E	A	6.1	0.46	A	5.9	0.47	A	5.9	0.47	A	8.5	0.63
15	River Road/Chambers Street/Northwest Expressway (River Road Corridor)	LOS D/LOS E	C	31.1	0.84	D	43.2	0.93	D	45.6	0.97	D	44.9	0.96
16	Chambers Street/W. 6th Avenue (River Road Corridor)	0.85/1.00	*C*	*31.1*	***0.87***	**D**	**42.8**	**1.01**	**D**	**46.4**	**1.00**	**D**	**44.8**	**1.00**
17	Chambers Street/W. 7th Avenue (River Road Corridor)	0.85/1.00	*D*	*38.9*	***0.88***	**E**	**57.9**	**1.04**	**E**	**46.5**	**1.01**	*E*	*45.3*	*0.99*
18	Oak Street/E. 11th Avenue (30th Avenue to LCC Corridor)	LOS E/LOS F	B	14.1	0.71	B	13.8	0.74	B	17.4	0.88	B	12.0	0.74
19	Pearl Street/E. 11th Avenue (30th Avenue to LCC Corridor)	LOS E/LOS F	B	19.8	0.73	C	23.3	0.83	C	23.4	0.83	*F*	*101.8*	*1.17*

Table 4.2-1. P.M. Peak Hour Study Intersection Performance

Study Intersection Number	Study Intersection	Operating Standard[a]	2015 Existing			2035 No-Build Alternative			2035 Enhanced Corridor Alternative			2035 EmX Alternative		
			LOS	Delay (sec)	v/c	LOS	Delay (sec)	v/c	LOS	Delay (sec)	v/c	LOS	Delay (sec)	v/c
20	Oak Street/E. 13th Avenue (30th Avenue to LCC Corridor)	LOS E/LOS F	B	14.1	0.59	B	14.6	0.63	B	15.5	0.63	B	16.0	0.63
21	Pearl Street/E. 13th Avenue (30th Avenue to LCC Corridor)	LOS E/LOS F	B	10.2	0.55	B	10.1	0.62	B	10.1	0.62	B	13.9	0.89
22	Oak Street/E. 18th Avenue (30th Avenue to LCC Corridor)	LOS D/LOS E	B	19.5	0.69	C	20.8	0.78	B	18.9	0.76	B	18.9	0.75
23	Pearl Street/E. 18th Avenue (30th Avenue to LCC Corridor)	LOS D/LOS E	C	28.6	0.80	C	26.9	0.89	C	25.3	0.88	C	26.8	0.90
24	Amazon Parkway/E. 24th Avenue (30th Avenue to LCC Corridor)	LOS D/LOS E	B	16.5	0.73	C	22.9	0.80	C	23.7	0.82	C	23.7	0.82
25	Amazon Parkway/E. 29th Avenue (30th Avenue to LCC Corridor)	LOS D/LOS E	C	27.9	0.73	D	39.1	0.76	D	39.8	0.78	D	39.9	0.78
26	Hilyard Street/Amazon Parkway/E. 30th Avenue (30th Avenue to LCC Corridor)	LOS D/LOS E	D	36.9	0.82	D	53.5	0.96	D	52.1	0.95	D	52.2	0.95
27	Pearl Street/E. 6th Avenue (Coburg Road Corridor)	LOS E/LOS F	B	13.2	0.63	B	15.8	0.70	C	25.3	0.69	C	26.9	0.72
28	Pearl Street/E. 7th Avenue (Coburg Road Corridor)	LOS E/LOS F	B	19.0	0.65	C	21.2	0.72	C	20.9	0.72	C	23.3	0.76
29	High Street/E. 7th Avenue (Coburg Road Corridor)	LOS E/LOS F	B	17.3	0.74	B	16.3	0.74	B	18.7	0.73	C	23.4	0.88
30	Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard (Coburg Road Corridor, Martin Luther King, Jr. Boulevard Corridor)	LOS D/LOS E	C	34.0	0.97	*E*	*55.5*	*1.10*	*E*	*57.6*	*1.13*	**F**	**127.3**	**1.39**
31	Coburg Road/Cedarwood Drive/I-105 EB Onramp (Coburg Road Corridor)	0.85/1.00	*C*	*27.4*	*0.86*	*D*	*36.0*	*0.96*	*D*	*39.3*	*0.98*	**E**	**68.8**	**1.15**
32	Coburg Road/Oakway Road/I-105 WB onramp (Coburg Road Corridor)	0.85/1.00	D	38.2	0.70	*D*	*44.0*	*0.88*	*D*	*42.3*	*0.88*	*D*	*37.2*	*0.87*
33	Coburg Road/Oakmont Way (Coburg Road Corridor)	LOS D/LOS E	C	20.2	0.61	C	21.3	0.66	C	24.8	0.62	C	29.0	0.65
34	Coburg Road/Harlow Road/Pioneer Pike (Coburg Road Corridor)	LOS D/LOS E	C	34.5	0.87	D	50.4	0.99	C	30.7	0.78	D	54.1	1.00
35	Coburg Road/Cal Young Road (Coburg Road Corridor)	LOS D/LOS E	B	13.8	0.55	B	16.6	0.62	B	19.8	0.63	B	19.4	0.63
36	Coburg Road/Willakenzie Road (Coburg Road Corridor)	LOS D/LOS E	C	30.3	0.71	D	41.4	0.86	D	42.6	0.87	D	41.9	0.85
37	Coburg Road/EB Randy Papé Beltline Onramp (Coburg Road Corridor)	0.85/1.00	C	30.2	0.85	**D**	**55.8**	**1.04**	D	39.5	0.95	**E**	**56.5**	**1.03**

Table 4.2-1. P.M. Peak Hour Study Intersection Performance

Study Intersection Number	Study Intersection	Operating Standard[a]	2015 Existing LOS	2015 Existing Delay (sec)	2015 Existing v/c	2035 No-Build Alternative LOS	2035 No-Build Alternative Delay (sec)	2035 No-Build Alternative v/c	2035 Enhanced Corridor Alternative LOS	2035 Enhanced Corridor Alternative Delay (sec)	2035 Enhanced Corridor Alternative v/c	2035 EmX Alternative LOS	2035 EmX Alternative Delay (sec)	2035 EmX Alternative v/c
38	Coburg Road/WB Randy Papé Beltline Onramp (Coburg Road Corridor)	0.85/1.00	C	24.6	0.72	C	30.5	0.81	C	22.9	0.70	C	23.7	0.80
39	Coburg Road/Chad Drive (Coburg Road Corridor)	LOS D/LOS E	D	39.5	0.75	C	29.8	0.88	C	32.0	0.89	D	50.5	1.18
40	Coburg Road/Crescent Avenue (Coburg Road Corridor)	LOS D/LOS E	C	21.0	0.78	D	42.6	0.96	D	43.0	0.96	D	39.9	1.06
41	Gateway Street/International Way (Coburg Road Corridor)	LOS D/LOS E	C	31.8	0.68	C	33.9	0.82	C	26.0	0.80	C	26.0	0.80
30	Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard (Martin Luther King, Jr. Boulevard Corridor)	LOS D/LOS E	C	34.0	0.97	E	55.5	1.10	E	60.1	1.10	-	-	-
42	Martin Luther King, Jr. Boulevard/Club Road/Centennial Loop (Martin Luther King, Jr. Boulevard Corridor)	LOS D/LOS E	C	33.4	0.70	D	41.7	0.73	C	29.1	0.54	-	-	-
43	Martin Luther King, Jr. Boulevard/Kinsrow Avenue (Martin Luther King, Jr. Boulevard Corridor)	LOS D/LOS E	A	5.3	0.52	B	12.4	0.46	B	18.1	0.59	-	-	-
44	Martin Luther King, Jr. Boulevard/S. Garden Way (Martin Luther King, Jr. Boulevard Corridor)	LOS D/LOS E	B	12.6	0.53	B	19.6	0.64	C	20.1	0.65	-	-	-

Source: DKS Transportation Analysis. (2016).

Italic underlined values do not meet current standards
Bold underlined values do not meet proposed standards or current standards

Delay = Average Intersection Delay in seconds
LOS = Level of Service
v/c = volume-to-capacity

[a] Current/proposed operations standards for these facilities.

4.3. Transit Impacts

4.3.1. Amount of Service

In general, the EmX Alternatives would result in a substantial increase in corridor transit capacity with relatively small increases in corridor transit VHT[3] and VMT[4] when compared to the No-Build Alternatives and Enhanced Corridor Alternatives, as shown in Table 4.3-1. This is because EmX has higher frequencies (10-minute service all day), which translates to two extra trips each hour of service throughout the day resulting in more vehicle hours and miles compared to the Enhanced Corridor Alternatives or No-Build Alternatives. Similarly, the substantial difference in place-miles associated with both the Enhanced Corridor Alternatives and EmX Alternatives reflects the implementation of EmX service or Enhanced bus service in the corridor and the replacement of parallel bus service with higher capacity vehicles. Place-miles refers to the total carrying capacity (seated and standing) of each bus and is calculated by multiplying vehicle capacity of each bus by the number of service miles traveled each day. Place-miles highlight differences among alternatives caused by a different mix of vehicles and levels of service.

4.3.2. Travel Time

4.3.2.1. In-Vehicle Transit Travel Time

In general, in-vehicle transit travel time and in-vehicle plus walk and wait travel time for both Enhanced Corridor and EmX Alternatives are better than under the No-Build Alternative in every corridor except under the 30th Avenue to LCC Corridor Enhanced Corridor Alternative, as explained in Subsection 4.3.2.2. Transit travel times are shown in Table 4.3-2.

The a.m. peak hour in-vehicle transit travel time to downtown Eugene from key locations within each corridor is improved with both Enhanced Corridor and EmX Alternatives. EmX Alternatives include greater levels of capital and operational improvements (e.g. BAT lanes, exclusive transit lanes, queue jumps) in each corridor and, while this varies by corridor, the inclusion of these improvements serve to produce travel time savings between 2 and 18 minutes compared to the No-Build Alternatives. The Coburg Road Corridor EmX Alternative yields the largest travel time improvement compared to the No-Build Alternative. Under the Enhanced Corridor Alternatives, where levels of capital improvements are reduced compared to the EmX Alternatives, improvement in in-vehicle travel time is not as substantial and travel time savings are not as large, between 1 and 15 minutes, compared to the No-Build Alternative. Again, the Coburg Road Corridor EmX Alternative yields the largest travel time improvement compared to the No-Build Alternative.

4.3.2.2. In-Vehicle Plus Walk and Wait Travel Time

The a.m. peak hour in-vehicle plus walk and wait travel times mirror in-vehicle transit travel times in that the EmX Alternatives, because of the higher level of capital and operational improvements and the additional service frequencies, result in greater travel time savings (between 2 and 21 minutes) compared to the No-Build Alternatives, as shown in Table 4.3-2. Under the Enhanced Corridor Alternatives, total travel time savings range from 7 to 15 minutes except in the 30th Avenue to LCC Corridor, where total travel time actually increases by 1 minute compared to the No-Build Alternative.

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[3] Vehicle hours traveled in revenue service
[4] Vehicle miles traveled in revenue service

Table 4.3-1. 2035 Systemwide Transit Service Characteristics by Alternative

Measure	Highway 99 Corridor			River Road Corridor			30th Avenue to LCC Corridor			Coburg Road Corridor			MLK, Jr. Boulevard Corridor	
	No-Build	EC	EmX	No-Build	EC	EmX	No-Build	EC	EmX	No-Build	EC	EmX	No-Build	EC
Annual EmX and Fixed Route Transit VHT[a]	278,600	277,500	290,500	278,600	277,500	285,600	278,600	274,100	282,900	278,600	277,500	282,000	278,600	285,800
Annual Transit VMT[b]	4,520,200	4,600,800	4,734,200	4,520,200	4,547,400	4,744,400	4,520,200	4,487,800	4,633,400	4,520,200	4,565,400	4,674,100	4,520,200	4,653,000
Average Weekday Corridor Transit Place-Miles[c]	51,440	92,290	156,340	104,320	138,130	192,720	160,540	177,080	223,480	57,880	69,350	104,020	26,770	80,200

Source: LCOG Regional Travel Demand Model Results (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

EC = Enhanced Corridor
MLK = Martin Luther King

[a] VHT = Vehicle hours traveled in revenue service.
[b] VMT = Vehicle miles traveled in revenue service.
[c] Place-Miles = Transit Vehicle Capacity (seated and standing) multiplied by VMT. (Place-miles refers to the total carrying capacity (seated and standing) of each bus and is calculated by multiplying vehicle capacity of each bus by the number of service miles traveled each day. Place-miles highlight differences among alternatives caused by a different mix of vehicles and levels of service.)

Table 4.3-2. 2035 Systemwide Transit Travel Times (a.m. Peak Hour) by Alternative

Measure	Highway 99 Corridor (From Cubit/Barger)			River Road Corridor (From Santa Clara Transit Center)			30th Avenue to LCC Corridor (From Lane Community College)			Coburg Road Corridor (From Coburg Rd/Crescent Ave)			MLK, Jr. Boulevard Corridor (From Kinsrow/Commons)	
	No-Build	EC	EmX	No-Build	EC	EmX	No-Build	EC	EmX	No-Build	EC	EmX	No-Build	EC
In-vehicle Travel Time to Eugene Station[a]	29	19	17	26	21	18	17	16	15	30	15	12	13	11
In-vehicle Plus Walk and Wait[b]	40	29	25	45	34	27	26	27	24	41	26	20	31	24

Source: LCOG Regional Travel Demand Model Results (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

EC = Enhanced Corridor
MLK = Martin Luther King

[a] In-vehicle transit travel times represent time spent in the transit vehicle.
[b] in-vehicle plus walk and wait travel time represents walk time, one-half the wait time, and in-vehicle time in minutes.

This is because the service plan used in the modeling of the Enhanced Corridor Alternative replaced Routes 81 and 82 with Enhanced Corridor service and the combined frequency of those two routes under the No-Build Alternative is better than the 15-minute frequency under the 30th Avenue to LCC Corridor Enhanced Corridor Alternative. Potentially, service adjustments could be made which would allow for improved peak frequencies and/or connections to key markets such as the U of O that are somewhat reduced with the current implementation of the service plan for this corridor.

In terms of automobile travel times, there is no appreciable difference in times between the No-Build Alternative and the Build Alternatives.

4.3.3. Reliability

One of the major contributing factors to reliable transit service is the length of exclusive lanes for transit or travel lanes that are prioritized for transit vehicles (such as BAT lanes and queue jump lanes). All of the EmX Alternatives would have some level of exclusive or priority operating lanes compared to the No-Build Alternative, the highest being EmX operations in the River Road Corridor, with 22 percent of the new corridor lanes being prioritized for transit vehicles, as shown in Table 4.3-3. All of the Enhanced Corridor Alternatives except for the 30th Avenue to LCC Corridor would have some travel lanes that are prioritized for transit vehicles, the highest being Enhanced Corridor operations on the Martin Luther King, Jr. Boulevard Corridor, with 25 percent of the new corridor lanes being prioritized for transit vehicles.

Reliability measures include the total number of new round-trip miles, the total number of exclusive and/or priority miles, the percentage of new corridor exclusive or priority miles and the number of trunk-line intersections with transit priority treatment. Another indicator of the relative service reliability among the alternatives is characterized by the priority given to the transit trunk line at intersections.

4.3.4. Transit Ridership

This section addresses total systemwide transit ridership, corridor ridership, and transit boardings for the No-Build, Enhanced Corridor, and EmX Alternatives.

4.3.4.1. Systemwide Average Weekday Transit Ridership

Transit ridership for this measure is defined as average weekday systemwide linked trips in 2035. A linked trip is a one-way trip taken by a person from an origin to a destination, independent of the number of vehicles or transfers used to complete the trip. Table 4.3-4 shows the change in systemwide transit trips for each alternative. Overall, the Enhanced Corridor Alternatives would result in a slight increase of less than 1 percent in systemwide transit trips compared to the No-Build Alternatives. The exception to this is the Martin Luther King, Jr. Boulevard Enhanced Corridor Alternative, which yields a 1.3 percent increase in systemwide transit trips, compared to the No-Build Alternative. The 30th Avenue to LCC Corridor Enhanced Corridor Alternative would yield a 0.2 percent decrease in systemwide transit trips compared to the No-Build Alternative because the Enhanced Corridor Alternative would decrease the frequency of bus service along 30th Avenue. The EmX Alternatives would result in nearly a 2 percent increase in systemwide transit trips compared to the No-Build Alternatives.

4.3.4.2. Corridor Ridership

Corridor ridership is defined as any transit trip (bus or BRT vehicle) that is produced in and/or attracted to the respective corridor that, for this purpose, has been defined as the transportation analysis zone

(TAZ) within a 0.5-mile buffer around the transit line. Total corridor ridership for each alternative is shown in Table 4.3-5.

Overall, the Highway 99 Corridor EmX Alternative and the Coburg Road Corridor EmX Alternative would have the highest increase in corridor ridership compared to the No-Build Alternative, followed closely by the River Road Corridor EmX Alternative. Of the Enhanced Corridor Alternatives, the Martin Luther King, Jr. Boulevard Enhanced Corridor Alternative results in the highest increase in corridor ridership compared to the No-Build Alternative.

4.3.5. Transit Boardings

Daily unlinked transit ridership, also referred to as boardings, were categorized by boarding totals for all EmX lines that were not part of the project and boarding totals for all routes within the project corridor, shown in Table 4.3-6. The reason boardings on EmX lines that are not part of the project were included is to show that there is some variation in boardings on these routes where the project route and the existing EmX system share operations on a portion of the alignment. For example, existing EmX service on both the River Road Corridor and the Highway 99 Corridor show a loss of 150 and 500 boardings, respectively. This is because the River Road Corridor EmX Alternative and the Highway 99 Corridor EmX Alternative share a common operating segment along W. 6th Avenue and W. 7th Avenue with the existing West Eugene EmX service. As a result, there is some shifting of riders that occurs from the West Eugene EmX line with the introduction of another EmX route along W. 6th Avenue and W. 7th Avenue. All Enhanced Corridor Alternatives see a reduction in non-project EmX boardings, the largest being on the Coburg Road Corridor Enhanced Corridor Alternative. This is because the Coburg Road Corridor Enhanced Corridor Alternative would share a common operating segment with the Gateway EmX line, which would again cause some shifting of riders between the two lines.

On every corridor, the EmX Alternative outperforms the Enhanced Corridor Alternative by a substantial margin in corridor boardings. This is because of the faster travel times, higher levels of service, and priority improvements included in the EmX Alternatives. Under the Enhanced Corridor Alternatives, all the alternatives outperform the No-Build Alternative, the largest being the Martin Luther King, Jr. Boulevard Corridor with an increase of 73 percent, or 1,400 additional daily corridor boardings (see Table 4.3-6). The one exception among the Enhanced Corridor Alternatives is the 30th Avenue to LCC Corridor, which shows a reduction of 100 corridor boardings. This is because replacing Routes 81 and 82, which have a better combined frequency, with Enhanced Corridor service that is slightly less frequent, results in higher waiting times compared to the No-Build Alternative.

Table 4.3-3. 2035 Systemwide Average Weekday Transit Reliability Measures by Alternative

Measure	Highway 99 Corridor			River Road Corridor			30th Avenue to LCC Corridor			Coburg Road Corridor			MLK, Jr. Boulevard Corridor
	EC	EmX	Delta between EmX and Enhanced Corridor	EC	EmX	Delta between EmX and Enhanced Corridor	EC	EmX	Delta between EmX and Enhanced Corridor	EC	EmX	Delta between EmX and Enhanced Corridor	EC
Total Number of New Round-Trip EmX System Miles (miles)	0	10.5	10.5	0	10.3	10.3	0	10.2	10.2	0	13.2	13.2	0
Total Length of New Corridor Exclusive/Priority Lanes[a] (miles)	0.4	2.30	1.9	0.29	5.99	5.7	0	1.37	1.37	0.49	2.20	1.71	2.41
Percent of New Corridor that is Exclusive/Priority Lanes[a]	3.6%	21.9%	18.1%	2.8%	58.2%	55.3%	0%	13.4%	13.4%	3.7%	16.7%	13.0%	25.1%

Source: *MovingAhead Level 2 Definition of Alternatives*. (CH2M et al., 2016).

EC = Enhanced Corridor
MLK = Martin Luther King

[a] Exclusive/priority lanes are defined as the round-trip miles of business access and transit lanes, bus-only lanes, and queue jumps.

Table 4.3-4. Average Weekday 2035 Systemwide Ridership by Alternative

Measure	Highway 99 Corridor[b]			River Road Corridor[c]			30th Avenue to LCC Corridor			Coburg Road Corridor			MLK, Jr. Boulevard Corridor	
	No-Build	EC	EmX	No-Build	EC	EmX	No-Build	EC	EmX	No-Build	EC	EmX	No-Build	EC
Total Systemwide Transit Trips[a]	46,410	46,780	47,300	46,410	46,520	47,230	46,410	46,310	47,070	46,410	46,620	47,270	46,410	47,030
Delta from No-Build		370	890		110	820		-100	660		210	860		620
% Change from No-Build		0.8%	1.9%		0.2%	1.8%		-0.2%	1.4%		0.5%	1.9%		1.3%

EC = Enhanced Corridor
LCC = Lane Community College
MLK = Martin Luther King
TAZ = transportation analysis zone

[a] Systemwide transit trips are defined as one-way linked trips taken by a person from the trip's origin to the trip's destination, independent of the number of vehicles or transfers used to complete the trip.
[b] Highway 99 Corridor Enhanced Corridor and EmX Alternatives have different corridors because the routing in downtown is different - the Highway 99 Corridor Enhanced Corridor Alternative extends south to 11th/13th Avenues and captures more TAZs.
[c] While the River Road Corridor Enhanced Corridor and EmX Alternatives have different alignments Downtown, the alignments are close enough together that the alternatives have the same buffer zones and TAZs.

Table 4.3-5. Average Weekday 2035 Corridor[a] Ridership by Alternative

Measure	Highway 99 Corridor[c] No-Build	Highway 99 Corridor[c] EC	Highway 99 Corridor[c] EmX	River Road Corridor No-Build	River Road Corridor EC	River Road Corridor EmX	30th Avenue to LCC Corridor No-Build	30th Avenue to LCC Corridor EC	30th Avenue to LCC Corridor EmX	Coburg Road Corridor No-Build	Coburg Road Corridor EC	Coburg Road Corridor EmX	MLK, Jr. Boulevard Corridor No-Build	MLK, Jr. Boulevard Corridor EC
Total Corridor Transit Trips[b]	9,638/9,365	9,807	10,406	9,575	9,645	10,615	10,850	10,720	11,575	10,060	10,350	11,200	10,120	10,800
Delta from No-Build		169	1,042		70	1,042		-130	725		290	1,140		680
% Change from No-Build		1.8%	11.1%		0.7%	10.9%		-1.24%	6.6%		2.95%	11.4%		6.8%

EC = Enhanced Corridor
MLK = Martin Luther King

[a] Corridors overlap and include some common areas, but do not include downtown Eugene or the University of Oregon, as a result one cannot add up the totals to arrive at a regional total.
[b] Corridor transit trips are defined as any EmX or Bus trip with at least one trip end in the corridor, excluding downtown Eugene or the University of Oregon.
[c] 99EC and 99EmX have different corridors because the routing into Downtown is different – the 99EC extends south to 11th /13th Avenues and captures more TAZs.

Table 4.3-6. Average Weekday 2035 System EmX and Corridor Total Boardings by Alternative

Measure	Highway 99 Corridor No-Build	Highway 99 Corridor EC	Highway 99 Corridor EmX	River Road Corridor No-Build	River Road Corridor EC	River Road Corridor EmX	30th Avenue to LCC Corridor No-Build	30th Avenue to LCC Corridor EC	30th Avenue to LCC Corridor EmX	Coburg Road Corridor No-Build	Coburg Road Corridor EC	Coburg Road Corridor EmX	MLK, Jr. Boulevard Corridor No-Build	MLK, Jr. Boulevard Corridor EC
Non-Project Total EmX Service	24,500	24,150	24,000	24,500	24,500	24,350	24,500	24,450	24,800	24,500	24,050	24,550	24,500	24,300
Delta from No-Build		-350	-500		0	-150		-50	300		-450	50		-200
Corridor Routes Total	2,650	3,450	4,900	5,350	5,400	7,100	3,300	3,200	4,700	7,200	8,300	9,300	1,950	3,350
Delta from No-Build		800	2,250		50	1,700		-100	1,400		1,100	2,100		1,400
Total	27,150	27,600	28,900	29,850	29,900	31,450	27,800	27,650	29,500	31,700	32,350	33,850	26,450	27,650
Delta from No-Build		450	1,750		50	1,550		-150	1,700		650	2,150		1,200

Source: LCOG Regional Travel Demand Model Results (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

Note: For Enhanced Corridor Alternative, numbers represent EmX and Enhanced Corridor daily boardings combined.

EC = Enhanced Corridor
MLK = Martin Luther King

4.4. Indirect and Cumulative Effects

Indirect impacts are caused by the build alternatives and occur later in time or are farther removed in distance, but are still reasonably foreseeable. Cumulative impact analyses focus on those impacts resulting from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of which agency or person undertakes such other actions.

Potential indirect impacts to transportation policies were assessed for the No-Build, Enhanced Corridor, and EmX Alternatives. This evaluation includes determining if future 2035 traffic volume forecasts and anticipated land use changes may potentially impact transportation policies.

Cumulative impacts were qualitatively analyzed and based on comprehensive land use and transportation elements that are components of all build alternatives. This contextual analysis includes past, present and reasonably foreseeable future projects or actions occurring in the project area or the broader community which when combined with the project build alternatives, may lead to significant impacts to the transportation system or conflicts with LTD's and the City of Eugene's adopted transportation policies. Compared to the No-Build Alternatives, operation of all of the Enhanced Corridor and EmX Alternatives with the exception of the 30th Avenue to LCC Corridor Enhanced Corridor Alternative would better support LTD's and the City of Eugene's adopted transportation policies by increasing transit ridership.

There would be impacts to three study intersections that would cause motor vehicle operations to operate worse than the No-Build Alternative and would require mitigation measures: one intersection on the 30th Avenue to LCC Corridor EmX Alternative and two intersections on the Coburg Road Corridor EmX Alternative.

4.4.1. No-Build Alternatives

The No-Build Alternatives would not have as many beneficial indirect impacts as the Enhanced Corridor and EmX Alternatives. The No-Build Alternatives would not provide the potential for mode choice and travel behavior changes that would move towards meeting City of Eugene and regional transportation goals and policies.

Cumulative impacts (such as planned improvement projects, development projects, and land use changes) were accounted for when developing the future volumes used for operations analysis.

4.4.2. Enhanced Corridor and EmX Alternatives

Almost all of the build alternatives would provide beneficial indirect impacts. Most build alternatives would increase the opportunity for travelers to change travel behavior and modes over the No-Build Alternatives, which would help the City of Eugene and region meet future mode share goals.

4.5. Short-Term Construction-Related Impacts

4.5.1. No-Build Alternatives

Under the No-Build Alternatives, the MovingAhead Project is not proposing any improvements. However, under the No-Build Alternative other local and regional programs have planned improvement projects that would cause short-term construction impacts (such as increased delays and potential detour routing for motor vehicles, bicycles, and pedestrians). In addition, there could be safety issues associated with an increase in heavy vehicle movements and potential transport of hazardous waste during construction. These short-term construction-related impacts are addressed through other local and regional programs and projects.

4.5.2. Enhanced Corridor and EmX Alternatives

Under the Enhanced Corridor and EmX Alternatives, construction activities may include new BAT lanes, new transit only lanes, new bus pullouts, and new sidewalks/bicycle facilities. With the exception of the new pedestrian bridge over the heavy rail tracks on the Highway 99 Corridor, all of the new facilities would be at-grade, and the construction of new lanes would require either widening of the existing roadway or reconstruction of existing travel lanes.

The first several months of construction would be preliminary low-impact work, such as surveying and staging. Construction activities would result in some traffic disruption, including increased delays and potential detour routing for motor vehicles, bicycles, and pedestrians. In addition, there could be safety issues due to increases in heavy vehicle movements and potential transport of hazardous waste during construction.

4.6. Potential Mitigation Measures

4.6.1. No-Build Alternatives

4.6.1.1. Long-Term Impacts

The MovingAhead Project is not proposing any changes that would impact intersection operations under the No-Build Alternative; therefore, no mitigation measures are required.

4.6.1.2. Short-Term Impacts

The MovingAhead Project is not proposing any construction under the No-Build Alternative; therefore, no mitigation measures are required.

4.6.2. Enhanced Corridor and EmX Alternatives

LTD has prepared an *Addendum to MovingAhead Alternatives Analysis Technical Reports Memorandum* (CH2M, 2017b) that evaluates ways to avoid or minimize impacts at some properties. Please see this addendum for additional information on potential parking, acquisitions, and tree impacts mitigation.

4.6.2.1. Long-Term Impacts

Mitigation measures for individual alternatives are described in Chapters 5 through 9. There are no long-term impacts common to all alternatives that would require mitigation measures.

4.6.2.2. Short-Term Impacts

Mitigation measures during construction would require early, frequent, and ongoing communication among LTD, contractors, and affected property owners/tenants. Construction timing, staging, and signage would be coordinated by the LTD-designated staff liaison in consultation with the affected property owners/tenants to minimize business and residential disruptions. Speed zone reductions within the construction zone, closed or narrow lanes, and temporary driveway relocation would also be considered to mitigate construction impacts. Variable message signs, the LTD website, and local news sources could also be used to provide roadway users with advance notice of current or pending construction activities. All required mitigation measures would be specified in LTD's construction contracting documents.

4.7. Permits and Approvals

ORS 366.215 states that the Oregon Transportation Commission may not permanently reduce the vehicle-carrying capacity of an identified freight route. Exceptions for safety or access will be considered, and exceptions may be granted if the design is in Oregon's best interest and freight movement is not unreasonably impeded.

Approval is required from the ODOT Motor Carrier Division for the Highway 99 Enhanced Corridor and EmX Alternatives in order to install raised medians on Highway 99, W. 6th Avenue, or W. 7th Avenue.

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5. Highway 99 Corridor Environmental Consequences

A summary of the Highway 99 Corridor alternatives and key findings is provided below.

- The Highway 99 Corridor Enhanced Corridor Alternative would convert an eastbound right turn only lane to a BAT lane on W. 7th Avenue between 7th Place and Garfield Street; install bus queue jump phases at three intersections; install a northbound right turn lane at the Highway 99N/Roosevelt Boulevard intersection, install a northbound bus only left turn lane at the Highway 99N/Barger Drive intersection, and install 10 enhanced pedestrian crossings and two upgraded crossings. The key findings are as follows:
  - Transit travel time from the terminus to Eugene Station (one-way inbound) would improve by ten minutes during the a.m. peak hour over the No-Build Alternative (see Section 5.3.2 for travel time discussion).
  - System ridership would increase by 0.8 percent or 370 average weekday riders per day (see Section 5.3.4 for ridership discussion).
  - The Enhanced Corridor Alternative would install 1.26 miles of new or reconstructed sidewalk and 0.12 mile of new or improved bike facilities. The W. 6th Avenue segment between Garfield Street and 5th Avenue, as well as Barger Drive between Highway 99N and Cubit Street, would get improved pedestrian facilities. A new pedestrian bridge would be built over the railroad tracks adjacent to Highway 99 connecting Edison Street to Highway 99N about one-third of a mile north of Roosevelt Boulevard (see Section 5.2.2.2 for pedestrian and bicycle improvements discussion).
  - Roadway circulation would improve at Cubit Street/Winco Foods due to the installation of a new traffic signal (see Section 5.2.2.6 for discussion of changes to roadway circulation).
  - Off-street parking impacts at 6 sites could affect up to 50 off-street spaces (see Section 5.2.2.8 for discussion of parking impacts).
- The Highway 99 Corridor EmX Alternative would convert an eastbound right turn only lane to a BAT lane on W. 7th Avenue between 7th Place and Garfield Street; install bus queue jump phases at four intersections; install a dual northbound left turn lane at the Highway 99N/Roosevelt Boulevard intersection; install a northbound bus only left turn lane at the Highway 99N/Barger Drive intersection; and install nine enhanced pedestrian crossings. The key findings are as follows:
  - Transit travel time from the terminus to Eugene Station (one-way inbound) would improve by 12 minutes during the a.m. peak hour over the No-Build Alternative (see Section 5.3.2 for travel time discussion).
  - Transit reliability would improve due to exclusive/priority transit lanes on 24.3 percent of the corridor (see Section 5.3.3 for transit reliability discussion).
  - Systemwide ridership would increase by 1.9 percent or 890 average weekday riders per day (see Section 5.3.4 for ridership discussion).
  - The EmX Alternative would install 1.37 miles of new or reconstructed sidewalk and 4.01 miles of new or improved bike facilities. The W. 6th Avenue segment between Garfield Street and 5th Avenue, as well as Barger Drive between Highway 99N and Cubit Street, would get improved pedestrian facilities. A new pedestrian bridge would be built over the railroad tracks adjacent to Highway 99 connecting Edison Street to Highway 99N about one-third of a mile north of Roosevelt Boulevard (see Section 5.2.3.2 for pedestrian and bicycle improvements discussion).
  - Roadway circulation would improve at Cubit Street/Winco Foods due to the installation of a new traffic signal (see Section 5.2.3.6 for discussion of changes to roadway circulation).
  - Off-street parking impacts at 6 sites could affect up to 53 off-street spaces (see Section 5.2.3.8 for discussion of parking impacts).

5.1. Affected Environment

The following section evaluates the Highway 99 Corridor for base year and future year (2035) transportation conditions. Supporting data were acquired from intersection motor vehicle, pedestrian, and bicycle movement counts, the LCOG regional travel demand model, field observations, and ODOT crash data. The study area is shown on Figure 5.1-1.

Figure 5.1-1. Highway 99 Corridor Study Area Map

Source: DKS Transportation Analysis. (2016).

5.1.1. Roadway Characteristics

The transportation characteristics of the Highway 99 Corridor are shown in Table 5.1-1 and include functional classification, number of travel lanes, posted speeds, presence of sidewalks and bike lanes, and existing transit routes serving the segment. ODOT owns the Highway 99 portion of the corridor and classifies it as a major arterial. The City of Eugene owns the Barger Drive portion of the corridor and classifies it as a minor arterial. Currently, Route 40, Route 41, Route 43, and Route 95 serve the Highway 99 Corridor. Route 40 runs between Eugene Station and Barger Drive/Cubit Street every 15 to 30 minutes during peak hours and every 30 to 60 minutes during off peak hours. Route 41 runs along Highway 99 between Eugene Station and Barger Drive/N. Terry Street every 15 minutes during peak hours and 30 minutes during off peak hours. Route 95 runs along Highway 99 between Eugene Station and Junction City eight times a day during weekdays.

Table 5.1-1. Highway 99 Corridor Existing Study Area Roadway Characteristics

Roadway	Jurisdiction	Functional Classification[a]	Number of Travel Lanes	Posted Speed	Sidewalk	Bike Lanes	LTD Transit Routes
Altamont Street: Barger Drive to Aerial Way	City of Eugene	Local	2	25 mph	Both sides	No	–
Aerial Way: Altamont Street to Wagner Street	City of Eugene	Local	2	25 mph	Both sides	No	40
Wagner Street: Aerial Way to Cubit Street	City of Eugene	Local	2	25 mph	Both sides	No	40
Cubit Street: Barger Drive to Wagner Street	City of Eugene	Major Collector	4–5	20 mph	Both sides	Yes	40
Barger Drive: Century Drive to Cubit Street	City of Eugene	Minor Arterial	3	35 mph	Both sides	Yes	41
Barger Drive: Hwy 99N to Century Drive	City of Eugene	Minor Arterial	3	35 mph	Both sides[b]	Yes	41
Hwy 99N: Fairfield Avenue to Barger Drive	ODOT	Major Arterial	5	45 mph	Both sides	Yes	41, 95
Hwy 99N: Roosevelt Boulevard to Fairfield Avenue	ODOT	Major Arterial	5	40 mph	Both sides	Yes	41, 95
Hwy 99N: W. 5th Avenue to Roosevelt Boulevard	ODOT	Major Arterial	4–5	40 mph	No[c]	No[c]	41, 95
W. 6th Avenue: Garfield Street to 5th Avenue	ODOT	Major Arterial	2–3 (WB Only)	40 mph	Some on north	No	41, 95
W. 6th Avenue: Blair Street to Chambers Street	ODOT	Major Arterial	4[d] (WB Only)	30 mph	Both sides	No	–
W. 6th Avenue: Chambers Street to Garfield Street	ODOT	Major Arterial	4[d] (WB Only)	30 mph	Both sides	No	41, 95
W. 6th Avenue: Madison Street to Blair Street	ODOT	Major Arterial	5[e] (WB Only)	30 mph	Both Sides	No	–
W. 6th Avenue: Charnelton Street to Madison Street	ODOT	Major Arterial	4[d] (WB Only)	30 mph	Both sides	No	–
W. 7th Avenue: W. 5th Avenue to Garfield Street	ODOT	Major Arterial	3–4 (EB Only)	30 mph	No[c]	No[c]	41, 95

Table 5.1-1. Highway 99 Corridor Existing Study Area Roadway Characteristics

Roadway	Jurisdiction	Functional Classification[a]	Number of Travel Lanes	Posted Speed	Sidewalk	Bike Lanes	LTD Transit Routes
W. 7th Avenue: Garfield Street to Chambers Street	ODOT	Major Arterial	5[e] (EB Only)	30 mph	Both sides	No	41, 95
W. 7th Avenue: Chambers Street to Blair Street	ODOT	Major Arterial	4 (EB Only)	30 mph	Both sides	No	95
W. 7th Avenue: Blair Street to Washington Street	ODOT	Major Arterial	5[e] (EB Only)	30 mph	Both sides	No	95
W. 7th Avenue: Washington Street to Charnelton Street	ODOT	Major Arterial	4[d] (EB Only)	30 mph	Both sides	No	95
Charnelton Street: W. 6th Avenue to W. 13th Avenue	City of Eugene	Local	2	25 mph	Both sides	Yes	–
Willamette Street: W. 10th Avenue to W. 11th Avenue	City of Eugene	Local	2	25 mph	Both sides	No	28, 76
W. 11th Avenue: Willamette Street to Charnelton Street	City of Eugene	Minor Arterial	2 (WB Only)	20 mph	Both sides	Yes	36, 66, 76
Olive Street: W. 10th Avenue to W. 11th Avenue	City of Eugene	Local	2	25 mph	Both sides	No	32, 33, 36, 41, 76, 93
W. 10th Avenue: Willamette Street to Lincoln Street	City of Eugene	Local	2	25 mph	Both Sides	Yes	43
W. 11th Avenue: Chambers Street to Charnelton Street	City of Eugene	Minor Arterial	2 (WB Only)	30 mph	Both sides	No	32, 43, 76, 93
W. 13th Avenue: Chambers Street to Charnelton Street	City of Eugene	Minor Arterial	2 (EB Only)	20–30 mph	Both sides	Yes	32, 41, 76, 93
Chambers Street: W. 6th Avenue to W. 7th Avenue	City of Eugene	Major Arterial	6	30 mph	Both sides	Yes	–
Chambers Street: W. 7th Avenue to W. 13th Avenue	City of Eugene	Minor Arterial	3	30 mph	Both sides	Yes	–

Source: DKS Transportation Analysis. (2016).

LTD = Lane Transit District
ODOT = Oregon Department of Transportation

[a] Oregon Transportation Map. Federal Functional Classification Review, City of Eugene. 2014 Edition. htt p://www.oregon.gov/ODOT/TD/TDATA/pages/gis/citymaps.aspx.
[b] Sidewalk complete on both sides of the road except for one gap on the north side west of Empire Park Dr.
[c] Section will have multi-use path on the south/west side of Hwy 99N between Garfield and Roosevelt in the near future (currently in construction).
[d] Three general purpose travel lanes and one BAT lane.
[e] Four general purpose travel lanes and one BAT lane.

The most recent average daily traffic on the corridor is shown in Table 5.1-2.

Table 5.1-2. Highway 99 Corridor 2013 Average Daily Traffic

Roadway Segment	ADT
Barger Drive: Hwy 99N to Taney Street	11,000
Chambers Street: W. 11th Avenue to W. 13th Avenue	6,500
Hwy 99N: Bethel Drive to Barger Drive	29,700
Hwy 99N: W. 5th Avenue to Roosevelt Avenue	28,500
W. 6th Avenue: Chambers Street to Garfield Street	26,900
W. 6th Avenue: Jefferson Street to Blair Boulevard	30,400
W. 6th Avenue: Charnelton Street to Lincoln Street	14,000
W. 7th Avenue: Garfield Street to Chambers Street	26,900
W. 7th Avenue: Blair Boulevard to Jefferson Street	31,000
W. 7th Avenue: Lincoln Street to Charnelton Street	19,000
Charnelton Street: 8th Avenue to Broadway Avenue	3,100
W. 11th Avenue: Lincoln Street to Lawrence Street	12,900
W. 13th Avenue: Lawrence Street to Lincoln Street	13,300
Chambers Street: W. 11th Avenue to W. 7th Avenue	16,000

Source: City of Eugene. (2013).
Compiled by DKS Transportation Analysts. (2016).

5.1.2. Study Intersections

Seven study intersections on the Highway 99 Corridor were selected for traffic analysis for the existing conditions, 2035 No-Build Alternative, 2035 Enhanced Corridor Alternative, and 2035 EmX Alternative analyses. The study intersections are located throughout the corridor except for the downtown area (between Eugene Station and Chambers Street). Although future volumes were developed at some downtown intersections, the vehicle volumes did not change substantially among alternatives. In addition, the roadway configuration would not change in the downtown area, and EmX service will be operating on W. 6th Avenue and W. 7th Avenue upon completion of the WEEE project. Detailed traffic analysis on W. 6th Avenue was performed as part of that project (LTD, 2010). For these reasons, it was assumed that downtown operations would be very similar to No-Build Alternative operations for all build alternatives.

The study intersections evaluated for this corridor were:

- Highway 99N/Barger Drive
- Highway 99N/Fairfield Avenue
- Highway 99N/Royal Avenue
- Highway 99N/Roosevelt Boulevard
- W. 7th Avenue/W. 5th Avenue
- W. 6th Avenue/Garfield Street
- W. 7th Avenue/Garfield Street

5.1.3. Bicycle and Pedestrian Conditions

Pedestrian and bicycle activity at the seven study intersections was counted on all four legs of each intersection during the p.m. peak hours (Table 5.1-3). The volumes were collected in 2010 and 2015, with dates varying by intersection. The highest p.m. peak hour pedestrian volumes occurred at Highway 99N/Royal Avenue and Highway 99N/Roosevelt Boulevard, and the highest bicycle volumes occurred at W. 6th Avenue/Garfield Street and W. 7th Avenue/Garfield Street.

Table 5.1-3. Highway 99 Corridor Study Intersection p.m. Peak Hour Pedestrian and Bicycle Volumes

Study Intersection Number	Study Intersection	Date of Intersection Count	p.m. Peak Hour Activity	
			Pedestrian	Bicycle
1	Hwy 99N/Barger Drive	5/27/2010[a]	0	0
2	Hwy 99N/Fairfield Avenue	10/6/2015	8	2
3	Hwy 99N/Royal Avenue[c]	7/20/2010[b]	60	0
4	Hwy 99N/Roosevelt Boulevard	5/27/2010[a]	37	0
5	W. 7th Avenue/W. 5th Avenue	10/28/2015	0	0
6	W. 6th Avenue/Garfield Street	10/28/2015	15	3
7	W. 7th Avenue/Garfield Street	10/28/2015	12	4

Source: DKS Transportation Analysis. (2016).

Note: Total volume crossing all legs of each intersection.

[a] Turning movement count was obtained from the Draft Eugene 2035 TSP.
[b] Turning movement count was obtained from Quality Counts through their historic counts database.
[c] Closest signalized intersection to proposed bicycle/pedestrian bridge and ramps over heavy rail tracks.

A qualitative assessment of the pedestrian and bicycle facilities along the Highway 99 Corridor was conducted using methodology from ODOT's *Analysis Procedures Manual* (ODOT, 2014), and the results are shown in Table 5.1-4. Overall, the pedestrian and bicycle facilities on the Highway 99 Corridor are poor to fair. Much of the corridor consists of a five-lane arterial with narrow bike lanes and a high density of driveways. However, a project is currently in construction that will create a multi-use path on the west side of Highway 99N between Garfield Street and Roosevelt Boulevard, which will create excellent conditions for both pedestrians and bicyclists on that portion of the corridor.

Table 5.1-4. Highway 99 Corridor Existing Conditions Qualitative Assessment of Pedestrian and Bicycle Facilities[a]

Segment	Walking	Biking
W. 11th Avenue: Willamette Street to Lincoln Street	Good	Fair
Willamette Street: W. 10th Avenue to W. 11th Avenue	Good	Poor
W. 10th Avenue: Willamette Street to Lincoln Street	Excellent	Good
Lincoln Street: W. 10th Avenue to W. 13th Avenue	Good	Good
W. 6th Avenue: Charnelton Street to Chambers Street	Good	Poor
W. 6th Avenue: Chambers Street to Garfield Street	Good	Poor
W. 6th Avenue: Garfield Street to 5th Avenue	Poor	Poor
Chambers Street: W. 6th Avenue to W. 7th Avenue	Good	Good
Chambers Street: W. 7th Avenue to W. 13th Avenue	Fair	Good
W. 7th Avenue: W. 5th Avenue to Garfield Street	Poor[b]	Poor[b]
W. 7th Avenue: Garfield Street to Chambers Street	Good	Poor
W. 7th Avenue: Chambers Street to Lincoln Street	Good	Poor
W. 11th Avenue: Chambers Street to Lincoln Street	Good	Fair
W. 13th Avenue: Chambers Street to Lincoln Street	Good	Good
Hwy 99N: W. 5th Avenue to Roosevelt Boulevard	Poor[b]	Poor[b]
Hwy 99N: Roosevelt Boulevard to Barger Drive	Fair	Fair
Barger Drive: Hwy 99N to Cubit Street	Fair	Fair
Cubit Street: Barger Drive to Wagner Street	Good	Fair
Wagner Street: Cubit Street to Aerial Way	Good	Fair
Aerial Way: Wagner Street to Altamont Street	Good	Fair
Altamont Street: Aerial Way to Barger Drive	Good	Fair

Source: DKS Transportation Analysis. (2016).

[a] Qualitative analysis based on methodology described in Chapter 14 of ODOT's *Analysis Procedures Manual* (ODOT, 2014).
[b] Rating is currently "poor," but will become "excellent" once the multi-use path on the south/west side of Highway 99W between Garfield Street and Roosevelt Boulevard is completed (it is currently in construction).

5.1.4. Transit

Currently, Route 40, Route 41, Route 43, and Route 95 serve the Highway 99 Corridor. Route 40 runs along Roosevelt Boulevard, Elmira Road, Bertelsen Road, Royal Avenue, and Echo Hollow Road between Eugene Station and Barger Drive/Cubit Street every 15 to 30 minutes during peak hours and every 30 to 60 minutes during off peak hours. Route 41 runs along Highway 99 between Eugene Station and Barger Drive/N. Terry Street every 15 minutes during peak hours and 30 minutes during off peak hours. Route 43 runs between Eugene Station and the Green Hill Road/Barger Drive intersection along Highway 99 and W. 11th Avenue every 30 minutes during peak hours and 60 minutes during off peak hours. Route 95 runs along Highway 99 between Eugene Station and Junction City eight times a day during the weekdays.

5.1.5. Safety Analysis

Intersection crashes were gathered from the ODOT database for the last 5 full years of data (2010-2014). Crashes were grouped by severity (Table 5.1-5) and type (Table 5.1-6 and Figure 5.1-3) at both the segment and intersection levels. In total, the Highway 99 Corridor, which is 5.3 miles in length, had 469 crashes in the 5-year period analyzed. One fatality occurred on Highway 99N near Royal Avenue – at night when a vehicle struck an individual in the roadway.

Table 5.1-5. Highway 99 Corridor 5-Year Collision Breakdown by Severity (2010–2014 Crashes)

Corridor – Highway 99 (Approx. 5.3 Miles)							
	Fatality	Serious Injury	Evident Injury	Possible Injury	PDO[a]	Total	Segment Collision Rate[b]
Segment	**1**	**9**	**60**	**131**	**268**	**469**	**–**
Aerial Way: Wagner Street to Altamont Street	0	0	0	0	0	0	0.00
Wagner Street: Cubit Street to Aerial Way	0	0	0	0	0	0	0.00
Altamont Street: Aerial Way to Barger Drive	0	0	0	0	0	0	0.00
Barger Drive: Hwy 99N to Echo Hollow Road/Cubit Street	0	0	0	0	0	0	0.00
Cubit Street: Barger Drive to Wagner Street	0	0	0	0	0	0	0.00
Hwy 99N: Lakewood Court/Bethel Drive to Barger Drive	0	0	0	1	2	3	0.02
Hwy 99N: Fairfield Avenue to Lakewood Court/Bethel Drive	0	1	7	5	8	21	0.08
Hwy 99N: Royal Avenue to Fairfield Avenue	1	0	3	3	3	10	0.05
Hwy 99N: Elmira Road to Royal Avenue	0	0	1	6	8	15	0.08
Hwy 99N: Roosevelt Boulevard to Elmira Road	0	0	5	5	6	16	0.18
Hwy 99N: Roosevelt Boulevard to W. 5th Avenue	0	1	3	5	8	17	0.09
W. 6th Avenue: Blair Boulevard to Polk Street	0	0	0	2	14	16	0.11
W. 6th Avenue: Chambers Street to W. 5th Avenue	0	0	1	2	13	16	0.08
W. 6th Avenue: Charnelton Street to Jefferson Street	0	0	0	2	2	4	0.05
W. 6th Avenue: Jefferson Street to Blair Boulevard	0	0	1	2	17	20	0.14
W. 6th Avenue: Polk Street to Chambers Street	0	0	0	3	11	14	0.10
W. 6th Avenue: W. 5th Avenue to Roosevelt Boulevard	0	1	3	3	7	14	0.07
W. 7th Avenue: Blair Boulevard to Jefferson Street	0	0	2	4	10	16	0.14
W. 7th Avenue: Chambers Street to Polk Street	0	0	1	1	1	3	0.02
W. 7th Avenue: Garfield Street to Chambers Street	0	0	0	4	9	13	0.12
W. 7th Avenue: Jefferson Street to Olive Street	0	0	0	4	4	8	0.06
W. 7th Avenue: Polk Street to Blair Boulevard	0	1	1	4	5	11	0.06
W. 7th Avenue: W. 5th Avenue to Garfield Street	0	0	1	3	2	6	0.04
Charnelton Street: W. 11th Avenue to W. 7th Avenue	0	0	0	0	1	1	0.09
Charnelton Street: W. 7th Avenue to W. 6th Avenue	0	0	0	0	3	3	0.43
Chambers Street: W. 11th Avenue to W. 13th Avenue	0	0	0	1	1	2	0.11
Chambers Street: W. 11th Avenue to W. 7th Avenue	0	0	1	3	5	9	0.10
Chambers Street: W. 7th Avenue to W. 6th Avenue	0	0	1	2	5	8	0.27
W. 10th Avenue: Lincoln Street to Olive Street	0	0	0	0	0	0	0.00

Table 5.1-5. Highway 99 Corridor 5-Year Collision Breakdown by Severity (2010–2014 Crashes)

Corridor – Highway 99 (Approx. 5.3 Miles)							
	Fatality	Serious Injury	Evident Injury	Possible Injury	PDO[a]	Total	Segment Collision Rate[b]
Segment	**1**	**9**	**60**	**131**	**268**	**469**	**–**
W. 11th Avenue: Olive Street to Jefferson Street	0	0	2	2	8	12	0.12
W. 11th Avenue: Jefferson Street to Monroe Street	0	0	1	0	3	4	0.10
W. 11th Avenue: Monroe Street to Polk Street	0	0	0	2	2	4	0.04
W. 11th Avenue: Polk Street to Chambers Street	0	0	0	1	6	7	0.10
W. 11th Avenue: Willamette Street to Charnelton Street	0	0	1	2	3	6	0.16
W. 13th Avenue: Chambers Street to Polk Street	0	0	0	0	0	0	0.00
W. 13th Avenue: Jefferson Street to Lincoln Street	0	0	1	1	3	5	0.17
W. 13th Avenue: Monroe Street to Jefferson Street	0	0	0	0	0	0	0.00
W. 13th Avenue: Polk Street to Monroe Street	0	0	0	0	0	0	0.00
Intersections							
Highway 99N & Barger Drive	0	0	2	6	7	15	0.32[c]
Highway 99N & Fairfield Avenue	0	1	2	3	4	10	0.25[c]
Highway 99N & Royal Avenue	0	1	4	6	7	18	0.42[c]
Highway 99N & Roosevelt Boulevard	0	1	9	20	30	60	**1.00**[c]
W. 7th Avenue & W. 5th Avenue	0	1	2	1	6	10	0.28[c]
Garfield Street & W. 6th Avenue	0	0	0	3	10	13	0.32[c]
Garfield Street & W. 7th Avenue	0	1	5	19	31	56	**0.99**[c]

Source: ODOT Crash Data. (2016). Compiled by DKS Transportation Analysts. (2016).

[a] PDO = Property Damage Only.
[b] Collisions per 1 million vehicle miles.
[c] Collisions per 1 million entering vehicles.

Table 5.1-6. Highway 99 Corridor Collision Breakdown by Type

	Angle	Rear-End	Turn	Side-swipe	Backing	Head-On	Fixed Object	Pedestrian	Other	Total
Corridor - Highway 99 (Approx. 5.3 Miles)	**39**	**191**	**122**	**70**	**8**	**4**	**27**	**6**	**2**	**469**
Intersections										
Hwy 99N & Roosevelt Blvd	7	39	5	3	2	0	0	3	1	60
Garfield St & W. 7th Ave	18	12	26	0	0	0	0	0	0	56

Source: ODOT Crash Data. (2016). Compiled by DKS Transportation Analysis. (2016).

Table 5.1-5 shows the number of crashes by severity, along with the collision rate. Typically, intersections with a collision rate above or near 1 crash per million entering vehicles or segments with a collision rate above or near 1 crash per million vehicle miles are flagged for consideration of safety improvements. Based on high collision rates, the intersections that should be considered for safety improvements on the Highway 99 Corridor are Highway 99N/Roosevelt Boulevard and Garfield Street/W. 7th Avenue. None of the segments has collision rates near 1 crash per million vehicle miles.

Figure 5.1-2 shows a “heat map” of reported collisions along the Highway 99N corridor between 2010 and 2014: high densities of crashes are shown in red, medium densities are shown in orange, and low densities are shown in green. Serious injury crashes are shown as black points along the corridor, and a fatal crash is shown as a black point with a cross through it. Figure 5.1-1 shows that the highest densities of crashes have occurred at:

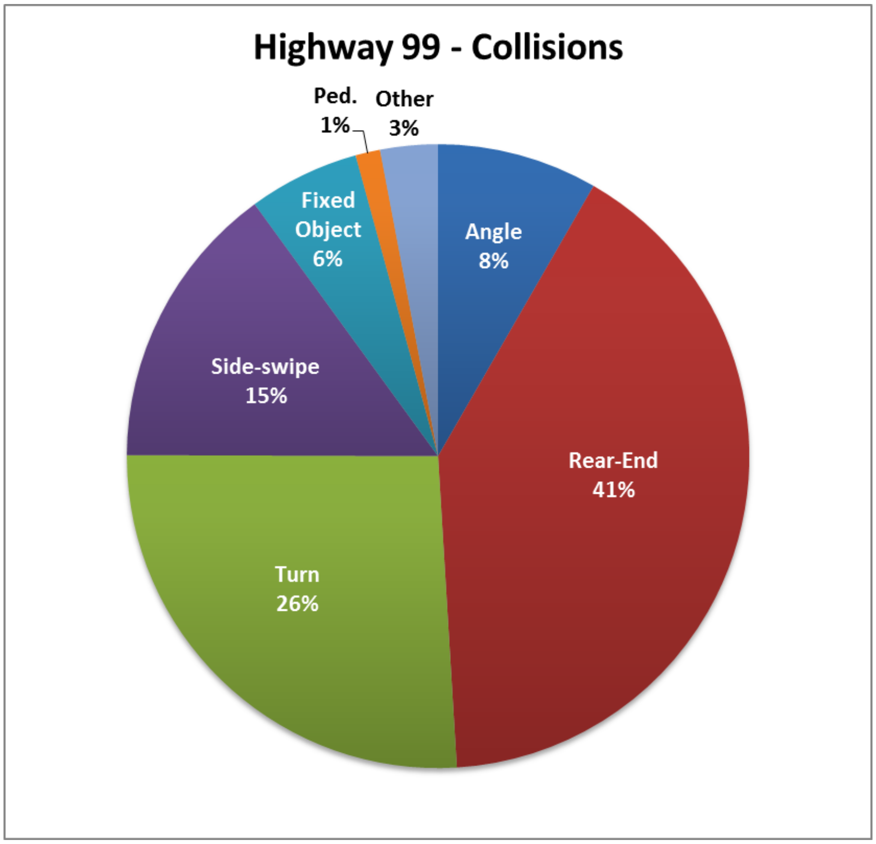
- Highway 99N/Fairfield Avenue
- Highway 99N/Royal Avenue
- Highway 99N/Roosevelt Boulevard
- W. 7th Avenue: Garfield Street to Chambers Street
- W. 6th Avenue: Washington Street to Blair Boulevard

Figure 5.1-2. Highway 99 Corridor 5-Year Crash Heat Map (2010–2014)

Source: DKS Transportation Analysis. (2016).

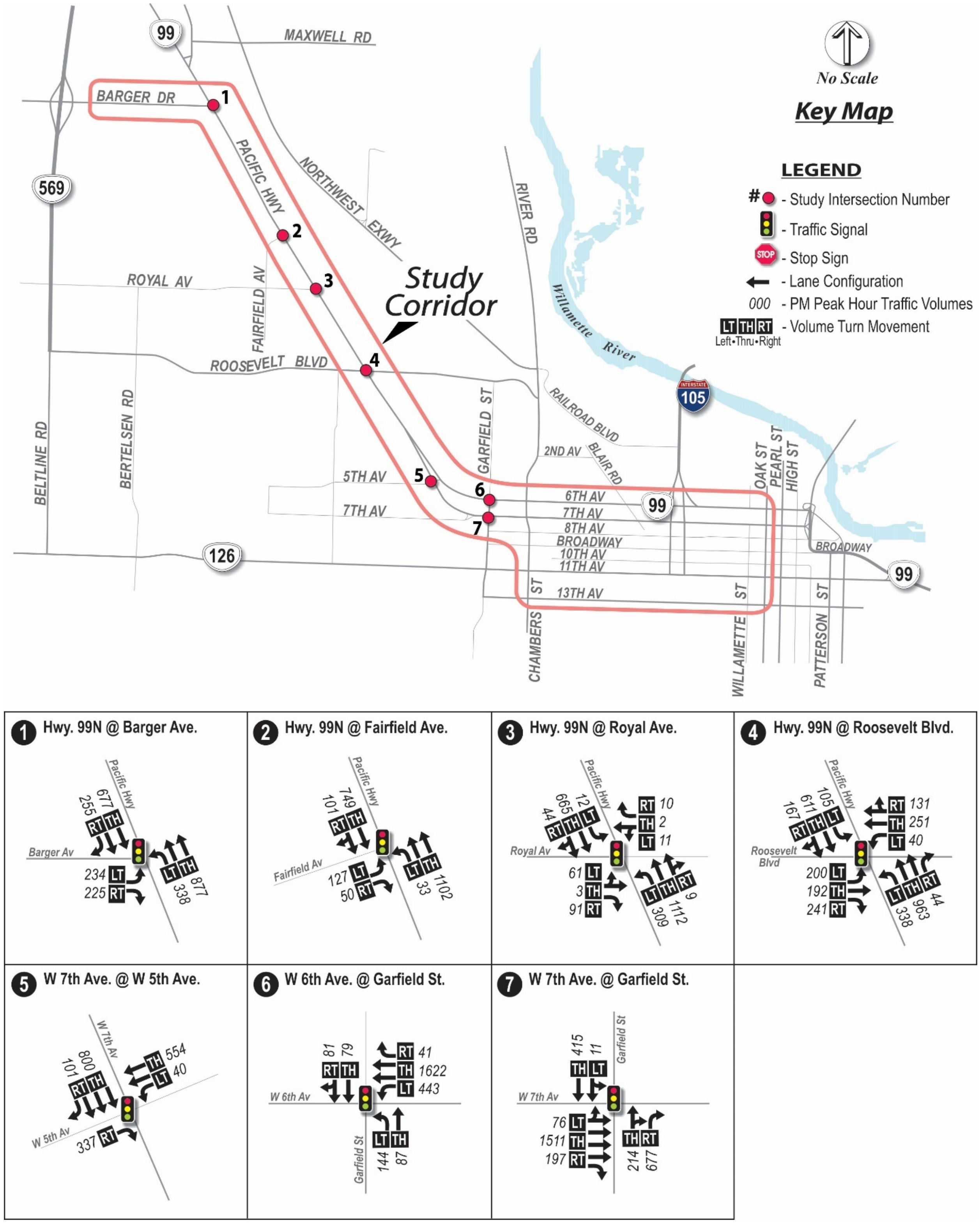
The corridor was analyzed further to determine which types of crashes are most prevalent. As shown on Figure 5.1-3, the most prevalent collision types were rear-end and turning, together accounting for two-thirds of the total collisions along the corridor. These crash types are typical on urban highways. The intersections at both Highway 99N/Roosevelt Boulevard and Garfield Street/W. 7th Avenue had a high number of angle crashes. Figure 5.1-4 shows a complete summary of the collision types for intersections that had an annual collision rate near or above 1.0.

Figure 5.1-3. Highway 99 Corridor Collision Breakdown (2010–2014) by Type



Source: DKS Transportation Analysis. (2016).

Figure 5.1-4. Highway 99 Corridor 2015 Existing p.m. Peak Hour Traffic Volumes



Source: DKS Transportation Analysis. (2016).

5.1.6. Existing Motor Vehicle Intersection Operations

The existing performance of the study intersections was evaluated using a traffic operations model based on 2000 *Highway Capacity Manual* methodology (TRB, 2000). The existing p.m. peak hour turning movement counts are shown on Figure 5.1-4.

The 2015 base year traffic volumes and existing roadway network were used to determine study intersection delay, level of service, and v/c ratio. Existing intersection traffic signal timing was obtained from the City of Eugene and incorporated into the analysis. The existing study intersection operations analysis is presented in Table 5.1-7. The operations analysis was conducted at all of the study intersections during the p.m. peak hour. During the existing p.m. peak hour, mobility standards are met at all of the study intersections.

Table 5.1-7. Highway 99 Corridor Existing 2015 p.m. Peak Hour Study Intersection Operations

Study Intersection Number	Study Intersection	Date of Intersection Count	Juris-diction	Operating Standard[c]	LOS	Delay (sec)	v/c
1	Hwy 99N/Barger Drive	5/27/2010[a]	ODOT	0.85/0.85	C	20.2	0.68
2	Hwy 99N/Fairfield Avenue	10/6/2015	ODOT	0.85/0.85	A	7.2	0.57
3	Hwy 99N/Royal Avenue	7/20/2010[b]	ODOT	0.85/0.85	A	9.4	0.55
4	Hwy 99N/Roosevelt Boulevard	5/27/2010[a]	ODOT	0.85/1.00	D	42.3	0.83
5	W. 7th Avenue/W. 5th Avenue	10/28/2015	ODOT	0.85/1.00	B	18.4	0.37
6	W. 6th Avenue/Garfield Street	10/28/2015	ODOT	0.85/1.00	B	14.2	0.77
7	W. 7th Avenue/Garfield Street	10/28/2015	ODOT	0.85/1.00	C	22.2	0.71

Source: DKS Transportation Analysis. (2016).

Italic underlined values do not meet current standards
Bold underlined values do not meet proposed standards or current standards

Delay = Average Intersection Delay in seconds
LOS = Level of Service
v/c = volume-to-capacity

[a] Turning movement count was obtained from the Draft Eugene 2035 TSP.
[b] Turning movement count was obtained from Quality Counts through their historic counts database.
[c] Current/proposed operations standards for these facilities.

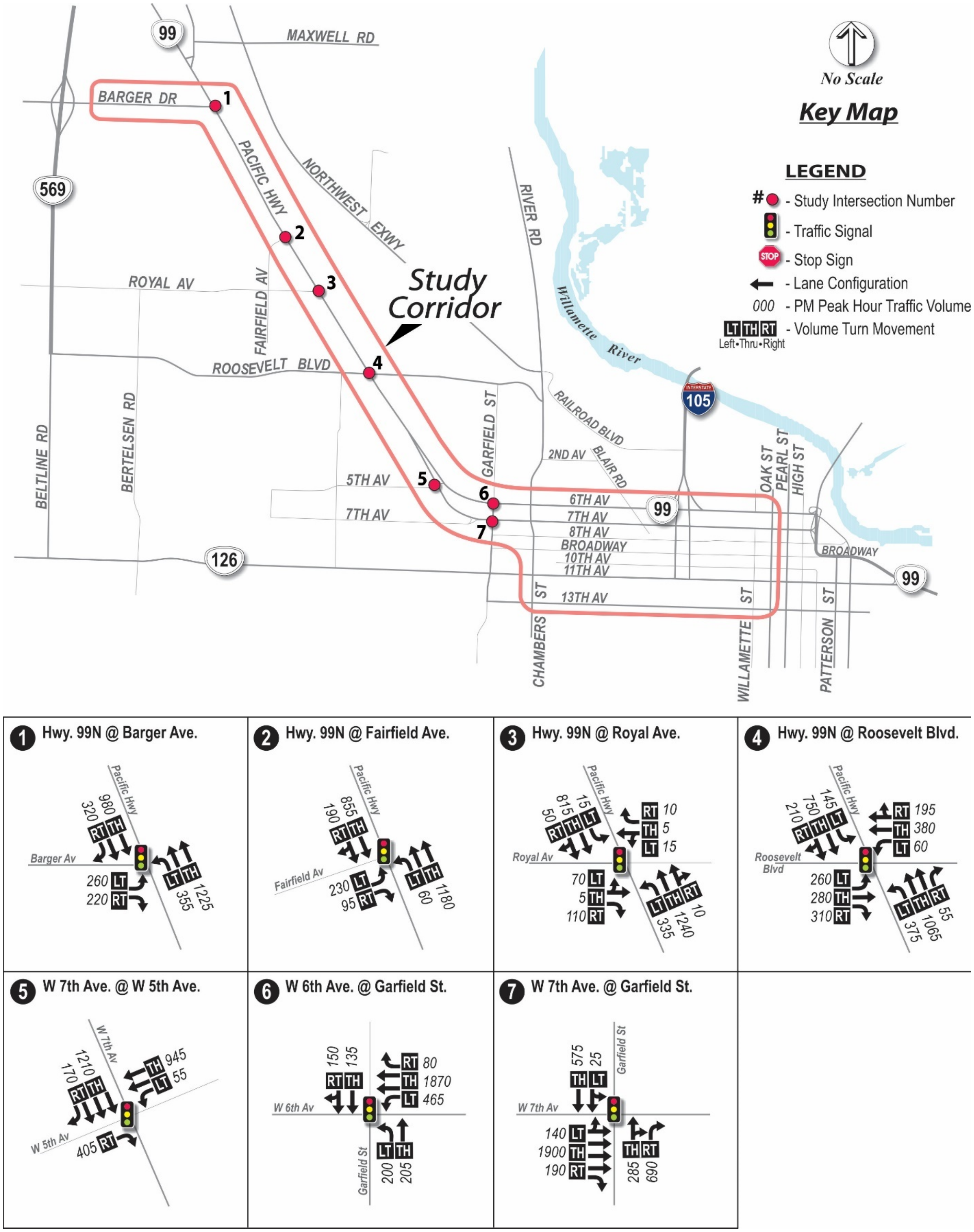
5.2. Long-Term Direct Impacts

5.2.1. No-Build Alternative

5.2.1.1. Local Traffic Operations

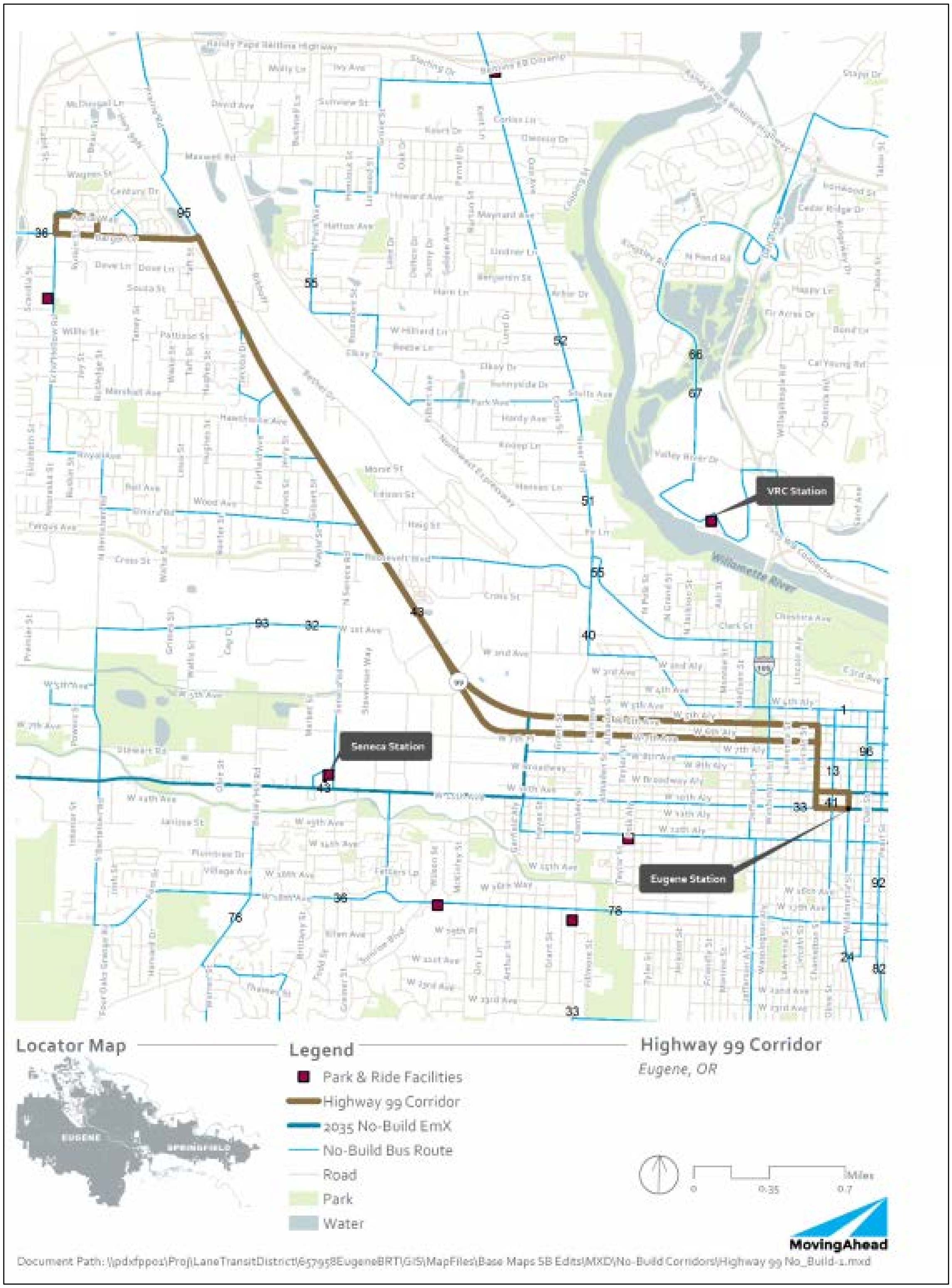
The future Highway 99 Corridor No-Build Alternative peak hour turning movement volumes are shown on Figure 5.2-1. Figure 5.2-2 shows the Highway 99 Corridor 2035 No-Build Alternative transit network.

Figure 5.2-1. Highway 99 Corridor 2035 No-Build Alternative p.m. Peak Hour Traffic Volumes



Source: DKS Transportation Analysis. (2016).

Figure 5.2-2. Highway 99 Corridor 2035 No-Build Alternative Transit Network



Source: CH2M. (2016).

The 2035 No-Build Alternative transportation analysis was based on a future roadway network that included the expected transportation improvements identified in the Draft Eugene 2035 TSP. The Draft Eugene 2035 TSP projects that would construct capacity improvements in the study area are shown in Table 5.2-1.

Table 5.2-1. Highway 99 Corridor Expected Transportation Improvement Projects On or Near the Corridor

Project Name	Description
Roadway Projects	
Bethel Drive: Hwy 99 to Roosevelt Boulevard	Upgrade to 2-lane urban facility
Barger Drive: West of Randy Papé Beltline Highway	Widen to include additional travel lane in each direction
Bike/Pedestrian Projects	
Garfield Street: Roosevelt Boulevard to 6th Avenue	Add bike lanes
6th Avenue: Garfield Street to 5th Avenue	Add bike lanes
Hwy 99N: Roosevelt Boulevard to W. 7th Avenue/Garfield Street	Shared-use path
Roosevelt Boulevard: Maple Street to Hwy 99N	Add shared-use path
Hwy 99N: Garfield Street to Roosevelt Boulevard	Construct sidewalks

Source: Draft Eugene 2035 TSP (City of Eugene, 2016).

A traffic operations model was created for the study area to evaluate vehicle traffic flow and intersection operating conditions, such as average vehicle delay and congestion. The 2035 No-Build Alternative performance of the study intersections were evaluated using a traffic operations model based on 2000 *Highway Capacity Manual* methodology (Transportation Research Board [TRB], 2000). The operations analysis was conducted at all of the study intersections during the p.m. peak hour. The No-Build Alternative study intersection operations analysis for the 2035 p.m. peak hour is presented in Table 5.2-2.

Table 5.2-2. Highway 99 Corridor No-Build Alternative 2035 p.m. Peak Hour Study Intersection Operations

Study Intersection Number	Study Intersection	Jurisdiction	Operating Standard[a]	LOS	Delay (sec)	v/c
1	Hwy 99N/Barger Drive	ODOT	0.85/0.85	C	25.7	0.77
2	Hwy 99N/Fairfield Avenue	ODOT	0.85/0.85	B	13.8	0.56
3	Hwy 99N/Royal Avenue	ODOT	0.85/0.85	B	11.0	0.64
4	Hwy 99N/Roosevelt Boulevard	ODOT	0.85/1.00	<u>**F**</u>	<u>**88.9**</u>	<u>**1.03**</u>
5	W. 7th Avenue/W. 5th Avenue	ODOT	0.85/1.00	B	19.6	0.59
6	W. 6th Avenue/Garfield Street	ODOT	0.85/1.00	<u>*C*</u>	<u>*32.8*</u>	<u>*0.98*</u>
7	W. 7th Avenue/Garfield Street	ODOT	0.85/1.00	C	23.2	0.82

Table 5.2-2. Highway 99 Corridor No-Build Alternative 2035 p.m. Peak Hour Study Intersection Operations

Study Intersection Number	Study Intersection	Jurisdiction	Operating Standard[a]	LOS	Delay (sec)	v/c

Source: DKS Transportation Analysis. (2016).

Italic underlined values do not meet current standards
Bold underlined values do not meet proposed standards or current standards

Delay = Average Intersection Delay in seconds
LOS = Level of Service
v/c = volume-to-capacity

[a] Current/proposed operations standards for these facilities.

During the 2035 p.m. peak hour No-Build Alternative conditions, mobility standards are not met at the following study intersections:

- Highway 99N/Roosevelt Boulevard (current and proposed standards)
- W. 6th Avenue/Garfield Street (current standards only)

5.2.1.2. Connectivity to Roadway, Bike, and Pedestrian Facilities

The Highway 99 Corridor No-Build Alternative was compared with the existing and proposed roadway, bike, and pedestrian projects from the expected transportation improvement projects identified in the Draft Eugene 2035 TSP (Table 5.2-1) to determine how well coordinated the projects were. Expected transportation improvement projects, such as the addition of bike lanes and construction of new sidewalks, would improve access to transit. For example, the planned installation of new sidewalks on Highway 99N between Garfield Street and Roosevelt Boulevard would improve pedestrian access to nearby transit stops. In addition, the planned shared use path on Highway 99N would allow people to more easily pair bicycling with transit.

The No-Build Alternative would not change connectivity to planned roadway, bike, or pedestrian projects.

The No-Build Alternative qualitative assessment of pedestrian and bicycle facilities is shown in Table 5.2-3. Pedestrian facilities were rated “excellent”, “good”, “fair”, or “poor” based on presence and width of sidewalks or paths, presence and width of buffers (such as landscaping), outside travel lane width, number of travel lanes and speed of motorized traffic, presence and width of bicycle lane or shoulder, and presence of lighting. Bicycle facilities were rated “excellent”, “good”, “fair”, or “poor” based on preferred type of facility (bike lane, buffered bike lane, off-street path) given motor vehicle volume of the roadway, presence and width of a shoulder, outside travel lane width, grade, pavement condition, obstructions, presence of on-street parking, and number of travel lanes and speed of motorized traffic.

Table 5.2-3. Highway 99 Corridor No-Build Alternative Qualitative Assessment of Pedestrian and Bicycle Facilities[a]

Segment	Walking	Biking
W. 11th Avenue: Willamette Street to Lincoln Street	Good	Fair
Willamette Street: W. 10th Avenue to W. 11th Avenue	Good	Poor

Table 5.2-3. Highway 99 Corridor No-Build Alternative Qualitative Assessment of Pedestrian and Bicycle Facilities[a]

Segment	Walking	Biking
W. 10th Avenue: Willamette Street to Lincoln Street	Excellent	Good
Charnelton Street: W. 6th Avenue to W. 11th Avenue	Good	Poor
Lincoln Street: W. 10th Avenue to W. 13th Avenue	Good	Good
W. 6th Avenue: Charnelton Street to Chambers Street	Good	Poor
W. 6th Avenue: Chambers Street to Garfield Street	Good	Poor
W. 6th Avenue: Garfield Street to 5th Avenue	Poor	Poor
Chambers Street: W. 6th Avenue to W. 7th Avenue	Good	Good
Chambers Street: W. 7th Avenue to W. 13th Avenue	Fair	Good
W. 7th Avenue: W. 5th Avenue to Garfield Street	Poor[b]	Poor[b]
W. 7th Avenue: Garfield Street to Chambers Street	Good	Poor
W. 7th Avenue: Chambers Street to Lincoln Street	Good	Poor
W. 7th Avenue: Lincoln Street to Charnelton Street	Good	Poor
W. 11th Avenue: Chambers Street to Lincoln Street	Good	Fair
W. 13th Avenue: Chambers Street to Lincoln Street	Good	Good
Hwy 99N: W. 5th Avenue to Roosevelt Boulevard	Poor[b]	Poor[b]
Hwy 99N: Roosevelt Boulevard to Barger Drive	Fair	Fair
Barger Drive: Hwy 99N to Cubit Street	Fair	Fair
Cubit Street: Barger Drive to Wagner Street	Good	Fair
Wagner Street: Cubit Street to Aerial Way	Good	Fair
Aerial Way: Wagner Street to Altamont Street	Good	Fair
Altamont Street: Aerial Way to Barger Drive	Good	Fair

Source: DKS Transportation Analysis. (2016).

[a] Qualitative analysis based on methodology described in Chapter 14 of ODOT's *Analysis Procedures Manual* (ODOT, 2014).

[b] Rating is currently "poor," but will become "excellent" once the multi-use path on the south/west side of Highway 99W between Garfield Street and Roosevelt Boulevard is completed (it is currently in construction).

5.2.1.3. Plan Consistency

The Highway 99 Corridor No-Build Alternative was evaluated for consistency with the Long Range Transit Plan (LTD, 2014), the FTN concept, and the goals outlined in the *Central Lane Metropolitan Planning Organization Regional Transportation Plan (*LCOG, 2011, December) and the Draft Eugene 2035 TSP.

The purpose of the LTD FTN is to leverage transit service investments by tying service to the density and other elements of adjacent development. The FTN enables a well-connected network that provides regional circulation by providing an average transit frequency of 15 minutes or better, a reliable transit system that runs on schedule (by implementing strategies such as transit priority at signalized intersections), and enhanced stations with bicycle and pedestrian connections (LTD, 2014). The No-Build

Alternative would not meet the FTN goal of providing frequent service on Highway 99, as it would only run frequent service buses during weekday peak hour periods.

The BRT system is the "highest level of service available within the FTN, and is a permanent, integrated system that uses buses or specialized vehicles on roadways or dedicated lanes to efficiently transport passengers" (LTD, 2014). BRT system elements include branded multi-door 60-foot-long BRT vehicles, enhances stations with level boarding platforms instead of bus stops, off-board fare collection, transit signal priority, wider stop spacing, and 10-minute service frequencies. BRT service is intended to improve transit speed, reliability, and ridership (CH2M, 2016a). The No-Build Alternative would not meet these BRT system elements.

The five primary goals outlined in the Draft Eugene 2035 TSP are to, (1) create an integrated system that is safe and efficient and reduces fossil fuel usage by 50 percent, (2) advance regional sustainability by reducing fossil fuel reliance, (3) reduce reliance on any single mode, (4) address the needs and safety of all travelers, and (5) by 2035, triple the percentage of trips made on foot, by bicycle, and by transit from 2014 levels. The No-Build Alternative would not improve bus service enough to meet many of these goals, such as improving frequency during off-peak hours to reduce reliance on other modes, reducing fossil fuel reliance, or helping to triple the percentage of trips made on foot, by bicycle, and by transit by 2035 from 2014 levels, compared to the build alternatives.

5.2.1.4. Transit Priority at Signalized Intersections

The Highway 99 Corridor No-Build Alternative would not include any changes to traffic signal operations, and no exclusive bus signal phasing would be provided, except for those already under construction along W. 6th Avenue, W. 7th Avenue, Charnelton Street, 10th Avenue, and 11th Avenue as part of the WEEE Project.

5.2.1.5. Safety

The Highway 99 Corridor No-Build Alternative would retain the existing roadway system except for the expected transportation improvements described in the Draft Eugene 2035 TSP and identified in Table 5.2-1. Motor vehicle safety would not be affected under the No-Build Alternative.

5.2.1.6. Roadway Circulation

The Highway 99 Corridor No-Build Alternative would retain existing roadway circulation except for the expected transportation improvements described in the Draft Eugene 2035 TSP and identified in Table 5.2-1. Motor vehicle circulation would not be affected under the No-Build Alternative.

5.2.1.7. Freight

Highway 99, W. 6th Avenue, and W. 7th Avenue are classified as national freight routes, and ODOT designates them as a Reduction Review Route (ODOT, 2015). The Reduction Review Route designation requires the review of any proposed changes on these facilities to determine if there will be a reduction of vehicle-carrying capacity.

The No-Build Alternative is not expected to impact freight truck movement.

5.2.1.8. Parking and Access

The Highway 99 Corridor No-Build Alternative would not affect on-street or off-street parking and would not affect property access.

5.2.1.9. Emergency Vehicle Flow and Access

Emergency vehicle flow and access would not change under the Highway 99 Corridor No-Build Alternative.

5.2.2. Enhanced Corridor Alternative

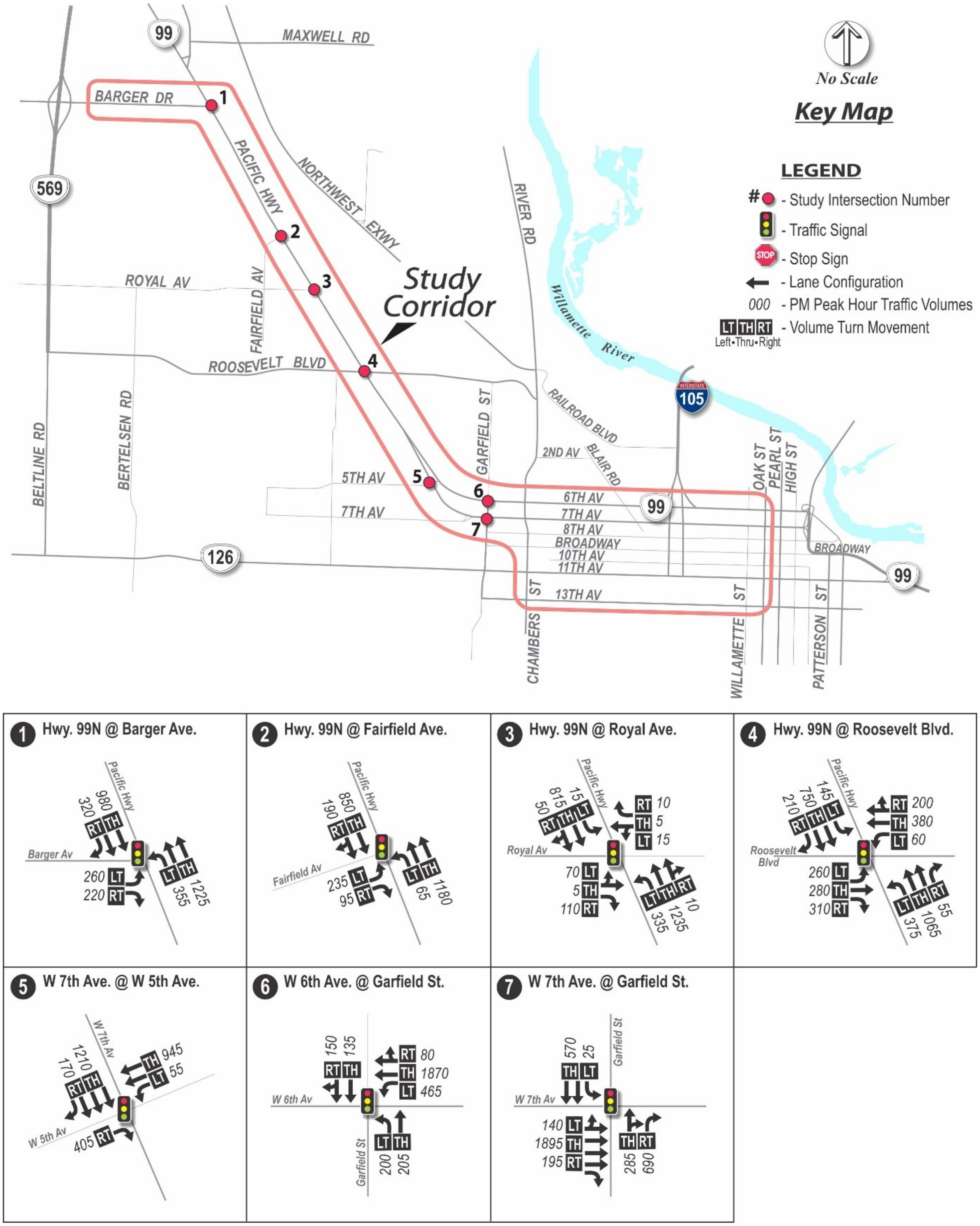
5.2.2.1. Local Traffic Operations

The Highway 99 Corridor Enhanced Corridor Alternative would install roadway improvements that would affect study intersection operations, including:

- Converting an eastbound right turn only lane to a BAT lane on W. 7th Avenue between 7th Place and Garfield Street
- Installing bus queue jump phases at the Highway 99N/Roosevelt Boulevard intersection (northbound and southbound), the Highway 99N/Bethel Drive intersection (northbound and southbound), and the Highway 99N/Barger Drive intersection (northbound)
- Lengthening the existing southbound right turn lane and installing a northbound right turn lane at the Highway 99N/Roosevelt Boulevard intersection
- Installing a northbound bus only left turn lane on Highway 99 at Barger Drive

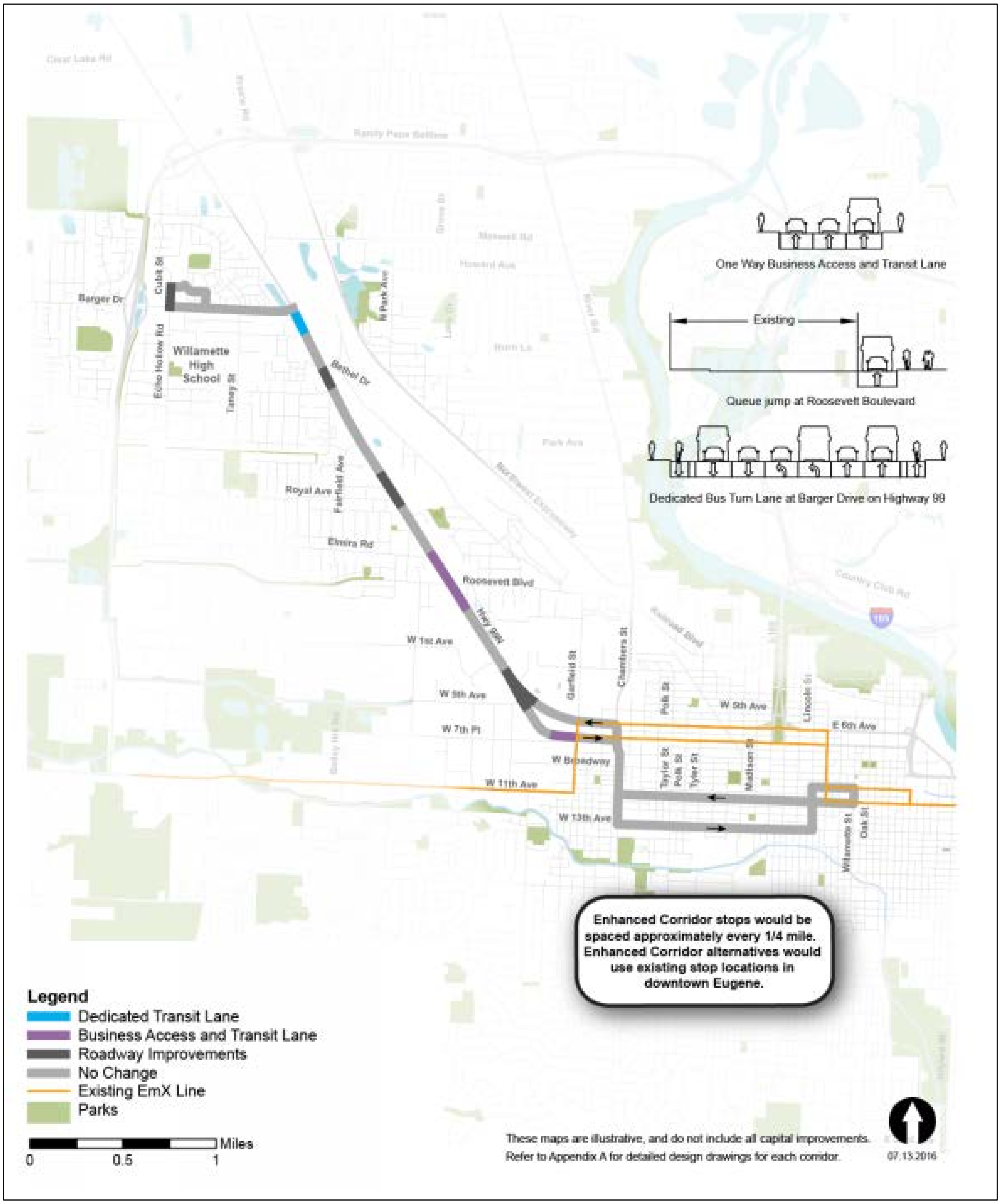
The 2035 p.m. peak hour turning movement volumes for the Enhanced Corridor Alternative are shown on Figure 5.2-3 and the transit and roadway improvements are shown on Figure 5.2-4. The study intersection performance for the 2035 p.m. peak hour No-Build and Enhanced Corridor Alternatives are shown in Table 5.2-4. Vehicle delay at the Highway 99N/Roosevelt Boulevard intersection would improve due to the addition of a northbound right turn lane, and vehicle delay at the W. 6th Avenue/Garfield Street intersection would improve due to a small decrease in motor vehicle volume.

