

US 97 Bend North Corridor Project

Final Environmental Impact Statement and Final Section 4(f) Evaluation

July 2014

U.S. Department of Transportation
Federal Highway Administration

Oregon Department of Transportation

Federal-Aid Number: S004(112) • **ODOT Key Number:** 14020 • FHWA-OR-EIS-14-01-F

Cover Photo: Current conditions in proposed action corridor looking north with US 97, US 20, and Empire Avenue (east-west) in the foreground.

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FHWA-OR-EIS-14-01-F

US 97 Bend North Corridor Project
Deschutes County, Oregon
ODOT Key Number: 14020
Federal Aid Number: S004(112)
Final Environmental Impact Statement
and Final Section 4(f) Evaluation

Submitted Pursuant to 42 USC 4332 (2)(c) and where applicable, 49 USC 303
by US Department of Transportation, Federal Highway Administration (FHWA)
and Oregon Department of Transportation (ODOT)

Robert Bryant, ODOT Region 4 Manager

July 24, 2014
Date of Approval

Phillip A. Ditzler, FHWA Division Administrator

July 24, 2014
Date of Approval

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The Oregon Department of Transportation (ODOT) and Federal Highway Administration (FHWA) plan to improve a segment of US 97 in Deschutes County, Oregon between the Deschutes Market Road/Tumalo Junction interchange and the Empire Avenue interchange. A Draft Environmental Impact Statement (EIS) for the US 97 Bend North Corridor Project was published in July 2011. The Preferred Alternative for the project is an approximately two-mile, access-controlled, four-lane bypass, expressway on a new alignment.

The Preferred Alternative will reroute US 97, from Empire Avenue to just north of Grandview Drive, east of its current alignment, adjacent to the existing railroad tracks. For this segment, the current US 97 roadway would become an extension of 3rd Street and local arterial. A new signalized intersection with US 97 and 3rd Street will be constructed at the northern end of the bypass. The project will reduce traffic congestion, improve traffic flow, and enhance public safety on US 97 between the Deschutes Market Road/Tumalo Junction interchange and the Empire Avenue interchange. Adverse impacts from the project will include the conversion of 82 acres of land to highway use; displacement of 44 businesses and 6 residences; relocation or removal of 1 historic resource; creation of 39 acres of new impervious surfaces while 95 acres of contributing impervious area will be treated; noise impacts to 55 residences and outdoor areas at 4 businesses that will not be abated; while noise abatement will be considered in final design for 12 residences that are noise impacted.

Total project construction cost for the Preferred Alternative is approximately $174 million in 2016 dollars, of which estimated right of way costs are approximately $74 million. The project will be constructed in phases. Specific phases have not yet been identified. Construction is planned to begin in 2016.

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TO THOSE WHO HAVE EXPRESSED INTEREST IN THE:

US 97 Bend North Corridor Project
Final Environmental Impact Statement and
Final Section 4(f) Evaluation
Deschutes County, Oregon
ODOT Key Number: 14020
Federal Aid Number: S004(112)

Thank you for your interest in the proposed US 97 Bend North Corridor Project.

The Federal Highway Administration (FHWA) and Oregon Department of Transportation (ODOT) have completed the **Final Environmental Impact Statement (EIS) and Final Section 4(f) Evaluation** for the project.

If you have questions or need additional information concerning the proposed project, please contact Amy Pfeiffer, ODOT Environmental Project Manager at: (541) 388-6052.

Thank you for your participation,

Robert Bryant
ODOT Region 4 Manager

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Chapter 2 Alternatives
Chapter 3 Affected Environment, Environmental Consequences and Mitigation
Chapter 4 Cumulative Impacts
Chapter 5 Local Short-term Uses and Long-term Productivity
Chapter 6 Irreversible and Irretrievable Commitment of Resources
Chapter 7 Comments and Coordination

Notice of Document Availability

This Final Environmental Impact Statement and Final Section 4(f) Evaluation is available for review at the following locations:

Deschutes County Public Library:

Downtown Bend Branch
601 NW Wall Street
Bend, Oregon 97701

East Bend Branch
62080 Dean Swift Road
Bend, OR 97701

La Pine Branch
16425 1st Street
La Pine, OR 97739

Redmond Branch
827 SW Deschutes Avenue
Redmond, OR 97756

Sisters Branch
110 N Cedar Street
Sisters, OR 97759

Federal Highway Administration Oregon Division
530 Center Street NE, Suite 420
Salem, Oregon 97301

Oregon State Library
250 Winter Street NE
Salem, Oregon 97301-3950

Oregon Department of Transportation Geo-Environmental Section
4040 Fairview Industrial Drive SE, MS #6
Salem, Oregon 97302

Oregon Department of Transportation Region 4
63055 N Highway 97
Bend, Oregon 97701

These documents are also available on the project website:
www.us97solutions.org/document_library/default.aspx

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Chapter 10: References

List of Acronyms

Acronym	Term
APE	Area of Potential Effects
API	Area of Potential Impact
BNSF	BNSF Railway Company
Btu	British Thermal Unit
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CETAS	Collaborative Environmental and Transportation Agreement for Streamlining
CO	Carbon Monoxide
dBA	Decibels Adjusted
DEQ	Oregon Department of Environmental Quality
EIS	Environmental Impact Statement
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
GIS	Geographic Information System
MPO	Metropolitan Planning Organization
NEPA	National Environmental Policy Act
NO_2	Nitrogen Dioxide
O_3	Ozone
OAR	Oregon Administrative Rules
ODOT	Oregon Department of Transportation
ORS	Oregon Revised Statutes
Pb	Lead
PCB	Polychlorinated biphenyl
RCRA	Resource Conservation and Recovery Act of 1976
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy For Users
Section 4(f)	Section 4(f) of the US Department of Transportation Act of 1966
Section 6(f)	Section 6(f) of the Land and Water Conservation Fund Act of 1965
SO_2	Sulfur Dioxide
T&E	Threatened and Endangered
TDM	Transportation Demand Management
TSM	Transportation System Management
UGB	Urban Growth Boundary
USC	United States Code
USGS	United States Geological Survey
v/c	Volume to Capacity

Executive Summary

How to Use this Document

In the Final Environmental Impact Statement (EIS) and this Executive Summary:

- Text from the Draft EIS that remains substantially unchanged, including minor edits such as correction of typos, numerical errors and rewording to clarify meaning, is printed in black
- New text is printed in orange, the same color as this text
- Text that has been revised because of a change in design or impacts is printed in black text with strikeout and the new numbers or text are added in orange. In cases where information has substantially changed new, orange text is provided at the end of the section and includes an explanation of the change. All text discussing the Preferred Alternative is in orange text.
- Figures from the Draft EIS are included in this Final EIS. Where the content of a Draft EIS figure has changed, such as to show a change in design or impacts, the Draft EIS figure is immediately followed by a new figure with the same exhibit number, but with "FEIS" annotated to the exhibit number. An explanation of the change that has been made is included as a note to the figure.
- In a table, where minor changes to impact numbers or text has changed because of a change in design or impacts, the revised numbers or text from the Draft EIS remain in the table as black text with strikeout and the new numbers or text are added in orange immediately below. In a table where the only change was to include the Preferred Alternative that new information is also shown in orange. An explanation of the change is included as a note underneath the table. Where minor changes to tables have been made, the exhibit number remains the same as in the Draft EIS, but with "FEIS" annotated to the exhibit number. In cases where information in a table has substantially changed a new table has been added using the same exhibit number from the Draft EIS, but with "FEIS" annotated to the exhibit number.
- The Draft EIS text on proposed mitigation measures is retained, followed by the mitigation measure commitments that are incorporated into the Preferred Alternative.

Information that has changed between the Draft EIS and Final EIS is generally focused on presenting the Preferred Alternative. The design of the East DS1 and East DS2 Alternatives, which were not identified as the Preferred Alternative, has not changed and the Final EIS does not typically contain changes to the evaluation of these alternatives, unless information is being corrected or added based on comments received on the Draft EIS.

Executive Summary Content

ES.1 Proposed Action
ES.2 Alternatives Considered
ES.3 Other Actions
ES.4 Summary of Adverse and Beneficial Impacts of the Alternatives
ES.5 Unresolved Issues
ES.6 Identified Areas of Concern
ES.7 Permits and Approvals Needed
ES.8 Avoidance, Minimization, and/or Mitigation Commitments Incorporated into the Preferred Alternative

This Executive Summary provides an overview of the project and its potential impacts. The US 97 North Bend Corridor Project Final EIS provides the information in greater detail.

ES.1 Proposed Action

ES.1.1 Project Identification and Description

US 97 is a strategic north-south highway that runs through the central portion of the state and complements the I-5 corridor, as shown in Exhibit ES1. It is designated as a statewide facility and freight route on the National Highway System, and as an expressway from the south end of the City of Redmond through Bend. US 97 is a critical link in moving goods and people through Central Oregon. In the Bend area, US 97 is used as a route for local residents to travel to and from home and work, and it is a connection to area shopping, dining, businesses, schools and recreation. Bend and Central Oregon have experienced significant population growth over the past decade. Between April 2000 and July 2006, Bend was the fourth-fastest growing metropolitan area in the United States (US Census Bureau 2007), although the recent economic downturn has slowed development in Bend over the last five years. Bend's population growth, in combination with US 97 also serving as a regional facility that moves freight and traffic through the region, has led to an increase in traffic congestion and delay, disruptions in traffic flow, and an increase in the severity of vehicular crashes along US 97.

The Oregon Department of Transportation (ODOT) and Federal Highway Administration (FHWA) propose to improve an approximate 6-mile corridor on US 97 in Deschutes County, Oregon between the Deschutes Market Road/Tumalo Junction interchange and the Empire Avenue interchange to address congestion, traffic flow, and safety on this highway corridor. Exhibit ES-2 summarizes the proposed action's location, funding, length, and project type.

This Draft Environmental Impact Statement (EIS) was prepared to analyze the environmental impacts of the proposed action.

This Final EIS documents all of the alternatives considered during the development and narrowing of alternatives. The Preferred Alternative includes modifications to the East DS2 Alternative, in response to comments received on the Draft EIS. The Draft EIS was published in July 2011 and circulated for public comment, including a public hearing. This Final EIS discloses the beneficial and adverse impacts resulting from the Preferred Alternative, identifies the Preferred Alternative, and responds to public and agency comments submitted on the Draft EIS.

Definition

Practical Design

Practical design is a strategy to deliver focused benefits for the State's transportation system while working with the realities of a fiscally constrained funding environment.

Definitions

Area of Potential Impact

The area of potential impact (API) is the area within which potential direct impacts from the proposed action may occur.

Public Approach Road

Public approach road is an existing or planned city street or county road connection that provides vehicular access to and from a highway.