Figure 5.2-3. Highway 99 Corridor 2035 Enhanced Corridor Alternative p.m. Peak Hour Traffic Volumes



Source: DKS Transportation Analysis. (2016).

Figure 5.2-4. Highway 99 Corridor 2035 Enhanced Corridor Alternative Transit and Roadway Improvements



Source: CH2M. (2016).

Table 5.2-4. Highway 99 Corridor Enhanced Corridor Alternative 2035 p.m. Peak Hour Study Intersection Operations

Study Intersection Number	Study Intersection	Jurisdiction	Operating Standard[a]	No-Build Alternative LOS	No-Build Alternative Delay (sec)	No-Build Alternative v/c	Enhanced Corridor Alternative LOS	Enhanced Corridor Alternative Delay (sec)	Enhanced Corridor Alternative v/c
1	Hwy 99N/ Barger Drive	ODOT	0.85/0.85	C	25.7	0.77	C	26.0	0.77
2	Hwy 99N/ Fairfield Avenue	ODOT	0.85/0.85	B	13.8	0.56	B	14.2	0.57
3	Hwy 99N/ Royal Avenue	ODOT	0.85/0.85	B	11.0	0.64	B	11.9	0.64
4	Hwy 99N/ Roosevelt Boulevard	ODOT	0.85/1.00	**<u>F</u>**	**<u>88.9</u>**	**<u>1.03</u>**	**<u>E</u>**	**<u>79.2</u>**	**<u>1.03</u>**
5	W. 7th Avenue/ W. 5th Avenue	ODOT	0.85/1.00	B	19.6	0.59	B	19.9	0.60
6	W. 6th Avenue/Garfield Street	ODOT	0.85/1.00	*<u>C</u>*	*<u>32.8</u>*	*<u>0.98</u>*	*<u>C</u>*	*<u>27.9</u>*	*<u>0.95</u>*
7	W. 7th Avenue/Garfield Street	ODOT	0.85/1.00	C	23.2	0.82	C	23.1	0.80

Source: DKS Transportation Analysis. (2016).

Italic <u>underlined</u> values do not meet current standards
Bold <u>underlined</u> values do not meet proposed standards or current standards

Delay = Average Intersection Delay in seconds
LOS = Level of Service
v/c = volume-to-capacity Ratio

[a] Current/proposed operations standards for these facilities.

For the Enhanced Corridor Alternative, mobility standards would not be met at the following study intersections:

- Highway 99N/Roosevelt (current and proposed standards)
- W. 6th Avenue/Garfield Street (current standards only)

5.2.2.2. Connectivity to Roadway, Bike, and Pedestrian Facilities

The proposed multi-modal project improvements (shown on Figure 5.2-5 and in Table 5.2-5) for the Highway 99 Corridor Enhanced Corridor Alternative were compared with the existing and proposed roadway, bike, and pedestrian projects from the expected transportation improvement projects identified in the Draft Eugene 2035 TSP (Table 5.2-1) to determine how well coordinated the projects were. Expected transportation improvement projects, such as the addition of bike lanes and construction of new sidewalks, would improve access to transit. For example, the planned installation of new sidewalks on Highway 99N between Garfield Street and Roosevelt Boulevard would improve pedestrian access to nearby Enhanced Corridor Alternative transit stops. In addition, the planned shared use path on Highway 99N would allow people to more easily pair bicycling with transit.

Figure 5.2-5. Highway 99 Corridor 2035 Enhanced Corridor Alternative Pedestrian and Bicycle Improvements

Source: CH2M. (2016).

The amounts of new and reconstructed pedestrian and bicycle facilities proposed under the Enhanced Corridor Alternative are shown in Table 5.2-5. Compared to the No-Build Alternative, the Enhanced Corridor Alternative would install many pedestrian improvements. Most notably, the Enhanced Corridor Alternative would construct a new pedestrian bridge and approach ramps over the heavy rail line, connecting Edison Street to Highway 99N about one-third of a mile north of Roosevelt Boulevard. In addition, the Enhanced Corridor Alternative would install 10 new enhanced crossings (flashing beacon or Pedestrian Hybrid Beacon), upgrade two existing crossings, and install over one mile of new and reconstructed sidewalk. The sidewalk gaps on W. 6th Avenue between Garfield Street and W. 5th Avenue, as well as on the north side of Barger Drive between Highway 99N and Empire Park Drive, would be connected to existing sidewalks.

The Highway 99 Enhanced Corridor Alternative would improve some bike facilities compared to the No-Build Alternative, but would not see the more substantial improvements proposed in the EmX Alternative.

Table 5.2-5. Highway 99 Corridor Enhanced Corridor Alternative New and Reconstructed Pedestrian and Bicycle Facilities

Improvement	Length of Facilities
New Sidewalk	1,750 feet (0.33 mile)
Reconstructed/Improved Sidewalk	4,900 feet (0.93 mile)
Number of New Mainline Enhanced Crossings[a]	10 (8 on Hwy 99N, 2 on Barger Drive)
Number of New Upgraded Crossings[b]	2 on Chambers Street
Sidewalk Gaps Connected	W. 6th Avenue between Garfield Street and W. 5th Avenue Barger Drive between Hwy 99N and Century Drive
New Bike Facilities	170 feet (0.03 mile)
Improved Bike Facilities	500 feet (0.09 mile)
Other New Facilities	New pedestrian bridge and ramps over heavy rail track, 1,200 feet total length

Source: CH2M Transportation Analysis. (2016).

[a] Enhanced crossing would install either a flashing yellow indication (flashing beacon), a yellow, red, flashing red indication (Pedestrian Hybrid Beacon), or a full traffic signal with pedestrian crossings along the mainline to warn vehicles of a pedestrian crossing.

[b] Upgraded crossings would consist of installing ADA ramps and possibly median refuge islands and/or crosswalk striping.

The qualitative assessment of pedestrian facilities, shown in Table 5.2-6, shows that two roadway segments would improve over the No-Build Alternative from “poor” or “fair” ratings to “good” ratings. Biking facilities would not change under the Enhanced Corridor Alternative compared to the No-Build Alternative.

Table 5.2-6. Highway 99 Corridor Enhanced Corridor Alternative Qualitative Assessment of Pedestrian Facilities[a]

Segment	No-Build Alternative Walking	Enhanced Corridor Alternative Walking
W. 11th Avenue: Willamette Street to Lincoln Street	Good	Good
Willamette Street: W. 10th Avenue to W. 11th Avenue	Good	Good
W. 10th Avenue: Willamette Street to Lincoln Street	Excellent	Excellent
Charnelton Street: W. 6th Avenue to W. 11th Avenue	Good	-[b]
Lincoln Street: W. 10th Avenue to W. 13th Avenue	Good	Good
W. 6th Avenue: Charnelton Street to Chambers Street	Good	-[b]
W. 6th Avenue: Chambers Street to Garfield Street	Good	Good
W. 6th Avenue: Garfield Street to 5th Avenue	Poor	Good
Chambers Street: W. 6th Avenue to W. 7th Avenue	Good	Good
Chambers Street: W. 7th Avenue to W. 13th Avenue	Fair	Fair
W. 7th Avenue: W. 5th Avenue to Garfield Street	Excellent	Excellent
W. 7th Avenue: Garfield Street to Chambers Street	Good	Good
W. 7th Avenue: Chambers Street to Lincoln Street	Good	-[b]
W. 7th Avenue: Lincoln Street to Charnelton Street	Good	-[b]
W. 11th Avenue: Chambers Street to Lincoln Street	Good	Good
W. 13th Avenue: Chambers Street to Lincoln Street	Good	Good
Hwy 99N: W. 5th Avenue to Roosevelt Boulevard	Excellent	Excellent
Hwy 99N: Roosevelt Boulevard to Barger Drive	Fair	Fair
Barger Drive: Hwy 99N to Cubit Street	Fair	Good
Cubit Street: Barger Drive to Wagner Street	Good	Good
Wagner Street: Cubit Street to Aerial Way	Good	Good
Aerial Way: Wagner Street to Altamont Street	Good	Good
Altamont Street: Aerial Way to Barger Drive	Good	Good

Source: DKS Transportation Analysis. (2016).

[a] Qualitative analysis based on methodology described in Chapter 14 of ODOT's *Analysis Procedures Manual* (ODOT, 2014).

[b] Segment not on EC Corridor

5.2.2.3. Plan Consistency

The Highway 99 Corridor Enhanced Corridor Alternative was evaluated for consistency with the Long Range Transit Plan (LTD, 2014), the FTN concept, and the goals outlined in the Regional Transportation Plan (LCOG, 2011, December) and the Draft Eugene 2035 TSP.

The purpose of the LTD FTN is to leverage transit service investments by tying service to the density and other elements of adjacent development. The FTN enables a well-connected network that provides regional circulation by providing an average transit frequency of 15 minutes or better, a reliable transit system that runs on schedule (by implementing strategies such as transit priority at signalized intersections), and enhanced stations with bicycle and pedestrian connections (LTD, 2014). The Enhanced Corridor Alternative would meet the FTN goals by providing frequent service on Highway 99N, installing transit priority at signalized intersections, and adding BAT lanes and transit queue jumps to help make service more reliable and on schedule.

The BRT system is the "highest level of service available within the FTN, and is a permanent, integrated system that uses buses or specialized vehicles on roadways or dedicated lanes to efficiently transport passengers" (LTD, 2014). BRT system elements include branded multi-door 60-foot-long BRT vehicles, enhances stations with level boarding platforms instead of bus stops, off-board fare collection, transit signal priority, wider stop spacing, and 10-minute service frequencies. BRT service is intended to improve transit speed, reliability, and ridership (CH2M, 2016a). The Enhanced Corridor Alternative would not meet these BRT system elements.

The five primary goals outlined in the Draft Eugene 2035 TSP are to: (1) create an integrated system that is safe and efficient and reduces fossil fuel usage by 50 percent, (2) advance regional sustainability by reducing fossil fuel reliance, (3) reduce reliance on any single mode, (4) address the needs and safety of all travelers, and (5) by 2035, triple the percentage of trips made on foot, by bicycle, and by transit from 2014 levels. The Enhanced Corridor Alternative helps Eugene to slightly improve transit mode share, and pedestrian improvements would be installed as part of the Enhanced Corridor Alternative that would help increase pedestrian mode share. However, the Enhanced Corridor Alternative would not provide enough bicycle facility improvements to help increase bicycle mode share over the No-Build Alternative.

5.2.2.4. Transit Priority at Signalized Intersections

The Highway 99 Corridor Enhanced Corridor Alternative would include traffic signal construction and modifications at several intersections. Several traffic signals will provide exclusive bus signal phasing that would allow buses to safely enter traffic flow or travel through an intersection. The locations of proposed bus signal phases are shown in Table 5.2-7.

Table 5.2-7. Highway 99 Corridor Enhanced Corridor Alternative Proposed Bus Phases

Intersection	Bus Phase
Hwy 99N/Roosevelt Boulevard	Southbound
Hwy 99N/Royal Avenue	Northbound/Southbound
Hwy 99N/Bethel Drive	Northbound/Southbound
Hwy 99N/Barger Drive	Northbound Left Turn

Source: DKS Transportation Analysis. (2016).

In addition, every traffic signal on the corridor would receive transit signal priority. Transit signal priority modifies normal traffic signal operations by extended green phases or shortening side street phases in order to reduce delay for transit vehicles.

5.2.2.5. Safety

Potential safety benefits and impacts associated with the Highway 99 Corridor Enhanced Corridor Alternative include:

- The proposed alternative would install BAT lanes on Highway 99N approaching Roosevelt Boulevard (northbound and southbound), which would serve both buses and turning general-purpose vehicles.

These BAT lanes would reduce potential vehicle conflicts such as rear end collisions (Federal Highway Administration [FHWA], 2014)

- Bus queue jumps at Highway 99N/Roosevelt Boulevard (southbound), Highway 99N/Royal Avenue (queue jump northbound and reverse queue jump southbound), and Highway 99N/Bethel Drive (reverse queue jumps northbound and southbound) would serve buses exclusively, eliminating the merging conflict between vehicles and buses
- Nine new bicycle/pedestrian crossings and two upgraded crossings along the corridor would improve opportunities for bicyclists and pedestrians to cross Highway 99N
- Segments of new sidewalks and a pedestrian bridge across the freight railroad line would improve safety for pedestrians

Overall, motor vehicle, bicycle, and pedestrian safety would be improved by the increase in crossing options and improvement in facilities.

5.2.2.6. Roadway Circulation

The Highway 99 Corridor Enhanced Corridor Alternative was evaluated to assess motor vehicle circulation. Overall, there is little difference in roadway circulation compared to the No-Build Alternative. The installation of a new traffic signal at the Cubit Street/Winco Foods intersection (located 200 feet north of Barger Drive) would improve circulation for commercial shopping areas on both the east and west sides of Cubit Street compared to the No-Build Alternative. This new traffic signal is located at the Cubit Street terminus and would facilitate bus maneuvers leaving the station and entering the southbound left turn lane at Barger Drive.

5.2.2.7. Freight

Highway 99, W. 6th Avenue, and W. 7th Avenue are classified as national freight routes, and are designated by ODOT as a Reduction Review Route (ODOT, 2015). The Reduction Review Route designation requires the review of any proposed changes on these facilities to determine if there will be a reduction of vehicle-carrying capacity.

The Enhanced Corridor Alternative would install six enhanced pedestrian crossings with raised medians on Highway 99N, which could cause a slight increase in freight travel times along the corridor. The Enhanced Corridor Alternative will need ODOT approval for installing raised medians for pedestrian crossings on Highway 99N; this should be coordinated through ODOT's Motor Carrier Transportation Division.

There are 11 driveways adjacent to the six enhanced pedestrian crossings that would have a reduced left turn deceleration area, resulting in potential increased delays for freight accessing the driveways or for freight traveling along Highway 99N. These potential freight delays are expected to be less than 10 seconds along the entire corridor. Table 5.2-8 lists the 11 driveways with impacts to the left turn deceleration area on Highway 99N.

Table 5.2-8. Highway 99 Corridor Enhanced Corridor Alternative Driveway Left Turn Access Impacts to Freight

Crosswalk Location on Hwy 99N	Impacted Business Location	Side of Hwy 99N
100 feet north of Pattison Street	Northwest Self Storage	East
	Maxxum Marine	West
700 feet south of Pattison Street	Karsten Homes/Dutch Brothers	East
	US Bank	West
650 feet south of Fairfield Avenue	Cars and Trucks R-Us	East
	Gilbert Shopping Center	West
600 feet north of Royal Avenue	Family Housing Program	East
	Vacant Storage Facility	West
700 feet south of Royal Avenue	Best Economy Inn Motel	West
1200 feet north of Roosevelt Boulevard	EMDG Sales	East
	Car Quest Auto Parts	West

Source: DKS Transportation Analysis. (2016).

5.2.2.8. Parking and Access

The Highway 99 Corridor Enhanced Corridor Alternative would not impact on-street parking.

Off-street parking impacts are listed in Table 5.2-9.

Table 5.2-9. Highway 99 Corridor Enhanced Corridor Alternative Off-Street Parking Impacts

Business	Location	Maximum Number Spaces Impacted
Winco	Barger Drive/Cubit Street	12 parking spaces
Residential Driveway	Barger Drive / Taney Street southwest corner	4 parking spaces
Shopping Center	Hwy 99N/Fairfield Avenue southwest corner	10 parking spaces
Wheeler Dealer	Hwy 99N east side, 1,000 feet south of Fairfield Avenue	6 parking spaces
Battery X-Change	Hwy 99N east side, 1,500 feet north of Roosevelt Boulevard	6 parking spaces
Former Porky's Palace Site (Closed)	Hwy 99N/Royal Avenue southwest corner	12 parking spaces[a]

Source: DKS Transportation Analysis. (2016).

[a] Mitigation is available for Porky's Palace site that would eliminate parking impacts.

The Enhanced Corridor Alternative would close one access point on Barger Drive along the project alignment, a single-family residential driveway on the southwest corner of Barger Drive and Taney Street, in order to install a station platform. This access point does not service any covered parking. This residence currently has two other access points, both on Taney Street.

In addition, the access and circulation at the former Porky's Palace would be impacted by the new bus pullout on the southwest corner of Highway 99N and Royal Avenue. The driveway on Highway 99N would still be accessible, but a bus pullout would be installed adjacent to the driveway, which would require some right of way acquisition. This loss of right of way on Highway 99N would prevent vehicles in the former Porky's Palace parking lot from being able to drive around the east and north sides of the building, which would affect the parking lot circulation. Mitigation is available for the impacts to the former Porky's Palace site, as described in Section 5.7.1.

There are 16 driveways adjacent to the six enhanced pedestrian crossings that would have a reduced left turn deceleration area, resulting in potential increased delays for motor vehicles accessing the driveways or traveling along Highway 99N. In addition, 12 locations would have potential impacts to motor vehicles performing a two-stage left turn out of the driveways due to the refuge islands. Table 5.2-10 lists the driveways and side streets with potential impacts to the left turn movements onto and off of the mainline.

Table 5.2-10. Highway 99 Corridor Enhanced Corridor Alternative Driveway Left Turn Access Impacts to Motor Vehicles

Crosswalk, Station, or Bus Pullout Location	Impacted Business, Street, or Residence	Side of Major Street	Type of Access Change
Chambers Street/W 12th Avenue	W 12th Avenue	East	Left Turn - Exiting Side Street
	W 12th Avenue	West	Left Turn - Exiting Side Street
	Residential Access	West	Left Turn – Entering Driveway
Chambers Street/W Broadway	W Broadway	East	Left Turn - Exiting Side Street
	W Broadway	West	Left Turn - Exiting Side Street
	Oregon Ice Cream Company	West	Left Turn - Entering Driveway
	Residential Access	East	Left Turn – Entering Driveway
	Residential Access	East	Left Turn – Exiting Driveway
Hwy 99/100 feet north of Pattison Street	Northwest Self Storage	East	Left Turn – Entering Driveway
	Maxxum Marine	West	Left Turn – Entering Driveway
	Kevin Cohen Plumbing	West	Left Turn – Exiting Driveway
Hwy 99/Pattison Street (station)	Northwest Self Storage	East	Potential driveway impact (removal or relocation)
Hwy 99/700 feet south of Pattison Street	Karsten Homes / Dutch Brothers / Amazon Automotive	East	Left Turn – Entering Driveway
	US Bank	West	Left Turn – Entering Driveway
Hwy 99/650 feet south of Fairfield Avenue	Cars and Trucks R-Us	East	Left Turn – Entering Driveway
	Gilbert Shopping Center	West	Left Turn – Entering Driveway
Hwy 99/600 feet north of Royal Avenue	Family Housing Program	East	Left Turn – Entering Driveway
	Vacant Storage Facility	West	Left Turn – Entering Driveway
	940 Business Center	West	Left Turn – Exiting Driveway
Hwy 99/Royal Avenue southwest corner (bus pullout)	Porky's Palace (Closed)	West	Driveway impact (remove or relocate) on Hwy 99 & on-site circulation
Hwy 99/700 feet south of Royal Avenue	Best Economy Inn Motel	West	Left Turn – Entering Driveway
	Driveway to Vacant Lot	East	Left Turn - Exiting Driveway
	Pet and Pride Grooming Salon	West	Left Turn – Exiting Driveway
Hwy 99/1,200 feet north of Roosevelt Boulevard	Emog Sales	East	Left Turn – Entering Driveway
	Car Quest Auto Parts	West	Left Turn – Entering Driveway

Hwy 99/north of Roosevelt Boulevard (station)	Northwest Pawn/Cash King/Word&Spirit Int'l Church	East	Driveway impact (remove or relocate)
Barger Drive/Century Drive	Century Drive	North	Left Turn - Exiting Side Street
	Residential Access	South	Left Turn - Entering Driveway
	Kingdom Hall of Jehovah's Witnesses	South	Left Turn - Exiting Driveway
Barger Drive/Taney Street southwest corner	Residential Access	South	Driveway impact (remove or relocate) on Barger Drive
Barger Drive/Altamont Street	Residential Access	South	Left Turn - Exiting Driveway
	Residential Access	South	Left Turn - Entering Driveway
Source: DKS Transportation Analysis. (2016).	**Source: DKS Transportation Analysis. (2016).**	**Source: DKS Transportation Analysis. (2016).**	**Source: DKS Transportation Analysis. (2016).**

Table 5.2-10. Highway 99 Corridor Enhanced Corridor Alternative Driveway Left Turn Access Impacts to Motor Vehicles

Crosswalk, Station, or Bus Pullout Location	
Chambers Street/W 12th Avenue	V V F
Chambers Street/W Broadway	V V C C F F
Hwy 99/100 feet north of Pattison Street	N N K
Hwy 99/Pattison Street (station)	N
Hwy 99/700 feet south of Pattison Street	K D A U
Hwy 99/650 feet south of Fairfield Avenue	C C C

Table 5.2-10. Highway 99 Corridor Enhanced Corridor Alternative Driveway Left Turn Access Impacts to Motor Vehicles

Crosswalk, Station, or Bus Pullout Location	Impa Stree
Chambers Street/W 12th Avenue	W 12tl W 12tl Reside
Chambers Street/W Broadway	W Bro W Bro Oregoı Compa Reside Reside
Hwy 99/100 feet north of Pattison Street	Northv Maxxu Kevin (
Hwy 99/Pattison Street (station)	Northv
Hwy 99/700 feet south of Pattison Street	Karste Dutch Amazo US Bar
Hwy 99/650 feet south of Fairfield Avenue	Cars ar Gilbert Center
Hwy 99/600 feet north of Royal Avenue	Family Progra Vacant 940 Bu
Hwy 99/Royal Avenue southwest corner (bus pullout)	Porky':
Hwy 99/700 feet south of Royal Avenue	Best Ei Motel

Table 5.2-10. Highway 99 Corridor Enhanced Corridor Alternat

Table 5.2-10. Highway 99 Corridor Enhanced Corridor Alternative Driveway Left Turn Access Impacts to Motor Vehicles

Crosswalk, Station, or Bus Pullout Location	Im Str
Chambers Street/W 12th Avenue	W 1 W 1 Resi
Chambers Street/W Broadway	W B W B Oreg Com Resi Resi
Hwy 99/100 feet north of Pattison Street	Nort Max Kevi
Hwy 99/Pattison Street (station)	Nort
Hwy 99/700 feet south of Pattison Street	Kars Dutc Ama US E
Hwy 99/650 feet south of Fairfield Avenue	Cars Gilb Cent
Hwy 99/600 feet north of Royal Avenue	Fam Prog Vaca 940

Hwy 99/600 feet north of Royal Avenue	Family Housing Program	East	Left Turn – Entering Driveway
	Vacant Storage Facility	West	Left Turn – Entering Driveway
	940 Business Center	West	Left Turn – Exiting Driveway
Hwy 99/Royal Avenue southwest corner (bus pullout)	Porky's Palace (Closed)	West	Left Turn – Exiting Driveway
Hwy 99/700 feet south of Royal Avenue	Best Economy Inn Motel	East	Left Turn – Entering Driveway
	Driveway to Vacant Lot Pet and Pride Grooming Salon	East	Driveway impact (remove or relocate)
Hwy 99/1,200 feet north of Roosevelt Boulevard	Emog Sales	North	Left Turn - Exiting Side Street
	Car Quest Auto Parts	South	Left Turn - Entering Driveway
Hwy 99/north of Roosevelt Boulevard (station)	Northwest Pawn/Cash King/Word&Spirit Int'l Church	South	Left Turn - Exiting Driveway Driveway impact (remove or relocate)
Barger Drive/Century Drive	Century Drive	North	Left Turn - Exiting Side Street
	Residential Access	South	Left Turn - Entering Driveway
	Kingdom Hall of Jehovah's Witnesses	South	Left Turn - Exiting Driveway
Barger Drive/Taney Street southwest corner	Residential Access	South	Driveway impact (remove or relocate) on Barger Drive
Barger Drive/Altamont Street	Residential Access	South	Left Turn - Exiting Driveway
	Residential Access	South	Left Turn - Entering Driveway

Table 5.2-10. Highway 99 Corridor Enhanced Corridor Alternative Driveway Left Turn Access Impacts to Motor Vehicles

Access Impacts to Motor Vehicles

Crosswalk, Station, or Bus Pullout Location	Impacted Business, Street, or Residence	Side of Major Street	
Chambers Street/W 12th Avenue	W 12th Avenue	East	Left
	W 12th Avenue	West	Left
	Residential Access	West	Left
Chambers Street/W Broadway	W Broadway	East	Left
	W Broadway	West	Left
	Oregon Ice Cream Company	West	Left
	Residential Access	East	Left
	Residential Access	East	Left
Hwy 99/100 feet north of Pattison Street	Northwest Self Storage	East	Left
	Maxxum Marine	West	Left
	Kevin Cohen Plumbing	West	Left
Hwy 99/Pattison Street (station)	Northwest Self Storage	East	Pote reloc
Hwy 99/700 feet south of Pattison Street	Karsten Homes / Dutch Brothers / Amazon Automotive	East	Left
	US Bank	West	Left
Hwy 99/650 feet south of Fairfield Avenue	Cars and Trucks R-Us	East	Left
	Gilbert Shopping Center	West	Left
Hwy 99/600 feet north of Royal Avenue	Family Housing Program	East	Left
	Vacant Storage Facility	West	Left
	940 Business Center	West	Left
Hwy 99/Royal Avenue southwest corner (bus pullout)	Porky's Palace (Closed)	West	Driv Hwy
Hwy 99/700 feet south of Royal Avenue	Best Economy Inn Motel	West	Left
	Driveway to Vacant Lot	East	Left
	Pet and Pride Grooming Salon	West	Left
Hwy 99/1,200 feet north of Roosevelt Boulevard	Emog Sales	East	Left
	Car Quest Auto Parts	West	Left
Hwy 99/north of Roosevelt Boulevard (station)	Northwest Pawn/Cash King/Word&Spirit Int'l Church	East	Driv
Barger Drive/Century Drive	Century Drive	North	Left
	Residential Access	South	Left

Crosswalk, Station, or Bus Pullout Location
Chambers Street/W 12th Avenue
Chambers Street/W Broadway
Hwy 99/100 feet north of Pattison Street
Hwy 99/Pattison Street (station)
Hwy 99/700 feet south of Pattison Street
Hwy 99/650 feet south of Fairfield Avenue
Hwy 99/600 feet north of Royal Avenue
Hwy 99/Royal Avenue southwest corner (bus pullout)
Hwy 99/700 feet south of Royal Avenue

Hwy 99/1,200 feet north of Roosevelt Boulevard	Car Quest Auto Parts	West	Left Turn – Entering Driveway
Hwy 99/north of Roosevelt Boulevard (station)	Northwest Pawn/Cash King/Word&Spirit Int'l Church	East	Driveway impact (remove or relocate)
Barger Drive/Century Drive	Century Drive	North	Left Turn - Exiting Side Street
	Residential Access	South	Left Turn - Entering Driveway
	Kingdom Hall of Jehovah's Witnesses	South	Left Turn - Exiting Driveway
Barger Drive/Taney Street southwest corner	Residential Access	South	Driveway impact (remove or relocate) on Barger Drive
Barger Drive/Altamont Street	Residential Access	South	Left Turn - Exiting Driveway
	Residential Access	South	Left Turn - Entering Driveway

Source: DKS Transportation Analysis (2016).

Table 5.2-10. Highway 99 Corridor Enhanced Corridor Alternative Driveway Left Turn Access Impacts to Motor Vehicles

Crosswalk, Station, or Bus Pullout Location	Impa Stree
Chambers Street/W 12th Avenue	W 12t
	W 12t
	Reside
Chambers Street/W Broadway	W Bro
	W Bro
	Orego Compa
	Reside
	Reside
Hwy 99/100 feet north of Pattison Street	Northv
	Maxxu
	Kevin (
Hwy 99/Pattison Street (station)	Northv
Hwy 99/700 feet south of Pattison Street	Karste Dutch Amazo
	US Bar
Hwy 99/650 feet south of Fairfield Avenue	Cars ar
	Gilbert Center

Table 5.2-10. Highway 99 Corridor Enhanced Corridor Alternative Driveway Left Turn Access Impacts to Motor Vehicles

Crosswalk, Station, or Bus Pullout Location	Im Str
Chambers Street/W 12th Avenue	W 1
	W 1
	Resi
Chambers Street/W Broadway	W B
	W B
	Oreg Com
	Resi
	Resi
Hwy 99/100 feet north of Pattison Street	Nort
	Max
	Kevi
Hwy 99/Pattison Street (station)	Nort
Hwy 99/700 feet south of Pattison Street	Kars Dutc Ama
	US E

Hwy 99/650 feet south of Fairfield Avenue	Cars and Trucks R-Us Gilbert Shopping Center		
Hwy 99/600 feet north of Royal Avenue	Family Housing Program	East	Left Turn – Entering Driveway
	Vacant Storage Facility	West	Left Turn – Entering Driveway
	940 Business Center	West	Left Turn – Exiting Driveway
Hwy 99/Royal Avenue southwest corner (bus pullout)	Porky's Palace (Closed)	West	Driveway Impact (remove or relocate) Hwy 99 & on-site circulation
Hwy 99/700 feet south of Royal Avenue	Best Economy Inn Motel	West	Left Turn – Entering Driveway
	Driveway to Vacant Lot	East	Left Turn - Exiting Driveway
	Pet and Pride Grooming Salon	West	Left Turn – Exiting Driveway
Hwy 99/1,200 feet north of Roosevelt Boulevard	Emog Sales	East	Left Turn – Entering Driveway
	Car Quest Auto Parts	West	Left Turn – Entering Driveway
Hwy 99/north of Roosevelt Boulevard (station)	Northwest Pawn/Cash King/Word&Spirit Int'l Church	East	Driveway impact (remove or relocate)
Barger Drive/Century Drive	Century Drive	North	Left Turn - Exiting Side Street
	Residential Access	South	Left Turn - Entering Driveway
	Kingdom Hall of Jehovah's Witnesses	South	Left Turn - Exiting Driveway
Barger Drive/Taney Street southwest corner	Residential Access	South	Driveway impact (remove or relocate) Barger Drive
Barger Drive/Altamont Street	Residential Access	South	Left Turn - Exiting Driveway
	Residential Access	South	Left Turn - Entering Driveway

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Crosswalk, Statio Bus Pullout Locat
Chambers Street/ 12th Avenue
Chambers Street/ Broadway
Hwy 99/100 feet north of Pattison Street
Hwy 99/Pattison Street (station)
Hwy 99/700 feet south of Pattison Street
Hwy 99/650 feet south of Fairfield Avenue
Hwy 99/600 feet north of Royal Av
Hwy 99/Royal Av southwest corner pullout)
Hwy 99/700 feet south of Royal Av

	Pet and Pride Grooming Salon	West	Left
Hwy 99/1,200 feet north of Roosevelt Boulevard	Emog Sales	East	Left
	Car Quest Auto Parts	West	Left
Hwy 99/north of Roosevelt Boulevard (station)	Northwest Pawn/Cash King/Word&Spirit Int'l Church	East	Driv
Barger Drive/Century Drive	Century Drive	North	Left
	Residential Access	South	Left
	Kingdom Hall of Jehovah's Witnesses	South	Left
Barger Drive/Taney Street southwest corner	Residential Access	South	Driv Barg
Barger Drive/Altamont Street	Residential Access	South	Left
	Residential Access	South	Left

Source: DKS Transportation Analysis. (2016).

Source: DKS Transportation Analysis. (2016).

Source: DKS Transportation Analysis. (2016).

Source: DKS Transportation Analysis. (2016).

Table 5.2-10. Highway 99 Corridor Enhanced Corridor Alternative Driveway Left Turn Access Impacts to Motor Vehicles

Crosswalk, Station, or Bus Pullout Location	
Chambers Street/W 12th Avenue	\
	\

Table 5.2-10. Highway 99 Corridor Enhanced Corridor Alternative Driveway Left Turn Access Impacts to Motor Vehicles

Crosswalk, Station, or Bus Pullout Location	Impa Stree
Chambers Street/W 12th Avenue	W 12tl
	W 12tl
	Reside
Chambers Street/W Broadway	W Bro
	W Bro
	Oregoı Compa
	Reside
	Reside
	Northı
	Maxxu

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Table 5.2-10. Highway 99 Corridor Enhanced Corridor Alternative Driveway Left Turn Access Impacts to Motor Vehicles

Crosswalk, Station, or Bus Pullout Location	Im Str
Chambers Street/W 12th Avenue	W 1
	W 1
	Resi
Chambers Street/W Broadway	W B
	W B
	Oreg Com
	Resi

	Residential Access	West	Left Turn – Entering Driveway
Chambers Street/W Broadway	W Broadway	East	Left Turn - Exiting Side Street
	W Broadway	West	Left Turn - Exiting Side Street
	Oregon Ice Cream Company	West	Left Turn - Entering Driveway
	Residential Access	East	Left Turn – Entering Driveway
	Residential Access	East	Left Turn – Exiting Driveway
Hwy 99/100 feet north of Pattison Street	Northwest Self Storage	East	Left Turn – Entering Driveway
	Maxxum Marine	West	Left Turn – Entering Driveway
	Kevin Cohen Plumbing	West	Left Turn – Exiting Driveway
Hwy 99/Pattison Street (station)	Northwest Self Storage	East	Potential driveway impact (removal or relocation)
Hwy 99/700 feet south of Pattison Street	Karsten Homes / Dutch Brothers / Amazon Automotive	East	Left Turn – Entering Driveway
	US Bank	West	Left Turn – Entering Driveway
Hwy 99/650 feet south of Fairfield Avenue	Cars and Trucks R-Us	East	Left Turn – Entering Driveway
	Gilbert Shopping Center	West	Left Turn – Entering Driveway
Hwy 99/600 feet north of Royal Avenue	Family Housing Program	East	Left Turn – Entering Driveway
	Vacant Storage Facility	West	Left Turn – Entering Driveway
	940 Business Center	West	Left Turn – Exiting Driveway
Hwy 99/Royal Avenue southwest corner (bus pullout)	Porky's Palace (Closed)	West	Driveway impact (remove or relocate) on Hwy 99 & on-site circulation
Hwy 99/700 feet south of Royal Avenue	Best Economy Inn Motel	West	Left Turn – Entering Driveway
	Driveway to Vacant Lot	East	Left Turn - Exiting Driveway
	Pet and Pride Grooming Salon	West	Left Turn – Exiting Driveway
Hwy 99/1,200 feet north of Roosevelt Boulevard	Emog Sales	East	Left Turn – Entering Driveway
	Car Quest Auto Parts	West	Left Turn – Entering Driveway
Hwy 99/north of Roosevelt Boulevard (station)	Northwest Pawn/Cash King/Word&Spirit Int'l Church	East	Driveway impact (remove or relocate)
Barger Drive/Century Drive	Century Drive	North	Left Turn - Exiting Side Street
	Residential Access	South	Left Turn - Entering Driveway
	Kingdom Hall of Jehovah's Witnesses	South	Left Turn - Exiting Driveway
Barger Drive/Taney Street southwest corner	Residential Access	South	Driveway impact (remove or relocate) on Barger Drive

Barger Drive/Altamont Street	Residential Access	South	Left Turn - Exiting Driveway
	Residential Access	South	Left Turn - Entering Driveway

Crosswalk, Statio Bus Pullout Locat
Chambers Street/ 12th Avenue
Chambers Street/ Broadway
Hwy 99/100 feet north of Pattison Street
Hwy 99/Pattison Street (station)
Hwy 99/700 feet south of Pattison Street
Hwy 99/650 feet south of Fairfield Avenue
Hwy 99/600 feet north of Royal Av

	Vacant Storage Facility	West	Left
	940 Business Center	West	Left
Hwy 99/Royal Avenue southwest corner (bus pullout)	Porky's Palace (Closed)	West	Driv Hwy
Hwy 99/700 feet south of Royal Avenue	Best Economy Inn Motel	West	Left
	Driveway to Vacant Lot	East	Left
	Pet and Pride Grooming Salon	West	Left
Hwy 99/1,200 feet north of Roosevelt Boulevard	Emog Sales	East	Left
	Car Quest Auto Parts	West	Left
Hwy 99/north of Roosevelt Boulevard (station)	Northwest Pawn/Cash King/Word&Spirit Int'l Church	East	Driv
Barger Drive/Century Drive	Century Drive	North	Left
	Residential Access	South	Left
	Kingdom Hall of Jehovah's Witnesses	South	Left
Barger Drive/Taney Street southwest corner	Residential Access	South	Driv Barg
Barger Drive/Altamont Street	Residential Access	South	Left
	Residential Access	South	Left

Source: DKS Transportation Analysis. (2016).

Source: DKS Transportation Analysis. (2016).

Source: DKS Transportation Analysis. (2016).

Source: DKS Transportation Analysis. (2016).

Table 5.2-10. Highway 99 Corridor Enhanced Corridor Alternative Driveway Left Turn Access

Table 5.2-10. Highway 99 Corridor Enhanced Corridor Alternative Driveway Left Turn Access Impacts to Motor Vehicles

Crosswalk, Station, or Bus Pullout Location	Impa Stree
Chambers Street/W 12th Avenue	W 12tl
	W 12tl

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Table 5.2-10. Highway 99 Corridor Enhanced Corridor Alternative Driveway Left Turn Access Impacts to Motor Vehicles

Impacts to Motor Vehicles

Crosswalk, Station, or Bus Pullout Location	Impacted Business, Street, or Residence		
Chambers Street/W 12th Avenue	Residential Access	West	Left Turn – Entering Driveway
Chambers Street/W Broadway	W Broadway	East	Left Turn – Exiting Side Street
	W Broadway	West	Left Turn - Exiting Side Street
	Oregon Ice Cream Company	West	Left Turn – Entering Driveway
	Residential Access	East	Left Turn – Entering Driveway
	Residential Access	East	Left Turn – Exiting Driveway
Hwy 99/100 feet north of Pattison Street	Northwest Self Storage	East	Left Turn – Entering Driveway
	Maxxum Marine	West	Left Turn – Entering Driveway
	Kevin Cohen Plumbing	West	Left Turn – Exiting Driveway
Hwy 99/Pattison Street (station)	Northwest Self Storage	East	Potential driveway impact (removal or relocation)
Hwy 99/700 feet south of Pattison Street	Karsten Homes / Dutch Brothers / Amazon Automotive	East	Left Turn – Entering Driveway
	US Bank	West	Left Turn – Entering Driveway
Hwy 99/650 feet south of Fairfield Avenue	Cars and Trucks R-Us	East	Left Turn – Entering Driveway
	Gilbert Shopping Center	West	Left Turn – Entering Driveway
Hwy 99/600 feet north of Royal Avenue	Family Housing Program	East	Left Turn – Entering Driveway
	Vacant Storage Facility	West	Left Turn – Entering Driveway
	940 Business Center	West	Left Turn – Exiting Driveway
Hwy 99/Royal Avenue southwest corner (bus pullout)	Porky's Palace (Closed)	West	Driveway impact (remove or relocate) Hwy 99 & on-site circulation
Hwy 99/700 feet south of Royal Avenue	Best Economy Inn Motel	West	Left Turn – Entering Driveway
	Driveway to Vacant Lot	East	Left Turn – Exiting Driveway
	Pet and Pride Grooming Salon	West	Left Turn – Exiting Driveway
Hwy 99/1,200 feet north of Roosevelt Boulevard	Emog Sales	East	Left Turn – Entering Driveway
	Car Quest Auto Parts	West	Left Turn – Entering Driveway
Hwy 99/north of Roosevelt Boulevard (station)	Northwest Pawn/Cash King/Word&Spirit Int'l Church	East	Driveway impact (remove or relocate)
Barger Drive/Century Drive	Century Drive	North	Left Turn - Exiting Side Street
	Residential Access	South	Left Turn - Entering Driveway
	Kingdom Hall of Jehovah's Witnesses	South	Left Turn - Exiting Driveway
Barger Drive/Taney Street southwest corner	Residential Access	South	Driveway impact (remove or relocate)

Hwy 99/north of Roosevelt Boulevard (station)	Northwest King/Word&Spirit Int'l Church	East	Driveway impact (remove or relocate)
Barger Drive/Century Drive	Century Drive	North	Left Turn - Exiting Side Street
	Residential Access	South	Left Turn - Entering Driveway
	Kingdom Hall of Jehovah's Witnesses	South	Left Turn - Exiting Driveway
Barger Drive/Taney Street southwest corner	Residential Access	South	Driveway impact (remove or relocate) on Barger Drive
Barger Drive/Altamont Street	Residential Access	South	Left Turn - Exiting Driveway
	Residential Access	South	Left Turn - Entering Driveway

Barger Drive/Altamont Street	Residential Access	South	Left Turn - Exiting Driveway	Kingdom Hall of Jehovah's Witnesses
	Residential Access	South	Left Turn - Entering Driveway	
		Barger Drive/Taney Street southwest corner		Residential Access
		Barger Drive/Altamont Street		Residential Access
				Residential Access

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Crosswalk, Statio Bus Pullout Locat
Chambers Street/ 12th Avenue
Chambers Street/ Broadway
Hwy 99/100 feet north of Pattison Street

Hwy 99/Pattison Street (station)	Northwest Self Storage	East	Pote relo
Hwy 99/700 feet south of Pattison Street	Karsten Homes / Dutch Brothers / Amazon Automotive	East	Left
	US Bank	West	Left
Hwy 99/650 feet south of Fairfield Avenue	Cars and Trucks R-Us	East	Left
	Gilbert Shopping Center	West	Left
Hwy 99/600 feet north of Royal Avenue	Family Housing Program	East	Left
	Vacant Storage Facility	West	Left
	940 Business Center	West	Left
Hwy 99/Royal Avenue southwest corner (bus pullout)	Porky's Palace (Closed)	West	Driv Hwy
Hwy 99/700 feet south of Royal Avenue	Best Economy Inn Motel	West	Left
	Driveway to Vacant Lot	East	Left
	Pet and Pride Grooming Salon	West	Left
Hwy 99/1,200 feet north of Roosevelt Boulevard	Emog Sales	East	Left
	Car Quest Auto Parts	West	Left
Hwy 99/north of Roosevelt Boulevard (station)	Northwest Pawn/Cash King/Word&Spirit Int'l Church	East	Driv
Barger Drive/Century Drive	Century Drive	North	Left
	Residential Access	South	Left
	Kingdom Hall of Jehovah's Witnesses	South	Left
Barger Drive/Taney Street southwest corner	Residential Access	South	Driv Barg
Barger Drive/Altamont Street	Residential Access	South	Left
	Residential Access	South	Left

Source: DKS Transportation Analysis. (2016).

Source: DKS Transportation Analysis. (2016).

Source: DKS Transportation Analysis. (2016).

Source: DKS Transportation Analysis. (2016).

Table 5.2-10. Highway 99 Corrido

Table 5.2-10. Highway 99 Corridor Enhanced Corridor Alternative

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Table 5.2-10. Highway 99 Corridor Enhanced

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Crosswalk, Station, or Bus Pullout Location	
Chambers Street/W 12th Avenue	V
	V
	F
Chambers Street/W Broadway	V
	V
	C C
	F
	F
Hwy 99/100 feet north of Pattison Street	N
	N
	K
Hwy 99/Pattison Street (station)	N
Hwy 99/700 feet south of Pattison Street	K D A
	U
Hwy 99/650 feet south of Fairfield Avenue	C
	G C
Hwy 99/600 feet north of Royal Avenue	F F
	V
	S

Driveway
Left Turn
Access
Impacts to
Motor
Vehicles

Crosswalk, Station, or Bus Pullout Location	Impa Stree
Chambers Street/W 12th Avenue	W 12tl
	W 12tl
	Reside
Chambers Street/W Broadway	W Bro
	W Bro
	Orego Compa
	Reside
	Reside
Hwy 99/100 feet north of Pattison Street	Northv
	Maxxu
	Kevin (
Hwy 99/Pattison Street (station)	Northv
Hwy 99/700 feet south of Pattison Street	Karste Dutch Amazo
	US Bar
Hwy 99/650 feet south of Fairfield Avenue	Cars ai
	Gilbert Center
Hwy 99/600 feet north of Royal Avenue	Family Progra
	Vacant
	940 Bu
Hwy 99/Royal Avenue southwest corner (bus pullout)	Porky'
Hwy 99/700 feet south of Royal Avenue	Best E Motel
	Drivew Lot
	Pet an Groom
Hwy 99/1,200 feet north of Roosevelt Boulevard	Emog
	Car Qu

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e
Driveway
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Access
Impacts
to Motor
Vehicles

Crosswalk, Station, or Bus Pullout Location	Im Str
Chambers Street/W 12th Avenue	W 1
	W 1
	Resi
Chambers Street/W Broadway	W B
	W B
	Oreg Com
	Resi
	Resi
Hwy 99/100 feet north of Pattison Street	Nort
	Max
	Kevi
Hwy 99/Pattison Street (station)	Nort
Hwy 99/700 feet south of Pattison Street	Kars Dutc Ama
	US E
Hwy 99/650 feet south of Fairfield Avenue	Cars
	Gilb Cent
Hwy 99/600 feet north of Royal Avenue	Fam Prog
	Vaca
	940
Hwy 99/Royal Avenue southwest corner (bus pullout)	Pork
Hwy 99/700 feet south of Royal Avenue	Best Mot
	Driv Lot

Hwy 99/Royal Avenue southwest corner (bus pullout)	Porky's Palace (Closed)	West	Driveway impact (remove or relocate) on Hwy 99 & on-site circulation
Hwy 99/700 feet south of Royal Avenue	Best Economy Inn Motel	West	Left Turn – Entering Driveway
	Driveway to Vacant Lot	East	Left Turn - Exiting Driveway
	Pet and Pride Grooming Salon	West	Left Turn – Exiting Driveway
Hwy 99/1,200 feet north of Roosevelt Boulevard	Emog Sales	East	Left Turn – Entering Driveway
	Car Quest Auto Parts	West	Left Turn – Entering Driveway
Hwy 99/north of Roosevelt Boulevard (station)	Northwest Pawn/Cash King/Word&Spirit Int'l Church	East	Driveway impact (remove or relocate)
Barger Drive/Century Drive	Century Drive	North	Left Turn - Exiting Side Street
	Residential Access	South	Left Turn - Entering Driveway
	Kingdom Hall of Jehovah's Witnesses	South	Left Turn - Exiting Driveway
Barger Drive/Taney Street southwest corner	Residential Access	South	Driveway impact (remove or relocate) on Barger Drive
Barger Drive/Altamont Street	Residential Access	South	Left Turn - Exiting Driveway
	Residential Access	South	Left Turn - Entering Driveway

Crosswalk, Statio
Bus Pullout Locat

Chambers Street/
12th Avenue

Chambers Street/W Broadway	W Broadway	East	Left
	W Broadway	West	Left
	Oregon Ice Cream Company	West	Left
	Residential Access	East	Left
	Residential Access	East	Left
Hwy 99/100 feet north of Pattison Street	Northwest Self Storage	East	Left
	Maxxum Marine	West	Left
	Kevin Cohen Plumbing	West	Left
Hwy 99/Pattison Street (station)	Northwest Self Storage	East	Pote relo
Hwy 99/700 feet south of Pattison Street	Karsten Homes / Dutch Brothers / Amazon Automotive	East	Left
	US Bank	West	Left
Hwy 99/650 feet south of Fairfield Avenue	Cars and Trucks R-Us	East	Left
	Gilbert Shopping Center	West	Left
Hwy 99/600 feet north of Royal Avenue	Family Housing Program	East	Left
	Vacant Storage Facility	West	Left
	940 Business Center	West	Left
Hwy 99/Royal Avenue southwest corner (bus pullout)	Porky's Palace (Closed)	West	Driv Hwy
Hwy 99/700 feet south of Royal Avenue	Best Economy Inn Motel	West	Left
	Driveway to Vacant Lot	East	Left
	Pet and Pride Grooming Salon	West	Left
Hwy 99/1,200 feet north of Roosevelt Boulevard	Emog Sales	East	Left
	Car Quest Auto Parts	West	Left
Hwy 99/north of Roosevelt Boulevard (station)	Northwest Pawn/Cash King/Word&Spirit Int'l Church	East	Driv
Barger Drive/Century Drive	Century Drive	North	Left
	Residential Access	South	Left
	Kingdom Hall of Jehovah's Witnesses	South	Left
Barger Drive/Taney Street southwest corner	Residential Access	South	Driv Barg
	Residential Access	South	Left

	Barger Drive/Altamont Street	Residential Access	South	Left

Source: DKS Transportation Analysis. (2016).

Source: DKS Transportation Analysis. (2016).

Source: DKS Transportation Analysis. (2016).

Table 5.2-10. Highway 99 Corridor Enhanced Corridor Alternative Driveway Left Turn Access Impacts to Motor Vehicles

Crosswalk, Station, or Bus Pullout Location	
Chambers Street/W 12th Avenue	V
	V
	F
Chambers Street/W Broadway	V
	V
	C
	C
	F
	F
Hwy 99/100 feet north of Pattison Street	N
	N
	K
Hwy 99/Pattison Street (station)	N

Table 5.2-10. Highway 99 Corridor Enhanced Corridor Alternative Driveway Left Turn Access Impacts to Motor Vehicles

Crosswalk, Station, or Bus Pullout Location	Impa Stree
Chambers Street/W 12th Avenue	W 12tl
	W 12tl
	Reside
Chambers Street/W Broadway	W Bro
	W Bro
	Orego Compa
	Reside
	Reside
Hwy 99/100 feet north of Pattison Street	Northv
	Maxxu
	Kevin (
Hwy 99/Pattison Street (station)	Northv
Hwy 99/700 feet south of Pattison Street	Karste Dutch Amazo
	US Bar
Hwy 99/650 feet south of Fairfield Avenue	Cars aı
	Gilbert Center
Hwy 99/600 feet north of Royal Avenue	Family Progra
	Vacant
	940 Bu

Table 5.2-1 C . Highway 99 Corridor Enhanced Corridor Alt

Table 5.2-10. Highway 99 Corridor Enhanced Corridor Alternative Driveway Left Turn Access Impacts to Motor Vehicles

Crosswalk, Station, or Bus Pullout Location	Im Str
Chambers Street/W 12th Avenue	W 1
	W 1
	Resi
Chambers Street/W Broadway	W B
	W B
	Oreg Com
	Resi
	Resi
Hwy 99/100 feet north of Pattison Street	Nort
	Max
	Kevi
Hwy 99/Pattison Street (station)	Nort
Hwy 99/700 feet south of Pattison Street	Kars Dutc Ama
	US E
Hwy 99/650 feet south of Fairfield Avenue	Cars
	Gilb Cent
Hwy 99/600 feet north of Royal Avenue	Fam Prog

Hwy 99/700 feet south of Pattison Street	Karsten Homes / Dutch Brothers / Amazon Automotive	East	Left Turn – Entering Driveway
	US Bank	West	Left Turn – Entering Driveway
Hwy 99/650 feet south of Fairfield Avenue	Cars and Trucks R-Us	East	Left Turn – Entering Driveway
	Gilbert Shopping Center	West	Left Turn – Entering Driveway
Hwy 99/600 feet north of Royal Avenue	Family Housing Program	East	Left Turn – Entering Driveway
	Vacant Storage Facility	West	Left Turn – Entering Driveway
	940 Business Center	West	Left Turn – Exiting Driveway
Hwy 99/Royal Avenue southwest corner (bus pullout)	Porky's Palace (Closed)	West	Driveway impact (remove or relocate) on Hwy 99 & on-site circulation
Hwy 99/700 feet south of Royal Avenue	Best Economy Inn Motel	West	Left Turn – Entering Driveway
	Driveway to Vacant Lot	East	Left Turn - Exiting Driveway
	Pet and Pride Grooming Salon	West	Left Turn – Exiting Driveway
Hwy 99/1,200 feet north of Roosevelt Boulevard	Emog Sales	East	Left Turn – Entering Driveway
	Car Quest Auto Parts	West	Left Turn – Entering Driveway
Hwy 99/north of Roosevelt Boulevard (station)	Northwest Pawn/Cash King/Word&Spirit Int'l Church	East	Driveway impact (remove or relocate)
Barger Drive/Century Drive	Century Drive	North	Left Turn - Exiting Side Street
	Residential Access	South	Left Turn - Entering Driveway
	Kingdom Hall of Jehovah's Witnesses	South	Left Turn - Exiting Driveway
Barger Drive/Taney Street southwest corner	Residential Access	South	Driveway impact (remove or relocate) on Barger Drive
Barger Drive/Altamont Street	Residential Access	South	Left Turn - Exiting Driveway
	Residential Access	South	Left Turn - Entering Driveway

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Crosswalk, Statio Bus Pullout Locat
Chambers Street/ 12th Avenue
Chambers Street/ Broadway
Hwy 99/100 feet north of Pattison Street
Hwy 99/Pattison Street (station)
Hwy 99/700 feet south of Pattison Street
Hwy 99/650 feet south of Fairfield Avenue
Hwy 99/600 feet north of Royal Av
Hwy 99/Royal Av southwest corner pullout)
Hwy 99/700 feet south of Royal Av
Hwy 99/1,200 fee north of Rooseve Boulevard

Hwy 99/north of Roosevelt Boulevard (station)	Northwest Pawn/Cash King/Word&Spirit Int'l Church	East	Driv
Barger Drive/Century Drive	Century Drive	North	Left
	Residential Access	South	Left
	Kingdom Hall of Jehovah's Witnesses	South	Left
Barger Drive/Taney Street southwest corner	Residential Access	South	Driv Barg
Barger Drive/Altamont Street	Residential Access	South	Left
	Residential Access	South	Left

Source: DKS Transportation Analysis. (2016).

Source: DKS Transportation Analysis. (2016).

Source: DKS Transportation Analysis. (2016).

Table 5.2-10. Highway 99 Corridor Enhanced Corridor Alternative Driveway Left Turn Access Impacts to Motor Vehicles

Crosswalk, Station, or Bus Pullout Location	
Chambers Street/W 12th Avenue	V
	V
	F
Chambers Street/W Broadway	V
	V

Table 5.2-10. Highway 99 Corridor Enhanced Corridor Alternative Driveway Left Turn Access Impacts to Motor Vehicles

Crosswalk, Station, or Bus Pullout Location	Impa Stree
Chambers Street/W 12th Avenue	W 12tl
	W 12tl
	Reside
Chambers Street/W Broadway	W Bro
	W Bro
	Orego Compa
	Reside
	Reside
Hwy 99/100 feet north of Pattison Street	Northv
	Maxxu
	Kevin (
Hwy 99/Pattison Street (station)	Northv

Table 5.2-

Table 5.2-10. Highway 99 Corridor Enhanced Corridor Alternative Driveway Left Turn Access Impacts to Motor Vehicles

Crosswalk, Station, or Bus Pullout Location	Im Str
Chambers Street/W 12th Avenue	W 1
	W 1
	Resi
Chambers Street/W Broadway	W B
	W B
	Oreg Com
	Resi
	Resi
Hwy 99/100 feet north of Pattison Street	Nort
	Max
	Kevi

	Oregon Ice Cream Company	West	Left Turn - Entering Driveway
	Residential Access	East	Left Turn – Entering Driveway
	Residential Access	East	Left Turn – Exiting Driveway
Hwy 99/100 feet north of Pattison Street	Northwest Self Storage	East	Left Turn – Entering Driveway
	Maxxum Marine	West	Left Turn – Entering Driveway
	Kevin Cohen Plumbing	West	Left Turn – Exiting Driveway
Hwy 99/Pattison Street (station)	Northwest Self Storage	East	Potential driveway impact (removal or relocation)
Hwy 99/700 feet south of Pattison Street	Karsten Homes / Dutch Brothers / Amazon Automotive	East	Left Turn – Entering Driveway
	US Bank	West	Left Turn – Entering Driveway
Hwy 99/650 feet south of Fairfield Avenue	Cars and Trucks R-Us	East	Left Turn – Entering Driveway
	Gilbert Shopping Center	West	Left Turn – Entering Driveway
Hwy 99/600 feet north of Royal Avenue	Family Housing Program	East	Left Turn – Entering Driveway
	Vacant Storage Facility	West	Left Turn – Entering Driveway
	940 Business Center	West	Left Turn – Exiting Driveway
Hwy 99/Royal Avenue southwest corner (bus pullout)	Porky's Palace (Closed)	West	Driveway impact (remove or relocate) on Hwy 99 & on-site circulation
Hwy 99/700 feet south of Royal Avenue	Best Economy Inn Motel	West	Left Turn – Entering Driveway
	Driveway to Vacant Lot	East	Left Turn - Exiting Driveway
	Pet and Pride Grooming Salon	West	Left Turn – Exiting Driveway
Hwy 99/1,200 feet north of Roosevelt Boulevard	Emog Sales	East	Left Turn – Entering Driveway
	Car Quest Auto Parts	West	Left Turn – Entering Driveway
Hwy 99/north of Roosevelt Boulevard (station)	Northwest Pawn/Cash	East	Driveway impact (remove or relocate)
	King/Word&Spirit Int'l Church		
Barger Drive/Century Drive	Century Drive	North	Left Turn - Exiting Side Street
	Residential Access	South	Left Turn - Entering Driveway
	Kingdom Hall of Jehovah's Witnesses	South	Left Turn - Exiting Driveway
Barger Drive/Taney Street southwest corner	Residential Access	South	Driveway impact (remove or relocate) on Barger Drive
Barger Drive/Altamont Street	Residential Access	South	Left Turn - Exiting Driveway
	Residential Access	South	Left Turn - Entering Driveway

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Crosswalk, Statio Bus Pullout Locat
Chambers Street/ 12th Avenue
Chambers Street/ Broadway
Hwy 99/100 feet north of Pattison Street
Hwy 99/Pattison Street (station)
Hwy 99/700 feet south of Pattison Street
Hwy 99/650 feet south of Fairfield Avenue
Hwy 99/600 feet north of Royal Av

Hwy 99/Royal Avenue southwest corner (bus pullout)	Porky's Palace (Closed)	West	Driv Hwy
Hwy 99/700 feet south of Royal Avenue	Best Economy Inn Motel	West	Left
	Driveway to Vacant Lot	East	Left
	Pet and Pride Grooming Salon	West	Left
Hwy 99/1,200 feet north of Roosevelt Boulevard	Emog Sales	East	Left
	Car Quest Auto Parts	West	Left
Hwy 99/north of Roosevelt Boulevard (station)	Northwest Pawn/Cash King/Word&Spirit Int'l Church	East	Driv
Barger Drive/Century Drive	Century Drive	North	Left
	Residential Access	South	Left
	Kingdom Hall of Jehovah's Witnesses	South	Left
Barger Drive/Taney Street southwest corner	Residential Access	South	Driv Barg
Barger Drive/Altamont Street	Residential Access	South	Left
	Residential Access	South	Left

Source: DKS Transportation Analysis. (2016).

Source: DKS Transportation Analysis. (2016).

Source: DKS Transportation Analysis. (2016).

Table 5.2-10. Highway 99 Corridor Enhanced Corridor Alternative Driveway Left Turn Access Impacts to Motor Vehicles

Crosswalk, Station, or Bus Pullout Location	Impacted Business, Street, or Residence	Side of Major Street	Type of Access Change
Chambers Street/W 12th Avenue	W 12th Avenue	East	Left Turn - Exiting Side Street
	W 12th Avenue	West	Left Turn - Exiting Side Street
	Residential Access	West	Left Turn – Entering Driveway
Chambers Street/W Broadway	W Broadway	East	Left Turn - Exiting Side Street
	W Broadway	West	Left Turn - Exiting Side Street
	Oregon Ice Cream Company	West	Left Turn - Entering Driveway
	Residential Access	East	Left Turn – Entering Driveway
	Residential Access	East	Left Turn – Exiting Driveway
Hwy 99/100 feet north of Pattison Street	Northwest Self Storage	East	Left Turn – Entering Driveway
	Maxxum Marine	West	Left Turn – Entering Driveway
	Kevin Cohen Plumbing	West	Left Turn – Exiting Driveway

Hwy 99/Pattison Street (station)	Northwest Self Storage	East	Potential driveway impact (removal or relocation)
Hwy 99/700 feet south of Pattison Street	Karsten Homes / Dutch Brothers / Amazon Automotive	East	Left Turn – Entering Driveway
	US Bank	West	Left Turn – Entering Driveway
Hwy 99/650 feet south of Fairfield Avenue	Cars and Trucks R-Us	East	Left Turn – Entering Driveway
	Gilbert Shopping Center	West	Left Turn – Entering Driveway
Hwy 99/600 feet north of Royal Avenue	Family Housing Program	East	Left Turn – Entering Driveway
	Vacant Storage Facility	West	Left Turn – Entering Driveway
	940 Business Center	West	Left Turn – Exiting Driveway
Hwy 99/Royal Avenue southwest corner (bus pullout)	Porky's Palace (Closed)	West	Driveway impact (remove or relocate) on Hwy 99 & on-site circulation
Hwy 99/700 feet south of Royal Avenue	Best Economy Inn Motel	West	Left Turn – Entering Driveway
	Driveway to Vacant Lot	East	Left Turn - Exiting Driveway
	Pet and Pride Grooming Salon	West	Left Turn – Exiting Driveway
Hwy 99/1,200 feet north of Roosevelt Boulevard	Emog Sales	East	Left Turn – Entering Driveway
	Car Quest Auto Parts	West	Left Turn – Entering Driveway
Hwy 99/north of Roosevelt Boulevard (station)	Northwest Pawn/Cash King/Word&Spirit Int'l Church	East	Driveway impact (remove or relocate)
Barger Drive/Century Drive	Century Drive	North	Left Turn - Exiting Side Street
	Residential Access	South	Left Turn - Entering Driveway
	Kingdom Hall of Jehovah's Witnesses	South	Left Turn - Exiting Driveway
Barger Drive/Taney Street southwest corner	Residential Access	South	Driveway impact (remove or relocate) on Barger Drive
Barger Drive/Altamont Street	Residential Access	South	Left Turn - Exiting Driveway
	Residential Access	South	Left Turn - Entering Driveway

Source: DKS Transportation Analysis. (2016).

5.2.2.9. Emergency Vehicle Flow and Access

The emergency service authorities do not foresee any major issues of concern related to expanded transit services. Emergency service providers would have an opportunity to review more detailed designs and would work with Lane Transit District to address issues in the future (Lane Fire Authority, personal communication, 2017, April 13).

5.2.3. EmX Alternative

5.2.3.1. Local Traffic Operations

The Highway 99 Corridor EmX Alternative would provide roadway improvements that would affect study intersection, operations including:

- Lengthening right turn lanes and installing dual northbound left turn lanes at the Highway 99N/Roosevelt Boulevard intersection
- Converting an eastbound right turn only lane to a BAT lane on W. 7th Avenue between W. 7th Place and Garfield Street
- Installing a northbound bus only left turn lane on Highway 99 at Barger Drive
- Installing bus queue jump phases at the Highway 99N/Roosevelt Boulevard intersection (southbound), the Highway 99N/Royal Avenue intersection (northbound and southbound), Highway 99N/Bethel Drive (northbound and southbound), and Highway 99N/Barger Drive (northbound)

The 2035 p.m. peak hour turning movement volumes for the EmX Alternative are shown on Figure 5.2-6 and the transit and roadway improvements are shown on Figure 5.2-7. The study intersection performance for the 2035 p.m. peak hour No-Build and EmX Alternatives are shown in Table 5.2-11. Delay at Highway 99N/Roosevelt Boulevard would improve due to the addition of a second northbound left turn only lane, and delay at the W. 6th Avenue/Garfield Street intersection would improve due to a small decrease in motor vehicle volumes.

During the 2035 p.m. peak hour, mobility standards would not be met at the following study intersections:

- Highway 99N/Roosevelt Boulevard (current standards only)
- W. 6th Avenue/Garfield Street (current standards only)

Table 5.2-11. Highway 99 Corridor EmX Alternative 2035 p.m. Peak Hour Study Intersection Operations

Study Intersection Number	Study Intersection	Jurisdiction	Operating Standard[a]	No-Build LOS	No-Build Delay (sec)	No-Build v/c	EmX LOS	EmX Delay (sec)	EmX v/c
1	Hwy 99N/ Barger Drive	ODOT	0.85/0.85	C	25.7	0.77	C	26.8	0.80
2	Hwy 99N/ Fairfield Avenue	ODOT	0.85/0.85	B	13.8	0.56	B	14.0	0.57
3	Hwy 99N/ Royal Avenue	ODOT	0.85/0.85	B	11.0	0.64	B	11.9	0.64
4	Hwy 99N/Roosevelt Boulevard	ODOT	0.85/1.00	**F**	**88.9**	**1.03**	*E*	*71.5*	*0.94*
5	W. 7th Avenue/W. 5th Avenue	ODOT	0.85/1.00	B	19.6	0.59	C	20.6	0.61
6	W. 6th Avenue/Garfield Street	ODOT	0.85/1.00	*C*	*32.8*	*0.98*	*C*	*27.0*	*0.95*
7	W. 7th Avenue/Garfield Street	ODOT	0.85/1.00	C	23.2	0.82	C	23.0	0.81

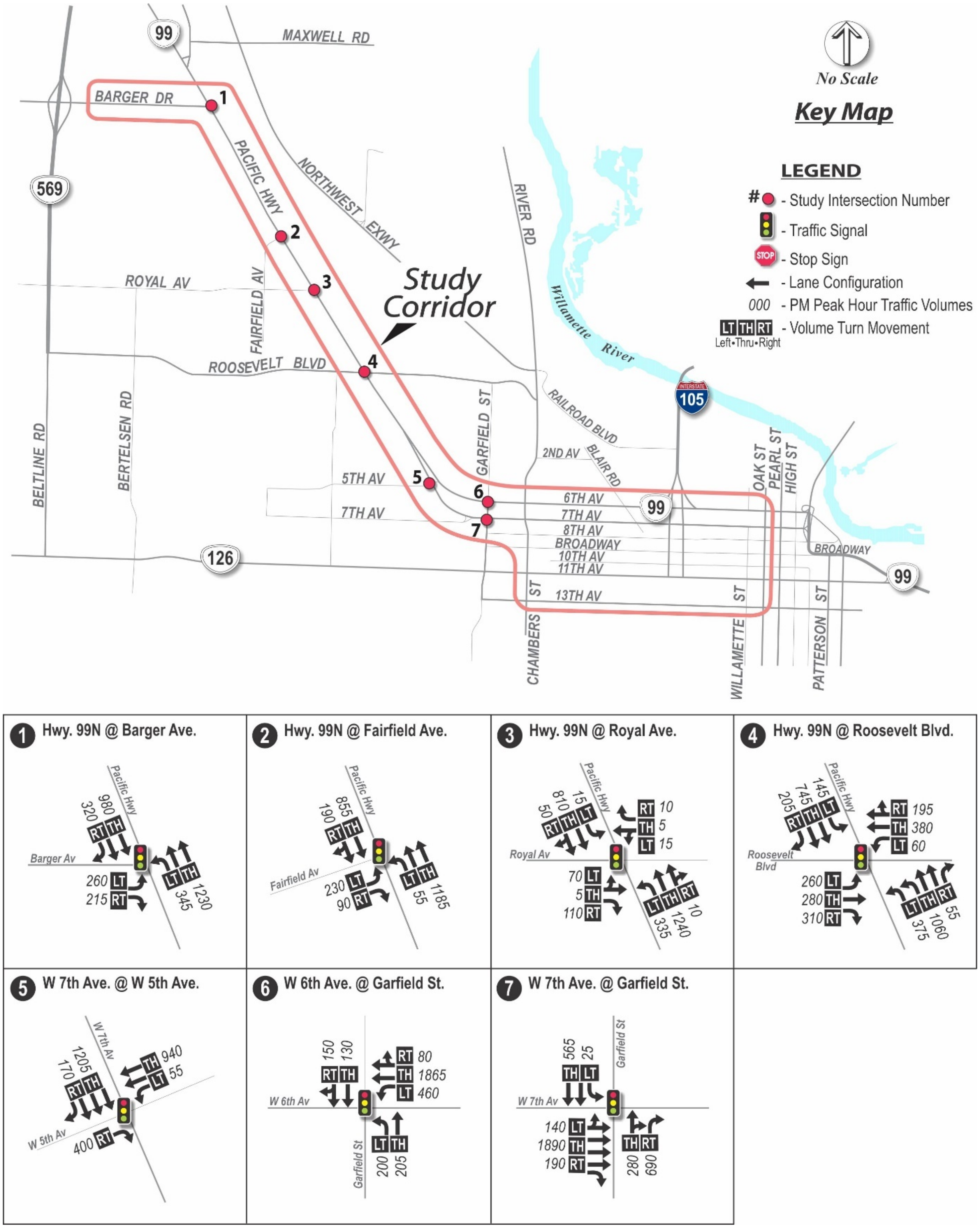
Source: DKS Transportation Analysis. (2016).

Italic underlined values do not meet current standards
Bold underlined values do not meet proposed standards or current standards

Delay = Average Intersection Delay in seconds
LOS = Level of Service
v/c = volume-to-capacity

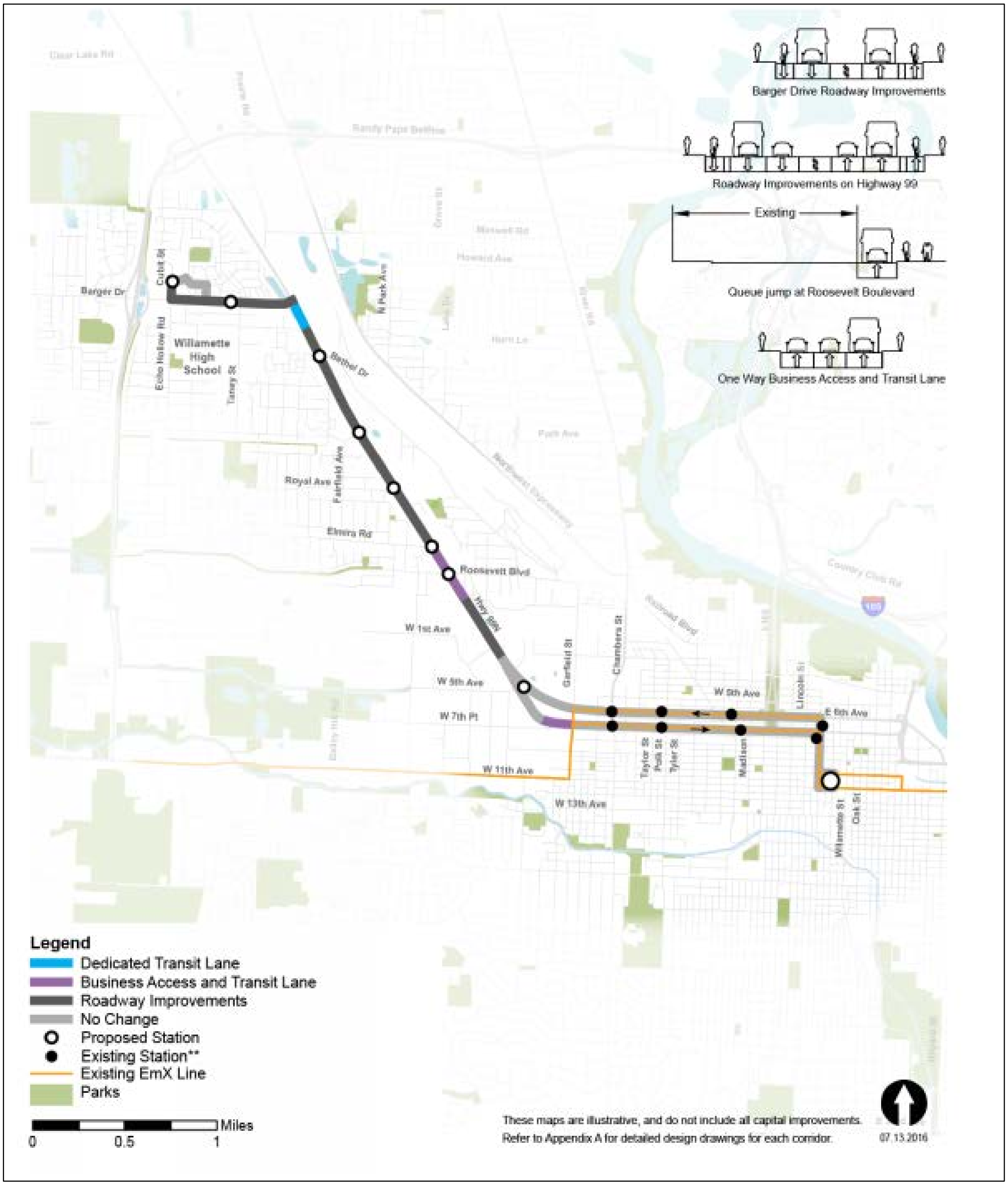
[a] Current/proposed operations standards for these facilities.

Figure 5.2-6. Highway 99 Corridor 2035 EmX Alternative p.m. Peak Hour Traffic Volumes



Source: DKS Transportation Analysis. (2016).

Figure 5.2-7. Highway 99 Corridor 2035 EmX Alternative Transit and Roadway Improvements



Source: CH2M. (2016).

5.2.3.2. Connectivity to Roadway, Bike, and Pedestrian Facilities

The proposed multi-modal project improvements (shown on Figure 5.2-8 and in Table 5.2-12) for the Highway 99 Corridor EmX Alternative were compared with the proposed roadway, bike, and pedestrian projects from the expected transportation improvement projects identified in the Draft Eugene 2035 TSP (Table 5.2-1) to determine how well coordinated the projects were. Expected transportation improvement projects, such as the addition of bike lanes and construction of new sidewalks, would improve access to transit. For example, the planned installation of new sidewalks on Highway 99N between Garfield Street and Roosevelt Boulevard would improve pedestrian access to nearby EmX transit stations. In addition, the planned shared use paths on Highway 99N would allow people to more easily pair bicycling to transit. The buffered bike lanes that would be installed as part of the EmX multi-modal improvements would connect to these planned improvements.

The amounts of new and reconstructed pedestrian and bicycle facilities proposed under the EmX Alternative are shown in Table 5.2-12. Compared to the No-Build Alternative, the EmX Alternative would install many pedestrian improvements. Most notably, the EmX Alternative would construct a new pedestrian bridge and approach ramps over the heavy rail line, connecting Edison Street to Highway 99N about one-third of a mile north of Roosevelt Boulevard. In addition, the EmX Alternative would install nine new enhanced crossings (flashing beacon or Pedestrian Hybrid Beacon), one upgraded crossing, and 7,250 feet (1.37 miles) of new and reconstructed sidewalk. The sidewalk gaps on W. 6th Avenue between Garfield Street and W. 5th Avenue, as well as on the north side of Barger Drive between Highway 99N and Empire Park Drive would be connected to existing sidewalks.

Compared to the No-Build and Enhanced Corridor Alternatives, the EmX Alternative would install new bicycle improvements. Most notably, the EmX Alternative would restripe Highway 99 to create a buffered bicycle lane between Roosevelt Boulevard and Barger Drive, and restripe Barger Drive to create an eastbound buffered bicycle lane between Highway 99N and Ruskin Street.

Table 5.2-12. Highway 99 Corridor EmX Alternative New and Reconstructed Pedestrian and Bicycle Facilities

Improvement	Length of Facilities
New Sidewalk	2,650 feet (0.50 mile)
Reconstructed/Improved Sidewalk	4,600 feet (0.87 mile)
Number of New Mainline Enhanced Crossings[a]	9 (7 on Hwy 99N, 2 on Barger Drive)
Sidewalk Gaps Connected	W. 6th Avenue between Garfield Street and W. 5th Avenue Barger Drive between Hwy 99N and Century Drive
New Bike Facilities	170 feet (0.03 mile)
Improve Bike Facilities	21,000 feet (3.98 miles)
Other New Facilities	New pedestrian bridge and ramps over heavy rail track, 1,200 feet total length

Source: CH2M Transportation Analysis. (2016).

[a] Enhanced crossing would install either a flashing yellow indication (flashing beacon), a yellow, red, flashing red indication (Pedestrian Hybrid Beacon), or a full traffic signal with pedestrian crossings along the mainline to warn vehicles of a pedestrian crossing.

Figure 5.2-8. Highway 99 Corridor 2035 EmX Alternative Pedestrian and Bicycle Improvements

Source: CH2M. (2016).

The qualitative assessment of pedestrian and bicycle facilities, shown in Table 5.2-13, shows that two roadway segments would improve over the No-Build Alternative from “poor” or “fair” ratings to “good” ratings for both pedestrians and bicyclists.

Table 5.2-13. Highway 99 Corridor EmX Alternative Qualitative Assessment of Pedestrian Facilities[a]

Segment	No-Build Walking	EmX Walking	No-Build Biking	EmX Biking
W. 11th Avenue: Willamette Street to Charnelton Street	Good	Good	Fair	Fair
Willamette Street: W. 10th Avenue to W. 11th Avenue	Good	Good	Poor	Poor
W. 10th Avenue: Willamette Street to Lincoln Street	Excellent	Excellent	Good	Good
Charnelton Street: W. 6th Avenue to W. 11th Avenue	Good	Good	Poor	Poor
Lincoln Street: W. 10th Avenue to W. 13th Avenue	Good	–[b]	Good	–[b]
W. 6th Avenue: Charnelton Street to Chambers Street	Good	Good	Poor	Poor
W. 6th Avenue: Chambers Street to Garfield Street	Good	Good	Poor	Poor
W. 6th Avenue: Garfield Street to 5th Avenue	Poor	**Good**	Poor	Poor
Chambers Street: W. 6th Avenue to W. 7th Avenue	Good	–[b]	Good	–[b]
Chambers Street: W. 7th Avenue to W. 13th Avenue	Good	–[b]	Good	–[b]
W. 7th Avenue: W. 5th Avenue to Garfield Street	Excellent	Excellent	Excellent	Excellent
W. 7th Avenue: Garfield Street to Chambers Street	Good	Good	Poor	Poor
W. 7th Avenue: Chambers Street to Lincoln Street	Good	Good	Poor	Poor
W. 7th Avenue: Lincoln Street to Charnelton Street	Good	Good	Poor	Poor
W. 11th Avenue: Chambers Street to Lincoln Street	Good	–[b]	Fair	–[b]
W. 13th Avenue: Chambers Street to Lincoln Street	Good	–[b]	Good	–[b]
Hwy 99N: W. 5th Avenue to Roosevelt Boulevard	Excellent	Excellent	Excellent	Excellent
Hwy 99N: Roosevelt Boulevard to Barger Drive	Fair	Fair	Fair	**Good**
Barger Drive: Hwy 99N to Cubit Street	Fair	**Good**	Fair	**Good**
Cubit Street: Barger Drive to Wagner Street	Good	Good	Fair	Fair
Wagner Street: Cubit Street to Aerial Way	Good	Good	Fair	Fair
Aerial Way: Wagner Street to Altamont Street	Good	Good	Fair	Fair
Altamont Street: Aerial Way to Barger Drive	Good	Good	Fair	Fair

Source: DKS Transportation Analysis. (2016).

[a] Qualitative analysis based on methodology described in Chapter 14 of ODOT's *Analysis Procedures Manual* (ODOT, 2014).

[b] Segment not on EmX Corridor

5.2.3.3. Plan Consistency

The Highway 99 Corridor EmX Alternative was evaluated for consistency with the Long Range Transit Plan (LTD, 2014), the FTN concept, and the goals outlined in the Regional Transportation Plan (LCOG, 2011, December) and the Draft Eugene 2035 TSP.

The purpose of the LTD FTN is to leverage transit service investments by tying service to the density and other elements of adjacent development. The FTN enables a well-connected network that provides regional circulation by providing an average transit frequency of 15 minutes or better, a reliable transit system that runs on schedule (by implementing strategies such as transit priority at signalized intersections), and enhanced stations with bicycle and pedestrian connections (LTD, 2014). The EmX Alternative would meet the FTN goal by providing frequent service on Highway 99N, implementing transit priority at signalized intersections, and adding BAT lanes and transit queue jumps to help make service more reliable and on schedule.

The BRT system is the “highest level of service available within the FTN, and is a permanent, integrated system that uses buses or specialized vehicles on roadways or dedicated lanes to efficiently transport passengers” (LTD, 2014). BRT system elements include branded multi-door 60-foot-long BRT vehicles, enhances stations with level boarding platforms instead of bus stops, off-board fare collection, transit signal priority, wider stop spacing, and 10-minute service frequencies. BRT service is intended to improve transit speed, reliability, and ridership (CH2M, 2016a). The EmX Alternative would meet many of these BRT system elements and would install 2.55 miles of BAT lanes and queue jumps, but would not install any exclusive lanes along the corridor.

The five primary goals outlined in the Draft Eugene 2035 TSP are to: (1) create an integrated system that is safe and efficient and reduces fossil fuel usage by 50 percent, (2) advance regional sustainability by reducing fossil fuel reliance, (3) reduce reliance on any single mode, (4) address the needs and safety of all travelers, and (5) by 2035, triple the percentage of trips made on foot, by bicycle, and by transit from 2014 levels. The EmX Alternative helps Eugene to slightly improve transit mode share, and new pedestrian and bicycle improvements would be installed as part of the EmX Alternative that helps increase pedestrian and bicycle mode share.

5.2.3.4. Transit Priority at Signalized Intersections

The Highway 99 Corridor EmX Alternative would include traffic signal construction and modifications at several intersections. Several traffic signals will provide exclusive bus signal phasing that would allow buses to safely enter traffic flow or travel through an intersection. The locations of proposed bus signal phases are shown in Table 5.2-14. Compared to the No-Build Alternative, the EmX Alternative would have four additional signals with exclusive bus phasing. Compared to the Enhanced Corridor Alternative, the EmX Alternative would have one additional signal with exclusive bus phasing (W. 7th Avenue/W. 5th Avenue).

Table 5.2-14. Highway 99 Corridor EmX Alternative Proposed Bus Phases

Intersection	Bus Phase
W. 7th Avenue/W. 5th Avenue	Southbound
Hwy 99/Roosevelt Boulevard	Southbound
Hwy 99/Royal Avenue	Northbound/Southbound
Hwy 99/Bethel Drive	Northbound/Southbound
Hwy 99N/Barger Drive	Northbound Left Turn

Source: DKS Transportation Analysis. (2016).

In addition, every traffic signal on the corridor would receive transit signal priority. Transit signal priority modifies normal traffic signal operations by extended green phases or shortening side street phases in order to reduce delay for transit vehicles.

5.2.3.5. Safety

Potential safety benefits and impacts associated with the Highway 99 Corridor EmX Alternative include:

- The proposed alternative would install BAT lanes on Highway 99N approaching Roosevelt Boulevard (northbound and southbound), which would serve both buses/BRT vehicles and turning general-purpose vehicles. The BAT lane would reduce potential vehicle conflicts such as rear end collisions (FHWA, 2014)

- Bus/BRT vehicle queue jumps at W. 7th Avenue/W. 5th Avenue (southbound), Highway 99N/Roosevelt Boulevard (southbound), Highway 99N/Royal Avenue (reverse queue jumps northbound and southbound), and Highway 99N/Bethel Drive (northbound/southbound) would serve buses and BRT vehicles exclusively, eliminating the merging conflict between vehicles and buses/BRT vehicles
- Dual northbound left turn lanes from Highway 99N onto Roosevelt Boulevard westbound would reduce vehicle queue spillback from the left turn lanes into the through lanes and could reduce potential vehicle conflicts such as rear end collisions (FHWA, 2014)
- A buffered bicycle lane would increase separation between motor vehicles and bicycles, and could reduce conflicts
- Nine new bicycle/pedestrian crossings along the corridor would improve opportunities for bicyclists and pedestrians to cross Highway 99N
- Segments of new sidewalks and a new pedestrian bridge across the freight railroad line would improve safety for pedestrians

Overall, motor vehicle, bicycle, and pedestrian safety would be improved under the EmX Alternative compared to the No-Build and Enhanced Corridor Alternatives due to the reduction in vehicle queue spillback at the Highway 99N/Roosevelt Boulevard intersection, the installation of buffered bike lanes, and the installation of new bicycle/pedestrian crossings, and the installation of additional new and/or reconstructed sidewalks.

5.2.3.6. Roadway Circulation

The Highway 99 Corridor EmX Alternative was evaluated to assess motor vehicle circulation. Overall, there is little difference in roadway circulation compared to the No-Build and Enhanced Corridor Alternatives. The installation of a new traffic signal at the Cubit Street/Winco Foods intersection (located 200 feet north of Barger Drive) would improve circulation for commercial shopping areas on both the east and west sides of Cubit Street compared to the No-Build Alternative. This new traffic signal is located at the Cubit Street terminus and would facilitate bus maneuvers leaving the station and entering the southbound left turn lane at Barger Drive. This improvement is the same as for the Enhanced Corridor Alternative.

In addition, the EmX Alternative would narrow the motor vehicle lane widths on Highway 99N between Roosevelt Boulevard and Barger Drive and on Barger Drive between Highway 99N and Ruskin Street to 10 feet in order to add a buffered bike lane on both sides on Highway 99N and on the south side of Barger Drive. The primary advantages of narrowing travel lanes to 10 feet are: slower travel speeds, reducing crossing width for pedestrians, and less right-of-way impacts. The primary disadvantage is that narrower travel lanes have the potential to slightly increase crash risk, but the crash severity would be lower (due to lower speeds) (NACTO, 2013).

5.2.3.7. Freight

Highway 99N, W. 6th Avenue, and W. 7th Avenue are classified as national freight routes, and are designated by ODOT as a Reduction Review Route (ODOT, 2015). The Reduction Review Route designation requires the review of any proposed changes on these facilities to determine if there will be a reduction of vehicle-carrying capacity.

The EmX Alternative would install six enhanced pedestrian crossings with raised medians on Highway 99N, which could cause a slight increase in freight travel times. The EmX Alternative will need

ODOT approval for installing raised medians for pedestrian crossings on Highway 99N; this would need to be coordinated through ODOT's Motor Carrier Transportation Division.

There are 11 driveways potentially accessed by freight that are adjacent to the enhanced pedestrian crossings that would have a reduced left turn deceleration area, resulting in potential increased delays for freight accessing the driveways or for freight traveling along Highway 99N. These potential freight delays are expected to be less than 10 seconds along the entire corridor. Table 5.2-15 lists the 11 driveways with potential impacts to the left turn deceleration area on Highway 99N.

Table 5.2-15. Highway 99 Corridor EmX Alternative Driveway Left Turn Access Impacts to Freight

Crosswalk Location on Hwy 99N	Impacted Business Location	Side of Hwy 99N
100 feet north of Pattison Street	Northwest Self Storage	East
	Maxxum Marine	West
700 feet south of Pattison Street	Karsten Homes/Dutch Brothers	East
	US Bank	West
650 feet south of Fairfield Avenue	Cars and Trucks R-Us	East
	Gilbert Shopping Center	West
600 feet north of Royal Avenue	Family Housing Program	East
	Vacant Storage Facility	West
700 feet south of Royal Avenue	Best Economy Inn Motel	West
1200 feet north of Roosevelt Boulevard	Emog Sales	East
	Car Quest Auto Parts	West

Source: DKS Transportation Analysis. (2016).

5.2.3.8. Parking and Access

The Highway 99 Corridor EmX Alternative would not impact on-street parking. The EmX Alternative would have potential off-street parking impacts, which are listed in Table 5.2-16.

Table 5.2-16. Highway 99 Corridor EmX Alternative Off-Street Parking Impacts

Business	Location	Maximum Spaces Impacted
Winco	Barger Drive/Cubit Street	12 parking spaces
Shopping Center	Highway 99/Fairfield Avenue southwest corner	9 parking spaces
Ace Buyers	Highway 99/Royal Avenue northeast corner	12 parking spaces
Porky's Palace (Closed)	Highway 99/Royal Avenue southwest corner	12 parking spaces[a]
Battery X-Change	Highway 99 east side, 1,500 feet north of Roosevelt Boulevard	6 parking spaces
Patty's	Highway 99/Roosevelt Boulevard	2 parking spaces

Source: DKS Transportation Analysis. (2016).

[a] Mitigation is available for Porky's Palace site.

In addition, the access and circulation at the former Porky's Palace would be impacted by the new bus pullout on the southwest corner of Highway 99N and Royal Avenue. The driveway on Highway 99N would still be accessible, but a bus pullout would be installed adjacent to the driveway, which would require some right of way acquisition. This loss of right of way on Highway 99N would prevent vehicles in the former Porky's Palace parking lot from being able to drive around the east and north sides of the building, which would affect the parking lot circulation. Mitigation is available for the Porky's Palace site.

There are 14 driveways adjacent to the proposed enhanced pedestrian crossings that would have a reduced left turn deceleration area, resulting in potential increased delays for motor vehicles accessing the driveways or traveling along Highway 99N. In addition, five locations would have potential impacts to motor vehicles performing a two-stage left turn out of the driveways due to the refuge islands. Table 5.2-17 lists the locations with potential impacts to the left turn movements onto and off of the mainline.

Table 5.2-17. **Highway 99 Corridor EmX Alternative Driveway Left Turn Access Impacts to Motor Vehicles**

Crosswalk, Station, or Bus Pullout Location	Impacted Business, Street, or Residence	Side of Major Street	Type of Access Change
Hwy 99/100 feet north of Pattison Street	Northwest Self Storage	East	Left Turn – Entering Driveway
	Maxxum Marine	West	Left Turn – Entering Driveway
	Kevin Cohen Plumbing	West	Left Turn – Exiting Driveway
Hwy 99/700 feet south of Pattison Street	Karsten Homes / Dutch Brothers / Amazon Automotive	East	Left Turn – Entering Driveway
	US Bank	West	Left Turn – Entering Driveway
Hwy 99/650 feet south of Fairfield Avenue	Cars and Trucks R-Us	East	Left Turn – Entering Driveway
	Gilbert Shopping Center	West	Left Turn – Entering Driveway
Hwy 99/600 feet north of Royal Avenue	Family Housing Program	East	Left Turn – Entering Driveway
	Vacant Storage Facility	West	Left Turn – Entering Driveway
	940 Business Center	West	Left Turn – Entering Driveway
Hwy 99/Royal Avenue southwest corner (bus pullout)	Porky's Palace (Closed)	West	Driveway impact (remove or relocate) on Hwy 99 & on-site circulation
Hwy 99/700 feet south of Royal Avenue	Best Economy Inn Motel	West	Left Turn – Entering Driveway
	Driveway to Vacant Lot	East	Left Turn - Exiting Driveway
	Pet and Pride Grooming Salon	West	Left Turn – Entering Driveway
Hwy 99/1,200 feet north of Roosevelt Boulevard	Emog Sales	East	Left Turn – Entering Driveway
	Car Quest Auto Parts	West	Left Turn – Entering Driveway
Hwy 99/north of Roosevelt Boulevard (station)	Northwest Pawn/Cash King/Word&Spirit Int'l Church	East	Driveway impact (remove or relocate)
Barger Drive/Century Drive	Century Drive	North	Left Turn - Exiting Side Street
	Residential Access	South	Left Turn - Entering Driveway
	Kingdom Hall of Jehovah's Witnesses	South	Left Turn - Exiting Driveway
Barger Drive/600 feet east of Altamont Street	Residential Access	South	Left Turn - Exiting Driveway; Right-in/right out for other driveway access to same property

Source: DKS Transportation Analysis. (2016).

5.2.3.9. Emergency Vehicle Flow and Access

The emergency service authorities do not foresee any major issues of concern related to expanded transit services. Emergency service providers would have an opportunity to review more detailed designs and would work with LTD to address issues in the future (Lane Fire Authority, personal communication, 2017, April 13).

5.3. Transit

5.3.1. Corridor Transit Service Characteristics

The amount of transit service provided in a corridor is measured by daily VHT, daily VMT, and daily place-miles of service. Daily vehicle hours are the cumulative time that transit vehicles are in service and daily vehicle miles are the distance they travel, independent of the size of the vehicle. Place-miles refers to the total carrying capacity (seated and standing) of each bus and is calculated by multiplying vehicle capacity of each bus by the number of service miles traveled each day. Place-miles highlight differences among alternatives caused by a different mix of vehicles and levels of service. Table 5.3-1 summarizes these major transit characteristics for the Highway 99 Corridor No-Build, Enhanced Corridor, and EmX Alternatives.

Table 5.3-1. Highway 99 Corridor 2035 Corridor Transit Service Characteristics by Alternative

Measure	No-Build Alternative	Enhanced Corridor Alternative	Delta from No-Build Alternative	EmX Alternative	Delta from No-Build Alternative
Annual EmX and Fixed Route Transit VHT[a]	278,600	277,500	(1,100)	292,500	13,900
Annual Transit VMT[b]	4,520,200	4,600,800	80,600	4,864,800	344,600
Average Weekday Corridor Transit Place-Miles[c]	37,500	78,340	40,840	142,390	104,890

Source: LCOG Regional Travel Demand Model Results (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

[a] VHT = Vehicle hours traveled in revenue service.

[b] VMT = Vehicle miles traveled in revenue service.

[c] Place-Miles = Transit Vehicle Capacity (seated and standing) multiplied by VMT. (Place-miles refers to the total carrying capacity (seated and standing) of each bus and is calculated by multiplying vehicle capacity of each bus by the number of service miles traveled each day. Place-miles highlight differences among alternatives caused by a different mix of vehicles and levels of service.)

The EmX Alternative would result in a substantial increase in corridor transit capacity when compared to the No-Build and Enhanced Corridor Alternatives. This is because EmX has higher frequencies (10-minute service all day), which translates to two extra trips each hour of service throughout the day resulting in more vehicle hours and miles compared to the No-Build and Enhanced Corridor Alternatives. Similarly, the substantial difference in place-miles associated with both the Enhanced Corridor and EmX Alternatives reflects the implementation of EmX or Enhanced Corridor bus service in the corridor and the replacement of parallel bus service with higher capacity vehicles. Corridor transit place-miles would increase by 40,850 place-miles for the Enhanced Corridor Alternative and 104,900 place-miles for the EmX Alternative compared to the No-Build Alternative.

5.3.2. Transit and Passenger Vehicle Travel Time

Transit travel time is assessed using in-vehicle time and total travel time. Table 5.3-2 provides a summary of in-vehicle and total auto and transit travel times in the a.m. peak hour for trips to the Eugene Station from the corridor route terminus.

In-vehicle transit travel time includes only the amount of time it takes for a transit vehicle to travel between an origin and destination. For buses, this measure reflects roadway speed limits, congestion, and stop dwell time. In-vehicle plus walk and wait travel time includes time spent walking to transit, initial wait time, transfer wait time (if any), in-vehicle time, and time walking from transit to the destination.

In terms of auto times, there is no appreciable difference in times between the No-Build Alternative and the Build Alternatives. For transit travel times, both the Enhanced Corridor and EmX Alternatives demonstrate substantial travel time savings compared to the No-Build Alternative.

Table 5.3-2. Highway 99 Corridor 2035 Auto and Transit Travel Times (a.m. Peak Hour) by Alternative

	Travel Time to Eugene Station from Cubit/Barger (minutes)					
	Auto	Transit				
	No-Build, EC, and EmX Alternatives	No-Build Alternative	EC Alternative		EmX Alternative	
Measure	**Time**	**Time**	**Time**	**Delta from No-Build Alternative**	**Time**	**Delta from No-Build Alternative**
In-Vehicle[a]	12	29	19	-10	17	-12
In-Vehicle Plus Walk and Wait[b]	16	40	29	-11	25	-15

Source: LCOG Regional Travel Demand Model Results (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

EC = Enhanced Corridor

[a] In-vehicle transit travel times represent time spent in the transit vehicle.
[b] In-vehicle plus walk and wait travel time represents walk time, one-half the wait time, and in-vehicle time in minutes.

5.3.3. Reliability

One of the major contributing factors to reliable transit service is the amount of exclusive and/or priority transit lanes along the corridor and at signalized intersections. Transit signal priority, installed at signalized intersections for the Highway 99 Corridor Enhanced Corridor and EmX Alternatives, would minimize the variability of delay at traffic signals. Reliability measures include the total amount of new round-trip miles, the total length of exclusive and/or priority lanes, the percentage of new corridor exclusive or priority lanes, the number of trunk-line intersections with transit priority treatment, and the amount of motor vehicle congestion at signalized intersections on the corridor. Typically, the more congested the corridor, the greater the variability in delay at signalized intersections.

Table 5.3-3 summarizes these transit reliability measures for the Enhanced Corridor and EmX Alternatives. Every signalized intersection for both the Enhanced Corridor and EmX Alternatives would implement transit signal priority, whereas the No-Build Alternative would not implement additional transit signal priority. Compared to the No-Build Alternative, the Enhanced Corridor Alternative provides some priority treatment and the EmX Alternative provides substantially more priority treatment. The Enhanced Corridor Alternative can be expected to have more reliable travel times during peak periods and the EmX Alternative can be expected to have even greater travel time reliability during peak periods compared to the No-Build Alternative.

Table 5.3-3. Highway 99 Corridor 2035 Average Weekday Corridor Transit Reliability Measures

Measure	Enhanced Corridor	EmX	Delta between EmX and Enhanced Corridor
Total Number of New Round-Trip EmX System Miles (miles)	0	10.5	10.5
Total Length of New Corridor Exclusive/Priority Lanes[a] (miles)	0.4	2.30	1.9
Percent of New Corridor that is Exclusive/Priority Lanes[a]	3.6%	21.9%	18.1%

Source: *MovingAhead Level 2 Definition of Alternatives*. (CH2M et al., 2016).

[a] Exclusive/priority lanes are defined as the round-trip miles of business access and transit lanes, bus-only lanes, and queue jumps.

5.3.4. Transit Ridership

Systemwide transit ridership is defined as average weekday systemwide linked-trips in 2035. A linked trip is a one-way trip taken by a person from an origin to a destination, independent of the number of vehicles or transfers used to complete the trip. The Enhanced Corridor Alternative would result in a slight increase of less than 1 percent in systemwide transit trips, while the Highway 99 Corridor EmX Alternative would result in nearly a 2 percent increase in systemwide transit trips compared to the No-Build Alternative.

Corridor ridership is defined as any transit trip that is produced in and/or attracted to the respective corridor that, for this purpose, has been defined as the TAZ within a 0.5-mile buffer around the transit line. As shown in Table 5.3-4, the EmX Alternative would have the highest increase in corridor ridership compared to the No-Build Alternative, and the Enhanced Corridor Alternative would also increase ridership on the corridor.

Table 5.3-4. Highway 99 Corridor Average Weekday 2035 Systemwide and Corridor[a] Ridership by Alternative

Measure	No-Build Alternative (EC)[b]	EC	No-Build Alternative (EmX)[b]	EmX
Total Systemwide Transit Trips[c]	46,410	46,780	46,410	47,300
Delta from No-Build		370		890
% Change from No-Build		0.8%		1.9%
Total Corridor Transit Trips[d]	25,060	25,280	24,270	25,530
Delta from No-Build		220		1,260
% Change from No-Build		0.9%		5.2%

Source LCOG Regional Travel Demand Model Results (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

EC = Enhanced Corridor

[a] Corridors overlap and include some common areas, downtown Eugene for example, as a result one cannot add up the totals to arrive at a regional total.

[b] Highway 99 Corridor Enhanced Corridor and EmX Alternatives have different corridors because the routing in downtown is different - the Highway 99 Corridor Enhanced Corridor Alternative extends south to 11th/13th Avenues and captures more traffic analysis zones.

[c] Systemwide transit trips are defined as one-way linked trips taken by a person from the trips origin to the trips destination, independent of the number of vehicles or transfers used to complete the trip.

[d] Corridor transit trips are defined as any EmX or bus trip with at least one trip end in the corridor.

5.3.5. Transit Boardings

Daily unlinked transit ridership, also referred to as boardings, is summarized in Table 5.3-5. There are two categories of boardings shown in the table. The first is a boarding total for all EmX lines that are not part of the project and the second is boardings for all routes within the project corridor. The reason boardings on other EmX lines are included is to show that there is some variation in boardings on the routes where the project route and the existing EmX system share operating on a portion of the alignment. Non-project EmX service for the EmX Alternative shows a loss of 500 boardings. This is because the Highway 99 Corridor EmX Alternative shares a common operating segment along W. 6th Avenue and W. 7th Avenue with the existing EmX service. As a result, more shifting of riders would occur from the West Eugene EmX line with the introduction of another EmX route along West 6th Avenue and W. 7th Avenue for the EmX Alternative than for the Enhanced Corridor Alternative. The Enhanced Corridor Alternative shows a reduction in non-project EmX boardings for the same reason, although the effect is smaller. Corridor daily boardings for both the Enhanced Corridor and EmX Alternatives would increase compared to the No-Build Alternative.

Table 5.3-5. Highway 99 Corridor 2035 Average Weekday System EmX and Corridor Daily Boardings

	No-Build Alternative	Enhanced Corridor Alternative		EmX Alternative	
Route	Daily Boardings	Daily Boardings	Delta from No-Build	Daily Boardings	Delta from No-Build
Non-Project Total EmX Service	24,500	24,150	-350	24,000	-500
Corridor Routes Total	2,650	3,450	800	4,900	2,250
Total	**27,150**	**27,600**	**450**	**28,900**	**1,750**

Source: LCOG Regional Travel Demand Model Results (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

Note: For Enhanced Corridor Alternative, numbers represent EmX and Enhanced Corridor daily boardings combined.

5.4. Annualized Impacts and Costs

The total annualized costs, according to FTA-provided factors and changes in VMT, associated with changes in safety (fatalities and serious injuries) are shown in Table 5.4-1, and will be incorporated into a total environmental benefit analysis using data from the *MovingAhead Air Quality Technical Report* (Michael Minor and Associates, Inc. and CH2M, 2017), the *MovingAhead Energy and Sustainability Technical Report* (DKS and CH2M, 2017), the *MovingAhead Operating and Maintenance Costs Technical Report* (LTD and City of Eugene, 2017), and the *MovingAhead Capital Cost Estimating Technical Report* (CH2M, 2017a). The total annualized cost savings based on changes in fatality and serious injury crash rates would be substantial under the Highway 99 Corridor EmX Alternative, and minor under the Enhanced Corridor Alternative.

The FTA annualized safety cost is calculated from the annual VMT by mode under each alternative. The modes included in this metric are automobiles, trucks, and buses (no bicycles or pedestrians). This cost calculation assumes that the fatal/serious injury crash frequency rises as VMT rises, and does not take into account reduced crash rates associated with the build alternative infrastructure improvements.

Table 5.4-1. Highway 99 Corridor Enhanced Corridor and EmX Alternatives 2035 Estimated Regionwide Annual Cost Savings Relative to No-Build Alternative

Annual Value	Enhanced Corridor Alternative	EmX Alternative
Annual VMT Decrease (Increase)	354,812	1,120,092
Annual Cost Savings (Increase) for Fatalities	$49,278	$136,607
Annual Cost Savings (Increase) for Serious Injuries	($37,288)	$67,063
Annual Total Savings (Increase)	**$11,990**	**$203,670**

Sources: DKS Transportation Analysis. (2016).

Cost Factors: *New and Small Starts Evaluation and Rating Process Final Policy Guidance* (FTA, 2013, August).

The changes in safety were based on changes in VMT for each alternative, according to the factors shown in Table 5.4-2.

Table 5.4-2. Fatality and Serious Injury Factors Per Million Vehicle Miles Traveled by Mode

Mode	Fatalities/Million VMT	Serious Injuries/Million VMT
Automobile	0.013	0.195
Heavy Truck[a]	0.004[a]	1.824[a]
Bus – Diesel	0.004	1.824
Bus – Electric	0.004	1.458

Source: *New and Small Starts Evaluation and Rating Process Final Policy Guidance* (FTA, 2013, August).

[a] Heavy Truck factors were not provided, and were assumed to be the same as diesel bus factors.

The total annual cost increase for serious injuries in the Enhanced Corridor Alternative because the bus VMT is higher than in the No-Build Alternative, but the automobile VMT does not decrease enough to make up for the cost increase.

The safety costs were developed using the following cost factors from *New and Small Starts Evaluation and Rating Process Final Policy Guidance* (FTA, 2013, August):

- $9.1 million for each fatality
- $490,000 for each serious injury

An annualization factor of 342[5] was used to estimate annual automobile and heavy truck VMT based on average weekday VMT data. LTD provided annualized bus VMT.

5.5. Indirect and Cumulative Effects

No indirect effects are anticipated for either the Highway 99 Corridor Enhanced Corridor or EmX Alternatives.

Cumulative effects were accounted for in the LCOG model for projecting future motor vehicle volume growth. Compared to the No-Build Alternative, the Enhanced Corridor and EmX Alternatives would offer

[5] The annualization factor was calculated based on 2015 traffic volume data from ODOT's Automated Traffic Recording (ATR) stations. An average value was applied based on the six ATR stations located in the Eugene-Springfield region.

more potential for mode shifts from motor vehicle travel to transit to help reduce congested traffic conditions. In addition, the Enhanced Corridor and EmX Alternatives would decrease the level of congestion compared to the No-Build Alternative at two of the most congested intersections on the corridor: Highway 99/Roosevelt Boulevard and W. 6th Avenue/Garfield Street. This comparatively decreased congestion would benefit both transit and motor vehicle users.

5.6. Short-Term Construction-Related Impacts

There would be no construction impacts under the Highway 99 Corridor No-Build Alternative.

The Highway 99 Corridor Enhanced Corridor Alternative would follow the alignment of existing streets – primarily Chambers Street, W. 11th Avenue, W. 13th Avenue, Highway 99, and Barger Drive – and would require the construction of new bus pullouts and some new BAT lanes. This wider road footprint would be constructed within the existing right of way (ROW) wherever possible, but ROW acquisition would be necessary at places all along the extent of the alignment. Potential corridor-wide construction-related impacts are summarized in Table 5.6-1.

Table 5.6-1. Highway 99 Corridor Enhanced Corridor Alternative Construction Impacts

Roadway	Functional Classification	Construction Truck Traffic	Lane Closure	Detour Route Available?	Sidewalk Impacts?	Bike Lanes Impacts?
Barger Drive	Minor Arterial	Moderate	Short Int.	No	Yes	Yes
Cubit Street	Major Collector	Moderate	Short Int.	No	Yes	Yes
Altamont Street	Local	Limited	Int.	No	Yes	No
Bethel Drive	Neighborhood Collector	Limited	Int.	No	Yes	No
Fairfield Avenue	Neighborhood Collector	Limited	Int.	No	Yes	No
Royal Avenue	Minor Arterial	Limited	Int.	No	Yes	Yes
Roosevelt Boulevard	Minor Arterial	Limited	Int.	No	Yes	Yes
W. 6th Avenue (Garfield Street to W. 5th Avenue)	Major Arterial	Moderate	Short	No	Yes	No
W. 5th Avenue	Major Collector	Limited	Int.	No	Yes	No
Highway 99	Major Arterial	Moderate	Short	No	Yes	Yes
W. 11th Avenue (Charnelton Street to Polk Street)	Minor Arterial	Limited	Int.	No	Yes	No
W. 13th Avenue (at Monroe Street and Jefferson Street)	Minor Arterial	Limited	Int.	No	Yes	No

Source: DKS Transportation Analysis. (2016).

Notes: Sidewalk impacts mean that sidewalk reconstruction would be necessary to match in with the new sidewalk. Bike lane impacts mean that the bike lane would be affected by the construction of the project.

Int. = Short-length lane closures (less than 500 feet) near intersection for a street intersecting the corridor
Long = possible long-length lane closure (longer than 500 feet)
Short = possible short-length lane closure (less than 500 feet)

Limited = Some construction traffic present and small travel delays are possible
Moderate = Construction traffic present and travel delays likely

The EmX Alternative would follow the alignment of existing streets – primarily Charnelton Street, W. 6th Avenue, W. 7th Avenue, Highway 99, and Barger Drive – and would require the construction of new bus pullouts, some new BAT lanes, EmX stations, as well as median EmX stations on Barger Drive. The alignment on W. 6th Avenue and W. 7th Avenue would leverage existing infrastructure developed for the WEEE project. In addition, the motor vehicle lanes on Highway 99 between Roosevelt Boulevard and Barger Drive would be restriped in order to add a buffered bike lane to both sides of the roadway. The motor vehicle lanes on Barger Drive between Highway 99N and Ruskin Street would also be restriped to create an eastbound buffered bicycle lane. This would require some short-term short-length (less than 500 feet) and long-length (more than 500 feet) lane closures. No long-term full roadway closures are anticipated.

The construction impacts for the EmX Alternative would be more extensive than the Enhanced Corridor Alternative, with long-length lane closures (longer than 500 feet) instead of short-length lane closures (less than 500 feet) on Highway 99N and Barger Drive, and intersection impacts due to signal modifications on Taney Street, W. 6th Avenue, and W. 7th Avenue instead of W. 11th Avenue and W. 13th Avenue. The impacts are shown in Table 5.6-2.

Table 5.6-2. Highway 99 Corridor EmX Alternative Construction Impacts

Roadway	Functional Classification	Construction Truck Traffic	Lane Closure	Detour Route Available?	Sidewalk Impacts?	Bike Lanes Impacts?
Barger Drive	Minor Arterial	Moderate	Long Int.	No	Yes	Yes
Cubit Street	Major Collector	Moderate	Short Int.	No	Yes	Yes
Altamont Street	Local	Limited	Int.	No	Yes	No
Taney Street	Local	Limited	Int.	No	Yes	Yes
Bethel Drive	Neighborhood Collector	Limited	Int.	No	Yes	No
Fairfield Avenue	Neighborhood Collector	Limited	Int.	No	Yes	No
Royal Avenue	Minor Arterial	Limited	Int.	No	Yes	Yes
Roosevelt Boulevard	Minor Arterial	Limited	Int.	No	Yes	Yes
W. 6th Avenue (Garfield Street to W. 5th Avenue)	Major Arterial	Moderate	Short	No	Yes	No
W. 5th Avenue (at W. 6th Avenue)	Major Collector	Limited	Int.	No	Yes	No
Highway 99	Major Arterial	Moderate	Long	No	Yes	Yes
W. 6th Avenue (Polk Street to Charnelton Street)	Major Arterial	Limited	Int.	No	Yes	No
W. 7th Avenue (Charnelton Street to Polk Street)	Major Arterial	Limited	Int.	No	Yes	No

Source: DKS Transportation Analysis. (2016).

Notes: Sidewalk impacts mean that sidewalk reconstruction would be necessary to match in with the new sidewalk. Bike lane impacts mean that the bike lane would be affected by the construction of the project.

Short = possible short-length lane closure (less than 500 feet)
Long = possible long-length lane closure (longer than 500 feet)
Int. = Short-length lane closures (less than 500 feet) near intersection for a street intersecting the corridor

Limited = Some construction traffic present and small travel delays are possible
Moderate = Construction traffic present and travel delays likely

LTD anticipates a construction period of approximately 18 months. Of that period, the first several months would be preliminary low-impact work, such as surveying and staging. Building either the Enhanced Corridor or EmX Alternative would take about 6 to 10 months of heavy construction (street demolition and reconstruction). That work would be spread over two (summer) construction seasons due to the difficulty of working during winter weather. The contractor would typically work in contained segments of five to ten blocks on one side of the street at a time.

Sidewalk construction would affect pedestrians and bicyclists. Construction of the improvements along the length of the project could impact existing curbs or other features along the alignment. The demolition and reconstruction of the curbs, gutters, sidewalks, and other facilities may be necessary to make room for the construction of the project. This activity would generate construction traffic for the removal of debris and the delivery of construction materials and equipment.

Construction may require short-term long-length (longer than 500 feet) and short-length (shorter than 500 feet) lane closures and rerouting of traffic. No long-term long-length lane closures are anticipated.

BAT and BRT-only lane construction would also impact side streets. Temporary restrictions of turn movements, into or out of the side streets, and some detours may be necessary at some of these intersections.

Work in residential areas would be completed during the day to comply with City of Eugene noise limits.

5.7. Potential Mitigation Measures

5.7.1. Long-Term Direct Impacts

Because the operations under the Highway 99 Corridor Enhanced Corridor and EmX Alternatives would be no worse than No-Build operations, mitigation measures due to traffic operations would not be necessary.

The former Porky's Palace (closed) onsite circulation would be impacted with the installation of southbound bus pullout on Highway 99N just south of Royal Avenue. In order to mitigate this impact, it is recommended that the bus pullout be located approximately 40 feet south of where it is currently shown. This would maintain full on-site circulation. LTD has prepared an *Addendum to MovingAhead Alternatives Analysis Technical Reports Memorandum* (CH2M, 2017b) that evaluates ways to avoid or minimize impacts at some properties. Please see this addendum for additional information on potential parking, acquisitions, and tree impacts mitigation.

5.7.2. Short-Term Construction-Related Impacts

LTD and the contractor will carefully plan construction to minimize the potential impact to businesses, roadway users, and surrounding communities. For example, LTD plans to limit the length of any single lane closures to about five to ten blocks, and one side of the road would be worked on at a time to minimize the impact to road users. Shorter segments would be used in locations with higher than normal driveway density. Short construction segment lengths should allow for the contractor to quickly complete the work within a segment and reopen it to the public. The construction activities would flow from one segment to the next in a rolling construction sequence. Two adjoining segments would be worked on simultaneously with the goal of excavating, utility installation, base rock, and paving being completed within a 2- to 4-week period for each segment. Depending on the type of land uses in each construction segment (commercial or residential), and the predominant hours of operation for adjacent businesses, construction could occur at night if it would further reduce potential business and traffic disruptions. Any night work would have to comply with City of Eugene noise restrictions.

Business access would be maintained to the greatest extent practicable throughout all stages of construction. In high traffic locations or locations with heavily accessed business driveways, construction could take place at night if consistent with the City of Eugene's construction requirements. This would reduce impacts to the adjacent businesses and their customers.

Mitigation measures would also require early, frequent, and ongoing communication among LTD, contractors, and affected property owners/tenants. Construction timing, staging, and signage would be coordinated by LTD's designated staff liaison(s) in consultation with the affected property owners/tenants to minimize business and residential disruptions. Speed zone reductions within the construction zone, closed or narrow lanes, and temporary driveway relocation would also be considered to mitigate construction impacts. Variable message signs, the LTD website, and local news sources could also be used to provide roadway users with advance notice of current or pending construction activities and alternate routes. All required mitigation measures would be specified in LTD's construction contracting documents.

Emergency vehicle access would be provided at all times throughout the construction process.

5.8. Permits and Approvals

Permits and approvals needed for the Highway 99 Corridor alternatives are shown in Table 5.8-1. ORS 366.215 states that the Oregon Transportation Commission may not permanently reduce the vehicle-carrying capacity of an identified freight route. Exceptions for safety or access will be considered, and exceptions may be granted if the design is in Oregon's best interest and freight movement is not unreasonably impeded.

Approval for raised medians on Highway 99, W. 6th Avenue, or W. 7th Avenue should be coordinated with ODOT and through ODOT's Motor Carrier Transportation Division.

Table 5.8-1. Highway 99 Corridor Permits and Approvals

Permits and Approvals	No-Build	Enhanced Corridor	EmX
ODOT Motor Carrier Division	No	Yes	Yes

6. River Road Corridor Environmental Consequences

A summary of the River Road Corridor alternatives and key findings is provided below.

- The River Road Corridor Enhanced Corridor Alternative would install a northbound BAT lane on River Road on the approach to Silver Lane, and would convert general purpose lanes to BAT lanes in both directions on River Road from Silver Lane to Randy Papé Beltline eastbound (EB) Onramp and from Randy Papé Beltline westbound (WB) Onramp to Division Avenue. In addition, the Enhanced Corridor Alternative would install a northbound right turn lane and exclusive bus phase at the River Road/Railroad Boulevard intersection, six enhanced pedestrian crossings, and replace one existing enhanced crossing. The key findings are as follows:
  - Transit travel time from the terminus to Eugene Station (one-way inbound) would improve by 5 minutes during the a.m. peak hour over the No-Build Alternative (see Section 6.3.2 for travel time discussion).
  - System ridership would increase by 0.2 percent or 110 average weekday riders per day (see Section 6.3.4 for ridership discussion).
  - The Enhanced Corridor Alternative would install 4,000 feet (0.76 mile) of new or reconstructed sidewalk (see Section 6.2.2.2 for pedestrian and bicycle improvements discussion).
  - Off-street parking impacts at one site could impact up to two off-street spaces (see Section 6.2.2.8 for discussion of parking impacts).
  - Four drive-throughs would have potential business circulation impacts (see Section 6.2.2.8 for access impacts).

- The River Road Corridor EmX Alternative would convert general purpose lanes to BAT lanes in both directions on River Road from Northwest Expressway to Kourt Drive and from Randy Papé Beltline WB Onramp to Division Avenue. In addition, the EmX Alternative would install center running transit only lanes in both directions between Corliss Lane and Randy Papé Beltline EB Onramp. The EmX Alternative would install a northbound right turn lane and exclusive bus phase at the River Road/Railroad Boulevard intersection, four enhanced pedestrian crossings, and replace one existing enhanced crossing. The key findings are as follows:
  - Transit travel time from the terminus to Eugene Station (one-way inbound) would improve by 8 minutes during the a.m. peak hour over the No-Build Alternative (see Section 6.3.2 for travel time discussion).
  - Transit reliability would improve due to exclusive/priority transit lanes on 22.1 percent of the corridor (see Section 6.3.3 for transit reliability discussion).
  - Systemwide ridership would increase by 1.8 percent or 820 average weekday riders per day (see Section 6.3.4 for ridership discussion).
  - The EmX Alternative would install 6,740 feet (1.2 miles) of new or reconstructed sidewalk and 26,920 feet (5.09 miles) of new or improved bike facilities (see Section 6.2.3.2 for pedestrian and bicycle improvements discussion).
  - Off-street parking impacts at one site could impact up to 31 off-street spaces (see Section 6.2.3.8 for discussion of parking impacts).
  - Six drive-throughs would have potential business circulation impacts (see Section 6.2.3.8 for access impacts).

6.1. Affected Environment

The following section evaluates the River Road Corridor for base year and future year (2035) transportation conditions. Supporting data were acquired from intersection vehicle, pedestrian, and bicycle turning movement counts, the LCOG regional travel demand model, field observations, and ODOT crash data. The study area is shown on Figure 6.1-1.

Figure 6.1-1. River Road Corridor Study Area Map

Source: DKS Transportation Analysis. (2016).

6.1.1. Roadway Characteristics

The transportation characteristics of the River Road Corridor are shown in Table 6.1-1 and include functional classification, number of travel lanes, posted speeds, presence of sidewalks and bike lanes, and existing transit routes serving the segment. The River Road Corridor is owned by the City of Eugene with the exception W. 6th Avenue between Madison Street and Chambers Street and W. 7th Avenue between Chambers Street to Washington Street (ODOT facilities). The entire corridor is classified as a major arterial. Currently, Routes 51 and 52 serve the River Road Corridor. Route 51 runs along River Road between Eugene Station and the River Road/Irvington Drive intersection every 30 to 45 minutes. Route 52 runs along River Road between Eugene Station and the Irvington Drive/Willowbrook Street intersection every 30 minutes during the peak hours.

Table 6.1-1. River Road Corridor Existing Study Area Roadway Characteristics

Roadway	Jurisdiction	Functional Classification[a]	Number of Travel Lanes	Posted Speed	Sidewalk	Bike Lanes	LTD Transit Routes
Hunsaker Lane: River Road to Yvonne Street	City of Eugene	Major Collector	2	35 mph	No	No	-
River Road: Maxwell Road to Irving Road	City of Eugene	Major Arterial	5	35 mph	Both sides	Yes	51, 52
River Road: Northwest Expressway to Maxwell Avenue	City of Eugene	Major Arterial	5	35 mph	Both sides	Yes	51, 52, 55[b]
Chambers Street: W. 2nd Avenue to Northwest Expressway	City of Eugene	Major Arterial	4	35 mph	West side only	Yes	40[c], 52
Chambers Street: W. 6th Avenue to 2nd Avenue	City of Eugene	Major Arterial	5	35 mph	Both sides	Yes	-
Chambers Street: W. 6th Avenue to W. 7th Avenue	City of Eugene[d]	Major Arterial	6	30 mph	Both sides	Yes	-
W. 6th Avenue: Blair Street to Chambers Street	ODOT	Major Arterial	4[e] (WB only)	30 mph	Both sides	No	-
W. 6th Avenue: Madison Street to Blair Street	ODOT	Major Arterial	5[f] (WB only)	30 mph	Both sides	No	-
W. 6th Avenue: Charnelton Street to Madison Street	City of Eugene	Major Arterial	4[e] (WB only)	30 mph	Both sides	No	-
W. 7th Avenue: Chambers Street to Blair Street	ODOT	Major Arterial	4 (EB only)	30 mph	Both sides	No	95
W. 7th Avenue: Blair Street to Washington Street	ODOT	Major Arterial	5[f] (EB only)	30 mph	Both sides	No	95
W. 7th Avenue: Washington Street to Charnelton Street	City of Eugene	Major Arterial	4[e] (EB only)	30 mph	Both sides	No	95
Olive Street: E. 5th Avenue to W. 11th Avenue	City of Eugene	Local	2	25 mph	Both sides	Yes[g]	01
Charnelton Street: W. 6th Avenue to W. 11th Avenue	City of Eugene	Local	2	25 mph	Both sides	No	40, 51, 52, 95
W. 10th Avenue: Charnelton Street to Willamette Street	City of Eugene	Local	2	25 mph	Both sides	Yes	43
E. 11th Avenue: Olive Street to Willamette Street	City of Eugene	Major Collector	2 (WB only)	25 mph	Both sides	Yes	36, 66, 76
Willamette Street: W. 11th Avenue to W. 10th Avenue	City of Eugene	Local	2	25 mph	Both sides	Yes[g]	-
Railroad Boulevard: River Road to N. Grand Street	City of Eugene	Major Collector	2	30 mph	West side only	Yes	51

Table 6.1-1. River Road Corridor Existing Study Area Roadway Characteristics

Roadway	Jurisdiction	Functional Classification[a]	Number of Travel Lanes	Posted Speed	Sidewalk	Bike Lanes	LTD Transit Routes
W. 1st Avenue: N. Grand Street to Washington Street	City of Eugene	Major Collector	2-3	30 mph	Both sides	Yes	51
W. 2nd Avenue: Chambers Street to Blair Boulevard	City of Eugene	Major Collector	2	30 mph	North side	Yes	40, 52
Blair Boulevard: W. 2nd Avenue to W. 5th Avenue	City of Eugene	Major Collector	2	20 mph	Both sides	Yes[g]	40, 52
W. 5th Avenue: Blair Boulevard to Olive Street	City of Eugene	Major Collector	2	25 mph	Both sides	Yes	40, 51, 52
Jefferson Street: W. 1st Avenue to W. 5th Avenue	City of Eugene	Major Collector	2	30 mph	Both sides	Yes	51
Washington Street: W. 1st Avenue to W. 5th Avenue	City of Eugene	Major Collector	2	30 mph	Both sides	Yes	51

Source: DKS Transportation Analysis. (2016).

[a] Oregon Transportation Map. Federal Functional Classification Review, City of Eugene. 2014 Edition. http://www.oregon.gov/ODOT/TD/TDATA/pages/gis/citymaps.aspx
[b] Bus turns left on Park Ave.
[c] 2nd Ave to Roosevelt Blvd only.
[d] Chambers St/6th Ave and Chambers St/7th Ave intersections are owned by ODOT.
[e] Three general purpose travel lanes and one BAT lane.
[f] Four general purpose travel lanes and one BAT lane.
[g] Sharrow (a shared-lane marking placed in a travel lane indicating where bicyclists should cycle).

The most recent average daily traffic on the corridor is shown in Table 6.1-2.

Table 6.1-2. River Road Corridor 2013 Average Daily Traffic

Roadway Segment	ADT
River Road: Silver Lane to Maxwell Avenue	32,300
River Road: Park Avenue to Horn Lane	20,300
W. 6th Avenue: Jefferson Street to Blair Boulevard	30,400
W. 6th Avenue: Charnelton Street to Lincoln Street	14,000
W. 7th Avenue: Blair Boulevard to Jefferson Street	31,000
W. 7th Avenue: Lincoln Street to Charnelton Street	19,000
Charnelton Street: 8th Avenue to Broadway Avenue	3,100
Railroad Boulevard: Washington Street to River Road	8,000
Blair Boulevard: W. 2nd Avenue to W. 5th Avenue	3,900
Olive Street: 8th Avenue to Broadway Avenue	6,100

Source: *2013 Traffic Flow Map*. (City of Eugene, 2013).

Compiled by DKS, 2016.

6.1.2. Study Intersections

Ten study intersections on the River Road Corridor were selected for traffic analysis for the existing conditions, 2035 No-Build Alternative, 2035 Enhanced Corridor Alternative, and 2035 EmX Alternative analyses. The study intersections are located throughout the corridor except for the downtown area (between Eugene Station and Chambers Street). Although future volumes were developed at some downtown intersections, the vehicle volumes did not change substantially between alternatives. In addition, the roadway configuration would not change in the downtown area, and EmX service will be operating on W. 6th Avenue and W. 7th Avenue upon completion of the WEEE project. Detailed traffic analysis on Charnelton Street, W. 6th Avenue, and W. 7th Avenue was performed as part of that project (LTD, 2010). For these reasons, it was assumed that downtown traffic operations would be very similar to No-Build operations for all build alternatives.

The study intersections evaluated for this corridor were:

- River Road/Irving Road/Hunsaker Lane
- River Road/Ruby Avenue/Division Avenue
- River Road/Randy Papé Beltline
- Westbound Onramp
- River Road/Randy Papé Beltline
- Randy Papé Beltline EB Onramp
- River Road/Silver Lane/River Avenue
- River Road/Maxwell Road/E. Rosewood Avenue
- River Road/Horn Lane/Arbor Drive
- River Road/Chambers Street/Northwest Expressway
- Chambers Street/W. 6th Avenue
- Chambers Street/W. 7th Avenue

6.1.3. Bicycle and Pedestrian Conditions

Pedestrian and bicycle activity at the 10 study intersections was counted during the p.m. peak hour (Table 6.1-3). The highest p.m. peak hour pedestrian volumes occurred at the River Road/Randy Papé Beltline EB Onramp and River Road/Silver Lane intersections, while the highest bicycle volumes occurred at the Chambers Street/7th Avenue, Chambers Street/6th Avenue, and River Road/Horn Lane/Arbor Drive intersections.

Table 6.1-3. River Road Corridor Study Intersection p.m. Peak Hour Pedestrian and Bicycle Volumes

Study Intersection Number	Study Intersection	Date of Intersection Count	p.m. Peak Hour Activity	
			Pedestrian	Bicycle
8	River Road/Irving Road/Hunsaker Lane	1/20/2015[a]	20	11
9	River Road/Ruby Avenue/Division Avenue	10/6/2015	34	20
10	River Road/Randy Papé Beltline WB Onramp	10/6/2015	44	6
11	River Road/Randy Papé Beltline EB Onramp	10/6/2015	53	11
12	River Road/Silver Lane/River Avenue	10/6/2015	65	19
13	River Road/Maxwell Road/E. Rosewood Avenue	5/27/2010[b]	12	0
14	River Road/Horn Lane/Arbor Drive	10/6/2015	9	26
15	River Road/Chambers Street/Northwest Expressway	5/27/2010[b]	11	0
16	Chambers Street/W. 6th Avenue	9/15/2010[b]	19	21
17	Chambers Street/W. 7th Avenue	10/28/2015	12	27

Table 6.1-3. River Road Corridor Study Intersection p.m. Peak Hour Pedestrian and Bicycle Volumes

Study Intersection Number	Study Intersection	Date of Intersection Count	p.m. Peak Hour Activity	
			Pedestrian	Bicycle

Source: DKS Transportation Analysis. (2016).

Note: Total volume crossing all legs of each intersection.

[a] Turning movement count was obtained from the City of Eugene staff.
[b] Turning movement count was obtained from the Draft Eugene 2035 TSP.

A qualitative assessment of the pedestrian and bicycle facilities along the River Road study corridor was conducted using methodology from ODOT's *Analysis Procedures Manual* (ODOT, 2014). Overall, the pedestrian and bicycle facilities are fair to good (Table 6.1-4). Much of the corridor consists of a five-lane arterial with standard width bike lanes and wide sidewalks buffered by landscaping and trees for most of the corridor. There is a buffered bike lane on River Road between Horn Lane and Maxwell Road.

Table 6.1-4. River Road Corridor Existing Conditions Qualitative Assessment of Pedestrian and Bicycle Facilities[a]

Segment	Walking	Biking
Hunsaker Lane: River Road to Yvonne Street	Poor	Poor
River Road: Maxwell Road to Irving Road	Good	Fair
River Road: Horn Lane to Maxwell Road	Good	Good
River Road: Northwest Expressway to Horn Lane	Good	Fair
Chambers Street: W. 2nd Avenue to Northwest Expressway	Fair	Fair
Chambers Street: W. 5th Avenue to W. 2nd Avenue	Fair	Good
Chambers Street: W. 5th Avenue to W. 7th Avenue	Good	Fair
W. 6th Avenue: Charnelton Street to Chambers Street	Good	Poor
W. 7th Avenue: Chambers Street to Charnelton Street	Good	Poor
Olive Street: W. 5th Avenue to W. 11th Avenue	Fair	Fair
Charnelton Street: W. 6th Avenue to W. 10th Avenue	Good	Poor
W. 10th Avenue: Charnelton Street to Willamette Street	Good	Poor
E. 11th Avenue: Olive Street to Willamette Street	Good	Poor
Willamette Street: W. 10th Avenue to E. Broadway	Good	Fair
Railroad Boulevard: River Road to N. Grand Street	Fair	Good
W. 1st Avenue: N. Grand Street to Washington Street	Good	Good
W. 2nd Avenue: Chambers Street to Blair Boulevard	Good	Fair
Blair Boulevard: W. 2nd Avenue to W. 5th Avenue	Fair	Fair
W. 5th Avenue: Blair Boulevard to Olive Street	Good	Good
Jefferson Street: W. 1st Avenue to W. 5th Avenue	Good	Poor
Washington Street: W. 1st Avenue to W. 5th Avenue	Good	Poor

Table 6.1-4. River Road Corridor Existing Conditions Qualitative Assessment of Pedestrian and Bicycle Facilities[a]

Segment	Walking	Biking

Source: DKS Transportation Analysis. (2016).

[a] Qualitative analysis based on methodology described in Chapter 14 of ODOT's *Analysis Procedures Manual* (ODOT, 2014).

6.1.4. Transit

Currently, Routes 51 and 52 serve the River Road Corridor. Route 51 runs along River Road between Eugene Station and the River Road/Irvington Drive intersection every 30 to 45 minutes on weekdays and every 30 to 60 minutes on weekends. Route 52 runs along River Road between Eugene Station and the Irvington Drive/Willowbrook Street intersection every 30 minutes during the peak hours on weekdays and every 60 minutes on weekends. Routes 51 and 52 are coordinated such that they run every 15 minutes on River Road between Northwest Expressway and Irvington Drive.

6.1.5. Safety Analysis

Intersection crashes were gathered from the ODOT database for the last 5 full years of data (2010-2014). Crashes are grouped by severity (Table 6.1-5) and type (Table 6.1-6 and Figure 6.1-3) at both the segment and intersection levels. In total, the River Road Corridor had 548 crashes in the 5-year period analyzed. There was one fatality that occurred along River Road at Irving Road where a cyclist was rear ended when a driver made an improper lane change and failed to yield to the cyclist. Table 6.1-5 shows the number of crashes by severity along with the intersection collision rate. Typically, intersections with a collision rate above or near 1 crash per million entering vehicles or segments with a collision rate above or near 1 crash per million vehicle miles are flagged for consideration of safety improvements. Based on high collision rates, the Chambers Street/W. 7th Avenue and the River Road/Irving Road intersections should be considered for safety improvements on the River Road Corridor. None of the segments have collision rates near 1 crash per million vehicle miles.

Figure 6.1-2 shows a "heat map" of reported collisions along the River Road Corridor between 2010 and 2014, where higher densities of crashes are shown in red, medium densities are shown in orange, and lower densities are shown in green. Serious injury crashes are shown as black points along the corridor, and fatal crashes are shown as black points with a cross through it. The crashes on the River Road Corridor were concentrated on W. 6th Avenue and W. 7th Avenue between Washington Street and Jackson Street, Chambers Street between W. 6th Avenue and W. 7th Avenue, and River Road between Maxwell Road and Irving Road, with one fatality occurring at Irving Road.

Table 6.1-5. River Road Corridor 5-Year Collision Breakdown by Severity (2010–2014 Crashes)

Corridor – River Road (Approx. 5.2 Miles)							
	Fatality	Serious Injury	Evident Injury	Possible Injury	PDO[a]	Total	Segment Collision Rate[b]
Segment	**0**	**9**	**69**	**175**	**295**	**548**	**–**
Hunsaker Lane: River Road to Daffodil Court	0	0	0	0	4	4	0.21
River Road: Silver Lane/River Avenue to Irving Road/Hunsaker Lane	0	0	5	19	30	54	0.17
River Road: Maxwell Road/E. Rosewood Avenue to Silver Avenue/River Avenue	0	0	7	10	11	28	0.12
River Road: Rosewood Avenue to Maxwell Road/E. Rosewood Avenue	0	0	0	0	0	0	0.00
River Road: Howard Avenue to Rosewood Avenue	0	0	0	0	1	1	0.05
River Road: Horn Lane/Arbor Drive to Howard Avenue	0	0	2	2	2	6	0.03
River Road: Park Avenue to Horn Lane/Arbor Drive	0	0	3	8	4	15	0.08
River Road: Northwest Expressway/Railroad Boulevard to Park Avenue	0	0	1	5	7	13	0.04
Chambers Street: Northwest Expressway/Railroad Boulevard to Roosevelt Boulevard	0	0	0	1	0	1	0.02
Chambers Street: Roosevelt Boulevard to W. 1st Avenue	0	0	0	0	0	0	0.00
Chambers Street: W. 2nd Avenue to Roosevelt Boulevard	0	0	0	0	0	0	0.00
Chambers Street: W. 6th Avenue to W. 2nd Avenue	0	0	0	2	3	5	0.04
Chambers Street: W. 6th Avenue to W. 7th Avenue	0	0	1	2	5	8	0.28
W. 6th Avenue: Polk Street to Chambers Street	0	0	0	3	11	14	0.10
W. 6th Avenue: Blair Boulevard to Polk Street	0	0	0	2	14	16	0.11
W. 6th Avenue: Jefferson Street to Blair Boulevard	0	0	1	2	17	20	0.14
W. 6th Avenue: Charnelton Street to Jefferson Street	0	0	0	2	2	4	0.03
W. 7th Avenue: Chambers Street to Polk Street	0	0	1	1	1	3	0.02
W. 7th Avenue: Polk Street to Blair Boulevard	0	1	1	4	5	11	0.06
W. 7th Avenue: Blair Boulevard to Jefferson Street	0	0	2	4	10	16	0.14
W. 7th Avenue: Jefferson Street to Olive Street	0	0	0	4	4	8	0.04
Charnelton Street: W. 11th Avenue to W. 6th Avenue	0	0	0	0	1	1	0.09
W. 11th Avenue: Willamette Street to Charnelton Street	0	0	1	2	3	6	0.44
Olive Street: W. 11th Avenue to W. 5th Avenue	0	0	1	1	2	4	0.24
Railroad Boulevard: Grand Street to Chambers Street/River Road	0	0	0	0	1	1	0.01
Blair Boulevard: Van Buren Street to W. 5th Avenue	0	0	0	0	1	1	0.21
Blair Boulevard: W. 1st Avenue to Van Buren Street	0	0	0	0	2	2	0.12

Table 6.1-5. River Road Corridor 5-Year Collision Breakdown by Severity (2010–2014 Crashes)

Corridor – River Road (Approx. 5.2 Miles)							
	Fatality	Serious Injury	Evident Injury	Possible Injury	PDO[a]	Total	Segment Collision Rate[b]
Segment	**0**	**9**	**69**	**175**	**295**	**548**	**–**
W. 1st Avenue: Chambers Street to Blair Boulevard	0	0	0	0	1	1	0.03
W. 1st Avenue: Van Buren Street to Grand Street	0	0	0	0	0	0	0.00
W. 1st Avenue: Washington Street to Van Buren Street	0	0	1	2	2	5	0.07
W. 5th Avenue: Blair Boulevard to Washington Street	0	0	0	0	0	0	0.00
W. 5th Avenue: Olive Street to Washington Street	0	0	0	0	0	0	–
Washington Street: W. 5th Avenue to W. 1st Avenue	0	0	0	0	1	1	0.02
Intersections							
River Road & Irving Road	1	1	7	14	25	48	**0.91**[c]
River Road & Ruby Ave/Division Ave	0	1	4	12	16	33	0.49[c]
River Road & Randy Papé Beltline WB On/Randy Papé Beltline WB Off	0	1	1	11	12	25	0.37[c]
River Road & Randy Papé Beltline EB Off/Randy Papé Beltline EB On	0	0	1	7	19	27	0.42[c]
River Road & Silver Ln/River Ave	0	2	6	14	20	42	0.77[c]
River Road & Maxwell Road/ E. Rosewood Ave	0	0	5	7	9	21	0.51[c]
River Road & Horn Ln/Arbor Dr	0	0	1	1	2	4	0.12[c]
Chambers St/River Road & Northwest Expressway/Railroad Blvd	0	1	8	5	12	26	0.46[c]
Chambers St & W. 6th Ave	0	0	4	18	12	34	0.71[c]
Chambers St & W. 7th Ave	0	2	5	10	22	39	**0.99**[c]

Source: ODOT Crash Data. 2016. Compiled by DKS, 2016.

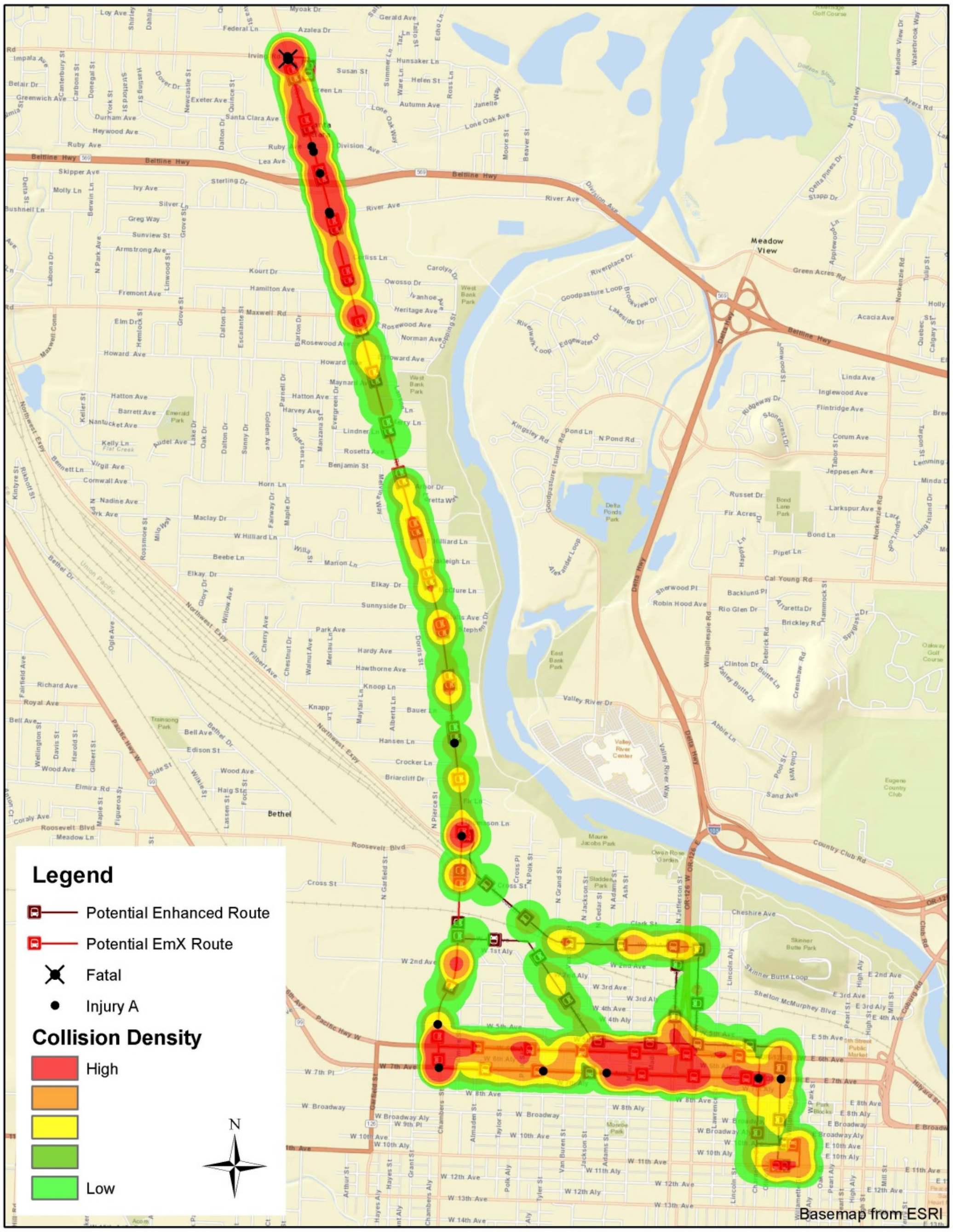
[a] PDO = Property Damage Only.
[b] Collisions per I million vehicle miles.
[c] Collisions per 1 million entering vehicles.

Table 6.1-6. River Road Corridor Collision Breakdown by Type

Corridor – River Road (Approx. 5.2 Miles)	Angle	Rear-End	Turn	Side-swipe	Backing	Head-On	Fixed Object	Pedestrian	Other	Total
	45	**246**	**161**	**56**	**4**	**3**	**25**	**8**	**1**	**549**
Intersections										
River Road & Irving Road	6	15	24	1	0	1	0	1	0	48
Chambers St & W. 7th Ave	14	13	11	1	0	0	0	0	0	39

Source: ODOT Crash Data. (2016). Compiled by DKS Transportation Analysts. (2016).

Figure 6.1-2. River Road 5-Year Crash Heat Map (2010 – 2014)

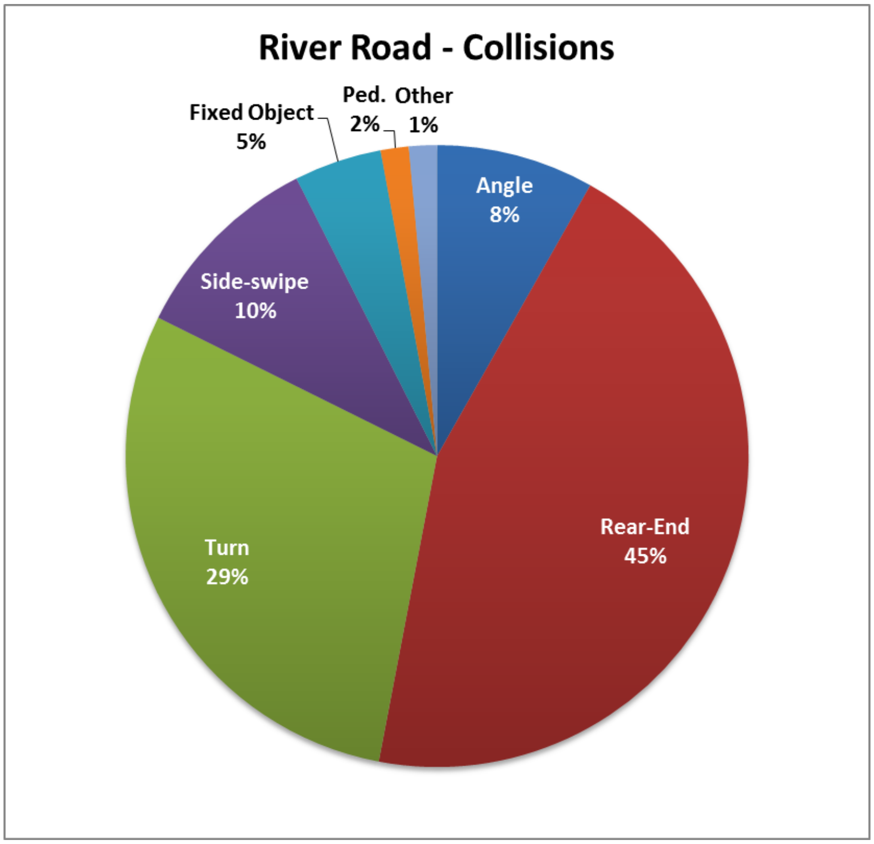


Source: DKS Transportation Analysis. (2016).

Further analysis of the corridor was done in order to determine what types of crashes are most prevalent. As shown on Figure 6.1-3, the most prevalent collision types were rear end and turning, together accounting for 75 percent of the total collisions along the corridor. In addition, there were a large number of angle crashes at Chambers Street/W. 7th Ave and River Road/Irving Road and pedestrian-involved crashes in the Randy Papé Beltline area (River Road between Silver Lane and Irving

Road). Table 6.1-6 shows a complete summary of the collision types for intersections that had a collision rate above or near 1.0.

Figure 6.1-3. River Road Corridor Collision Breakdown by Type

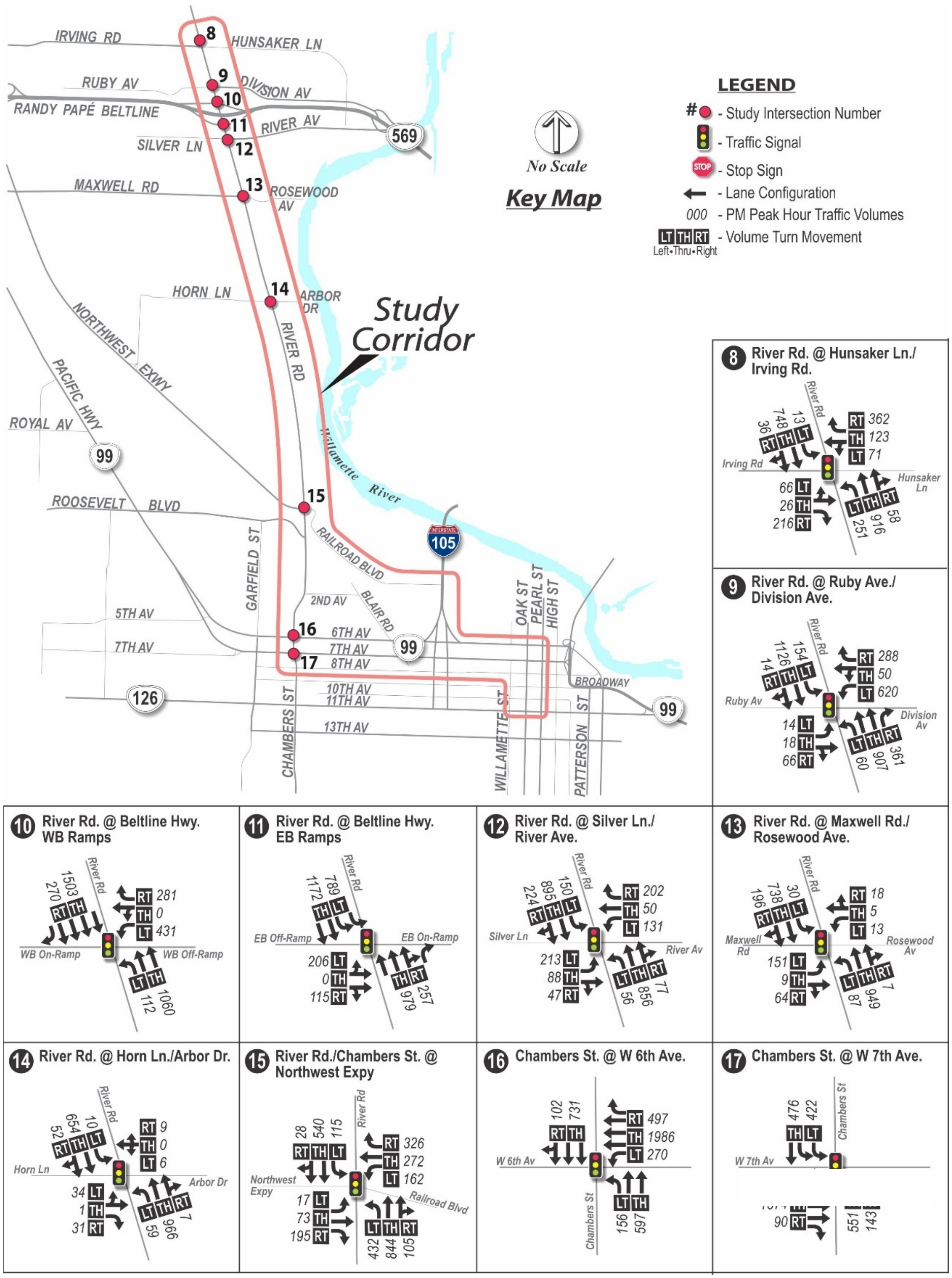


6.1.6. Existing Motor Vehicle Intersection Operations

A traffic operations model was created for the study area to evaluate vehicles traffic flow and intersection conditions, such as average vehicle delay and congestion. The existing performance of the study intersections were evaluated using a traffic operations model based on 2000 *Highway Capacity Manual* methodology (TRB, 2000). The existing p.m. peak hour turning movement counts are shown on Figure 6.1-4.

The 2015 base year traffic volumes and existing roadway network were used to determine study intersection delay, level of service, and volume-to-capacity ratio. Existing intersection traffic signal timing was obtained from the City of Eugene and incorporated into the analysis. The existing study intersection operations analysis is presented in Table 6.1-7. Currently, all of the intersections meet operating standards.

Figure 6.1-4. River Road Corridor 2015 Existing p.m. Peak Hour Traffic Volumes



Source: DKS Transportation Analysis. (2016).

Table 6.1-7. River Road Corridor Existing 2015 p.m. Peak Hour Study Intersection Operations

Study Intersection Number	Study Intersection	Date of Intersection Count	Jurisdiction	Operating Standard[c]	LOS	Delay (sec)	v/c
8	River Road/Irving Road/Hunsaker Lane	1/20/2015[a]	City of Eugene	LOS D/LOS E	C	21.7	0.72
9	River Road/Ruby Avenue/Division Avenue	10/6/2015	City of Eugene	LOS D/LOS E	C	29.7	0.71
10	River Road/Randy Papé Beltline WB Onramp	10/6/2015	City of Eugene	0.85/1.00	C	24.3	0.57
11	River Road/Randy Papé Beltline EB Onramp	10/6/2015	City of Eugene	0.85/1.00	C	27.1	0.64
12	River Road/Silver Lane/River Avenue	10/6/2015	City of Eugene	LOS D/LOS E	C	24.5	0.64
13	River Road/Maxwell Road/E. Rosewood Avenue	5/27/2010[b]	City of Eugene	LOS D/LOS E	B	10.8	0.57
14	River Road Horn Lane/Arbor Drive	10/6/2015	City of Eugene	LOS D/LOS E	A	6.1	0.46
15	River Road/Chambers Street/Northwest Expressway	5/27/2010[b]	City of Eugene	LOS D/LOS E	C	31.1	0.84
16	Chambers Street/W. 6th Avenue	9/15/2010[b]	ODOT	0.85/1.00	*<u>C</u>*	*<u>31.1</u>*	***<u>0.87</u>***
17	Chambers Street/W. 7th Avenue	10/28/2015	ODOT	0.85/1.00	*<u>D</u>*	*<u>38.9</u>*	***<u>0.88</u>***

Source: DKS Transportation Analysis. (2016).

<u>Italic</u> <u>underlined</u> values do not meet current standards.
<u>Bold</u> <u>underlined</u> values do not meet proposed standards or current standards.

[a] Turning movement count was obtained from the City of Eugene staff.
[b] Turning movement count was obtained from the Draft Eugene 2035 TSP.
[c] Current/proposed operations standards for these facilities.

During the existing p.m. peak hour, mobility standards are not met at the following study intersections:

- Chambers Street/W. 6th Avenue (current standards only)
- Chambers Street/W. 7th Avenue (current standards only)

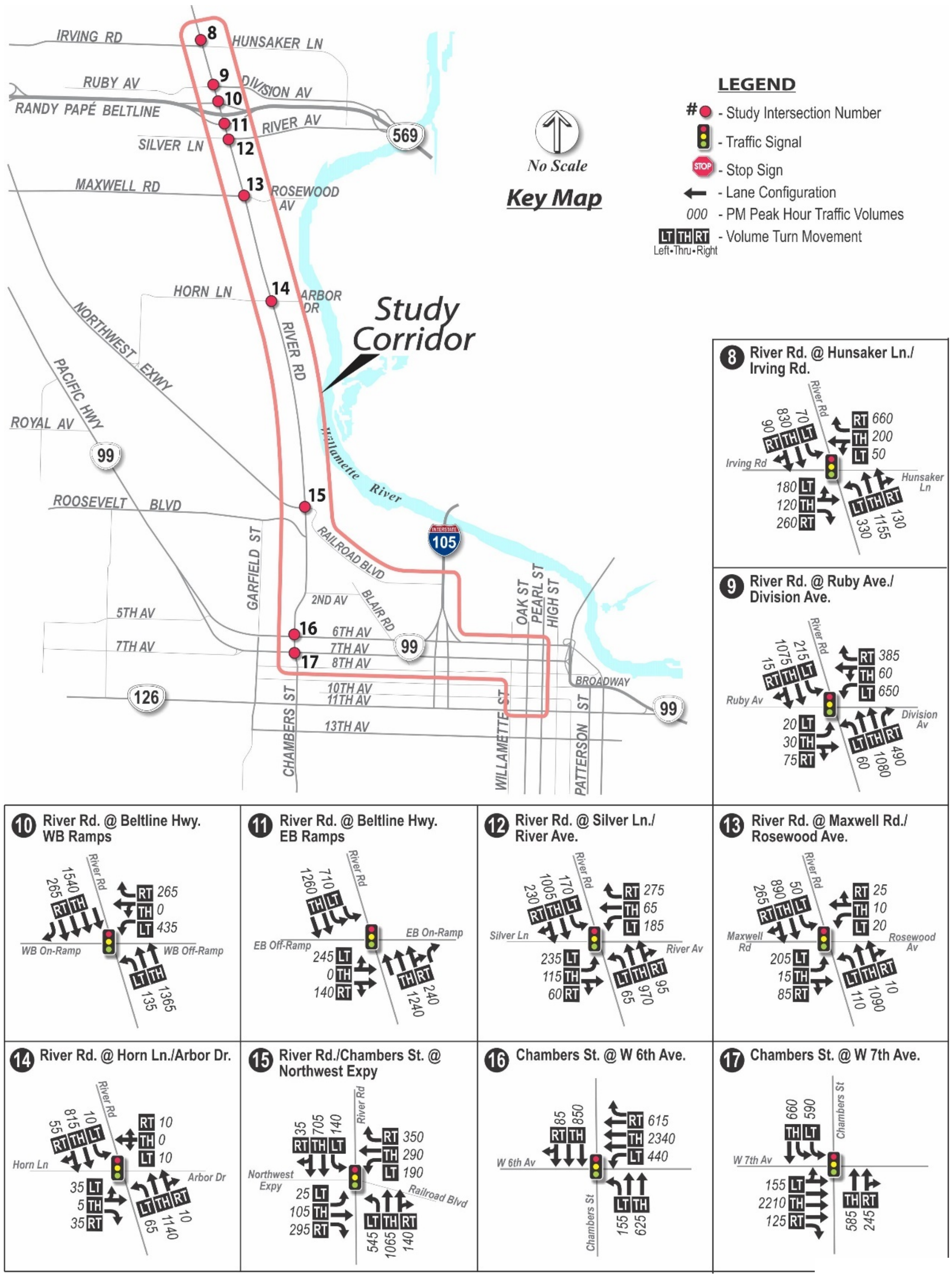
6.2. Long-Term Direct Impacts

6.2.1. No-Build Alternative

6.2.1.1. Local Traffic Operations

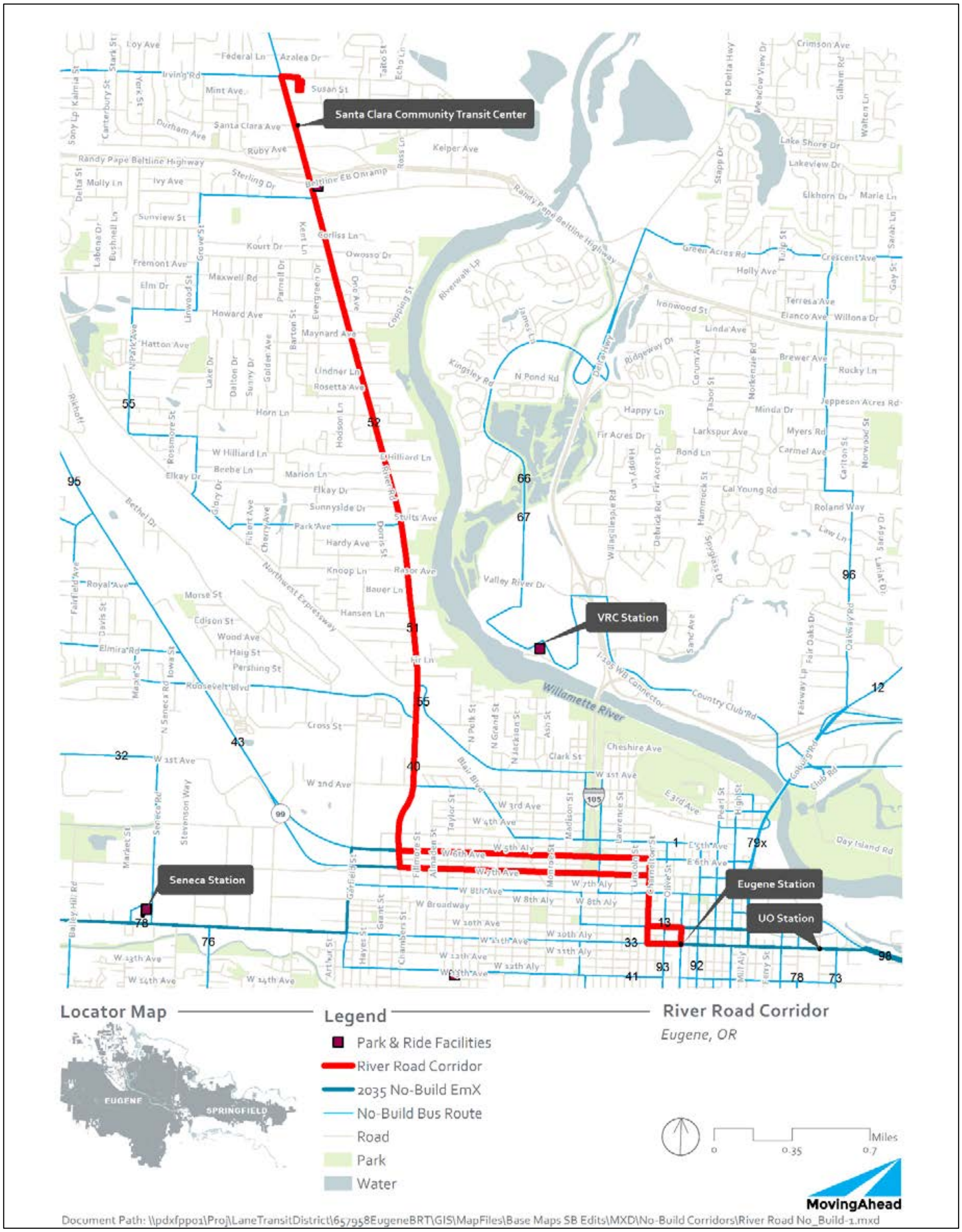
The future No-Build Alternative motor vehicle turning movement volumes are shown on Figure 6.2-1. Figure 6.2-2 shows the River Road Corridor 2035 No-Build Alternative transit network.

Figure 6.2-1. River Road Corridor 2035 No-Build Alternative p.m. Peak Hour Traffic Volumes



Source: DKS Transportation Analysis. (2016).

Figure 6.2-2. River Road Corridor 2035 No-Build Alternative Transit Network



Source: CH2M. (2016).

The 2035 No-Build transportation analysis was based on a future roadway network which included the expected transportation improvements identified in the Draft Eugene 2035 TSP. The Draft Eugene 2035 TSP projects that would construct capacity improvements in the study area are shown in Table 6.2-1.

Table 6.2-1. River Road Corridor Expected Transportation Improvement Projects On or Near the Corridor

Project Name	Description
Roadway Projects	
Hunsaker Lane/Beaver Street: *River Road to Division Avenue*	Upgrade to 2-lane urban collector standards
Bike/Pedestrian Projects	
Ruby Avenue, Horn Lane, Arbor Drive, and Park Avenue	Install bicycle boulevards
Hunsaker Lane, Howard Avenue, Hilliard Lane	Install sidewalks
River Road: Northwest Expressway to Division Avenue	Install protected bicycle lanes

Source*:* Draft Eugene 2035 TSP (City of Eugene, 2016a).

A traffic operations model was created for the study area to evaluate traffic flow and intersection operating conditions, such as average vehicle delay and congestion. The 2035 No-Build performance of the study intersections were evaluated using a traffic operations model based on 2000 *Highway Capacity Manual* methodology (TRB, 2000). The operations analysis was conducted at all of the study intersections during the p.m. peak hour. The No-Build Alternative study intersection operations analysis for the 2035 p.m. peak hour is presented in Table 6.2-2.

Table 6.2-2. River Road Corridor No-Build Alternative 2035 p.m. Peak Hour Study Intersection Operations

Study Intersection Number	Study Intersection	Jurisdiction	Operating Standard[a]	LOS	Delay (sec)	v/c
8	River Road/Irving Road/Hunsaker Lane	City of Eugene	LOS D/LOS E	D	37.0	0.95
9	River Road/Ruby Avenue/Division Avenue	City of Eugene	LOS D/LOS E	C	34.1	0.82
10	River Road/Randy Papé Beltline WB Onramp	ODOT	0.85/1.00	C	23.4	0.65
11	River Road/Randy Papé Beltline EB Onramp	ODOT	0.85/1.00	C	24.7	0.73
12	River Road/Silver Lane/River Avenue	City of Eugene	LOS D/LOS E	C	28.0	0.71
13	River Road/Maxwell Road/E. Rosewood Avenue	City of Eugene	LOS D/LOS E	B	16.4	0.66
14	River Road/Horn Lane/Arbor Drive	City of Eugene	LOS D/LOS E	A	5.9	0.47
15	River Road/Chambers Street/Northwest Expressway	City of Eugene	LOS D/LOS E	D	43.2	0.93
16	Chambers Street/W. 6th Avenue	ODOT	0.85/1.00	**D**	**42.8**	**1.01**
17	Chambers Street/W. 7th Avenue	ODOT	0.85/1.00	**E**	**57.9**	**1.04**

Source: DKS Transportation Analysis. (2016).

Italic underlined values do not meet current standards.
Bold underlined values do not meet proposed standards or current standards.

LOS = Level of Service
Delay = Average Intersection Delay in seconds
v/c = volume-to-capacity

[a] Existing/proposed operations standards for these facilities.

Under the 2035 No-Build Alternative, mobility standards are not met at the study intersections listed below:

- Chambers Street/W. 6th Avenue (current and proposed standards)
- Chambers Street/W. 7th Avenue (current and proposed standards)

6.2.1.2. Connectivity to Roadway, Bike, and Pedestrian Facilities

The River Road Corridor No-Build Alternative was compared with the existing and proposed roadway, bike, and pedestrian projects from the expected transportation improvement projects identified in the Draft Eugene 2035 TSP (Table 6.2-1) to determine how well coordinated the projects were. Expected transportation improvement projects, such as the addition of bike lanes and construction of new sidewalks, would improve access to transit. For example, the planned installation of new sidewalks on Hunsaker Lane, Howard Avenue, and Hilliard Lane would improve pedestrian access to nearby transit stops on River Road. In addition, the planned protected bicycle lanes on River Road would allow people to more easily pair bicycling with transit.

The No-Build Alternative qualitative assessment of pedestrian and bicycle facilities is shown in Table 6.2-3. Pedestrian facilities were rated "excellent," "good," "fair," or "poor" based on presence and width of sidewalks or paths, presence and width of buffers (such as landscaping), outside travel lane width, number of travel lanes and speed of motorized traffic, presence and width of bicycle lane or shoulder, and presence of lighting. Bicycle facilities were rated "excellent," "good," "fair," or "poor" based on preferred type of facility (bike lane, buffered bike lane, off-street path) given motor vehicle volume of the roadway, presence and width of a shoulder, outside travel lane width, grade, pavement condition, obstructions, presence of on-street parking, and number of travel lanes and speed of motorized traffic.

Table 6.2-3. River Road Corridor No-Build Alternative Qualitative Assessment of Pedestrian and Bicycle Facilities[a]

Segment	Walking	Biking
Hunsaker Lane: River Road to Yvonne Street	Poor	Poor
River Road: Ruby Avenue/Division Avenue to Irving Road	Good	Fair
River Road: Northwest Expressway to Ruby Avenue/Division Avenue	Good	Excellent
Chambers Street: W. 2nd Avenue to Northwest Expressway	Fair	Fair
Chambers Street: W. 5th Avenue to W. 2nd Avenue	Fair	Good
Chambers Street: W. 6th Avenue to W. 7th Avenue	Good	Fair
W. 6th Avenue: Charnelton Street to Chambers Street	Good	Poor
W. 7th Avenue: Chambers Street to Charnelton Street	Good	Poor
Olive Street: W. 5th Avenue to W. 11th Avenue	Fair	Fair
Charnelton Street: W. 6th Avenue to W. 10th Avenue	Good	Poor
W. 10th Avenue: Charnelton Street to Willamette Street	Good	Poor
E. 11th Avenue: Olive Street to Willamette Street	Good	Poor
Willamette Street: W. 10th Avenue to E. Broadway	Good	Fair
Railroad Boulevard: River Road to N. Grand Street	Fair	Good
W. 1st Avenue: N. Grand Street to Washington Street	Good	Good
W. 2nd Avenue: Chambers Street to Blair Boulevard	Good	Fair
Blair Boulevard: W. 2nd Avenue to W. 5th Avenue	Fair	Fair
W. 5th Avenue: Blair Boulevard to Olive Street	Good	Good
Jefferson Street: W. 1st Avenue to W. 5th Avenue	Good	Poor
Washington Street: W. 1st Avenue to W. 5th Avenue	Good	Poor

Source: DKS, 2016.
[a] Qualitative analysis based on methodology described in Chapter 14 of ODOT's *Analysis Procedures Manual* (ODOT, 2014).

6.2.1.3. Plan Consistency

The River Road Corridor No-Build Alternative was evaluated for consistency with the Long Range Transit Plan (LTD, 2014), the FTN concept, and the goals outlined in the Regional Transportation Plan (LCOG, 2011, December) and the Draft Eugene 2035 TSP.

The purpose of the LTD FTN is to leverage transit service investments by tying service to the density and other elements of adjacent development. The FTN enables a well-connected network that provides regional circulation by providing an average transit frequency of 15 minutes or better, a reliable transit system that runs on schedule (by implementing strategies such as transit priority at signalized intersections), and enhanced stations with bicycle and pedestrian connections (LTD, 2014). The No-Build Alternative meets the FTN goal of providing frequent service on River Road between Northwest Expressway and Irvington Drive through the combined frequencies of Routes 51, 52, and 55 (CH2M, 2016a).

The BRT system is the "highest level of service available within the FTN, and is a permanent, integrated system that uses buses or specialized vehicles on roadways or dedicated lanes to efficiently transport passengers" (LTD, 2014). BRT system elements include branded multi-door 60-foot-long BRT vehicles, enhanced stations with level boarding platforms instead of bus stops, off-board fare collection, transit signal priority, wider stop spacing, and 10-minute service frequencies. BRT service is intended to improve transit speed, reliability, and ridership (CH2M, 2016a). The No-Build Alternative would not meet these BRT system elements.

The five primary goals outlined in the Draft Eugene 2035 TSP are to: (1) create an integrated system that is safe and efficient and reduces fossil fuel usage by 50 percent, (2) advance regional sustainability by reducing fossil fuel reliance, (3) reduce reliance on any single mode, (4) address the needs and safety of all travelers, and (5) triple the percentage of trips made on foot, by bicycle, and by transit by 2035 from 2014 levels. The No-Build Alternative would not improve bus service enough to meet many of these goals, such as improving frequency during off-peak hours to reduce reliance on other modes, reducing fossil fuel reliance, or helping to triple the percentage of trips made on foot, by bicycle, and by transit by 2035 from 2014 levels, compared to the build alternatives.

6.2.1.4. Transit Priority at Signalized Intersections

The River Road Corridor No-Build Alternative would not include any changes to traffic signal operations, and no exclusive bus signal phasing would be provided, except for those already under construction along W. 6th Avenue, W. 7th Avenue, Charnelton Street, 10th Avenue, and 11th Avenue as part of the WEEE project.

6.2.1.5. Safety

The River Road Corridor No-Build Alternative would retain the existing roadway system except for the expected transportation improvements described in the Draft Eugene 2035 TSP and identified in Table 6.2-1. Motor vehicle safety would not be affected under the No-Build Alternative.

6.2.1.6. Roadway Circulation

The River Road Corridor No-Build Alternative would retain existing roadway circulation except for the expected transportation improvements described in the Draft Eugene 2035 TSP and identified in Table 6.2-1. Motor vehicle circulation would not be affected under the No-Build Alternative.

6.2.1.7. Freight

Highway 99, W. 6th Avenue, and W. 7th Avenue are classified as national freight routes, and are designated by ODOT as a Reduction Review Route (ODOT, 2015). The Reduction Review Route designation requires the review of any proposed changes on these facilities to determine if there will be a reduction of vehicle-carrying capacity.

The No-Build Alternative is not expected to impact freight truck movement.

6.2.1.8. Parking and Access

The River Road Corridor No-Build Alternative would not impact on-street or off-street parking and would not impact property access.

6.2.1.9. Emergency Vehicle Flow and Access

Emergency vehicle flow and access would not change under the River Road Corridor No-Build Alternative.

6.2.2. Enhanced Corridor Alternative

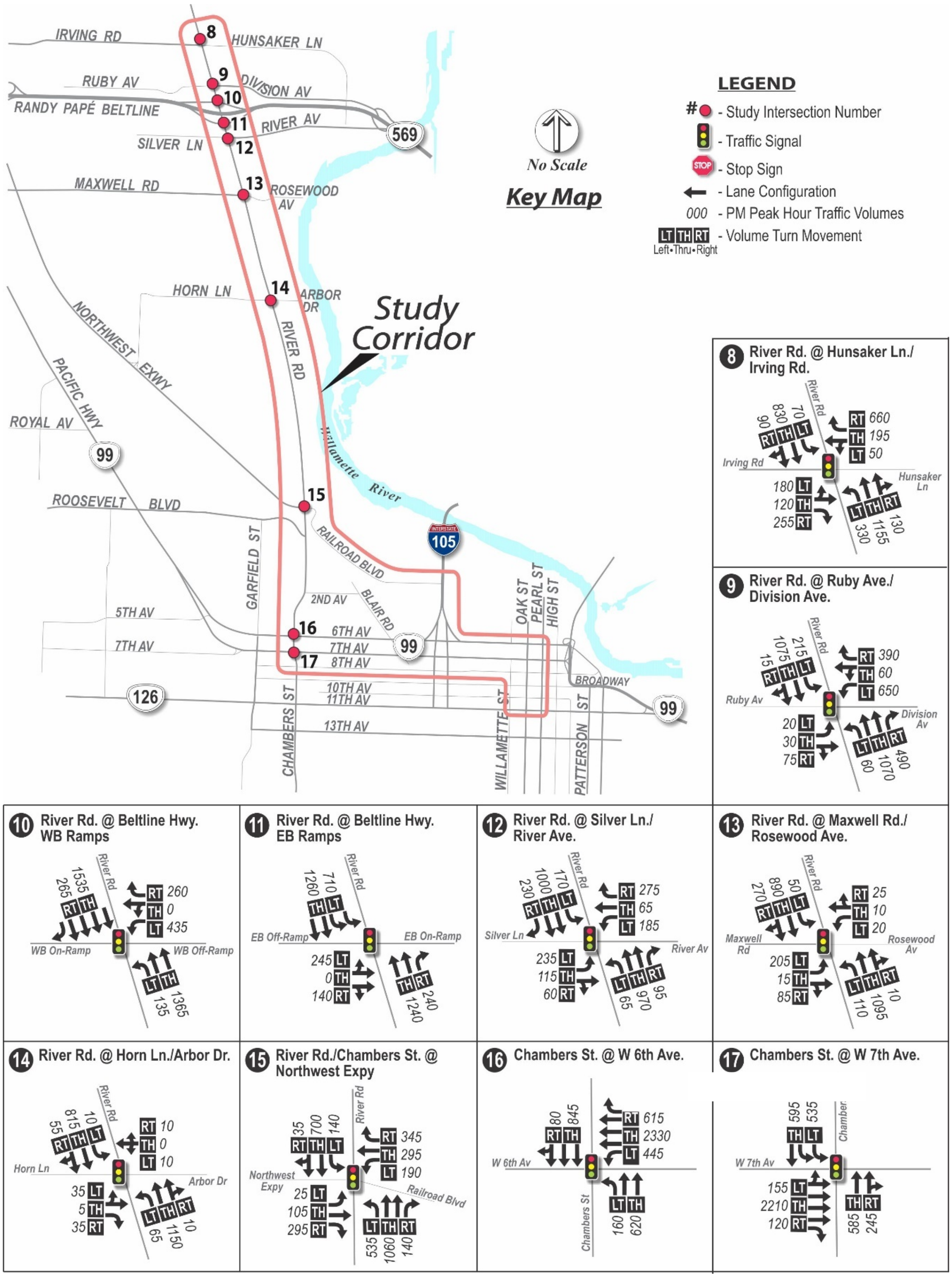
6.2.2.1. Local Traffic Operations

The River Road Corridor Enhanced Corridor Alternative would install roadway improvements that would affect study intersection operations, including:

- Installing a northbound right turn lane at River Road/Railroad Boulevard
- Constructing a northbound BAT lane approaching Silver Lane
- Converting general purpose lanes to BAT lanes in both directions on River Road from Silver Lane to Randy Papé Beltline EB Onramp and from Randy Papé Beltline WB Onramp to Division Avenue

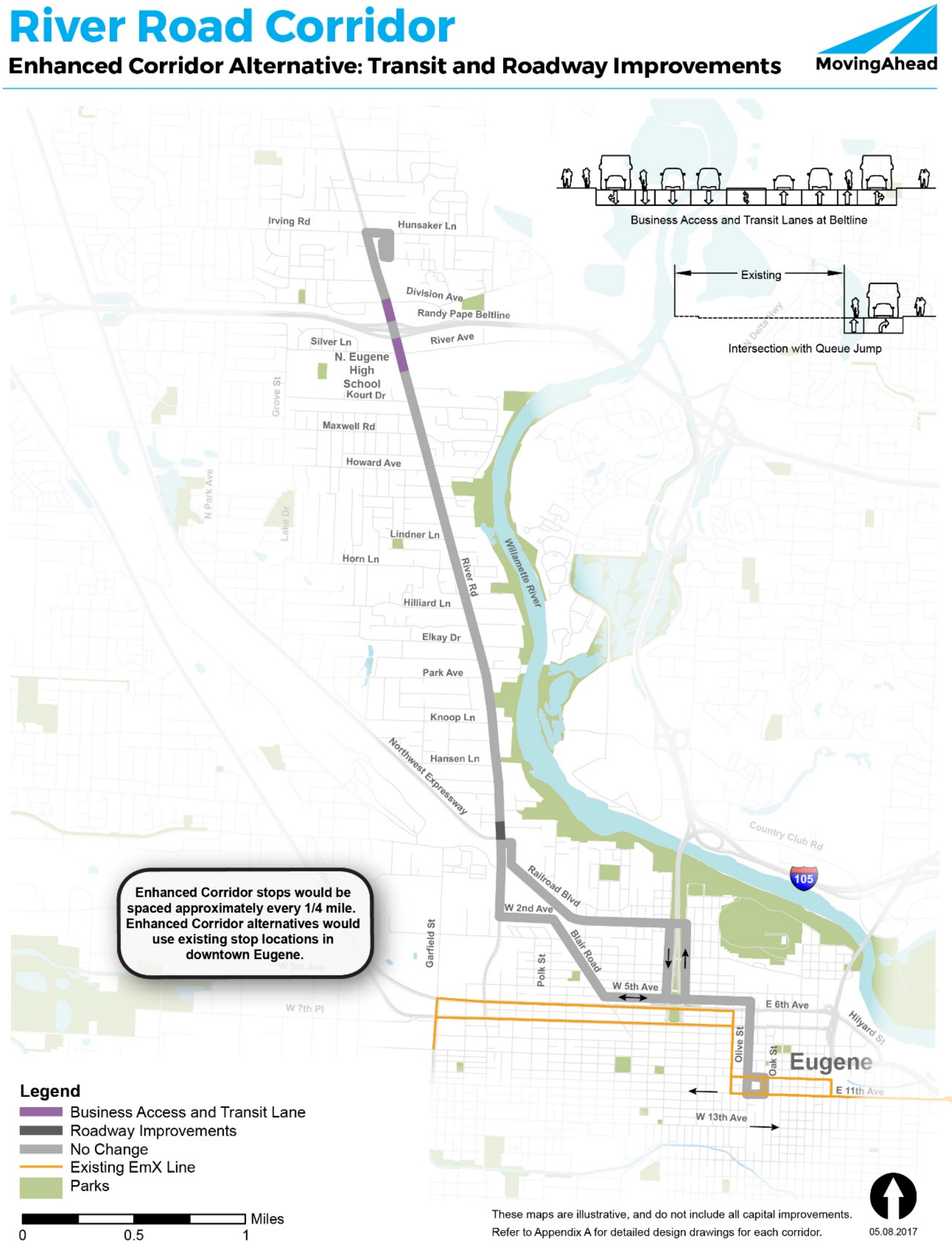
The 2035 p.m. peak hour turning movement volumes for the Enhanced Corridor Alternative are shown on Figure 6.2-3 and the transit and roadway improvements are shown on Figure 6.2-4. The study intersection performance for the 2035 p.m. peak hour No-Build and Enhanced Corridor Alternatives are shown in Table 6.2-4. There would be no substantial change in vehicle delay under the Enhanced Corridor Alternative compared to the No-Build Alternative. The Enhanced Corridor buses are not routed through the Chambers Street intersections at W. 6th Avenue or W. 7th Avenue; however, vehicle volumes through these intersections changed from the No-Build Alternative as a result of the Enhanced Corridor operations.

Figure 6.2-3. River Road Corridor Enhanced Corridor Alternative 2035 p.m. Peak Hour Traffic Volumes



Source: DKS Transportation Analysis. (2016).

Figure 6.2-4. River Road Corridor Enhanced Corridor Alternative 2035 Transit and Roadway Improvements



Source: CH2M. (2016).