Private Driveway

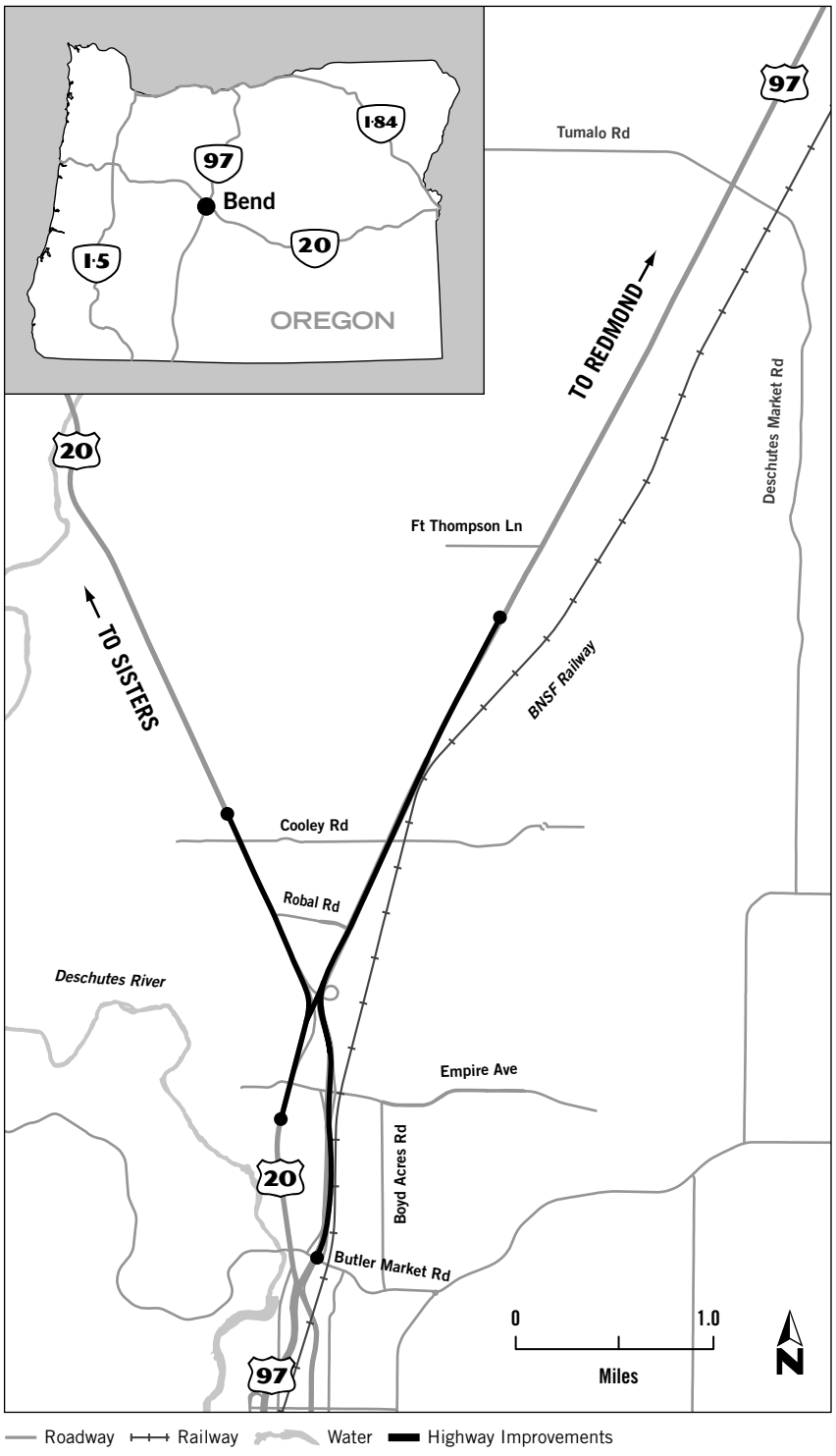
Private driveway is an approach that serves vehicular access to a roadway from one or more properties and that is not a public approach road.

Peak Hour

A peak hour (or rush hour) is a part of the day with the highest traffic volume during which traffic congestion on roads is worst. Normally, the two peak hour periods (morning and evening) occur when people are traveling to or from work or school.

The 2007 evening peak hour in the API is 4:00 to 5:00 pm. By 2035, the peak period will likely spread across multiple hours.

Exhibit ES-1: *Proposed Action Corridor*



ES.1.2 Purpose of and Need for the Proposed Action

Purpose of the Project

The purpose of the proposed action is to improve safety and mobility for trucks and automobiles on US 97 by implementing a practical design solution that is affordable within the potential 20-year funding opportunities and that meets the following performance objectives for

the medium-term (5-10 years) and long-term (over 10 years) planning periods as defined by the Bend Metropolitan Planning Organization's *2007–2030 Metropolitan Transportation Plan.* Performance objectives for the proposed action include:

- Makes incremental improvements to reduce delay, congestion, and the number and severity of crashes at the US 97/Cooley Road and US 97/Robal Road intersections within the medium-term planning period
- Reduces delay and congestion, and improves safety and operations on US 97 as an expressway between the Deschutes Market Road/ Tumalo Junction interchange and Empire Avenue interchange
- Supports economic development consistent with local agency plans; minimizes impacts to existing and planned local economic base; and provides for existing and planned local connectivity within the long-term planning period.

Exhibit ES-2: *Summary of the Proposed Action*

Project Name: US 97 Bend North Corridor Project	
State: Oregon	Southern Milepost: 136.33
County: Deschutes	Northern Milepost: 130.18
City: Bend	Project Length: 6 miles
ODOT Region: 4	Improvement Type: Highway realignment (modernization)
Highway/Roadway: US 97	Number of Proposed Travel Lanes on US 97: 4

Funding Source: FHWA and ODOT

Need for the Project

The proposed action is needed to address:

- **Congestion at Approaches**—Peak hour traffic volumes on US 97 within the area of potential impact (API) are at or exceed capacity of the current highway facility. If nothing is done by 2035, US 97 and the surrounding roadway systems, would experience severe congestion at public road approaches and private driveways during peak travel hours.

Since the publication of the Draft EIS, the ***2011 Amended Oregon Highway Plan*** was published in January 2012. For the urban expressway portion of US 97 located within the Bend Metropolitan Planning Organization boundary the ***2011 Amended Oregon Highway Plan*** revised the mobility standard from a v/c ratio of 0.80 to a mobility target of 0.85. On April 17, 2013 the Oregon Transportation Commission reviewed the expressway designation of this section of US 97 and decided to retain the expressway designation.

In the Final EIS the years of analysis for the No Build Alternative and the Preferred Alternative have been updated from 2007 to 2011 for the existing conditions, 2016 for the estimated year of opening, and

2036 for the future design year. Based on a trend analysis of traffic count data between 2007 and 2011, ODOT and the Bend Metropolitan Planning Organization determined that applying a 10 percent reduction to the 2007 existing traffic volumes would more accurately represent the future conditions (2036). This reduction in traffic volumes is reflective of the reduced population change in the Bend area between 2007 and 2011. This updated traffic analysis for the No Build Alternative demonstrates that if the longterm needs are not addressed, by 2036 US 97 and other roadway systems in the project's area of potential impact (API) would experience severe congestion during peak hours of travel.

Traffic Flow within the Corridor—Traffic flow on US 97 in the API is interrupted and slowed, especially during peak hours. By 2035, average daily traffic in the API is estimated to grow by over 40 percent. If no improvements are made, by 2035 travel times would increase substantially, average travel speeds would be reduced to less than 2 miles per hour (mph) in some areas, and longer traffic queues would further reduce traffic flow.

The result of the traffic analysis for the No Build Alternative in the Final EIS was similar to that for the No Build Alternative in the Draft EIS. If no improvements are made to US 97, the future (2036) traffic flow on US 97 would experience extensive delay and queuing; travel time would increase substantially; and average travel speeds would be reduced to 5 mph.

Safety—The number of severe injury or fatal crashes has increased in the API over the past six years. Specifically, the intersections of US 97 with Cooley Road and with Robal Road are listed in the top 5 percent of ODOT's 2010 Safety Priority Index System, which represents the locations with the highest collision history and ODOT's highest priorities for safety improvements. Also, the existing public road approaches and private driveways along US 97 are spaced substantially closer than current applicable design standards would recommend, further contributing to the increased risk of crashes as drivers encounter unanticipated congestion upon entering the API.

In October 2011, the Oregon Transportation Commission approved the ***Transportation Safety Action Plan***, an element of the ***Oregon Transportation Plan***. This document also serves as the State of Oregon's ***Strategic Highway Safety Plan***, a document required by federal law. The ***Transportation Safety Action Pla***n envisions a future where Oregon's transportation-related death and injury rate continues to decline.

The ***Updated Traffic Analysis Report*** prepared for the Final EIS includes an updated crash analysis and a new predictive analysis that identifies crash frequencies expected for the No Build and Preferred

Alternatives. The updated traffic analysis shows that number of severe injury or fatal crashes in the API has remained relatively constant, with a spike in 2008. The US 97 at Robal Road intersection has consistently been in the top 5 percent of crash locations in the state, while the US 97 at Cooley Road intersection alternates between the top 10 percent and top 5 percent. The predictive crash analysis prepared for the Final EIS also identified safety issues on the current facility, particularly at the US 97 and Cooley Road and US 97 and Robal Road intersections.

ES.1.3 Background

Project stakeholders have consistently requested the transportation infrastructure improvements associated with the proposed action should be economically feasible and support economic development.

Ability to Implement the Proposed Action within the Medium-term and Long-term Planning Periods—Based on past experience and forecasts for Central Oregon, it is conceivable that the proposed action could receive up to $250 million over a 20 to 30 year timeframe. It is not reasonable to assume that such a significant amount of funding could be raised within the first 10 years. Therefore, the ability to make fundable improvements by 2020 is critical in order to begin to provide some congestion relief and improve traffic flow and safety.

Current and Future Economic Lands—The City of Bend has identified the economic lands between US 97 and US 20 as an important component to its current and future economic base. In this vicinity, land can be generally described as being inside the current urban growth boundary (UGB) or being inside a proposed expansion of the UGB that was approved by the Bend City Council on January 5, 2009. Minimizing impacts to these economic lands, such as avoiding the bisection of parcels greater than 5 acres in size, is a key factor in understanding economic impacts associated with the proposed action.

More Information

The traffic analysis for the No Build Alternative assumes construction of approximately 30 publicly-funded and privately-funded road improvement projects. These include widening, realignment or extensions of existing roads, new roads, and new signals or roundabouts.

For additional detail on the publicly-funded and privately-funded roadway improvements assumed for the No Build Alternative see the ***Updated Traffic Analysis Report*** (ODOT 2014o), listed in Appendix K and available in the document library of the project's website (www.us97solutions.org).

ES.2 Alternatives Considered

FHWA and ODOT are considering three alternatives for the proposed action including two build alternatives and the No Build Alternative as required by the National Environmental Policy Act.

Based on the Draft EIS and comments received from agencies and the public, the East DS2 Alternative was modified to minimize impacts to neighborhoods east of US 97, and substantially minimize impacts to rural residential properties north of Cooley Road and west of US 97 by containing all improvements within the adopted UGB, except for the extension of Britta Street west of US 20 and the intersection improvements at Cooley Road and O.B. Riley Road. The East DS2 Modified Alternative is identified as the Preferred Alternative in the Final EIS.