Table 6.2-4. River Road Corridor Enhanced Corridor Alternative 2035 p.m. Peak Hour Study Intersection Operations

Study Intersection Number	Study Intersection	Jurisdiction	Operating Standard[a]	No-Build			Enhanced Corridor		
				LOS	Delay (sec)	v/c	LOS	Delay (sec)	v/c
8	River Road/Irving Road/Hunsaker Lane	City of Eugene	LOS D/LOS E	D	37.0	0.95	D	38.0	0.96
9	River Road/Ruby Avenue/Division Avenue	City of Eugene	LOS D/LOS E	C	34.1	0.82	C	28.6	0.84
10	River Road/Randy Papé Beltline WB Onramp	ODOT	0.85/1.00	C	23.4	0.65	C	21.0	0.65
11	River Road/Randy Papé Beltline EB Onramp	ODOT	0.85/1.00	C	24.7	0.73	C	32.7	0.80
12	River Road/Silver Lane/River Avenue	City of Eugene	LOS D/LOS E	C	28.0	0.71	C	26.5	0.65
13	River Road/Maxwell Road/E. Rosewood Avenue	City of Eugene	LOS D/LOS E	B	16.4	0.66	B	16.6	0.67
14	River Road/Horn Lane/Arbor Drive	City of Eugene	LOS D/LOS E	A	5.9	0.47	A	5.9	0.47
15	River Road/Chambers Street/Northwest Expressway	City of Eugene	LOS D/LOS E	D	43.2	0.93	D	45.6	0.97
16	Chambers Street/W. 6th Avenue	ODOT	0.85/1.00	**D**	**42.8**	**1.01**	**D**	**46.4**	**1.00**
17	Chambers Street/W. 7th Avenue	ODOT	0.85/1.00	**E**	**57.9**	**1.04**	**E**	**46.5**	**1.01**

Source: DKS Transportation Analysis. (2016).

Italic underlined values do not meet current standards.
Bold underlined values do not meet proposed standards or current standards.

Delay = Average Intersection Delay in seconds
LOS = Level of Service
v/c = volume-to-capacity

[a] Current/proposed operations standards for these facilities.

For the River Road Corridor Enhanced Corridor Alternative, mobility standards would not be met at the following study intersections:

- Chambers St/W. 6th Ave (current and proposed standards)
- Chambers St/W. 7th Ave (current and proposed standards)

6.2.2.2. Connectivity to Roadway, Bike, and Pedestrian Facilities

The proposed multi-modal project improvements (shown in Table 6.2-5 and on Figure 6.2-5) were compared with the existing and proposed roadway, bike, and pedestrian projects from the expected transportation improvement projects identified in the Draft Eugene 2035 TSP (Table 6.2-1) to determine how well coordinated the projects were. The addition of the Santa Clara Community Transit Center would greatly improve access to transit from motor vehicle, bicycle, and pedestrian modes, and would help facilitate bus transfers. The planned installation of protected bike lanes on River Road between Northwest Expressway and Division Avenue would improve opportunities for biking to and from transit stations on River Road. The planned installation of new sidewalks and bicycle boulevards on multiple side streets, such as Horn Lane and Hilliard Lane, would improve pedestrian and bicycle access to nearby Enhanced Corridor transit stops.

The amount of new and reconstructed pedestrian and bicycle facilities proposed under the Enhanced Corridor Alternative are shown in Table 6.2-5. Compared to the No-Build Alternative, the Enhanced Corridor Alternative would install some pedestrian improvements, including six new enhanced crossings (flashing beacon or Pedestrian Hybrid Beacon) and one replacement of an existing enhanced crossing. The Enhanced Corridor Alternative would install about 4,000 feet of reconstructed or improved sidewalks, mainly on River Road at the new transit stops.

The Enhanced Corridor Alternative would not improve bike facilities compared to the No-Build Alternative.

Table 6.2-5. River Road Corridor Enhanced Corridor Alternative New and Reconstructed Pedestrian and Bicycle Facilities

Improvement	Length of Facilities
New Sidewalk	0
Reconstructed/Improved Sidewalk	4,000 feet (0.76 miles)
Number of New Mainline Enhanced Crossings[a]	6 on River Road
Number of Replaced Enhanced Crossings[a]	1 on River Road
New Bike Facilities	0
Improved Bike Facilities	0

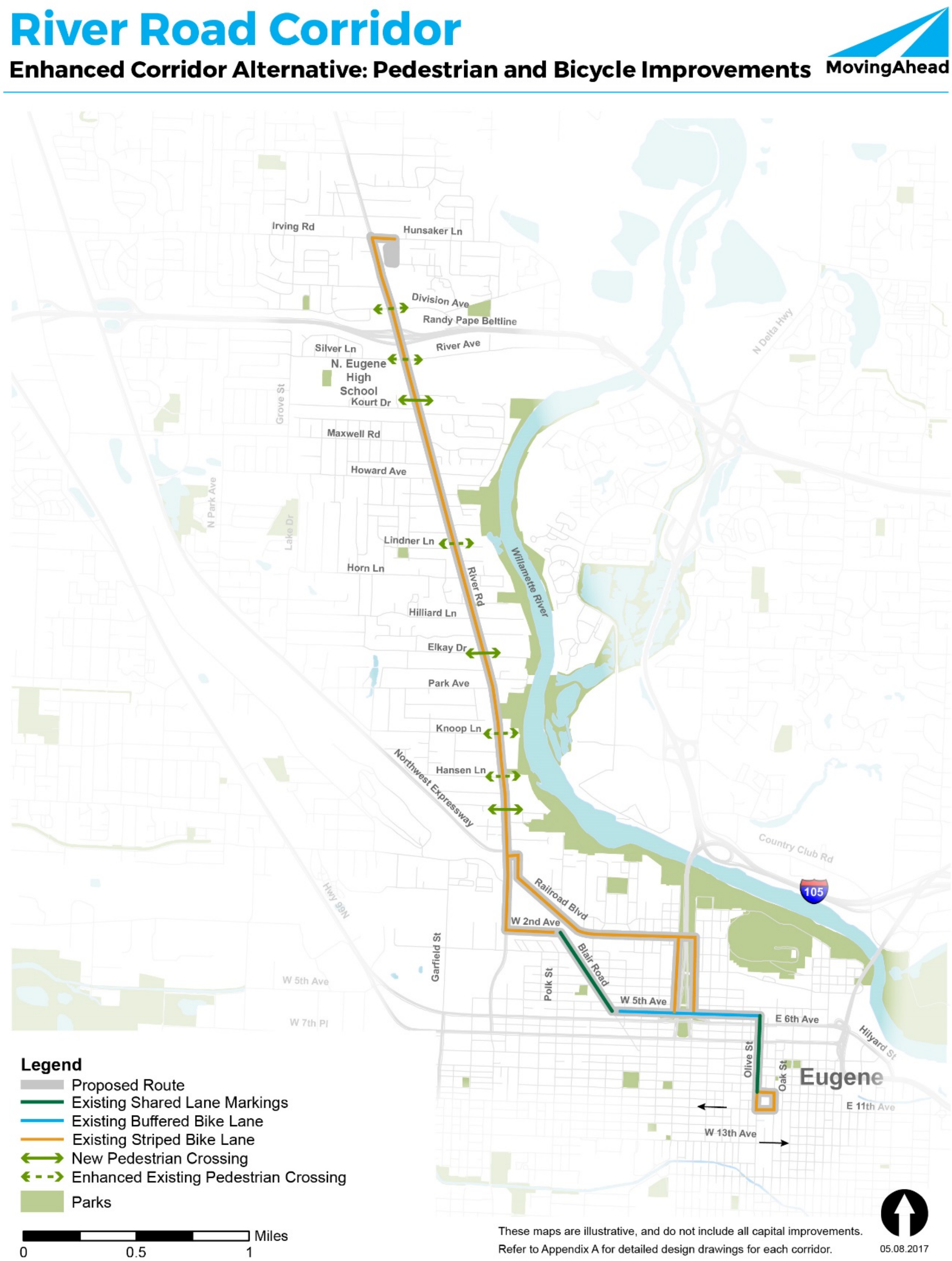
Source: CH2M Transportation Analysis. (2016).

[a] Enhanced crossing would install either a flashing yellow indication (flashing beacon), a yellow, red, flashing red indication (Pedestrian Hybrid Beacon), or a full traffic signal with pedestrian crossings along the mainline to warn vehicles of a pedestrian crossing.

[b] Upgraded crossings would consist of installing ADA ramps and possibly median refuge islands and/or crosswalk striping.

The qualitative assessment of pedestrian facilities for the Enhanced Corridor Alternative would not change compared to the No-Build Alternative, because the main benefit to pedestrians is the installation of enhanced and upgraded crossings of River Road, rather than an upgrade to facilities along River Road. Biking facilities would not change under the Enhanced Corridor Alternative compared to the No-Build Alternative.

Figure 6.2-5. River Road Corridor Enhanced Corridor Alternative 2035 Pedestrian and Bicycle Improvements



Source: CH2M. (2016).

6.2.2.3. Plan Consistency

The River Road Corridor Enhanced Corridor Alternative was evaluated for consistency with the Long Range Transit Plan (LTD, 2014), the FTN concept, and the goals outlined in the Regional Transportation Plan (LCOG, 2011, December) and the Draft Eugene 2035 TSP.

The purpose of the LTD FTN is to leverage transit service investments by tying service to the density and other elements of adjacent development. The FTN enables a well-connected network that provides regional circulation by providing an average transit frequency of 15 minutes or better, a reliable transit system that runs on schedule (by implementing strategies such as transit priority at signalized intersections), and enhanced stations with bicycle and pedestrian connections (LTD, 2014). The Enhanced Corridor Alternative would meet the FTN goals by providing frequent service on River Road, installing transit priority at signalized intersections, and adding BAT lanes and transit queue jumps to help make service more reliable and on schedule.

The BRT system is the "highest level of service available within the FTN, and is a permanent, integrated system that uses buses or specialized vehicles on roadways or dedicated lanes to efficiently transport passengers" (LTD, 2014). BRT system elements include branded multi-door 60-foot-long BRT vehicles, enhances stations with level boarding platforms instead of bus stops, off-board fare collection, transit signal priority, wider stop spacing, and 10-minute service frequencies. BRT service is intended to improve transit speed, reliability, and ridership (CH2M, 2016a). The Enhanced Corridor Alternative would not meet these BRT system elements.

The five primary goals outlined in the Draft Eugene 2035 TSP are to: (1) create an integrated system that is safe and efficient and reduces fossil fuel usage by 50 percent, (2) advance regional sustainability by reducing fossil fuel reliance, (3) reduce reliance on any single mode, (4) address the needs and safety of all travelers, and (5) triple the percentage of trips made on foot, by bicycle, and by transit by 2035 from 2014 levels. The Enhanced Corridor Alternative helps Eugene to slightly improve transit mode share, but is not expected to help improve bicycle and pedestrian mode share over the No-Build Alternative.

6.2.2.4. Transit Priority at Signalized Intersections

The River Road Corridor Enhanced Corridor Alternative would include traffic signal modifications at several intersections. One traffic signal – a northbound phase at the River Road/Railroad Boulevard intersection - will provide exclusive bus signal phasing that would allow buses to safety enter traffic flow or travel through an intersection.

In addition, every traffic signal on the corridor would receive transit signal priority. Transit signal priority modifies normal traffic signal operations by extended green phases or shortening side street phases in order to reduce delay for transit vehicles.

6.2.2.5. Safety

Potential safety impacts associated with the River Road Corridor Enhanced Corridor Alternative include:

- BAT lanes on River Road (northbound from Randy Papé Beltline EB Onramp to Division Avenue, northbound and southbound between Randy Papé Beltline WB Onramp and Silver Lane) would serve both buses and turning general-purpose vehicles. These BAT lanes would reduce potential vehicle conflicts such as rear end collisions (FHWA, 2014)
- Bus queue jump at River Road/Railroad Boulevard (northbound) would serve buses and right turning vehicles exclusively, eliminating the merging conflict between vehicles and buses

- Three upgraded bicycle and pedestrian crossings and five new enhanced crossings along the corridor would improve opportunities for bicyclists and pedestrians to cross River Road

Overall, motor vehicle, bicycle, and pedestrian safety would be improved by the increase in crossing options and improvement in facilities.

6.2.2.6. Roadway Circulation

The River Road Corridor Enhanced Corridor Alternative was evaluated to assess motor vehicle circulation. There is no difference in roadway circulation compared to the No-Build Alternative.

6.2.2.7. Freight

The River Road Corridor Enhanced Corridor Alternative would install five new enhanced pedestrian crossings with raised medians on River Road, which could cause a slight increase in freight travel times along the corridor.

There is one driveway, accessing the Twin Dragon parking lot on the east side of River Road at Elkay Drive, that would have a reduced left turn deceleration area, resulting in potential increased delays for freight accessing the driveway or for freight traveling along River Road. The potential freight delay is expected to be less than 10 seconds along the entire corridor.

In addition, the Enhanced Corridor Alternative may impact westbound left turning freight movements from Division Avenue onto River Road due to the installation of a pedestrian island on the south side of the intersection.

6.2.2.8. Parking and Access

The River Road Corridor Enhanced Corridor Alternative would not impact on-street parking. The Enhanced Corridor Alternative would have potential off-street parking impacts at the Arby's parking lot, located on the west side of River Road between Silver Lane and Randy Papé Beltline EB Onramp, which could impact a maximum of two parking spaces.

The Enhanced Corridor Alternative would not close any access points on the project corridor.

The Enhanced Corridor Alternative would have potential business circulation impacts for the following four drive-throughs:

- Carl's Jr. (west side of River Road between Silver Lane and Randy Papé Beltline EB Onramp)
- Arby's (west side of River Road between Silver Lane and Randy Papé Beltline EB Onramp)
- Lube It USA (southwest corner of the River Road/Silver Lane intersection)
- US Bank (northeast corner of River Road/Randy Papé Beltline WB Onramp)

There are 13 driveways, alleys, or side streets adjacent to the proposed enhanced or upgraded pedestrian crossings that would have a reduced left turn deceleration area, resulting in potential increased delays for motor vehicles accessing the driveways or traveling along River Road. In addition, four locations would have potential impacts to motor vehicles performing a two-stage left turn[6] from side streets due to the refuge islands. Table 6.2-6 lists the locations with potential impacts to the left turn movements onto and off of the mainline.

[6] A two-stage left turn means that motor vehicles make a left turn from a side street onto the mainline by first crossing one direction of traffic by turning into a median lane, then waiting until the other direction is clear before pulling out into the through lanes

.Table 6.2-6. River Road Corridor Enhanced Corridor Alternative Left Turn Access Impacts to Motor Vehicles

Crosswalk Location on River Road	Impacted Location	Side of River Road	Type of Impact
South side of Corliss Lane	Two residential driveways	East	Left Turn – Entering Driveway
	Two residential driveways	West	Left Turn – Entering Driveway
	Corliss Lane	East	Left Turn – Exiting Side Street
South side of Merry Lane	Residential driveway	West	Left Turn – Entering Driveway
	Merry Lane	East	Left Turn – Exiting Side Street
North side of Elkay Drive	Emerald Shopping Center	East	Left Turn – Entering Driveway
	Two residential driveways	West	Left Turn – Entering Driveway
	Elkay Drive	West	Left Turn – Exiting Side Street
North side of Hansen Lane	Residential driveway	East	Left Turn – Entering Driveway
	Residential alley	West	Left Turn – Entering Driveway
	Hansen Lane	West	Left Turn – Exiting Side Street
South side of Briarcliff Drive	Residential driveway	East	Left Turn – Entering Driveway
	Briarcliff Drive	West	Left Turn – Entering Side Street

Source: DKS Transportation Analysis. (2016).

6.2.2.9. Emergency Vehicle Flow and Access

The emergency service authorities do not foresee any major issues of concern related to expanded transit services. Emergency service providers would have an opportunity to review more detailed designs and would work with Lane Transit District to address issues in the future (Lane Fire Authority, personal communication, April 13, 2017).

6.2.3. EmX Alternative

6.2.3.1. Local Traffic Operations

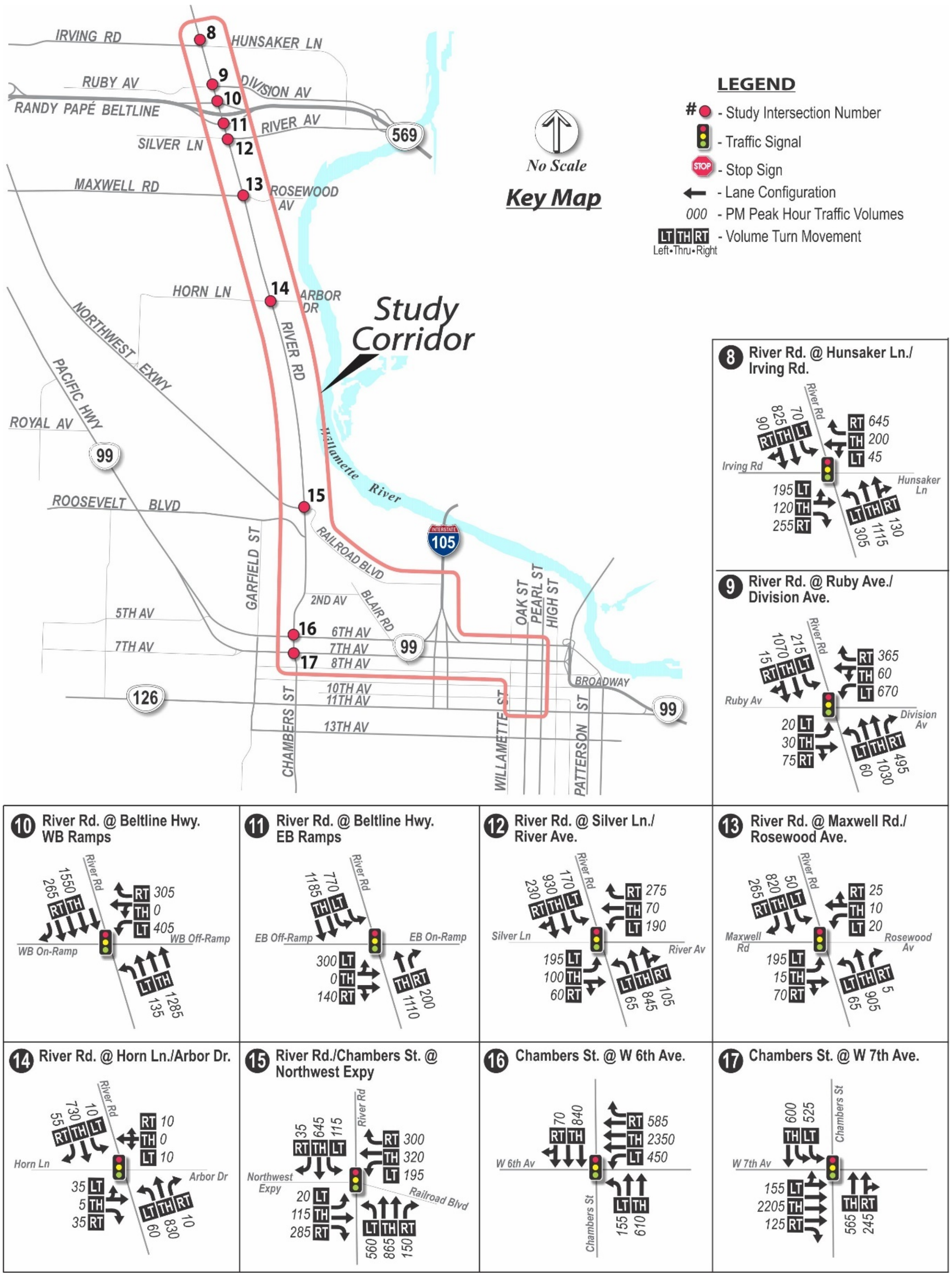
The River Road Corridor EmX Alternative would install roadway improvements that would affect study intersection operations, including:

- Converting general purpose lanes to BAT lanes in both directions on River Road from Northwest Expressway to Kourt Drive and from Randy Papé Beltline WB Onramp to Division Avenue

- Constructing new center running transit only lanes in both directions between Corliss Lane and Randy Papé Beltline EB Onramp
- Installing a northbound right turn lane at River Road/Railroad Boulevard

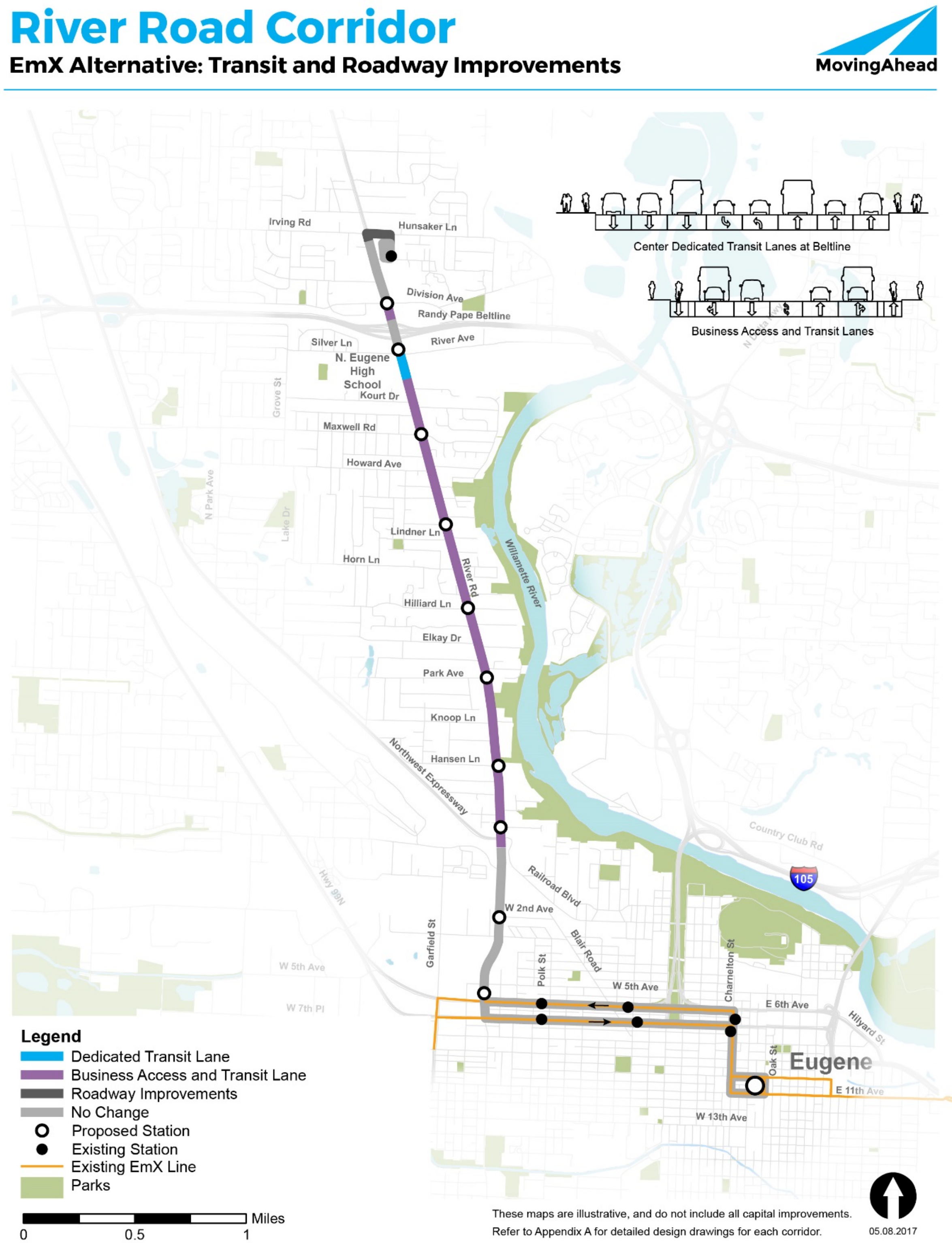
The 2035 p.m. peak hour turning movement volumes for the EmX Alternative are shown on Figure 6.2-6 and the transit and roadway improvements are shown on Figure 6.2-7. The study intersection performance for the 2035 p.m. peak hour No-Build and EmX Alternatives are shown in Table 6.2-7. Several intersections on the Highway 99 Corridor were evaluated as part of this alternative because of the number of motor vehicles that may detour from River Road onto Highway 99 due to the change in lane configuration on River Road. Operations improved at the Chambers Street/W. 7th Avenue intersection due to a decrease in p.m. peak hour traffic volumes for the EmX Alternative. Operations degraded slightly at the River Road/Randy Papé Beltline EB Onramp and River Road/Maxwell Road intersections due to the conversion of a general-purpose travel lane to a BAT lane.

Figure 6.2-6. River Road Corridor 2035 EmX Alternative p.m. Peak Hour Traffic Volumes



Source: DKS Transportation Analysis. (2016).

Figure 6.2-7. River Road Corridor EmX Alternative 2035 Transit and Roadway Improvements



Source: CH2M. (2016).

Table 6.2-7. River Road Corridor EmX Alternative 2035 p.m. Peak Hour Study Intersection Operations

Study Intersection Number	Study Intersection	Jurisdiction	Operating Standard[a]	No-Build LOS	No-Build Delay (sec)	No-Build v/c	EmX LOS	EmX Delay (sec)	EmX v/c
8	River Road/Irving Road/Hunsaker Lane	City of Eugene	LOS D/LOS E	D	37.0	0.95	D	40.4	1.00
9	River Road/Ruby Avenue/Division Avenue	City of Eugene	LOS D/LOS E	C	34.1	0.82	D	35.3	0.81
10	River Road/Randy Papé Beltline WB Onramp	ODOT	0.85/1.00	C	23.4	0.65	C	26.0	0.59
11	River Road/Randy Papé Beltline EB Onramp	ODOT	0.85/1.00	C	24.7	0.73	D	41.0	0.77
12	River Road/Silver Lane/River Avenue	City of Eugene	LOS D/LOS E	C	28.0	0.71	C	25.5	0.69
13	River Road/Maxwell Road/E. Rosewood Avenue	City of Eugene	LOS D/LOS E	B	16.4	0.66	C	31.6	0.85
14	River Road/Horn Lane/Arbor Drive	City of Eugene	LOS D/LOS E	A	5.9	0.47	A	8.5	0.63
15	River Road/Chambers Street/Northwest Expressway	City of Eugene	LOS D/LOS E	D	43.2	0.93	D	44.9	0.96
16	Chambers Street/W. 6th Avenue	ODOT	0.85/1.00	**D**	**42.8**	**1.01**	**D**	**44.8**	**1.00**
17	Chambers Street/W. 7th Avenue	ODOT	0.85/1.00	**E**	**57.9**	**1.04**	*E*	*45.3*	*0.99*
1	Hwy 99N/Barger Drive[b]	ODOT	0.85/0.85	C	25.7	0.77	C	25.3	0.77
2	Hwy 99N/Fairfield Avenue[b]	ODOT	0.85/0.85	B	13.8	0.56	B	13.4	0.58
3	Hwy 99N/Royal Avenue[b]	ODOT	0.85	B	11.0	0.64	B	10.9	0.63
4	Hwy 99N/Roosevelt Boulevard[b]	ODOT	0.85/1.00[a]	**F**	**88.9**	**1.03**	**F**	**91.0**	**1.04**

Source: DKS Transportation Analysis. (2016).

Italic underlined values do not meet current standards
Bold underlined values do not meet proposed standards or current standards

Delay = Average Intersection Delay in seconds
LOS = Level of Service
v/c = volume-to-capacity

[a] Current/proposed operations standards for these facilities.
[b] Intersection on nearby corridor evaluated due to possibility of detour traffic from River Road using Highway 99 due to the change in lane configuration.

For the 2035 River Road Corridor EmX Alternative p.m. peak hour, mobility standards would not be met at the following study intersections:

- Chambers St/W. 6th Ave (current and proposed standards)
- Chambers St/W. 7th Ave (current standards only)
- Highway 99N/Roosevelt Boulevard (current and proposed standards)

6.2.3.2. Connectivity to Roadway, Bike, and Pedestrian Facilities

The proposed multi-modal project improvements (shown on Figure 6.2-8 and Table 6.2-8) were compared with the proposed roadway, bike, and pedestrian projects from the expected transportation improvement projects identified in the Draft Eugene 2035 TSP (Table 6.2-1) to determine how well coordinated the projects were. The addition of the planned Santa Clara Community Transit Center would greatly improve access to transit from motor vehicle, bicycle, and pedestrian modes, and would help facilitate bus transfers. The planned installation of protected bike lanes on River Road between Northwest Expressway and Division Avenue would improve opportunities for biking to and from transit stations on River Road. The planned installation of new sidewalks and bicycle boulevards on multiple side streets, such as Horn Lane and Hilliard Lane, would improve pedestrian and bicycle access to nearby transit stations.

The amount of new and reconstructed pedestrian and bicycle facilities proposed under the EmX Alternative are shown in Table 6.2-8. Compared to the No-Build Alternative, the EmX Alternative would install over one mile of pedestrian improvements, including five new enhanced crossings (flashing beacon or Pedestrian Hybrid Beacon) and one replacement of an existing enhanced crossing. The EmX Alternative would install about 6,400 feet (1.2 miles) of new and reconstructed sidewalks, including new sidewalks routed behind the new transit stations and a multi-use path on the east side of River Road between Kourt Drive and Silver Lane.

Compared to the No-Build and Enhanced Corridor Alternatives, the EmX Alternative would install new bicycle improvements. Most notably, the EmX Alternative would restripe River Road between Northwest Expressway and Silver Lane to create protected bicycle lanes on both sides of the street. In addition, the bicycle lane would be replaced with a shared use path on both sides of River Road between Silver Lane and Division Avenue and a new eastbound bicycle lane would be installed on Hunsaker Lane adjacent to the corridor terminus. The bicycle lanes would be routed behind transit stations on River Road in order to reduce conflicts between bicycles, motor vehicles, and BRT vehicles.

Table 6.2-8. River Road Corridor EmX Alternative New and Reconstructed Pedestrian and Bicycle Facilities

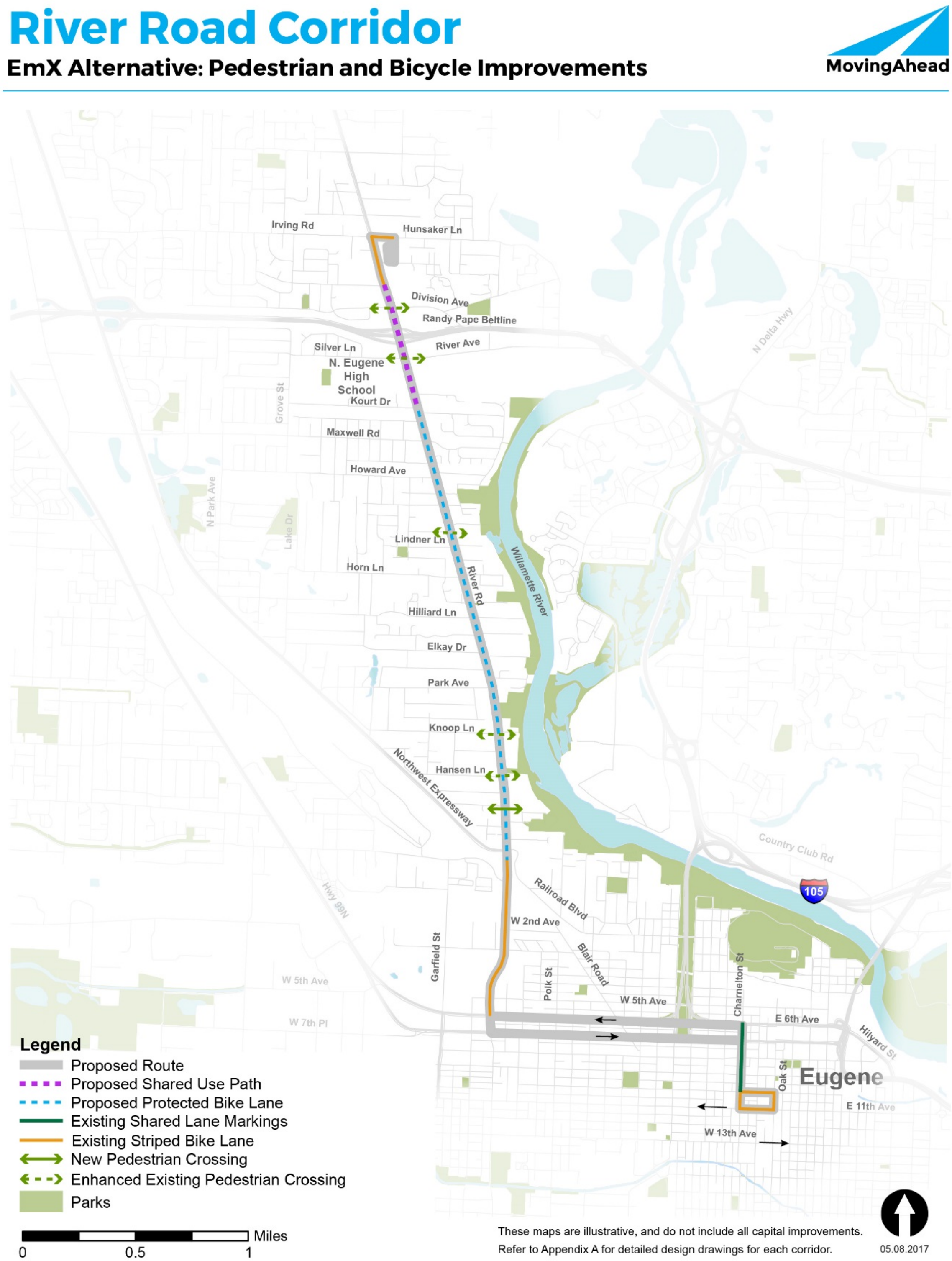
Improvement	Length of Facilities
New Sidewalk	340 feet (0.06 miles)
Reconstructed/Improved Sidewalk	6,400 feet (1.2 miles)
Number of New Mainline Enhanced Crossings[a]	4 on River Road
Number of Replaced Enhanced Crossings[a]	1 on River Road
New Bike Facilities	340 feet (0.06 miles)
Improved Bike Facilities	26,580 feet (5.03 miles)

Source: CH2M Transportation Analysis. (2016).

[a] Enhanced crossing would install either a flashing yellow indication (flashing beacon), a yellow, red, flashing red indication (Pedestrian Hybrid Beacon), or a full traffic signal with pedestrian crossings along the mainline to warn vehicles of a pedestrian crossing.

[b] Upgraded crossings would consist of installing ADA ramps and possibly median refuge islands and/or crosswalk striping.

Figure 6.2-8. River Road Corridor EmX Alternative 2035 Pedestrian and Bicycle Improvements



Source: CH2M. (2016).

The qualitative assessment of pedestrian and bicycle facilities, shown in Table 6.2-9, shows that four roadway segments would improve over the No-Build Alternative from “poor” or “fair” ratings to “good” ratings for both pedestrians and bicyclists.

Table 6.2-9. River Road Corridor EmX Alternative Qualitative Assessment of Pedestrian Facilities[a]

Segment	No-Build Walking	EmX Walking	No-Build Biking	EmX Biking
Hunsaker Lane: River Road to Yvonne Street (South Side Only)	Poor	Good	Poor	Good
River Road: Maxwell Road to Irving Road	Good	Good	Fair	Good
River Road: Horn Lane to Maxwell Road	Good	Good	Good	Good
River Road: Northwest Expressway to Horn Lane	Good	Good	Fair	Good
Chambers Street: W. 2nd Avenue to Northwest Expressway	Fair	Fair	Fair	Fair
Chambers Street: W. 5th Avenue to W. 2nd Avenue	Fair	Fair	Good	Good
Chambers Street: W. 5th Avenue to W. 7th Avenue	Good	Good	Fair	Fair
W. 6th Avenue: Charnelton Street to Chambers Street	Good	Good	Poor	Poor
W. 7th Avenue: Chambers Street to Charnelton Street	Good	Good	Poor	Poor
Olive Street: W. 5th Avenue to W. 11th Avenue	Fair	Fair	Fair	Fair
Charnelton Street: W. 6th Avenue to W. 10th Avenue	Good	Good	Poor	Poor
W. 10th Avenue: Charnelton Street to Willamette Street	Good	Good	Poor	Poor
E. 11th Avenue: Olive Street to Willamette Street	Good	Good	Poor	Poor
Willamette Street: W. 10th Avenue to E. Broadway	Good	Good	Fair	Fair
Railroad Boulevard: River Road to N. Grand Street	Fair	-[b]	Good	-[b]
W. 1st Avenue: N. Grand Street to Washington Street	Good	-[b]	Good	-[b]
W. 2nd Avenue: Chambers Street to Blair Boulevard	Good	-[b]	Fair	-[b]
Blair Boulevard: W. 2nd Avenue to W. 5th Avenue	Fair	-[b]	Fair	-[b]
W. 5th Avenue: Blair Boulevard to Olive Street	Good	-[b]	Good	-[b]
Jefferson Street: W. 1st Avenue to W. 5th Avenue	Good	-[b]	Poor	-[b]
Washington Street: W. 1st Avenue to W. 5th Avenue	Good	-[b]	Poor	-[b]

Source: DKS Transportation Analysis. (2016).

[a] Qualitative analysis based on methodology described in Chapter 14 of ODOT’s *Analysis Procedures Manual* (ODOT, 2014).

[b] Segment not on EmX Corridor

6.2.3.3. Plan Consistency

The River Road Corridor EmX Alternative was evaluated for consistency with the Long Range Transit Plan (LTD, 2014), the FTN concept, and the goals outlined in the Regional Transportation Plan (LCOG, 2011, December) and the Draft Eugene 2035 TSP.

The purpose of the LTD FTN is to leverage transit service investments by tying service to the density and other elements of adjacent development. The FTN enables a well-connected network that provides regional circulation by providing an average transit frequency of 15 minutes or better, a reliable transit system that runs on schedule (by implementing strategies such as transit priority at signalized intersections), and enhanced stations with bicycle and pedestrian connections (LTD, 2014). The EmX Alternative would meet the FTN goal by providing frequent service on River Road, implementing transit priority at signalized intersections, and adding BAT lanes and transit queue jumps to help make service more reliable and on schedule.

The BRT system is the “highest level of service available within the FTN, and is a permanent, integrated system that uses buses or specialized vehicles on roadways or dedicated lanes to efficiently transport passengers” (LTD, 2014). BRT system elements include branded multi-door 60-foot-long BRT vehicles, enhances stations with level boarding platforms instead of bus stops, off-board fare collection, transit signal priority, wider stop spacing, and 10-minute service frequencies. BRT service is intended to improve transit speed, reliability, and ridership (CH2M, 2016a). The EmX Alternative would meet most of these BRT system elements.

The five primary goals outlined in the Draft Eugene 2035 TSP are to: (1) create an integrated system that is safe and efficient and reduces fossil fuel usage by 50 percent, (2) advance regional sustainability by reducing fossil fuel reliance, (3) reduce reliance on any single mode, (4) address the needs and safety of all travelers, and (5) triple the percentage of trips made on foot, by bicycle, and by transit by 2035 from 2014 levels. The EmX Alternative helps Eugene to slightly improve transit mode share, and new pedestrian and bicycle improvements would be installed as part of the EmX Alternative that helps increase pedestrian and bicycle mode share.

6.2.3.4. Transit Priority at Signalized Intersections

The River Road Corridor EmX Alternative would include traffic signal modifications at several intersections. One traffic signal will provide exclusive bus signal phasing that would allow buses to safety enter traffic flow or travel through an intersection. The location of proposed bus signal phase is shown in Table 6.2-10. Compared to the No-Build Alternative, both the Enhanced Corridor and EmX Alternatives would have one additional signal with exclusive bus phasing.

Table 6.2-10. River Road Corridor EmX Alternative Proposed Bus Phases

Intersection	Bus Phase
River Road/Railroad Boulevard	Northbound

Source: DKS Transportation Analysis. (2016).

In addition, every traffic signal on the corridor would receive transit signal priority. Transit signal priority modifies normal traffic signal operations by extended green phases or shortening side street phases in order to reduce delay for transit vehicles.

6.2.3.5. Safety

Potential safety impacts associated with the River Road Corridor EmX Alternative include:

- BAT lanes on River Road between Northwest Expressway and Kourt Drive, which would serve both BRT vehicles and turning general-purpose vehicles. These BAT lanes would reduce potential vehicle conflicts such as rear end collisions (FHWA, 2014)
- Installing a northbound right turn lane from River Road onto Railroad Boulevard could reduce potential vehicle conflicts such as rear end collisions (FHWA, 2014) and be used as a bus queue jump, eliminating the merging conflict between vehicles and buses
- Center running transit lanes on River Road between Corliss Lane and Randy Papé Beltline Highway could reduce angle crashes by restricting left turn access into and out of driveways

- A protected bicycle lane on River Road between Northwest Expressway and Silver Lane would increase separation between motor vehicles and bicycles, reducing conflicts
- Routing bicycle lanes behind EmX stations and away from travel lanes on River Road would reduce bicycle, vehicle, and BRT vehicle conflicts
- One new bicycle and pedestrian crossing and five new enhanced crossings along the corridor would improve opportunities for bicyclists and pedestrians to cross River Road
- Installing a Bus queue jump at River Road/Railroad Boulevard (northbound) would serve buses and right turning vehicles exclusively, eliminating the merging conflict between vehicles and buses

Overall, motor vehicle, bicycle, and pedestrian safety would be improved under the EmX Alternative compared to the No-Build and Enhanced Corridor Alternatives due to the BAT lanes reducing conflicts between turning and through vehicles, the installation of protected bicycle lanes with facilities routed behind transit stations, the installation of new bicycle/pedestrian crossings, and the installation of additional new and reconstructed sidewalks.

6.2.3.6. Roadway Circulation

The River Road Corridor EmX Alternative was evaluated to assess motor vehicle circulation. There would be little difference in roadway circulation compared to the No-Build and Enhanced Corridor Alternatives. The EmX Alternative would narrow the motor vehicle lane widths on River Road between Northwest Expressway and Silver Lane in order to install a protected bicycle lane on both sides of the street. The primary advantages of narrowing travel lanes are: slower travel speeds, reducing crossing width for pedestrians, and less right-of-way impacts. The primary disadvantage is that narrower travel lanes have the potential to slightly increase crash risk, but the crash severity would be lower (due to lower speeds) (NACTO, 2013).

6.2.3.7. Freight

The River Road Corridor EmX Alternative would install five enhanced pedestrian crossings with raised medians on River Road, which could cause a slight increase in freight travel times along the corridor.

There is one driveway, accessing the Dollar Tree parking lot on the east side of River Road between Corliss Lane and Silver Lane, that would have a reduced left turn deceleration area, resulting in potential increased delays for freight accessing the driveway or for freight traveling along River Road. The potential freight delay is expected to be less than 10 seconds along the entire corridor.

In addition, the EmX Alternative may impact westbound left turning freight movements from Division Avenue onto River Road due to the installation of a pedestrian island on the south side of the intersection.

6.2.3.8. Parking and Access

The River Road Corridor EmX Alternative would not impact on-street parking. The EmX Alternative would have potential off-street parking impacts, which are listed in Table 6.2-11.

Table 6.2-11. River Road Corridor EmX Alternative Off-Street Parking Impacts

Business	Location	Maximum Spaces Impacted[a]
Gentle Dental	River Road/Division Avenue	10 parking spaces
Arby’s	River Road between Silver Lane and Randy Papé Beltline EB Onramp	2 parking spaces

Table 6.2-11. River Road Corridor EmX Alternative Off-Street Parking Impacts

Business	Location	Maximum Spaces Impacted[a]
Bi-Mart	River Road between Kourt Drive and Silver Lane	4 parking spaces
Pacific Continental Bank	River Road between Corliss Lane and Silver Lane	3 parking spaces
Chen's Happy Garden	River Road between Corliss Lane and Silver Lane	1 parking space
Vacant Building	River Road between Corliss Lane and Silver Lane	1 parking space
Crescent Automotive	Chambers Street/W. 6th Avenue	10 parking spaces

Source: DKS Transportation Analysis. (2016).

The EmX Alternative would have potential business circulation impacts for the following six drive-throughs:

- Carl's Jr. (west side of River Road between Silver Lane and Randy Papé Beltline EB Onramp)
- Arby's (west side of River Road between Silver Lane and Randy Papé Beltline EB Onramp)
- Lube It USA (southwest corner of the River Road/Silver Lane intersection)
- US Bank (northeast corner of River Road/Randy Papé Beltline WB Onramp)
- Espresso Express (west side of River Road between Kourt Drive and Silver Lane)
- Key Bank (west side of River Road between Kourt Drive and Silver Lane)

In addition, the access and circulation at the Govinda's Vegetarian Buffet would be impacted by the new bus pullout on the southwest corner of River Road and Hilliard Lane. The driveway on River Road would be impacted in order to install a new transit pullout, which would require some right of way acquisition. This loss of right of way on River Road would prevent vehicles in the Govinda's Vegetarian Buffet parking lot from being able to drive around the east and north sides of the building, which would impact the parking lot circulation.

There are seven driveways, alleys, or side streets adjacent to the six enhanced pedestrian crossings that would have a reduced left turn deceleration area, resulting in potential increased delays for motor vehicles accessing the driveways or traveling along River Road. In addition, two locations would have potential impacts to motor vehicles performing a two-stage left turn out of the driveways due to the refuge islands. Table 6.2-12 lists the locations with potential impacts to the left turn movements onto and off of the mainline.

Table 6.2-12. River Road Corridor EmX Alternative Left Turn Access Impacts to Motor Vehicles

Crosswalk Location on River Road	Impacted Location	Side of River Road	Type of Impact
River Road/300 feet south of Silver Lane (median island, no crosswalk)	Dollar Tree driveway	East	Left Turn – Entering Driveway
River Road/Merry Lane	Residential driveway	West	Left Turn – Entering Driveway
North side of Hansen Lane	Residential driveway (2)	West	Driveway impact (remove or relocate)
	Merry Lane	East	Left Turn - Exiting Side Street
South side of Hansen Lane (bus pullout)	Vacant Lot	East	Opportunity for driveway on River Road removed with proposed station
River Road / Hilliard Lane southwest corner (station)	Govinda's Vegetarian Buffet	West	Driveway impact (remove or relocate) on River Road
River Road / Hilliard Lane northeast corner (station)	Tienda y Panaderia Santigo/Modern Classics Tatto/The Nail Nook	East	Driveway impact (remove or relocate)
River Road/North side of Hansen Lane	Residential driveway	East	Left Turn – Entering Driveway
	Residential alley	West	Left Turn – Entering Alley
	Hansen Lane	West	Left Turn - Exiting Side Street
	Vacant Lot	East	Station location causes vacant lot to lose ability to install a driveway for access
River Road/South side of Hansen Lane (station)	Residential driveway	West	Potential driveway impact (removal or relocation)
River Road/South side of Briarcliff Drive	Residential driveway	East	Left Turn – Entering Driveway
	Briarcliff Drive	West	Left Turn – Entering Roadway
River Road/North side of Thomason Lane (station)	The Corner Market	East	Driveway impact (remove or relocate)
Chambers Street south of W 5th Ave	Northwest Solvent & Supply	East	Driveway impact (remove or relocate)
River Road/300 feet south of Silver Lane (median island, no crosswalk)	Dollar Tree driveway	East	Left Turn – Entering Driveway
River Road/Merry Lane	Residential driveway	West	Left Turn – Entering Driveway

Source: DKS Transportation Analysis. (2016).

6.2.3.9. Emergency Vehicle Flow and Access

The emergency service authorities do not foresee any major issues of concern related to expanded transit services. Emergency service providers would have an opportunity to review more detailed designs and would work with Lane Transit District to address issues in the future (Lane Fire Authority, personal communication, April 13, 2017).

6.3. Transit

6.3.1. Corridor Transit Service Characteristics

The amount of transit service provided in a corridor is measured by daily VHT, daily VMT, and daily place-miles of service. Daily vehicle hours are the cumulative time that transit vehicles are in service and daily vehicle miles are the distance they travel, independent of the size of the vehicle. Place-miles refers to the total carrying capacity (seated and standing) of each bus and is calculated by multiplying vehicle capacity of each bus by the number of service miles traveled each day. Place-miles highlight differences among alternatives caused by a different mix of vehicles and levels of service. Table 6.3-1 summarizes these major transit characteristics for the No-Build, Enhanced Corridor, and EmX Alternatives.

Table 6.3-1. River Road Corridor 2035 Corridor Transit Service Characteristics by Alternative

Measure	No-Build Alternative	Enhanced Corridor Alternative	Delta from No-Build	EmX Alternative	Delta from No-Build
Annual EmX and Fixed Route Transit VHT[a]	278,600	277,500	(1,100)	285,600	7,000
Annual Transit VMT[b]	4,520,200	4,547,400	27,200	4,744,400	224,200
Average Weekday Corridor Transit Place-Miles[c]	104,320	138,130	33,810	192,720	88,400

Source: LCOG Regional Travel Demand Model Results (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

[a] VHT= Vehicle hours traveled in revenue service.

[b] VMT = Vehicle miles traveled in revenue service.

[c] Place-Miles = Transit Vehicle Capacity (seated and standing) multiplied by VMT. (Place-miles refers to the total carrying capacity (seated and standing) of each bus and is calculated by multiplying vehicle capacity of each bus by the number of service miles traveled each day. Place-miles highlight differences among alternatives caused by a different mix of vehicles and levels of service.)

The River Road Corridor EmX Alternative would result in a substantial increase in corridor transit capacity when compared to the No-Build and Enhanced Corridor Alternatives. This is because EmX has higher frequencies (10-minute service all day), which translates to two extra trips each hour of service throughout the day resulting in more vehicle hours and miles compared to the No-Build and Enhanced Corridor Alternatives. Similarly, the substantial difference in place-miles associated with both the Enhanced Corridor and EmX Alternatives reflects the implementation of EmX or Enhanced bus service in the corridor and the replacement of parallel bus service with higher capacity vehicles. Corridor transit place-miles would increase by 33,810 place-miles for the Enhanced Corridor Alternative and 88,400 place-miles for the EmX Alternative compared to the No-Build Alternative.

6.3.2. Transit and Passenger Vehicle Travel Time

Transit travel time is assessed using in-vehicle time and total travel time. Table 6.3-2 provides a summary of in-vehicle and total auto and transit travel times in the a.m. peak hour for trips to Eugene Station from the route terminus.

In-vehicle transit travel time includes only the amount of time it takes for a transit vehicle to travel between an origin and destination. For buses, this measure reflects roadway speed limits, congestion, and stop dwell time. In-vehicle plus walk and wait travel time includes time spent walking to transit, initial wait time, transfer wait time (if any), in-vehicle time, and time walking from transit to the destination.

In terms of auto times, there is no appreciable difference in times between the No-Build Alternative and the Build Alternatives. For transit travel times, both the Enhanced Corridor and EmX Alternatives demonstrate travel time savings of at least 5 minutes compared to the No-Build Alternative.

Table 6.3-2. River Road Corridor 2035 Auto and Transit Travel Times (a.m. Peak Hour) by Alternative

	Travel Time to Eugene Station from Santa Clara Transit Center (minutes)					
	Auto	Transit				
	No-Build, EC, and EmX Alternatives	No-Build Alternative	EC Alternative		EmX Alternative	
Measure	Time	Time	Time	Delta from No-Build	Time	Delta from No-Build
In-Vehicle[a]	10	26	21	-5	18	-8
In-Vehicle Plus Walk and Wait[b]	14	45	34	-11	27	-18

Source: LCOG Regional Travel Demand Model Results. (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

EC = Enhanced Corridor

[a] In-vehicle transit travel times represent time spent in the transit vehicle.
[b] In-vehicle plus walk and wait travel time represents walk time, one-half the wait time, and in-vehicle time in minutes.

6.3.3. Reliability

One of the major contributing factors to reliable transit service is the amount of exclusive and/or priority transit lanes along the corridor and at signalized intersections. Transit signal priority, installed at signalized intersections for the River Road Corridor Enhanced Corridor and EmX Alternatives, would minimize the variability of delay at traffic signals. Reliability measures include the total amount of new round-trip miles, the total length of exclusive and/or priority lanes, the percentage of new corridor exclusive or priority lanes, the number of trunk-line intersections with transit priority treatment, and the amount of motor vehicle congestion at signalized intersections on the corridor. Typically, the more congested the corridor, the greater the variability in delay at signalized intersections.

Table 6.3-3 summarizes these transit reliability measures for the Enhanced Corridor and EmX Alternatives. Every signalized intersection for both the Enhanced Corridor and EmX Alternatives would implement transit signal priority, whereas the No-Build Alternative would not implement additional transit signal priority. Compared to the No-Build Alternative, the Enhanced Corridor Alternative provides some priority treatment and the EmX Alternative provides substantially more priority treatment. The

Enhanced Corridor Alternative can be expected to have more reliable travel times during peak periods and the EmX Alternative can be expected to have even greater travel time reliability during peak periods compared to the No-Build Alternative.

Table 6.3-3. River Road Corridor 2035 Average Weekday Corridor Transit Reliability Measures

Measure	Enhanced Corridor	EmX	Delta between EmX and Enhanced Corridor
Total Number of New Round-Trip EmX System Miles (Miles)	0	10.3	10.3
Total Length of New Corridor Exclusive/Priority Lanes[a] (miles)	0.29	5.99	5.7
Percent of New Corridor that is Exclusive/Priority Lanes[a]	2.8%	58.2%	55.3%

Source: *MovingAhead Level 2 Definition of Alternatives* (CH2M et al., 2016).

[a] Exclusive/priority lanes are defined as the round-trip miles of business access and transit (BAT) lanes, bus-only lanes, and queue jumps.

6.3.4. Transit Ridership

System-wide transit ridership is defined as average weekday system-wide linked-trips in 2035. A linked trip is a one-way trip taken by a person from an origin to a destination, independent of the number of vehicles or transfers used to complete the trip. The Enhanced Corridor Alternative would result in a slight increase of less than 1 percent in systemwide transit trips, while the EmX Alternative would result in nearly a 2 percent increase in systemwide transit trips compared to the No-Build Alternative.

Corridor ridership is defined as any transit trip that is produced in and/or attracted to the respective corridor which for this purpose has been defined as the TAZ within a 0.5-mile buffer around the transit line. As shown in Table 6.3-4, the EmX Alternative would have the highest increase in corridor ridership compared to the No-Build Alternative, and the Enhanced Corridor Alternative would slightly increase ridership on the corridor.

Table 6.3-4. River Road Corridor Average Weekday 2035 Systemwide and Corridor Ridership by Alternative

Measure	No-Build Alternative	Enhanced Corridor	EmX
Total Systemwide Transit Trips[a]	46,410	46,520	47,230
Delta from No-Build		110	820
% Change from No-Build		0.2%	1.8%
Total Corridor Transit Trips[b]	24,480	24,570	25,740
Delta from No-Build		90	1,260
% Change from No-Build		0.4%	5.1%

Source: LCOG Regional Travel Demand Model Results (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

Note: Corridors overlap and include some common areas, downtown Eugene for example, as a result one cannot add up the totals to arrive at a regional total.

[a] Systemwide transit trips are defined as one-way linked trips taken by a person from the trips origin to the trips destination, independent of the number of vehicles or transfers used to complete the trip.
[b] Corridor transit trips are defined as any EmX or Bus trip with at least one trip end in the corridor.

6.3.5. Transit Boardings

Daily unlinked transit ridership, also referred to as boardings, is summarized in Table 6.3-5. There are two categories of boardings shown in the table. The first is a boarding total for all EmX lines that are not part of the project and the second is boardings for all routes within the project corridor. The reason boardings on other EmX lines are included is to show that there is some variation in boardings on the routes where the project route and the existing EmX system share operating on a portion of the alignment. Non-project EmX service for the EmX Alternative shows a loss of 150 boardings. This is because the River Road Corridor EmX Alternative shares a common operating segment along W. 6th Avenue and W. 7th Avenue with the existing EmX service. As a result, more shifting of riders would occur from the West Eugene EmX line with the introduction of another EmX route along West 6th Avenue and W. 7th Avenue for the EmX Alternative than for the Enhanced Corridor Alternative. Corridor daily boardings for both the Enhanced Corridor and EmX Alternatives would increase compared to the No-Build Alternative.

Table 6.3-5. River Road Corridor 2035 Average Weekday System EmX and Corridor Daily Boardings

	No-Build Alternative	Enhanced Corridor Alternative		EmX Alternative	
Route	**Daily Boardings**	**Daily Boardings**	**Delta from No-Build**	**Daily Boardings**	**Delta from No-Build**
Non-Project Total EmX Service	24,500	24,500	0	24,350	-150
Corridor Routes Total	5,350	5,400	50	7,100	1,750
Total	**29,850**	**29,900**	**50**	**31,450**	**1,550**

Source: LCOG Regional Travel Demand Model Results (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

Note: For Enhanced Corridor Alternative, numbers represent EmX and Enhanced Corridor daily boardings combined.

6.4. Annualized Impacts and Costs

The total annualized costs, according to FTA-provided factors and changes in VMT, associated with changes in safety (fatalities and serious injuries) are shown in Table 6.4-1, and will be incorporated into a total environmental benefit analysis using data from the *MovingAhead Air Quality Technical Report* (Michael Minor and Associates, Inc. and CH2M, 2017), the *MovingAhead Energy and Sustainability Technical Report* (DKS and CH2M, 2017), the *MovingAhead Operating and Maintenance Costs Technical Report* (LTD and City of Eugene, 2017), and the *MovingAhead Capital Cost Estimating Technical Report* (CH2M, 2017a).

The FTA annualized safety cost is calculated from the annual VMT by mode under each alternative. The modes included in this metric are automobiles, trucks, and buses (no bicycles or pedestrians). This cost calculation assumes that the fatal/serious injury crash frequency rises as VMT rises, and does not take into reduced crash rates associated with the build alternative infrastructure improvements.

Table 6.4-1. River Road Corridor Enhanced Corridor and EmX Alternatives 2035 Estimated Regionwide Annual Cost Savings Relative to No-Build Alternative

Annual Value	Enhanced Corridor Alternative	EmX Alternative
Annual VMT Decrease (Increase)	209,711	268,577
Annual Cost Savings (Increase) for Fatalities	$22,931	$43,802
Annual Cost Savings (Increase) for Serious Injuries	$38,330	($91,580)
Annual Total Savings (Increase)	**$61,262**	**($47,777)**

Sources: DKS Transportation Analysis. (2016).

Cost Factors: *New and Small Starts Evaluation and Rating Process Final Policy Guidance* (FTA, 2013, August).

The total annual cost increases for serious injuries in the EmX Alternative because the bus VMT is higher than in the No-Build Alternative, but the automobile VMT does not decrease enough to make up for the cost increase.

The changes in safety were based on changes in VMT for each alternative, according to the factors shown in Table 6.4-2.

Table 6.4-2. Fatality and Serious Injury Factors Per Million Vehicle Miles Traveled by Mode

Mode	Fatalities/Million VMT	Serious Injuries/Million VMT
Automobile	0.013	0.195
Heavy Truck[a]	0.004[a]	1.824[a]
Bus – Diesel	0.004	1.824
Bus – Electric	0.004	1.458

Source: *New and Small Starts Evaluation and Rating Process Final Policy Guidance* (FTA, 2013, August).

[a] Heavy Truck factors were not provided, and were assumed to be the same as diesel bus factors.

The safety costs were developed using the following cost factors from *New and Small Starts Evaluation and Rating Process Final Policy Guidance* (FTA, 2013, August):

- $9.1 million for each fatality
- $490,000 for each serious injury

An annualization factor of 342[7] was used to estimate annual automobile and heavy truck VMT based on average weekday VMT data. Annualized bus VMT was provided by LTD.

6.5. Indirect and Cumulative Effects

No indirect effects are anticipated for either the River Road Corridor Enhanced Corridor or EmX Alternative.

Cumulative effects were accounted for in the LCOG model for projecting future motor vehicle volume growth. Compared to the No-Build Alternative, the Enhanced Corridor and EmX Alternatives would offer more potential for mode shifts from motor vehicle travel to transit to help reduce congested traffic conditions.

[7] The annualization factor was calculated based on 2015 traffic volume data from ODOT's Automated Traffic Recording (ATR) stations. An average value was applied based on the six ATR stations located in the Eugene-Springfield region.

6.6. Short-Term Construction-Related Impacts

There would be no construction impacts under the River Road Corridor No-Build Alternative.

The Enhanced Corridor Alternative would follow the alignment of existing streets – primarily River Road, Chambers Street, Railroad Boulevard/W. 1st Avenue, Jefferson Street, Washington Street, Olive Street, W. 5th Avenue, Blair Boulevard, and W. 2nd Avenue – and would require the construction of new bus pullouts and some new BAT lanes. This wider road footprint would be constructed within the existing ROW wherever possible, but ROW acquisition would be necessary at places all along the extent of the alignment. Potential corridor-wide construction-related impacts are summarized in Table 6.6-1.

Table 6.6-1. River Road Corridor Enhanced Corridor Alternative Construction Impacts

Roadway	Functional Classification	Construction Truck Traffic	Lane Closure	Detour Route Available?	Sidewalk Impacts?	Bike Lanes Impacts?
Hunsaker Lane	Major Collector/Minor Arterial	Limited	Int.	No	Yes	Yes
River Road	Major Arterial	Moderate	Short Int.	No	Yes	Yes
Division Avenue	Major Collector	Limited	Int.	No	Yes	No
Randy Papé Beltline WB Onramp	Major Arterial	Limited	Int.	No	No	No
Randy Papé Beltline EB Onramp	Major Arterial	Limited	Int.	No	No	No
Silver Lane	Major Collector	Limited	Int.	No	Yes	Yes
Corliss Lane	Local Street	Limited	Int.	No	Yes	No
Maxwell Road	Minor Arterial	Limited	Int.	No	Yes	Yes
Howard Avenue	Neighborhood Collector	Limited	Int.	No	Yes	Yes
Merry Lane	Local Street	Limited	Int.	No	Yes	No
Horn Lane	Neighborhood Collector	Limited	Int.	No	Yes	Yes
Hilliard Lane	Local Street	Limited	Int.	No	Yes	Yes
Elkay Drive	Local Street	Limited	Int.	No	Yes	No
Park Avenue	Neighborhood Collector	Limited	Int.	No	Yes	Yes
Hansen Lane	Local Street	Limited	Int.	No	Yes	No
Briarcliff Drive	Local Street	Limited	Int.	No	Yes	No
Northwest Expressway	Major Collector/Minor Arterial	Limited	Int.	No	Yes	Yes

Source: DKS Transportation Analysis. (2016).

Sidewalk impacts mean that sidewalk reconstruction would be necessary to match in with the new sidewalk.
Bike lane impacts mean that the bike lane would be affected by the construction of the project.

Int. = Short-length lane closures (less than 500 feet) near intersection for a street intersecting the corridor
Long = possible long-length lane closure (longer than 500 feet)
Short = possible short-length lane closure (less than 500 feet)
Limited = Some construction traffic present and small travel delays are possible
Moderate = Construction traffic present and travel delays likely

The EmX Alternative would follow the alignment of existing streets – primarily River Road, Chambers Street, W. 6th Avenue, W. 7th Avenue, and Charnelton Street – and would require the construction of new bus pullouts, new BAT lanes, EmX stations, including several median EmX stations. The alignment on W. 6th Avenue and W. 7th Avenue would use existing infrastructure developed for the WEEE project. In addition, the motor vehicle lanes on River Road between Northwest Expressway and Silver Lane would be restriped in order to add a buffered bike lane to both sides of the roadway. This restriping would require some short-term short-length (less than 500 feet) and long-length (more than 500 feet) lane closures. No long-term full roadway closures are anticipated.

The construction impacts for the EmX Alternative would be more extensive than the Enhanced Corridor Alternative, with long-length lane closures (longer than 500 feet) instead of short-length lane closures (less than 500 feet) on River Road, and intersection impacts due to signal modifications on Hansen Lane, Knoop Lane, Merry Lane, Silver Lane, Randy Papé Beltline ramps, Division Avenue, and Hunsaker Lane. The impacts are shown in Table 6.6-2.

Table 6.6-2. River Road Corridor EmX Alternative Construction Impacts

Roadway	Functional Classification	Construction Truck Traffic	Lane Closure	Detour Route Available?	Sidewalk Impacts?	Bike Lanes Impacts?
Hunsaker Lane	Major Collector/Minor Arterial	Moderate	Short Int.	No	Yes	Yes
River Road	Major Arterial	Moderate	Long Int.	No	Yes	Yes
Division Avenue	Major Collector	Moderate	Int.	No	Yes	No
Randy Papé Beltline WB Onramp	Major Arterial	Moderate	Int.	No	No	No
Randy Papé Beltline EB Onramp	Major Arterial	Moderate	Int.	No	No	No
Silver Lane	Major Collector	Moderate	Int.	No	Yes	Yes
Corliss Lane	Local Street	Limited	Int.	No	Yes	No
Maxwell Road	Minor Arterial	Limited	Int.	No	Yes	Yes
Howard Avenue	Neighborhood Collector	Limited	Int.	No	Yes	Yes
Merry Lane	Local Street	Limited	Int.	No	Yes	No
Horn Lane	Neighborhood Collector	Limited	Int.	No	Yes	Yes
Hilliard Lane	Local Street	Limited	Int.	No	Yes	Yes
Elkay Drive	Local Street	Limited	Int.	No	Yes	No
Park Avenue	Neighborhood Collector	Limited	Int.	No	Yes	Yes
Hansen Lane	Local Street	Limited	Int.	No	Yes	No
Briarcliff Drive	Local Street	Limited	Int.	No	Yes	No
Northwest Expressway	Major Collector/Minor Arterial	Limited	Int.	No	Yes	Yes

Source: DKS Transportation Analysis. (2016).

Sidewalk impacts mean that sidewalk reconstruction would be necessary to match in with the new sidewalk
Bike lane impacts mean that the bike lane would be affected by the construction of the project

Int. = Short-length lane closures (less than 500 feet) near intersection for a street intersecting the corridor
Long = possible long-length lane closure (longer than 500 feet)
Short = possible short-length lane closure (less than 500 feet)

Limited = Some construction traffic present and small travel delays are possible
Moderate = Construction traffic present and travel delays likely

Sidewalk construction would affect pedestrians and bicyclists. Construction of the improvements along the length of the project could impact existing curbs or other features along the alignment. The demolition and reconstruction of the curbs, gutters, sidewalks, and other facilities may be necessary to make room for the construction of the project. This activity would generate construction traffic for the removal of debris and the delivery of construction materials and equipment.

Construction may require short-term long-length (longer than 500 feet) and short-length (shorter than 500 feet) lane closures and rerouting of traffic. No long-term long-length lane closures are anticipated.

BAT and BRT-only lane construction would also impact side streets. Temporary restrictions of turn movements, into or out of the side streets, and some detours may be necessary at some of these intersections.

Work in residential areas would be completed during the day to comply with City of Eugene noise limits.

6.7. Potential Mitigation Measures

6.7.1. Long-Term Direct Impacts

Because the operations under the River Road Corridor Enhanced Corridor and EmX Alternatives would not be significantly impacted (v/c change of 0.02 or more) compared to No-Build operations, mitigation measures due to traffic operations would not be necessary. LTD has prepared an *Addendum to MovingAhead Alternatives Analysis Technical Reports Memorandum* (CH2M, 2017b) that evaluates ways to avoid or minimize impacts at some properties. Please see this addendum for additional information on potential parking, acquisitions, and tree impacts mitigation.

6.7.2. Short-Term Construction-Related Impacts

LTD and the contractor will carefully plan construction to minimize the potential impact to businesses, roadway users, and surrounding communities. For example, LTD plans to limit the length of any single lane closures to about five to ten blocks, and one side of the road would be worked on at a time to minimize the impact to road users. Shorter segments would be used in locations with higher than normal driveway density. Short construction segment lengths should allow for the contractor to quickly complete the work within a segment and reopen it to the public. The construction activities would flow from one segment to the next in a rolling construction sequence. Two adjoining segments would be worked on simultaneously with the goal of excavating, utility installation, base rock, and paving being completed within a 2- to 4-week period for each segment. Depending on the type of land uses in each construction segment (commercial or residential), and the predominant hours of operation for adjacent businesses, construction could occur at night if it would further reduce potential business and traffic disruptions. Any night work would have to comply with City of Eugene noise restrictions.

Business access would be maintained to the greatest extent practicable throughout all stages of construction. In high traffic locations or locations with heavily accessed business driveways, construction could take place at night if consistent with the City of Eugene's night construction requirements. This would reduce impacts to the adjacent businesses and their customers.

Mitigation measures would also require early, frequent, and ongoing communication among LTD, contractors, and affected property owners/tenants. Construction timing, staging, and signage would be coordinated by LTD's designated staff liaison in consultation with the affected property owners/tenants to minimize business and residential disruptions. Speed zone reductions within the construction zone, closed or narrow lanes, and temporary driveway relocation would also be considered to mitigate construction impacts. Variable message signs, the LTD website, and local news sources could also be used to provide roadway users with advance notice of current or pending construction activities and alternate routes. All required mitigation measures would be specified in LTD's construction contracting documents.

Emergency vehicle access would be provided at all times throughout the construction process.

6.8. Permits and Approvals

No permits or approvals are required for potential transportation impacts evaluated for the River Road Corridor.

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7. 30th Avenue to Lane Community College Corridor Environmental Consequences

A summary of the 30th Avenue to LCC Corridor alternatives and key findings is provided below.

The Enhanced Corridor Alternative would extend E. 20th Avenue from Oak Street to Amazon Parkway as a 60-foot-wide street, installing new traffic signals at Amazon Parkway/E. 20th Avenue, Oak Street/E. 20th Avenue, Amazon Parkway/driveway of former Civic Stadium site, and University Street/E. 30th Avenue. In addition, the Enhanced Corridor Alternative would replace two enhanced pedestrian crossings and install one new enhanced crossing. The key findings are as follows:

- Transit travel time from the terminus to Eugene Station (one-way inbound) would improve by 1 minute during the a.m. peak hour over the No-Build Alternative (see Section 7.3.2 for travel time discussion).
- System ridership would decrease by 0.2 percent or 100 average weekday riders per day (see Section 7.3.4 for ridership discussion).
- The Enhanced Corridor Alternative would install 3,520 feet (0.67 mile) of new or reconstructed sidewalk and 7,300 feet (1.38 miles) of new or improved bicycle facilities (see Section 7.2.2.2 for pedestrian and bicycle improvements discussion).
- Up to 101 on-street parking spaces could potentially be removed on Pearl Street and Oak Street. Mitigation measures could add up to 32 parking spaces (see Section 7.2.2.8 for discussion of parking impacts and Section 7.7.1 for discussion of mitigation measures).

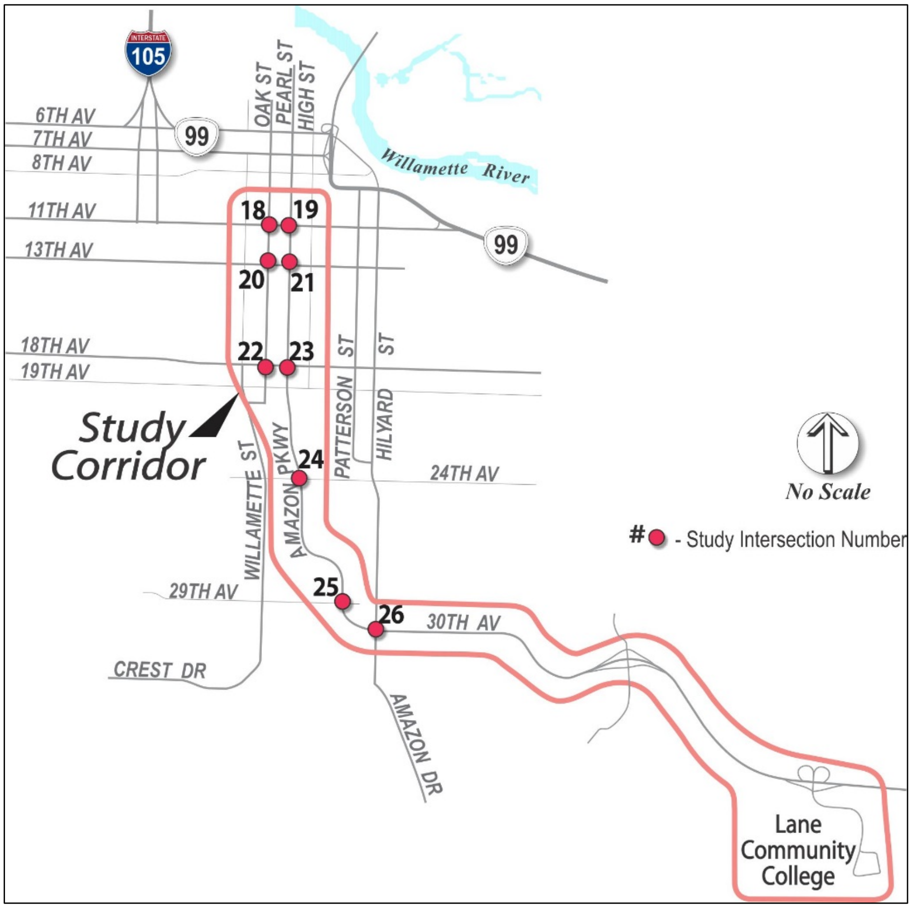
The EmX Alternative would extend E. 20th Avenue from Oak Street to Amazon Parkway as a 60-foot-wide street, installing new traffic signals at Amazon Parkway/E. 20th Avenue, Oak Street/E. 20th Avenue, Amazon Parkway/driveway of former Civic Stadium site, and University Street/E. 30th Avenue. In addition, the EmX Alternative would convert a general-purpose lane on Pearl Street between 10th Avenue and 19th Avenue to a BAT lane, and would install eight new enhanced pedestrian crossings and replace two existing enhanced crossings. The key findings are as follows:

- Transit travel time from the terminus to Eugene Station (one-way inbound) would improve by 2 minutes during the a.m. peak hour over the No-Build Alternative (see Section 7.3.2 for travel time discussion).
- Transit reliability would improve due to exclusive/priority transit lanes on 13.4 percent of the corridor (see Section 7.3.3 for transit reliability discussion).
- Systemwide ridership would increase by 1.4 percent or 660 average weekday riders per day (see Section 7.3.4 for ridership discussion).
- The EmX Alternative would install 2,930 feet (0.55 mile) of new or reconstructed sidewalk and 7,040 feet (1.34 miles) of new or improved bike facilities (see Section 7.2.3.2 for pedestrian and bicycle improvements discussion).
- Up to 147 on-street parking spaces could potentially be removed on Pearl Street and Oak Street. Mitigation measures could add up to 7 parking spaces (see Section 7.2.3.8 for discussion of parking impacts and Section 7.7.1 for discussion of mitigation measures).
- Up to 16 off-street parking spaces at 2 locations could be impacted. Three driveways along the corridor could be impacted (see Section 7.2.3.8 for parking and access impacts).

7.1. Affected Environment

The following section evaluates the 30th Avenue to LCC Corridor for base year and future year (2035) transportation conditions. Supporting data were acquired from intersection motor vehicle, pedestrian, and bicycle turning movement counts, the LCOG regional travel demand model, field observations, and ODOT crash data. The study area is shown on Figure 7.1-1.

Figure 7.1-1. 30th Avenue to Lane Community College Corridor Study Area Map



Source: DKS Transportation Analysis. (2016).

7.1.1. Roadway Characteristics

The transportation characteristics of the 30th Avenue to LCC Corridor are shown in Table 7.1-1 and include functional classification, number of travel lanes, posted speeds, presence of sidewalks and bike lanes, and existing transit routes serving the segment. The 30th Avenue to LCC Corridor is owned by the City of Eugene with the exception of the east end of the corridor (30th Avenue from Spring Boulevard to LCC) which is owned by Lane County. The entire City of Eugene portion of the corridor is classified as a minor arterial; the Lane County portion of 30th Avenue is an urban minor arterial and Gonyea Road is a rural major collector. Currently, Route 81, Route 82, and Route 92 serve the 30th Avenue to LCC Corridor. Route 81 runs along 30th Avenue between Eugene Station, the University of Oregon, and LCC every 30 minutes. Route 82 runs along 30th Avenue between Eugene Station and LCC every 10 to 20 minutes.

Route 92 runs along 30th Avenue between Eugene Station and Lowell, a town 20 miles to the southeast, three times a day.

Table 7.1-1. 30th Avenue to Lane Community College Corridor Existing Study Area Roadway Characteristics

Roadway	Jurisdiction	Functional Classification[b]	Number of Travel Lanes	Posted Speed	Sidewalk	Bike Lanes	LTD Transit Routes
Gonyea Road: 30th Avenue to Lane Community College	Lane County	Rural Major Collector	4	40 mph	No	Yes	81, 82, 92
E. 30th Avenue: Spring Boulevard to Gonyea Road	Lane County	Urban Minor Arterial	4	55 mph	No	No	81, 82, 92
E. 30th Avenue: Agate Street to Spring Boulevard	City of Eugene	Minor Arterial	4	45 mph	No	No	81, 82, 92
E. 30th Avenue: University Street to Agate Street	City of Eugene	Minor Arterial	3	45 mph	South side	No	81, 82, 92
E. 30th Avenue: Alder Street to University Street	City of Eugene	Minor Arterial	3	35 mph	Both sides	No	81, 82, 92
Amazon Parkway: Hilyard Street to Alder Street	City of Eugene	Minor Arterial	4	35 mph	Both sides	No	81, 82, 92
Amazon Parkway: E. 29th Avenue to Hilyard Street	City of Eugene	Minor Arterial	4	35 mph	Path[a]	No	73, 82, 92
Amazon Parkway: W. 19th Avenue to E. 29th Avenue	City of Eugene	Minor Arterial	2	35 mph	Some west side[a]	Yes	82, 92
Oak Street: E. 19th Avenue to E. 17th Avenue	City of Eugene	Minor Arterial	2 (NB only)	25 mph	Both sides	Yes	82, 92
Oak Street: E. 17th Avenue to E. 13th Avenue	City of Eugene	Minor Arterial	2 (NB only)	25 mph	Both sides	No	82, 92
Oak Street: E. 13th Avenue to E. 11th Avenue	City of Eugene	Minor Arterial	2 (NB only)	20 mph	Both sides	No	82, 92
E. 19th Avenue: Oak Street to Pearl Street	City of Eugene	Major Collector	2 (SB only)	25 mph	Both sides	No	82,92
Pearl Street: E. 10th Avenue to E. 13th Avenue	City of Eugene	Minor Arterial	2 (SB only)	20 mph	Both sides	Yes	12, 27, 66, 67, 82, 92
Pearl Street: E. 13th Avenue to E. 19th Avenue	City of Eugene	Minor Arterial	2 (SB only)	25 mph	Both sides	Yes	27, 82, 92
Olive Street: E. 10th Avenue to E. 11th Avenue	City of Eugene	Local	2	20 mph	Both sides	No	01
E. 11th Avenue: Olive Street to Oak Street	City of Eugene	Minor Arterial	2 (WB only)	20 mph	Both sides	WB only	27, 28, 76, 81, 98
E. 10th Avenue: Olive Street to Pearl Street	City of Eugene	Local	2	20 mph	Both sides	EB only	13, 67, 91

Source: DKS Transportation Analysis. (2016).

LTD = Lane Transit District
mph = miles per hour

[a] Paved paths and unpaved trails run parallel to Amazon, but there are no sidewalks immediately adjacent to the parkway in this stretch.

[b] Oregon Transportation Map. Federal Functional Classification Review. (City of Eugene, 2014 Edition). http://www.oregon.gov/ODOT/TD/TDATA/pages/gis/citymaps.aspx

The most recent average daily traffic on the corridor is shown in Table 7.1-2.

Table 7.1-2. 30th Avenue to Lane Community College Corridor 2013 Average Daily Traffic

Roadway Segment	Average Daily Traffic
Pearl Street: E. 13th Avenue to E. 14th Avenue	10,500
Oak Street: E. 14th Avenue to E. 13th Avenue	11,100
Amazon Parkway: E. 19th Avenue to E. 24th Avenue	16,100
Amazon Parkway: E. 24th Avenue to E. 27th Avenue	11,100
Amazon Parkway: E. 27th Avenue to E. 29th Avenue	9,200
Amazon Parkway/E. 30th Avenue: E. 29th Avenue to Hilyard Street	17,000
E. 30th Avenue: Hilyard Street to Harris Street	18,100
E. 30th Avenue: Harris Street to Spring Boulevard	17,400
E. 30th Avenue: Spring Boulevard to Forest Boulevard	17,000

Source: City of Eugene. (2013).
Compiled by DKS Transportation Analysis. (2016).

7.1.2. Study Intersections

Nine study intersections on the 30th Avenue to LCC Corridor were selected for traffic analysis for the existing conditions, 2035 No-Build Alternative, 2035 Enhanced Corridor Alternative, and 2035 EmX Alternative analyses. The study intersections are located throughout the corridor.

The study intersections evaluated for this corridor were:

- Oak St/E. 11th Ave
- Pearl St/E. 11th Ave
- Oak St/E. 13th Ave
- Pearl St/E. 13th Ave
- Oak St/E. 18th Ave
- Pearl St/E. 18th Ave
- Amazon Pkwy/E. 24th Ave
- Amazon Pkwy/E. 29th Ave
- Hilyard St/Amazon Pkwy/E. 30th Ave

7.1.3. Bicycle and Pedestrian Conditions

Pedestrian and bicycle activity at the nine study intersections was counted for the p.m. peak hours (Table 7.1-3). The highest p.m. peak hour pedestrian volumes occurred at Oak Street/E. 11th Avenue and Pearl Street/E. 18th Avenue and the highest bicycle volumes occurred at Pearl Street/E. 18th Avenue and Amazon Parkway/E. 24th Avenue.

Table 7.1-3. 30th Avenue to Lane Community College Corridor Study Intersection p.m. Peak Hour Pedestrian and Bicycle Volumes

Study Intersection Number	Study Intersection	Date of Intersection Count	p.m. Peak Hour Activity	
			Pedestrian	Bicycle
18	Oak Street/E. 11th Avenue	5/26/2010[a]	151	–[c]
19	Pearl Street/E. 11th Avenue	5/26/2010[a]	92	–[c]
20	Oak Street/E. 13th Avenue	5/26/2010[a]	62	–[c]
21	Pearl Street/E. 13th Avenue	5/26/2010[a]	70	–[c]
22	Oak Street/E. 18th Avenue	10/7/2015	60	17
23	Pearl Street/E. 18th Avenue	10/7/2015	119	99
24	Amazon Parkway/E. 24th Avenue	10/7/2015	29	38
25	Amazon Parkway/E. 29th Avenue	10/7/2015	45	15
26	Hilyard Street/Amazon Parkway/E. 30th Avenue	5/17/2010[b]	31	0

Source: DKS Transportation Analysis. (2016).

Note: Total volume crossing all legs of each intersection.

[a] Turning movement count was obtained from the City of Eugene staff.
[b] Turning movement count was obtained from the Draft Eugene 2035 TSP.
[c] Bicycle counts were not taken.

A qualitative assessment of the pedestrian and bicycle facilities along the 30th Avenue to LCC Corridor was conducted (Table 7.1-4) using methodology from ODOT's *Analysis Procedures Manual* (ODOT, 2014). Overall, the pedestrian and bicycle facilities are fair to good in the City of Eugene portion of the corridor and poor to fair in the Lane County portion of the corridor. The downtown portion of the corridor consists mostly of two-lane streets with landscape buffered sidewalks and bike lanes. The Amazon corridor between 19th Avenue and 30th Avenue consists of a two-lane road with narrow bike lanes and no adjacent sidewalks; however, the adjacent park features many multi-use trails, several of which run parallel to the parkway. The 30th Avenue portion of the corridor mainly consists of a four-lane, high speed roadway with no pedestrian or bicycle facilities.

Table 7.1-4. 30th Avenue to Lane Community College Corridor Existing Conditions Qualitative Assessment of Pedestrian and Bicycle Facilities[a]

Segment	Walking	Biking
E. 10th Avenue: Olive Street to Pearl Street	Good	Fair
E. 11th Avenue: Olive Street to Oak Street	Good	Fair
Olive Street: E. 10th Avenue to E. 11th Avenue	Fair	Poor
Pearl Street: E. 10th Avenue to E. 19th Avenue	Good	Fair
E. 19th Avenue: Oak Street to Pearl Street	Good	Poor
Oak Street: E. 11th Avenue to E. 17th Avenue	Good	Fair
Oak Street: E. 19th Avenue to E. 17th Avenue	Good	Good
High Street: E. 10th Avenue to E. 19th Avenue	Good	Good
Amazon Parkway: E. 19th Avenue to Pedestrian Overcrossing	Fair	Fair
Amazon Parkway: Pedestrian Overcrossing to E. 24th Avenue	Poor[b]	Fair[b]
Amazon Parkway: E. 24th Avenue to E. 29th Avenue	Poor[b]	Fair[b]
Amazon Parkway: E. 29th Avenue to Hilyard Street	Poor[b]	Fair[b]
30th Avenue: Hilyard Street to Agate Street	Fair	Poor
30th Avenue: Agate Street to Gonyea Road	Poor	Poor
Gonyea Road: 30th Avenue to Lane Community College	Poor	Fair

Source: DKS Transportation Analysis. (2016).

[a] Qualitative analysis based on methodology described in Chapter 14 of ODOT's Analysis Procedures Manual (ODOT, 2014).
[b] Paved and unpaved multi-use trails run parallel to Amazon Parkway, but there are no sidewalks immediately adjacent to the parkway in this stretch.

7.1.4. Transit

Currently, Route 81, Route 82, and Route 92 serve the 30th Avenue to LCC Corridor. Route 81 runs along 30th Avenue between Eugene Station, the University of Oregon, and LCC every 30 minutes. Route 82 runs along 30th Avenue between Eugene Station and LCC every 10 to 20 minutes. Route 92 runs along 30th Avenue between Eugene Station and Lowell, a town 20 miles to the southeast, three times a day.

7.1.5. Safety Analysis

Intersection crashes were gathered from the ODOT database for the last 5 full years of data (2010-2014). Crashes are grouped by severity (Table 7.1-5) and type (Figure 7.1-3) at both the segment and intersection levels. In total, the 30th Avenue to LCC Corridor had 184 crashes during the 5-year period analyzed. There were no reported fatalities along this corridor.

Table 7.1-5 shows the number of crashes by severity along with the intersection collision rate. Typically, intersections with a collision rate above or near 1 crash per million entering vehicles or segments with a collision rate above or near 1 crash per million vehicle miles are flagged for consideration of safety improvements. Currently, none of the study intersections have collision rates near 1 crash per million entering vehicles and none of the segments have collision rates near 1 crash per million vehicle miles.

Figure 7.1-2 shows a “heat map” of reported collisions along the 30th Avenue to LCC Corridor between 2010 and 2014, where higher densities of crashes are shown in red, medium densities are shown in orange, and lower densities are shown in green. Serious injury crashes are shown as black points along the corridor, and fatal crashes are shown as black points with a cross through it. The crashes on the 30th Avenue to LCC Corridor were concentrated downtown along E. 11th Avenue, Pearl Street, and E. 13th Avenue, at E. 18th Avenue/Pearl Street, E. 24th Avenue/Amazon Parkway, Hilyard/Amazon Parkway/E. 30th Avenue.