ES.2.1 No Build Alternative

The No Build Alternative would maintain the current US 97 facility as it presently exists (Exhibit ES-3). The No Build Alternative consists of assigning design year 2036 travel forecasts to the financially constrained Bend Metropolitan Transportation Plan scenario. The transportation analysis for the No Build Alternative assumes construction of both publicly-funded and privately-funded roadway improvements and traffic signal projects, which include projects funded through the Oregon Statewide Transportation Improvement Program or the City of Bend's Capital Improvement Plan, and roadway improvements in approved private developments.

ES.2.2 Build Alternatives

Two build alternatives are being considered for the proposed action: the East DS1 Alternative and the East DS2 Alternative. Both alternatives would reroute US 97 east of its current alignment, adjacent to the existing railroad tracks. Where US 97 is realigned, the current US 97 roadway would be used as a portion of the extension of 3rd Street. Within the City of Bend UGB, jurisdiction over this converted segment of US 97 is proposed to be transferred to the City of Bend under either the East DS1 or East DS2 Alternatives. ODOT would retain jurisdiction of the newly realigned portion of US 97.

The Preferred Alternative will also involve transferring the jurisdiction of the current US 97 facility to the City of Bend; this facility will become an extension of 3rd Street as a result of the Preferred Alternative. ODOT will retain jurisdiction of the newly realigned portion of US 97.

Most of the common design features of the East DS1 and East DS2 Alternatives are located south of Cooley Road. These alternatives differ in the location and type of northern interchange. The commonalities and unique features of each build alternative are described below. The East DS1 and East DS2 Alternatives are shown in Exhibit ES-4 and Exhibit ES-5.

The Preferred Alternative does not include a northern interchange as contained in either the East DS1 or East DS2 Alternatives. As a result of the Preferred Alternative, US 97 connects to 3rd Street at a signalized intersection. Other design elements of the Preferred Alternative include enhanced pedestrian and bicycle improvements, design improvements for Empire Avenue, and a signalized intersection at 3rd Street and Mervin Sampels Road (Exhibit ES-5 FEIS).

Common Design Features of the Build Alternatives

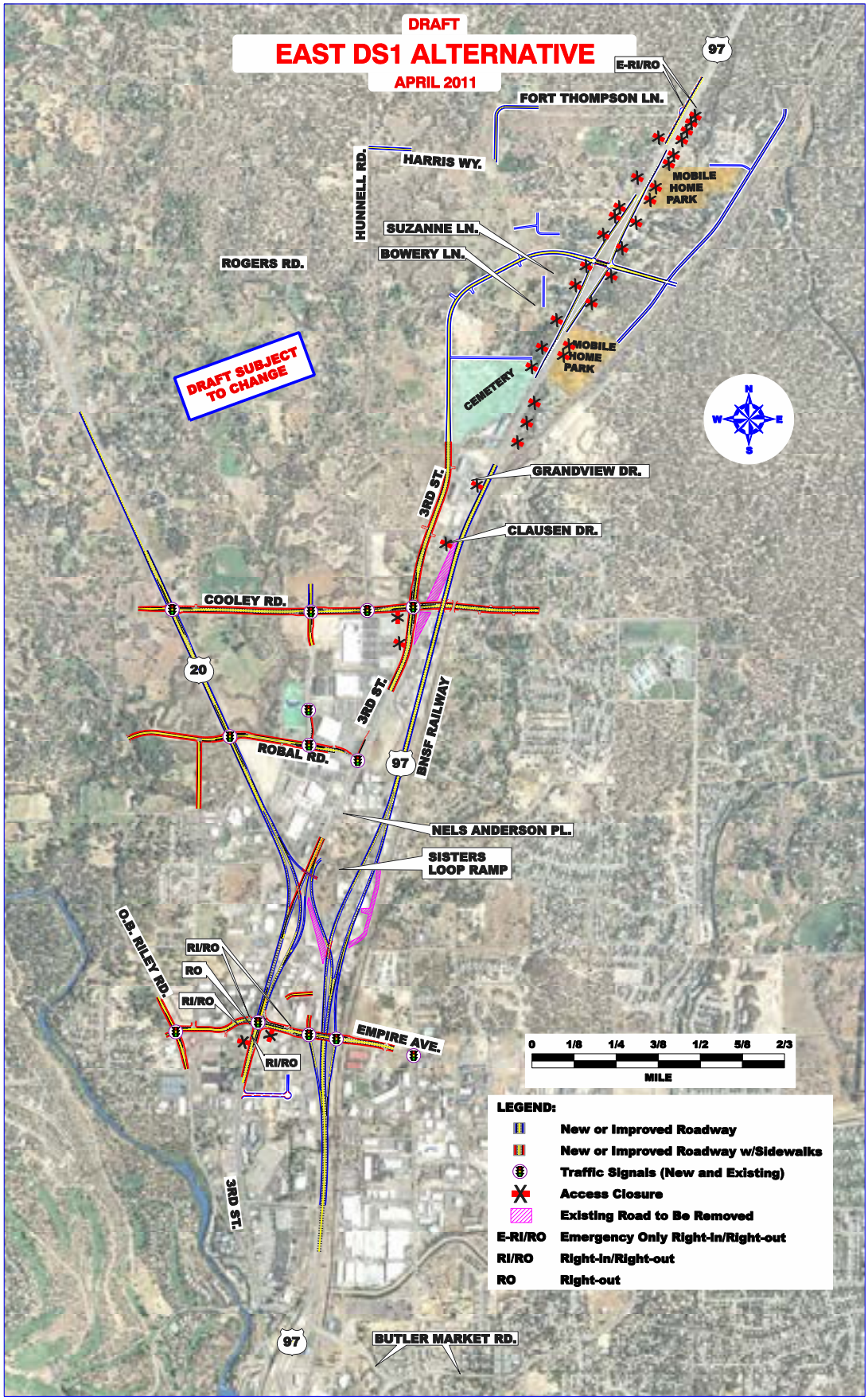
Between Butler Market Road and Cooley Road, the East DS1 and East DS2 Alternatives have a similar design. Design features that are

Chapter 1 Purpose of and Need For Proposed Action
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Exhibit ES-3: *No Build Alternative*



Exhibit ES-4: *East DS1 Alternative*



Chapter 1 Purpose of and Need For Proposed Action
Chapter 2 Alternatives
Chapter 3 Affected Environment, Environmental Consequences and Mitigation
Chapter 4 Cumulative Impacts
Chapter 5 Local Short-term Uses and Long-term Productivity
Chapter 6 Irreversible and Irretrievable Commitment of Resources
Chapter 7 Comments and Coordination

Exhibit ES-5: *East DS2 Alternative*

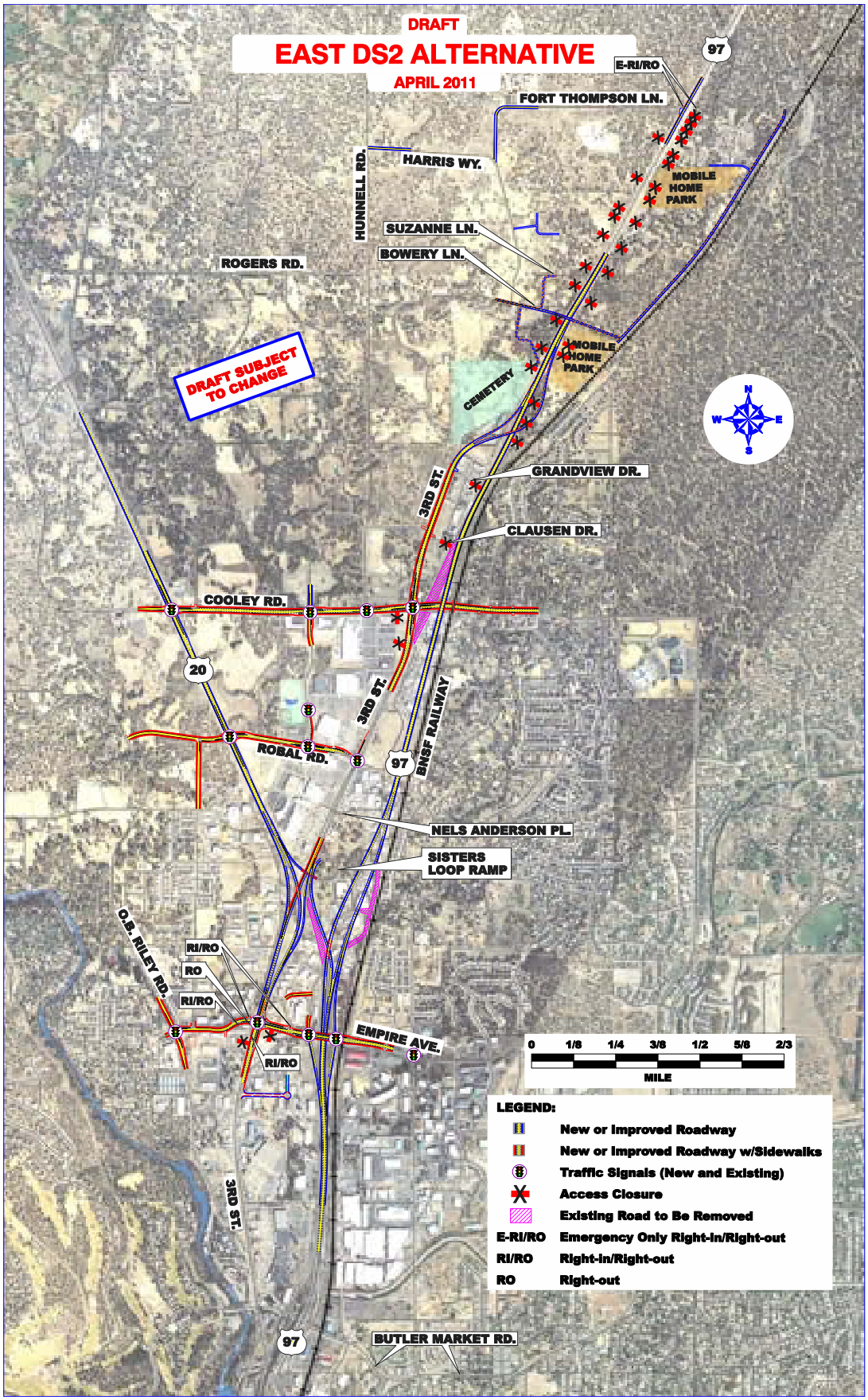


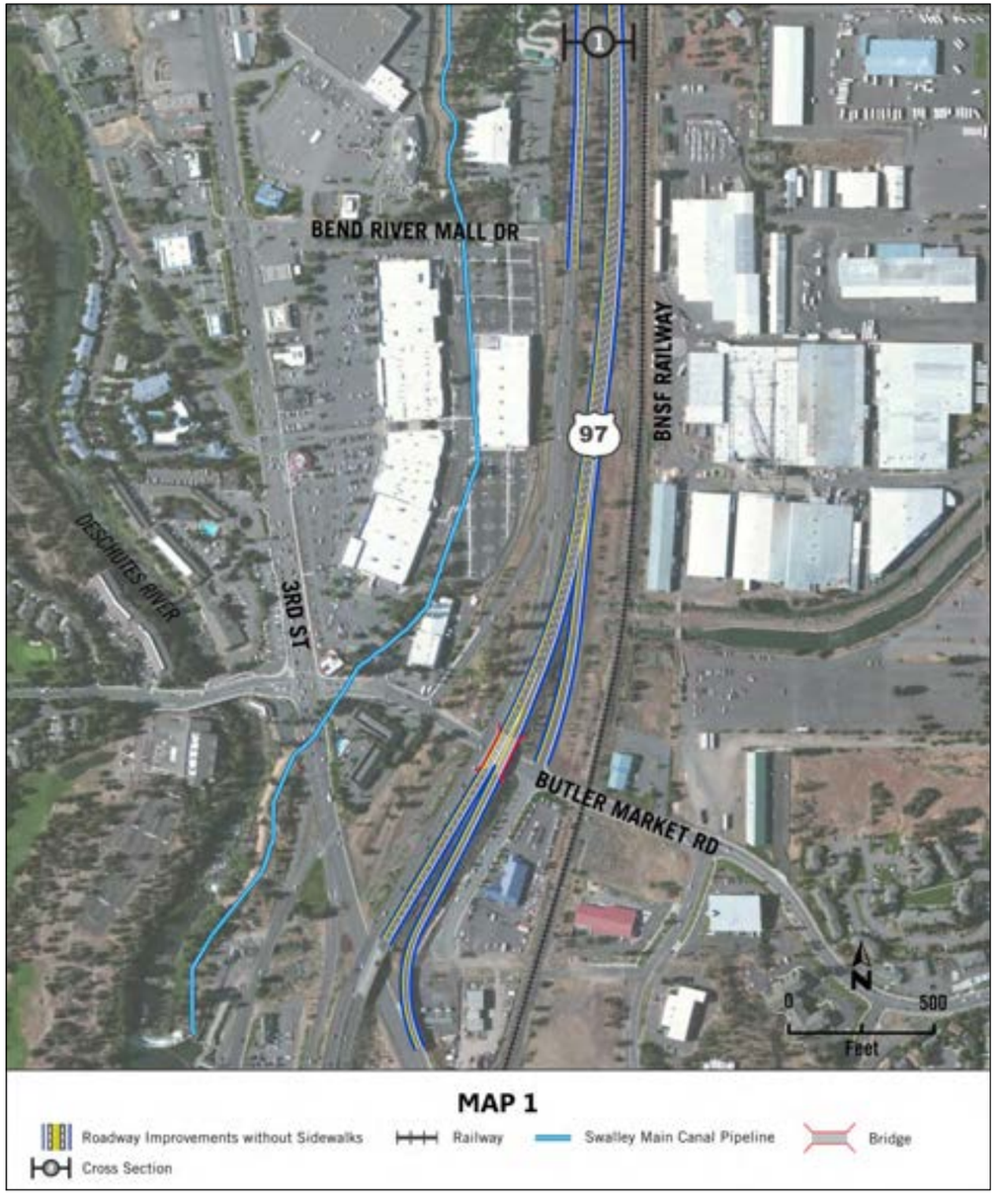
Exhibit ES-5 FEIS: *Preferred Alternative Mapset Index*

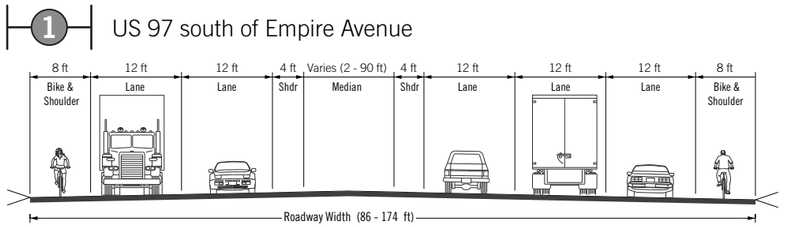


Note: This new exhibit was added to the Final EIS to show the design of the Preferred Alternative.

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Exhibit ES-5 FEIS: *Preferred Alternative (Map 1)*





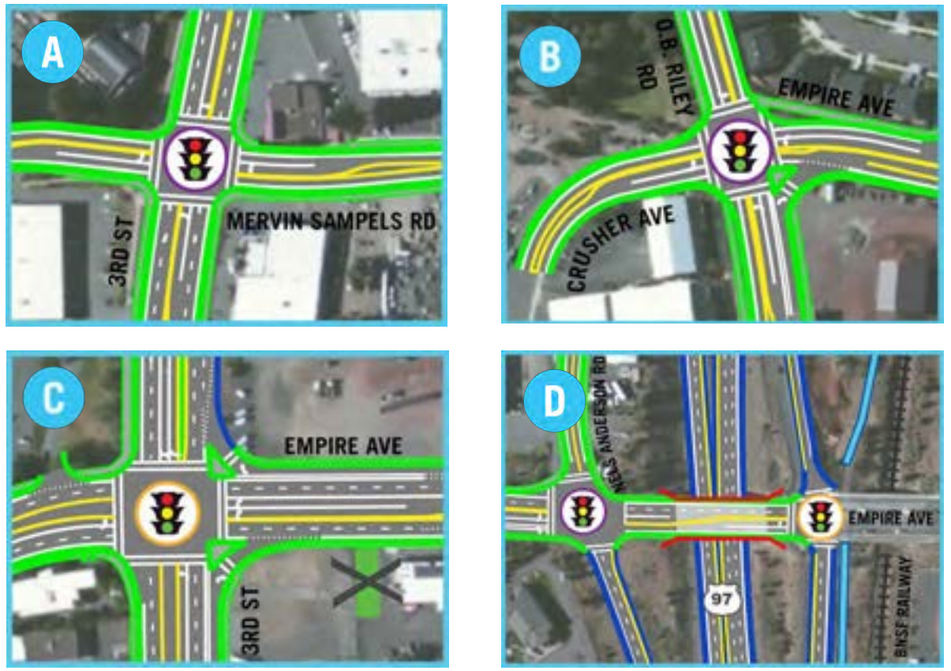
Note: The design shown in this exhibit is conceptual in nature. Further refinements may be made during the final design process. Where roadway improvements shown in this exhibit end, the improvements will transition to the existing roadway cross section.

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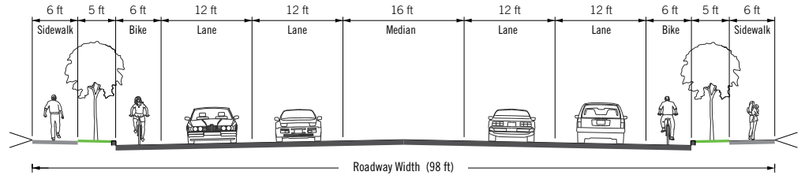
Exhibit ES-5 FEIS: *Preferred Alternative (Map 2)*



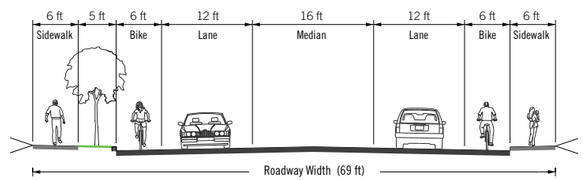
Note: The design shown in this exhibit is conceptual in nature. Further refinements may be made during the final design process. Where roadway improvements shown in this exhibit end, the improvements will transition to the existing roadway cross section.



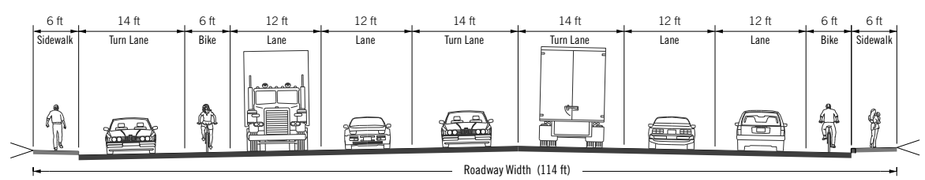
2 3rd Street south of Loco Road



3 Empire Avenue between O.B. Riley Road and 3rd Street

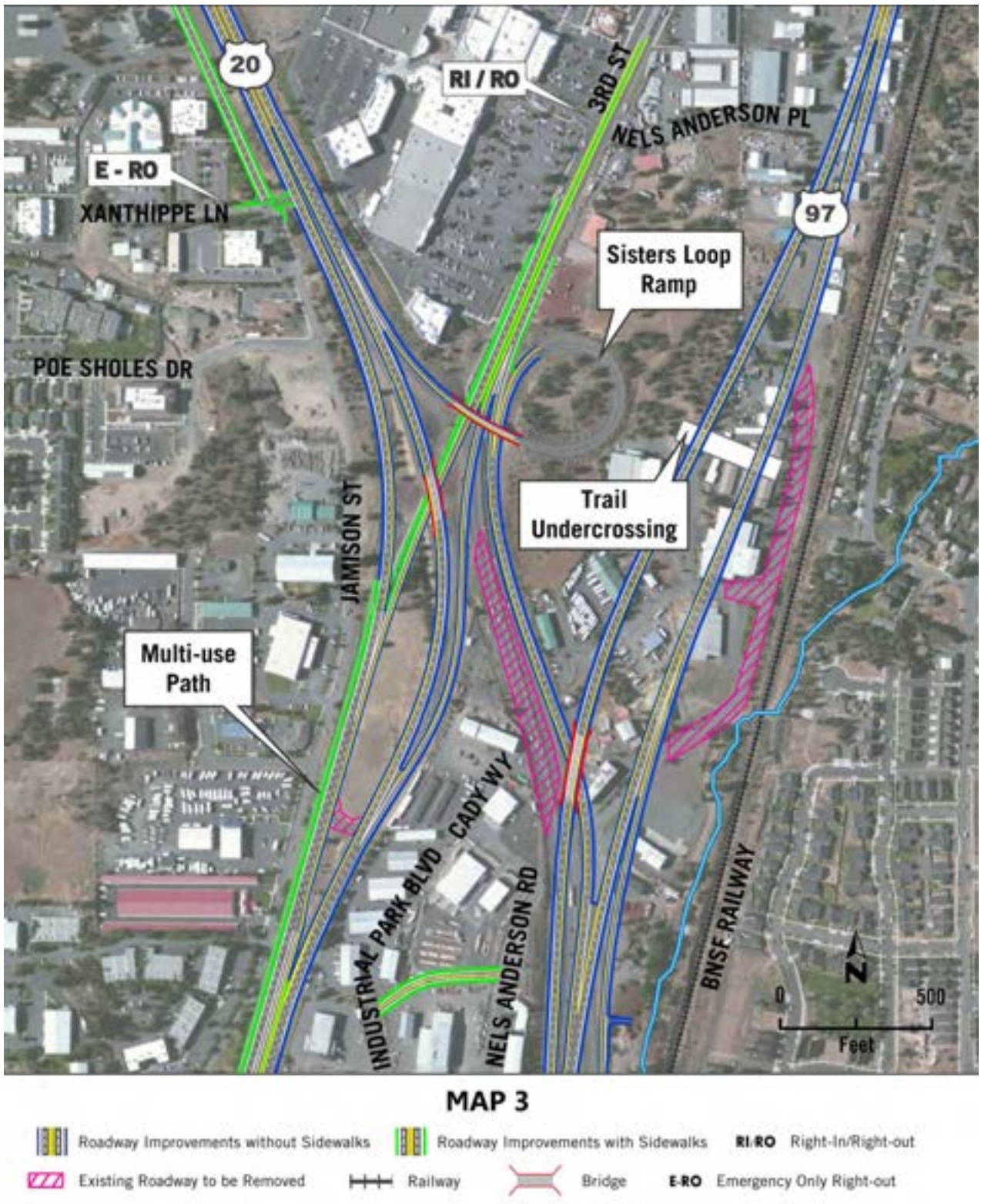


4 Empire Avenue east of 3rd Street



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Exhibit ES-5 FEIS: *Preferred Alternative (Map 3)*



Note: The design shown in this exhibit is conceptual in nature. Further refinements may be made during the final design process. Where roadway improvements shown in this exhibit end, the improvements will transition to the existing roadway cross section.