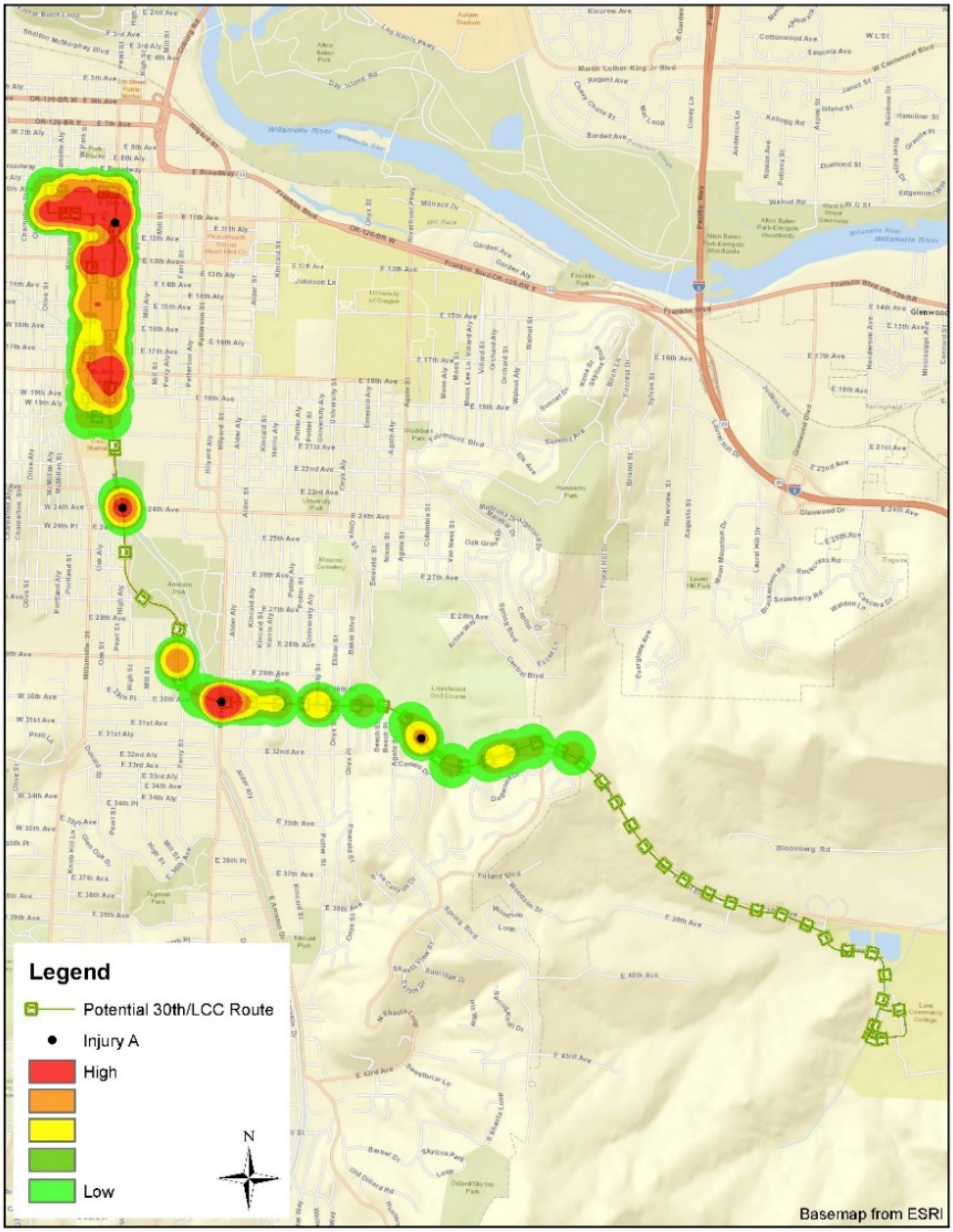
Table 7.1-5. 30th Avenue to Lane Community College Corridor 5-Year Collision Breakdown by Severity (2010–2014 Crashes)

Corridor - 30th Avenue to LCC (Approx. 5.2 Miles)							
	Fatality	Serious Injury	Evident Injury	Possible Injury	PDO[a]	Total	Segment Collision Rate[b]
Segments	**0**	**5**	**29**	**58**	**92**	**184**	**-**
E. 30th Avenue: Spring Boulevard to Forest Boulevard	0	0	1	0	2	3	0.02
E. 30th Avenue: Harris Street to Spring Boulevard	0	2	2	0	4	8	0.03
E. 30th Avenue: Hilyard Street to Harris Street	0	0	1	4	2	7	0.11
Amazon Parkway/E. 30th Avenue: E. 29th Avenue to Hilyard Street	0	0	1	0	1	2	0.03
Amazon Parkway: E. 27th Avenue to E. 29th Avenue	0	0	1	0	0	1	0.02
Amazon Parkway: E. 24th Avenue to E. 27th Avenue	0	0	0	1	2	3	0.05
Amazon Parkway: E. 19th Avenue to E. 24th Avenue	0	0	1	1	0	2	0.02
E. 19th Avenue: Amazon Parkway/Pearl Street to Oak Street	0	0	0	0	0	0	0.00
Pearl Street: W/E. 10th Avenue to E. 19th Avenue	0	1	4	5	12	22	0.17
Oak Street: E. 19th Avenue to E. 11th Avenue	0	0	1	1	5	7	0.06
W. 10th Avenue: Olive Street to Pearl Street	0	0	0	0	1	1	0.05
E. 11th Avenue: Oak Street to Olive Street	0	0	0	5	5	10	0.26
Intersections							
Oak St & E. 11th Ave	0	0	1	3	4	8	0.20[c]
Pearl St & E. 11th Ave	0	0	6	4	12	22	0.58[c]
Oak St & E. 13th Ave	0	0	3	6	5	14	0.46[c]
Pearl St & E. 13th Ave	0	0	1	6	8	15	0.50[c]
Oak St & E. 18th Ave	0	0	0	0	5	5	0.13[c]
Pearl St & E. 18th Ave	0	0	4	5	7	16	0.44[c]
Amazon Pkwy & E. 24th Ave	0	1	0	5	2	8	0.26[c]
Amazon Pkwy & E. 29th Ave	0	0	0	3	3	6	0.19[c]
Hilyard St & Amazon Pkwy/E. 30th Ave	0	1	2	9	12	24	0.38[c]

Source: ODOT Crash Data. (2016). Compiled by DKS Transportation Analysts. (2016).

[a] PDO = Property Damage Only.
[b] Collisions per 1 million vehicle miles.
[c] Collisions per 1 million entering vehicles.

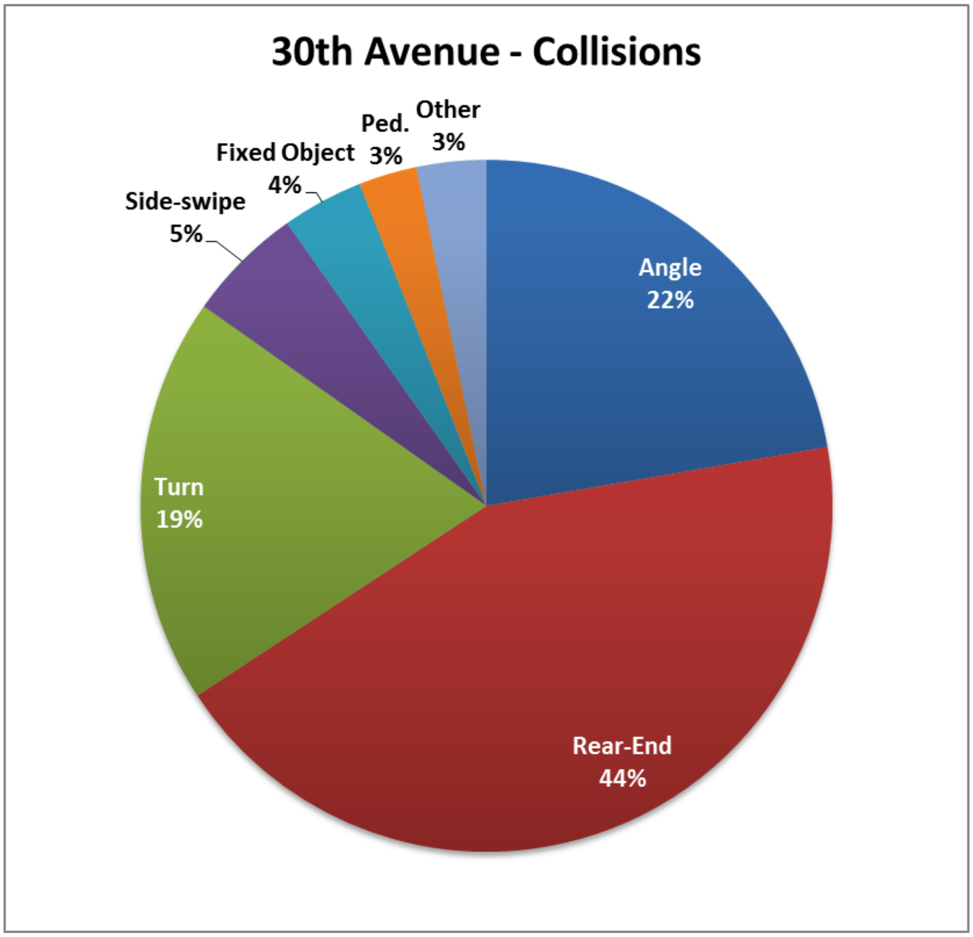
Figure 7.1-2. 30th Avenue to Lane Community College Corridor 5-Year Crash Heat Map (2010 – 2014)



Source: DKS Transportation Analysis. (2016).

Further analysis of the corridor was done in order to determine what types of crashes are most prevalent. As shown on Figure 7.1-3, the most prevalent collision types are rear end and angle, together accounting for over 60 percent of the total collisions along the corridor. In addition, there were a large number of turning crashes along Pearl Street and at Hilyard Street/Amazon Parkway/E. 30th Avenue. In addition, there were several pedestrian involved crashes along Pearl Street and Amazon Parkway/E. 29th Avenue. There were no segments or intersections that had a collision rate above or near 1 crash per million entering vehicles.

Figure 7.1-3. 30th Avenue to Lane Community College Corridor Collision Breakdown by Type

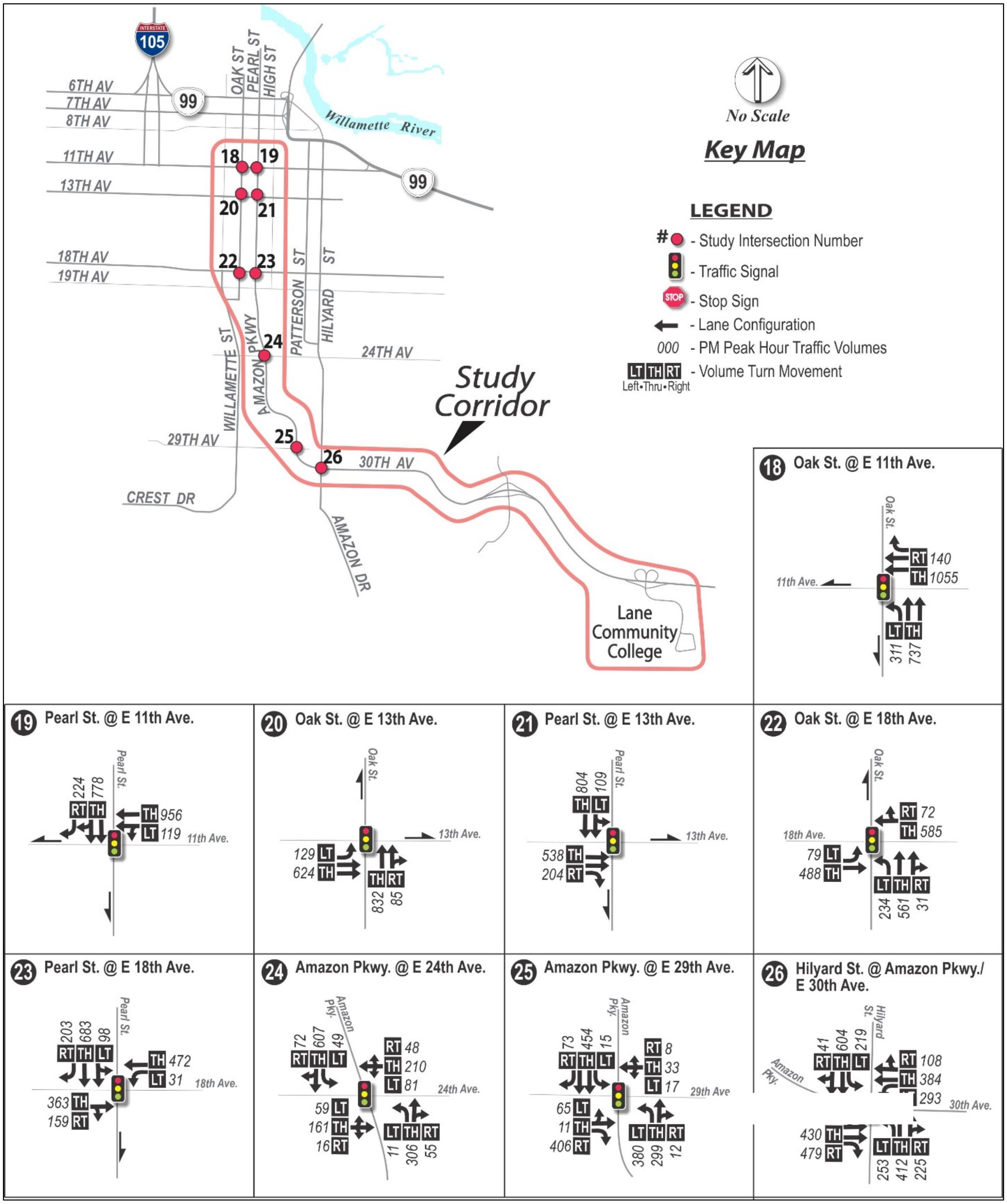


Source: DKS Transportation Analysis. (2016).

7.1.6. Existing Motor Vehicle Intersection Operations

The existing performance of the study intersections was evaluated using a traffic operations model based on 2000 *Highway Capacity Manual* methodology (TRB, 2000). The existing p.m. peak hour turning movement counts are shown on Figure 7.1-4.

Figure 7.1-4. 30th Avenue to Lane Community College Corridor 2015 Existing p.m. Peak Hour Traffic Volumes



Source: DKS Transportation Analysis. (2016).

The 2015 base year traffic volumes and existing roadway network were used to determine study intersection delay, level of service, and volume-to-capacity ratio. Existing intersection traffic signal timing was obtained from the City of Eugene and incorporated into the analysis. The existing study intersection operations analysis is presented in Table 7.1-6. The operations analysis was conducted at all of the study intersections during the p.m. peak hour.

Table 7.1-6. 30th Avenue to Lane Community College Corridor Existing 2015 p.m. Peak Hour Study Intersection Operations

Study Intersection Number	Study Intersection	Date of Intersection Count	Jurisdiction	Operating Standard[a]	LOS	Delay (sec)	v/c
18	Oak Street/E. 11th Avenue	5/26/2010[b]	City of Eugene	LOS E/LOS F	B	14.1	0.71
19	Pearl Street/E. 11th Avenue	5/26/2010[b]	City of Eugene	LOS E/LOS F	B	19.8	0.73
20	Oak Street/E. 13th Avenue	5/26/2010[b]	City of Eugene	LOS E/LOS F	B	14.1	0.59
21	Pearl Street/E. 13th Avenue	5/26/2010[b]	City of Eugene	LOS E/LOS F	B	10.2	0.55
22	Oak Street/E. 18th Avenue	10/7/2015	City of Eugene	LOS D/LOS E	B	19.5	0.69
23	Pearl Street/E. 18th Avenue	10/7/2015	City of Eugene	LOS D/LOS E	C	28.6	0.80
24	Amazon Parkway/E. 24th Avenue	10/7/2015	City of Eugene	LOS D/LOS E	B	16.5	0.73
25	Amazon Parkway/E. 29th Avenue	10/7/2015	City of Eugene	LOS D/LOS E	C	27.9	0.73
26	Hilyard Street/Amazon Parkway/E. 30th Avenue	5/17/2010[b]	City of Eugene	LOS D/LOS E	D	36.9	0.82

Source: DKS Transportation Analysis. (2016).

Italic underlined values do not meet current standards
Bold underlined values do not meet proposed standards or current standards

[a] Current/proposed operations standards for these facilities.
[b] Turning movement count was obtained from the City of Eugene staff.

During the existing p.m. peak hour, mobility standards are met at all of the study intersections.

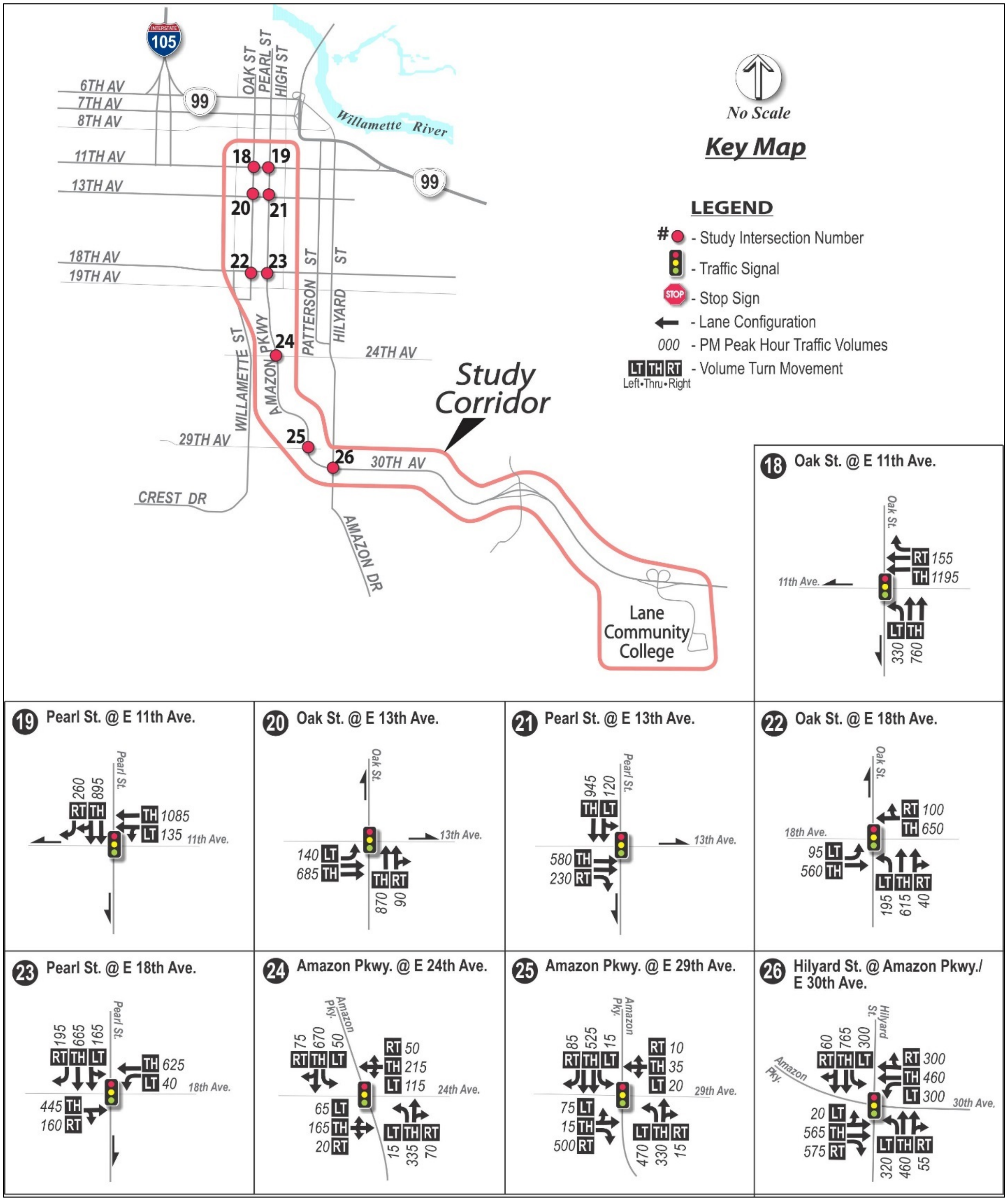
7.2. Long-Term Direct Impacts

7.2.1. No-Build Alternative

7.2.1.1. Local Traffic Operations

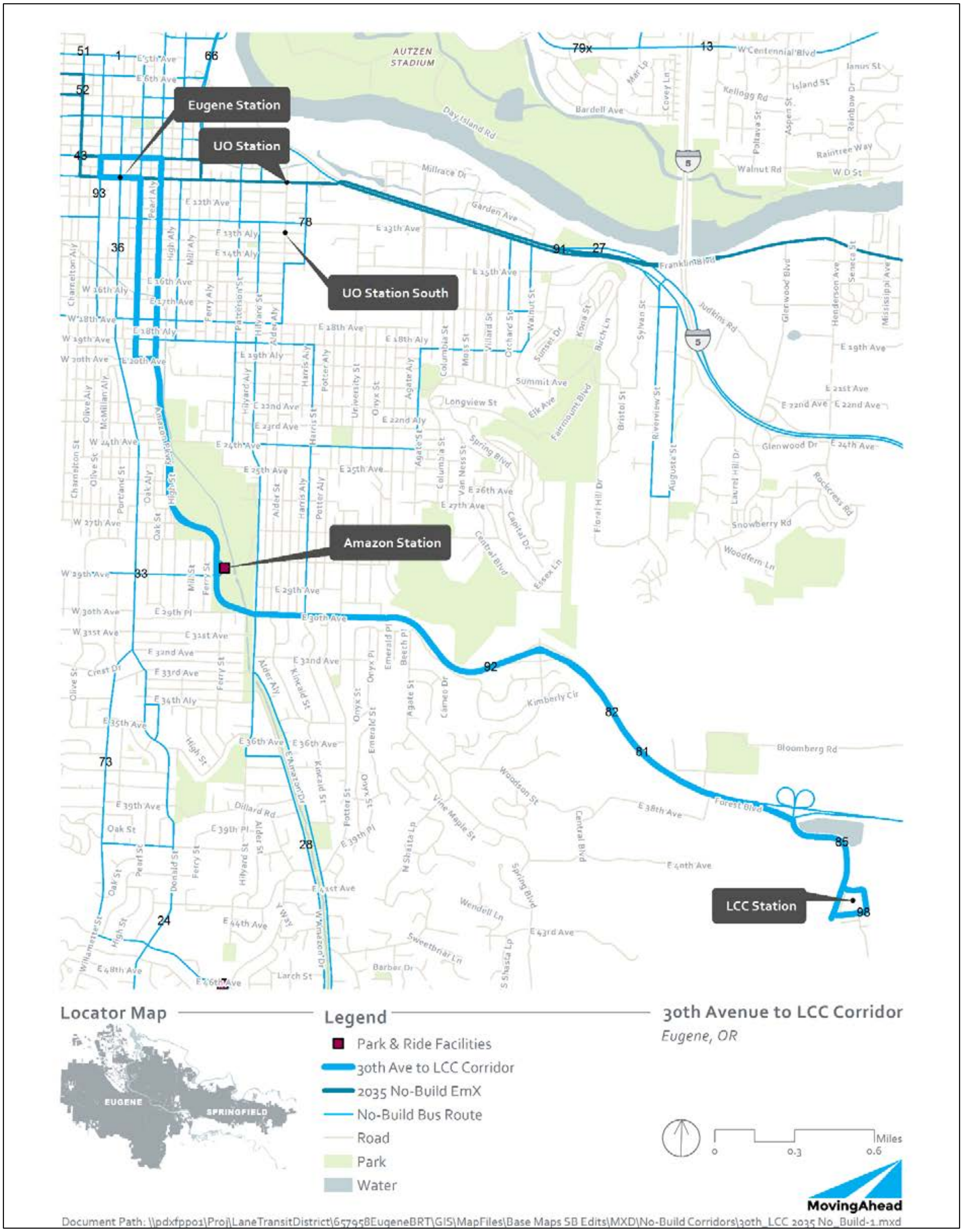
The future 30th Avenue to LCC Corridor No-Build Alternative motor vehicle turning movement volumes are shown on Figure 7.2-1. Figure 7.2-2 shows the 30th Avenue to LCC Corridor 2035 No-Build Alternative Transit Network.

Figure 7.2-1. 30th Avenue to Lane Community College Corridor No-Build Alternative 2035 p.m. Peak Hour Traffic Volumes



Source: DKS Transportation Analysis. (2016).

Figure 7.2-2. 30th Avenue to Lane Community College Corridor No-Build Alternative 2035 Transit Network



Source: CH2M. (2016).

The 2035 No-Build transportation analysis was based on a future roadway network which include the expected transportation improvements identified in the Draft Eugene 2035 TSP. The Draft Eugene 2035 TSP projects that would construct capacity improvements in the study area are shown in Table 7.2-1.

Table 7.2-1. 30th Avenue to Lane Community College Corridor Expected Transportation Improvement Projects On or Near the Corridor

Project Name	Description
Roadway Projects	
None	
Bike/Pedestrian Projects	
High Street Cycle Track	Install separated, two-way bicycle facility from E 5th Avenue to E 19th Avenue
Alder Street/Kincaid Street	Install bicycle boulevard from E. 17th Avenue to E. 30th Avenue (on Alder Street) and from E. 30th Avenue to E. 39th Avenue (Kincaid Street)

Source: *Draft Eugene 2035 TSP*. (City of Eugene, 2016a).

A traffic operations model was created for the study area to evaluate traffic flow and intersection operating conditions, such as average vehicle delay and congestion. The 2035 No-Build performance of the study intersections were evaluated using a traffic operations model based on 2000 *Highway Capacity Manual* methodology (TRB, 2000). The operations analysis was conducted at all of the study intersections during the p.m. peak hour. The No-Build Alternative study intersection operations analysis for the 2035 p.m. peak hour is presented in Table 7.2-2.

Table 7.2-2. 30th Avenue to Lane Community College Corridor No-Build Alternative 2035 p.m. Peak Hour Study Intersection Operations

Study Intersection Number	Study Intersection	Jurisdiction	Operating Standard[a]	LOS	Delay (sec)	v/c
18	Oak Street/E. 11th Avenue	City of Eugene	LOS E/LOS F	B	13.8	0.74
19	Pearl Street/E. 11th Avenue	City of Eugene	LOS E/LOS F	C	23.3	0.83
20	Oak Street/E. 13th Avenue	City of Eugene	LOS E/LOS F	B	14.6	0.63
21	Pearl Street/E. 13th Avenue	City of Eugene	LOS E/LOS F	B	10.1	0.62
22	Oak Street/E. 18th Avenue	City of Eugene	LOS D/LOS E	C	20.8	0.78
23	Pearl Street/E. 18th Avenue	City of Eugene	LOS D/LOS E	C	26.9	0.89
24	Amazon Parkway/E. 24th Avenue	City of Eugene	LOS D/LOS E	C	22.9	0.80
25	Amazon Parkway/E. 29th Avenue	City of Eugene	LOS D/LOS E	D	39.1	0.76
26	Hilyard Street/Amazon Parkway/E. 30th Avenue	City of Eugene	LOS D/LOS E	D	53.5	0.96

Source: DKS Transportation Analysis. (2016).

Italic underlined values do not meet current standards
Bold underlined values do not meet proposed standards or current standards

Delay = Average Intersection Delay in seconds
LOS = Level of Service
v/c = volume-to-capacity

[a] Existing/proposed operations standards for these facilities.

Under the 2035 p.m. peak hour No-Build Alternative, mobility standards would be met at all of the study intersections.

7.2.1.2. Connectivity to Planned Roadway, Bike, Pedestrian Projects

The 30th Avenue to LCC Corridor No-Build Alternative was compared with the existing and proposed roadway, bike, and pedestrian projects from the expected transportation improvement projects identified in the Draft Eugene 2035 TSP (Table 7.2-1) to determine how well coordinated the projects were. Expected transportation improvement projects, such as the addition of bike lanes and construction of new sidewalks, would improve access to transit. For example, the planned installation of a bicycle boulevard on Alder Street would improve bicycle and pedestrian access to nearby transit stops on 30th Avenue. Likewise, the planned installation of a separated two-way cycle track on High Street would improve bicycle access to nearby transit stops on Amazon Parkway, Pearl Street, and Oak Street.

The No-Build Alternative would not change connectivity to planned roadway, bike, or pedestrian projects.

The No-Build Alternative qualitative assessment of pedestrian and bicycle facilities is shown in Table 7.2-3. Pedestrian facilities were rated "excellent", "good", "fair", or "poor" based on presence and width of sidewalks or paths, presence and width of buffers (such as landscaping), outside travel lane width, number of travel lanes and speed of motorized traffic, presence and width of bicycle lane or shoulder, and presence of lighting. Bicycle facilities were rated "excellent", "good", "fair", or "poor" based on preferred type of facility (bike lane, buffered bike lane, off-street path) given motor vehicle volume of the roadway, presence and width of a shoulder, outside travel lane width, grade, pavement condition, obstructions, presence of on-street parking, and number of travel lanes and speed of motorized traffic.

Table 7.2-3. 30th Avenue to Lane Community College Corridor No-Build Alternative Qualitative Assessment of Pedestrian and Bicycle Facilities[a]

Segment	Walking	Biking
E. 10th Avenue: Olive Street to Pearl Street	Good	Fair
E. 11th Avenue: Olive Street to Oak Street	Good	Fair
Olive Street: E. 10th Avenue to E. 11th Avenue	Fair	Poor
Pearl Street: E. 10th Avenue to E. 19th Avenue	Good	Fair
E. 19th Avenue: Oak Street to Pearl Street	Good	Poor
Oak Street: E. 11th Avenue to E 17th Avenue	Good	Fair
Oak Street: E. 19th Avenue to E. 17th Avenue	Good	Good
High Street: E. 10th Avenue to E. 19th Avenue	Good	Good
Amazon Parkway: E. 19th Avenue to Pedestrian Overcrossing	Fair	Fair
Amazon Parkway: Pedestrian Overcrossing to E. 24th Avenue	Poor[b]	Fair[b]
Amazon Parkway: E. 24th Avenue to E. 29th Avenue	Poor[b]	Fair[b]
Amazon Parkway: E. 29th Avenue to Hilyard Street	Poor[b]	Fair[b]
30th Avenue: Hilyard Street to Agate Street	Fair	Poor
30th Avenue: Agate Street to Gonyea Road	Poor	Poor
Gonyea Road: 30th Avenue to Lane Community College	Poor	Fair

Source: DKS Transportation Analysis. (2016).

[a] Qualitative analysis based on methodology described in Chapter 14 of ODOT's *Analysis Procedures Manual* (ODOT, 2014).

[b] Paved and unpaved multi-use trails run parallel to Amazon Parkway, but there are no sidewalks immediately adjacent to the parkway in this stretch.

7.2.1.3. Plan Consistency

The 30th Avenue to LCC Corridor No-Build Alternative was evaluated for consistency with the Long Range Transit Plan (LTD, 2014), the FTN concept, and the goals outlined in the Regional Transportation Plan (MPO, 2011) and the Draft Eugene 2035 TSP.

The purpose of the LTD FTN is to leverage transit service investments by tying service to the density and other elements of adjacent development. The FTN enables a well-connected network that provides regional circulation by providing an average transit frequency of 15 minutes or better, a reliable transit system that runs on schedule (by implementing strategies such as transit priority at signalized intersections), and enhanced stations with bicycle and pedestrian connections (LTD, 2014). The No-Build Alternative would meet the FTN goal of providing frequent service on 30th Avenue, as it would run three routes on the corridor (Route 81, Route 82, and Route 92), and these routes combine to provide 10-minute frequencies during peak periods and 15 minute frequencies during off-peak periods.

The BRT system is the "highest level of service available within the FTN, and is a permanent, integrated system that uses buses or specialized vehicles on roadways or dedicated lanes to efficiently transport passengers" (LTD, 2014). BRT system elements include branded multi-door 60-foot-long BRT vehicles, enhanced stations with level boarding platforms instead of bus stops, off-board fare collection, transit signal priority, wider stop spacing, and 10-minute service frequencies. BRT service is intended to improve transit speed, reliability, and ridership (CH2M, 2016). The No-Build Alternative would not meet these BRT system elements.

The five primary goals outlined in the Draft Eugene 2035 TSP are to: (1) create an integrated system that is safe and efficient and reduces fossil fuel usage by 50 percent, (2) advance regional sustainability by reducing fossil fuel reliance, (3) reduce reliance on any single mode, (4) address the needs and safety of all travelers, and (5) triple the percentage of trips made on foot, by bicycle, and by transit by 2035 from 2014 levels. The No-Build Alternative would not improve bus service enough to meet many of these goals, such as improving frequency during off-peak hours to reduce reliance on other modes, reducing fossil fuel reliance, or helping to triple the percentage of trips made on foot, by bicycle, and by transit by 2035 from 2014 levels, compared to the build alternatives.

7.2.1.4. Transit Priority at Signalized Intersections

The 30th Avenue to LCC Corridor No-Build Alternative would not include any changes to traffic signal operations, and no exclusive bus signal phasing would be provided, except for those already under construction along 10th Avenue and 11th Avenue as part of the WEEE project.

7.2.1.5. Safety

The 30th Avenue to LCC Corridor No-Build Alternative would retain the existing roadway system except for the expected transportation improvements described in the Draft Eugene 2035 TSP and identified in Table 7.2-1. Overall safety would not be affected under the No-Build Alternative.

7.2.1.6. Circulation

The 30th Avenue to LCC Corridor No-Build Alternative would retain existing roadway circulation except for the expected transportation improvements described in the Draft Eugene 2035 TSP and identified in Table 7.2-1. Motor vehicle circulation would not be affected under the No-Build Alternative.

7.2.1.7. Freight

The 30th Avenue to LCC Corridor No-Build Alternative is not expected to impact freight truck movement.

7.2.1.8. Parking and Access

The 30th Avenue to LCC Corridor No-Build Alternative would not impact on-street or off-street parking and would not impact property access.

7.2.1.9. Emergency Vehicle Flow and Access

Emergency vehicle flow and access would not change under the 30th Avenue to LCC Corridor No-Build Alternative.

7.2.2. Enhanced Corridor Alternative

7.2.2.1. Local Traffic Operations

The 30th Avenue to LCC Corridor Enhanced Corridor Alternative would install roadway improvements that would affect study intersection operations, including:

- Extending E. 20th Avenue from Oak Street to Amazon Parkway as a 60-foot-wide street
- Installing new traffic signals at Amazon Parkway/E. 20th Avenue, Oak Street/E. 20th Avenue, Amazon Parkway/driveway of former Civic Stadium site, and University Street/E. 30th Avenue
- Prohibiting eastbound left turns at Hilyard Street/Amazon Parkway/E. 30th Avenue

The 2035 p.m. peak hour turning movement volumes for the Enhanced Corridor Alternative are shown on Figure 7.2-3 and the transit and roadway improvements are shown on Figure 7.2-4. The study intersection performance for the 2035 p.m. peak hour No-Build and Enhanced Corridor Alternatives are shown in Table 7.2-4. Operations degraded slightly at the Oak Street/E. 11th Avenue intersection due to the conversion of an exclusive left turn lane to a buffered bike lane, but are still well within operating standard.

Table 7.2-4. 30th Avenue to Lane Community College Corridor Enhanced Corridor Alternative 2035 p.m. Peak Hour Study Intersection Operations

Study Intersection Number	Study Intersection	Jurisdiction	Operating Standard[a]	No-Build			Enhanced Corridor		
				LOS	Delay (sec)	v/c	LOS	Delay (sec)	v/c
18	Oak Street/E. 11th Avenue	City of Eugene	LOS E/LOS F	B	13.8	0.74	B	17.4	0.88
19	Pearl Street/E. 11th Avenue	City of Eugene	LOS E/LOS F	C	23.3	0.83	C	23.4	0.83
20	Oak Street/E. 13th Avenue	City of Eugene	LOS E/LOS F	B	14.6	0.63	B	15.5	0.63
21	Pearl Street/E. 13th Avenue	City of Eugene	LOS E/LOS F	B	10.1	0.62	B	10.1	0.62
22	Oak Street/E. 18th Avenue	City of Eugene	LOS D/LOS E	C	20.8	0.78	B	18.9	0.76
23	Pearl Street/E. 18th Avenue	City of Eugene	LOS D/LOS E	C	26.9	0.89	C	25.3	0.88
24	Amazon Parkway/E. 24th Avenue	City of Eugene	LOS D/LOS E	C	22.9	0.80	C	23.7	0.82
25	Amazon Parkway/E. 29th Avenue	City of Eugene	LOS D/LOS E	D	39.1	0.76	D	39.8	0.78
26	Hilyard Street/Amazon Parkway/E. 30th Avenue	City of Eugene	LOS D/LOS E	D	53.5	0.96	D	52.1	0.95

Source: DKS Transportation Analysis. (2016).

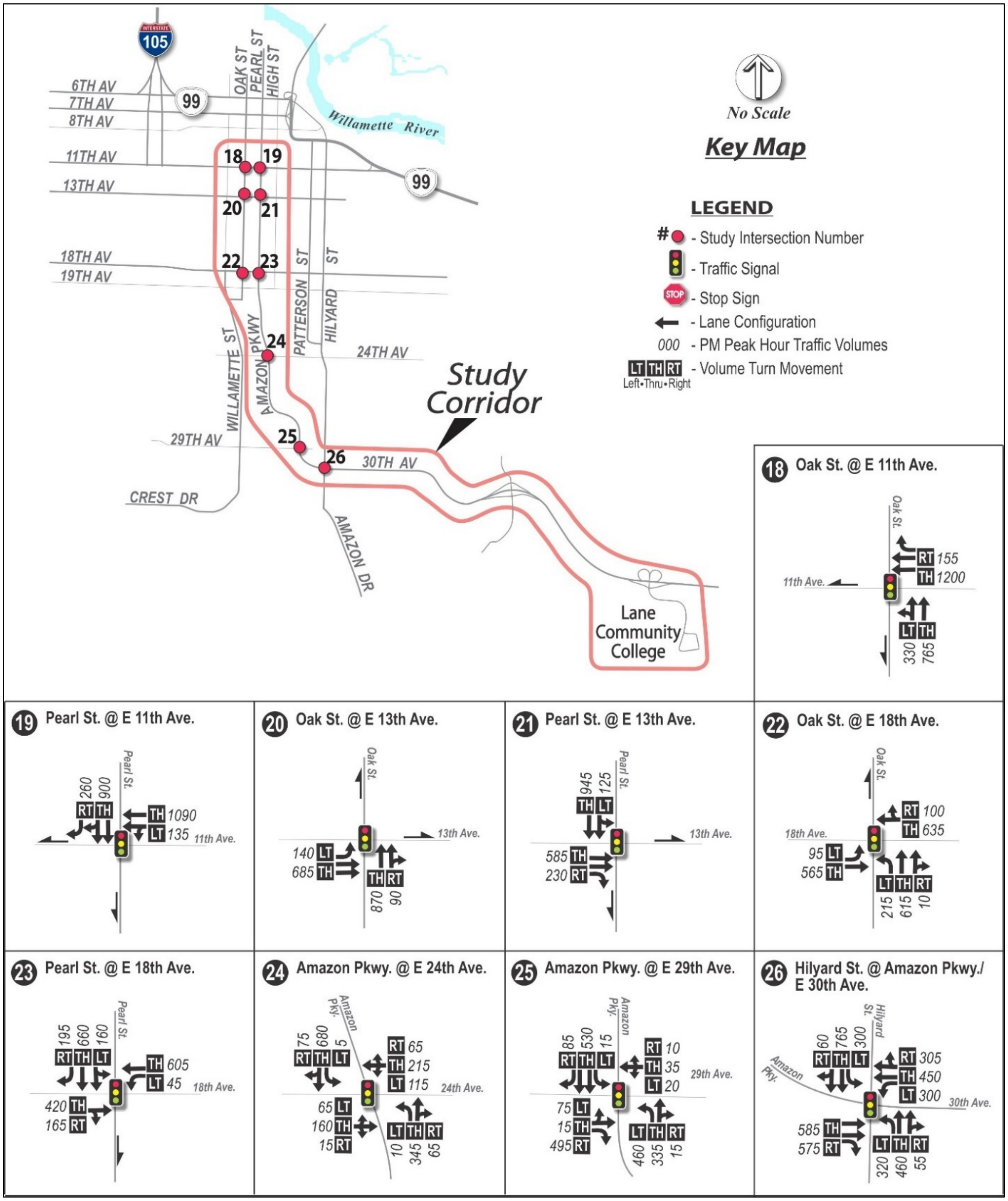
Italic underlined values do not meet current standards
Bold underlined values do not meet proposed standards or current standards

Delay = Average Intersection Delay in seconds
LOS = Level of Service
v/c = volume-to-capacity

[a] Existing/proposed operations standards for these facilities.

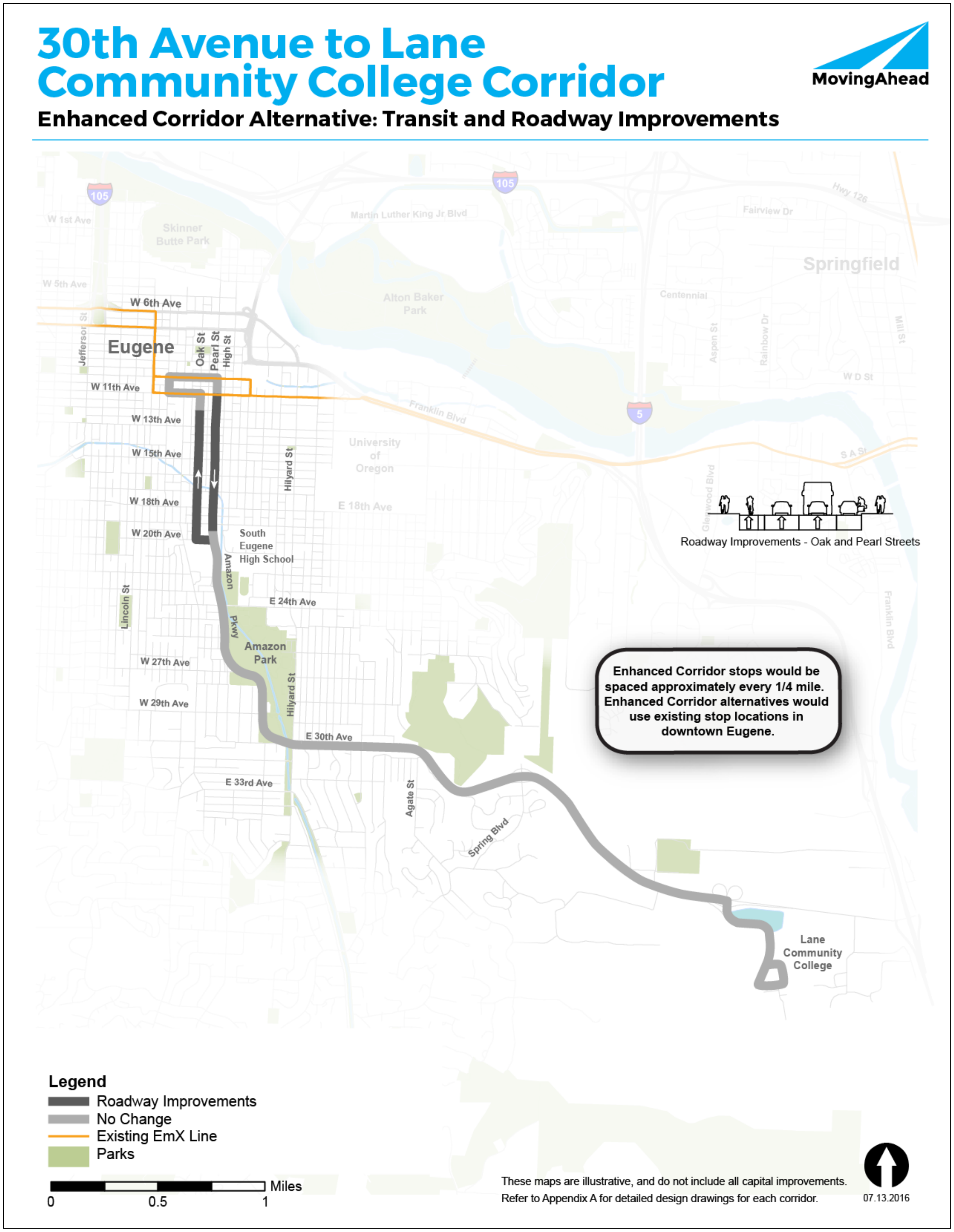
For the Enhanced Corridor Alternative, operating standards are met at all of the study intersections.

Figure 7.2-3. 30th Avenue to Lane Community College Corridor 2035 Enhanced Corridor Alternative p.m. Peak Hour Traffic Volumes



Source: DKS Transportation Analysis. (2016).

Figure 7.2-4. 30th Avenue to Lane Community College Corridor 2035 Enhanced Corridor Alternative Transit and Roadway Improvements



Source: CH2M. (2016).

7.2.2.2. Connectivity to Roadway, Bike, and Pedestrian Facilities

The proposed multi-modal project improvements (shown on Figure 7.2-5 and in Table 7.2-5) were compared with the existing and proposed roadway, bike, and pedestrian projects from the expected transportation improvement projects identified in the Draft Eugene 2035 TSP (Table 7.2-1) to determine how well coordinated the projects were. Expected transportation improvement projects, such as the installation of a bicycle boulevard on Alder Street and Kincaid Street, would improve bicycle and pedestrian access to nearby Enhanced Corridor transit stops. Likewise, the planned installation of a separated two-way cycle track on High Street would improve bicycle access to nearby transit stops on Amazon Parkway, Pearl Street, and Oak Street.

The amount of new and reconstructed pedestrian and bicycle facilities proposed under the Enhanced Corridor Alternative are shown in Table 7.2-5. Compared to the No-Build Alternative, the Enhanced Corridor Alternative would install a large number of pedestrian improvements. Most notably, the Enhanced Corridor Alternative would decommission the existing pedestrian bridge over Amazon Parkway located 650 feet south of the E. 19th Avenue intersection and install an at-grade crossing and sidewalks.

The 30th Avenue to LCC Corridor Enhanced Corridor Alternative would improve bike facilities compared to the No-Build Alternative by installing buffered bicycle lanes on Pearl Street from E. 11th Avenue to E. 19th Avenue and on Oak Street from E. 11th Avenue to E. 20th Avenue.

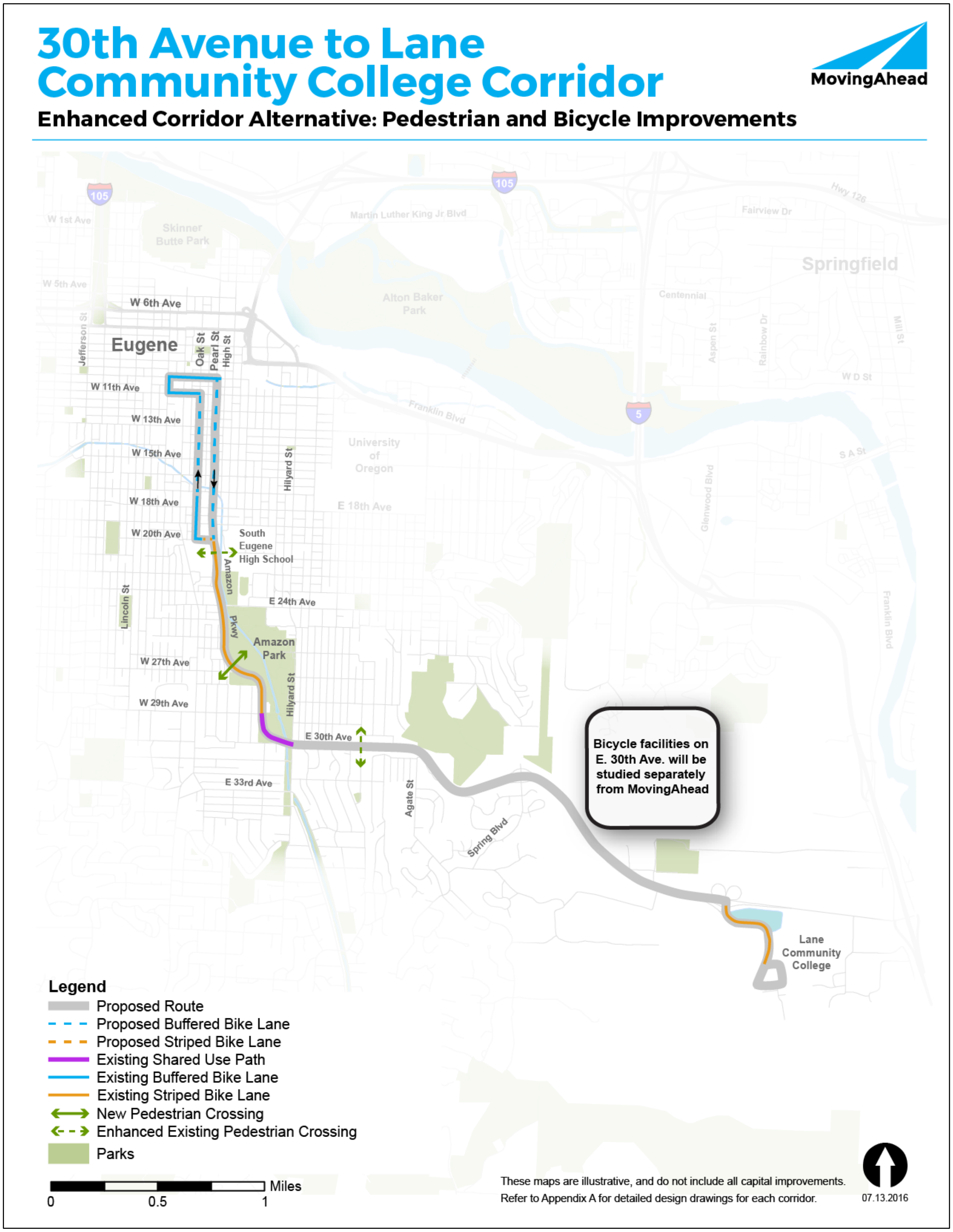
Table 7.2-5. 30th Avenue to Lane Community College Corridor Enhanced Corridor Alternative New and Reconstructed Pedestrian and Bicycle Facilities

Improvement	Length of Facilities
New Sidewalk	2,300 feet (0.44 miles)
Reconstructed/Improved Sidewalk	1,220 feet (0.23 miles)
Number of New Mainline Enhanced Crossings[a]	1 (on Amazon Parkway)
Number of Replaced Enhanced Crossings[a]	2 (1 on Amazon Parkway, 1 on E. 30th Avenue)
New Bike Facilities	650 feet (0.12 miles)
Improved Bike Facilities	6,650 feet (1.26 miles)
Other Facilities	Decommission pedestrian bridge on Amazon Parkway located 650 feet south of E. 19th Avenue

Source: CH2M Transportation Analysis. (2016).

[a] Enhanced crossing would install either a flashing yellow indication (flashing beacon), a yellow, red, flashing red indication (Pedestrian Hybrid Beacon), or a full traffic signal with pedestrian crossings along the mainline to warn vehicles of a pedestrian crossing.

Figure 7.2-5. 30th Avenue to Lane Community College Corridor 2035 Enhanced Corridor Alternative Pedestrian and Bicycle Improvements



Source: CH2M. (2016).

The qualitative assessment of pedestrian and bicycle facilities, shown in Table 7.2-6, shows that three roadway segments would improve over the No-Build Alternative from “poor” or “fair” ratings to “good” ratings (one for walking and two for biking).

Table 7.2-6. 30th Avenue to Lane Community College Corridor Enhanced Corridor Alternative Qualitative Assessment of Pedestrian and Bicycle Facilities[a]

Segment	No-Build Walking	Enhanced Corridor Walking	No-Build Biking	Enhanced Corridor Biking
E. 10th Avenue: Olive Street to Pearl Street	Good	Good	Fair	Fair
E. 11th Avenue: Olive Street to Oak Street	Good	Good	Fair	Fair
Olive Street: E. 10th Avenue to E. 11th Avenue	Fair	Fair	Poor	Poor
Pearl Street: E. 10th Avenue to E. 19th Avenue	Good	Good	Fair	Good
E. 19th Avenue: Oak Street to Pearl Street	Good	Good	Poor	Poor
Oak Street: E. 11th Avenue to E. 17th Avenue	Good	Good	Fair	Good
Oak Street: E. 19th Avenue to E. 17th Avenue	Good	Good	Good	Good
High Street: E. 10th Avenue to E. 19th Avenue	Good	Good	Good	Good
Amazon Parkway: E. 19th Avenue to Pedestrian Overcrossing	Fair	Good	Fair	Fair
Amazon Parkway: Pedestrian Overcrossing to E. 24th Avenue	Poor[b]	Poor[b]	Fair[b]	Fair[b]
Amazon Parkway: E. 24th Avenue to E. 29th Avenue	Poor[b]	Poor[b]	Fair[b]	Fair[b]
Amazon Parkway: E. 29th Avenue to Hilyard Street	Poor[b]	Poor[b]	Fair[b]	Fair[b]
30th Avenue: Hilyard Street to Agate Street	Fair	Fair	Poor	Poor
30th Avenue: Agate Street to Gonyea Road	Poor	Poor	Poor	Poor
Gonyea Road: 30th Avenue to Lane Community College	Poor	Poor	Fair	Fair

Source: DKS Transportation Analysis. (2016).

[a] Qualitative analysis based on methodology described in Chapter 14 of ODOT’s *Analysis Procedures Manual* (ODOT, 2014).

[b] Paved and unpaved multi-use trails run parallel to Amazon Parkway, but there are no sidewalks immediately adjacent to the parkway in this stretch.

7.2.2.3. Plan Consistency

The 30th Avenue to LCC Corridor Enhanced Corridor Alternative was evaluated for consistency with the Long Range Transit Plan (LTD, 2014), the FTN concept, and the goals outlined in the Regional Transportation Plan (LCOG, 2011, December) and the Draft Eugene 2035 TSP.

The purpose of the LTD FTN is to leverage transit service investments by tying service to the density and other elements of adjacent development. The FTN enables a well-connected network that provides regional circulation by providing an average transit frequency of 15 minutes or better, a reliable transit system that runs on schedule (by implementing strategies such as transit priority at signalized intersections), and enhanced stations with bicycle and pedestrian connections (LTD, 2014). The Enhanced Corridor Alternative would meet the FTN goals by provided frequent service buses on the 30th Avenue to LCC Corridor. However, the service would not be as frequent as under the No-Build Alternative.

The BRT system is the "highest level of service available within the FTN, and is a permanent, integrated system that uses buses or specialized vehicles on roadways or dedicated lanes to efficiently transport passengers" (LTD, 2014). BRT system elements include branded multi-door 60-foot-long BRT vehicles, enhances stations with level boarding platforms instead of bus stops, off-board fare collection, transit signal priority, wider stop spacing, and 10-minute service frequencies. BRT service is intended to improve transit speed, reliability, and ridership (CH2M, 2016a). The Enhanced Corridor Alternative would not meet these BRT system elements.

The five primary goals outlined in the Draft Eugene 2035 TSP are to: (1) create an integrated system that is safe and efficient and reduces fossil fuel usage by 50 percent, (2) advance regional sustainability by reducing fossil fuel reliance, (3) reduce reliance on any single mode, (4) address the needs and safety of all travelers, and (5) triple the percentage of trips made on foot, by bicycle, and by transit by 2035 from 2014 levels. The Enhanced Corridor Alternative would not help Eugene to improve transit mode share. Significant bicycle and pedestrian improvements would be installed as part of the Enhanced Corridor Alternative that helps increase bicycle and pedestrian mode share over the No-Build Alternative.

7.2.2.4. Transit Priority at Signalized Intersections

The 30th Avenue to LCC Corridor Enhanced Corridor Alternative would include traffic signal construction at several intersections; however, none of the traffic signals would provide exclusive bus signal phasing.

Every traffic signal on the corridor would receive transit signal priority. Transit signal priority modifies normal traffic signal operations by extended green phases or shortening side street phases in order to reduce delay for transit vehicles.

7.2.2.5. Safety

Potential safety impacts associated with the 30th Avenue to LCC Corridor Enhanced Corridor Alternative include:

- One new upgraded crossings and two new enhanced crossings along the corridor would improve opportunities for bicyclists and pedestrians to cross Amazon Parkway
- Prohibiting eastbound left turn movements from 30th Avenue onto Hilyard Street could reduce rear end collisions for eastbound traffic
- New buffered bike lanes on Pearl Street and Oak Street would increase separation between motor vehicles and bicycles, which would reduce conflicts

Overall, motor vehicle safety would not be significantly affected under the Enhanced Corridor Alternative. Bicycle and pedestrian safety would be improved by the increase in crossing options and improvement in facilities.

7.2.2.6. Roadway Circulation

The 30th Avenue to LCC Corridor Enhanced Corridor Alternative was evaluated to assess motor vehicle circulation. Overall, roadway circulation would improve compared to the No-Build Alternative. The Enhanced Corridor Alternative would extend 20th Avenue from Oak Street to Amazon Parkway as a 60-foot-wide street with cross section to be determined. The extension of 20th Avenue would increase street connectivity.

Roadway circulation would be impacted at the Hilyard Street/Amazon Parkway intersection by prohibiting the eastbound left turn movement. Drivers would be able to take an eastbound left turn two blocks to the east, onto Kincaid Street, or three blocks to the east, onto Harris Street.

In addition, the installation of the following four new traffic signals would improve roadway circulation:

- Oak Street/E. 20th Avenue
- Amazon Parkway/E. 20th Avenue
- Amazon Parkway/former Civic Stadium site driveway
- E. 30th Avenue/University Street

7.2.2.7. Freight

The 30th Avenue to LCC Corridor Enhanced Corridor Alternative is not expected to impact freight truck movement.

7.2.2.8. Parking and Access

The 30th Avenue to LCC Corridor Enhanced Corridor Alternative would repurpose on-street parking to create a buffered bicycle lane on Pearl Street between 12th Avenue and 19th Avenue and on Oak Street between 12th Avenue and 20th Avenue. A parking occupancy survey was conducted on October 4, 2016, and October 5, 2016, in order to determine the peak parking demand on Oak Street and Pearl Street. Parking data were collected between 11:00 a.m. and 3:00 p.m., where the average occupancy for all block faces combined was 51 percent. The peak hour of occupancy occurred between noon and 1:00 p.m. on October 5, 2016, where block faces were an average of 55 percent occupied. Table 7.2-7 shows the occupancy by block during the peak hour of parking occupancy. A total of 101 on-street parking spaces would be impacted (removed) under the Enhanced Corridor Alternative.

Table 7.2-7. 30th Avenue to Lane Community College Corridor EC Alternative Weekday Peak Hour On-Street Parking Occupancy (Noon to 1:00 p.m.)

	Oak Street			Pearl Street		
	Number of Available Spaces	Number of Occupied Spaces	Percent Occupied	Number of Available Spaces	Number of Occupied Spaces	Percent Occupied
12th Avenue to 13th Avenue	13	1	8%	10	6	60%
13th Avenue to 14th Avenue	15	3	20%	5	4	80%
14th Avenue to 15th Avenue	11	7	64%	10	5	50%
15th Avenue to 16th Avenue	17	15	88%	3	1	33%
16th Avenue to 17th Avenue	11	1	9%	No Parking	N/A	N/A
17th Avenue to 18th Avenue	No Parking	N/A	N/A	No Parking	N/A	N/A

18th Avenue to 19th Avenue	17	16	94%	4	0	0%
19th Avenue to 20th Avenue	11	9	82%	No Parking	N/A	N/A
Subtotals (by street)	*95*	*52*	*55%*	*32*	*15*	*47%*
Total (Oak Street & Pearl Street)	**127**	**67**	**51%**			

Source: DKS Transportation Analysis. (2016). Data collection by All Traffic Data on October 4, 2016, and October 5, 2016.

Table 7.2-8. 30th Avenue to Lane Community College Corridor EC Alternative On-Street Parking Impacts

	Oak Street		Pearl Street	
	Number of Spaces Potentially Removed	**Number of Available Spaces**	**Number of Spaces Potentially Removed**	**Number of Available Spaces**
11th Avenue to 12th Avenue	6	16	-	1
12th Avenue to 13th Avenue	10	13	10	10
13th Avenue to 14th Avenue	15	15	5	5
14th Avenue to 15th Avenue	11	11	10	10
15th Avenue to 16th Avenue	9	17	3	3
16th Avenue to 17th Avenue	4	11	N/A	No Parking
17th Avenue to 18th Avenue	N/A	No Parking	N/A	No Parking
18th Avenue to 19th Avenue	7	17	N/A	4
19th Avenue to 20th Avenue	11	11	N/A	No Parking
Subtotals (by street)	*73*	*111*	*28*	*33*
Total (Oak Street & Pearl Street)	**101**	**220**		

The Enhanced Corridor Alternative would not impact off-street parking, access, or circulation.

7.2.2.9. Emergency Vehicle Flow and Access

The emergency service authorities do not foresee any major issues of concern related to expanded transit services. Emergency service providers would have an opportunity to review more detailed designs and would work with Lane Transit District to address issues in the future (Lane Fire Authority, personal communication, April 13, 2017).

7.2.3. EmX Alternative

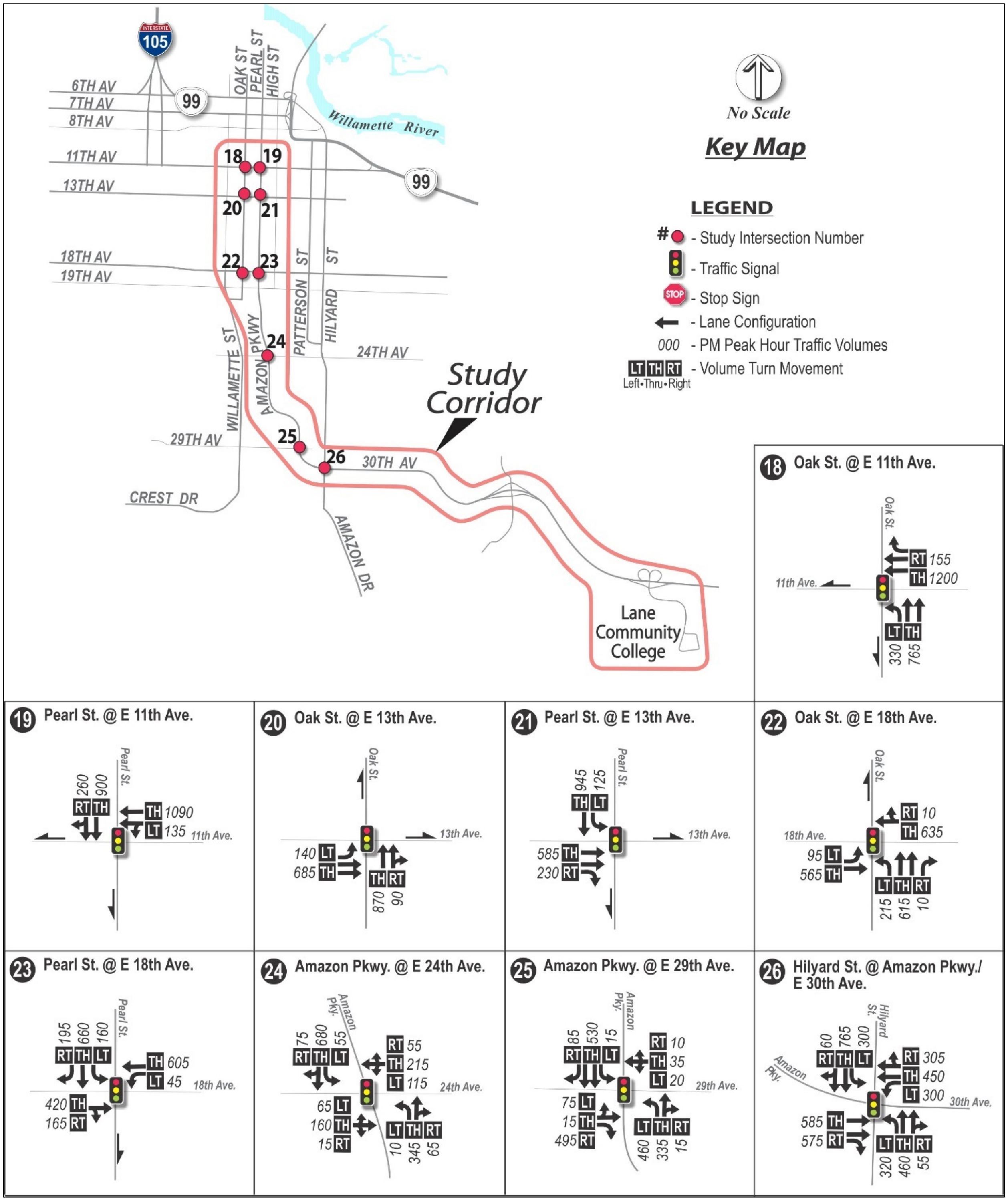
7.2.3.1. Local Traffic Operations

The 30th Avenue to LCC Corridor EmX Alternative would install roadway improvements that would affect study intersection operations, including:

- Prohibiting eastbound left turns at Hilyard Street/Amazon Parkway/E. 30th Avenue
- Extending E. 20th Avenue from Oak Street to Amazon Parkway as a 60-foot-wide street
- Installing 4 new traffic signals at Amazon Parkway/E. 20th Avenue, Oak Street/E. 20th Avenue, Amazon Parkway/driveway of former Civic Stadium site, and University Street/E. 30th Avenue
- Repurpose a general-purpose lane on Pearl Street between 10th Avenue and 19th Avenue, and Oak Street between 11th Avenue and 20th Avenue to BAT lanes
- Install transit queue jump at Pearl Street/19th Avenue

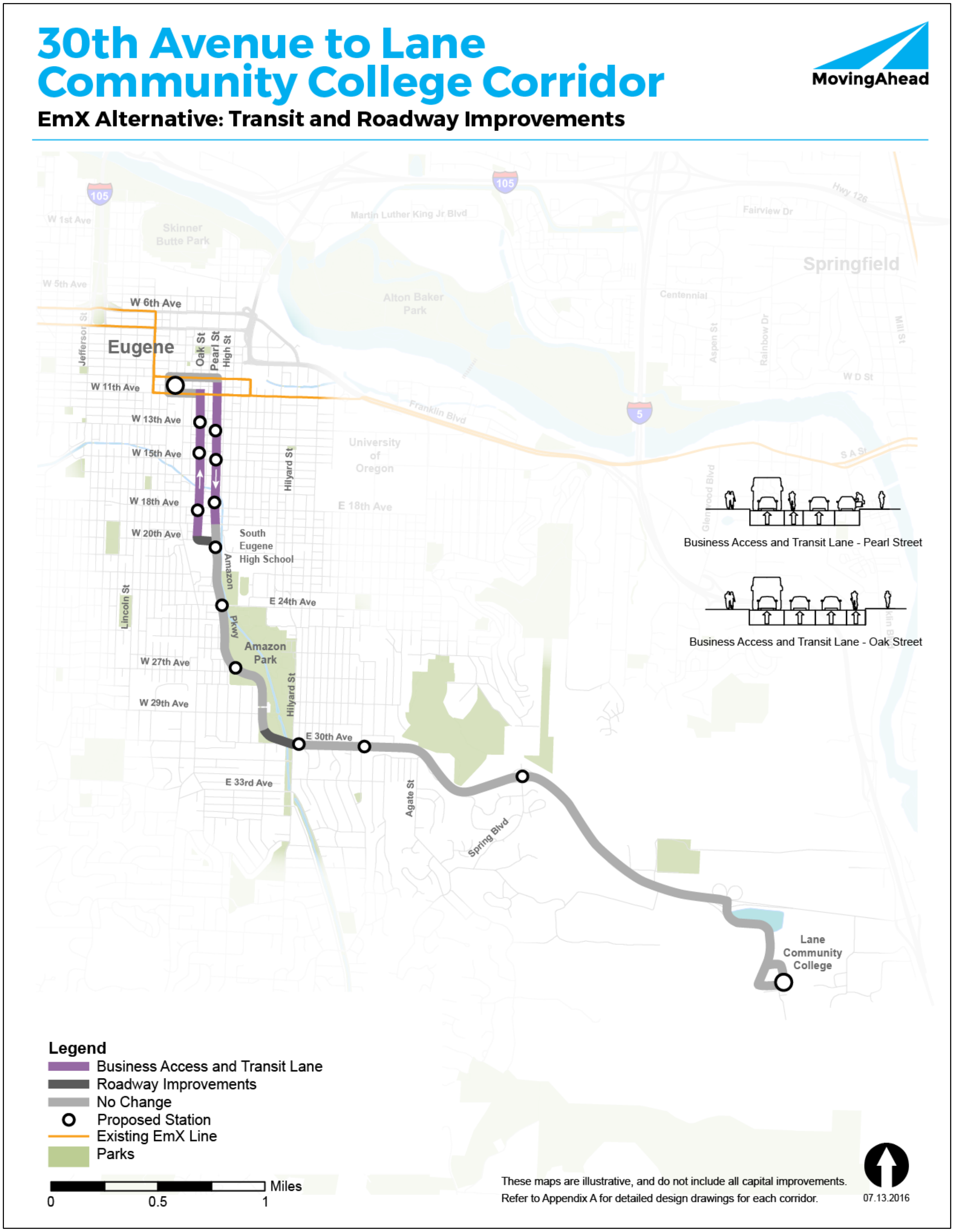
The 2035 p.m. peak hour turning movement volumes for the EmX Alternative are shown on Figure 7.2-6 and the transit and roadway improvements are shown on Figure 7.2-7. The study intersection performance for the 2035 p.m. peak hour No-Build and EmX Alternatives are shown in Table 7.2-8. Operations degraded at the Pearl Street/E. 11th Avenue intersection due to the conversion of a general-purpose travel lane to a BAT lane.

Figure 7.2-6. 30th Avenue to Lane Community College Corridor 2035 EmX Alternative p.m. Peak Hour Traffic Volumes



Source: DKS Transportation Analysis. (2016).

Figure 7.2-7. 30th Avenue to Lane Community College Corridor 2035 EmX Alternative Transit and Roadway Improvements



Source: CH2M. (2016).

Table 7.2-8. 30th Avenue to Lane Community College Corridor EmX Alternative 2035 p.m. Peak Hour Study Intersection Operations

Study Intersection Number	Study Intersection	Jurisdiction	Operating Standard[a]	No-Build			EmX		
				LOS	Delay (sec)	v/c	LOS	Delay (sec)	v/c
18	Oak Street/E. 11th Avenue	City of Eugene	LOS E/LOS F	B	13.8	0.74	B	12.0	0.74
19	Pearl Street/E. 11th Avenue	City of Eugene	LOS E/LOS F	C	23.3	0.83	*F*	*101.8*	*1.17*
20	Oak Street/E. 13th Avenue	City of Eugene	LOS E/LOS F	B	14.6	0.63	B	16.0	0.63
21	Pearl Street/E. 13th Avenue	City of Eugene	LOS E/LOS F	B	10.1	0.62	B	13.9	0.89
22	Oak Street/E. 18th Avenue	City of Eugene	LOS D/LOS E	C	20.8	0.78	B	18.9	0.75
23	Pearl Street/E. 18th Avenue	City of Eugene	LOS D/LOS E	C	26.9	0.89	C	28.1	0.90
24	Amazon Parkway/E. 24th Avenue	City of Eugene	LOS D/LOS E	C	22.9	0.80	C	23.7	0.82
25	Amazon Parkway/E. 29th Avenue	City of Eugene	LOS D/LOS E	D	39.1	0.76	D	39.9	0.78
26	Hilyard Street/Amazon Parkway/E. 30th Avenue	City of Eugene	LOS D/LOS E	D	53.5	0.96	D	52.2	0.95

Source: DKS Transportation Analysis. (2016).

Italic underlined values do not meet current standards
Bold underlined values do not meet proposed standards or current standards

Delay = Average Intersection Delay in seconds
LOS = Level of Service
v/c = volume-to-capacity

[a] Current/proposed operations standards for these facilities.

For the EmX Alternative, operating standards would not be met at the following study intersection:

- Pearl Street/E. 11th Avenue (current standards only)

7.2.3.2. Connectivity to Roadway, Bike, and Pedestrian Facilities

The proposed multi-modal project improvements (shown in Table 7.2-9 and on Figure 7.2-8) were compared with the existing and proposed roadway, bike, and pedestrian projects from the expected transportation improvement projects identified in the Draft Eugene 2035 TSP (Table 7.2-1) to determine how well coordinated the projects were. Expected transportation improvement projects, such as the installation of a bicycle boulevard on Alder Street and Kincaid Street, would improve bicycle and pedestrian access to nearby transit stops.

The amount of new and reconstructed pedestrian and bicycle facilities proposed under the EmX Alternative are shown in Table 7.2-9. Compared to the No-Build Alternative, the EmX Alternative would install a significant number of pedestrian improvements. Most notably, the EmX Alternative would decommission the existing pedestrian bridge over Amazon Parkway located 650 feet south of the E. 19th Avenue intersection and install an at-grade crossing and sidewalks.

The 30th Avenue to LCC Corridor EmX Alternative would improve bike facilities compared to the No-Build and Enhanced Corridor Alternatives by installing a two-way cycle track on High Street from E. 10th Avenue connecting to the multi-use path at E. 19th Avenue.

Table 7.2-9. 30th Avenue to Lane Community College Corridor EmX Alternative New and Reconstructed Pedestrian and Bicycle Facilities

Improvement	Length of Facilities
New Sidewalk	1,540 feet (0.29 miles)
Reconstructed/Improved Sidewalk	1,390 feet (0.26 miles)
Number of New Mainline Enhanced Crossings[a]	10 total: 1 on Amazon Parkway, 2 on E. 30th Avenue, 2 on Pearl Street, 2 on Oak Street, 3 on High Street
Number of Upgraded Crossings[b]	1 on Amazon Parkway
New Bike Facilities	3,520 feet (0.67 miles)
Improved Bike Facilities	3,520 feet (0.67 miles)
Other Facilities	Decommission pedestrian bridge on Amazon Parkway located 650 feet south of E. 19th Avenue

Source: CH2M Transportation Analysis. (2016).

[a] Enhanced crossing would install either a flashing yellow indication (flashing beacon), a yellow, red, flashing red indication (Pedestrian Hybrid Beacon), or a full traffic signal with pedestrian crossings along the mainline to warn vehicles of a pedestrian crossing.

[b] Upgraded crossings would consist of installing ADA ramps and possibly median refuge islands and/or crosswalk striping.

The qualitative assessment of pedestrian and bicycle facilities, shown in Table 7.2-10, shows that two roadway segments would improve over the No-Build Alternative ratings (one for walking and one for biking).

Table 7.2-10. 30th Avenue to Lane Community College Corridor EmX Alternative Qualitative Assessment of Pedestrian and Bicycle Facilities[a]

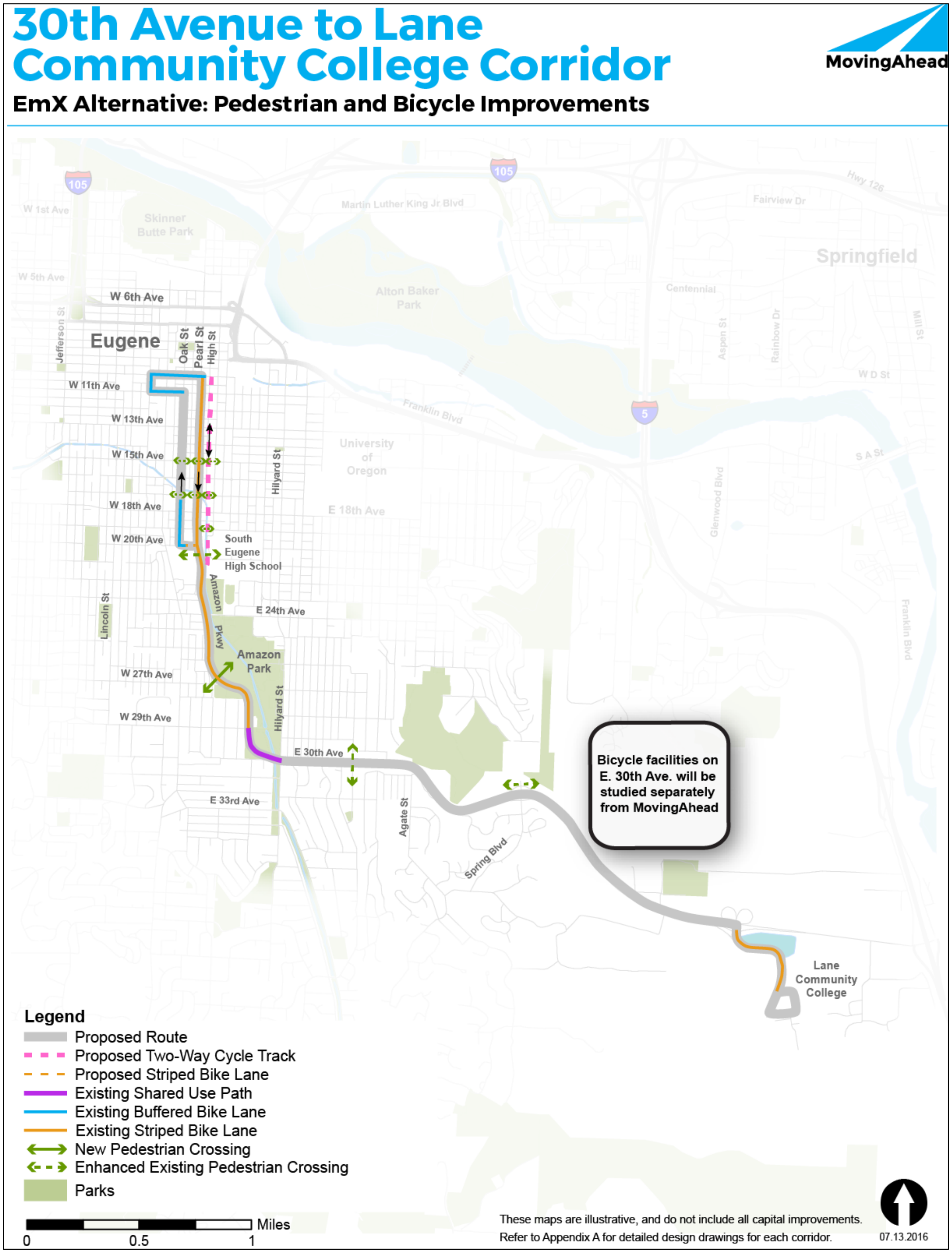
Segment	No-Build Walking	EmX Walking	No-Build Biking	EmX Biking
E. 10th Avenue: Olive Street to Pearl Street	Good	Good	Fair	Fair
E. 11th Avenue: Olive Street to Oak Street	Good	Good	Fair	Fair
Olive Street: E. 10th Avenue to E. 11th Avenue	Fair	Fair	Poor	Poor
Pearl Street: E. 10th Avenue to E. 19th Avenue	Good	Good	Fair	Fair
E. 19th Avenue: Oak Street to Pearl Street	Good	Good	Poor	Poor
Oak Street: E. 11th Avenue to E. 17th Avenue	Good	Good	Fair	Fair
Oak Street: E. 19th Avenue to E. 17th Avenue	Good	Good	Good	Good
High Street: E. 10th Avenue to E. 19th Avenue	Good	Good	Good	Excellent
Amazon Parkway: E. 19th Avenue to Pedestrian Overcrossing	Fair	Good	Fair	Fair
Amazon Parkway: Pedestrian Overcrossing to E. 24th Avenue	Poor[b]	Poor[b]	Fair[b]	Fair[b]
Amazon Parkway: E. 24th Avenue to E. 29th Avenue	Poor[b]	Poor[b]	Fair[b]	Fair[b]
Amazon Parkway: E. 29th Avenue to Hilyard Street	Poor[b]	Poor[b]	Fair[b]	Fair[b]
30th Avenue: Hilyard Street to Agate Street	Fair	Fair	Poor	Poor
30th Avenue: Agate Street to Gonyea Road	Poor	Poor	Poor	Poor
Gonyea Road: 30th Avenue to Lane Community College	Poor	Poor	Fair	Fair

Source: DKS Transportation Analysis. (2016).

[a] Qualitative analysis based on methodology described in Chapter 14 of ODOT's *Analysis Procedures Manual* (ODOT, 2014).

[b] Paved and unpaved multi-use trails run parallel to Amazon Parkway, but there are no sidewalks immediately adjacent to the parkway in this stretch.

Figure 7.2-8. 30th Avenue to Lane Community College Corridor 2035 EmX Alternative Pedestrian and Bicycle Improvements



Source: CH2M. (2016).

7.2.3.3. Plan Consistency

The 30th Avenue to LCC Corridor EmX Alternative was evaluated for consistency with the Long Range Transit Plan (LTD, 2014), the FTN concept, and the goals outlined in the Regional Transportation Plan (LCOG, 2011, December) and the Draft Eugene 2035 TSP.

The purpose of the LTD FTN is to leverage transit service investments by tying service to the density and other elements of adjacent development. The FTN enables a well-connected network that provides regional circulation by providing an average transit frequency of 15 minutes or better, a reliable transit system that runs on schedule (by implementing strategies such as transit priority at signalized intersections), and enhanced stations with bicycle and pedestrian connections (LTD, 2014). The EmX Alternative would meet the FTN goals by providing frequent service on Amazon Parkway/E. 30th Avenue, installing transit priority at signalized intersections, and adding BAT lanes and transit queue jumps to help make service more reliable and on schedule.

The BRT system is the "highest level of service available within the FTN, and is a permanent, integrated system that uses buses or specialized vehicles on roadways or dedicated lanes to efficiently transport passengers" (LTD, 2014). BRT system elements include branded multi-door 60-foot-long BRT vehicles, enhanced stations with level boarding platforms instead of bus stops, off-board fare collection, transit signal priority, wider stop spacing, and 10-minute service frequencies. BRT service is intended to improve transit speed, reliability, and ridership (CH2M, 2016a). The EmX Alternative would meet most of these BRT system elements.

The five primary goals outlined in the Draft Eugene 2035 TSP are to: (1) create an integrated system that is safe and efficient and reduces fossil fuel usage by 50 percent, (2) advance regional sustainability by reducing fossil fuel reliance, (3) reduce reliance on any single mode, (4) address the needs and safety of all travelers, and (5) triple the percentage of trips made on foot, by bicycle, and by transit by 2035 from 2014 levels. The EmX Alternative may help Eugene to slightly improve transit mode share, and significant bicycle improvements would be installed as part of the EmX Alternative that may help increase bicycle mode share. The EmX Alternative would provide some pedestrian facility improvements that help increase pedestrian mode share over the No-Build Alternative.

7.2.3.4. Transit Priority at Signalized Intersections

The 30th Avenue to LCC Corridor EmX Alternative would include traffic signal construction at several intersections. One traffic signal, located at the Pearl Street/E. 19th Avenue intersection, will provide exclusive bus signal phasing that would allow buses to safety enter traffic flow or travel through an intersection. Compared to the No-Build Alternative, both the Enhanced Corridor and the EmX Alternatives would have one additional signal with exclusive bus phasing.

In addition, every traffic signal on the corridor would receive transit signal priority. Transit signal priority modifies normal traffic signal operations by extending green phases or shortening side street phases in order to reduce delay for transit vehicles.

7.2.3.5. Safety

Potential safety impacts associated with the 30th Avenue to LCC Corridor EmX Alternative include:

- BAT lanes along Pearl Street and Oak Street which would serve both BRT vehicles and turning general-purpose vehicles. The addition of a turn lane would reduce potential vehicle conflicts such as rear end collisions (FHWA, 2014)

- Prohibiting eastbound left turn movements from 30th Avenue onto Hilyard Street could reduce rear end collisions for eastbound traffic
- A new two-way cycle track on High Street from 10th Avenue to the Amazon multi-use path at E. 19th Avenue would increase separation between motor vehicles and bicycles, and could reduce conflicts
- One new bicycle and pedestrian crossing and ten new enhanced crossings along the corridor could improve opportunities for bicyclists and pedestrians to cross Amazon Parkway

Overall, motor vehicle, bicycle, and pedestrian safety would be improved under the EmX Alternative compared to the No-Build and Enhanced Corridor Alternatives.

7.2.3.6. Roadway Circulation

The 30th Avenue to LCC Corridor EmX Alternative was evaluated to assess motor vehicle circulation. Overall, roadway circulation would improve compared to the No-Build Alternative, and would be the same as the Enhanced Corridor Alternative. The EmX Alternative would extend 20th Avenue from Oak Street to Amazon Parkway as a 60-foot-wide street with cross section to be determined. The extension of 20th Avenue would increase street connectivity.

Roadway circulation would be impacted at the Hilyard Street/Amazon Parkway intersection by prohibiting the eastbound left turn movement. Drivers would be able to take an eastbound left turn two blocks to the east, onto Kincaid Street, or three blocks to the east, onto Harris Street.

In addition, the installation of the following four new traffic signals would improve roadway circulation:

- Oak Street/E. 20th Avenue
- Amazon Parkway/E. 20th Avenue
- Amazon Parkway/former Civic Stadium site driveway
- E. 30th Avenue/University Street

7.2.3.7. Freight

The 30th Avenue to LCC Corridor EmX Alternative is not expected to impact freight truck movement.

7.2.3.8. Parking and Access

The 30th Avenue to LCC Corridor EmX Alternative would repurpose on-street parking to create BAT lanes on Pearl Street between 12th Avenue and 19th Avenue and on Oak Street between 12th Avenue and 20th Avenue. A parking occupancy survey was conducted on October 4, 2016, and October 5, 2016, in order to determine the peak parking demand on Oak Street and Pearl Street. Parking data were collected between 11:00 a.m. and 3:00 p.m., where the average occupancy for all block faces combined was 51 percent. The peak hour of occupancy occurred between noon and 1:00 p.m. on October 5, 2016, where block faces were an average of 55 percent occupied. Table 7.2-11 shows the occupancy by block during the peak hour of parking occupancy and Table 7.2-13 shows the on-street parking spaces that would be impacted. A net total of 79 on-street parking spaces would be impacted (removed) under the EmX Alternative on Oak Street and Pearl Street. An additional net total of 68 parking spaces would be impacted (removed) on High Street due to the installation of a two-way cycle track between E. 10th Avenue and E. 19th Avenue. A net total of 147 on-street parking spaces would be removed under the EmX Alternative.

Table 7.2-11. 30th Avenue to Lane Community College Corridor EmX Alternative Weekday Peak Hour On-Street Parking Occupancy (Noon to 1:00 p.m.)

	Oak Street				Pearl Street			
Block Face	Number of Spaces Potentially Removed (Net)[a]	Number of Available Spaces	Number of Occupied Spaces	Percent Occupied	Number of Spaces Potentially Removed (Net)[a]	Number of Available Spaces	Number of Occupied Spaces	Percent Occupied
12th Avenue to 13th Avenue	7	13	1	8%	0	10	6	60%
13th Avenue to 14th Avenue	15	15	3	20%	0	5	4	80%
14th Avenue to 15th Avenue	11	11	7	64%	0	10	5	50%
15th Avenue to 16th Avenue	17	17	15	88%	7 spaces added	3	1	33%
16th Avenue to 17th Avenue	4	11	1	9%	N/A	No Parking	N/A	N/A
17th Avenue to 18th Avenue	12 spaces added	No Parking	N/A	N/A	N/A	No Parking	N/A	N/A
18th Avenue to 19th Avenue	11	17	16	94%	6 spaces added	4	0	0%
19th Avenue to 20th Avenue	11	11	9	82%	N/A	No Parking	N/A	N/A
Subtotals (by street)	*64*	*95*	*52*	*55%*	*13 spaces added*	*32*	*15*	*47%*
Total (Oak Street & Pearl Street)	**51**	**127**	**67**	**51%**				

Source: DKS Transportation Analysis. (2016). Data collection by All Traffic Data on October 4, 2016, and October 5, 2016.

N/A = not applicable

[a] EmX Alternative would add or remove existing parking spaces on each block.

Table 7.2-13. 30th Avenue to Lane Community College Corridor EmX Alternative On-Street Parking Impacts

	Oak Street		Pearl Street		High Street	
	Number of Spaces Potentially Removed	Number of Available Spaces	Number of Spaces Potentially Removed	Number of Available Spaces	Number of Spaces Potentially Removed	Number of Available Spaces
11th Avenue to 12th Avenue	6	16	1	1	0	8
12th Avenue to 13th Avenue	7	13	0	10	8	8
13th Avenue to 14th Avenue	15	15	0	5	12	12

14th Avenue to 15th Avenue	11	11	0	10	6	6
15th Avenue to 16th Avenue	17	17	0	3	12	12
16th Avenue to 17th Avenue	4	11	N/A	No Parking	8	8
17th Avenue to 18th Avenue	0	No Parking	N/A	No Parking	11	11
18th Avenue to 19th Avenue	7	17	0	4	11	11
19th Avenue to 20th Avenue	11	11	N/A	No Parking		
Subtotals (by street)	*78*	*111*	*1*	*33*	*68*	*76*
Total (Oak Street & Pearl Street)	**147**	**220**				

The EmX Alternative would have potential off-street parking impacts, which are listed in Table 7.2-12.

Table 7.2-12. 30th Avenue to Lane Community College Corridor EmX Alternative Off-Street Parking Impacts

Business	Location	Maximum Spaces Impacted[a]
Albertsons	Amazon Parkway/Hilyard Street	11 parking spaces
Starbucks	Pearl Street/E. 18th Avenue	5 parking spaces

Source: DKS Transportation Analysis. (2016).

[a] EmX Alternative would add or remove existing parking spaces on each block.

There are three driveways on the corridor that would be impacted by the EmX Alternative. The Key Bank driveway, located on Amazon Parkway just east of Hilyard Street, would be impacted (removed or relocated) by a BRT station. There are two other driveways providing access to this site, both located on Hilyard Street. In addition, two residential driveways located on the west side of Oak Street just south of E. 13th Avenue, would also be impacted (removed or relocated) by a BRT station.

7.2.3.9. Emergency Vehicle Flow and Access

The emergency service authorities do not foresee major issues of concern related to expanded transit services. Emergency service providers would have an opportunity to review more detailed designs and would work with Lane Transit District to address issues in the future (Lane Fire Authority, personal communication, April 13, 2017).

7.3. Transit

7.3.1. Corridor Transit Service Characteristics

The amount of transit service provided in a corridor is measured by daily VHT, daily VMT, and daily place-miles of service. Daily vehicle hours are the cumulative time that transit vehicles are in service and daily vehicle miles are the distance they travel, independent of the size of the vehicle. Place-miles refers to the total carrying capacity (seated and standing) of each bus and is calculated by multiplying vehicle capacity of each bus by the number of service miles traveled each day. Place-miles highlight differences among alternatives caused by a different mix of vehicles and levels of service. Table 7.3-1 summarizes these major transit characteristics for the 30th Avenue to LCC Corridor No-Build, Enhanced Corridor, and EmX Alternatives.

Table 7.3-1. 30th Avenue to Lane Community College Corridor 2035 Corridor Transit Service Characteristics by Alternative

Measure	No-Build Alternative	Enhanced Corridor Alternative	Delta from No-Build	EmX Alternative	Delta from No-Build
Annual EmX and Fixed Route Transit VHT[a]	278,600	277,500	(1,100)	282,000	3,400
Annual Transit VMT[b]	4,520,200	4,565,400	45,200	4,674,100	153,900
Average Weekday Corridor Transit Place-Miles[c]	57,880	69,350	11,470	104,020	46,140

Source: LCOG Regional Travel Demand Model Results (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

[a] VHT = Vehicle hours traveled in revenue service.

[b] VMT = Vehicle miles traveled in revenue service.

[c] Place-Miles = Transit Vehicle Capacity (seated and standing) multiplied by VMT. (Place-miles refers to the total carrying capacity (seated and standing) of each bus and is calculated by multiplying vehicle capacity of each bus by the number of service miles traveled each day. Place-miles highlight differences among alternatives caused by a different mix of vehicles and levels of service.)

The EmX Alternative would result in a substantial increase in corridor transit capacity when compared to the No-Build and Enhanced Corridor Alternatives. This is because EmX has higher frequencies (10-minute service all day), which translates to an average of two extra trips each hour of service throughout the day resulting in more vehicle hours and miles compared to the No-Build and Enhanced Corridor Alternatives. Similarly, the substantial difference in place-miles associated with both the Enhanced Corridor and EmX Alternatives reflects the implementation of EmX or Enhanced bus service in the corridor and the replacement of parallel bus service with higher capacity vehicles. Corridor place-miles would increase by 11,470 place-miles for the Enhanced Corridor Alternative and 46,140 place-miles for the EmX Alternative compared to the No-Build Alternative.

7.3.2. Transit and Passenger Vehicle Travel Time

Transit travel time is assessed using in-vehicle time and total travel time. Table 7.3-2 provides a summary of in-vehicle and total auto and transit travel times in the a.m. peak hour for trips to the Eugene Station from the route terminus.

In-vehicle transit travel time includes only the amount of time it takes for a transit vehicle to travel between an origin and destination. For buses, this measure reflects roadway speed limits, congestion, and stop dwell time. In-vehicle plus walk and wait travel time includes time spent walking to transit, initial wait time, transfer wait time (if any), in-vehicle time, and time walking from transit to the destination.