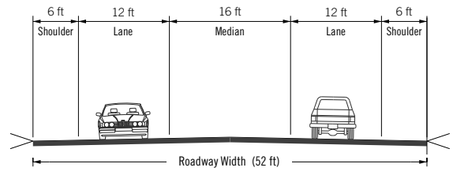
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Exhibit ES-5 FEIS: *Preferred Alternative (Map 4)*

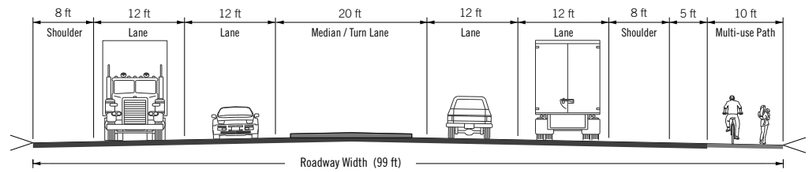




5 Britta Street



6 US 20 between Cooley Road and Robal Road



Note: The design shown in this exhibit is conceptual in nature. Further refinements may be made during the final design process. Where roadway improvements shown in this exhibit end, the improvements will transition to the existing roadway cross section.

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Exhibit ES-5 FEIS: *Preferred Alternative (Map 5)*





Note: The design shown in this exhibit is conceptual in nature. Further refinements may be made during the final design process. Where roadway improvements shown in this exhibit end, the improvements will transition to the existing roadway cross section.

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Exhibit ES-5 FEIS: *Preferred Alternative (Map 6)*

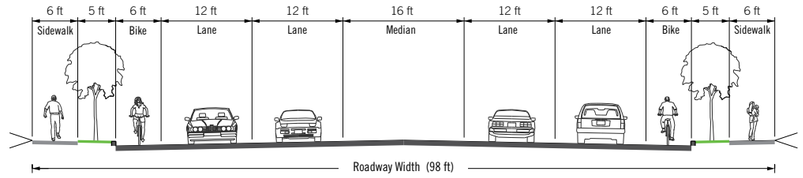


Note: The design shown in this exhibit is conceptual in nature. Further refinements may be made during the final design process. Where roadway improvements shown in this exhibit end, the improvements will transition to the existing roadway cross section.

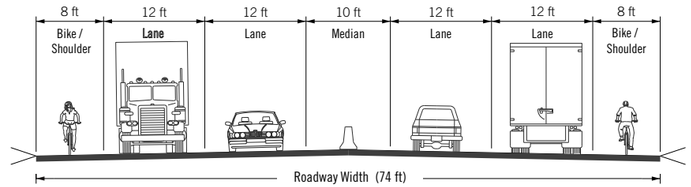




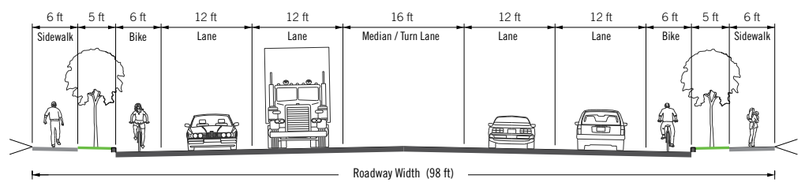
2 3rd Street south of Loco Road



7 US 97 between Empire Avenue and 3rd Street

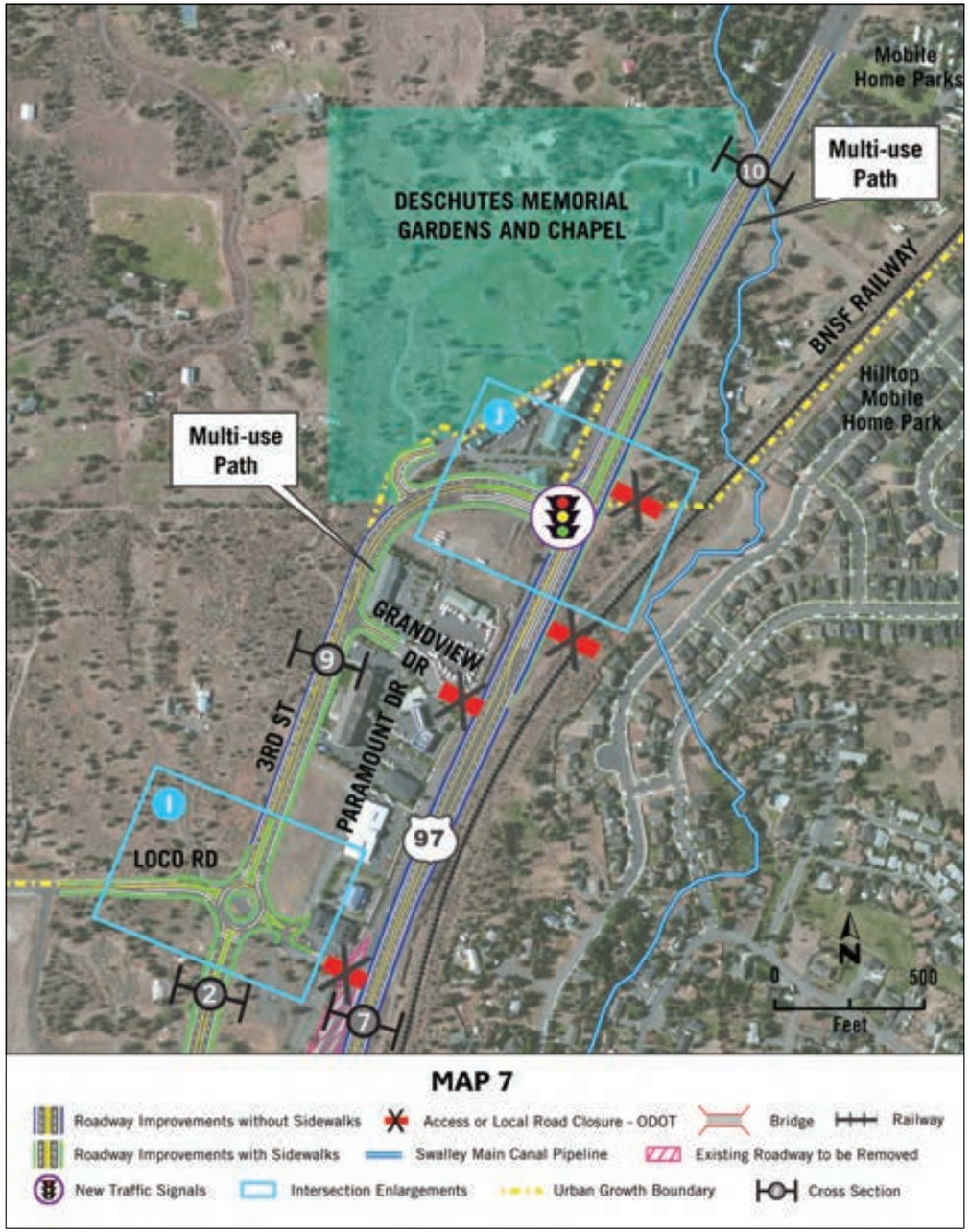


8 Cooley Road east of Hunnell Road



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Exhibit ES-5 FEIS: *Preferred Alternative (Map 7)*

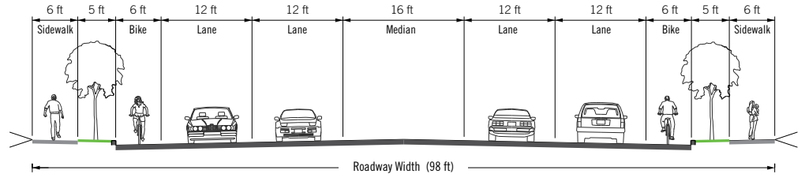


Note: The design shown in this exhibit is conceptual in nature. Further refinements may be made during the final design process. Where roadway improvements shown in this exhibit end, the improvements will transition to the existing roadway cross section.

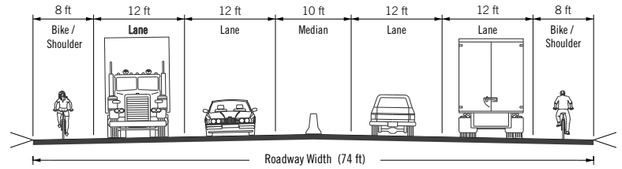




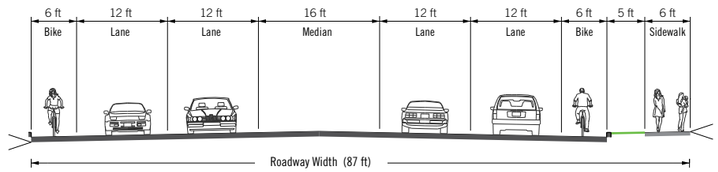
2 3rd Street south of Loco Road



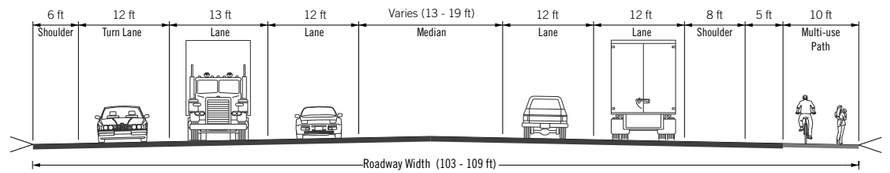
7 US 97 between Empire Avenue and 3rd Street



9 3rd Street north of Loco Road



10 US 97 north of 3rd Street



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common include some intersection configurations, ramps, auxiliary lanes, grade-separations, and pedestrian and bicycle facilities.

Between Butler Market Road and Empire Avenue, US 97 would be a free flow highway facility with access to and from the highway provided at the Butler Market Road and Empire Avenue interchanges. The Empire Avenue interchange would retain its configuration as a partial diamond interchange, with a widened Empire Avenue crossing over US 97 in the East DS1 and East DS2 Alternatives. An off-ramp would allow vehicles on northbound US 97 to exit the highway at Empire Avenue; there would be no off-ramp from southbound US 97 to Empire Avenue. On-ramps would allow eastbound and westbound vehicles on Empire Avenue to enter northbound or southbound US 97.