In terms of auto times, there is no appreciable difference in times between the No-Build Alternative and the Build Alternatives. For transit travel times, neither the Enhanced Corridor nor EmX Alternatives demonstrate significant travel time savings compared to the No-Build Alternative. The Enhanced Corridor Alternative shows that travel time would actually increase by 1 minute compared to the No-Build Alternative. This is because the service plan used in the modeling of that alternative replaced the Routes 81 and 82 with Enhanced Corridor service and the combined frequency on those two in the No-Build is better than the 15-minute frequency on the Enhanced bus in the 30th Avenue to LCC Corridor. Potentially, service adjustments could be made which would allow for improved peak frequencies and/or connections to key markets such as the University of Oregon that are somewhat reduced with the currently implementation of the service plan for this corridor.

Table 7.3-2. 30th Avenue to Lane Community College Corridor 2035 Auto and Transit Travel Times (a.m. Peak Hour) by Alternative

	Travel Time to Eugene Station from Lane Community College					
	Auto	Transit				
	No-Build, Enhanced Corridor, and EmX Alternatives	No-Build Alternative	Enhanced Corridor Alternative		EmX Alternative	
Measure	Time	Time	Time	Delta from No-Build	Time	Delta from No-Build
In-Vehicle[a]	11	17	16	-1	15	-2
In-Vehicle Plus Walk and Wait[b]	15	26	27	1	24	-2

Source: LCOG Regional Travel Demand Model Results (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

[a] In-vehicle transit travel times represent time spent in the transit vehicle.
[b] In-vehicle plus walk and wait travel time represents walk time, one-half the wait time, and in-vehicle time in minutes.

7.3.3. Reliability

One of the major contributing factors to reliable transit service is the amount of exclusive and/or priority transit lanes along the corridor and at signalized intersections. Transit signal priority, installed at signalized intersections for the 30th Avenue to LCC Corridor Enhanced Corridor and EmX Alternatives, would minimize the variability of delay at traffic signals. Reliability measures include the total amount of new round-trip miles, the total length of exclusive and/or priority lanes, the percentage of new corridor exclusive or priority lanes, the number of trunk-line intersections with transit priority treatment, and the amount of motor vehicle congestion at signalized intersections on the corridor. Typically, the more congested the corridor, the greater the variability in delay at signalized intersections.

Table 7.3-3 summarizes these transit reliability measures for the Enhanced Corridor and EmX Alternatives. Every signalized intersection for both the Enhanced Corridor and EmX Alternatives would implement transit signal priority, whereas the No-Build Alternative would not implement additional transit signal priority. Compared to the No-Build Alternative, the Enhanced Corridor Alternative would not be expected to improve reliability. Compared to the No-Build Alternative, the EmX Alternative provides some priority treatment, and can be expected to have greater travel time reliability during peak periods compared to the No-Build and Enhanced Corridor Alternatives.

Table 7.3-3. 30th Avenue to Lane Community College Corridor 2035 Average Weekday Corridor Transit Reliability Measures

Measure	Enhanced Corridor	EmX	Delta between EmX and Enhanced Corridor
Total Number of New Round-Trip EmX System Miles (miles)	0	10.2	10.2
Total Number of New Corridor Exclusive/Priority Lanes[a] (miles)	0	1.37	1.37
Percent of New Corridor that is Exclusive/Priority Lanes	0%	13.4%	13.4%

Source: *MovingAhead Level 2 Definition of Alternatives* (CH2M et al., 2016).

[a] Exclusive/priority lanes are defined as the round-trip miles of business access and transit lanes, bus-only lanes, and queue jumps associated with each EmX alternative.

7.3.4. Transit Ridership

Systemwide transit ridership is defined as average weekday systemwide linked-trips in 2035. A linked trip is a one-way trip taken by a person from an origin to a destination, independent of the number of vehicles or transfers used to complete the trip. The 30th Avenue to LCC Corridor Enhanced Corridor Alternative would result in a slight decrease of 0.2 percent in systemwide transit trips, while the EmX Alternative would result in a 1.4 percent increase in systemwide transit trips compared to the No-Build Alternative.

Corridor ridership is defined as any transit trip that is produced in and/or attracted to the respective corridor which for this purpose has been defined as the TAZ within a 0.5-mile buffer around the transit line. As shown in Table 7.3-4, the EmX Alternative would have the highest increase in corridor ridership compared to the No-Build Alternative, but the Enhanced Corridor Alternative would slightly decrease ridership on the corridor.

Table 7.3-4. 30th Avenue to Lane Community College Corridor Average Weekday 2035 Systemwide and Corridor Ridership by Alternative

Measure	No-Build Alternative	Enhanced Corridor	EmX
Total Systemwide Transit Trips[a]	46,410	46,310	47,070
Delta from No-Build		-100	660
% Change from No-Build		-0.2%	1.4%
Total Corridor Transit Trips[b]	26,380	26,230	27,480
Delta from No-Build		-150	1,100
% Change from No-Build		-0.6%	4.2%

Source: LCOG Regional Travel Demand Model Results. (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

Note: Corridors overlap and include some common areas, downtown Eugene for example, as a result one cannot add up the totals to arrive at a regional total.

[a] Systemwide transit trips are defined as one-way linked trips taken by a person from the trips origin to the trips destination, independent of the number of vehicles or transfers used to complete the trip.

[b] Corridor transit trips are defined as any EmX or Bus trip with at least one trip end in the corridor.

7.3.5. Transit Boardings

Daily unlinked transit ridership, also referred to as boardings, is summarized in Table 7.3-5. There are two categories of boardings shown in the table. The first is a boarding total for all EmX lines that are not part of the project and the second is boardings for all routes within the project corridor. The reason boardings on other EmX lines are included is to show that there is some variation in boardings on the routes where the project route and the existing EmX system share operating on a portion of the alignment. The 30th Avenue to LCC Corridor Enhanced Corridor Alternative shows a loss of both non-project EmX boardings and corridor boardings, likely due to the decrease in frequency of bus service compared to the No-Build Alternative. Non-project and corridor daily boardings for the EmX Alternative would both increase compared to the No-Build Alternative.

Table 7.3-5. 30th Avenue to Lane Community College Corridor 2035 Average Weekday System EmX and Corridor Daily Boardings

Route	No-Build Alternative	Enhanced Corridor Alternative		EmX Alternative	
	Daily Boardings	Daily Boardings	Delta from No-Build	Daily Boardings	Delta from No-Build
Non-Project Total EmX Service	24,500	24,450	-50	24,800	300
Corridor Routes Total	3,300	3,200	-100	4,700	1,400
Total	**27,800**	**27,650**	**-150**	**29,500**	**1,700**

Source: LCOG Regional Travel Demand Model Results (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

Note: For Enhanced Corridor Alternative numbers represent EmX and Enhanced Corridor daily boardings combined.

7.4. Annualized Impacts & Costs

The total annualized costs, according to FTA-provided factors and changes in VMT, associated with changes in safety (fatalities and serious injuries) are shown in Table 7.4-1, and will be incorporated into a total environmental benefit analysis using data from the *MovingAhead Air Quality Technical Report* (Michael Minor and Associates, Inc. and CH2M, 2017), the *MovingAhead Energy and Sustainability Technical Report* (DKS and CH2M, 2017), the *MovingAhead Operating and Maintenance Costs Technical Report* (LTD and City of Eugene, 2017), and the *MovingAhead Capital Cost Estimating Technical Report* (CH2M, 2017a). Both the 30th Avenue to LCC Corridor Enhanced Corridor and EmX Alternatives would see cost increases based on changes in safety over the No-Build Alternative.

The FTA annualized safety cost is calculated from the annual VMT by mode under each alternative. The modes included in this metric are automobiles, trucks, and buses (no bicycles or pedestrians). This cost calculation assumes that the fatal/serious injury crash frequency rises as VMT rises, and does not take into reduced crash rates associated with the build alternative infrastructure improvements.

Table 7.4-1. 30th Avenue to Lane Community College Corridor Enhanced Corridor and EmX Alternatives 2035 Estimated Regionwide Annual Cost Savings Relative to No-Build Alternative

Annual Value	Enhanced Corridor Alternative	EmX Alternative
Annual VMT Decrease (Increase)	(211,493)	196,019
Annual Cost Savings (Increase) for Fatalities	($26,635)	$31,293
Annual Cost Savings (Increase) for Serious Injuries	($4,454)	($60,257)
Annual Total Savings (Increase)	($31,090)	($28,964)

Sources: DKS Transportation Analysis. (2016).

Cost Factors: *New and Small Starts Evaluation and Rating Process Final Policy Guidance* (FTA, 2013, August).

The total annual cost is greater for fatalities and serious injuries with the Enhanced Corridor Alternative because the automobile VMT is higher than in the No-Build Alternative. The total annual cost is greater for serious injuries with the EmX Alternative because the bus VMT is higher than in the No-Build Alternative, but the automobile VMT does not decrease enough to make up for the cost increase.

The changes in safety were based on changes in VMT for each alternative, according to the factors shown in Table 7.4-2.

Table 7.4-2. Fatality and Serious Injury Factors Per Million Vehicle Miles Traveled by Mode

Mode	Fatalities/Million VMT	Serious Injuries/Million VMT
Automobile	0.013	0.195
Heavy Truck[a]	0.004[a]	1.824[a]
Bus – Diesel	0.004	1.824
Bus – Electric	0.004	1.458

Source: *New and Small Starts Evaluation and Rating Process Final Policy Guidance* (FTA, 2013, August).

[a] Heavy Truck factors were not provided, and were assumed to be the same as diesel bus factors.

The safety costs were developed using the following cost factors from *New and Small Starts Evaluation and Rating Process Final Policy Guidance* (FTA, 2013, August):

- $9.1 million for each fatality
- $490,000 for each serious injury

An annualization factor of 342[8] was used to estimate annual automobile and heavy truck VMT based on average weekday VMT data. Annualized bus VMT was provided by LTD.

7.5. Indirect and Cumulative Effects

No indirect effects are anticipated for either the 30th Avenue to LCC Corridor Enhanced Corridor or EmX Alternatives.

Cumulative effects were accounted for in the LCOG model for projecting future motor vehicle volume growth. Compared to the No-Build Alternative, the Enhanced Corridor and EmX Alternatives would not offer more potential for mode shifts from motor vehicle travel to transit.

7.6. Short-Term Construction-Related Impacts

There would be no construction impacts under the 30th Avenue to LCC Corridor No-Build Alternative.

The 30th Avenue to LCC Corridor Enhanced Corridor and EmX Alternatives would have similar construction impacts. The Enhanced Corridor and EmX Alternatives both follow the alignment of existing streets – primarily E. 10th Avenue, E. 11th Avenue, Oak Street, Pearl Street, Amazon Parkway, and E. 30th Avenue – with the exception of the new extension of E. 20th Avenue, and would require the construction of new multi-modal improvements. These improvements would be located within the existing ROW wherever possible, but ROW acquisition would be necessary at places along the extent of the alignment. Potential corridor-wide construction-related impacts for both the Enhanced Corridor and EmX Alternatives are summarized in Table 7.6-1.

[8] The annualization factor was calculated based on 2015 traffic volume data from ODOT's Automated Traffic Recording (ATR) stations. An average value was applied based on the six ATR stations located in the Eugene-Springfield region.

Table 7.6-1. 30th Avenue to Lane Community College Corridor Enhanced Corridor and EmX Alternatives Construction Impacts

Roadway	Functional Classification	Construction Truck Traffic	Lane Closure	Detour Route Available?	Sidewalk Impacts?	Bike Lanes Impacts?
E. 10th Avenue	Local	Limited	Int.	No	Yes	Yes
E. 11th Avenue	Minor Arterial	Limited	Int.	No	Yes	Yes
Oak Street	Minor Arterial	Moderate	Int. Long	No	Yes	Yes
Pearl Street	Minor Arterial	Moderate	Int. Long	No	Yes	Yes
E. 13th Avenue	Minor Arterial	Limited	Int.	No	Yes	Yes
E. 18th Avenue	Minor Arterial	Limited	Int.	No	Yes	Yes
E. 19th Avenue	Major Collector	Limited	Int.	No	Yes	Yes
Amazon Parkway	Minor Arterial	Moderate	Int. Short	No	Yes	Yes
E. 24th Avenue	Minor Arterial	Limited	Int.	No	Yes	Yes
E. 27th Avenue	Major Collector	Limited	Int.	No	No	No
E. 29th Avenue	Minor Arterial	Limited	Int.	No	Yes	Yes
Hilyard Street	Minor Arterial	Limited	Int.	No	Yes	No
University Street	Local	Moderate	Int.	No	Yes	No
E. 30th Avenue	Urban Minor Arterial/Rural Major Collector	Limited	None	No	No	No

Source: DKS Transportation Analysis. (2016).

Notes: Sidewalk impacts mean that sidewalk reconstruction would be necessary to match in with the new sidewalk. Bike lane impacts mean that the bike lane would be affected by the construction of the project.

Int. = Short-length lane closures (less than 500 feet) near intersection for a street intersecting the corridor
Long = possible long-length lane closure (longer than 500 feet)
Short = possible short-length lane closure (less than 500 feet)

Limited = Some construction traffic present and small travel delays are possible
Moderate = Construction traffic present and travel delays likely

Sidewalk construction would affect pedestrians and bicyclists. Construction of the improvements along the length of the project could impact existing curbs or other features along the alignment. The demolition and reconstruction of the curbs, gutters, sidewalks, and other facilities may be necessary to make room for the construction of the project. This activity would generate construction traffic for the removal of debris and the delivery of construction materials and equipment.

Construction may require short-term long-length (longer than 500 feet) and short-length (shorter than 500 feet) lane closures and rerouting of traffic. No long-term long-length lane closures are anticipated.

BAT lane construction on Oak Street and Pearl Street under the EmX Alternative would also impact side streets. Temporary restrictions of turn movements, into or out of the side streets, and some detours may be necessary at some of these intersections.

Work in residential areas would be completed during the day to comply with City of Eugene noise limits.

7.7. Potential Mitigation Measures

7.7.1. Long-Term Direct Impacts

Because the operations under the 30th Avenue to LCC Corridor Enhanced Corridor Alternative would be no worse than No-Build Alternative operations, mitigation measures due to traffic operations would not be necessary.

The 30th Avenue to LCC Corridor EmX Alternative operations analysis identified one study intersection that would have significant local traffic impacts and further degrade No-Build conditions if evaluated under current operating standards. Under the proposed operating standards, no mitigation would be required at this intersection. The identified mitigation measures for the impacted study intersection are summarized in Table 7.7-1. LTD has prepared an *Addendum to MovingAhead Alternatives Analysis Technical Reports Memorandum* (CH2M, 2017b) that evaluates ways to avoid or minimize impacts at some properties. Please see this addendum for additional information on potential parking, acquisitions, and tree impacts mitigation.

Table 7.7-1. 30th Avenue to Lane Community College Corridor EmX Alternative Study Intersection Mitigation Measures

Study Intersection Number	Study Intersection	Mitigation	Unmitigated Operations			Mitigated Operations		
			LOS	Delay (sec)	v/c	LOS	Delay (sec)	v/c
19	Pearl St/E. 11th Ave	• Modify coordinated signal timing • Change lane configuration from 1 right only/1 through-right to 1 through only/1 through-right, continue to 200 feet downstream of intersection	*F*	*101.8*	*1.17*	C	23.3	0.83

Source: DKS Transportation Analysis. (2016).

Italic underlined values do not meet current standards
Bold underlined values do not meet proposed standards or current standards
Delay = Average Intersection Delay in seconds
LOS = Level of Service
v/c = volume-to-capacity

Mitigation measures due to loss of on-street parking on Oak Street and Pearl Street between E. 12th Avenue and E. 20th Avenue on the 30th Avenue to LCC Corridor for both the Enhanced Corridor and EmX Alternatives and on High Street between E. 10th Avenue and E. 19th Avenue for the EmX Alternative are shown in Table 7.7-2.

Table 7.7-2 30th Avenue to Lane Community College Corridor Enhanced Corridor and EmX Alternatives On-Street Parking Mitigation Measures

Alternative	Potential Loss of On-street Parking on Oak, Pearl, and High Streets	Number of On-Street Parking Spaces Added for Mitigation on Oak Street and Pearl Street	Net Loss of On-Street Parking Spaces[a]
30th Avenue to LCC Corridor Enhanced Corridor Alternative	91	51	40
30th Avenue to LCC Corridor EmX Alternative	163	25	138

Source: DKS Transportation Analysis. (2016).

[a] Enhanced Corridor and EmX Alternatives would add or remove existing parking spaces on each block.

7.7.2. Short-Term Construction-Related Impacts

LTD and the contractor will carefully plan construction to minimize the potential impact to businesses, roadway users, and surrounding communities. For example, LTD plans to limit the length of any single lane closures to about five to ten blocks, and one side of the road would be worked on at a time to minimize the impact to road users. Shorter segments would be used in locations with higher than normal driveway density. Short construction segment lengths should allow for the contractor to quickly complete the work within a segment and reopen it to the public. The construction activities would flow from one segment to the next in a rolling construction sequence. Two adjoining segments would be worked on simultaneously with the goal of excavating, utility installation, base rock, and paving being completed within a 2- to 4-week period for each segment. Depending on the type of land uses in each construction segment (commercial or residential), and the predominant hours of operation for adjacent businesses, construction could occur at night if it would further reduce potential business and traffic disruptions. Any night work would have to comply with City of Eugene noise restrictions.

Business access would be maintained to the greatest extent practicable throughout all stages of construction. In high traffic locations or locations with heavily accessed business driveways, construction could take place at night if consistent with the City of Eugene's night construction requirements. This would reduce impacts to the adjacent businesses and their customers.

Mitigation measures would also require early, frequent, and ongoing communication among LTD, contractors, and affected property owners/tenants. Construction timing, staging, and signage would be coordinated by LTD's designated staff liaison in consultation with the affected property owners/tenants to minimize business and residential disruptions. Speed zone reductions within the construction zone, closed or narrow lanes, and temporary driveway relocation would also be considered to mitigate construction impacts. Variable message signs, the LTD website, and local news sources could also be used to provide roadway users with advance notice of current or pending construction activities and alternate routes. All required mitigation measures would be specified in LTD's construction contracting documents.

Emergency vehicle access would be provided at all times throughout the construction process.

7.8. Permits and Approvals

No permits or approvals are required for potential transportation impacts evaluated for the 30th Avenue to LCC Corridor.

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8. Coburg Road Corridor Environmental Consequences

A summary of the Coburg Road Corridor alternatives and key findings is provided below.

The Coburg Road Corridor Enhanced Corridor Alternative would install BAT lanes on Coburg Road from Country Club Road to Cedarwood Drive/I-105 EB Onramp, extend northbound and southbound right turn lanes on Coburg Road at Oakmont Way, extend northbound right turn lanes at Harlow Road, Willakenzie Road, Randy Papé Beltline EB Onramp, Randy Papé Beltline WB Onramp, Chad Drive, and Crescent Avenue, install a northbound right turn only lane on Coburg Road at Randy Papé Beltline EB Onramp, and install a southbound right turn only lane on Coburg Road at Randy Papé Beltline WB Onramp. In addition, the Enhanced Corridor Alternative would install five new traffic signals, two enhanced pedestrian crossings, and seven upgraded crossings. The key findings are as follows:

- Transit travel time from the terminus to Eugene Station (one-way inbound) would improve by 5 minutes during the a.m. peak hour over the No-Build Alternative (see Section 8.3.2 for travel time discussion).
- System ridership would increase by 0.5 percent or 210 average weekday riders per day (see Section 8.3.4 for ridership discussion).
- The Enhanced Corridor Alternative would install 7,550 feet (1.43 miles) of new or reconstructed sidewalk (see Section 8.2.2.2 for pedestrian and bicycle improvements discussion).
- Off-street parking impacts at 5 sites could impact up to 67 off-street spaces, and 4 sites would be limited to right-in/right out only access (see Section 8.2.2.8 for discussion of parking impacts).

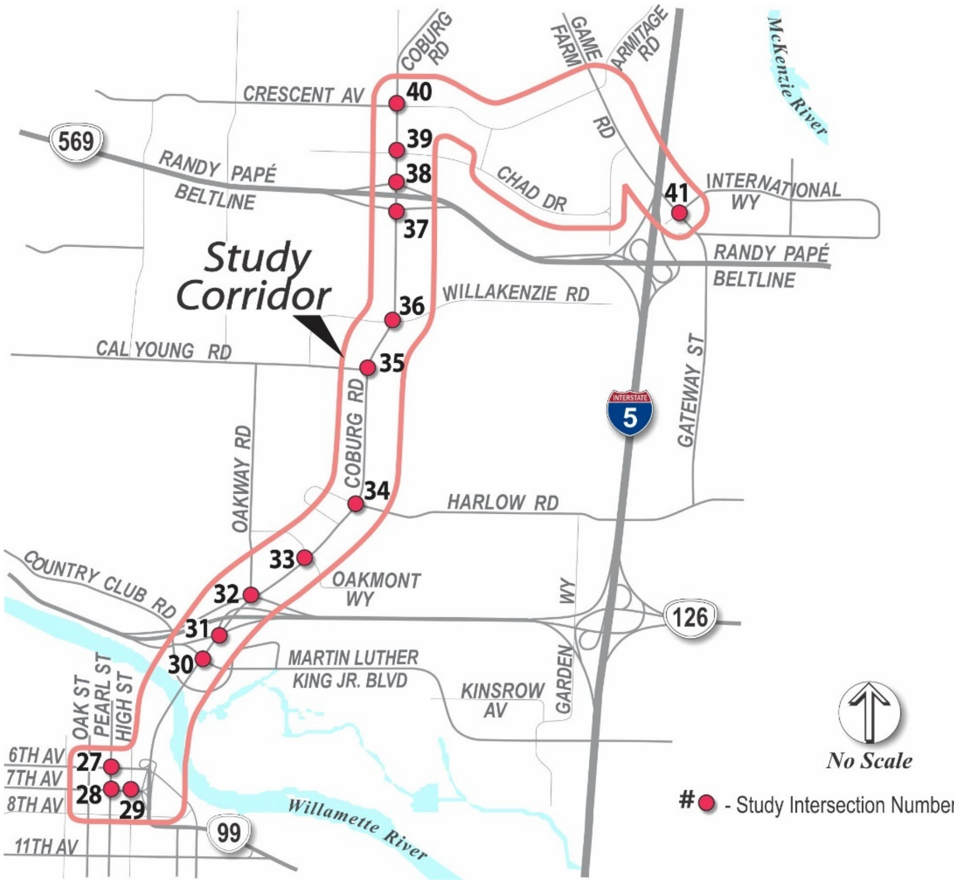
The Coburg Road Corridor EmX Alternative would convert a general purpose lane to a BAT lane on 7th Avenue between Oak Street and High Street and on 6th Avenue between High Street and Pearl Street; install center-running transit lanes on Coburg Road north of the Ferry Street Bridge to Cedarwood Drive/I-105 EB Onramp, near Oakway Road, between Pioneer Pike and Harlow Road, and between Elysium Avenue and Crescent Avenue; install northbound and southbound right turn lanes at Coburg Road and Willakenzie Road; and install a transit-only left turn lane from Crescent Avenue onto Coburg Road. In addition, the EmX Alternative would install six new traffic signals, two enhanced pedestrian crossings, and seven upgraded crossings. The key findings are as follows:

- Transit travel time from the terminus to Eugene Station (one-way inbound) would improve by 5 minutes during the a.m. peak hour over the No-Build Alternative (see Section 8.3.2 for travel time discussion).
- System ridership would increase by 1.9 percent or 860 average weekday riders per day (see Section 8.3.4 for ridership discussion).
- The EmX Alternative would install 14,800 feet (2.80 miles) of new or reconstructed sidewalk and 1,900 feet (0.36 mile) of improved bicycle facilities (see Section 8.2.3.2 for pedestrian and bicycle improvements discussion).
- Off-street parking impacts at 16 sites could impact up to 134 off-street spaces, 7 sites would be limited to right-in/right out only access, and 2 drive-throughs would have potential business circulation impacts (see Section 8.2.3.8 for discussion of parking impacts).

8.1. Affected Environment

The following section evaluates the Coburg Road Corridor for base year and future year (2035) transportation conditions. Supporting data were acquired from intersection motor vehicle, pedestrian, and bicycle turning movement counts, the LCOG regional travel demand model, field observations, and ODOT crash data. The study area is shown on Figure 8.1-1.

Figure 8.1-1. Coburg Road Corridor Study Area Map



Source: DKS Transportation Analysis. (2016).

8.1.1. Roadway Characteristics

The transportation characteristics of the Coburg Road Corridor are shown in Table 8.1-1 and include functional classification, number of travel lanes, posted speeds, presence of sidewalks and bike lanes, and existing transit routes serving the segment. The Coburg Road Corridor is owned by the City of Eugene and is classified as a major arterial south of Randy Papé Beltline and a minor arterial north of Randy Papé Beltline.

Table 8.1-1. Coburg Road Corridor Existing Study Area Roadway Characteristics

Roadway	Jurisdiction	Functional Classification[a]	Number of Travel Lanes	Posted Speed	Sidewalk	Bike Lanes	LTD Transit Routes
Game Farm Road: International Way to I-5	City of Eugene	Minor Arterial	3	35 mph	Both sides	Yes	12
Game Farm Road: I-5 to Old Coburg Road	City of Eugene	Minor Arterial	3	45 mph	West side[b]	Yes	12
Chad Drive: Game Farm Road to Shadow View Drive	City of Eugene	Major Collector	3	35 mph	Both sides	Yes	67
Shadow View Drive: Chad Drive to Crescent Avenue	City of Eugene	Local	2	25 mph	Both sides	No	66, 67
Crescent Avenue: Shadow View Drive to Coburg Road	City of Eugene	Minor Arterial	3	35 mph	South side[c]	Yes	12[d]
Coburg Road: Crescent Avenue to Randy Papé Beltline	City of Eugene	Minor Arterial	5	35 mph	Both sides	Yes	66, 67
Coburg Road: Randy Papé Beltline to Oakway Road	City of Eugene	Major Arterial	5	35 mph	Both sides	Yes	12[e], 66, 67
Coburg Road: Oakway Road to Martin Luther King, Jr. Boulevard	City of Eugene	Major Arterial	5	35 mph	Both sides	Yes	12, 66, 67, 91[f]
Coburg Road: Martin Luther King, Jr. Boulevard to Ferry Street Bridge	City of Eugene	Major Arterial	4-5[g]	35 mph	Both sides	Yes	12, 66, 67, 91
E. 7th Avenue: Pearl Street to Mill Street	ODOT	Major Arterial	4 (EB only)	30 mph	Both sides	No	95
E. 8th Avenue: Pearl Street to Mill Street	City of Eugene	Local	2 (WB only)	25 mph	Both sides	Yes	12, 13, 91, 96
Pearl Street: E. 6th Avenue to E. 11th Avenue	City of Eugene	Minor Arterial	2 (SB only)	25 mph	Both sides	No	12, 66, 67
Oak Street: E. 7th Avenue to E. 10th Avenue	City of Eugene	Minor Arterial	3-4 (NB only)	30 mph	Both sides	No	12, 40, 66, 95, 96, 98, 24
W. 10th Avenue: Olive Street to Oak Street	City of Eugene	Local	2-3	25 mph	Both sides	Yes	13, 67, 91
W. 11th Avenue: Pearl Street to Olive Street	City of Eugene	Minor Arterial	3 (WB only)	20 mph	Both sides	Yes	36, 66, 76
Olive Street: 10th Avenue to 11th Avenue	City of Eugene	Local	2	25 mph	Both sides	Yes	36, 76

[a] Oregon Transportation Map. Federal Functional Classification Review, City of Eugene. 2014 Edition. http://www.oregon.gov/ODOT/TD/TDATA/pages/gis/citymaps.aspx
[b] West side only north of Old Coburg Road.
[c] South side only west of Shadow View Drive.
[d] Service runs from Game Farm Road to Shadow View Drive.
[e] Service runs from Oakway to Harlow Road.
[f] Route enters and exits Coburg Road via OR126.
[g] Four lanes on Ferry Street Bridge, five lanes 200 feet south of Martin Luther King, Jr. Boulevard intersection, five lanes plus two bus only lanes 100 feet south of Martin Luther King, Jr. Boulevard intersection.

The most recent average daily traffic on the corridor is shown in Table 8.1-2.

Table 8.1-2. Coburg Road Corridor 2013 Average Daily Traffic

Roadway Segment	ADT
N Game Farm Road/Gateway Street: International Way to Old Coburg Road	2,900
Chad Drive: Old Coburg Road to Shadow View Drive	8,100
Coburg Road: Chad Drive to Randy Papé Beltline	35,200
Coburg Road: Jeppesen Acres Road to Randy Papé Beltline	27,500
Coburg Road: Oakmont Way to Pioneer Pike/Harlow Road	33,400
Coburg Road: Oakway Road to Oakmont Way	37,000
Ferry Street Bridge	63,500
E. 7th Avenue: High Street to Ferry Street Bridge	27,500
E. 6th Avenue: Ferry Street Bridge to High Street	14,900

Source: City of Eugene. (2013).
Compiled by DKS Transportation Analysis. (2016).

8.1.2. Study Intersections

Fifteen study intersections on the Coburg Road Corridor were selected for traffic analysis for the existing conditions, 2035 No-Build Alternative, 2035 Enhanced Corridor Alternative, and 2035 EmX Alternative analyses. The study intersections are located throughout the corridor.

The study intersections evaluated for this corridor were:

- Pearl Street/E. 6th Avenue
- Pearl Street/E. 7th Avenue
- High Street/E. 7th Avenue
- Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard
- Coburg Road/Cedarwood Drive/I-105 Ramp
- Coburg Road/Oakway Road/I-105 Ramp
- Coburg Road/Oakmont Way
- Coburg Road/Harlow Road/Pioneer Pike
- Coburg Road/Cal Young Road
- Coburg Road/Willakenzie Road
- Coburg Road/EB Randy Papé Beltline Onramp
- Coburg Road/WB Randy Papé Beltline Onramp
- Coburg Road/Chad Drive
- Coburg Road/Crescent Avenue
- Gateway Street/International Way

8.1.3. Bicycle and Pedestrian Conditions

Pedestrian and bicycle activity at the 15 study intersections was counted for the p.m. peak hours (Table 8.1-3). The highest p.m. peak hour pedestrian volumes occurred at Pearl Street/E. 6th Avenue and Coburg Road/Oakway Road/I-105 Ramp and the highest bicycle volumes occurred at High Street/E. 7th Avenue, Pearl Street/E. 7th Avenue, and Pearl Street/E. 6th Avenue.

Table 8.1-3. Coburg Road Corridor Study Intersection p.m. Peak Hour Pedestrian and Bicycle Volumes

Study Intersection Number	Study Intersection	Date of Intersection Count	p.m. Peak Hour Activity	
			Pedestrian	Bicycle
27	Pearl Street/E. 6th Avenue	10/7/2015	90	31
28	Pearl Street/E. 7th Avenue	10/7/2015	72	33
29	High Street/E. 7th Avenue	10/7/2015	43	41
30	Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard	10/6/2015	47	5
31	Coburg Road/Cedarwood Drive/I-105 EB Onramp	10/6/2015	12[b]	–[b]
32	Coburg Road/Oakway Road/I-105 WB Onramp	5/26/2010[a]	51	–[c]
33	Coburg Road/Oakmont Way	10/6/2015	41	11
34	Coburg Road/Harlow Road/Pioneer Pike	5/27/2010[a]	19	0
35	Coburg Road/Cal Young Road	5/27/2010[a]	33	0
36	Coburg Road/Willakenzie Road	10/6/2015	48	25
37	Coburg Road/EB Randy Papé Beltline Onramp	10/6/2015	4	10
38	Coburg Road/WB Randy Papé Beltline Onramp	10/6/2015	10	5
39	Coburg Road/Chad Drive	10/6/2015	1	4
40	Coburg Road/Crescent Avenue	10/28/2015	7	6
41	Gateway Street/International Way	10/6/2015	1	8

Source: DKS Transportation Analysis. (2016).

Note: Total volume crossing all legs of each intersection.

[a] Turning movement count was obtained from the Draft Eugene 2035 TSP.
[b] Counts were taken on the roadway only, not the parallel multi-use path.
[c] Bicycle counts were not taken.

A qualitative assessment of the pedestrian and bicycle facilities along the Coburg Road Corridor was conducted using methodology from ODOT's *Analysis Procedures Manual* (ODOT, 2014). Overall, the pedestrian and bicycle facilities range between fair and excellent (Table 8.1-4). There is a multi-use path on both sides of the roadway between the Ferry Street Bridge and Oakway Road that provides grade separation through the I-105 ramps. However, much of the corridor consists of a five-lane arterial with narrow bike lanes and standard width sidewalks without landscape buffers.

Table 8.1-4. Coburg Road Corridor Existing Conditions Qualitative Assessment of Pedestrian and Bicycle Facilities[a]

Segment	Walking	Biking
E. 6th Avenue: Pearl Street to Ferry Street Bridge	Excellent	Poor
E. 7th Avenue: Pearl Street to Mill Street	Good	Poor
E. 8th Avenue: Pearl Street to Mill Street	Good	Poor
Pearl Street: E. 6th Avenue to E. 11th Avenue	Good	Fair
Oak Street: E. 7th Avenue to E. 10th Avenue	Good	Fair
W. 10th Avenue: Olive Street to Oak Street	Good	Good
W. 11th Avenue: Olive Street to Pearl Street	Good	Poor
Olive Street: 10th Avenue to 11th Avenue	Good	Fair
Coburg Road: Ferry Street Bridge to Oakway Road	Excellent	Excellent
Coburg Road: Oakway Road to Oakmont Way	Good	Fair
Coburg Road: Oakmont Way to Crescent Avenue	Fair	Fair
Crescent Avenue: Coburg Road to Shadow View Drive	Fair[b]	Fair
Shadow View Drive: Crescent Avenue to Chad Drive	Fair	Poor
Chad Drive: Shadow View Drive to Game Farm Road	Good	Fair
Game Farm Road: Chad Drive to International Way	Good	Fair

Source: DKS Transportation Analysis. (2016).

[a] Qualitative analysis based on methodology described in Chapter 14 of ODOT's *Analysis Procedures Manual* (ODOT, 2014).
[b] Sidewalk is on south side only.

8.1.4. Transit

Currently, Route 12, Route 66, and Route 67 serve the Coburg Road Corridor. Route 12 runs along Coburg Road and Gateway Street between Eugene Station and northeast Eugene every 30 minutes. Route 66 runs over the Ferry Street Bridge between Eugene Station and Valley River Center every 15 to 30 minutes. Route 67 runs along Coburg Road between Eugene Station and N Delta Highway/Randy Papé Beltline every 15 to 30 minutes.

8.1.5. Safety Analysis

Intersection crashes were gathered from the ODOT database for the last 5 full years of data (2010-2014). Crashes are grouped by severity (Table 8.1-5) and type (Figure 8.1-3) at both the segment and intersection levels. In total, the Coburg Road Corridor had 288 crashes during the 5-year period analyzed. There was one fatality that occurred along Coburg Road north of 4th Avenue where a pedestrian was not visible in the roadway at night and was struck by a vehicle.

Table 8.1-5 shows the number of crashes by severity along with the intersection collision rate. Typically, intersections with a collision rate above or near 1 crash per million entering vehicles or segments with a collision rate above or near 1 crash per million vehicle miles are flagged for consideration of safety improvements. Currently, none of the study intersections have collision rates near 1 crash per million entering vehicles and none of the segments have collision rates near 1 crash per million vehicle miles.

Figure 8.1-2 shows a "heat map" of reported collisions along the Coburg Road Corridor between 2010 and 2014, where higher densities of crashes are shown in red, medium densities are shown in orange, and lower densities are shown in green. Serious injury crashes are shown as black points along the corridor, and fatal crashes are shown as black points with a cross through it. The crashes on the Coburg Road Corridor were concentrated around the traffic signals, with the highest densities occurring between the Ferry Street Bridge and Oakway Road as well as around the Randy Papé Beltline ramps.

Table 8.1-5. Coburg Road Corridor 5-Year Collision Breakdown by Severity (2010–2014 Crashes)

Corridor – Coburg Road (Approx. 5 Miles)							
	Fatality	Serious Injury	Evident Injury	Possible Injury	PDO[a]	Total	Segment Collision Rate[b]
Segment	**2**	**14**	**149**	**157**	**422**	**744**	**–**
Olive Street: W. 11th Avenue to W. 10th Avenue	0	0	0	0	1	1	0.14
Coburg Road: Bailey Lane to Willakenzie Road	0	1	3	8	14	26	0.20
Coburg Road: Randy Papé Beltline to Chad Drive	0	0	0	4	3	7	0.06
Coburg Road: Cedarwood Drive to Oakway Road	0	0	0	0	3	3	0.02
Coburg Road: Chad Drive to Crescent Avenue	0	0	0	1	3	4	0.12
Coburg Road: E. 7th Avenue to Martin Luther King, Jr. Boulevard/Country Club Road	1	4	46	0	73	124	0.38
Coburg Road: Jeppesen Acres Road to Randy Papé Beltline	0	0	1	6	6	13	0.09
Coburg Road: Martin Luther King, Jr. Boulevard/Country Club Road to Cedarwood Drive	0	1	0	2	6	9	0.07
Coburg Road: Martin Luther King, Jr. Boulevard/Country Club Road to E. 6th Avenue	1	4	46	0	73	124	0.37
Coburg Road: Oakmont Way to Pioneer Pike/Harlow Road	0	0	6	8	18	32	0.16
Coburg Road: Oakway Road to Oakmont Way	0	1	4	9	24	38	0.20
Coburg Road: Pioneer Pike/Harlow Road to Bailey Lane	0	0	1	1	7	9	0.04
Coburg Road: Willakenzie Road to Jeppesen Acres Road	0	0	6	9	7	22	0.43
Crescent Avenue: Coburg Road to Shadow View Drive	0	0	0	1	1	2	0.02
E. 11th Avenue: Pearl Street to Olive Street	0	0	0	4	10	14	0.24
E. 6th Avenue: Ferry Street Bridge to Pearl Street	0	0	0	0	1	1	0.01
E. 7th Avenue: Oak Street to Mill Street	0	0	1	3	8	12	0.09
E. 8th Avenue: Mill Street to Pearl Street	0	0	0	1	2	3	0.06
Oak Street: E. 10th Avenue to E. 7th Avenue	0	0	0	2	4	6	0.29
Pearl Street: E. 6th Avenue to E. 7th Avenue	0	0	0	0	1	1	0.05
Pearl Street: E. 8th Avenue to E. 11th Avenue	0	0	4	2	7	13	0.21

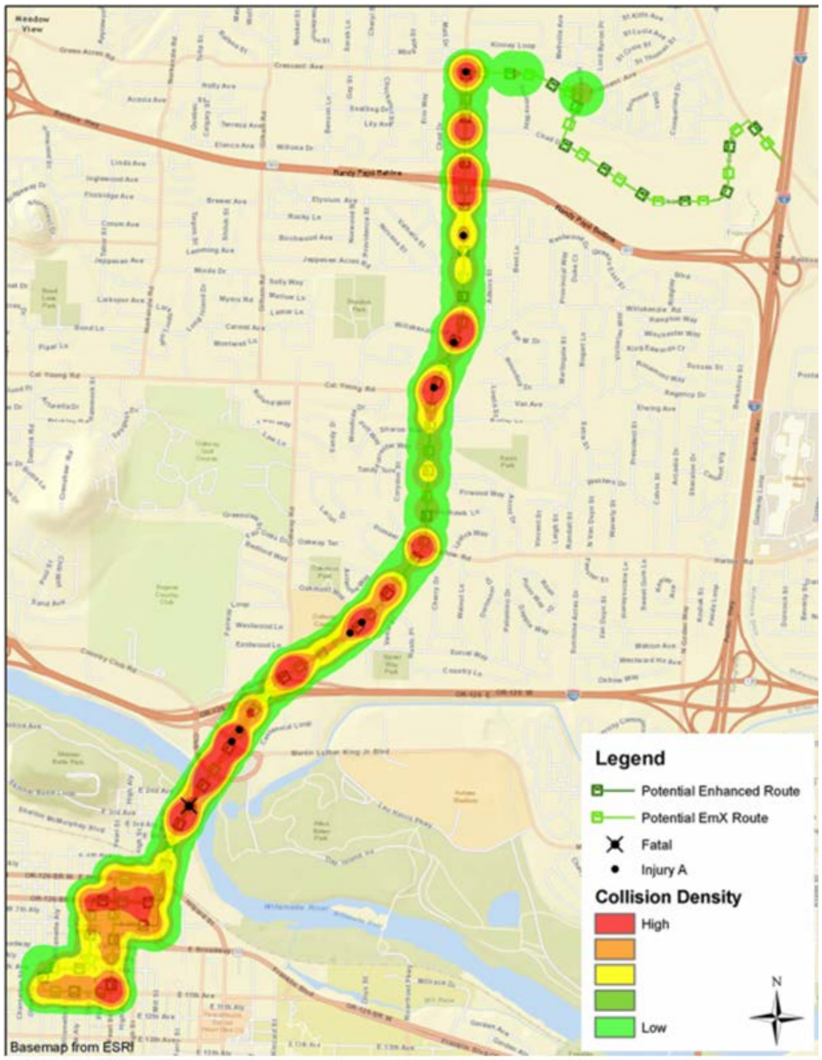
Table 8.1-5. Coburg Road Corridor 5-Year Collision Breakdown by Severity (2010–2014 Crashes)

Corridor – Coburg Road (Approx. 5 Miles)							
	Fatality	Serious Injury	Evident Injury	Possible Injury	PDO[a]	Total	Segment Collision Rate[b]
Segment	**2**	**14**	**149**	**157**	**422**	**744**	**–**
Intersections							
Pearl Street & E. 6th Avenue	0	0	2	4	7	13	0.38[c]
Pearl Street & E. 7th Avenue	0	0	2	3	9	14	0.31[c]
High Street & E. 7th Avenue	0	0	0	8	17	25	0.51[c]
Coburg Road & Country Club Road/Martin Luther King, Jr. Boulevard	0	1	1	15	24	41	0.42 [c]
Coburg Road & Cedarwood Drive	0	0	0	1	0	1	0.01[c]
Coburg Road & Oakway Road	0	0	2	8	9	19	0.27[c]
Coburg Road & Oakmont Way	0	1	5	5	3	14	0.27[c]
Coburg Road & Pioneer Pike/Harlow Road	0	0	1	3	3	7	0.13[c]
Coburg Road & Cal Young Road	0	0	2	4	9	15	0.35[c]
Coburg Road & Willakenzie Road	0	0	3	8	23	34	0.66[c]
Coburg Road & Randy Papé Beltline EB Off/Randy Papé Beltline EB On	0	0	1	11	9	21	0.36[c]
Coburg Road & Randy Papé Beltline WB On/Randy Papé Beltline WB Off	0	0	3	11	12	26	0.40[c]
Coburg Road & Chad Drive	0	0	3	6	17	26	0.51[c]
Coburg Road & Crescent Avenue	0	1	6	9	7	23	0.56[c]
N. Game Farm Road & Crescent Ave/Armitage Road	0	0	0	0	0	0	0.00[c]
Gateway St & International Way	0	0	0	0	0	0	0.00[c]

Source: ODOT Crash Data. (2016). Compiled by DKS Transportation Analysts. (2016).

[a] PDO = Property Damage Only.
[b] Collisions per 1 million vehicle miles.
[c] Collisions per 1 million entering vehicles.

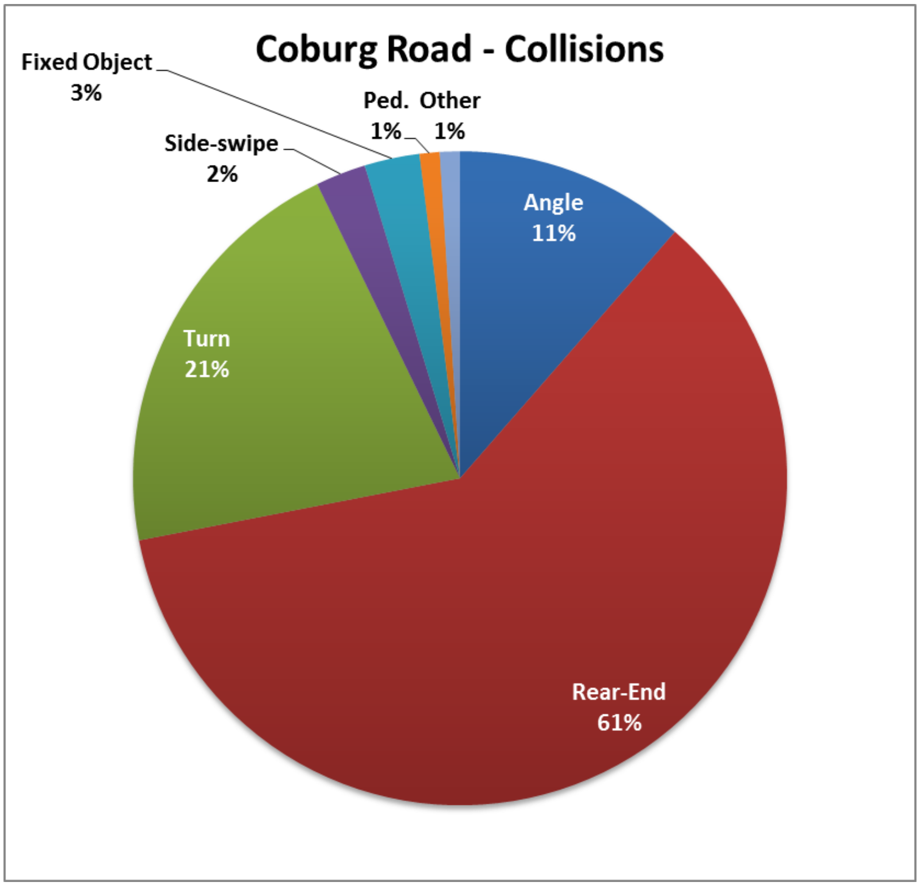
Figure 8.1-2. Coburg Road Corridor 5-Year Crash Heat Map (2010 – 2014)



Source: DKS Transportation Analysis. (2016).

Further analysis of the corridor was done in order to determine what types of crashes are most prevalent. As shown on Figure 8.1-3, the most prevalent collision types are rear end and turning, which together account for over 80 percent of the total collisions along the corridor. There were a high number of rear end crashes at Coburg Road/Country Club Lane/Martin Luther King, Jr. Boulevard, Coburg Road/Willakenzie Road and Coburg Road/Chad Drive. In addition, there were a large number of angle crashes at Pearl Street/E. 7th Avenue and High Street/E. 7th Avenue. There were no segments or intersections that had a collision rate above or near 1 crash per million entering vehicles.

Figure 8.1-3. Coburg Road Corridor Collision Breakdown by Type

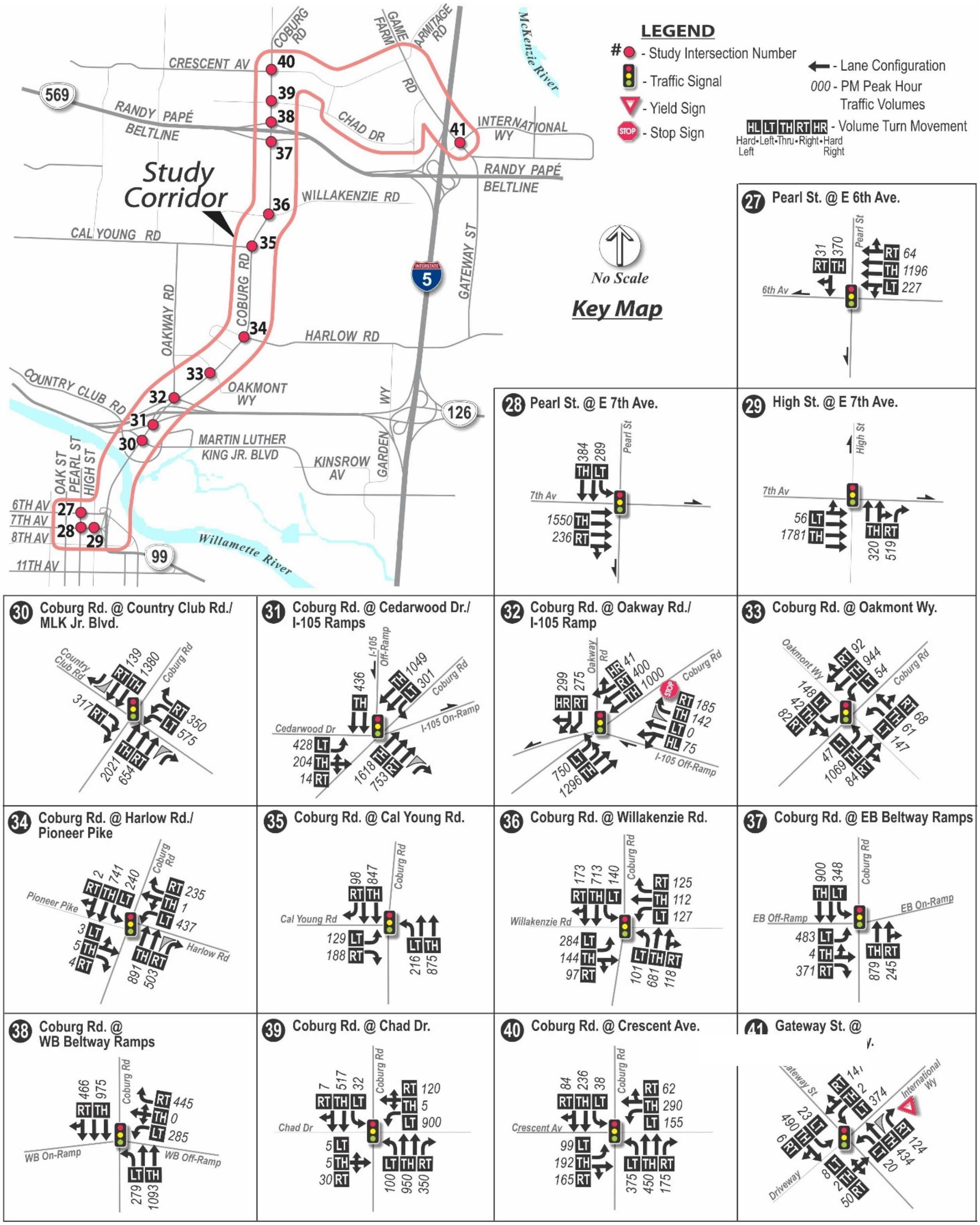


Source: DKS Transportation Analysis. (2016).

8.1.6. Existing Motor Vehicle Intersection Operations

A traffic operations model was created for the study area to evaluate vehicle traffic flow and intersection conditions, such as average vehicle delay and congestion. The existing p.m. peak hour performance of the study intersections were evaluated using a traffic operations model based on 2000 *Highway Capacity Manual* methodology (TRB, 2000). The 2015 base year traffic volumes and existing roadway network were used to determine study intersection delay, level of service, and volume-to-capacity ratio. Existing intersection traffic signal timing was obtained from the City of Eugene and incorporated into the analysis. The existing p.m. peak hour turning movement counts are shown on Figure 8.1-4.

Figure 8.1-4. Coburg Road Corridor 2015 Existing p.m. Peak Hour Traffic Volumes



Source: DKS Transportation Analysis. (2016).

The existing p.m. peak hour study intersection operations analysis is presented in Table 8.1-6. Currently, all of the intersections meet City of Eugene operating standards; however, the Coburg Road/Cedarwood Drive/I-105 Ramp does not meet ODOT operating standards.

Table 8.1-6. Coburg Road Corridor Existing 2015 p.m. Peak Hour Study Intersection Operations

Study Intersection Number	Study Intersection	Date of Intersection Count	Jurisdiction	Operating Standard[b]	LOS	Delay (sec)	v/c
27	Pearl Street/E. 6th Avenue	10/7/2015	City of Eugene	LOS E/LOS F	B	13.2	0.63
28	Pearl Street/E. 7th Avenue	10/7/2015	City of Eugene	LOS E/LOS F	B	19.0	0.65
29	High Street/E. 7th Avenue	10/7/2015	City of Eugene	LOS E/LOS F	B	17.3	0.74
30	Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard	10/6/2015	City of Eugene	LOS D/LOS E	C	34.0	0.97
31	Coburg Road/Cedarwood Drive/I-105 EB Onramp	10/6/2015	ODOT	0.85/1.00	<u>*C*</u>	<u>*27.4*</u>	<u>*0.86*</u>
32	Coburg Road/Oakway Road/I-105 WB onramp	5/26/2010[a]	ODOT	0.85/1.00	D	38.2	0.70
33	Coburg Road/Oakmont Way	10/6/2015	City of Eugene	LOS D/LOS E	C	20.2	0.61
34	Coburg Road/Harlow Road/Pioneer Pike	5/27/2010[a]	City of Eugene	LOS D/LOS E	C	34.5	0.87
35	Coburg Road/Cal Young Road	5/27/2010[a]	City of Eugene	LOS D/LOS E	B	13.8	0.55
36	Coburg Road/Willakenzie Road	10/6/2015	City of Eugene	LOS D/LOS E	C	30.3	0.71
37	Coburg Road/EB Randy Papé Beltline Onramp	10/6/2015	ODOT	0.85/1.00	C	30.2	0.85
38	Coburg Road/WB Randy Papé Beltline Onramp	10/6/2015	ODOT	0.85/1.00	C	24.6	0.72
39	Coburg Road/Chad Drive	10/6/2015	City of Eugene	LOS D/LOS E	D	39.5	0.75
40	Coburg Road/Crescent Avenue	10/28/2015	City of Eugene	LOS D/LOS E	C	21.0	0.78
41	Gateway Street/International Way	10/6/2015	City of Springfield	LOS D/LOS E	C	31.8	0.68

Source: DKS Transportation Analysis. (2016).

<u>*Italic* underlined</u> values do not meet current standards.
<u>**Bold** underlined</u> values do not meet proposed standards or current standards.

Delay = Average Intersection Delay in seconds
LOS = Level of Service
v/c = volume-to-capacity

[a] Turning movement count was obtained from the Draft Eugene 2035 TSP.
[b] Current/proposed operations standards shown on these facilities.

During the existing p.m. peak hour, mobility standards are not met at the following study intersection:

- Coburg Road/Cedarwood Drive/I-105 Ramp (current standards only)

8.2. Long-Term Direct Impacts

8.2.1. No-Build Alternative

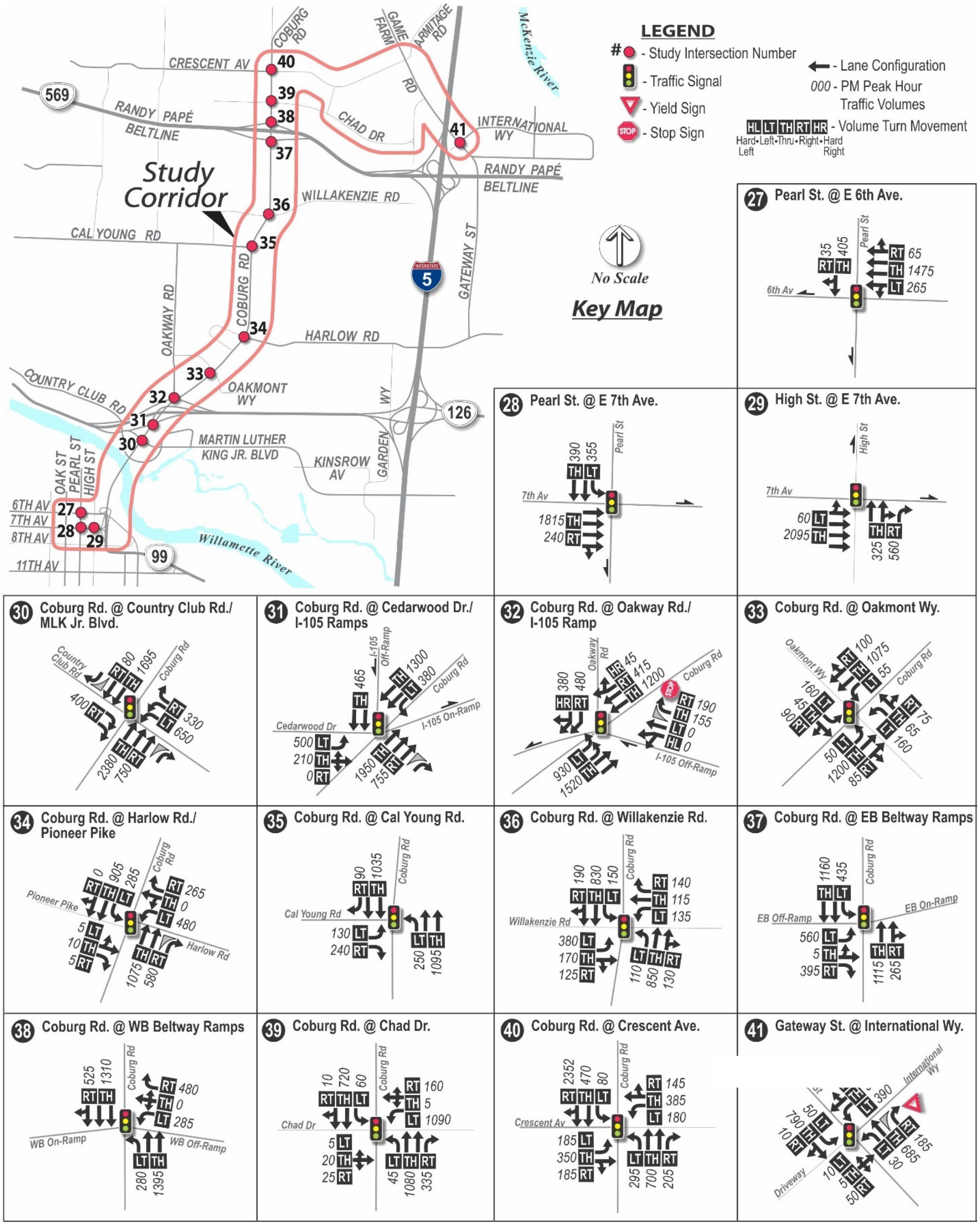
8.2.1.1. Local Traffic Operations

The 2035 p.m. peak hour Coburg Road Corridor No-Build Alternative motor vehicle turning movement volumes are shown on Figure 8.2-1. Figure 8.2-2 shows the Coburg Road Corridor 2035 No-Build Alternative Transit Network.

The 2035 p.m. peak hour No-Build transportation analysis was based on a future roadway network which included the expected transportation improvements identified in the Draft Eugene 2035 TSP. There were no expected projects identified on the Coburg Road Corridor.

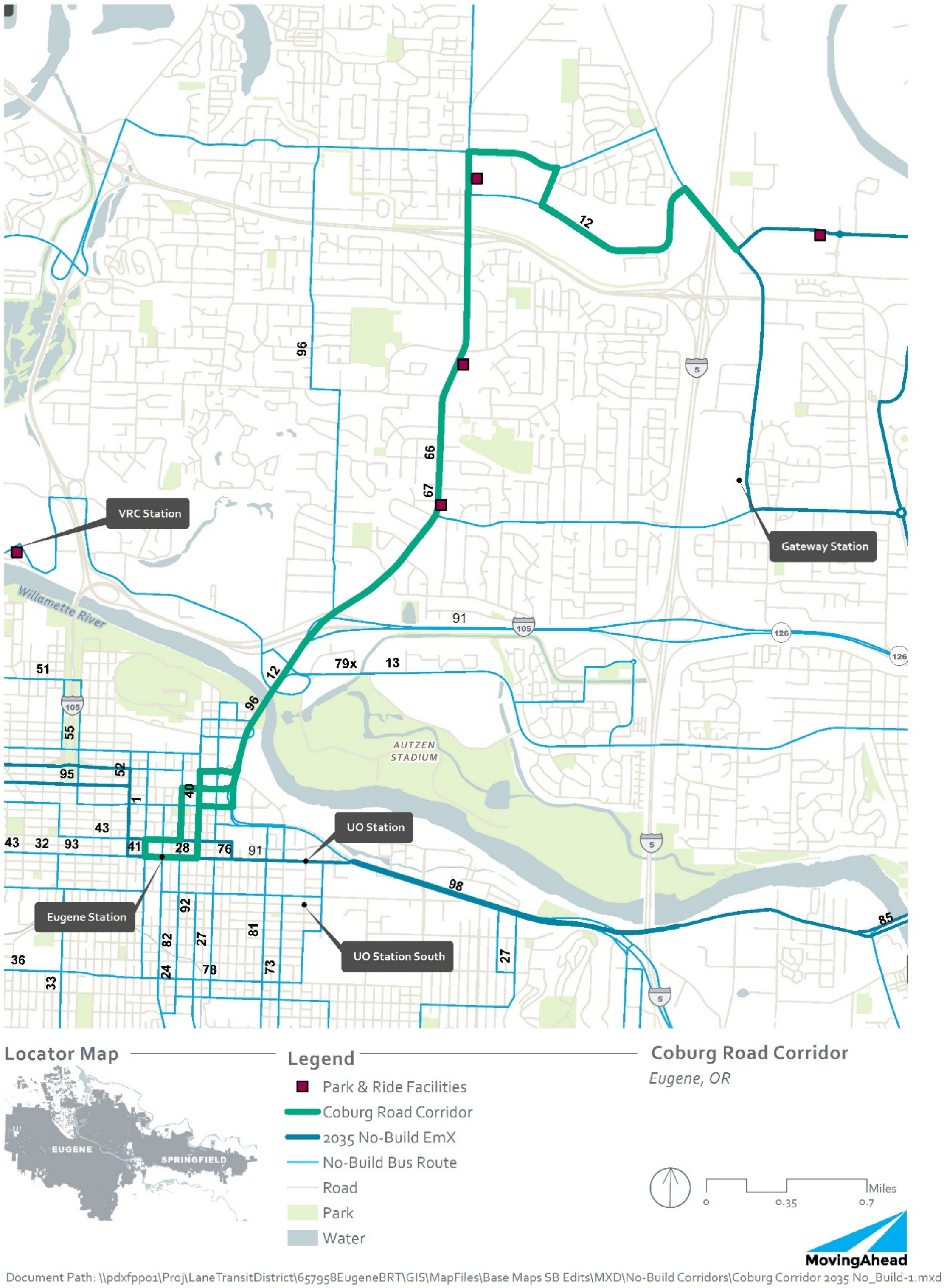
A traffic operations model was created for the study area to evaluate traffic flow and intersection operating conditions, such as average vehicle delay and congestion. The 2035 No-Build performance of the study intersections were evaluated using a traffic operations model based on 2000 *Highway Capacity Manual* methodology (TRB, 2000). The operations analysis was conducted at all of the study intersections during the p.m. peak hour. The No-Build Alternative study intersection operations analysis for the 2035 p.m. peak hour is presented in Table 8.2-1.

Figure 8.2-1. Coburg Road Corridor 2035 No-Build Alternative p.m. Peak Hour Traffic Volumes



Source: DKS Transportation Analysis. (2016).

Figure 8.2-2. Coburg Road Corridor No-Build Alternative 2035 Transit Network



Source: CH2M. (2016).

Table 8.2-1. Coburg Road Corridor 2035 p.m. Peak Hour No-Build Alternative Study Intersection Operations

Study Intersection Number	Study Intersection	Jurisdiction	Operating Standard[a]	LOS	Delay (sec)	v/c
27	Pearl Street/E. 6th Avenue	City of Eugene	LOS E/LOS F	B	15.8	0.70
28	Pearl Street/E. 7th Avenue	City of Eugene	LOS E/LOS F	C	21.2	0.72
29	High Street/E. 7th Avenue	City of Eugene	LOS E/LOS F	B	16.3	0.74
30	Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard	City of Eugene	LOS D/LOS E	*E*	*55.5*	*1.10*
31	Coburg Road/Cedarwood Drive/I-105 EB Onramp	ODOT	0.85/1.00	*D*	*36.0*	*0.96*
32	Coburg Road/Oakway Road/I-105 WB onramp	ODOT	0.85/1.00	*D*	*44.0*	*0.88*
33	Coburg Road/Oakmont Way	City of Eugene	LOS D/LOS E	C	21.3	0.66
34	Coburg Road/Harlow Road/Pioneer Pike	City of Eugene	LOS D/LOS E	D	50.4	0.99
35	Coburg Road/Cal Young Road	City of Eugene	LOS D/LOS E	B	16.6	0.62
36	Coburg Road/Willakenzie Road	City of Eugene	LOS D/LOS E	D	41.4	0.86
37	Coburg Road/EB Randy Papé Beltline Onramp	ODOT	0.85/1.00	**D**	**55.8**	**1.04**
38	Coburg Road/WB Randy Papé Beltline Onramp	ODOT	0.85/1.00	C	30.5	0.81
39	Coburg Road/Chad Drive	City of Eugene	LOS D/LOS E	C	29.8	0.88
40	Coburg Road/Crescent Avenue	City of Eugene	LOS D/LOS E	D	42.6	0.96
41	Gateway Street/International Way	City of Springfield	LOS D/LOS E	C	33.9	0.82

Source: DKS Transportation Analysis. (2016).

Italic underlined values do not meet current standards

Bold underlined values do not meet proposed standards or current standards

Delay = Average Intersection Delay in seconds

LOS = Level of Service

v/c = volume-to-capacity

[a] Current/proposed operations standards for these facilities.

Under the 2035 p.m. peak hour No-Build Alternative, mobility standards would not be met at the following study intersections:

- Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard (current standards only)
- Coburg Road/Cedarwood Drive/I-105 Ramp (current standards only)
- Coburg Road/Oakway Road/I-105 Ramp (current standards only)
- Coburg Road/EB Randy Papé Beltline Ramp (current and proposed standards)

8.2.1.2. Connectivity to Roadway, Bike, and Pedestrian Facilities

The Coburg Road Corridor No-Build Alternative was compared with the existing and proposed roadway, bike, and pedestrian projects from the expected transportation improvement projects to determine how well coordinated the projects were. No expected transportation improvement projects were located on the Coburg Road Corridor. The No-Build Alternative would not change connectivity to planned roadway, bike, or pedestrian projects.

The No-Build Alternative qualitative assessment of pedestrian and bicycle facilities is shown in Table 8.2-2. Pedestrian facilities were rated “excellent,” “good,” “fair,” or “poor” based on presence and width of sidewalks or paths, presence and width of buffers (such as landscaping), outside travel lane width, number of travel lanes and speed of motorized traffic, presence and width of bicycle lane or shoulder, and presence of lighting. Bicycle facilities were rated “excellent,” “good,” “fair,” or “poor” based on preferred type of facility (bike lane, buffered bike lane, off-street path) given motor vehicle volume of the roadway, presence and width of a shoulder, outside travel lane width, grade, pavement condition, obstructions, presence of on-street parking, and number of travel lanes and speed of motorized traffic.

Table 8.2-2. Coburg Road Corridor No-Build Alternative Qualitative Assessment of Pedestrian and Bicycle Facilities[a]

Segment	Walking	Biking
E. 6th Avenue: Pearl Street to Ferry Street Bridge	Excellent	Poor
E. 7th Avenue: Pearl Street to Mill Street	Good	Poor
E. 8th Avenue: Pearl Street to Mill Street	Good	Poor
Pearl Street: E. 6th Avenue to E. 11th Avenue	Good	Fair
Oak Street: E. 7th Avenue to E. 10th Avenue	Good	Fair
W. 10th Avenue: Olive Street to Oak Street	Good	Good
W. 11th Avenue: Olive Street to Pearl Street	Good	Poor
Olive Street: 10th Avenue to 11th Avenue	Good	Fair
Coburg Road: Ferry Street Bridge to Oakway Road	Excellent	Excellent
Coburg Road: Oakway Road to Oakmont Way	Good	Fair
Coburg Road: Oakmont Way to Crescent Avenue	Fair	Fair
Crescent Avenue: Coburg Road to Shadow View Drive	Fair[b]	Fair
Shadow View Drive: Crescent Avenue to Chad Drive	Fair	Poor
Chad Drive: Shadow View Drive to Game Farm Road	Good	Fair
Game Farm Road: Chad Drive to International Way	Good	Fair

Source: DKS Transportation Analysis. (2016).

[a] Qualitative analysis based on methodology described in Chapter 14 of ODOT’s *Analysis Procedures Manual* (ODOT, 2014).
[b] Sidewalk is on south side only.

8.2.1.3. Plan Consistency

The Coburg Road Corridor No-Build Alternative was evaluated for consistency with the Long Range Transit Plan (LTD, 2014), the FTN concept, and the goals outlined in the Regional Transportation Plan (LCOG, 2011, December) and the Draft Eugene 2035 TSP.

The purpose of the LTD FTN is to leverage transit service investments by tying service to the density and other elements of adjacent development. The FTN enables a well-connected network that provides regional circulation by providing an average transit frequency of 15 minutes or better, a reliable transit system that runs on schedule (by implementing strategies such as transit priority at signalized intersections), and enhanced stations with bicycle and pedestrian connections (LTD, 2014). The No-Build Alternative meets the FTN goal of providing frequent service on Coburg Road between the Ferry Street Bridge and Chad Drive through the combined frequencies of Routes 66 and 67 (CH2M, 2016a).

The BRT system is the "highest level of service available within the FTN, and is a permanent, integrated system that uses buses or specialized vehicles on roadways or dedicated lanes to efficiently transport passengers" (LTD, 2014). BRT system elements include branded multi-door 60-foot-long BRT vehicles, enhanced stations with level boarding platforms instead of bus stops, off-board fare collection, transit signal priority, wider stop spacing, and 10-minute service frequencies. BRT service is intended to improve transit speed, reliability, and ridership (CH2M, 2016a). The No-Build Alternative would not meet these BRT system elements.

The five primary goals outlined in the Draft Eugene 2035 TSP are to: (1) create an integrated system that is safe and efficient and reduces fossil fuel usage by 50 percent, (2) advance regional sustainability by reducing fossil fuel reliance, (3) reduce reliance on any single mode, (4) address the needs and safety of all travelers, and (5) triple the percentage of trips made on foot, by bicycle, and by transit by 2035 from 2014 levels. The No-Build Alternative would not improve bus service enough to meet many of these goals, such as improving frequency during off-peak hours to reduce reliance on other modes, reducing fossil fuel reliance, or helping to triple the percentage of trips made on foot, by bicycle, and by transit by 2035 from 2014 levels, compared to the build alternatives.

8.2.1.4. Transit Priority at Signalized Intersections

The Coburg Road Corridor No-Build Alternative would not include any changes to traffic signal operations, and no exclusive bus signal phasing would be provided, except for those already under construction along 10th Avenue and 11th Avenue as part of the WEEE project.

8.2.1.5. Safety

The Coburg Road Corridor No-Build Alternative would retain the existing roadway system. Motor vehicle safety would not be affected under the No-Build Alternative.

8.2.1.6. Roadway Circulation

The Coburg Road Corridor No-Build Alternative would retain existing roadway circulation. Motor vehicle circulation would not be affected under the No-Build Alternative.

8.2.1.7. Freight

The Coburg Road Corridor No-Build Alternative is not expected to impact freight truck movement.

8.2.1.8. Parking and Access

The Coburg Road Corridor No-Build Alternative would not impact on-street or off-street parking and would not impact property access.

8.2.1.9. Emergency Vehicle Flow and Access

Emergency vehicle flow and access would not change under the Coburg Road Corridor No-Build Alternative.

8.2.2. Enhanced Corridor Alternative

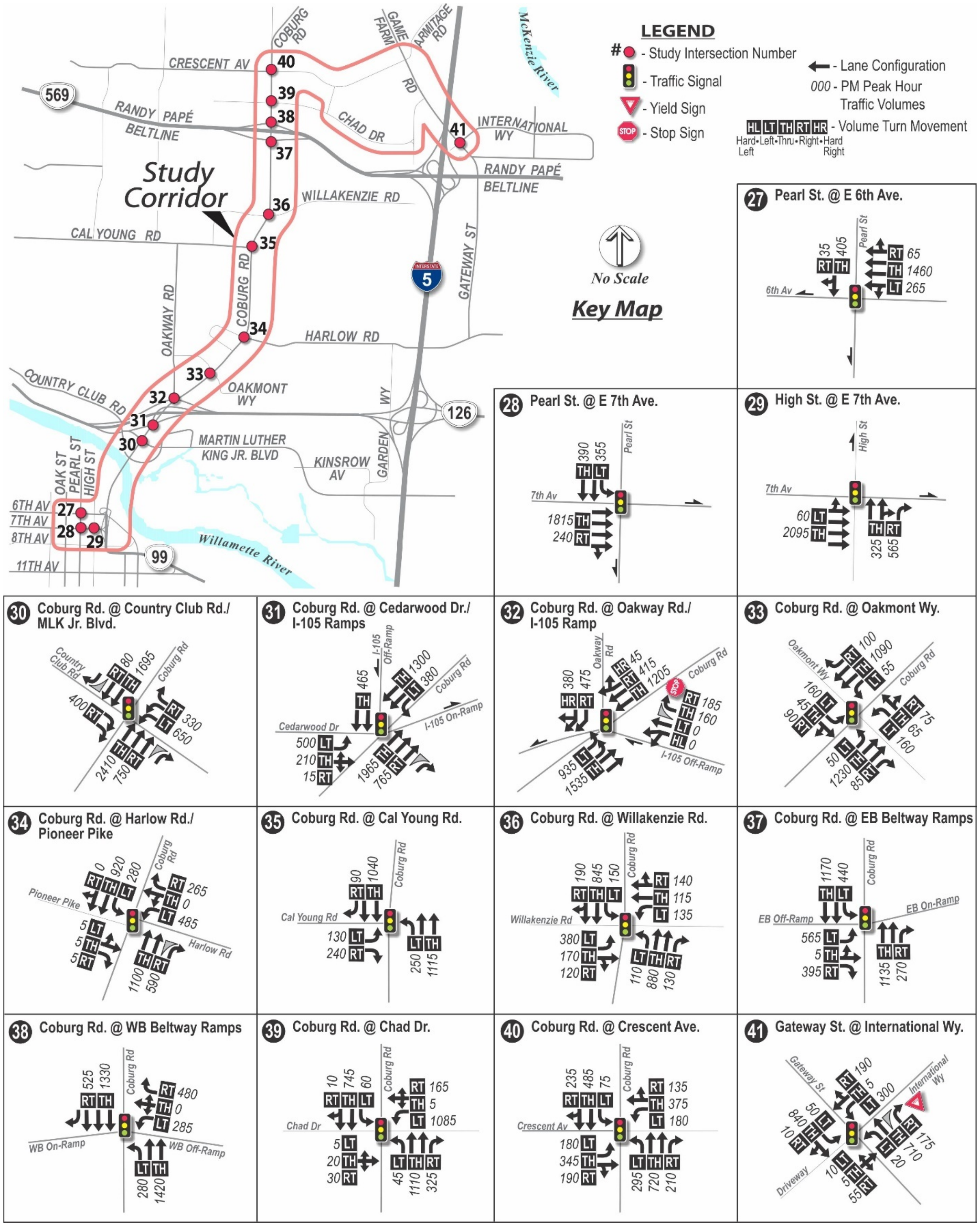
8.2.2.1. Local Traffic Operations

The Coburg Road Corridor Enhanced Corridor Alternative would install roadway improvements that would affect study intersection operations, including:

- Installing BAT lanes on Coburg Road from Country Club Road to Cedarwood Drive/I-105 EB Onramp
- Extending northbound and southbound right turn lanes on Coburg Road at Oakmont Way and northbound right turn lanes at Harlow Road, Willakenzie Road, Randy Papé Beltline EB Onramp, Randy Papé Beltline WB Onramp, Chad Drive, and Crescent Avenue
- Installing northbound right turn only lane on Coburg Road at Randy Papé Beltline EB Onramp
- Installing southbound right turn only lane on Coburg Road at Randy Papé Beltline WB Onramp

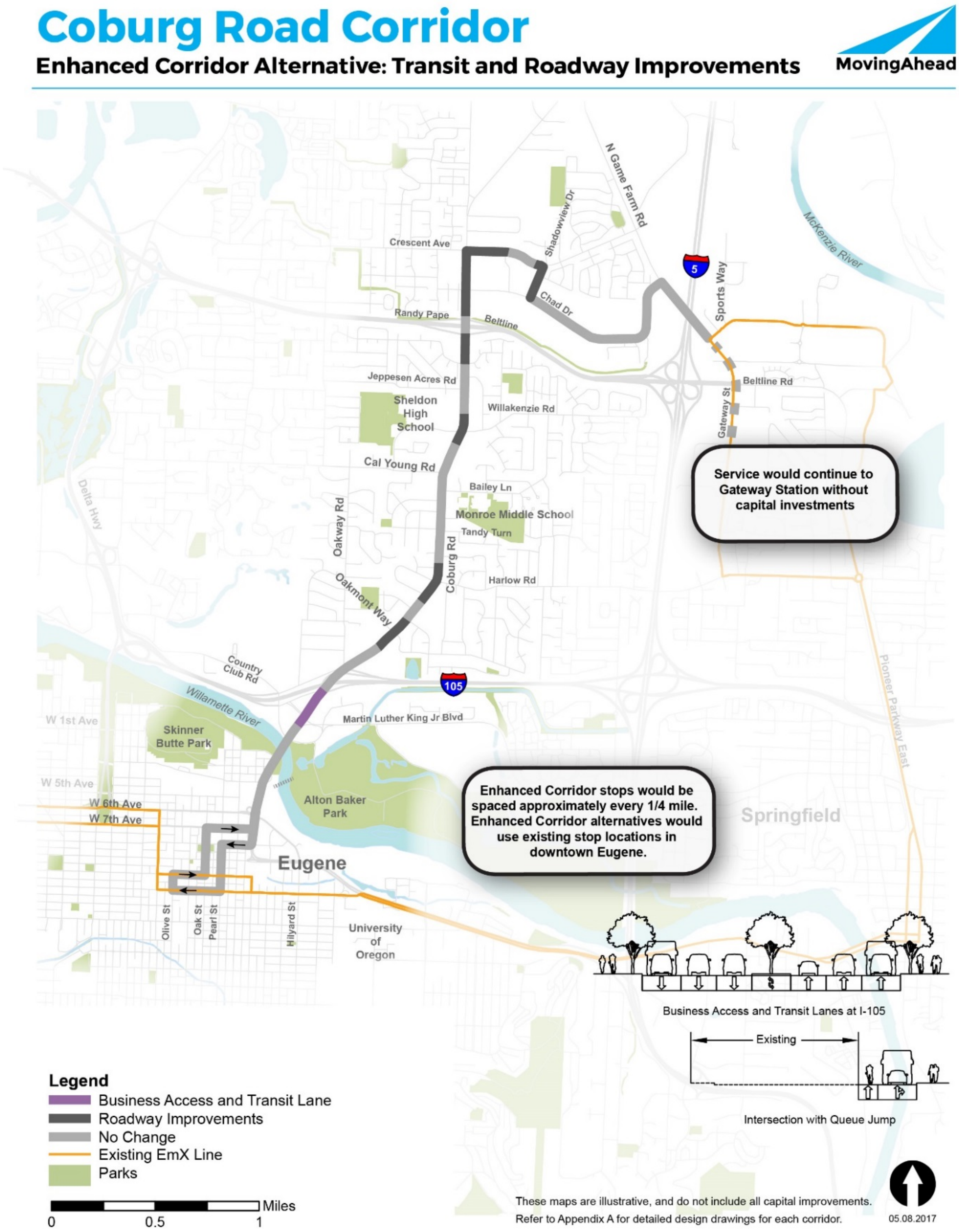
The 2035 p.m. peak hour turning movement volumes for the Enhanced Corridor Alternative are shown on Figure 8.2-3 and the transit and roadway improvements are shown on Figure 8.2-4. The study intersection performance for the 2035 p.m. peak hour No-Build and Enhanced Corridor Alternatives are shown in Table 8.2-3. Motor vehicle delay would improve at Coburg Road/Harlow Road and Coburg Road/EB Randy Papé Beltline Onramp due to the addition of northbound right turn lanes.

Figure 8.2-3. Coburg Road Corridor 2035 Enhanced Corridor Alternative p.m. Peak Hour Traffic Volumes



Source: DKS Transportation Analysis. (2016).

Figure 8.2-4. Coburg Road Corridor Enhanced Corridor Alternative 2035 Transit and Roadway Improvements



Source: CH2M. (2016).

Table 8.2-3. Coburg Road Corridor Enhanced Corridor Alternative 2035 p.m. Peak Hour Study Intersection Operations

Study Intersection Number	Study Intersection	Jurisdiction	Operating Standard[a]	No-Build			Enhanced Corridor		
				LOS	Delay (sec)	v/c	LOS	Delay (sec)	v/c
27	Pearl Street/E. 6th Avenue	City of Eugene	LOS E/LOS F	B	15.8	0.70	C	25.3	0.69
28	Pearl Street/E. 7th Avenue	City of Eugene	LOS E/LOS F	C	21.2	0.72	C	20.9	0.72
29	High Street/E. 7th Avenue	City of Eugene	LOS E/LOS F	B	16.3	0.74	B	18.7	0.73
30	Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard	City of Eugene	LOS D/LOS E	*E*	*55.5*	*1.10*	*E*	*57.6*	*1.13*
31	Coburg Road/Cedarwood Drive/I-105 EB Onramp	ODOT	0.85/1.00	*D*	*36.0*	*0.96*	*D*	*39.3*	*0.98*
32	Coburg Road/Oakway Road/I-105 WB onramp	ODOT	0.85/1.00	*D*	*44.0*	*0.88*	*D*	*42.3*	*0.88*
33	Coburg Road/Oakmont Way	City of Eugene	LOS D/LOS E	C	21.3	0.66	C	24.8	0.62
34	Coburg Road/Harlow Road/Pioneer Pike	City of Eugene	LOS D/LOS E	D	50.4	0.99	C	30.7	0.78
35	Coburg Road/Cal Young Road	City of Eugene	LOS D/LOS E	B	16.6	0.62	B	19.8	0.63
36	Coburg Road/Willakenzie Road	City of Eugene	LOS D/LOS E	D	41.4	0.86	D	42.6	0.87
37	Coburg Road/EB Randy Papé Beltline Onramp	ODOT	0.85/1.00	**D**	**55.8**	**1.04**	*D*	*39.5*	*0.95*
38	Coburg Road/WB Randy Papé Beltline Onramp	ODOT	0.85/1.00	C	30.5	0.81	C	22.9	0.70
39	Coburg Road/Chad Drive	City of Eugene	LOS D/LOS E	C	29.8	0.88	C	32.0	0.89
40	Coburg Road/Crescent Avenue	City of Eugene	LOS D/LOS E	D	42.6	0.96	D	43.0	0.96
41	Gateway Street/International Way	City of Springfield	LOS D/LOS E	C	33.9	0.82	C	26.0	0.80

Source: DKS Transportation Analysis. (2016).

Italic underlined values do not meet current standards
Bold underlined values do not meet proposed standards or current standards

Delay = Average Intersection Delay in seconds
LOS = Level of Service
v/c = volume-to-capacity

[a] Current/proposed operations standards for these facilities.

For the Enhanced Corridor Alternative, mobility standards are not met at the following study intersections:

- Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard (current standards only)
- Coburg Road/Cedarwood Drive/I-105 Ramp (current standards only)
- Coburg Road/Oakway Road/I-105 Ramp (current standards only)
- Coburg Road/EB Randy Papé Beltline Ramp (current standards only)

8.2.2.2. Connectivity to Planned Roadway, Bike, Pedestrian Projects

The proposed multi-modal project improvements (shown Table 8.2-4 and on Figure 8.2-5) were compared with the existing and proposed roadway, bike, and pedestrian projects from the expected transportation improvement projects identified in the Draft Eugene 2035 TSP to determine how well coordinated the projects were. No expected transportation improvement projects were located on the Coburg Road Corridor.

The amount of new and reconstructed pedestrian and bicycle facilities proposed under the Enhanced Corridor Alternative are shown in Table 8.2-5. Compared to the No-Build Alternative, the Enhanced Corridor Alternative would install pedestrian improvements, including two new enhanced crossings (flashing beacon or Pedestrian Hybrid Beacon) and seven upgraded crossings (median refuge island and ADA ramps). The Enhanced Corridor Alternative would install about 7,500 feet of reconstructed or improved sidewalks, and would connect a sidewalk gap on the north side of Crescent Avenue between Coburg Road and Tennyson Avenue.

The Enhanced Corridor Alternative would not improve bike facilities compared to the No-Build Alternative.

Table 8.2-4. Coburg Road Corridor Enhanced Corridor Alternative New and Reconstructed Pedestrian and Bicycle Facilities

Improvement	Length of Facilities
New Sidewalk	1,050 feet (0.20 miles)
Reconstructed/Improved Sidewalk	6,500 feet (1.23 miles)
Number of New Mainline Enhanced Crossings[a]	2 (1 on Coburg Road, 1 on Crescent Avenue)
Number of Upgraded Crossings[b]	7
Sidewalk Gaps Connected	North side of Crescent Avenue from Coburg Road to Tennyson Avenue
New Bike Facilities	0
Improved Bike Facilities	0

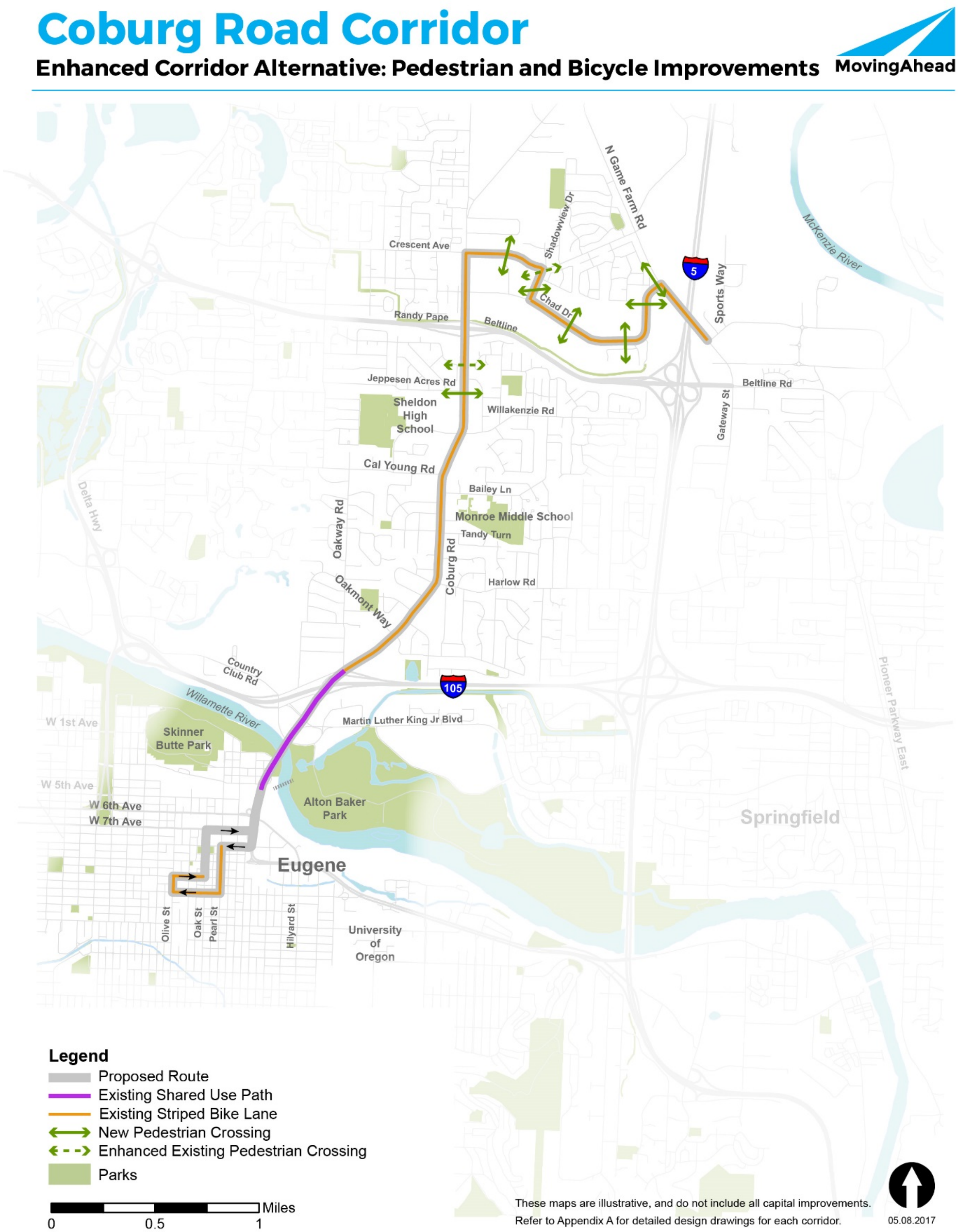
Source: CH2M Transportation Analysis. (2016).

[a] Enhanced crossing would install either a flashing yellow indication (flashing beacon), a yellow, red, flashing red indication (Pedestrian Hybrid Beacon), or a full traffic signal with pedestrian crossings along the mainline to warn vehicles of a pedestrian crossing.

[b] Upgraded crossings would consist of installing ADA ramps and possibly median refuge islands and/or crosswalk striping.

The qualitative assessment of pedestrian facilities, shown in Table 8.2-5, shows that the Crescent Avenue roadway segment would improve over the No-Build Alternative from “fair” to “good” by installing a sidewalk on the north side of the street. Biking facilities would not change under the Enhanced Corridor Alternative compared to the No-Build Alternative.

Figure 8.2-5. Coburg Road Corridor Enhanced Corridor Alternative 2035 Pedestrian and Bicycle Improvements



Source: CH2M. (2016).

Table 8.2-5. **Coburg Road Corridor Enhanced Corridor Alternative Qualitative Assessment of Pedestrian and Bicycle Facilities[a]**

Segment	No-Build Walking	Enhanced Corridor Walking
E. 6th Avenue: Pearl Street to Ferry Street Bridge	Excellent	Excellent
E. 7th Avenue: Pearl Street to Mill Street	Good	Good
E. 8th Avenue: Pearl Street to Mill Street	Good	Good
Pearl Street: E. 6th Avenue to E. 11th Avenue	Good	Good
Oak Street: E. 7th Avenue to E. 10th Avenue	Good	Good
W. 10th Avenue: Olive Street to Oak Street	Good	Good
W. 11th Avenue: Olive Street to Pearl Street	Good	Good
Olive Street: 10th Avenue to 11th Avenue	Good	Good
Coburg Road: Ferry Street Bridge to Oakway Road	Excellent	Excellent
Coburg Road: Oakway Road to Oakmont Way	Good	Good
Coburg Road: Oakmont Way to Crescent Avenue	Fair	Fair
Crescent Avenue: Coburg Road to Shadow View Drive	Fair[b]	Good
Shadow View Drive: Crescent Avenue to Chad Drive	Fair	Fair
Chad Drive: Shadow View Drive to Game Farm Road	Good	Good
Game Farm Road: Chad Drive to International Way	Good	Good

Source: DKS Transportation Analysis. (2016).

[a] Qualitative analysis based on methodology described in Chapter 14 of ODOT's *Analysis Procedures Manual* (ODOT, 2014).
[b] Sidewalk is on south side only.

8.2.2.3. Plan Consistency

The Enhanced Corridor Alternative was evaluated for consistency with the Long Range Transit Plan (LTD, 2014), the FTN concept, and the goals outlined in the Regional Transportation Plan (LCOG, 2011, December) and the Draft Eugene 2035 TSP.

The purpose of the LTD FTN is to leverage transit service investments by tying service to the density and other elements of adjacent development. The FTN enables a well-connected network that provides regional circulation by providing an average transit frequency of 15 minutes or better, a reliable transit system that runs on schedule (by implementing strategies such as transit priority at signalized intersections), and enhanced stations with bicycle and pedestrian connections (LTD, 2014). The Enhanced Corridor Alternative would meet the FTN goals by providing frequent service on Coburg Road, installing transit priority at signalized intersections, and adding BAT lanes and transit queue jumps to help make service more reliable and on schedule.

The BRT system is the "highest level of service available within the FTN, and is a permanent, integrated system that uses buses or specialized vehicles on roadways or dedicated lanes to efficiently transport passengers" (LTD, 2014). BRT system elements include branded multi-door 60-foot-long BRT vehicles, enhances stations with level boarding platforms instead of bus stops, off-board fare collection, transit signal priority, wider stop spacing, and 10-minute service frequencies. BRT service is intended to improve transit speed, reliability, and ridership (CH2M, 2016a). The Enhanced Corridor Alternative would not meet these BRT system elements.

The five primary goals outlined in the Draft Eugene 2035 TSP are to: (1) create an integrated system that is safe and efficient and reduces fossil fuel usage by 50 percent, (2) advance regional sustainability by reducing fossil fuel reliance, (3) reduce reliance on any single mode, (4) address the needs and safety of all travelers, and (5) triple the percentage of trips made on foot, by bicycle, and by transit by 2035 from 2014 levels. The Enhanced Corridor Alternative helps Eugene to slightly improve transit mode share, and some pedestrian improvements would be installed as part of the Enhanced Corridor Alternative that help increase pedestrian mode share. However, the Enhanced Corridor Alternative would not provide bicycle facility improvements to increase bicycle mode share over the No-Build Alternative.

8.2.2.4. Transit Priority at Signalized Intersections

The Coburg Road Corridor Enhanced Corridor Alternative would include traffic signal construction and modifications at several intersections. Several traffic signals would provide exclusive bus signal phasing that would allow buses to safety enter traffic flow or travel through an intersection. The locations of proposed bus signal phases are shown in Table 8.2-6.

Table 8.2-6. Coburg Road Corridor Enhanced Corridor Alternative Proposed Bus Phases

Intersection	Bus Phase
Ferry Street Bridge/E. 4th Avenue Ramp	Northbound (potential bus phase at new signal)
Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard	Northbound/Southbound (reverse queue jump)
Coburg Road/Cedarwood Drive/I-105 EB Onramp	Northbound/Southbound

Source: DKS Transportation Analysis. (2016).

In addition, every traffic signal on the corridor would receive transit signal priority. Transit signal priority modifies normal traffic signal operations by extended green phases or shortening side street phases in order to reduce delay for transit vehicles.

8.2.2.5. Safety

Potential safety impacts associated with the Coburg Road Corridor Enhanced Corridor Alternative include:

- BAT lanes along Coburg Road between I-105 and Country Club Road would serve both buses and turning general-purpose vehicles, reducing potential vehicle conflicts such as rear end collisions
- Bus queue jumps on Coburg Road at Country Club Road and Cedarwood Drive would serve buses exclusively, eliminating the merging conflict between vehicles and buses
- Adding or extending right turn lanes on Coburg Road at Oakmont Way (northbound and southbound), Harlow Road (northbound), Willakenzie Road (northbound), Randy Papé Beltline EB Onramp (northbound), Randy Papé Beltline WB Onramp (northbound), Chad Drive (northbound), and Crescent Avenue (northbound) could reduce potential vehicle conflicts such as rear end collisions (FHWA, 2014)
- Two new bicycle and pedestrian enhanced crossings and two new upgraded crossings along the corridor could improve opportunities for bicyclists and pedestrians to cross Coburg Road, Crescent Avenue, and Old Coburg Road

Overall, motor vehicle, pedestrian, and bicycle safety would be improved under the Enhanced Corridor Alternative.

8.2.2.6. Roadway Circulation

The Coburg Road Corridor Enhanced Corridor Alternative was evaluated to assess motor vehicle circulation. Overall, roadway circulation would improve under the Enhanced Corridor Alternative compared to the No-Build Alternative due to the installation of the following five new traffic signals:

- E. 4th Avenue onramp to the Ferry Street Bridge
- Coburg Road/Elysium Avenue
- Crescent Avenue/Shadow View Drive
- Shadow View Drive/Chad Drive
- Chad Drive/driveway of Veteran's Affairs hospital site

8.2.2.7. Freight

The Coburg Road Corridor Enhanced Corridor Alternative is not expected to impact freight truck movement.

8.2.2.8. Parking and Access

The Coburg Road Corridor Enhanced Corridor Alternative will not impact on-street parking.

Off-street parking impacts are listed in Table 8.2-7.

Table 8.2-7. Coburg Road Corridor Enhanced Corridor Alternative Off-Street Parking Impacts

Business	Location	Maximum Number Spaces Impacted[a]
Papa's Pizza	Coburg Road east side, 400 feet south of Willakenzie Road	12 parking spaces
The Hamptons Apartments	Coburg Road/Harlow Road southeast corner	15 parking spaces
H&R Block	Coburg Road west side, 200 feet north of Oakmont Way	4 parking spaces
Jiffy Lube	Coburg Road/Oakmont Way northwest corner	1 parking space
Kendall Subaru	Coburg Road/Cedarwood Drive southwest corner	10 parking spaces (lot would require reconfiguration)

Source: DKS Transportation Analysis. (2016).

[a] Enhanced Corridor Alternative would add or remove existing parking spaces on each block.

The Coburg Road Corridor Enhanced Corridor Alternative would not close any access points on the project corridor. However, the installation of a northbound right turn lane at the Coburg Road/Randy Papé Beltline EB Onramp would cause the removal the two way left turn lane on Coburg Road between Elysium Avenue and Randy Papé Beltline EB Onramp, which could limit several accesses on Coburg Road to right-in/right-out only access. These locations are shown in Table 8.2-8.

Table 8.2-8. Coburg Road Corridor Enhanced Corridor Alternative Access Changes for Motor Vehicles

Roadway Improvement Location	Impacted Business Location	Side of Street	Type of Access Change	Alternative Access
Coburg Road: Randy Papé Beltline EB Onramp to Elysium Avenue	Quality Research Associates	East	Right-in/right-out	None
	Vacant Lot	East	Right-in/right-out at two accesses	None
	Trauma Healing Project	West	Right-in/right-out	None
	Our Saviour's Lutheran Church	West	Right-in/right-out	None

Source: DKS Transportation Analysis. (2016).

There are two side streets adjacent to two enhanced pedestrian crossings that would have potential impacts to motor vehicles performing a two-stage left turn out of the streets due to the median refuge islands. In addition, there is one side street that would have a reduced left turn deceleration area, resulting in potential increased delays for motor vehicles accessing the driveways or traveling along the mainline. Table 8.2-9 lists the three locations with potential impacts.

Table 8.2-9. Coburg Road Corridor Enhanced Corridor Alternative Left Turn Access Impacts to Motor Vehicles

Crosswalk Location on Coburg Road Corridor	Impacted Street	Side of Street	Type of Impact
Crescent Avenue: East side of Tennyson Avenue intersection	Tennyson Avenue	North	Two Stage Left Turn – Exiting Side Street
	Suzanne Way	South	Left Turn – Entering Side Street
Coburg Road: North side of Jeppesen Acres Road	Jeppesen Acres Road	West	Two Stage Left Turn –Exiting Side Street

Source: DKS Transportation Analysis. (2016).

8.2.2.9. Emergency Vehicle Flow and Access

The emergency service authorities do not foresee any major issues of concern related to expanded transit services. Emergency service providers would have an opportunity to review more detailed designs and would work with Lane Transit District to address issues in the future (Lane Fire Authority, personal communication, April 13, 2017).

8.2.3. EmX Alternative

8.2.3.1. Local Traffic Operations

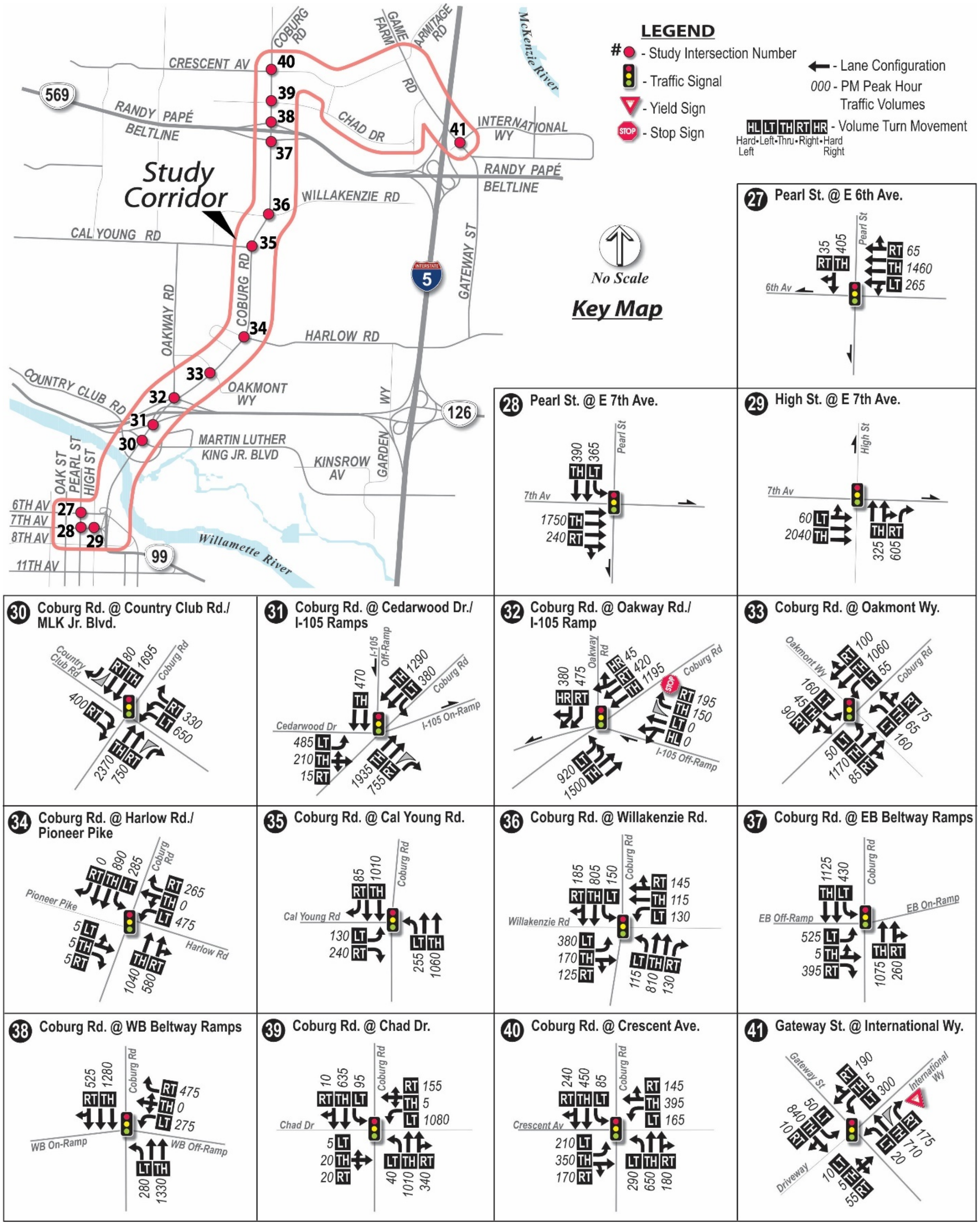
The Coburg Road Corridor EmX Alternative would install roadway improvements that would affect study intersection operations, including:

- Repurposing a general-purpose lane to a BAT lane on 7th Avenue between Oak Street and High Street and on 6th Avenue between High Street and Pearl Street

- Constructing center-running transit lanes on Coburg Road north of the Ferry Street Bridge to Cedarwood Drive/I-105 EB Onramp, near Oakway Road, between Pioneer Pike and Harlow Road, and between Elysium Avenue and Crescent Avenue
- Constructing northbound and southbound right turn lanes at Coburg Road and Willakenzie Road
- Installing a transit-only left turn lane from Crescent Avenue onto Coburg Road

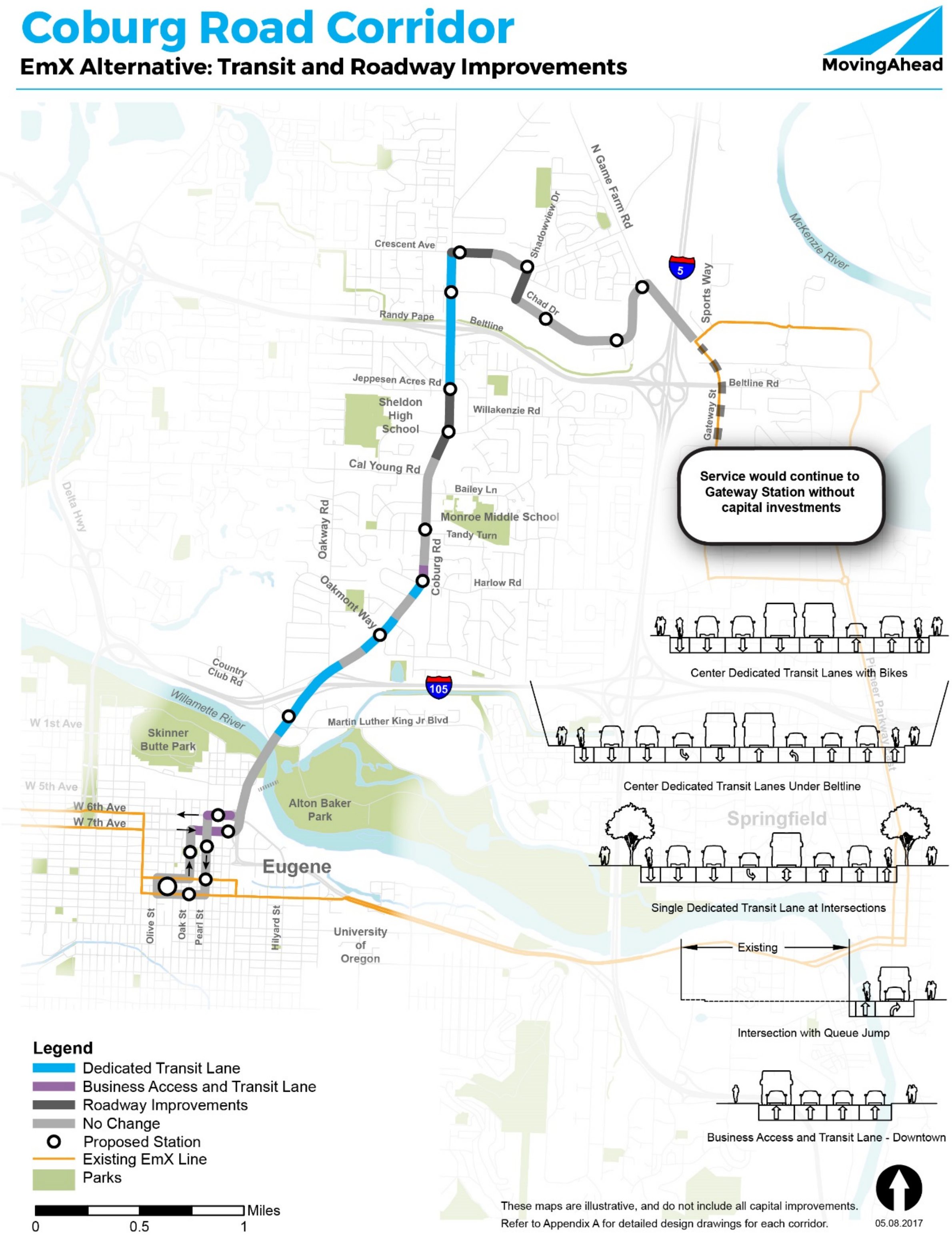
The 2035 p.m. peak hour turning movement volumes for the EmX Alternative are shown on Figure 8.2-6 and the transit and roadway improvements are shown on Figure 8.2-7. The study intersection performance for the 2035 p.m. peak hour No-Build and EmX Alternatives are shown in Table 8.2-10. Under the EmX Alternative, motor vehicle delay would increase at the Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard and Coburg Road/Cedarwood Drive/I-105 EB Onramp intersections due to the conversion of a northbound general purpose travel lane to a transit only lane.

Figure 8.2-6. Coburg Road Corridor 2035 EmX Alternative p.m. Peak Hour Traffic Volumes



Source: DKS Transportation Analysis. (2016).

Figure 8.2-7. Coburg Road Corridor EmX Alternative 2035 Transit and Roadway Improvements



Source: CH2M. (2016).

Table 8.2-10. Coburg Road Corridor EmX Alternative 2035 p.m. Peak Hour Study Intersection Operations

Study Intersection Number	Study Intersection	Jurisdiction	Operating Standard[a]	No-Build LOS	No-Build Delay (sec)	No-Build v/c	EmX LOS	EmX Delay (sec)	EmX v/c
27	Pearl Street/E. 6th Avenue	City of Eugene	LOS E/LOS F	B	15.8	0.70	C	26.9	0.72
28	Pearl Street/E. 7th Avenue	City of Eugene	LOS E/LOS F	C	21.2	0.72	C	23.3	0.76
29	High Street/E. 7th Avenue	City of Eugene	LOS E/LOS F	B	16.3	0.74	C	23.4	0.88
30	Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard	City of Eugene	LOS D/LOS E	<u>*E*</u>	<u>*55.5*</u>	<u>*1.10*</u>	<u>**F**</u>	<u>**127.3**</u>	<u>**1.39**</u>
31	Coburg Road/Cedarwood Drive/I-105 EB Onramp	ODOT	0.85/1.00	<u>*D*</u>	<u>*36.0*</u>	<u>*0.96*</u>	<u>**E**</u>	<u>**68.8**</u>	<u>**1.15**</u>
32	Coburg Road/Oakway Road / I-105 WB onramp	ODOT	0.85/1.00	<u>*D*</u>	<u>*44.0*</u>	<u>*0.88*</u>	<u>*D*</u>	<u>*37.2*</u>	<u>*0.87*</u>
33	Coburg Road/Oakmont Way	City of Eugene	LOS D/LOS E	C	21.3	0.66	C	29.0	0.65
34	Coburg Road/Harlow Road/Pioneer Pike	City of Eugene	LOS D/LOS E	D	50.4	0.99	D	54.1	1.00
35	Coburg Road/Cal Young Road	City of Eugene	LOS D/LOS E	B	16.6	0.62	B	19.4	0.63
36	Coburg Road/Willakenzie Road	City of Eugene	LOS D/LOS E	D	41.4	0.86	D	41.9	0.85
37	Coburg Road/EB Randy Papé Beltline Onramp	ODOT	0.85/1.00	<u>**D**</u>	<u>**55.8**</u>	<u>**1.04**</u>	<u>**E**</u>	<u>**56.5**</u>	<u>**1.03**</u>
38	Coburg Road/WB Randy Papé Beltline Onramp	ODOT	0.85/1.00	C	30.5	0.81	C	23.7	0.80
39	Coburg Road/Chad Drive	City of Eugene	LOS D/LOS E	C	29.8	0.88	D	50.5	1.18
40	Coburg Road/Crescent Avenue	City of Eugene	LOS D/LOS E	D	42.6	0.96	D	39.9	1.06
41	Gateway Street/International Way	City of Springfield	LOS D/LOS E	C	33.9	0.82	C	26.0	0.80

Source: DKS Transportation Analysis. (2016).

<u>*Italic* underlined</u> values do not meet current standards
<u>**Bold** underlined</u> values do not meet proposed standards or current standards

Delay = Average Intersection Delay in seconds
LOS = Level of Service
v/c = volume-to-capacity

[a] Current/proposed operations standards for these facilities.

For the 2035 p.m. peak hour EmX Alternative, mobility standards would not be met at the following study intersections:

- Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard (current and proposed standards)
- Coburg Road/Cedarwood Drive/I-105 Eastbound Ramp (current and proposed standards)
- Coburg Road/Oakway Road/I-105 Ramp (current standards only)
- Coburg Road/Randy Papé Beltline Eastbound Ramp (current and proposed standards)

8.2.3.2. Connectivity to Planned Roadway, Bike, Pedestrian Projects

The proposed multi-modal project improvements (shown in Table 8.2-11 on Figure 8.2-8) were compared with the existing and proposed roadway, bike, and pedestrian projects from the expected transportation improvement projects identified in the Draft Eugene 2035 TSP to determine how well coordinated the projects were. No expected transportation improvement projects were located on the Coburg Road Corridor.

The amount of new and reconstructed pedestrian and bicycle facilities proposed under the EmX Alternative are shown in Table 8.2-11. Compared to the No-Build Alternative, the EmX Alternative would install significant pedestrian improvements, including two new enhanced crossings (flashing beacon or Pedestrian Hybrid Beacon) and seven upgraded crossings. The EmX Alternative would install about 14,800 feet of reconstructed or improved sidewalks, and would connect a sidewalk gap on the north side of Crescent Avenue between Coburg Road and Tennyson Avenue.

Compared to the No-Build and Enhanced Corridor Alternatives, the EmX Alternative would improve bike facilities on Coburg Road by routing facilities behind new transit stations.

Table 8.2-11. Coburg Road Corridor EmX Alternative New and Reconstructed Pedestrian and Bicycle Facilities

Improvement	Length of Facilities
New Sidewalk	1,050 feet (0.20 miles)
Reconstructed/Improved Sidewalk	13,750 feet (2.60 miles)
Number of New Mainline Enhanced Crossings[a]	2 (1 on Coburg Road, 1 on Crescent Avenue)
Number of Upgraded Crossings[b]	7
Sidewalk Gaps Connected	North side of Crescent Avenue from Coburg Road to Tennyson Avenue
New Bike Facilities	0
Improved Bike Facilities	1,900 (0.36 miles)

Source: CH2M Transportation Analysis. (2016).

[a] Enhanced crossing would install either a flashing yellow indication (flashing beacon), a yellow, red, flashing red indication (Pedestrian Hybrid Beacon), or a full traffic signal with pedestrian crossings along the mainline to warn vehicles of a pedestrian crossing.

[b] Upgraded crossings would consist of installing ADA ramps and possibly median refuge islands and/or crosswalk striping.

The qualitative assessment of pedestrian facilities, shown in Table 8.2-12, shows that the Crescent Avenue roadway segment would improve over the No-Build Alternative from "fair" to "good" by installing a sidewalk on the north side of the street. The qualitative assessment of biking facilities would not change under the EmX Alternative compared to the No-Build Alternative, but spot improvements would be made by routing biking facilities behind new transit stations.

Figure 8.2-8. Coburg Road Corridor EmX Alternative 2035 Pedestrian and Bicycle Improvements

Source: CH2M. (2016).

Table 8.2-12. Coburg Road Corridor EmX Alternative Qualitative Assessment of Pedestrian and Bicycle Facilities[a]

Segment	No-Build Walking	EmX Walking
E. 6th Avenue: Pearl Street to Ferry Street Bridge	Excellent	Excellent
E. 7th Avenue: Pearl Street to Mill Street	Good	Good
E. 8th Avenue: Pearl Street to Mill Street	Good	Good
Pearl Street: E. 6th Avenue to E. 11th Avenue	Good	Good
Oak Street: E. 7th Avenue to E. 10th Avenue	Good	Good
W. 10th Avenue: Olive Street to Oak Street	Good	Good
W. 11th Avenue: Olive Street to Pearl Street	Good	Good
Olive Street: 10th Avenue to 11th Avenue	Good	Good
Coburg Road: Ferry Street Bridge to Oakway Road	Excellent	Excellent
Coburg Road: Oakway Road to Oakmont Way	Good	Good
Coburg Road: Oakmont Way to Crescent Avenue	Fair	Fair
Crescent Avenue: Coburg Road to Shadow View Drive	Fair[b]	Good
Shadow View Drive: Crescent Avenue to Chad Drive	Fair	Fair
Chad Drive: Shadow View Drive to Game Farm Road	Good	Good
Game Farm Road: Chad Drive to International Way	Good	Good

Source: DKS Transportation Analysis. (2016).

[a] Qualitative analysis based on methodology described in Chapter 14 of ODOT's *Analysis Procedures Manual* (ODOT, 2014).
[b] Sidewalk is on south side only.

8.2.3.3. Plan Consistency

The EmX Alternative was evaluated for consistency with the Long Range Transit Plan (LTD, 2014), the FTN concept, and the goals outlined in the Regional Transportation Plan (LCOG, 2011, December) and the Draft Eugene 2035 TSP.

The purpose of the LTD FTN is to leverage transit service investments by tying service to the density and other elements of adjacent development. The FTN enables a well-connected network that provides regional circulation by providing an average transit frequency of 15 minutes or better, a reliable transit system that runs on schedule (by implementing strategies such as transit priority at signalized intersections), and enhanced stations with bicycle and pedestrian connections (LTD, 2014). The EmX Alternative would meet the FTN goal by providing frequent service on the Coburg Road Corridor, implementing transit priority at signalized intersections, and adding BAT lanes and transit queue jumps to help make service more reliable and on schedule (CH2M, 2016a).

The BRT system is the "highest level of service available within the FTN, and is a permanent, integrated system that uses buses or specialized vehicles on roadways or dedicated lanes to efficiently transport passengers" (LTD, 2014). BRT system elements include branded multi-door 60-foot-long BRT vehicles, enhances stations with level boarding platforms instead of bus stops, off-board fare collection, transit signal priority, wider stop spacing, and 10-minute service frequencies. BRT service is intended to improve transit speed, reliability, and ridership (CH2M, 2016a). The EmX Alternative would meet these BRT system elements.

The five primary goals outlined in the Draft Eugene 2035 TSP are to: (1) create an integrated system that is safe and efficient and reduces fossil fuel usage by 50 percent, (2) advance regional sustainability by reducing fossil fuel reliance, (3) reduce reliance on any single mode, (4) address the needs and safety of all travelers, and (5) triple the percentage of trips made on foot, by bicycle, and by transit by 2035 from 2014 levels. The EmX Alternative helps Eugene to slightly improve transit mode share, and some pedestrian and bicycle improvements would be installed as part of the EmX Alternative that helps increase pedestrian and bicycle mode share.

8.2.3.4. Transit Priority at Signalized Intersections

The Coburg Road Corridor EmX Alternative would include traffic signal construction and modifications at several intersections. Several traffic signals will provide exclusive bus signal phasing that would allow buses to safety enter traffic flow or travel through an intersection. The locations of proposed bus signal phases are shown in Table 8.2-13.

Table 8.2-13. Coburg Road Corridor EmX Alternative Proposed Bus Phases

Intersection	Bus Phase
Mill Street/E. 7th Avenue	Northbound (potential bus phase at new signal)
Ferry Street Bridge/E. 4th Avenue Ramp	Northbound (potential bus phase at new signal)
Coburg Road/Oakmont Way	Northbound/Southbound
Coburg Road/Harlow Road	Northbound

Source: DKS Transportation Analysis. (2016).

In addition, every traffic signal on the corridor would receive transit signal priority. Transit signal priority modifies normal traffic signal operations by extended green phases or shortening side street phases in order to reduce delay for transit vehicles.

8.2.3.5. Safety

Potential safety impacts associated with the Coburg Road Corridor EmX Alternative include:

- Center running transit lanes on Coburg Road between Elysium Avenue and Crescent Avenue and between the Ferry Street Bridge and I-105 could reduce angle crashes by restricting left turn access into and out of driveways
- A southbound BAT lane on Coburg Road on the southbound approach to Harlow Road and on 7th Avenue and 6th Avenue between Oak Street and High Street would serve both BRT vehicles and turning general-purpose vehicles. These BAT lanes would reduce potential vehicle conflicts such as rear end collisions (FHWA, 2014)
- Transit queue jumps at the Coburg Road/Oakmont Way and Coburg Road/Harlow Road intersections would serve buses exclusively, eliminating the merging conflict between vehicles and buses
- New turn lanes on Coburg Road at Willakenzie Road and Crescent Avenue would reduce potential vehicle conflicts (FHWA, 2014)
- Four new enhanced bicycle and pedestrian crossings and two upgraded crossings along the corridor would improve opportunities for bicyclists and pedestrians to cross the mainline
- New traffic signals on the Ferry Street Bridge at 4th Avenue and 7th Avenue would reduce merging conflicts for motor vehicles

Overall, motor vehicle, bicycle, and pedestrian safety would be improved under the EmX Alternative.

8.2.3.6. Roadway Circulation

The Coburg Road Corridor EmX Alternative was evaluated to assess motor vehicle circulation. Overall, roadway circulation would improve under the EmX Alternative compared to the No-Build Alternative due to the installation of the following six new traffic signals:

- E. 7th Avenue onramp to the Ferry Street Bridge
- E. 4th Avenue onramp to the Ferry Street Bridge
- Coburg Road/Elysium Avenue
- Crescent Avenue/Shadow View Drive
- Shadow View Drive/Chad Drive
- Chad Drive/driveway of Veteran's Affairs hospital site

8.2.3.7. Freight

I-105 is classified as a freight route. Bus signal phasing and the center-running transit lane on Coburg Road north of the Ferry Street Bridge to the Cedarwood Drive/I-105 EB Onramp may impact freight truck movement by increasing delay on Coburg Road near the I-105 EB onramps.

There are two driveways for businesses located adjacent to proposed pedestrian crossings that would have a reduced left turn deceleration area, resulting in potential increased delays for freight accessing the driveways or for freight traveling along the corridor. These potential freight delays are expected to be less than 10 seconds along the entire corridor. Table 8.2-14 lists the driveways with potential impacts along the corridor.

Table 8.2-14. Coburg Road Corridor EmX Alternative Driveway Left Turn Access Impacts to Freight

Crosswalk Location	Impacted Business Location	Side of Street
Coburg Road 600 feet south of Willakenzie Road	Rite Aid Shopping Center	West
	Eugene Smiles	East

Source: DKS Transportation Analysis. (2016).

8.2.3.8. Parking and Access

The Coburg Road Corridor EmX Alternative would not impact on-street parking. The EmX Alternative would have potential off-street parking impacts, which are listed in Table 8.2-15.

Table 8.2-15. Coburg Road Corridor EmX Alternative Off-Street Parking Impacts

Business	Location	Maximum Spaces Impacted[a]
Eugene Swim and Tennis Center	Coburg Road/Crescent Avenue southwest corner	2 parking spaces
Office Depot/Shopko	Coburg Road, east side between Chad Drive and Crescent Avenue	26 parking spaces
Taco Bell	Coburg Road/Chad Drive northeast corner	8 parking spaces
Oregon Community Credit Union	Coburg Road/Chad Drive southeast corner	2 parking spaces
Battery X-Change	Highway 99 east side, 1,500 feet north of Roosevelt Boulevard	6 parking spaces
Papa's Pizza	Coburg Road east side, 400 feet south of Willakenzie Road	12 parking spaces
Fountain Villa Apartments	Coburg Road east side, 550 feet north of Cal Young Road	10 parking spaces
The Hamptons Apartments	Coburg Road/Harlow Road southeast corner	15 parking spaces
Farmers Insurance	Coburg Road east side, 200 feet north of Oakmont Way	2 parking spaces
Reliable Credit Association	Coburg Road east side, 150 feet north of Oakmont Way	1 parking space
Hawaiian Time	Coburg Road/Oakmont Way northeast corner	8 parking spaces
H&R Block	Coburg Road west side, 200 feet north of Oakmont Way	4 parking spaces
Jiffy Lube	Coburg Road/Oakmont Way northwest corner	1 parking space
MetroPCS	Coburg Road/Oakmont Way southeast corner	1 parking space
Albertson's	Coburg Road/Oakmont Way southeast corner	1 parking space
Kendall Subaru	Coburg Road/Cedarwood Drive southwest corner	10 parking spaces (lot would require reconfiguration)

Source: DKS Transportation Analysis. (2016).

[a] EmX Alternative would add or remove existing parking spaces on each block.

The EmX Alternative would not close any access points on the project corridor. However, the installation of center running transit lanes would limit several accesses on Coburg Road to right-in/right-out only access. These locations are shown in Table 8.2-16.

Table 8.2-16. Coburg Road Corridor EmX Alternative Access Changes for Motor Vehicles

Roadway Improvement Location	Impacted Business Location	Side of Street	Type of Access Change	Alternative Access
Coburg Road: Chad Drive to Crescent Avenue	Office Depot/Shopko Shopping Center	East	Right-in/right-out at two accesses	Accesses on Crescent Avenue and Chad Drive
	Eugene Swim and Tennis Club	West	Right-in/right-out at service access	Main access is on Crescent Avenue
Coburg Road: Randy Papé Beltline EB Onramp to Elysium Avenue	Quality Research Associates	East	Right-in/right-out	U turns permitted at Elysium Avenue
	Vacant Lot	East	Right-in/right-out at two accesses	U turns permitted at Elysium Avenue
	Trauma Healing Project	West	Right-in/right-out	None
	Our Saviour's Lutheran Church	West	Right-in/right-out	None
Coburg Road: Median Island north side of Harlow Road	Westminster Presbyterian Church	East	Right-in/right-out	Additional access located 200 feet to the north

Source: DKS Transportation Analysis. (2016).

The EmX Alternative would have potential business circulation impacts for the following two drive-throughs:

- Taco Bell (northeast corner of Coburg Road/Chad Drive)
- Oregon Community Credit Union (southeast corner of Coburg Road/Chad Drive)

There are two driveways or side streets located adjacent to enhanced pedestrian crossings that would have a reduced left turn deceleration area, resulting in potential increased delays for motor vehicles accessing the driveways or traveling along the mainline. In addition, five locations would have potential impacts to motor vehicles performing a two-stage left turn out of the driveways or side streets due to the refuge islands. Table 8.2-17 lists the locations with potential impacts.

Table 8.2-17. Coburg Road Corridor EmX Alternative Left Turn Access Impacts to Motor Vehicles

Crosswalk Location	Impacted Location	Side of Street	Type of Impact
Crescent Avenue 250 feet west of Tennyson Avenue	Crescent Medical Clinic	South	Left Turn – Exiting driveway
Crescent Avenue east side of Tennyson Avenue intersection	Tennyson Avenue	North	Left Turn – Exiting side street
Coburg Road north side of Jeppesen Acres Road	Jeppesen Acres Road	West	Left Turn – Exiting side street
Coburg Road 600 feet south of Willakenzie Road	Rite Aid Shopping Center	West	Left Turn – Entering driveway
	Eugene Smiles	East	Left Turn – Entering driveway
	Fountain Villa Apartments	East	Left Turn – Exiting driveway
Coburg Road north side of Pioneer Pike	Pioneer Pike	West	Left Turn – Exiting side street

Source: DKS Transportation Analysis. (2016).

8.2.3.9. Emergency Vehicle Flow and Access

The emergency service authorities do not foresee any major issues of concern related to expanded transit services. Emergency service providers would have an opportunity to review more detailed designs and would work with Lane Transit District to address issues in the future (Lane Fire Authority, personal communication, April 13, 2017).

8.3. Transit

8.3.1. Corridor Transit Service Characteristics

The amount of transit service provided in a corridor is measured by daily VHT, daily VMT, and daily place-miles of service. Daily vehicle hours are the cumulative time that transit vehicles are in service and daily vehicle miles are the distance they travel, independent of the size of the vehicle. Place-miles refers to the total carrying capacity (seated and standing) of each bus and is calculated by multiplying vehicle capacity of each bus by the number of service miles traveled each day. Place-miles highlight differences among alternatives caused by a different mix of vehicles and levels of service. Table 8.3-1 summarizes these major transit characteristics for the Coburg Road Corridor No-Build, Enhanced Corridor, and EmX Alternatives.

Table 8.3-1. Coburg Road Corridor 2035 Corridor Transit Service Characteristics by Alternative

Measure	No-Build Alternative	Enhanced Corridor Alternative	Delta from No-Build	EmX Alternative	Delta from No-Build
Annual EmX and Fixed Route Transit VHT[a]	278,600	274,100	(4,500)	282,900	4,300
Annual Transit VMT[b]	4,520,200	4,487,800	(32,400)	4,633,400	113,200
Average Weekday Corridor Transit Place-Miles[c]	160,540	177,080	16,540	223,480	62,940

Source: LCOG Regional Travel Demand Model Results (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

[a] VHT = Vehicle hours traveled in revenue service.

[b] VMT = Vehicle miles traveled in revenue service.

[c] Place-Miles = Transit Vehicle Capacity (seated and standing) multiplied by VMT. (Place-miles refers to the total carrying capacity (seated and standing) of each bus and is calculated by multiplying vehicle capacity of each bus by the number of service miles traveled each day. Place-miles highlight differences among alternatives caused by a different mix of vehicles and levels of service.)

The EmX Alternative would result in a substantial increase in corridor transit capacity when compared to the No-Build and Enhanced Corridor Alternatives. This is because EmX has higher frequencies (10-minute service all day), which translates to two extra trips each hour of service throughout the day resulting in more vehicle hours and miles compared to the No-Build and Enhanced Corridor Alternatives. Similarly, the substantial difference in place-miles associated with both the Enhanced Corridor and EmX Alternatives reflects the implementation of EmX or Enhanced bus service in the corridor and the replacement of parallel bus service with higher capacity vehicles. Corridor place-miles would increase by 16,540 place-miles for the Enhanced Corridor Alternative and 62,940 place-miles for the EmX Alternative compared to the No-Build Alternative.

8.3.2. Transit and Passenger Vehicle Travel Time

Transit travel time is assessed using in-vehicle time and total travel time. Table 8.3-2 provides a summary of in-vehicle and total auto and transit travel times in the a.m. peak hour for trips to Eugene Station from the project intersection located the furthest north on Coburg Road from Downtown.

In-vehicle transit travel time includes only the amount of time it takes for a transit vehicle to travel between an origin and destination. For buses, this measure reflects roadway speed limits, congestion, and stop dwell time. In-vehicle plus walk and wait travel time includes time spent walking to transit, initial wait time, transfer wait time (if any), in-vehicle time, and time walking from transit to the destination.

In terms of auto times, there is no appreciable difference in times between the No-Build Alternative and the Build Alternatives. For transit travel times, both the Enhanced Corridor and EmX Alternatives demonstrate significant travel time savings compared to the No-Build Alternative.

Table 8.3-2. Coburg Road Corridor 2035 Auto and Transit Travel Times (a.m. Peak Hour) by Alternative

	Travel Time to Eugene station From Coburg Road/Crescent Avenue					
	Auto	Transit				
	No-Build, Enhanced Corridor, and EmX Alternatives	No-Build Alternative	Enhanced Corridor Alternative		EmX Alternative	
Measure	Auto	Transit	Transit	Delta from No-Build	Transit	Delta from No-Build
In-Vehicle[a]	9	18	13	-5	13	-5
In-Vehicle Plus Walk and Wait[b]	13	29	24	-5	21	-8

Source: LCOG Regional Travel Demand Model Results (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

[a] In-vehicle transit travel times represent time spent in the transit vehicle.

[b] In-vehicle plus walk and wait travel time represents walk time, one-half the wait time, and in-vehicle time in minutes.

8.3.3. Reliability

One of the major contributing factors to reliable transit service is the amount of exclusive and/or priority transit lanes along the corridor and at signalized intersections. Transit signal priority, installed at signalized intersections for the Coburg Road Corridor Enhanced Corridor and EmX Alternatives, would minimize the variability of delay at traffic signals. Reliability measures include the total amount of new round-trip miles, the total length of exclusive and/or priority lanes, the percentage of new corridor exclusive or priority lanes, the number of trunk-line intersections with transit priority treatment, and the amount of motor vehicle congestion at signalized intersections on the corridor. Typically, the more congested the corridor, the greater the variability in delay at signalized intersections.

Table 8.3-1 summarizes these transit reliability measures for the Enhanced Corridor and EmX Alternatives. Every signalized intersection for both the Enhanced Corridor and EmX Alternatives would implement transit signal priority, whereas the No-Build Alternative would not implement additional transit signal priority. Compared to the No-Build Alternative, the Enhanced Corridor Alternative provides some priority treatment and the EmX Alternative provides significantly more priority treatment. The Enhanced Corridor Alternative can be expected to have more reliable travel times during peak periods and the EmX Alternative can be expected to have even greater travel time reliability during peak periods compared to the No-Build Alternative.

Table 8.3-3. Coburg Road Corridor 2035 Average Weekday Corridor Transit Reliability Measures

Measure	Enhanced Corridor	EmX	Delta between EmX and Enhanced Corridor
Total Number of New Round-Trip EmX System Miles	0	13.2	13.2
Total Number of New Corridor Exclusive Lanes[a] (miles)	0.49	2.20	1.71
Percent of New Corridor that is Exclusive Lanes	3.7%	16.7%	13.0%

Source: *MovingAhead Level 2 Definition of Alternatives* (CH2M et al., 2016).

[a] Exclusive/priority lanes are defined as the round-trip miles of business access and transit lanes, bus-only lanes, and queue jumps.

8.3.4. Transit Ridership

Systemwide transit ridership is defined as average weekday systemwide linked-trips in 2035. A linked trip is a one-way trip taken by a person from an origin to a destination, independent of the number of vehicles or transfers used to complete the trip. The Coburg Road Corridor Enhanced Corridor Alternative would result in a slight increase of less than 1 percent in systemwide transit trips, while the Coburg Road Corridor EmX Alternative would result in nearly a 2 percent increase in systemwide transit trips compared to the Coburg Road Corridor No-Build Alternative.

Corridor ridership is defined as any transit trip that is produced in and/or attracted to the respective corridor which for this purpose has been defined as the TAZ within a 0.5-mile buffer around the transit line. As shown in Table 8.3-4, the EmX Alternative would have the highest increase in corridor ridership compared to the No-Build Alternative, and the Enhanced Corridor Alternative would slightly increase ridership on the corridor.

Table 8.3-4. Coburg Road Corridor Average Weekday 2035 Systemwide and Corridor Ridership by Alternative

Measure	No-Build Alternative	Enhanced Corridor	EmX
Total Systemwide Transit Trips[a]	46,410	46,620	47,270
Delta from No-Build		210	860
% Change from No-Build		0.5%	1.9%
Total Corridor Transit Trips[b]	37,330	37,670	38,750
Delta from No-Build		340	1,420
% Change from No-Build		0.9%	3.8%

Source: LCOG Regional Travel Demand Model Results (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

Note: Corridors overlap and include some common areas, downtown Eugene for example, as a result one cannot add up the totals to arrive at a regional total.

[a] Systemwide transit trips are defined as one-way linked trips taken by a person from the trips origin to the trips destination, independent of the number of vehicles or transfers used to complete the trip.

[b] Corridor transit trips are defined as any EmX or bus trip with at least one trip end in the corridor.

8.3.5. Transit Boardings

Daily unlinked transit ridership, also referred to as boardings, is summarized in Table 8.3-5. There are two categories of boardings shown in the table. The first is a boarding total for all EmX lines that are not part of the project and the second is boardings for all routes within the project corridor. The reason boardings on other EmX lines are included is to show that there is some variation in boardings on the routes where the project route and the existing EmX system share operating on a portion of the alignment. The Enhanced Corridor Alternative shows a loss of non-project EmX boardings and an increase in corridor boardings. Non-project and corridor daily boardings for the Coburg Road Corridor EmX Alternative would both increase compared to the Coburg Road Corridor No-Build Alternative.

Table 8.3-5. Coburg Road Corridor 2035 Average Weekday System EmX and Corridor Daily Boardings

	No-Build Alternative	Enhanced Corridor Alternative		EmX Alternative	
Route	**Daily Boardings**	**Daily Boardings**	**Delta from No-Build**	**Daily Boardings**	**Delta from No-Build**
Non-Project Total EmX Service	24,500	24,050	-450	24,550	50
Corridor Routes Total	7,200	8,300	1,100	9,300	2,100
Total	**31,700**	**32,350**	**650**	**33,850**	**2,150**

Source: LCOG Regional Travel Demand Model Results (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

8.4. Annualized Impacts & Costs

The total annualized costs, according to FTA-provided factors and changes in VMT, associated with changes in safety (fatalities and serious injuries) are shown in Table 8.4-1, and will be incorporated into a total environmental benefit analysis using data from the *MovingAhead Air Quality Technical Report* (Michael Minor and Associates, Inc. and CH2M, 2017), the *MovingAhead Energy and Sustainability Technical Report* (DKS and CH2M, 2017), the *MovingAhead Operating and Maintenance Costs Technical Report* (LTD and City of Eugene, 2017), and the *MovingAhead Capital Cost Estimating Technical Report* (CH2M, 2017a). The total annualized cost savings based on changes in fatality and serious injury crash rates would be significant under the Enhanced Corridor Alternative, and minor under the Coburg Road Corridor EmX Alternative.

The FTA annualized safety cost is calculated from the annual VMT by mode under each alternative. The modes included in this metric are automobiles, trucks, and buses (no bicycles or pedestrians). This cost calculation assumes that the fatal/serious injury crash frequency rises as VMT rises, and does not take into reduced crash rates associated with the build alternative infrastructure improvements.

There would be total annual cost savings for both the Enhanced Corridor and EmX Alternatives due to a reduction in VMT over the No-Build Alternative. There would be a cost increase for serious injuries in the EmX Alternative due to the increase in bus VMT, which has a higher FTA factor for serious injuries than the automobile mode.

The changes in safety were based on changes in VMT for each alternative, according to the factors shown in Table 8.4-2.

Table 8.4-1. Coburg Road Corridor Enhanced Corridor and EmX Alternatives 2035 Estimated Regionwide Annual Cost Savings Relative to No-Build Alternative

Annual Value	Enhanced Corridor Alternative	EmX Alternative
Annual VMT Decrease (Increase)	329,981	359,824
Annual Cost Savings (Increase) for Fatalities	$31,718	$48,901
Annual Cost Savings (Increase) for Serious Injuries	$102,851	($27,351)
Annual Total Savings (Increase)	**$134,570**	**$21,549**

Sources: DKS Transportation Analysis. (2016).
Cost Factors: *New and Small Starts Evaluation and Rating Process Final Policy Guidance* (FTA, 2013, August).

Table 8.4-2. Fatality and Serious Injury Factors Per Million Vehicle Miles Traveled by Mode

Mode	Fatalities/Million VMT	Serious Injuries/Million VMT
Automobile	0.013	0.195
Heavy Truck[a]	0.004[a]	1.824[a]
Bus – Diesel	0.004	1.824
Bus – Electric	0.004	1.458

Source: *New and Small Starts Evaluation and Rating Process Final Policy Guidance* (FTA, 2013, August).
[a] Heavy Truck factors were not provided, and were assumed to be the same as diesel bus factors.

The safety costs were developed using the following cost factors from *New and Small Starts Evaluation and Rating Process Final Policy Guidance* (FTA, 2013, August):

- $9.1 million for each fatality
- $490,000 for each serious injury

An annualization factor of 342[9] was used to estimate annual automobile and heavy truck VMT based on average weekday VMT data. Annualized bus VMT was provided by LTD.

8.5. Indirect and Cumulative Effects

No indirect effects are anticipated for either the Coburg Road Corridor Enhanced Corridor or EmX Alternatives.

Cumulative effects were accounted for in the LCOG model for projecting future motor vehicle volume growth. Compared to the No-Build Alternative, the Enhanced Corridor and EmX Alternatives would offer more potential for mode shifts from motor vehicle travel to transit to help reduce congested traffic conditions.

[9] The annualization factor was calculated based on 2015 traffic volume data from the ODOTATR stations. An average value was applied based on the six ATR stations located in the Eugene-Springfield region.

8.6. Short-Term Construction-Related Impacts

There would be no construction impacts under the Coburg Road Corridor No-Build Alternative.

The Enhanced Corridor Alternative would follow the alignment of existing streets – primarily Oak Street, Pearl Street, W. 6th Avenue, W. 7th Avenue, Coburg Road, Crescent Avenue, Shadow View Drive, Chad Drive, and N Game Farm Road – and would require the construction of some new turn lanes and new traffic signals. This wider road footprint would be constructed within the existing ROW wherever possible, but ROW acquisition would be necessary at places all along the extent of the alignment. Potential corridor-wide construction-related impacts are summarized in Table 8.6-1.

Table 8.6-1. Coburg Road Corridor Enhanced Corridor Alternative Construction Impacts

Roadway	Functional Classification	Construction Truck Traffic	Lane Closure	Detour Route Available?	Sidewalk Impacts?	Bike Lanes Impacts?
W. 6th Avenue	Major Arterial	Limited	None	No	No	No
W. 7th Avenue	Major Arterial	Limited	None	No	No	No
Pearl Street	Major Arterial	Limited	None	No	No	No
Oak Street	Major Arterial	Limited	None	No	No	No
Coburg Road	Major Arterial	Moderate	Short Int.	No	Yes	Yes
Crescent Avenue	Minor Arterial	Moderate	Short Int.	No	Yes	Yes
Shadow View Drive	Local	Moderate	Int.	No	Yes	No
Chad Drive	Major Collector	Moderate	Int.	No	Yes	Yes
N Game Farm Road	Minor Arterial	Limited	Int.	No	No	No
Elysium Avenue	Local	Moderate	Int.	No	Yes	No
Willakenzie Road	Major Collector	Moderate	Int.	No	Yes	Yes
Harlow Road	Minor Arterial	Moderate	Int.	No	Yes	No
Oakmont Way	Major Collector	Moderate	Int.	No	Yes	Yes
Country Club Road	Minor Arterial	Moderate	Int.	No	Yes	Yes

Source: DKS Transportation Analysis. (2016).

Sidewalk impacts mean that sidewalk reconstruction would be necessary to match in with the new sidewalk.
Bike lane impacts mean that the bike lane would be affected by the construction of the project.

Int. = Short-length lane closures (less than 500 feet) near intersection for a street intersecting the corridor
Long = possible long-length lane closure (longer than 500 feet)
Short = possible short-length lane closure (less than 500 feet)

Limited = Some construction traffic present and small travel delays are possible
Moderate = Construction traffic present and travel delays likely

The EmX Alternative would follow the alignment of existing streets – primarily Oak Street, Pearl Street, W. 6th Avenue, W. 7th Avenue, Coburg Road, Crescent Avenue, Shadow View Drive, Chad Drive, and N Game Farm Road – and would require the construction of exclusive transit lanes, BAT lanes, new turn lanes, and new traffic signals. This wider road footprint would be constructed within the existing ROW wherever possible, but ROW acquisition would be necessary at places all along the extent of the alignment.

The construction impacts for the EmX Alternative would be more extensive than the Enhanced Corridor Alternative, with long-length lane closures (longer than 500 feet) instead of short-length lane closures (less than 500 feet) on Coburg Road, and more intersection impacts due to new signal construction and signal modifications Potential Corridor-wide construction-related impacts are summarized in Table 8.6-2 for the EmX Alternative.

Table 8.6-2. Coburg Road Corridor EmX Alternative Construction Impacts

Roadway	Functional Classification	Construction Truck Traffic	Lane Closure	Detour Route Available?	Sidewalk Impacts?	Bike Lanes Impacts?
W. 6th Avenue	Major Arterial	Moderate	Short	No	Yes	No
W. 7th Avenue	Major Arterial	Moderate	Long	No	Yes	No
Pearl Street	Major Arterial	Limited	Short	No	Yes	Yes
Oak Street	Major Arterial	Limited	Short	No	Yes	No
Coburg Road	Major Arterial	Moderate	Long Int.	No	Yes	Yes
I-105 Interchange	Major Arterial	Moderate	Int.	No	No	No
Crescent Avenue	Minor Arterial	Moderate	Short Int.	No	Yes	Yes
Shadow View Drive	Local	Moderate	Int.	No	Yes	No
Chad Drive	Major Collector	Moderate	Int.	No	Yes	Yes
N Game Farm Road	Minor Arterial	Limited	Int.	No	No	No
Elysium Avenue	Local	Moderate	Int.	No	Yes	No
Willakenzie Road	Major Collector	Moderate	Int.	No	Yes	Yes
Harlow Road	Minor Arterial	Moderate	Int.	No	Yes	No
Oakmont Way	Major Collector	Moderate	Int.	No	Yes	Yes
Country Club Road	Minor Arterial	Moderate	Int.	No	Yes	Yes

Source: DKS Transportation Analysis. (2016).

Sidewalk impacts mean that sidewalk reconstruction would be necessary to match in with the new sidewalk.
Bike lane impacts mean that the bike lane would be affected by the construction of the project.

Int. = Short-length lane closures (less than 500 feet) near intersection for a street intersecting the corridor
Long = possible long-length lane closure (longer than 500 feet)
Short = possible short-length lane closure (less than 500 feet)

Limited = Some construction traffic present and small travel delays are possible
Moderate = Construction traffic present and travel delays likely

LTD anticipates a construction period of approximately 18 months. Of that period, the first several months would be preliminary low-impact work, such as surveying and staging. Building either the Enhanced Corridor or EmX Alternative would take about 6 to 10 months of heavy construction (street demolition and reconstruction). That work would be spread over two (summer) construction seasons due to the difficulty of working during winter weather. The contractor would typically work in contained segments of five to ten blocks on one side of the street at a time.

Sidewalk construction would affect pedestrians and bicyclists. Construction of the improvements along the length of the project could impact existing curbs or other features along the alignment. The demolition and reconstruction of the curbs, gutters, sidewalks, and other facilities may be necessary to make room for the construction of the project. This activity would generate construction traffic for the removal of debris and the delivery of construction materials and equipment.

Construction may require short-term long-length (longer than 500 feet) and short-length (shorter than 500 feet) lane closures and rerouting of traffic. No long-term long-length lane closures are anticipated.

BAT and BRT-only lane construction would also impact side streets. Temporary restrictions of turn movements, into or out of the side streets, and some detours may be necessary at some of these intersections.

Work in residential areas would be completed during the day to comply with City of Eugene noise limits.

8.7. Potential Mitigation Measures

8.7.1. Long-Term Direct Impacts

Project-related mitigation measures would be required to return Coburg Road Corridor Enhanced Corridor and EmX Alternatives transportation operations to No-Build conditions or better. The mitigation measures considered include traffic signal timing improvements (changes to splits, cycle lengths, phasing), adding vehicle lanes, or changing intersection geometry.

The Enhanced Corridor Alternative operations analysis identified that the Coburg Road/Cedarwood Drive/I-105 EB Onramp would degrade No-Build conditions slightly if evaluated under current operating standards, but would meet proposed operating standards. No mitigation is recommended at this intersection, because the operating conditions would not be significantly impacted.

The Enhanced Corridor Alternative would not close any access points on the project corridor. However, the installation of a northbound right turn lane at the Coburg Road/Randy Papé Beltline EB Onramp would compromise the two way left turn lane on Coburg Road between Elysium Avenue and Randy Papé Beltline EB Onramp, which could limit several accesses on Coburg Road to right-in/right-out only access. The required mitigation measures are shown in Table 8.7-1. LTD has prepared an *Addendum to MovingAhead Alternatives Analysis Technical Reports Memorandum* (CH2M, 2017b) that evaluates ways to avoid or minimize impacts at some properties. Please see this addendum for additional information on potential parking, acquisitions, and tree impacts mitigation.

Table 8.7-1. Coburg Road Corridor Enhanced Corridor Alternative Access Mitigation Measures

Roadway Improvement Location	Impacted Business Location	Side of Street	Mitigation Measures
Coburg Road: Elysium Avenue to Randy Papé Beltline EB Onramp	Quality Research Associates	East	Provide southbound u turn movement at Coburg Road/Elysium Avenue intersection Provide at least 150-foot southbound left turn lane at Coburg Road/Elysium Avenue to accommodate u turn volume
	Vacant Lot	East	
	Trauma Healing Project	West	Provide northbound u turn movement at Coburg Road/Randy Papé Beltline WB Onramp intersection
	Our Saviour's Lutheran Church	West	

Source: DKS Transportation Analysis. (2016).

The EmX Alternative operations analysis identified two study intersections that would have significant local traffic impacts and further degrade No-Build conditions when evaluated under both the current and proposed operating standards. The identified mitigation measures for each impacted study intersection are summarized in Table 8.7-2.

Table 8.7-2. Coburg Road Corridor EmX Alternative Study Intersection Mitigation Measures

Study Intersection Number	Study Intersection	Mitigation Measures	Unmitigated Operations			Mitigated Operations		
			LOS	Delay (sec)	v/c	LOS	Delay (sec)	v/c
30	Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard	Convert northbound general purpose lane to BAT lane for bus and vehicles turning left at Oakway Road	F	127.3	1.39	E	55.3	1.09
31	Coburg Road/Cedarwood Drive/I-105 EB Onramp	Convert northbound general purpose lane to BAT lane for bus and vehicles turning left at Oakway Road	E	68.8	1.15	D	36.6	0.95

Source: DKS Transportation Analysis. (2016).

Delay = Average Intersection Delay in seconds
LOS = Level of Service
v/c = volume-to-capacity

The EmX Alternative would not close any access points on the project corridor. However, the installation of center running transit lanes would limit several accesses on Coburg Road to right-in/right-out only access. The required mitigation measures are shown in Table 8.7-3.

Table 8.7-3. Coburg Road Corridor EmX Alternative Access Mitigation Measures

Roadway Improvement Location	Impacted Business Location	Side of Street	Mitigation Measures
Coburg Road: Elysium Avenue to Randy Papé Beltline EB Onramp	Quality Research Associates	East	Provide southbound u turn movement at Coburg Road/Elysium Avenue intersection Provide at least 150-foot southbound left turn lane at Coburg Road/Elysium Avenue to accommodate u turn volume
	Vacant Lot	East	
	Trauma Healing Project	West	Provide northbound u turn movement at Coburg Road/Randy Papé Beltline WB Onramp intersection
	Our Saviour's Lutheran Church	West	

Source: DKS Transportation Analysis. (2016).

8.7.2. Short-Term Construction-Related Impacts

LTD and the contractor will carefully plan construction to minimize the potential impact to businesses, roadway users, and surrounding communities. For example, LTD plans to limit the length of any single lane closures to about 5 to 10 blocks, and one side of the road would be worked on at a time to minimize the impact to road users. Shorter segments would be used in locations with higher than normal driveway density. Short construction segment lengths should allow for the contractor to quickly complete the work within a segment and reopen it to the public. The construction activities would flow from one segment to the next in a rolling construction sequence. Two adjoining segments would be worked on simultaneously with the goal of excavating, utility installation, base rock, and paving being completed within a 2- to 4-week period for each segment. Depending on the type of land uses in each construction segment (commercial or residential), and the predominant hours of operation for adjacent businesses, construction could occur at night if it would further reduce potential business and traffic disruptions. Any night work would have to comply with City of Eugene noise restrictions.

Business access would be maintained to the greatest extent practicable throughout all stages of construction. In high traffic locations or locations with heavily accessed business driveways, construction could take place at night if consistent with the City of Eugene's night construction requirements. This would reduce impacts to the adjacent businesses and their customers.

Mitigation measures would also require early, frequent, and ongoing communication among LTD, contractors, and affected property owners/tenants. Construction timing, staging, and signage would be coordinated by LTD's designated staff liaison in consultation with the affected property owners/tenants to minimize business and residential disruptions. Speed zone reductions within the construction zone, closed or narrow lanes, and temporary driveway relocation would also be considered to mitigate construction impacts. Variable message signs, the LTD website, and local news sources could also be used to provide roadway users with advance notice of current or pending construction activities and alternate routes. All required mitigation measures would be specified in LTD's construction contracting documents.

Emergency vehicle access would be provided at all times throughout the construction process.

8.8. Permits and Approvals

No permits or approvals are required for potential transportation impacts evaluated for the Coburg Road Corridor.

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9. Martin Luther King, Jr. Boulevard Corridor Environmental Consequences

A summary of the Martin Luther King, Jr. Boulevard Corridor alternatives and key findings is provided below.

The Enhanced Corridor Alternative would convert general purpose lanes to BAT lanes in both directions on Martin Luther King, Jr. Boulevard from east of Club Road/Centennial to S Garden and install a westbound transit only left turn lane and a transit-only receiving lane at Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard. In addition, the Enhanced Corridor Alternative would install one new traffic signal and three enhanced pedestrian crossings. The key findings are as follows:

- Transit travel time from the terminus to Eugene Station (one-way inbound) would improve by two minutes during the a.m. peak hour over No-Build (see Section 9.3.2 for travel time discussion)
- System ridership would increase by 1.3 percent or 620 average weekday riders per day (see Section 9.3.4 for ridership discussion)

The Enhanced Corridor Alternative would install 2,380 feet (0.45 miles) of new or reconstructed sidewalk (see Section 9.2.2.2 for pedestrian and bicycle improvements discussion).

9.1. Affected Environment

The following section evaluates the Martin Luther King, Jr. Boulevard Corridor for base year and future year (2035) transportation conditions. Supporting data were acquired from intersection motor vehicle, pedestrian, and bicycle turning movement counts, the LCOG regional travel demand model, field observations, and ODOT crash data. The study area is shown on Figure 9.1-1.

Figure 9.1-1. Martin Luther King, Jr. Boulevard Corridor Study Area Map

Source: DKS Transportation Analysis. (2016).

9.1.1. Roadway Characteristics

The transportation characteristics of the Martin Luther King, Jr. Boulevard Corridor are shown in Table 9.1-1 and include functional classification, number of travel lanes, posted speeds, presence of sidewalks and bike lanes, and existing transit routes serving the segment. The Martin Luther King, Jr. Boulevard Corridor is owned by the City of Eugene and is classified as a minor arterial.

Table 9.1-1. Martin Luther King, Jr. Boulevard Corridor Existing Study Area Roadway Characteristics

Roadway	Jurisdiction	Functional Classification[a]	Number of Travel Lanes	Posted Speed	Sidewalk	Bike Lanes	LTD Transit Routes
Martin Luther King, Jr. Boulevard: Garden Way to Leo Harris Parkway	City of Eugene	Minor Arterial	5	40 mph	Both sides	No	13, 79x
Martin Luther King, Jr. Boulevard: Leo Harris Parkway to Club Road	City of Eugene	Minor Arterial	4	35 mph	Both sides	No	13, 79x
Coburg Road: Martin Luther King, Jr. Boulevard to Ferry Street Bridge	City of Eugene	Major Arterial	4	35 mph	Both sides	Yes	12, 66, 67, 91
E. 7th Avenue: Pearl Street to Ferry Street Bridge	ODOT	Major Arterial	4 (EB only)	30 mph	Both sides	No	95
Oak Street: E. 7th Avenue to E. 10th Avenue	City of Eugene	Minor Arterial	3-4 (NB only)	30 mph	Both sides	No	12,40,66, 95,96, 98, 24
E. 8th Avenue: Pearl Street to Mill Street	City of Eugene	Local	2 (WB only)	25 mph	Both sides	Yes	12, 13, 91, 96
Pearl Street: E. 8th Avenue to E. 11th Avenue	City of Eugene	Minor Arterial	2 (SB only)	25 mph	Both sides	No	12, 66, 67
W. 10th Avenue: Olive Street to Oak Street	City of Eugene	Local	2-3	25 mph	Both sides	Yes	13, 67, 91
W. 11th Avenue: Olive Street to Pearl Street	City of Eugene	Minor Arterial	3 (WB only)	20 mph	Both sides	Yes	36, 66, 76
Olive Street: 10th Avenue to 11th Avenue	City of Eugene	Local	2	25 mph	Both sides	Yes[b]	36, 76

Source: DKS Transportation Analysis. (2016).

[a] Oregon Transportation Map. Federal Functional Classification Review, City of Eugene. 2014 Edition. http://www.oregon.gov/ODOT/TD/TDATA/pages/gis/citymaps.aspx

[b] Sharrow (a shared-lane marking placed in a travel lane indicating where bicyclists should cycle).

The most recent average daily traffic on the corridor is shown in Table 9.1-2.

Table 9.1-2. Martin Luther King, Jr. Boulevard Corridor 2013 Average Daily Traffic

Roadway Segment	ADT
Martin Luther King, Jr. Boulevard: Leo Harris Parkway to Kinsrow Avenue	15,500
Martin Luther King, Jr. Boulevard: Club Road/Centennial Loop to Leo Harris Parkway	16,400
Martin Luther King, Jr. Boulevard: Coburg Road to Club Road/Centennial Loop	16,000
Ferry Street Bridge	63,500
E. 7th Avenue: High Street to Ferry Street Bridge	27,500
E. 6th Avenue: Ferry Street Bridge to High Street	14,900

Source: *2013 Traffic Flow Map* (City of Eugene, 2013).
Compiled by DKS Transportation Analysis. (2016).

9.1.2. Study Intersections

Four study intersections on the Martin Luther King, Jr. Boulevard Corridor were selected for traffic analysis for the existing conditions, 2035 No-Build Alternative, and 2035 Enhanced Corridor Alternative analyses. The study intersections are located throughout the corridor.

The study intersections evaluated for this corridor were:

- Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard (shown on Coburg Road Corridor figures)
- Martin Luther King, Jr. Boulevard/Club Road/Centennial Loop
- Martin Luther King, Jr. Boulevard/Kinsrow Avenue
- Martin Luther King, Jr. Boulevard/S Garden Way

9.1.3. Bicycle and Pedestrian Conditions

Pedestrian and bicycle activity at the four study intersections was counted on all four legs of each intersection during the p.m. peak hours (Table 9.1-3). The highest p.m. peak hour pedestrian and bicycle volumes occurred at Martin Luther King, Jr. Boulevard/Kinsrow Avenue.

Table 9.1-3. Martin Luther King, Jr. Boulevard Corridor Study Intersection p.m. Peak Hour Pedestrian and Bicycle Volumes

Study Intersection Number	Study Intersection	Date of Intersection Count	p.m. Peak Hour Activity	
			Pedestrian	Bicycle
30	Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard	10/6/2015	47	5
42	Martin Luther King, Jr. Boulevard/Club Road/Centennial Loop	10/7/2015	18	3
43	Martin Luther King, Jr. Boulevard/Kinsrow Avenue	10/7/2015	140	20
44	Martin Luther King, Jr. Boulevard/S Garden Way	10/7/2015	15	0

Source: DKS Transportation Analysis. (2016).

Note: Total volume crossing all legs of each intersection.

A qualitative assessment of the pedestrian and bicycle facilities along the Martin Luther King, Jr. Boulevard study corridor was conducted using methodology from ODOT's *Analysis Procedures Manual* (ODOT, 2014). Overall, the pedestrian facilities are good and the bicycle facilities are poor (Table 9.1-4). Much of the corridor consists of a four-lane arterial with standard width sidewalks and no bike lanes. West of Autzen Entry 2, the sidewalks are mostly landscape buffered; east of the stadium, there is no landscape buffer.

Table 9.1-4. Martin Luther King, Jr. Boulevard Corridor Existing Conditions Qualitative Assessment of Pedestrian and Bicycle Facilities[a]

Segment	Walking	Biking
Martin Luther King, Jr. Boulevard: Club Road to Leo Harris Parkway	Good	Poor
Martin Luther King, Jr. Boulevard: Leo Harris Parkway to Autzen Entry 2	Good	Poor
Martin Luther King, Jr. Boulevard: Autzen Entry 2 to S Garden Way	Fair	Poor
Coburg Road: Club Road to E. 8th Avenue	Fair	Poor
E. 7th Avenue: Pearl Street to Ferry Street Bridge	Good	Poor
E. 8th Avenue: Pearl Street to Mill Street	Good	Poor
Pearl Street: E. 8th Avenue to E. 11th Avenue	Good	Fair
Oak Street: E. 7th Avenue to E. 10th Avenue	Good	Fair
W. 10th Avenue: Olive Street to Oak Street	Good	Good
W. 11th Avenue: Olive Street to Pearl Street	Good	Good
Olive Street: 10th Avenue to 11th Avenue	Good	Fair

Source: DKS Transportation Analysis. (2016).

[a] Qualitative analysis based on methodology described in Chapter 14 of ODOT's *Analysis Procedures Manual* (ODOT, 2014).

9.1.4. Transit

Currently, Route 13 and Route 79x serve the Martin Luther King, Jr. Boulevard Corridor. Route 13 runs along Martin Luther King, Jr. Boulevard between Eugene Station and northeast Springfield every 30 minutes. Route 79x is an express route that runs over the Ferry Street Bridge between Eugene Station and University of Oregon Station every 30 minutes. The route operates only when the University of Oregon is in session.

9.1.5. Safety Analysis

Intersection crashes were gathered from the ODOT database for the last 5 full years of data (2010-2014). Crashes are grouped by severity (Table 9.1-5) and type (Table 9.1-6 and Figure 9.1-3) at both the segment and intersection levels. In total, the Martin Luther King, Jr. Boulevard Corridor had 82 crashes during the 5 years analyzed. There was one fatality that occurred along Martin Luther King, Jr. Boulevard north of Kinsrow Avenue where a vehicle crossed the centerline and struck a tree.

Table 9.1-5 shows the number of crashes by severity along with the intersection collision rate. Typically, intersections with a collision rate above or near 1 crash per million entering vehicles or segments with a collision rate above or near 1 crash per million vehicle miles are flagged for consideration of safety improvements. Based on high collision rates, the intersection that should be considered for safety improvements on the Martin Luther King, Jr. Boulevard Corridor is Martin Luther King, Jr. Boulevard/Kinsrow Avenue. None of the segments have collision rates near 1 crash per million vehicle miles.

Figure 9.1-2 shows a “heat map” of reported collisions along the Martin Luther King, Jr. Boulevard Corridor between 2010 and 2014, where higher densities of crashes are shown in red, medium densities are shown in orange, and lower densities are shown in green. Serious injury crashes are shown as black points along the corridor, and fatal crashes are shown as black points with a cross through it. The crashes on the Martin Luther King, Jr. Boulevard Corridor were concentrated at the Martin Luther King, Jr. Boulevard/Centennial Loop intersection and the Martin Luther King, Jr. Boulevard/Kinsrow Avenue intersection, where there was one fatality and two serious injury crashes.

Table 9.1-5. Martin Luther King, Jr. Boulevard Corridor 5-Year Collision Breakdown by Severity (2010–2014 Crashes)

Corridor – Martin Luther King, Jr. Boulevard (Approx. 1.8 Miles)	Fatality	Serious Injury	Evident Injury	Possible Injury	PDO[a]	Total	Segment Collision Rate[b]
Segment	**1**	**3**	**19**	**23**	**36**	**82**	**–**
Martin Luther King, Jr. Boulevard: Coburg Road to Club Road/Centennial Loop	0	0	0	0	1	1	0.03
Martin Luther King, Jr. Boulevard: Club Road/Centennial Loop to Leo Harris Parkway	0	0	1	2	4	7	0.09
Martin Luther King, Jr. Boulevard: Leo Harris Parkway to Kinsrow Avenue	1	1	0	0	6	8	0.04
Intersections							
Martin Luther King, Jr. Boulevard/Club Road/Centennial Loop	0	0	6	12	8	26	0.60[c]
Martin Luther King, Jr. Boulevard/Kinsrow Avenue	0	2	9	4	15	30	**1.01**[c]
Martin Luther King, Jr. Boulevard/S Garden Way	0	0	3	5	2	10	0.37[c]

Source: ODOT Crash Data. (2016). Compiled by DKS Transportation Analysts. (2016).

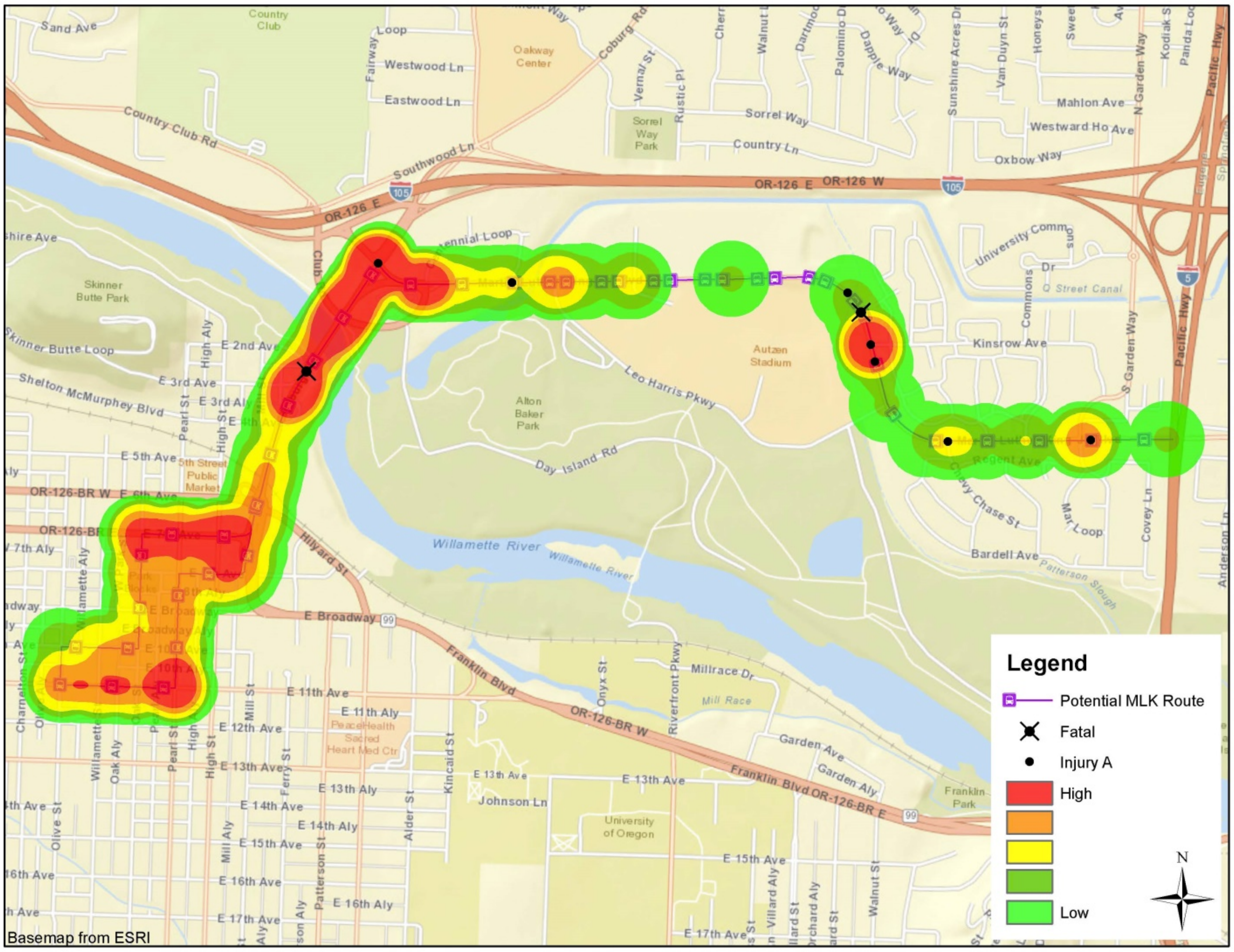
[a] PDO = Property Damage Only.
[b] Collisions per 1 million vehicle miles.
[c] Collisions per 1 million entering vehicles.

Table 9.1-6. Martin Luther King, Jr. Boulevard Corridor Collision Breakdown by Type (2010–2014)

Corridor – Martin Luther King, Jr. Boulevard (Approx. 1.8 Miles)	Angle	Rear-End	Turn	Side-swipe	Backing	Head-On	Fixed Object	Pedestrian	Other	Total
	5	**28**	**38**	**1**	**1**	**1**	**4**	**3**	**1**	**82**
Intersections										
Martin Luther King, Jr. Boulevard/Kinsrow Avenue	3	2	22	0	1	0	2	0	0	30

Source: ODOT Crash Data. (2016). Compiled by DKS Transportation Analysts. (2016).

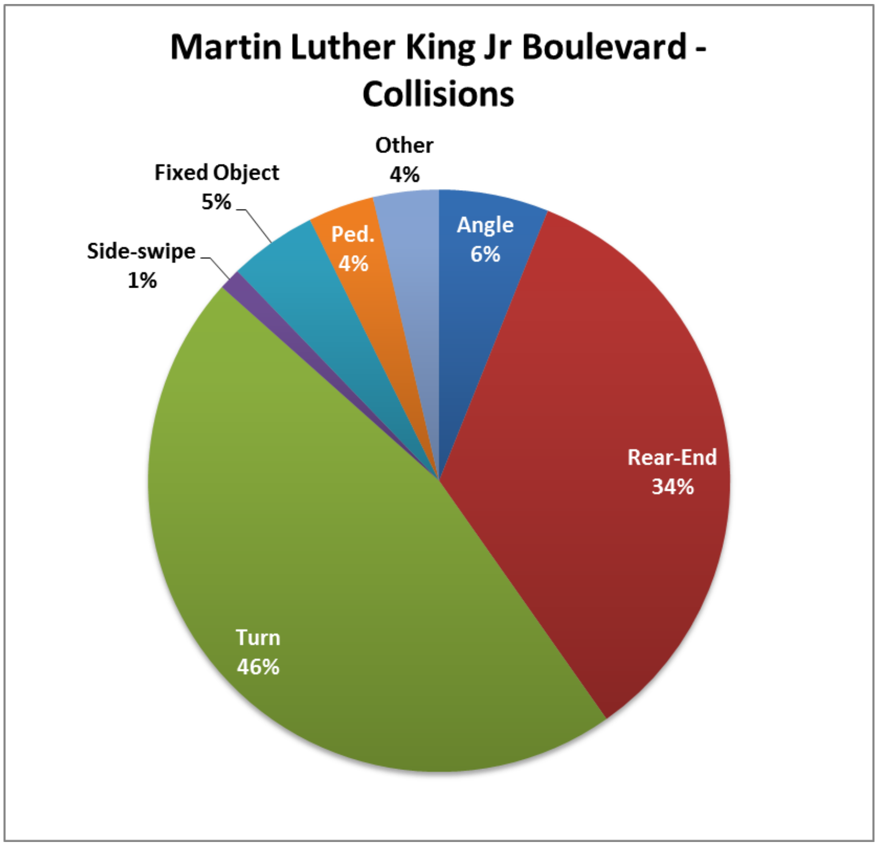
Figure 9.1-2. Martin Luther King, Jr. Boulevard Corridor 5-Year Crash Heat Map (2010 – 2014)



Source: DKS Transportation Analysis. (2016).

Further analysis of the corridor was done in order to determine what types of crashes are most prevalent. As shown on Figure 9.1-3, the most prevalent collision types are rear end and turning, together accounting for 80 percent of the total collisions along the corridor. The most common crash type at Martin Luther King, Jr. Boulevard/Club Road/Centennial Loop was rear end and the most common crash type at Martin Luther King, Jr. Boulevard/Kinsrow Avenue was turning. In addition, there were three pedestrian-involved crashes along the corridor, including two at the Martin Luther King, Jr. Boulevard/S Garden Way intersection. Table 9.1-6 shows a complete summary of the collision types for intersections that had a collision rate above or near 1.

Figure 9.1-3. Martin Luther King, Jr. Boulevard Corridor Collision Breakdown by Type



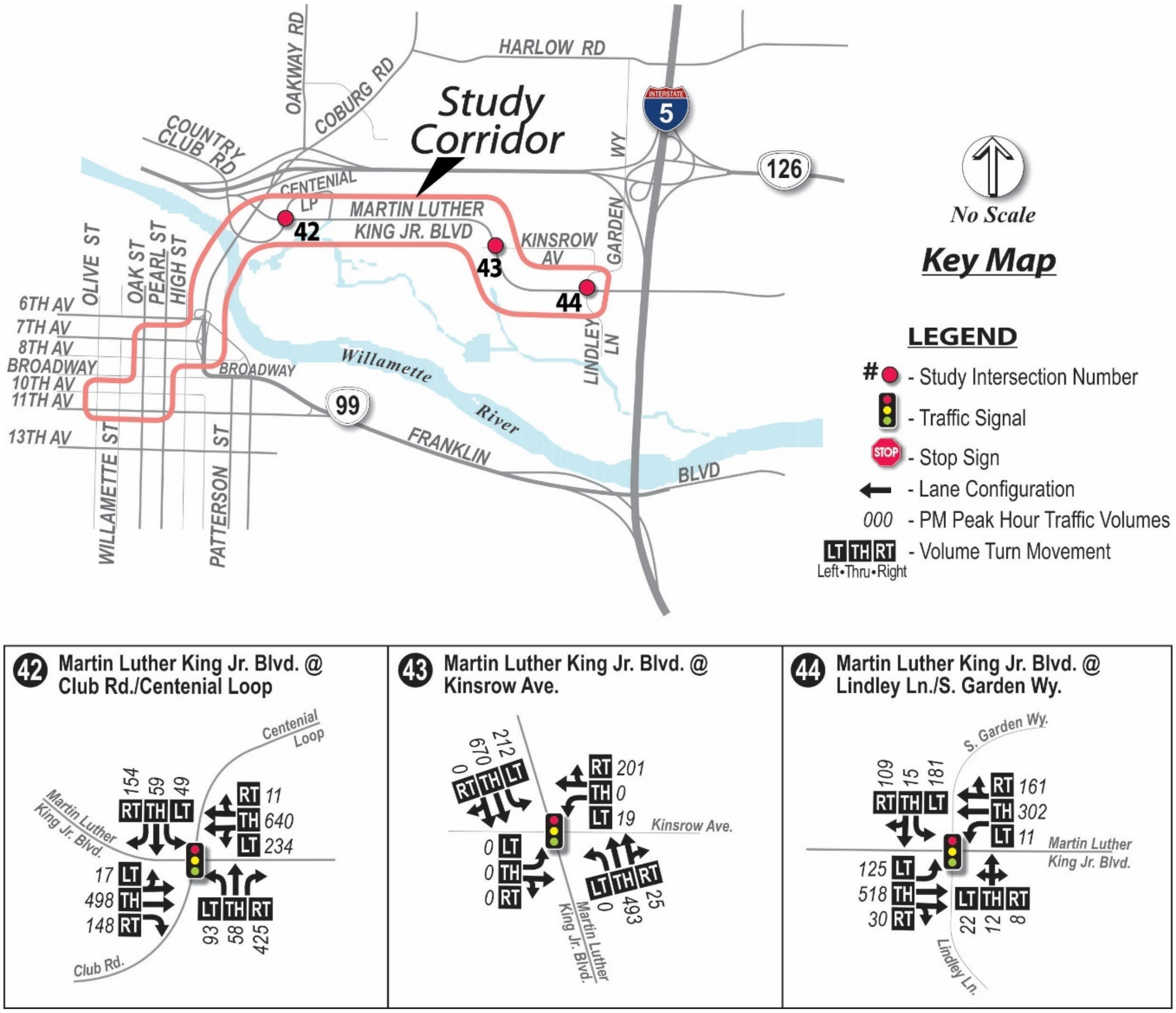
Source: DKS Transportation Analysis. (2016).

9.1.6. Existing Motor Vehicle Intersection Operations

A traffic operations model was created for the study area to evaluate vehicle traffic flow and intersection conditions. The existing performance of the study intersections was evaluated using a traffic operations model based on 2000 *Highway Capacity Manual* methodology (TRB, 2000). The existing p.m. peak hour turning movement counts are shown on Figure 9.1-4.

The 2015 base year traffic volumes and existing roadway network were used to determine study intersection delay, level of service, and volume-to-capacity ratio. Existing intersection traffic signal timing was obtained from the City of Eugene and incorporated into the analysis. The existing study intersection operations analysis is presented in Table 9.1-7. The operations analysis was conducted at all of the study intersections during the p.m. peak hour.

Figure 9.1-4. Martin Luther King, Jr. Boulevard Corridor Existing 2015 p.m. Peak Hour Traffic Volumes



Source: DKS Transportation Analysis. (2016).

Table 9.1-7. Martin Luther King, Jr. Boulevard Corridor Existing 2015 p.m. Peak Hour Study Intersection Operations

Study Intersection Number	Study Intersection	Date of Intersection Count	Jurisdiction	Operating Standard[a]	LOS	Delay (sec)	v/c
30	Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard	10/6/2015	City of Eugene	LOS D/LOS E	C	34.0	0.97
42	Martin Luther King, Jr. Boulevard/Club Road/Centennial Loop	10/7/2015	City of Eugene	LOS D/LOS E	C	33.4	0.70
43	Martin Luther King, Jr. Boulevard/Kinsrow Avenue	10/7/2015	City of Eugene	LOS D/LOS E	A	5.3	0.52
44	Martin Luther King, Jr. Boulevard/S Garden Way	10/7/2015	City of Eugene	LOS D/LOS E	B	12.6	0.53

Source: DKS Transportation Analysis. (2016).

Italic underlined values do not meet current standards
Bold underlined values do not meet proposed standards or current standards

Delay = Average Intersection Delay in seconds
LOS = Level of Service
v/c = volume-to-capacity

[a] Existing/proposed operations standards for these facilities.

During the existing p.m. peak hour, operating standards are met at all of the study intersections.

9.2. Long-Term Direct Impacts

9.2.1. No-Build Alternative

9.2.1.1. Local Traffic Operations

The future Martin Luther King, Jr. Boulevard Corridor No-Build Alternative motor vehicle turning movement volumes for the p.m. peak hour are shown on Figure 9.2-1. Figure 9.2-2 shows the Martin Luther King, Jr. Boulevard Corridor 2035 No-Build Alternative Transit network.

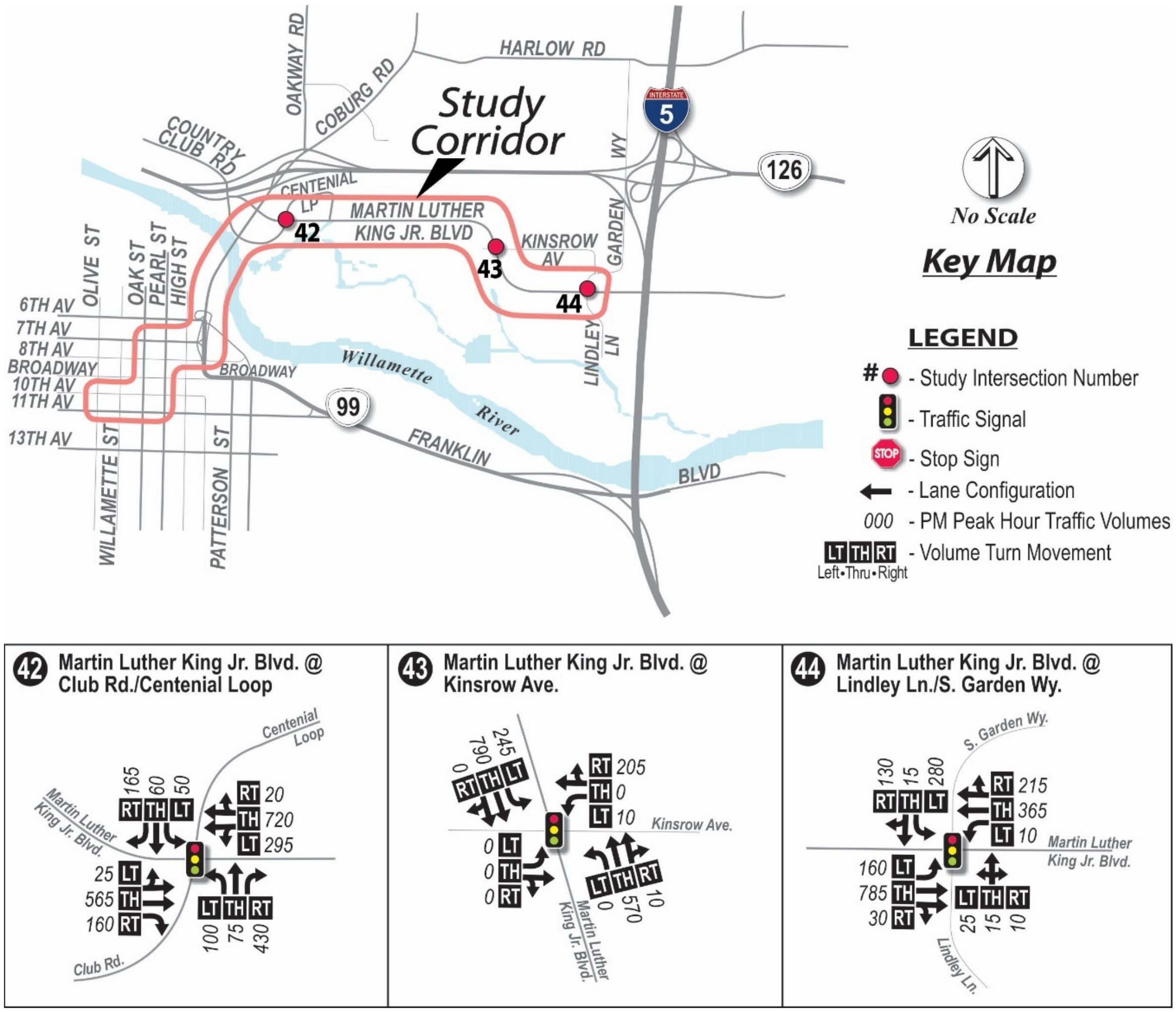
The 2035 No-Build transportation analysis was based on a future roadway network which included the expected transportation improvements identified in the Draft Eugene 2035 TSP. The Draft Eugene 2035 TSP projects that would construct capacity improvements in the study area are shown in Table 9.2-1.