About half way between Empire Avenue and the Sisters loop ramp, the US 97 northbound travel lanes would split; the two right lanes would continue on northbound US 97, and the left lane would cross under the southbound travel lanes on US 97 to access US 20 and 3rd Street. Southbound US 97 would cross over the left lane exiting from northbound US 97 to northbound 3rd Street/westbound US 20 on an elevated structure.

Between Nels Anderson Place and Cooley Road, US 97 would shift east to be immediately adjacent to the railroad tracks; the northbound and southbound travel lanes would be separated by a median barrier. An undercrossing would be constructed for Cooley Road to pass under US 97 and the railroad tracks. There would be no connection to US 97 at Cooley Road.

North of Grandview Drive, a number of new local road connections or new local roads would be constructed under the East DS1 and East DS2 Alternatives.

An emergency service turnaround on US 97 would be provided at Fort Thompson Lane. There would be a break in the median barrier for emergency vehicles only. Expanded shoulders in this area would accommodate emergency vehicles turning around to change direction.

The build alternatives would also have access management, stormwater management, and aesthetic treatments.

The Preferred Alternative will not include the following design elements that were common to the East DS1 and East DS2 Alternatives:

- A widened Empire Avenue crossing
- New local road connections or new local roads north of Grandview Drive

Key Point

Unique features of the East DS1 Alternative would include:

- Diamond interchange north of Bowery Lane allowing movements in all directions
- 3rd Street routed around the west side of Deschutes Memorial Gardens and Chapel
- 3rd Street extension east across US 97.

- An emergency service turnaround on US 97 at Fort Thompson Lane.

Design Features Unique to the East DS1 Alternative

Under the East DS1 Alternative, between Cooley Road and the City of Bend's UGB, 3rd Street would extend north with two travel lanes in each direction. North of the UGB, 3rd Street would have one northbound and one southbound travel lane and would be routed around the west side of the Deschutes Memorial Gardens and Chapel. Just north of Bowery Lane, US 97 would have a full diamond interchange with the new extension of 3rd Street. The interchange would allow all northbound and southbound movements on to and off of US 97. At the interchange, 3rd Street would be elevated to cross over US 97 and would terminate just west of the BNSF Railway.

New local road connections and new local roads that would be constructed between Grandview Drive and Fort Thompson Lane include:

- A new road would extend east of 3rd Street to access existing properties north of the Deschutes Memorial Gardens and Chapel
- A new road would connect Bowery Lane to Suzanne Lane
- A new road would extend east of Harris Way to access existing properties between Harris Way and US 97
- An upgraded connection would be provided between Fort Thompson Lane and Harris Way, and between Harris Way and Hunnell Road
- A new road would extend north and south of 3rd Street to access existing properties east of US 97.

New county roads and private driveways have been designed to meet the appropriate standards within this urban area. Existing substandard county roads would not be upgraded by this project, but would be prioritized and developed as standalone projects in the Deschutes County Transportation System Plan and Statewide Transportation Improvement Program projects.

Design Features Unique to the East DS2 Alternative

Under the East DS2 Alternative, 3rd Street would extend north with two travel lanes in each direction with a median that would also serve as a turn lane. The new extension of 3rd Street would connect with US 97 through a directional interchange on the southeast side of the Deschutes Memorial Gardens and Chapel, where 3rd Street would terminate. The directional interchange would allow southbound US 97 traffic to flow freely via an off-ramp to southbound 3rd Street.

Northbound 3rd Street traffic would cross over US 97 and flow freely onto northbound US 97 via an on-ramp.

New local road connections and new local roads that would be constructed between Grandview Drive and Fort Thompson Lane include:

- Bowery Lane would be upgraded and extended to the east, across US 97
- A new road would extend north and south of Bowery Lane to access existing properties east of US 97
- A new road would extend south of Bowery Lane to access existing properties north of Deschutes Memorial Gardens and Chapel
- A new road would extend north of Bowery Lane to access existing properties northwest of the Bowery Lane overcrossing of US 97
- A new road would extend east of Harris Way to access existing properties between Harris Way and US 97
- An upgraded connection would be provided between Fort Thompson Lane and Harris Way, and between Harris Way and Hunnell Road.

Key Point

Unique features of the East DS2 Alternative would include:

- Directional interchange south of Bowery Lane allowing free flow movements between 3rd Street and US 97
- Termination of 3rd Street southeast of Deschutes Memorial Gardens and Chapel
- Bowery Lane extension east across US 97.

New county roads and private driveways have been designed to meet the appropriate standards within this urban area. Existing substandard county roads would not be upgraded by this project, but would be prioritized and developed as standalone projects in the Deschutes County Transportation System Plan and Statewide Transportation Improvement Program projects.

Design Features Unique to the Preferred Alternative—East DS2 Modified Alternative

As a result of the Preferred Alternative, 3rd Street will extend north with two travel lanes in each direction with a two-way left turn lane. Approximately 0.6 mile north of Cooley Road, the new extension of 3rd Street will connect with US 97 through a signalized intersection on the south side of the Deschutes Memorial Gardens and Chapel, where 3rd Street will terminate.

Empire Avenue improvements will include utilizing the existing bridges and containing widening work between US 97 and 3rd Street. In addition a new signal will be added at 3rd Street and Mervin Sampels Road to provide access into the Empire Avenue/Sherman Road business area.

The Preferred Alternative will extend Britta Street to US 20 at Robal Road, whereas the East DS1 and East DS2 Alternatives would extend Robal Road to O.B. Riley Road. The Preferred Alternative will also add

Key Point

Unique features of the Preferred Alternative include:

- Signalized intersection at 3rd Street and US 97
- Termination of 3rd Street south of Deschutes Memorial Gardens and Chapel.

intersection improvements at O.B. Riley Road and Cooley Road. The Preferred Alternative will provide new facilities for serving bicycles and pedestrians.

ES.2.3 Other Alternatives Considered

The alternatives development phase gathered input from technical staff, project committees, participating agencies, and the public to identify alternatives that would address the purpose and need for the proposed action. Initially, a preliminary range of alternatives was developed that comprised 21 build alternatives located along three project corridors:

- **West corridor**—Reroute US 97 west of its existing alignment and closer to US 20
- **Existing corridor**—Retain US 97 on its existing alignment
- **East corridor**—Reroute US 97 east of its existing alignment and closer to the BNSF Railway.

A No Build Alternative was also considered and was automatically forwarded into the Draft EIS for evaluation per requirements under the National Environmental Policy Act.

This preliminary range of 21 build alternatives was assessed in terms of engineering feasibility, significant environmental impacts, and economic feasibility. From this initial assessment, the range of alternatives was revised based on how the alternatives compared to one another, and the best performing alternative(s) in each corridor were carried forward. The result yielded a combined preliminary range of 11 alternatives. Nine of the 11 build alternatives that were screened against the purpose and need and other criteria were eliminated from further consideration (Exhibit ES-6). Only the East DS1 and East DS2 Alternatives passed the screening and were carried forward for further analysis in the Draft EIS.

The Preferred Alternative was evaluated against the same screening criteria and demonstrated it addressed the purpose and need for the proposed action.

Exhibit ES-6: *Build Alternatives Considered but Eliminated from Further Study*

West Corridor	Existing Corridor	East Corridor
WS West Modified	GM2	WS East A Modified
WS West E (Modified)	Existing A	
West 1	Existing DS1	
West DS1	TSM/TDM	

ES.3 Other Actions

There are a number of current and reasonably foreseeable major development actions that are scheduled to take place in the project vicinity and may also influence future traffic conditions within the API. These projects include:

- **Juniper Ridge**—Juniper Ridge is a 1,500 acre site owned by the City of Bend east of the API, of which approximately 500 acres are located within the current City of Bend limits and UGB. The master plan for the project includes area for employment, educational and research opportunities, a town center, and residential neighborhoods.
- **Roadway**—Many streets and roadways under City of Bend and Deschutes County jurisdiction are scheduled for widening and/or extension, as planned in the City's and County's Transportation System Plans and the Bend Metropolitan Planning Organization's *2007–2030 Metropolitan Transportation Plan.* Other roadway projects include the installation of traffic signals and/or roundabouts on local streets throughout the API and greater Bend area.
- **Transit**—A new park and ride facility is planned within the API by the Bend Metropolitan Planning Organization.

  The Central Oregon Intergovernmental Council identified a priority need for a park and ride lot in the Cascade Village shopping center area. The Bend Metropolitan Planning Organization also identified the near-term need for a Redmond – Bend Community Connector (Route #24) stop serving Cascade Village and a future transit hub at the same location.
- **Utility**—Various stormwater and wastewater facility improvements are scheduled for construction throughout the City of Bend and Deschutes County
- **Parks and Trails—**Several smaller community parks and one larger regional park are scheduled for development by the Bend Park and Recreation District outside the API. As described in Section 3.6 Parks and Recreational Facilities, Bend Park and Recreation District's *Parks, Recreation, and Green Spaces Comprehensive Plan* and the *Bend Area General Plan Bicycle and Pedestrian System Map* include pedestrian and bicycle trails planned throughout the API and beyond to connect to local and regional destinations.

Chapter 1 Purpose of and Need For Proposed Action
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Chapter 3 Affected Environment, Environmental Consequences and Mitigation
Chapter 4 Cumulative Impacts
Chapter 5 Local Short-term Uses and Long-term Productivity
Chapter 6 Irreversible and Irretrievable Commitment of Resources
Chapter 7 Comments and Coordination

More Information



Learn more about the proposed action and view the Draft EIS by visiting the project website at: www.us97solutions.org

The Final EIS is also available on the project website.

ES.4 Summary of Adverse and Beneficial Impacts of the Alternatives

The No Build, East DS1, and East DS2 Alternatives were studied and analyzed to identify their long-term and temporary impacts to the local environment. Adverse and beneficial impacts of the alternatives are summarized in Exhibit ES-7 FEIS. Adverse impacts would be mitigated to the extent practicable and as required by applicable regulations.

This Final EIS has been updated to disclose the beneficial and adverse impacts associated with the updated 2036 No Build Alternative and the Preferred Alternative. The adverse and beneficial impacts of the Preferred Alternative are summarized in Exhibit ES-7 FEIS.

Exhibit ES-7 FEIS: *Summary of Adverse and Beneficial Impacts of the Proposed Action*

Resource Element	No Build Alternative	East DS1 Alternative	East DS2 Alternative	Preferred Alternative
Transportation				
Long-term impacts	■ Severe congestion during peak periods in much of the southern part of the API due to substantial increase in traffic volumes ■ Significant queuing on westbound Empire Avenue due to bottleneck at 3rd Street/Empire Avenue intersection ■ US 97 over capacity during peak periods from south of Butler Market Road through the US 20/3rd Street interchange due to increase in traffic volumes, affecting merge/diverge areas for the ramps to and from Empire Avenue ■ Freight trips delayed up to 15 minutes during peak periods due to congestion along the US 97/3rd Street corridor ■ Increased risk of vehicle/train collisions at Cooley Road atgrade crossing due to increasing traffic and current rail volumes ■ Substantial delays to buses traveling on US 97, US 20, and Robal Road during peak periods, with corresponding decrease in ontime performance due to extreme traffic congestion in the API ■ No improvements to the existing bicycle and pedestrian facilities	■ Alleviation of most of the arterial system queuing noted in the No Build Alternative as a result of realignment and access management improvements that shift traffic from the local arterial system onto limited access and access controlled facilities ■ Freight delays reduced to less than 5 minutes, resulting from separate facility for through trips ■ Improved ontime bus performance due to decreased congestion levels in the API ■ Improved motorist safety resulting from grade separating Cooley Road under the BNSF Railway ■ Improved pedestrian and bicycle facilities ■ Queuing reduced on westbound Empire Avenue, but more congestion at Empire Avenue/O.B. Riley Road intersection results from relief of 3rd Street/Empire Avenue bottleneck.		
	■ 9 intersections below operational standards (2—US 97, 4—US 20, 3—local road system) [1] ■ 4 US 97 mainline and merge/diverge/weave segments over standards[1] ■ 7 intersections blocked by queues[1] ■ 25 mph overall average network speed ■ 30,400 overall network stops ■ 800 hours overall network delay ■ 1,800 hours overall network travel time. [1]Because lower existing conditions traffic volumes were assumed for the updated No Build Alternative and Preferred Alternative traffic analysis, these particular measures are not directly comparable to the No Build Alternative and Preferred Alternative.	■ 8 intersections below operational standards (1—US 97, 4—US 20, 3—local road system) [1] ■ 4 US 97 mainline and merge/diverge/weave segments over standards[1] ■ 19 intersections blocked by queues[1] ■ 22 mph overall average network speed ■ 45,100 overall network stops ■ 1,000 hours overall network delay ■ 2,000 hours overall network travel time. [1]Because lower existing conditions traffic volumes were assumed for the updated No Build Alternative and Preferred Alternative traffic analysis, these particular measures are not directly comparable to the No Build Alternative and Preferred Alternative.	■ 5 intersections below operational standards (1—US 97, 3—US 20, 1—local road system) ■ 2 US 97 mainline and merge/diverge/weave segments over standards ■ 0 intersections blocked by queues ■ 19 mph overall average network speed ■ 35,500 overall network stops ■ 1,100 hours overall network delay ■ 1,900 hours overall network travel time.

Note: This revised exhibit reflects corrections to the impacts that would result from the East DS1 and East DS2 Alternatives, includes updated information for the 2036 No Build Alternative where applicable, and includes the impacts and benefits of the Preferred Alternative.

Exhibit ES-7 FEIS: *Summary of Adverse and Beneficial Impacts of the Proposed Action*

Resource Element	No Build Alternative	East DS1 Alternative	East DS2 Alternative	Preferred Alternative
Long-term impacts	▪ 12 intersections below operational standards (2—US 97, 4—US 20, 6—local road system) due to increased congestion during peak periods ▪ 15 intersections blocked by queues ▪ 5 mph overall average network speed ▪ 66,100 overall network stops ▪ 4,700 hours overall network delay ▪ 5,300 hours overall network travel time.			
Temporary construction impacts	None.	Congestion resulting in delay, reduced travel speeds, and increased travel time during construction (23 years) of improvements to intersections and existing roadways Delays and other impacts to transit service along Robal Road and into and out of Cascade Village Shopping Center during construction Temporary changes to private driveways for businesses on Nels Anderson Road, Cooley Road, and Robal Road during construction.		

Note: This revised exhibit reflects corrections to the impacts that would result from the East DS1 and East DS2 Alternatives, includes updated information for the 2036 No Build Alternative where applicable, and includes the impacts and benefits of the Preferred Alternative.

Exhibit ES-7 FEIS: *Summary of Adverse and Beneficial Impacts of the Proposed Action*

Resource Element	No Build Alternative	East DS1 Alternative	East DS2 Alternative	Preferred Alternative
Land Use				
Long-term impacts	■ Inconsistent with state, county, regional, and city transportation plans, *US Highway 97 Corridor Strategy, Oregon Highway Plan, Bend Area General Plan,* and *Northeast Bend Transportation Study* ■ No exceptions to statewide planning goals, but inconsistent with Goal 12 ■ No existing land uses converted ■ No prime farmland converted.	■ Generally consistent with state, county, regional, and city land use plans. ■ Inconsistent with county, regional, and city transportation plans. Amendments to *2007-2030 Metropolitan Transportation Plan*, *Deschutes County Transportation System Plan*, and *Bend Urban Area Transportation System Plan* required. ■ Inconsistent with statewide planning goals. 2 exceptions to Statewide Planning Goals 11 and 14 from Deschutes County required for construction of a new road and new interchange outside of the UGB.		■ Consistent with state, county, regional, and city land use and transportation plans ■ No exceptions to the statewide planning goals required.
		■ 180 acres of land converted to right of way ■ 10 acres of prime farmland and 124 acres of farmland of statewide importance converted to right of way.	■ 131 acres of land converted to right of way ■ 2 acres of prime farmland and 90 acres of farmland of statewide importance converted to right of way.	■ Approximately 82 acres of land converted to right of way ■ Approximately 0.07 acre of prime farmland and approximately 59 acres of farmland of statewide importance converted to right of way.
Temporary construction impacts	■ None.			

Note: This revised exhibit reflects corrections to the impacts that would result from the East DS1 and East DS2 Alternatives, includes updated information for the 2036 No Build Alternative where applicable, and includes the impacts and benefits of the Preferred Alternative.

Exhibit ES-7 FEIS: *Summary of Adverse and Beneficial Impacts of the Proposed Action*

Resource Element	No Build Alternative	East DS1 Alternative	East DS2 Alternative	Preferred Alternative
Right of Way and Utilities				
Long-term impacts	■ No right of way acquisition ■ No utility relocations.	■ Acquisition of 162 parcels totaling approximately 180 acres of right of way.	■ Acquisition of 142 parcels totaling approximately 131 acres of right of way.	■ Acquisition of an estimated 103 parcels totaling approximately 82 acres of right of way.
		■ Relocation of utility facilities.		
Temporary construction impacts	■ None.	■ Short interruptions to utility services.		

Note: This revised exhibit reflects corrections to the impacts that would result from the East DS1 and East DS2 Alternatives, includes updated information for the 2036 No Build Alternative where applicable, and includes the impacts and benefits of the Preferred Alternative.

Exhibit ES-7 FEIS: *Summary of Adverse and Beneficial Impacts of the Proposed Action*

Resource Element	No Build Alternative	East DS1 Alternative	East DS2 Alternative	Preferred Alternative
Environmental Justice				
Long-term impacts	■ No disproportionately high and adverse effects on minority or low-income populations.	■ No disproportionately high and adverse effects on minority or low-income populations ■ Environmental justice populations and others would access US 97 through the northern interchange, a full diamond interchange, with access to northbound and southbound US 97.	■ No disproportionately high and adverse effects on minority or low-income populations ■ Environmental justice populations and others would travel farther on local streets, including Bowery Lane and Hunnell Road, to access US 97. Segments of Bowery Lane and Hunnell Road would be unpaved. Access to southbound US 97 would occur at Empire Avenue. Access to northbound US 97 would occur at Empire Avenue or via 3rd Street north of Cooley Road.	■ No disproportionately high and adverse effects on minority or low-income populations ■ Environmental justice populations and others will maintain existing access to northbound and southbound US 97. The new signalized intersection at US 97 and 3rd Street will provide a connection to locations within the API and greater Bend. ■ A multi-use path will connect the mobile home parks to the signalized intersection, allowing safer travel for pedestrians and bicyclists along US 97 and a safer crossing of US 97.
Temporary construction impacts	■ No disproportionately high and adverse effects on minority or low-income populations.	■ No disproportionately high and adverse effects on minority or low-income populations ■ Persons with limited English proficiency could be more affected if they are unable to understand notifications about construction activities; however, notifications would be provided in English and Spanish, the predominant languages of the API ■ Temporary street crossings in construction zones could become obstacles for disabled and elderly individuals.		

Note: This revised exhibit reflects corrections to the impacts that would result from the East DS1 and East DS2 Alternatives, includes updated information for the 2036 No Build Alternative where applicable, and includes the impacts and benefits of the Preferred Alternative.

***Exhibit ES-7 FEIS:** Summary of Adverse and Beneficial Impacts of the Proposed Action*

Resource Element	No Build Alternative	East DS1 Alternative	East DS2 Alternative	Preferred Alternative
Socioeconomic Analysis				
Long-term impacts	■ Residents' quality of life impacted by failure to address vehicular safety concerns within the API ■ No change to community cohesion ■ Impedance of travel routes to and from destination businesses, deterrence of new development, difficulty attracting and retaining businesses, and decreased efficiency of local and regional freight movement as congestion worsens and traffic flow slows ■ No residences, businesses, or rental storage units displaced ■ PM peak traffic volumes Bowery Lane between Hunnell Road and 3rd Street: 7 vehicles/hour. ■ Hunnell Road: 270-920 vehicles/hour. ■ Emergency service provider response times would increase as compared with the existing conditions.	■ Increased air, noise, and visual impacts of new and expanded local roads, elevated structures, and the realignment of US 97 closer to residential neighborhoods could impact quality of life for residents in the API ■ Connectivity and safety for vehicles, pedestrians, and bicyclists generally improved particularly associated with the local street network (including travel to and from area businesses). However, in the vicinity of 3rd Street north of Cooley Road, the Hunnell Neighborhood would be bisected by 3rd Street, decreasing community cohesion in this localized area ■ Increased efficiency of local and regional freight movement, creating opportunities to enhance local and regional economies.	■ Increased air, noise, and visual impacts of new and expanded local roads, elevated structures, and the realignment of US 97 closer to residential neighborhoods could impact quality of life for residents in the API ■ Connectivity and safety for vehicles, pedestrians, and bicyclists generally improved particularly associated with the local street network (including travel to and from area businesses). However, community cohesion would decrease in the vicinity of Bowery Lane between Hunnell Road and 3rd Street because of the increased presence of cut-through traffic. ■ Increased efficiency of local and regional freight movement, creating opportunities to enhance local and regional economies. ■ Displacement of 13 residences, 51 businesses, 3 billboards, and ~~200~~ 250 rental storage units ■ PM Peak Traffic ◆ Bowery Lane between Hunnell Road and 3rd Street: 60—90 vehicles/hour. ◆ Hunnell Road: 180—260 vehicles/hour.	■ Increased air, noise, and visual impacts of new and expanded local roads, primarily located within the Bend UGB, and the realignment of US 97 closer to the Boyd Acres Neighborhood could impact quality of life for residents in the API ■ Community cohesion enhanced with improved connectivity for vehicles, pedestrians and bicyclists. Community cohesion adversely affected by property acquisitions and residential displacements; the magnitude of this impact is less than under the East DS1 and East DS2 Alternatives. ■ Increased efficiency of local and regional freight movement, creating opportunities to enhance local and regional economies.