Table 9.2-1. Expected Transportation Improvement Projects On or Near Martin Luther King, Jr. Boulevard Corridor

Project Name	Description
Roadway Projects	
Martin Luther King, Jr. Boulevard: *Club Road to Leo Harris Parkway*	Add a center turn lane along sections

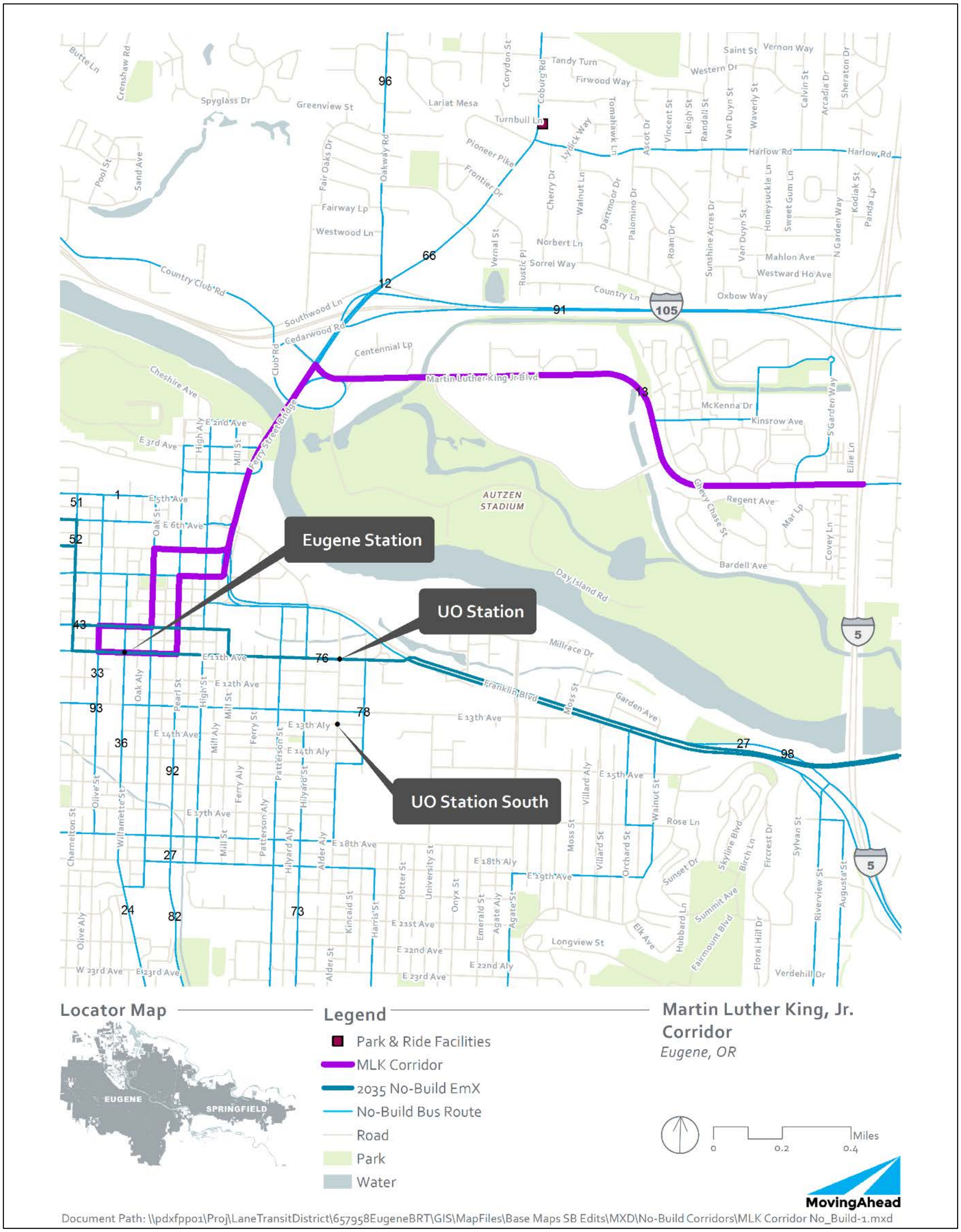
Source: *Draft Eugene 2035 Transportation System Plan* (Central Lane MPO, 2016, May).

Figure 9.2-1. Martin Luther King, Jr. Boulevard Corridor No-Build Alternative 2035 p.m. Peak Hour Traffic Volumes



Source: DKS Transportation Analysis. (2016).

Figure 9.2-2. Martin Luther King, Jr. Boulevard Corridor No-Build Alternative 2035 Transit Network



Source: CH2M. (2016).

A traffic operations model was created for the study area to evaluate vehicles traffic flow and intersection operating conditions, such as average vehicle delay and congestion. The 2035 No-Build performance of the study intersections were evaluated using a traffic operations model based on 2000 *Highway Capacity Manual* methodology (TRB, 2000). The operations analysis was conducted at all of the study intersections during the p.m. peak hour. The p.m. peak hour No-Build Alternative study intersection operations analysis is presented in Table 9.2-2.

Table 9.2-2. Martin Luther King, Jr. Boulevard Corridor 2035 p.m. Peak Hour No-Build Study Intersection Operations

Study Intersection Number	Study Intersection	Jurisdiction	Operating Standard[a]	LOS	Delay (sec)	v/c
30	Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard	City of Eugene	LOS D/LOS E	*E*	*55.5*	*1.10*
42	Martin Luther King, Jr. Boulevard/Club Road/Centennial Loop	City of Eugene	LOS D/LOS E	D	41.7	0.73
43	Martin Luther King, Jr. Boulevard/Kinsrow Avenue	City of Eugene	LOS D/LOS E	B	12.4	0.46
44	Martin Luther King, Jr. Boulevard/S Garden Way	City of Eugene	LOS D/LOS E	B	19.6	0.64

Source: DKS Transportation Analysis. (2016).

Italic underlined values do not meet current standards
Bold underlined values do not meet proposed standards or current standards

Delay = Average Intersection Delay in seconds
LOS = Level of Service
v/c = volume-to-capacity

[a] Current/proposed operations standards for these facilities.

Under the 2035 No-Build Alternative, mobility standards would not be met at the following study intersection:

- Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard (current standards only)

9.2.1.2. Connectivity to Planned Roadway, Bike, Pedestrian Projects

The Martin Luther King, Jr. Boulevard Corridor No-Build Alternative was compared with the existing and proposed roadway, bike, and pedestrian projects from the expected transportation improvement projects identified in the Draft Eugene 2035 TSP (Table 9.2-1) to determine how well coordinated the projects were. The expected project located on the corridor would not impact roadway, bicycle, or pedestrian connectivity to transit. The No-Build Alternative would not change connectivity to planned roadway, bike, or pedestrian projects.

The No-Build Alternative qualitative assessment of pedestrian and bicycle facilities is shown in Table 9.2-3. Pedestrian facilities were rated “excellent,” “good,” “fair,” or “poor” based on presence and width of sidewalks or paths, presence and width of buffers (such as landscaping), outside travel lane width, number of travel lanes and speed of motorized traffic, presence and width of bicycle lane or shoulder, and presence of lighting. Bicycle facilities were rated “excellent,” “good,” “fair,” or “poor” based on preferred type of facility (bike lane, buffered bike lane, off-street path) given motor vehicle volume of the roadway, presence and width of a shoulder, outside travel lane width, grade, pavement condition, obstructions, presence of on-street parking, and number of travel lanes and speed of motorized traffic.

Table 9.2-3. Martin Luther King, Jr. Boulevard Corridor Qualitative Assessment of Pedestrian and Bicycle Facilities[a]

Segment	Walking	Biking
Martin Luther King, Jr. Boulevard: Club Road to Leo Harris Parkway	Good	Poor
Martin Luther King, Jr. Boulevard: Leo Harris Parkway to Autzen Entry 2	Good	Poor
Martin Luther King, Jr. Boulevard: Autzen Entry 2 to S Garden Way	Fair	Poor
Coburg Road: Club Road to E. 8th Avenue	Fair	Poor
E. 7th Avenue: Pearl Street to Ferry Street Bridge	Good	Poor
E. 8th Avenue: Pearl Street to Mill Street	Good	Poor
Pearl Street: E. 8th Avenue to E. 11th Avenue	Good	Fair
Oak Street: E. 7th Avenue to E. 10th Avenue	Good	Fair
W. 10th Avenue: Olive Street to Oak Street	Good	Good
W. 11th Avenue: Olive Street to Pearl Street	Good	Good
Olive Street: 10th Avenue to 11th Avenue	Good	Fair

Source: DKS Transportation Analysis. (2016).

[a] Qualitative analysis based on methodology described in Chapter 14 of ODOT's *Analysis Procedures Manual* (ODOT, 2014).

9.2.1.3. Plan Consistency

The Martin Luther King, Jr. Boulevard Corridor No-Build Alternative was evaluated for consistency with the Long Range Transit Plan (LTD, 2014), the FTN concept, and the goals outlined in the Regional Transportation Plan (LCOG, 2011, December) and the Draft Eugene 2035 TSP.

The purpose of the LTD FTN is to leverage transit service investments by tying service to the density and other elements of adjacent development. The FTN enables a well-connected network that provides regional circulation by providing an average transit frequency of 15 minutes or better, a reliable transit system that runs on schedule (by implementing strategies such as transit priority at signalized intersections), and enhanced stations with bicycle and pedestrian connections (LTD, 2014). The No-Build Alternative does not meet the FTN goal of providing year-round frequent service on Martin Luther King, Jr. Boulevard (CH2M, 2016a).

The BRT system is the "highest level of service available within the FTN, and is a permanent, integrated system that uses buses or specialized vehicles on roadways or dedicated lanes to efficiently transport passengers" (LTD, 2014). BRT system elements include branded multi-door 60-foot-long BRT vehicles, enhances stations with level boarding platforms instead of bus stops, off-board fare collection, transit signal priority, wider stop spacing, and 10-minute service frequencies. BRT service is intended to improve transit speed, reliability, and ridership (CH2M, 2016a). The No-Build Alternative would not meet these BRT system elements.

The five primary goals outlined in the Draft Eugene 2035 TSP are to: (1) create an integrated system that is safe and efficient and reduces fossil fuel usage by 50 percent, (2) advance regional sustainability by reducing fossil fuel reliance, (3) reduce reliance on any single mode, (4) address the needs and safety of all travelers, and (5) triple the percentage of trips made on foot, by bicycle, and by transit by 2035 from 2014 levels. The No-Build Alternative would not improve bus service enough to meet many of these goals, such as improving frequency at all times of year to reduce reliance on other modes, reducing fossil fuel reliance, or helping to triple the percentage of trips made on foot, by bicycle, and by transit by 2035 from 2014 levels, compared to the build alternatives.

9.2.1.4. Transit Priority at Signalized Intersections

The Martin Luther King, Jr. Boulevard Corridor No-Build Alternative would not include any changes to traffic signal operations, and no exclusive bus signal phasing would be provided.

9.2.1.5. Safety

The Martin Luther King, Jr. Boulevard Corridor No-Build Alternative would retain the existing roadway system except for the expected transportation improvements described in the Draft Eugene 2035 TSP and identified in Table 9.2-1. Motor vehicle safety would not be affected under the No-Build Alternative.

9.2.1.6. Roadway Circulation

The Martin Luther King, Jr. Boulevard Corridor No-Build Alternative would retain existing roadway circulation except for the expected transportation improvements described in the Draft Eugene 2035 TSP and identified in Table 9.2-1. Motor vehicle circulation would not be affected under the No-Build Alternative.

9.2.1.7. Freight

The Martin Luther King, Jr. Boulevard Corridor No-Build Alternative is not expected to impact freight truck movement.

9.2.1.8. Parking and Access

The Martin Luther King, Jr. Boulevard Corridor No-Build Alternative would not impact on-street or off-street parking and would not impact property access.

9.2.1.9. Emergency Vehicle Flow and Access

Emergency vehicle flow and access would not change under the Martin Luther King, Jr. Boulevard Corridor No-Build Alternative.

9.2.2. Enhanced Corridor Alternative

9.2.2.1. Local Traffic Operations

The Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative would install roadway improvements that would affect study intersection operations including:

- Repurposing general purpose lanes for BAT lanes in both directions on Martin Luther King, Jr. Boulevard from east of Club Road/Centennial to S Garden
- Constructing a westbound transit only left turn lane and a transit-only receiving lane at Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard
- Updating signal timing at Martin Luther King, Jr. Boulevard/Club Road/Centennial Loop

The 2035 p.m. peak hour turning movement volumes for the Enhanced Corridor Alternative are shown on Figure 9.2-3 and the transit and roadway improvements are shown on Figure 9.2-4. The study intersection performance for the p.m. peak hour No-Build and Enhanced Corridor Alternatives are shown in Table 9.2-4. The vehicle delay at the Martin Luther King, Jr. Boulevard/Club Road/Centennial Loop intersection would improve due to the installation of dedicated left turn lanes, which would allow for more efficient signal phasing than the No-Build Alternative.

Table 9.2-4. Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative 2035 p.m. Peak Hour Study Intersection Operations

Study Intersection Number	Study Intersection	Jurisdiction	Operating Standard[a]	No-Build LOS	No-Build Delay (sec)	No-Build v/c	Enhanced Corridor LOS	Enhanced Corridor Delay (sec)	Enhanced Corridor v/c
30	Coburg Road/Country Club Road/Martin Luther King, Jr. Boulevard	City of Eugene	LOS D/LOS E	*E*	*55.5*	*1.10*	*E*	*60.1*	*1.10*
42	Martin Luther King, Jr. Boulevard/Club Road/Centennial Loop	City of Eugene	LOS D/LOS E	D	41.7	0.73	C	29.1	0.54
43	Martin Luther King, Jr. Boulevard/Kinsrow Avenue	City of Eugene	LOS D/LOS E	B	12.4	0.46	B	18.1	0.59
44	Martin Luther King, Jr. Boulevard/S Garden Way	City of Eugene	LOS D/LOS E	B	19.6	0.64	C	20.1	0.65

Source: DKS Transportation Analysis. (2016).

Italic underlined values do not meet current standards
Bold underlined values do not meet proposed standards or current standards

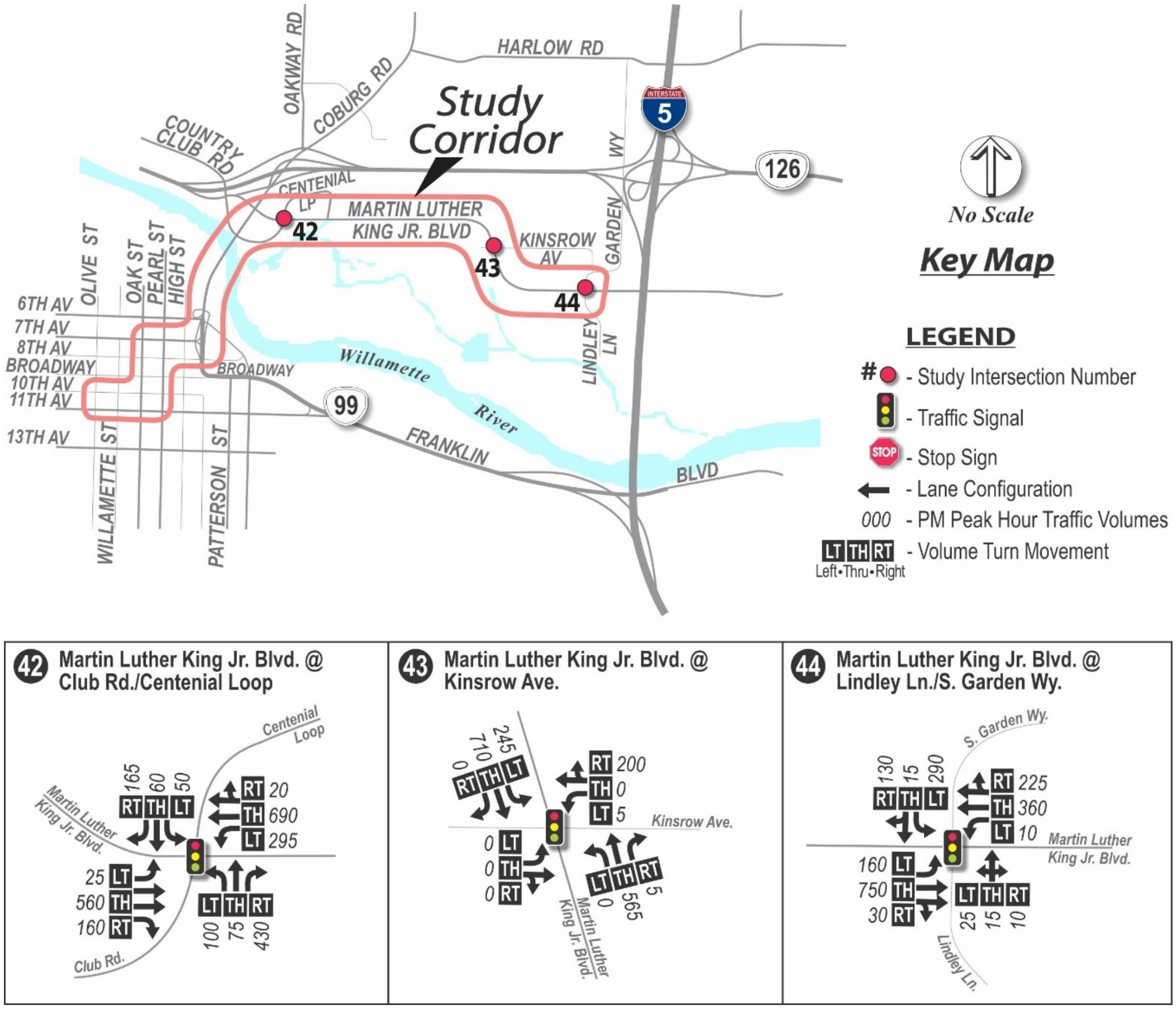
Delay = Average Intersection Delay in seconds
LOS = Level of Service
v/c = volume-to-capacity

[a] Current/proposed operations standards for these facilities.

For the Enhanced Corridor Alternative, mobility standards are not met at the following study intersection:

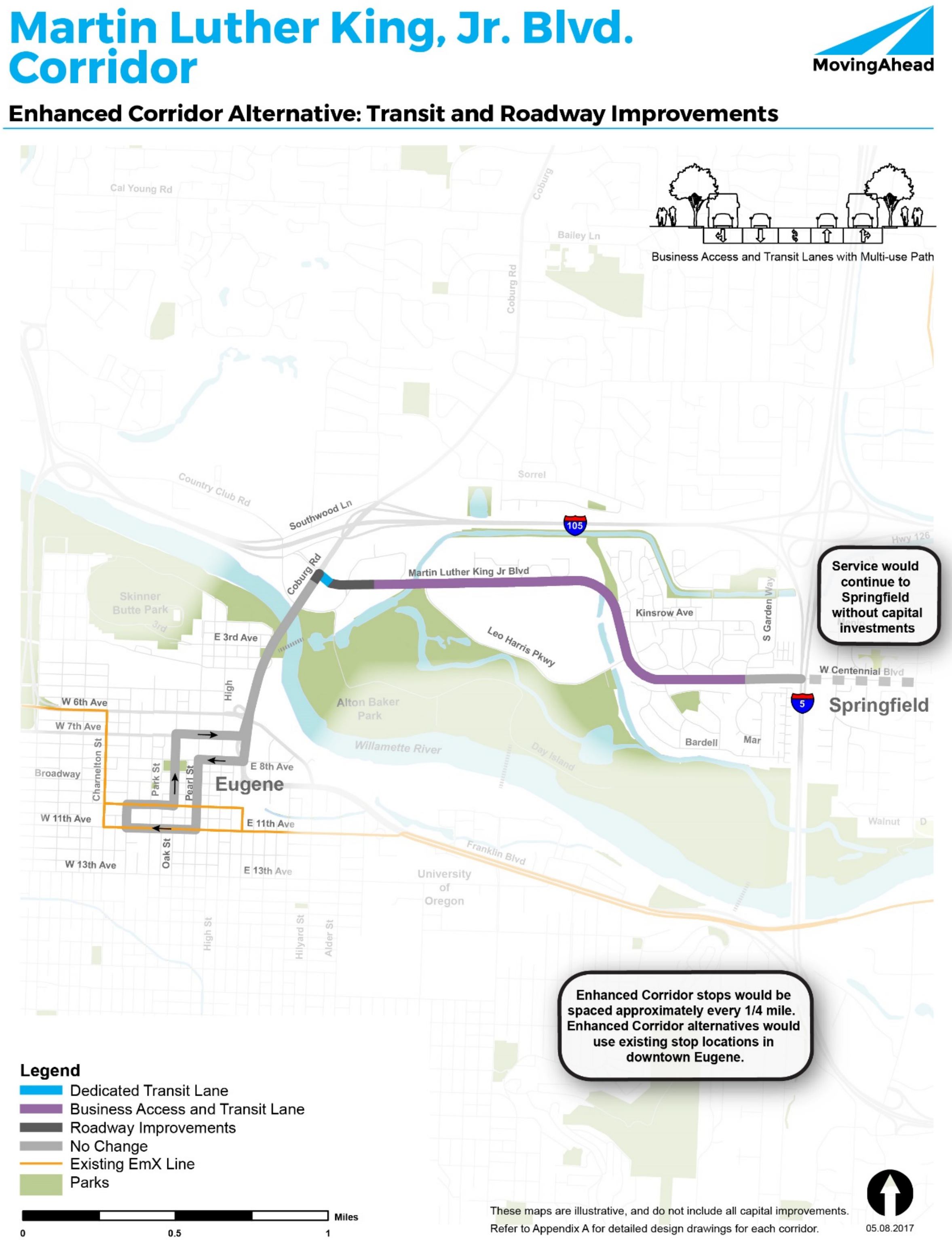
- Coburg Road/Country Club Boulevard/Martin Luther King, Jr. Boulevard (current standards only)

Figure 9.2-3. Martin Luther King, Jr. Boulevard Corridor 2035 Enhanced Corridor Alternative p.m. Peak Hour Traffic Volumes



Source: DKS Transportation Analysis. (2016).

Figure 9.2-4. Martin Luther King, Jr. Corridor Enhanced Corridor Alternative 2035 Transit and Roadway Improvements



Source: CH2M. (2016).

9.2.2.2. Connectivity to Roadway, Bike, and Pedestrian Facilities

The proposed multi-modal project improvements (shown in Table 9.2-5 and on Figure 9.2-5) were compared with the existing and proposed roadway, bike, and pedestrian projects from the expected transportation improvement identified in the Draft Eugene 2035 TSP (Table 9.2-4) to determine how well coordinated the projects were. The expected project located on the corridor would not impact roadway, bicycle, or pedestrian connectivity to transit.

The amount of new and reconstructed pedestrian and bicycle facilities proposed under the Enhanced Corridor Alternative are shown in Table 9.2-5. Compared to the No-Build Alternative, the Enhanced Corridor Alternative would install some pedestrian improvements, including three new enhanced crossings (flashing beacon or Pedestrian Hybrid Beacon). The Enhanced Corridor Alternative would install about 2,380 feet of reconstructed sidewalks, mainly on Martin Luther King, Jr. Boulevard near the new transit stops.

The Enhanced Corridor Alternative would not improve bicycle facilities compared to the No-Build Alternative.

Table 9.2-5. Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative New and Reconstructed Pedestrian and Bicycle Facilities

Improvement	Length of Facilities
New Sidewalk	0
Reconstructed/Improved Sidewalk	2,380 feet (0.45 mile)
Number of New Mainline Enhanced Crossings[a]	4 on Martin Luther King, Jr. Boulevard
Number of Upgraded Crossings[b]	0
New Bike Facilities	0
Improved Bike Facilities	0

Source: CH2M Transportation Analysis. (2016).

[a] Enhanced crossing would install either a flashing yellow indication (flashing beacon), a yellow, red, flashing red indication (Pedestrian Hybrid Beacon), or a full traffic signal with pedestrian crossings along the mainline to warn vehicles of a pedestrian crossing.

[b] Upgraded crossings would consist of installing ADA ramps and possibly median refuge islands and/or crosswalk striping.

The qualitative assessment of pedestrian facilities for the Enhanced Corridor Alternative would not change compared to the No-Build Alternative, because the main benefit to pedestrians is the installation of enhanced and upgraded crossings of Martin Luther King, Jr. Boulevard, rather than an upgrade to facilities along Martin Luther King, Jr. Boulevard. Biking facilities would not change under the Enhanced Corridor Alternative compared to the No-Build Alternative.

Figure 9.2-5. Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative 2035 Pedestrian and Bicycle Improvements

Source: CH2M. (2016).

9.2.2.3. Plan Consistency

The Enhanced Corridor Alternative was evaluated for consistency with the Long Range Transit Plan (LTD, 2014), the FTN concept, and the goals outlined in the Regional Transportation Plan (LCOG, 2011, December) and the Draft Eugene 2035 TSP.

The purpose of the LTD FTN is to leverage transit service investments by tying service to the density and other elements of adjacent development. The FTN enables a well-connected network that provides regional circulation by providing an average transit frequency of 15 minutes or better, a reliable transit system that runs on schedule (by implementing strategies such as transit priority at signalized intersections), and enhanced stations with bicycle and pedestrian connections (LTD, 2014). The Enhanced Corridor Alternative would meet the FTN goals by providing frequent service on Martin Luther King, Jr. Boulevard, installing transit priority at signalized intersections, and adding BAT lanes to help make service more reliable and on schedule.

The BRT system is the "highest level of service available within the FTN, and is a permanent, integrated system that uses buses or specialized vehicles on roadways or dedicated lanes to efficiently transport passengers" (LTD, 2014). BRT system elements include branded multi-door 60-foot-long BRT vehicles, enhances stations with level boarding platforms instead of bus stops, off-board fare collection, transit signal priority, wider stop spacing, and 10-minute service frequencies. BRT service is intended to improve transit speed, reliability, and ridership (CH2M, 2016a). The Enhanced Corridor Alternative would not meet these BRT system elements.

The five primary goals outlined in the Draft Eugene 2035 TSP are to: (1) create an integrated system that is safe and efficient and reduces fossil fuel usage by 50 percent, (2) advance regional sustainability by reducing fossil fuel reliance, (3) reduce reliance on any single mode, (4) address the needs and safety of all travelers, and (5) triple the percentage of trips made on foot, by bicycle, and by transit by 2035 from 2014 levels. The Enhanced Corridor Alternative may help Eugene to slightly improve transit mode share, but is not expected to improve bicycle and pedestrian mode share over the No-Build Alternative.

9.2.2.4. Transit Priority at Signalized Intersections

The Enhanced Corridor Alternative would include traffic signal construction and modifications at several intersections. None of the traffic signals would provide exclusive bus signal phasing.

Every traffic signal on the corridor would receive transit signal priority. Transit signal priority modifies normal traffic signal operations by extended green phases or shortening side street phases in order to reduce delay for transit vehicles.

9.2.2.5. Safety

Potential safety impacts associated with the Enhanced Corridor Alternative include:

- BAT lanes along Martin Luther King, Jr. Boulevard would serve both buses and turning general-purpose vehicles. These BAT lanes would reduce potential vehicle conflicts such as rear end collisions (FHWA, 2014)
- Four new bicycle and pedestrian crossings would improve opportunities for bicyclists and pedestrians to cross Martin Luther King, Jr. Boulevard
- A new traffic signal at Martin Luther King, Jr. Boulevard at Leo Harris Parkway would provide more protection for motor vehicles, pedestrians, and bicyclists crossing at the intersection

Overall, motor vehicle safety would not be substantially affected under the Enhanced Corridor Alternative. Bicycle and pedestrian safety would be improved by the increase in crossing options.

9.2.2.6. Roadway Circulation

The Enhanced Corridor Alternative was evaluated to assess motor vehicle circulation. The installation of a new traffic signal at the Martin Luther King, Jr. Boulevard/Leo Harris Parkway intersection would improve roadway circulation over the No-Build Alternative.

9.2.2.7. Freight

The Enhanced Corridor Alternative would install three enhanced pedestrian crossings with raised medians on Martin Luther King, Jr. Boulevard, which could cause a slight increase in freight travel times along the corridor.

9.2.2.8. Parking and Access

The Enhanced Corridor Alternative would not impact on-street or off-street parking.

There is one driveway adjacent to the enhanced pedestrian crossing that would have a reduced left turn deceleration area, resulting in potential increased delays for motor vehicles accessing the driveways or traveling along the corridor. In addition, two driveways and one side street would have potential impacts to motor vehicles performing a two-stage left turn due to the refuge islands. Table 9.2-6 lists the three locations with potential impacts.

Table 9.2-6. Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative Driveway and Access Impacts to Motor Vehicles

Crosswalk Location on Martin Luther King, Jr. Boulevard	Impacted Location	Side of Martin Luther King, Jr. Boulevard	Type of Impact
2,500 feet east of Leo Harris Parkway	Masonic Center Eugene Lodge	North	Left Turn - Entering Driveway
	University of Oregon Stadium	South	Left Turn - Exiting Driveway
West side of Chevy Chase Street	Chevy Chase Street	South	Left Turn - Exiting Side Street

Source: DKS Transportation Analysis. (2016).

9.2.2.9. Emergency Vehicle Flow and Access

The emergency service authorities do not foresee any major issues of concern related to expanded transit services. Emergency service providers would have an opportunity to review more detailed designs and would work with Lane Transit District to address issues in the future (Lane Fire Authority, personal communication, April 13, 2017).

9.3. Transit

9.3.1. Corridor Transit Service Characteristics

The amount of transit service provided in a corridor is measured by daily VHT, daily VMT, and daily place-miles of service. Daily vehicle hours are the cumulative time that transit vehicles are in service and daily vehicle miles are the distance they travel, independent of the size of the vehicle. Place-miles refers to the total carrying capacity (seated and standing) of each bus and is calculated by multiplying vehicle capacity of each bus by the number of service miles traveled each day. Place-miles highlight differences among alternatives caused by a different mix of vehicles and levels of service. Table 9.3-1 summarizes these major transit characteristics for the Martin Luther King, Jr. Boulevard Corridor No-Build and Enhanced Corridor Alternatives.

Table 9.3-1. Martin Luther King, Jr. Boulevard Corridor 2035 Corridor Transit Service Characteristics by Alternative

Measure	No-Build Alternative	Enhanced Corridor Alternative	Delta from No-Build
Annual EmX and Fixed Route Transit VHT[a]	278,600	285,800	7,200
Annual Transit VMT[b]	4,520,200	4,653,000	132,800
Average Weekday Transit Place-Miles[c]	26,770	80,200	53,430

Source: LCOG Regional Travel Demand Model Results (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

[a] VHT = Vehicle hours traveled in revenue service.

[b] VMT = Vehicle miles traveled in revenue service.

[c] Place-Miles = Transit Vehicle Capacity (seated and standing) multiplied by VMT. (Place-miles refers to the total carrying capacity (seated and standing) of each bus and is calculated by multiplying vehicle capacity of each bus by the number of service miles traveled each day. Place-miles highlight differences among alternatives caused by a different mix of vehicles and levels of service.)

Corridor place-miles would increase by 53,430 place-miles for the Enhanced Corridor Alternative compared to the No-Build Alternative. This is because the Enhanced Corridor Alternative would replace local route 13 Centennial, which operates at 30-minute frequency throughout the day, with Enhanced bus operating at 15-minute frequency throughout the day. The net result is a 67 percent (20 vehicle-hours traveled) increase in VHT and a 111 percent (420 vehicle miles traveled) increase in VMT in the corridor. In addition, the Enhanced Corridor Alternative extends only to I-5, but the route itself will continue beyond I-5 to cover the remaining portion of Route 13. This is another reason for the substantial increase in place-miles.

9.3.2. Transit and Passenger Vehicle Travel Time

Transit travel time is assessed using in-vehicle time and total travel time. Table 9.3-2 provides a summary of in-vehicle and total auto and transit travel times in the a.m. peak hour for trips to Eugene Station from the Kinsrow/Commons intersection.

In-vehicle transit travel time includes only the amount of time it takes for a transit vehicle to travel between an origin and destination. For buses, this measure reflects roadway speed limits, congestion, and stop dwell time. In-vehicle plus walk and wait travel time includes time spent walking to transit, initial wait time, transfer wait time (if any), in-vehicle time, and time walking from transit to the destination.

In terms of auto times, there is no appreciable difference in times between the No-Build Alternative and the Build Alternatives. For transit travel times, the Enhanced Corridor Alternative demonstrates some travel time savings compared to the No-Build Alternative.

Table 9.3-2. Martin Luther King, Jr. Boulevard Corridor 2035 Auto and Transit Travel Times (a.m. Peak Hour) by Alternative

	Travel Time to Eugene Station from Kinsrow/Commons			
	Auto	Transit		
	No-Build and Enhanced Corridor Alternatives	No-Build Alternative	Enhanced Corridor Alternative	
Measure	Time	Time	Time	Delta from No-Build
In-Vehicle[a]	7	13	11	-2
In-Vehicle Plus Walk and Wait[b]	11	31	24	-7

Source: LCOG Regional Travel Demand Model Results (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

[a] In-vehicle transit travel times represent time spent in the transit vehicle.
[b] In-vehicle plus walk and wait travel time represents walk time, one-half the wait time, and in-vehicle time in minutes.

9.3.3. Reliability

One of the major contributing factors to reliable transit service is the amount of exclusive and/or priority transit lanes along the corridor and at signalized intersections. Transit signal priority, installed at signalized intersections for the Enhanced Corridor Alternative, would minimize the variability of delay at traffic signals. Reliability measures include the total amount of new round-trip miles, the total length of exclusive and/or priority lanes, the percentage of new corridor exclusive or priority lanes, the number of trunk-line intersections with transit priority treatment, and the amount of motor vehicle congestion at signalized intersections on the corridor. Typically, the more congested the corridor, the greater the variability in delay at signalized intersections.

Table 9.3-3 summarizes these transit reliability measures for the Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative. Every signalized intersection for the Enhanced Corridor Alternative would implement transit signal priority, whereas the No-Build Alternative would not implement additional transit signal priority. Compared to the No-Build Alternative, the Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative provides more priority treatment. The Enhanced Corridor Alternative can be expected to have greater travel time reliability during peak periods compared to the No-Build Alternative.

Table 9.3-3. Martin Luther King, Jr. Boulevard Corridor 2035 Average Weekday Corridor Transit Reliability Measures

Measure	Enhanced Corridor
Total Number of New Round-Trip EmX System Miles (miles)	0
Total Length of New Corridor Exclusive/Priority Lanes[a] (miles)	2.41
Percent of New Corridor that is Exclusive/Priority Lanes[a]	25.1%

Source: *MovingAhead Level 2 Definition of Alternatives* (CH2M et al., 2016).

[a] Exclusive/priority lanes are defined as the round-trip miles of business access and transit lanes, bus-only lanes, and queue jumps.

9.3.4. Transit Ridership

Systemwide transit ridership is defined as average weekday systemwide linked-trips in 2035. A linked trip is a one-way trip taken by a person from an origin to a destination, independent of the number of vehicles or transfers used to complete the trip. The Enhanced Corridor Alternative would result in an increase of about 1.3 percent in systemwide transit trips compared to the No-Build Alternative.

Corridor ridership is defined as any transit trip that is produced in and/or attracted to the respective corridor which for this purpose has been defined as the TAZ within a 0.5-mile buffer around the transit line. As shown in Table 9.3-4, the Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative would increase in corridor ridership by about 3.4 percent compared to the No-Build Alternative.

Table 9.3-4. Martin Luther King, Jr. Boulevard Corridor Average Weekday 2035 Systemwide and Corridor Ridership by Alternative

Measure	No-Build Alternative	Enhanced Corridor
Total Systemwide Transit Trips[a]	46,410	47,030
Delta from No-Build		620
% Change from No-Build		1.3%
Total Corridor Transit Trips[b]	25,640	26,500
Delta from No-Build		860
% Change from No-Build		3.4%

Source: LCOG Regional Travel Demand Model Results (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

Note: Corridors overlap and include some common areas, downtown Eugene for example, as a result one cannot add up the totals to arrive at a regional total.

[a] Systemwide transit trips are defined as one-way linked trips taken by a person from the trips origin to the trips destination, independent of the number of vehicles or transfers used to complete the trip.

[b] Corridor transit trips are defined as any EmX or bus trip with at least one trip end in the corridor.

9.3.5. Transit Boardings

Daily unlinked transit ridership, also referred to as boardings, is summarized in Table 9.3-5. There are two categories of boardings shown in the table. The first is a boarding total for all EmX lines that are not part of the project and the second is boardings for all routes within the project corridor. The reason boardings on other EmX lines are included is to show that there is some variation in boardings on the routes where the project route and the existing EmX system share operating on a portion of the alignment. The Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative shows a loss of non-project EmX boardings and an increase in corridor boardings.

Table 9.3-5. Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative 2035 Average Weekday System EmX and Corridor Daily Boardings

	No-Build Alternative	Enhanced Corridor Alternative	
Route	**Daily Boardings**	**Daily Boardings**	**Delta from No-Build**
Non-Project Total EmX Service	24,500	24,300	-200
Corridor Routes Total	1,950	3,350	1,400
Total	**26,450**	**27,650**	**1,200**

Source: LCOG Regional Travel Demand Model Results (LCOG, 2016). Compiled by CH2M Transportation Analysts. (2016).

Note: For Enhanced Corridor Alternative, numbers represent EmX and Enhanced Corridor daily boardings combined.

9.4. Annualized Impacts & Costs

The total annualized costs, according to FTA-provided factors and changes in VMT, associated with changes in safety (fatalities and serious injuries) are shown in Table 9.4-1, and will be incorporated into a total environmental benefit analysis using data from the *MovingAhead Air Quality Technical Report* (Michael Minor and Associates, Inc. and CH2M, 2017), the *MovingAhead Energy and Sustainability Technical Report* (DKS and CH2M, 2017), the *MovingAhead Operating and Maintenance Costs Technical Report* (LTD and City of Eugene, 2017), and the *MovingAhead Capital Cost Estimating Technical Report* (CH2M, 2017a). The total annualized cost savings based on changes in fatality and serious injury crash rates would be minor under the Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative.

Table 9.4-1. Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative 2035 Estimated Regionwide Annual Cost Savings Relative to No-Build Alternative

Annual Value	Enhanced Corridor Alternative
Annual VMT Decrease (Increase)	264,843
Annual Cost Savings (Increase) for Fatalities	$34,316
Annual Cost Savings (Increase) for Serious Injuries	($3,792)
Annual VMT Decrease (Increase)	**$30,523**

Sources: DKS Transportation Analysis. (2016).
Cost Factors: *New and Small Starts Evaluation and Rating Process Final Policy Guidance* (FTA, 2013, August).

The changes in safety were based on changes in VMT for each alternative, according to the factors shown in Table 9.4-2.

Table 9.4-2. Fatality and Serious Injury Factors Per Million Vehicle Miles Traveled by Mode

Mode	Fatalities/Million VMT	Serious Injuries/Million VMT
Automobile	0.013	0.195
Heavy Truck[a]	0.004[a]	1.824[a]
Bus – Diesel	0.004	1.824
Bus – Electric	0.004	1.458

Source: *New and Small Starts Evaluation and Rating Process Final Policy Guidance* (FTA, 2013, August).

[a] Heavy Truck factors were not provided, and were assumed to be the same as diesel bus factors.

There would be total annual cost savings for the Enhanced Corridor Alternative due to a reduction in total VMT over the No-Build Alternative. However, there would be a cost increase for serious injuries due to the increase in bus VMT, which has a higher FTA factor for serious injuries than the automobile mode.

The safety costs were developed using the following cost factors from *New and Small Starts Evaluation and Rating Process Final Policy Guidance* (FTA, 2013, August):

- $9.1 million for each fatality
- $490,000 for each serious injury

An annualization factor of 342[10] was used to estimate annual automobile and heavy truck VMT based on average weekday VMT data. Annualized bus VMT was provided by LTD.

9.5. Indirect and Cumulative Effects

No indirect effects are anticipated for the Enhanced Corridor Alternative.

Cumulative effects were accounted for in the LCOG model for projecting future motor vehicle volume growth. Compared to the No-Build Alternative, the Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative would offer more potential for mode shifts from motor vehicle travel to transit to help reduce congested traffic conditions. In addition, the Enhanced Corridor Alternative would decrease the level of congestion compared to the No-Build Alternative at the Martin Luther King, Jr. Boulevard/Club Road/Centennial Loop intersection. This comparatively decreased congestion would benefit both transit and motor vehicle users.

9.6. Short-Term Construction-Related Impacts

There would be no construction impacts under the Martin Luther King, Jr. Boulevard Corridor No-Build Alternative.

The Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative would follow the alignment of existing streets – primarily E. 10th Avenue, E. 11th Avenue, Pearl Street, Oak Street, Coburg Road, and Martin Luther King, Jr. Boulevard – and would require the construction new BAT lanes. This road footprint would be constructed within the existing ROW wherever possible, but ROW acquisition

[10] The annualization factor was calculated based on 2015 traffic volume data from ODOT's Automated Traffic Recording (ATR) stations. An average value was applied based on the six ATR stations located in the Eugene-Springfield region.

would be necessary at places all along the extent of the alignment. Potential Corridor-wide construction-related impacts are summarized in Table 9.6-1.

Table 9.6-1. Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative Construction Impacts

Roadway	Functional Classification	Construction Truck Traffic	Lane Closure	Detour Route Available?	Sidewalk Impacts?	Bike Lanes Impacts?
Pearl Street	Minor Arterial	None	None	No	No	No
Oak Street	Minor Arterial	None	None	No	No	No
Coburg Road (at Country Club Road)	Major Arterial	Moderate	Int.	No	Yes	No
Club Road	Minor Arterial	Moderate	Int.	No	Yes	No
Leo Harris Parkway	Major Collector	Moderate	Int.	No	Yes	No
Kinsrow Avenue	Neighborhood Collector	Limited	Int.	No	Yes	No
Chevy Chase Street	Local	Limited	Int.	No	Yes	No
S Garden Way/Lindley Lane	Major Arterial	Limited	Int.	No	Yes	Yes
Martin Luther King, Jr. Boulevard	Minor Arterial	Moderate	Long Int.	No	Yes	No

Source: DKS Transportation Analysis. (2016).

Sidewalk impacts mean that sidewalk reconstruction would be necessary to match in with the new sidewalk.
Bike lane impacts mean that the bike lane would be affected by the construction of the project.

Int. = Short-length lane closures (less than 500 feet) near intersection for a street intersecting the corridor
Long = possible long-length lane closure (longer than 500 feet)
Short = possible short-length lane closure (less than 500 feet)

Limited = Some construction traffic present and small travel delays are possible
Moderate = Construction traffic present and travel delays likely

LTD anticipates a construction period of approximately 18 months. Of that period, the first several months would be preliminary low-impact work, such as surveying and staging. Building the Enhanced Corridor Alternative would take about 6 to 10 months of heavy construction (street demolition and reconstruction). That work would be spread over two (summer) construction seasons due to the difficulty of working during winter weather. The contractor would typically work in contained segments of five to ten blocks on one side of the street at a time.

Sidewalk construction would affect pedestrians and bicyclists. Construction of the improvements along the length of the project could impact existing curbs or other features along the alignment. The demolition and reconstruction of the curbs, gutters, sidewalks, and other facilities may be necessary to make room for the construction of the project. This activity would generate construction traffic for the removal of debris and the delivery of construction materials and equipment.

Construction may require short-term long-length (longer than 500 feet) and short-length (shorter than 500 feet) lane closures and rerouting of traffic. No long-term long-length lane closures are anticipated.

BAT lane construction would also impact side streets. Temporary restrictions of turn movements, into or out of the side streets, and some detours may be necessary at some of these intersections.

Work in residential areas would be completed during the day to comply with City of Eugene noise limits.

9.7. Potential Mitigation Measures

9.7.1. Long-Term Direct Impacts

Because the operations under the Martin Luther King, Jr. Boulevard Corridor Enhanced Corridor Alternative would be no worse than No-Build operations, mitigation measures due to traffic operations would not be necessary. LTD has prepared an *Addendum to MovingAhead Alternatives Analysis Technical Reports Memorandum* (CH2M, 2017b) that evaluates ways to avoid or minimize impacts at some properties. Please see this addendum for additional information on potential parking, acquisitions, and tree impacts mitigation.

9.7.2. Short-Term Construction-Related Impacts

LTD and the contractor will carefully plan construction to minimize the potential impact to businesses, roadway users, and surrounding communities. For example, LTD plans to limit the length of any single lane closures to about five to ten blocks, and one side of the road would be worked on at a time to minimize the impact to road users. Shorter segments would be used in locations with higher than normal driveway density. Short construction segment lengths should allow for the contractor to quickly complete the work within a segment and reopen it to the public. The construction activities would flow from one segment to the next in a rolling construction sequence. Two adjoining segments would be worked on simultaneously with the goal of excavating, utility installation, base rock, and paving being completed within a 2- to 4-week period for each segment. Depending on the type of land uses in each construction segment (commercial or residential), and the predominant hours of operation for adjacent businesses, construction could occur at night if it would further reduce potential business and traffic disruptions. Any night work would have to comply with City of Eugene noise restrictions.

Business access would be maintained to the greatest extent practicable throughout all stages of construction. In high traffic locations or locations with heavily accessed business driveways, construction could take place at night if consistent with the City of Eugene's night construction requirements. This would reduce impacts to the adjacent businesses and their customers.

Mitigation measures would also require early, frequent, and ongoing communication among LTD, contractors, and affected property owners/tenants. Construction timing, staging, and signage would be coordinated by LTD's designated staff liaison in consultation with the affected property owners/tenants to minimize business and residential disruptions. Speed zone reductions within the construction zone, closed or narrow lanes, and temporary driveway relocation would also be considered to mitigate construction impacts. Variable message signs, the LTD website, and local news sources could also be used to provide roadway users with advance notice of current or pending construction activities and alternate routes. All required mitigation measures would be specified in LTD's construction contracting documents.

Emergency vehicle access would be provided at all times throughout the construction process.

9.8. Permits and Approvals

No permits or approvals are required for potential transportation impacts evaluated for the Martin Luther King, Jr. Boulevard Corridor.

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Appendix A: Glossary and Naming Conventions

This appendix includes a detailed list of acronyms, abbreviations, and technical terms used throughout this report. It also includes naming conventions used in the MovingAhead Project.

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Acronyms and Abbreviations

Table A-1. Acronyms and Abbreviations

Acronyms and Abbreviations	Definitions
/H-RCP	Historic Structures or Sites Combine Zone
/WP	Waterside Protection
/WQ	Water Quality
°C	degree(s) Celsius
µg/L	microgram(s) per liter
µg/m^3	microgram(s) per cubic meter
AA	Alternatives Analysis
AAC	all aluminum conductor
AASHTO	American Association of State Highway and Transportation Officials
AAI	All Appropriate Inquiry
ACS	American Community Survey
ADA	Americans with Disabilities Act
AEO	Annual Energy Outlook
APE	Area of Potential Effect
API	Area of Potential Impact
approx.	approximately
ARTS	All Roads Transportation Safety Program
ATR	Automated Traffic Recording
BAT	business access and transit
BEST	Better Eugene Springfield Transit
BFE	Base Flood Elevation
BMP	best management practice
BPA	Bonneville Power Administration
BRT	bus rapid transit
Btu	British thermal unit
c	Circa
CAA	Clean Air Act
CAFE	Corporate Average Fuel Economy

Table A-1. Acronyms and Abbreviations

Acronyms and Abbreviations	Definitions
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CERCLIS	Comprehensive Environmental Response Compensation and Liability Information System
CFR	Code of Federal Regulations
CFU	Colony-Forming Unit
CH2M	CH2M HILL, Inc.
CIG	Capital Investment Grant
CIP	Capital Improvements Program
City	City of Eugene
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COGP	County Opportunity Grant Program
Corps	U.S. Army Corps of Engineers
CRL	Confirmed Release List
CSZ	Cascadia Subduction Zone
CTR	commute trip reduction
CWA	Clean Water Act
CY	cubic yard
dB	decibel
dBA	A-weighted decibel
DBE	Disadvantaged Business Enterprise
DEIS	Draft Environmental Impact Statement. Also referred to as Draft EIS.
DEQ	Oregon Department of Environmental Quality
DKS	DKS Associates
DLS	Donation Land Claim
DOE	Determination of Eligibility
DOGAMI	Oregon Department of Geology and Mineral Industries
DOT	Department of Transportation
Draft EIS	Draft Environmental Impact Statement. Also referred to as DEIS.
Draft Envision Eugene	*Draft Envision Eugene Community Vision* (Envision Eugene, 2016, July)
Draft Eugene 2035 TSP	*Draft Eugene 2035 Transportation System Plan* (Central Lane MPO, 2016)
DSL	Oregon Department of State Lands
DU	dwelling unit
EA	Environmental Assessment or each

Table A-1. Acronyms and Abbreviations

Acronyms and Abbreviations	Definitions
EC	City of Eugene Code
EC	eligible contributing
EC	Enhanced Corridor Alternative (in some tables)
ECLA	*Eugene Comprehensive Lands Assessment* (ECONorthwest, 2010, June)
ECSI	Environmental Cleanup Site Information database (Oregon DEQ, 2016)
EFH	essential fish habitat
EIS	Environmental Impact Statement
EJ	Environmental Justice
EmX	Emerald Express, Lane Transit District's Bus Rapid Transit System
EmX	EmX Alternative (in some tables)
EOA	Equity and Opportunity Assessment
EPA	U. S. Environmental Protection Agency
ES	eligible significant
ES NR	eligible significant NRHP
ESA	Endangered Species Act or Environmental Site Assessment
ESH	essential indigenous anadromous salmonid habitat
ESU	Evolutionarily Significant Unit
EWEB	Eugene Water & Electric Board
FAST Act	Fixing America's Surface Transportation Act
FEIS	Final Environmental Impact Statement. Also referred to as Final EIS.
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act of 1974
Final EIS	Final Environmental Impact Statement. Also referred to as FEIS.
FOE	Finding of Effect
FPPA	Farmland Protection Policy Act, 7 U.S.C. 4201-4209 and 7 CFR 658
FRA	Federal Railroad Administration
ft	foot (feet)
ft^2	square foot (feet)
FTA	Federal Transit Administration
FTN	Frequent Transit Network
FY	fiscal year
GAN	Grant Anticipation Note
GARVEE	Grant Anticipation Revenue Vehicle
GHG	greenhouse gas
GIS	geographic information system

Table A-1. Acronyms and Abbreviations

Acronyms and Abbreviations	Definitions
GLO	General Land Office
Heritage	Heritage Research Associates, Inc.
HGM	Hydro-geomorphic
HMTA	Hazardous Materials Transport Act of 1975, with amendments in 1990 and 1994
HOV	high-occupancy vehicle
HPNW	Historic Preservation Northwest
I-5	Interstate 5
I-105	Interstate 105
IOF	Immediate Opportunity Fund
ISA	International Society of Arboriculture
ISTEA	Intermodal Surface Transportation Efficiency Act
kV	kilovolt(s)
LaneACT	Lane Area Commission on Transportation
LCC	Lane Community College
LCDC	Land Conservation and Development Commission
LCOG	Lane Council of Governments
Ldn	day-night sound level
LE	Listed Endangered
LEP	limited English proficiency
L_{eq}	equivalent sound level
LF	lineal foot (feet)
LGAC	Local Government Affairs Council
LGGP	Local Government Grant Program
LID	Local Improvement District
L_{max}	maximum sound level
L_{min}	minimum sound level
LNG	liquefied natural gas
LOS	level of service
LPA	Locally Preferred Alternative
LRAPA	Lane Regional Air Protection Agency
LRFP	LTD’s Long-Range Financial Plan
LRT	Light Rail Transit
LRTP	LTD’s Long-Range Transit Plan
LT	Listed Threatened
LTD	Lane Transit District
LUST	leaking underground storage tank

Table A-1. Acronyms and Abbreviations

Acronyms and Abbreviations	Definitions
LWCF	Land and Water Conservation Fund
m	meter(s)
MAP-21	Moving Ahead for Progress in the 21st Century
MBTA	Migratory Bird Treaty Act
Metro Plan	*Metro Plan, Eugene-Springfield Metropolitan Area General Plan* (LCOG et al., 1987, as updated on 2015, December 31)
mg/kg	milligram(s) per kilogram
MI	mile(s)
mL	milliliter(s)
MMA	Michael Minor and Associates, Inc.
MOA	Memorandum of Agreement
MOE	Measure of Effectiveness
MPC	Metropolitan Policy Committee
mpg	miles per gallon
mph	miles per hour
MPO	Metropolitan Planning Organization
MTIP	*Metropolitan Transportation Improvement Program Federal FY 2015 to Federal FY 2018* (Central Lane MPO, adopted 2014, October, as amended)
Mw	Earthquake moment magnitude
N/A	not applicable
NA	not applicable; no data available
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NAVD88	North American Vertical Datum of 1988
ND	nodal development
NEPA	National Environmental Policy Act of 1969, as amended, 42 U.S.C. 4321-4347
NFA	no further action
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_2	nitrous dioxide
NO_x	nitrous oxides
NPDES	National Pollutant Discharge Elimination System
NPMS	National Pipeline Mapping System
NPS	Department of Interior's National Park Service
NR	Natural Resource
NRCS	Natural Resources Conservation Service

Table A-1. Acronyms and Abbreviations

Acronyms and Abbreviations	Definitions
NRHP	National Register of Historic Places
NS	no standard established
NW Natural	Northwest Natural
O_3	ozone
O&M	operations and maintenance
OAR	Oregon Administrative Rule
OARRA	Oregon Archaeological Records Remote Access
ODA	Oregon Department of Agriculture
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
ODOE	Oregon Department of Energy
ODOT	Oregon Department of Transportation
OHP	Oregon Highway Plan
OPA	Oil Pollution Act of 1990
OPRD	Oregon Parks and Recreation Department
OR	Oregon
ORBIC	Oregon Biodiversity Information Center
ORS	Oregon Revised Statutes
OTIB	Oregon Transportation Infrastructure Bank
Pb	Lead
PCB	polychlorinated biphenyl
PEM	Palustrine Emergent Wetland
PM	particulate matter
PM_{10}	particulate matter – 10 microns in diameter
$PM_{2.5}$	particulate matter – 2.5 microns in diameter
PMT	Project Management Team
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
PROS	Parks, Recreation, and Open Space
PUC	Public Utilities Commission
Qls	landslide and debris avalanche deposits
Qtg	terrace and fan deposits
Qty	quantity
RCRA	Resource Conservation and Recovery Act of 1976
RFFA	reasonably foreseeable future action

Table A-1. Acronyms and Abbreviations

Acronyms and Abbreviations	Definitions
ROW	right of way
RRFB	Rectangular Rapid Flash Beacon
RTP	*Central Lane Metropolitan Planning Organization Regional Transportation Plan* (LCOG, adopted 2007, November; 2011, December). (The RTP includes the Financially Constrained Roadway Projects List)
SARA	Superfund Amendments and Reauthorization Act of 1986
SARA III	Emergency Planning and Community Right to Know Act of 1986; part of the SARA amendments
SC	sensitive critical
SCC	Standard Cost Categories
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SDC	Systems Development Charge
SDWA	Safe Drinking Water Act
sec	second(s)
Section 4(f)	Section 4(f) of the Department of Transportation Act of 1966
Section 6(f)	Section 6(f) of the LWCF Act of 1965
Section 106	Section 106 of the National Historic Preservation Act of 1966 (36 CFR 800.5)
SF	square foot (feet)
SHPO	Oregon State Historic Preservation Office
SIP	State Implementation Plan
SMU	Species Management Unit
SO_2	sulfur dioxide
SOC	species of concern
SSGA	Small Starts Construction Grant Agreement
STA	Special Transportation Area
STIP	Statewide Transportation Improvement Program
SV	Sensitive Vulnerable
SY	square yard(s)
TAP	Transportation Alternatives Program
TAZ	transportation analysis zone
TCE	Temporary Construction Easement
TD	transit-oriented development
TDM	Transportation Demand Management
TEA-21	Transportation Equity Act for the 21st Century
Teoe	siliciclastic marine sedimentary rocks
TESCP	Temporary Erosion and Sediment Control Plan
TIF	Tax Increment Financing

Table A-1. Acronyms and Abbreviations

Acronyms and Abbreviations	Definitions
TIP	Transportation Improvement Program
TMDL	total maximum daily load
TOD	transit-oriented development
TPAU	Department of Transportation – Transportation Planning Analysis Unit
TPR	Transportation Planning Rule
TransPlan	*Eugene-Springfield Transportation System Plan* (City of Eugene et al., adopted 2002, July)
TRB	Transportation Research Board
TSI	Transportation System Improvement
TSM	Transportation System Management
TSP	Transportation System Plan
UGB	Urban Growth Boundary
UMTA	Urban Mass Transit Administration
Uniform Act	Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, 42 U.S.C. 4601 et. seq., 49 CFR Part 24
URA	Urban Renewal Area
U.S.C.	United States Code
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
v/c	volume-to-capacity
VHT	vehicle hours traveled
VMT	vehicle miles traveled
VOC	volatile organic compound
WEEE	West Eugene EmX Extension
WEG	wind erodibility group
YOE	year of expenditure

Terms

Table A-2. Terms

Terms	Definitions
Accessibility	The extent to which facilities are barrier-free and useable for all persons with or without disabilities.
Action	An "action," a federal term, is the construction or reconstruction, including associated activities, of a transportation facility. For the purposes of this Handbook, the terms "project," "proposal," and "action" are used interchangeably unless otherwise specified. An action may be categorized as a "categorical exclusion" or a "major federal action."
Agricultural/Forest/Natural Resource	AG, EFU-25, EFU-30, EFU-40, F-1, F-2, and NR
Alignment	Alignment is the street or corridor that the transit project would be located within.
Alternative Fuels	Low-polluting fuels which are used to propel a vehicle instead of high-sulfur diesel or gasoline. Examples include methanol, ethanol, propane or compressed natural gas, liquid natural gas, low-sulfur or "clean" diesel and electricity.
Alternatives Analysis (AA)	The process of evaluating the costs, benefits, and impacts of a range of transportation alternatives designed to address mobility problems and other locally-defined objectives in a defined transportation corridor, and for determining which particular investment strategy should be advanced for more focused study and development. The Alternatives Analysis (AA) process provides a foundation for effective decision making.
Area of Potential Effect	A term used in Section 106 to describe the area in which historic resources may be affected by a federal undertaking.
Area of Potential Impact	An assessment's Area of Potential Impact for the project is defined separately for each discipline.
Auxiliary Lanes	Lanes designed to improve safety and reduce congestion by accommodating cars and trucks entering or exiting the highway or roadway, and reducing conflicting weaving and merging movements.
Base Fare	The price charged to one adult for one transit ride; excludes transfer charges, and reduced fares.
Base Period	The period between the morning and evening peak periods when transit service is generally scheduled on a constant interval. Also known as "off-peak period."
Boarding	Boarding is a term used in transit to account for passengers of public transit systems. One person getting on a transit vehicle equals one boarding. In many cases, individuals will have to transfer to an additional transit vehicle to reach their destination and may well use transit for the return trip. Therefore, a single rider may account for several transit boardings in one day.
Bus Phase	An exclusive traffic signal phase for buses and/or BRT vehicles.
Bus Rapid Transit (BRT)	A transit mode that combines the quality of rail transit and the flexibility of buses. It can operate on bus lanes, high-occupancy vehicle (HOV) lanes, expressways, or ordinary streets. The vehicles are designed to allow rapid passenger loading and unloading, with more doors than ordinary buses.

Table A-2. Terms

Terms	Definitions
Business Access and Transit (BAT) Lane	In general, a BAT lane is a concrete lane, separated from general-purpose lanes by a paint stripe and signage. A BAT lane provides Bus Rapid Transit (BRT) priority operations, but general-purpose traffic is allowed to travel within the lane to make a turn into or out of a driveway or at an intersecting street. However, only the BRT vehicle is allowed to use the lane to cross an intersecting street.
Busway	Exclusive freeway lane for buses and carpools.
Capital Improvements Program (CIP)	A CIP is a short-range plan, usually 4 to 10 years, which identifies capital projects and equipment purchases, provides a planning schedule, and identifies options for funding projects in the program.
Categorical Exclusion (CE)	A CE means a category of actions that do not individually or cumulatively have a significant effect on the human environment and for which, therefore, neither an environmental assessment nor an environmental impact statement is required.
Chambers Special Area Zone	S-C
Charter Tree	A tree defined by the Eugene Charter (City of Eugene, 2002, updated 2008) as "…(a living, standing, woody plant having a trunk 25 inches in circumference at a point 4-½ feet above mean ground level at the base of the trunk) of at least fifty years of age within publicly owned rights of way for streets, roads, freeways, throughways, and thoroughfares and within those portions of the city which were in the incorporated boundaries of the city as of January 1, 1915, shall be designated historic street trees and recognized as objects of high historic value and significance in the history of the city and deserving of maintenance and protection." These trees have special historic importance to the City and require special processes be followed if their removal is proposed, including a public vote on the project proposing the removal.
Charter Tree Boundary	Defined by the Eugene Charter (City of Eugene, 2002, updated 2008) as "…those portions of the city which were in the incorporated boundaries of the city as of January 1, 1915." Trees within this boundary may, if they meet certain criteria, be granted the special title and protective status of a Charter Tree, defined above.
City of Eugene Zoning Classifications	Industrial (I-2 and I-3), Commercial (C-3), Mixed-Use (C-1, C-2, GO, S-C, S-CN, S-DR, S-DW, S-E, S-F, S-HB, S-JW, S-RN, S-W, and S-WS), Single-Family Residential (R-1), Multi-Family Residential (R-2 and R-3), Institution (PL and PRO), Agricultural/Forest/Natural Resource (AG, EFU-25, EFU-30, EFU-40, F-1, F-2, and NR), Office (E-1 and E-2), Special Area Zone (Non-Mixed Use) (S-H and S-RP), Downtown Westside Special Area Zone (S-DW), Chambers Special Area Zone (S-C)
Clean Air Act Amendments of 1990	The comprehensive federal legislation that establishes criteria for attaining and maintaining the federal standards for allowable concentrations and exposure limits for various air pollutants; the act also provides emission standards for specific vehicles and fuels.
Collector Streets	Collector streets provide a balance of both access and circulation within and between residential and commercial/industrial areas. Collectors differ from arterials in that they provide more of a citywide circulation function, do not require as extensive control of access, and are located in residential neighborhoods, distributing trips from the neighborhood and local street system.
Commercial	C-3

Table A-2. Terms

Terms	Definitions
Commuter Rail	Commuter rail is a transit mode that is a multiple car electric or diesel propelled train. It is typically used for local, longer-distance travel between a central city and adjacent suburbs, and can operate alongside existing freight or passenger rail lines or in exclusive rights of way.
Compressed Natural Gas (CNG)	An alternative fuel; compressed natural gas stored under high pressure. CNG vapor is lighter than air.
Conformity	The ongoing process that ensures the planning for highway and transit systems, as a whole and over the long term, is consistent with the state air quality plans for attaining and maintaining health-based air quality standards; conformity is determined by metropolitan planning organizations (MPOs) and the U.S. Department of Transportation (USDOT), and is based on whether transportation plans and programs meet the provisions of a State Implementation Plan.
Congestion Mitigation and Air Quality (CMAQ)	Federal funds available for either transit or highway projects that contribute significantly to reducing automobile emissions, which cause air pollution.
Cooperating Agency	Regulations that implement the National Environmental Policy Act define a cooperating agency as any federal agency, other than a lead agency, which has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal (or a reasonable alternative) for legislation or other major federal action significantly affecting the quality of the human environment.
Coordination Plan	Required under Moving Ahead for Progress in the 21st Century (MAP-21), the coordination plan contains procedures aimed at achieving consensus among all parties in the initial phase of environmental review and to pre-empt disagreements that can create delays later on in a project.
Corridor	A broad geographical band that follows a general directional flow connecting major sources of trips that may contain a number of streets, highways, and transit route alignments.
Corridor Transit Service Characteristics	The amount of transit service provided in each corridor, measured by daily vehicle hours traveled, daily vehicle miles traveled, and daily place-miles of service.
Demand Responsive	Non-fixed-route service utilizing vans or buses with passengers boarding and alighting at pre-arranged times at any location within the system's service area. Also called “Dial-a-Ride.”
Diesel Multiple Unit (DMU)	Each unit carries passengers and can be self-powered by a diesel motor; no engine unit is required.
Documented Categorical Exclusion (DCE)	A DCE means a group of actions that may also qualify as Categorical Exclusions (CEs) if it can be demonstrated that the context in which the action is taken warrants a CE exclusion; i.e., that no significant environmental impact will occur. Thus, these actions are referred to as DCEs. Such actions require some National Environmental Policy Act documentation, but not an Environmental Assessment or a full-scale Environmental Impact Statement. DCEs documentation must demonstrate that, in the context(s) in which these actions are to be performed, they will have no significant environmental impact or that such impacts will be mitigated.
Downtown Westside Special Area Zone	S-DW

Table A-2. Terms

Terms	Definitions
Draft Environmental Impact Statement (DEIS)	The DEIS is the document that details the results of the detailed analysis of all of the projects alternatives. The DEIS contains all information learned about the impacts of a project and alternatives.
Earmark	A federal budgetary term that refers to the specific designation by Congress that part of a more general lump-sum appropriation be used for a particular project; the earmark can be designated as a minimum and/or maximum dollar amount.
Effects	Effects include ecological, aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial. Effects include: (1) direct effects that are caused by the action and occur at the same time and place, and (2) indirect effects that are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use; population density or growth rate; and related effects on air and water and other natural systems, including ecosystems (40 CFR 1508.8).
Electrical Multiple Unit (EMU)	The EMU is heavier than a light rail vehicle, but it is powered in the same way by an overhead electrical system.
EmX	Lane Transit District's Bus Rapid Transit System, pronounced "MX," short for Emerald Express.
Environmental Assessment (EA)	A report subject to the requirements of the National Environmental Policy Act (NEPA) demonstrating that an Environmental Impact Statement (EIS) is not needed for a specific set of actions. The EA can lead to a Finding of No Significant Impact (FONSI).
Environmental Impact Statement (EIS)	A comprehensive study of likely environmental impacts resulting from major federally-assisted projects; EISsare required by the National Environmental Policy Act.
Environmental Justice	A formal federal policy on environmental justice was established in February 1994 with Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations." There are three fundamental environmental justice principles: • To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations. • To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process. • To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.
Envision Eugene	The City of Eugene's Comprehensive Plan (latest draft or as adopted). Envision Eugene includes a determination of the best way to accommodate the community's projected needs over the next 20 years.

Table A-2. Terms

Terms	Definitions
Evaluation Criteria	Evaluation criteria are the factors used to determine how well each of the proposed multimodal alternatives would meet the project's Goals and Objectives. The Evaluation Criteria require a mix of quantitative data and qualitative assessment. The resulting data are used to measure the effectiveness of proposed multimodal alternatives and to assist in comparing and contrasting each of the alternatives to select a preferred alternative.
Exclusive Right of Way	A roadway or other facility that can only be used by buses or other transit vehicles.
Fatal Flaw Screening	The purpose of a Fatal Flaw Screening is to identify alternatives that will not work for one reason or another (e.g., environmental, economic, community). By using a Fatal Flaw Screening process to eliminate alternatives that are not likely to be viable, a project can avoid wasting time or money studying options that are not viable and focus on alternatives and solutions that have the greatest probabilityy of meeting the community's needs (e.g., environmentally acceptable, economically efficient, implementable).
Finding of No Significant Impact (FONSI)	A document prepared by a federal agency showing why a proposed action would not have a significant impact on the environment and thus would not require preparation of an Environmental Impact Statement (EIS). A FONSI is based on the results of an Environmental Assessment (EA).
Fixed Guideway System	A system of vehicles that can operate only on its own guideway constructed for that purpose (e.g., rapid rail, light rail). Federal usage in funding legislation also includes exclusive right of way bus operations, trolley coaches, and ferryboats as "fixed guideway" transit.
Fixed Route	Service provided on a repetitive, fixed-schedule basis along a specific route with vehicles stopping to pick up and deliver passengers at set stops and stations; each fixed-route trip serves the same origins and destinations, unlike demand responsive and taxicabs.
Geographic Information System (GIS)	A data management software tool that enables data to be displayed geographically (i.e., as maps).
Goals and Objectives	Goals and objectives define the project's desired outcome and reflect community values. Goals and objectives build from the project's Purpose and Need Statement. • Goals are overarching principles that guide decision making. Goals are broad statements. • Objectives define strategies or implementation steps to attain the goals. Unlike goals, objectives are specific and measurable.
Guideway	A transit right of way separated from general purpose vehicles.
Headway	Time interval between vehicles passing the same point while moving in the same direction on a particular route.
Heritage Tree	The *City of Eugene Urban Forest Management Plan* (City of Eugene Public Works Department Maintenance Division, 1992) defines "Heritage Trees" as: "Any tree of exceptional value to our community based on its size (relative to species), history, location, or species, or any combination of these criteria." Such a tree cannot be removed "except when otherwise necessary for the public health, safety, or welfare."

Table A-2. Terms

Terms	Definitions
Hydrology	Refers to the flow of water including its volume, where it drains, and how quickly it flows.
Impacts	A term to describe the positive or negative effects upon the natural or built environments as a result of an action (i.e., project).
In-vehicle Travel Time	The amount of time it takes for a transit vehicle to travel between an origin and a destination.
In-vehicle Walk and Wait Travel Time	The amount of in-vehicle travel time plus time spent walking to transit, initial wait time, transfer wait time (if any), and time walking from transit to the destination.
Independent Utility	A project or section of a larger project that would be a usable and reasonable expenditure even if no other projects or sections of a larger project were built and/or improved.
Industrial	I-2 and I-3
Institution	PL and PRO
Intergovernmental Agreement	A legal pact authorized by state law between two or more units of government, in which the parties contract for, or agree on, the performance of a specific activity through either mutual or delegated provision.
Intermodal	Those issues or activities that involve or affect more than one mode of transportation, including transportation connections, choices, cooperation, and coordination of various modes. Also known as "multimodal."
Jefferson Westside Special Area Zone	S-JW
Joint Development	Ventures undertaken by the public and private sectors for development of land around transit stations or stops.
Key Transit Corridors	Key Transit Corridors are mapped in Envision Eugene and are anticipated to be significant transit corridors for the City and the region.
Kiss & Ride	A place where commuters are driven and dropped off at a station to board a public transportation vehicle.
Land and Water Conservation Fund (LWCF) Act of 1965	16 U.S.C. 4601-4 et seq. The Land and Water Conservation Fund (LWCF) State Assistance Program was established by the LWCF Act of 1965 to stimulate a nationwide action program to assist in preserving, developing, and providing assurance to all citizens of the United States (of present and future generations) such quality and quantity of outdoor recreation resources as may be available, necessary, and desirable for individual active participation. The program provides matching grants to states and through states to local units of government, for the acquisition and development of public outdoor recreation sites and facilities.
Landscape Tree	A living, standing, woody plant having a trunk that exists on private property.
Lane Regional Air Protection Agency (LRAPA)	LRAPA is responsible for achieving and maintain clean air in Lane County using a combination of regulatory and non-regulatory methods
Layover Time	Time built into a schedule between arrival at the end of a route and the departure for the return trip, used for the recovery of delays and preparation for the return trip.

Table A-2. Terms

Terms	Definitions
Lead Agency	The organization that contracts and administers a study. For transit projects, FTA would typically fill this role. The lead agency has the final say about the project's purpose and need, range of alternatives to be considered, and other procedural matters.
Level of Detail	The amount of data collected, and the scale, scope, extent, and degree to which item-by-item particulars and refinements of specific points are necessary or desirable in carrying out a study.
Level of Service (LOS)	LOS is a measure used by traffic engineers to determine the effectiveness of elements of transportation infrastructure. LOS is most commonly used to analyze highways, but the concept has also been applied to intersections, transit, and water supply.
Light Rail Transit (LRT)	Steel wheel/steel rail transit constructed on city streets, semi-private right of way, or exclusive private right of way. Formerly known as "streetcar" or "trolley car" service, LRT's major advantage is operation in mixed street traffic at grade. LRT vehicles can be coupled into trains, which require only one operator and often are used to provide express service.
Limited (or Controlled) Access	Restricted entry to a transportation facility based upon facility congestion levels or operational condition. For example, a limited access roadway normally would not allow direct entry or exit to private driveways or fields from said roadway.
Liquefaction	A phenomenon associated with earthquakes in which sandy to silty, water saturated soils behave like fluids. As seismic waves pass through saturated soil, the structure of the soil distorts, and spaces between soil particles collapse, causing ground failure.
Liquefied Natural Gas (LNG)	An alternative fuel; a natural gas cooled to below its boiling point of 260 degrees Fahrenheit so that it becomes a liquid; stored in a vacuum bottle-type container at very low temperatures and under moderate pressure. LNG vapor is lighter than air.
linked trip	A linked trip is a one-way trip taken by a person from an origin to a destination, independent of the number of vehicles or transfers used to complete the trip.
Local Streets	Local streets have the sole function of providing direct access to adjacent land. Local streets are deliberately designed to discourage through-traffic movements.
Locally Preferred Alternative (LPA)	The LPA is the alternative selected through the Alternatives Analysis process completed prior to or concurrent with National Environmental Policy Act analysis. This term is also used to describe the proposed action that is being considered for New Starts or Small Starts funds.
Low-Income Persons	Those whose median household income is at or below the Department of Health and Human Services poverty guidelines. For a four-person household with two related children, the poverty threshold is $24,300 (year 2016 dollars).
Maintenance area	An air quality designation for a geographic area in which levels of a criteria air pollutant meet the health-based primary standard (national ambient air quality standard, or NAAQS) for the pollutant. An area may have on acceptable level for one criteria air pollutant, but may have unacceptable levels for others. Maintenance/attainment areas are defined using federal pollutant limits set by EPA.

Table A-2. Terms

Terms	Definitions
Maintenance facility	A facility along a corridor used to clean, inspect, repair and maintain bus vehicles, as well as to store them when they are not in use.
Major Arterial	Major arterial streets should serve to interconnect the roadway system of a city. These streets link major commercial, residential, industrial, and institutional areas. Major arterial streets are typically spaced about one mile apart to assure accessibility and reduce the incidence of traffic using collectors or local streets for through traffic in lieu of a well-placed arterial street. Access control, such as raised center medians, is a key feature of an arterial route. Arterials are typically multiple miles in length.
Major Investment Study (MIS)	An alternatives analysis study process for proposed transportation investments in which a wide range of alternatives is examined to produce a smaller set of alternatives that best meet project transportation needs. The purpose of the study is to provide a framework for developing a package of potential solutions that can then be further analyzed during an Environmental Impact Statement process.
Metro Plan Designations	Commercial, Commercial/Mixed Use, Government and Education, Heavy Industrial, High Density Residential/Mixed-Use, High Density Residential, Light-Medium Industrial, Low Density Residential, Medium Density Residential, Medium Density Residential/Mixed-Use, Mixed-Use, Parks and Open Space, Major Retail Center, Campus Industrial, University Research
Metropolitan Planning Organization (MPO)	The organization designated by local elected officials as being responsible for carrying out the urban transportation and other planning processes for an area.
Minimum Operable Segment	A stand-alone portion of the alternative alignment that has independent utility, allowed by FTA to be considered as interim termini for a project. A minimum operable segment (MOS) provides flexibility to initiate a project with available funding while pursuing additional funding to complete the remainder of the project.
Minor Arterial	A minor arterial street system should interconnect with and augment the urban major arterial system and provide service to trips of moderate length at a somewhat lower level of travel mobility than major arterials. This system also distributes travel to geographic areas smaller than those identified with the higher system. The minor arterial street system includes facilities that allow more access and offer a lower traffic mobility. Such facilities may carry local bus routes and provide for community trips, but ideally should not be located through residential neighborhoods.
Minority	A person who is one or more of the following: • Black: a person having origins in any of the black racial groups of Africa • Hispanic or Latino: a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race • Asian American: a person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent • American Indian and Alaskan Native: a person having origins in any of the original people of North America, South America (including Central America), and who maintains cultural identification through tribal affiliation or community recognition • Native Hawaiian and Other Pacific Islander: a person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands

Table A-2. Terms

Terms	Definitions
Mitigation	A means to avoid, minimize, rectify, or reduce an impact, and in some cases, to compensate for an impact.
Mixed-Use	C-1, C-2, GO, S-C, S-CN, S-DR, S-DW, S-E, S-F, S-HB, S-JW, S-RN, S-W, and S-WS
Modal Split	A term that describes how many people use alternative forms of transportation. Frequently used to describe the percentage of people using private automobiles as opposed to the percentage using public transportation. Modal split can also be used to describe travelers using other modes of transportation. In freight transportation, modal split may be measured in mass.
Mode	A particular form or method of travel distinguished by vehicle type, operation technology, and right-of-way separation from other traffic.
Moving Ahead for Progress in the 21st Century (MAP-21)	Moving Ahead for Progress in the 21st Century (MAP-21) was signed by President Obama on July 6, 2012, reauthorizing surface transportation programs through FY 2014. It includes new and revised program guidance and regulations with planning requirements related to public participation, publication, and environmental considerations.
MovingAhead Project	The City of Eugene and LTD are working with regional partners and the community to determine which improvements are needed on some of our most important transportation corridors for people using transit, and facilities for people walking and biking. MovingAhead will prioritize transit, walking, and biking projects along these corridors so that they can be funded and built in the near-term. The project will focus on creating active, vibrant places that serve the community and accommodate future growth. During Phase 1, currently underway, the community will weigh in on preferred transportation solutions for each corridor and help prioritize corridors for implementation. When thinking about these important streets, LTD and the City of Eugene refer to them as corridors because several streets may work as a system to serve transportation needs.
Multi-Family Residential	R-2 and R-3
Multimodal	Multimodal refers to various modes. For the MovingAhead project, multimodal refers to Corridors that support various transportation modes including vehicles, buses, walking and cycling.
National Environmental Policy Act of 1969 (NEPA)	A comprehensive federal law requiring analysis of the environmental impacts of federal actions such as the approval of grants; also requiring preparation of an Environmental Impact Statement for every major federal action significantly affecting the quality of the human environment.
New Starts	Federal funding granted under Section 3(i) of the Federal Transit Act. These discretionary funds are made available for construction of a new fixed guideway system or extension of any existing fixed guideway system, based on cost-effectiveness, alternatives analysis results, and the degree of local financial commitment.

Table A-2. Terms

Terms	Definitions
No Action or No-Build Alternative	An alternative that is used as the basis to measure the impacts and benefits of the other alternative(s) in an environmental assessment or other National Environmental Policy Act action. The No-Build Alternative consists of the existing conditions, plus any improvements that have been identified in the Statewide Transportation Improvement Program.
Nonattainment Area	Any geographic region of the United States that the U.S. Environmental Protection Agency (EPA) has designated as not attaining the federal air quality standards for one or more air pollutants, such as ozone and carbon monoxide.
Notice of Intent	A federal announcement, printed in the *Federal Register*, advising interested parties that an Environmental Impact Statement will be prepared and circulated for a given project
Off-Peak Period	Non-rush periods of the day when travel activity is generally lower and less transit service is scheduled. Also called "base period."
Office	E-1 and E-2
Oregon Statewide Comprehensive Outdoor Recreation Plan (SCORP)	The 2013-2017 Oregon Statewide Comprehensive Outdoor Recreation Plan (SCORP), entitled *Ensuring Oregon's Outdoor Legacy* (OPRD, No Date), constitutes Oregon's basic 5-year plan for outdoor recreation. The plan guides the use of LWCF funds that come into the state; provides guidance for other OPRD-administered grant programs; and provides recommendations to guide federal, state, and local units of government, as well as the private sector, in making policy and planning decisions.
Park and Ride	Designated parking areas for automobile drivers who then board transit vehicles from these locations.
Participating Agency	A federal or non-federal agency that may have an interest in the project. These agencies are identified and contacted early-on in the project with an invitation to participate in the process. This is a broader category than "cooperating agency" (see Cooperating Agency).
Passenger Miles	The total number of miles traveled by passengers on transit vehicles; determined by multiplying the number of unlinked passenger trips times the average length of their trips.
Peak Hour	The hour of the day in which the maximum demand for transportation service is experienced (refers to private automobiles and transit vehicles).
Peak Period	Morning and afternoon time periods when transit riding is heaviest.
Peak/Base Ratio	The number of vehicles operated in passenger service during the peak period divided by the number operated during the base period.
Place-miles	Place-miles refers to the total carrying capacity (seated and standing) of each bus and is calculated by multiplying vehicle capacity of each bus by the number of service miles traveled each day. Place-miles highlight differences among alternatives caused by a different mix of vehicles and levels of service.
Preferred Alternative	An alternative that includes a major capital improvement project to address the problem under investigation. As part of the decision making process, the Preferred Alternative is compared against the No Action or No-Build Alternative from the standpoints of transportation performance, environmental consequences, cost-effectiveness, and funding considerations.

Table A-2. Terms

Terms	Definitions
Purpose and Need	The project Purpose and Need provides a framework for developing and screening alternatives. The purpose is a broad statement of the project's transportation objectives. The need is a detailed explanation of existing conditions that need to be changed or problems that need to be fixed.
Queuing	Occurs when traffic lanes cannot fit all the vehicles trying to use them, or if the line at an intersection extends into an upstream intersection.
Record of Decision (ROD)	A decision made by FTA as to whether the project sponsor receives federal funding for a project. The Record of Decision follows the Draft EIS and Final EIS.
Regulatory Agency	An agency empowered to issue or deny permits.
Resource Agency	A federal or state agency or commission that has jurisdictional responsibilities for the management of a resource such as plants, animals, water, or historic sites.
Revenue Hours	Hours of transit service available for carrying paying riders.
Ridership	The number of rides taken by people using a public transportation system in a given time period.
Ridesharing	A form of transportation, other than public transit, in which more than one person shares the use of the vehicle, such as a van or car, to make a trip. Also known as "carpooling" or "vanpooling."
Right of Way	Publicly owned land that can be acquired and used for transportation purposes.
Safe, Accountable, Flexible, Efficient Transportation Equity Act (SAFETEA-LU)	SAFETEA-LU was passed by Congress July 29, 2005, and signed by the President August 10, 2005. Includes new and revised program guidance and regulations (approximately 15 rulemakings) with planning requirements related to public participation, publication, and environmental considerations. SAFETEA-LU covers FY 2005 through FY 2009 with a total authorization of $45.3 billion.
Scoping	A formal coordination process used to determine the scope of the project and the major issues likely to be related to the proposed action (i.e., project).
Screening Criteria	Criteria used to compare alternatives.
Section 4(f) of the Department of Transportation Act of 1966	23 U.S.C. 138 and 49 U.S.C. 303. Parks are subject to evaluation in the context of Section 4(f) of the Department of Transportation Act of 1966, which governs the use of publicly-owned/open to the public park and recreation lands, government-owned wildlife lands, and historic resources.
Section 4(f) resources	(i) any publicly owned land in a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or (ii) any land from a historic site of national, state, or local significance
Section 6(f) of the LWCF Act of 1965	The LWCF's most important tool for ensuring long-term stewardship is its "conversion protection" requirement. Section 6(f)(3) strongly discourages conversions of state and local park, and recreational facilities to other uses. Conversion of property acquired or developed with assistance under the program requires approval of the Department of Interior's National Park Service (NPS) and substitution of other recreational properties of at least equal fair market value, and of reasonably equivalent usefulness and location.
Section 106	Section 106 of the National Historic Preservation Act of 1966 requires that federal agencies take into account the effect of government-funded construction projects on property that is included in, or eligible for inclusion in, the NRHP.

Table A-2. Terms

Terms	Definitions
Sharrow	A shared-lane marking placed in a travel lane indicating where bicyclists should cycle
Shuttle	A public or private vehicle that travels back and forth over a particular route, especially a short route or one that provides connections between transportation systems, employment centers, etc.
Single-Family Residential	R-1
Special Area Zone (Non-Mixed Use)	S-H and S-RP
Springfield 2030	Currently underway, this update to the City of Springfield's Comprehensive Plan will guide and support attainment of the community's livability and economic prosperity goals and redevelopment priorities.
Springfield Transportation System Plan (TSP)	The City of Springfield's Transportation System Plan looks at how the transportation system is currently used and how it should change to meet the long-term (20-year) needs of the City of Springfield's residents, businesses, and visitors. The Plan, which identifies improvements for all modes of transportation, will serve as the City of Springfield's portion of the Regional Transportation System Plan prepared by Lane Council of Governments (LCOG). It was prepared in coordination with Oregon Department of Transportation, LCOG, and the Oregon Department of Land Conservation and Development. The TSP was adopted March 11, 2014.
State Implementation Plan (SIP)	A state plan mandated by the Clean Air Act Amendments of 1990 that contains procedures to monitor, control, maintain, and enforce compliance with national standards for air quality.
Strategy	An intended action or series of actions which when implemented achieves the stated goal.
Street Tree	A living, standing, woody plant having a trunk that exists in the public right of way.
Study Area	The area within which evaluation of impacts is conducted. The study area for particular resources will vary based on the decisions being made and the type of resource(s) being evaluated.
Throughput	The number of users being served at any time by the transportation system.
Title VI	This Title declares it to be the policy of the United States that discrimination on the ground of race, color, or national origin shall not occur in connection with programs and activities receiving federal financial assistance and authorizes and directs the appropriate federal departments and agencies to take action to carry out this policy.
Transit Oriented Development (TOD) or Nodal Development	A strategy to build transit ridership, while discouraging sprawl, improving air quality and helping to coordinate a new type of community for residents. TODs are compact, mixed-use developments situated at or around transit stops. Sometimes referred to as Transit Oriented Communities, or Transit Villages.
Transit System	An organization (public or private) providing local or regional multi-occupancy-vehicle passenger service. Organizations that provide service under contract to another agency are generally not counted as separate systems.

Table A-2. Terms

Terms	Definitions
Transitway	A Bus Rapid Transit (BRT) priority lane generally with a concrete lane, with or without concrete tracks with grass-strip divider, and a curb separation, traversable by general-purpose vehicles at signalized intersections.
Transportation Demand Management (TDM)	Strategies to attempt to reduce peak period automobile trips by encouraging the use of high occupancy modes through commuter assistance, parking incentives, and work policies that alter the demand for travel in a defined area in terms of the total volume of traffic, the use of alternative modes of travel, and the distribution of travel over different times of the day.
Transportation Improvement Program (TIP)	A program of intermodal transportation projects, to be implemented over several years, growing out of the planning process and designed to improve transportation in a community. This program is required as a condition of a locality receiving federal transit and highway grants.
Travel Shed	Synonymous with “corridor” (see Corridor). A subarea in which multiple transportation facilities are experiencing congestion, safety, or other problems.
urban plaza	An urban plaza is a place that can be used for socializing, relaxation, and/or events.
v/c ratio	Used as a principal measure of congestion. The “v” represents the volume or the number of vehicles that are using the roadway at any particular period. The “c” represents the capacity of a roadway at its adopted level of service (LOS). If the volume exceeds the capacity of the roadway (volume divided by capacity exceeds 1.00), congestion exists.
Vehicle Hours of Delay	Cumulative delay experiences by transit vehicles during high traffic periods.
Water Quality	Refers to the characteristics of the water, such as its temperature and oxygen levels, how clear it is, and whether it contains pollutants.
Whiteaker Special Area Zone	S-W

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Appendix B: Construction Activities

General Construction Methods

The following section describes how construction of the Locally Preferred Alternative (LPA) would likely be staged and sequenced. This description is based on Lane Transit District's (LTD's) experience with the Franklin, Gateway, and West Eugene EmX Corridors. The final plan for construction methods, sequencing, and staging will be determined in coordination with the contractor and permitting authorities.

Utility work will generally be completed before the transportation infrastructure is constructed. Utility work, often conducted by local utility companies, occurs separately from project-related construction. After completing required utility relocation and other preparatory site work, the contractor will begin with construction of new transit lanes, bike lanes, sidewalks, and any other "flatwork." The contractor will modify existing signals or construct new traffic signals as part of this work. In some cases, the contractor may construct the signal footings but install signal arms after initial work is complete. Flatwork for stations, including curbs, ramps, and station footings, will be completed as the work progresses along the alignment. Streets and street segments will be restored to normal operations after this work is complete. The contractor is expected to progress approximately two blocks every 2 weeks, with additional time required – up to 2 weeks – for each enhanced stop or EmX station. Additional time will be required at intersections that require new or substantially modified traffic signals. The construction sequencing will be determined through coordination between the contractor and local residents, businesses, and property owners regarding construction scheduling preferences. It is expected that, for each major segment, the work would start at one end of the segment and progress to the other end of the segment. All flatwork is expected to be completed in two construction seasons.

Stations will be fabricated during the second construction season and installed during the subsequent (final) construction season, along with landscaping, fare machines, real-time passenger information, enhanced stop or EmX station amenities, and other similar items.

The contractor and LTD will coordinate closely with the Oregon Department of Transportation (ODOT) and with the City of Eugene (as appropriate to the jurisdiction) on traffic control. Depending on the segment, ODOT or the City will review and approve traffic plans for construction.

On streets with multiple lanes in each direction (or multiple lanes in one direction for one-way streets), at least one lane of traffic will be open at all times. Flaggers will coordinate travel at intersections and other points of congestion, as necessary. On streets with a single lane, it may be necessary to close one direction of traffic for certain periods. In those situations, flaggers will be used to manage the traffic flow safely. The contractor and LTD will also coordinate with businesses to ensure that the project maintains access for patrons and deliveries.

Coordination with Businesses and Residents

LTD's Franklin, Gateway, and West Eugene EmX projects demonstrated LTD's commitment to communicating with impacted businesses, residences, and travelers, both before and during construction. As with those projects, LTD will contact all businesses and residents along the alignment well before construction begins to solicit local concerns, issues, and scheduling preferences. Businesses and residents will also be able to communicate with the contractor and LTD during construction. LTD's construction liaison will provide e-mail updates and serve as an ongoing point of contact to address concerns and to provide information to affected businesses, residents, and other interested persons. LTD will provide a 24-hour hotline to quickly address construction concerns from businesses and residences.

LTD will also work to enhance activity at businesses affected by construction. This can be done through attractive signage, direct communications with the public (e.g., direct mail and advertising), and community events (e.g., street fairs). These techniques succeeded in keeping business areas active during previous EmX projects.