Note: This revised exhibit reflects corrections to the impacts that would result from the East DS1 and East DS2 Alternatives, includes updated information for the 2036 No Build Alternative where applicable, and includes the impacts and benefits of the Preferred Alternative.

Exhibit ES-7 FEIS: *Summary of Adverse and Beneficial Impacts of the Proposed Action*

Resource Element	No Build Alternative	East DS1 Alternative	East DS2 Alternative	Preferred Alternative
Long-term impacts		■ Displacement of 19 residences, 43 businesses, 4 billboards, and ~~200~~ 250 rental storage units ■ PM peak traffic volumes ◆ Bowery Lane between Hunnell Road and 3rd Street: 20—50 vehicles/hour. ◆ Hunnell Road: 80—140 vehicles/hour.Emergency service provider response times would decrease when compared to the No Build Alternative for 2 out of 6 sampled routes and would increase for 4 out of 6 routes. Response times would increase compared to existing conditions due to increased traffic volumes and out-of-direction travel. ■ Access to US 97 would require longer routes on local streets, including Bowery Lane and Hunnell Road. Segments of Bowery Lane and Hunnell Road would be unpaved. Access to southbound US 97 would occur at Empire Avenue. Access to northbound US 97 would occur at Empire Avenue or via 3rd Street at the northern interchange.	■ Emergency service provider response times would decrease when compared to the No Build Alternative for 2 out of 6 sampled routes and would increase for 4 out of 6 routes. Response times would increase compared to existing conditions due to increased traffic volumes and out-of-direction travel. ■ Access to US 97 would require longer routes on local streets, including Bowery Lane and Hunnell Road. Segments of Bowery Lane and Hunnell Road would be unpaved. Access to southbound US 97 would occur at Empire Avenue. Access to northbound US 97 would occur at Empire Avenue or via 3rd Street at the northern interchange.	■ Displacement of 6 residences, 44 businesses, 2 billboards, and 250 rental storage units ■ PM peak traffic volumes ◆ Hunnell Road: 100-595 vehicles/hour ■ Emergency service provider response times will decrease when compared to the No Build Alternative for 5 out of 6 sampled routes and will increase for 1 out of 6 routes. Response times will increase compared to existing conditions due to increased traffic volumes. ■ Access to northbound and southbound US 97 will occur at Empire Avenue and the northern signalized intersection of US 97 and 3rd Street.
Temporary construction impacts	■ None.	■ Residences affected by temporary road closures, detours, delay and congestion, modified travel routes, approach changes ■ Businesses affected by temporary road closures, detours, delay and congestion, modified travel routes, approach changes.		

Note: This revised exhibit reflects corrections to the impacts that would result from the East DS1 and East DS2 Alternatives, includes updated information for the 2036 No Build Alternative where applicable, and includes the impacts and benefits of the Preferred Alternative.

Exhibit ES-7 FEIS: *Summary of Adverse and Beneficial Impacts of the Proposed Action*

Resource Element	No Build Alternative	East DS1 Alternative	East DS2 Alternative	Preferred Alternative
Parks and Recreational Facilities				
Long-term impacts	■ None.	■ ~~None~~ No conversion of existing park or recreational facilities or alteration of existing trails ■ Connectivity and function of planned trails retained ■ Requires refinement of the conceptual alignment of the Rails with Trails Corridor at crossing with Cooley Road ■ No impacts to Section 4(f) or Section 6(f) resources.		
		■ Requires refinement of conceptual alignment of the extension of the North Parkway Trail between Empire Avenue and Robal Road.		■ Requires refinement of conceptual alignment of the extension of the North Parkway Trail between Empire Avenue and Robal Road; trail undercrossing included in design of Preferred Alternative will accommodate realignment of this future trail
Temporary construction impacts	■ None.	■ Trail users exposed to construction noise, vehicle, and work light illumination, and air and dust emissions.		
Historic Resources				
Long-term impacts	■ None.	■ Finding: Adverse effect to one historically significant property, resulting in a "use" under Section 4(f) ■ Finding: No adverse effect to ~~four~~ five historically significant properties, resulting in a *"de minimis* impact" under Section 4(f).		■ Section 106 finding of adverse effect and Section 4(f) individual evaluation for the Nels and Lillian Andersen House impacted by relocation or removal. ■ Section 4(f) ***de minimis*** findings for: Oregon Trunk Railway and Swalley Riley Lateral.
Temporary construction impacts	■ None.	■ Temporarily affect historic resources with dust, noise and vibration.		

Note: This revised exhibit reflects corrections to the impacts that would result from the East DS1 and East DS2 Alternatives, includes updated information for the 2036 No Build Alternative where applicable, and includes the impacts and benefits of the Preferred Alternative.

Exhibit ES-7 FEIS: *Summary of Adverse and Beneficial Impacts of the Proposed Action*

Resource Element	No Build Alternative	East DS1 Alternative	East DS2 Alternative	Preferred Alternative
Visual Resources				
Long-term impacts	■ None.	■ Decrease the visual quality in the area between Cooley Road and Fort Thompson Lane, including the Hunnell neighborhood.		■ Minimal decrease in visual quality within the API.
Temporary construction impacts	■ None.	■ Temporary visual impacts due to construction equipment, materials, and work activities ■ Glare from construction lights.		
Water Quality, Stormwater Runoff, and Hydrology				
Long-term impacts	■ 44 acres of impervious surfaces ■ 50% stormwater treatment (incidental treatment only) ■ 0 stormwater ponds and 0 stormwater swales ■ No change to roadway pollutant loads per year ■ No drywells and drainwells removed or stormwater treatment installed.	■ 49 acres of net new impervious surfaces ■ 99 acres of impervious surfaces treated ■ 100% stormwater treatment (56% formal treatment, 44% incidental treatment) ■ 6 stormwater ponds and 3 stormwater swales (2.3 acres) ■ Increased roadway pollutant loads per year.	■ 40 acres of net new impervious surfaces ■ 90 acres of impervious surfaces treated ■ 100% stormwater treatment (63% formal treatment, 37% incidental treatment) ■ 6 stormwater ponds and 4 stormwater swales (2.4 acres) ■ Increased roadway pollutant loads per year.	■ 39 acres of net new impervious surfaces ■ 95 acres of impervious surfaces treated ■ 100% stormwater treatment (59% formally treated, 41% incidentally treated) ■ 15 stormwater ponds and 6 stormwater swales (2.7 acres) ■ Increased roadway pollutant loads per year.
		■ Existing drywells and drainwells removed and stormwater treatment facilities installed to benefit groundwater by removing a route for contaminants to reach groundwater and drinking water		
Temporary construction impacts	■ None.	■ Potential soil erosion, increasing sediment and suspended solids from clearing and grading of 115–140 acres ■ Potential concrete spills or contaminant movement from stormwater runoff.		

Note: This revised exhibit reflects corrections to the impacts that would result from the East DS1 and East DS2 Alternatives, includes updated information for the 2036 No Build Alternative where applicable, and includes the impacts and benefits of the Preferred Alternative.

***Exhibit ES-7 FEIS:** Summary of Adverse and Beneficial Impacts of the Proposed Action*

Resource Element	No Build Alternative	East DS1 Alternative	East DS2 Alternative	Preferred Alternative
Natural Systems and Communities				
Long-term impacts	■ No removal of strategy habitat ■ No loss of habitat linkage feature	■ Removal of 66 acres of western juniper woodlands habitat and sagebrush shrublands/shrub-steppe strategy habitat ■ ~~Loss of approximately 950 linear feet of habitat linkage feature through piping of the Swalley Canal.~~ ■ Loss of approximately 70 linear feet of habitat linkage feature through piping of the Swalley Riley Lateral.	■ Removal of 62 acres of western juniper woodlands habitat and sagebrush shrublands/shrub-steppe strategy habitat ■ ~~Loss of approximately 2,300 linear feet of habitat linkage feature through piping of the Swalley Canal.~~ ■ Loss of approximately 70 linear feet of habitat linkage feature through piping of the Swalley Riley Lateral.	■ Removal of 16 acres of western juniper woodlands habitat and sagebrush shrublands/shrub-steppe strategy habitat ■ Loss of approximately 70 linear feet of habitat linkage feature through piping of the Swalley Riley Lateral.
Temporary construction impacts	■ None.	■ Strategy habitats temporarily exposed to increased noise, dust, and human activity during construction.		
Wetlands and Other Waters				
Long-term impacts	■ No new canal piping as a result of the proposed action.	■ ~~Pipe approximately 950 feet of the Swalley Canal.~~ ■ New piping of lateral lines connecting to Swalley Main Canal Pipeline: 515 feet.	■ ~~Pipe approximately 2,300 feet of the Swalley Canal.~~ ■ New piping of lateral lines connecting to Swalley Main Canal Pipeline: 515 feet.	■ New piping of lateral lines connecting to Swalley Main Canal Pipeline: 380 feet.
Temporary construction impacts	■ None.	■ No impacts to wetlands and other waters because construction of canal crossings would occur during dry conditions.		

Note: This revised exhibit reflects corrections to the impacts that would result from the East DS1 and East DS2 Alternatives, includes updated information for the 2036 No Build Alternative where applicable, and includes the impacts and benefits of the Preferred Alternative.

Exhibit ES-7 FEIS: *Summary of Adverse and Beneficial Impacts of the Proposed Action*

Resource Element	No Build Alternative	East DS1 Alternative	East DS2 Alternative	Preferred Alternative
Threatened and Endangered Species				
Long-term impacts	■ No habitat removal for threatened and endangered species.	■ Removal of 1 acre of marginal habitat for a state threatened plant.		
Temporary construction impacts	■ None.	■ None.		
Non-Threatened and Endangered Species				
Long-term impacts	■ No loss of habitat for strategy species ■ No loss of urban habitat.	■ Loss of 66 acres of habitat for non-threatened and endangered, strategy species associated with the western juniper woodlands habitat and sagebrush shrublands/shrub-steppe strategy habitat.	■ Loss of 62 acres of habitat for non-threatened and endangered, strategy species associated with the western juniper woodlands habitat and sagebrush shrublands/shrub-steppe strategy habitat.	■ Loss of 16 acres of habitat for non-threatened and endangered, strategy species associated with the western juniper woodlands habitat and sagebrush shrublands/shrub-steppe strategy habitat.
		■ Loss of 34 acres of urban habitat.		■ Loss of 24 acres of urban habitat.
Temporary construction impacts	■ None.	■ Non-threatened and endangered species temporarily exposed to increased noise, dust, and human activity.		

Note: This revised exhibit reflects corrections to the impacts that would result from the East DS1 and East DS2 Alternatives, includes updated information for the 2036 No Build Alternative where applicable, and includes the impacts and benefits of the Preferred Alternative.

***Exhibit ES-7 FEIS:** Summary of Adverse and Beneficial Impacts of the Proposed Action*

Resource Element	No Build Alternative	East DS1 Alternative	East DS2 Alternative	Preferred Alternative
Invasive Species				
Long-term impacts	■ No improvements to roadways near priority invasive species.	■ Increased roadway activity along Cooley Road and Clausen Drive resulting from roadway improvements, potentially spreading priority invasive species.		
Temporary construction impacts	■ None.	■ Approximately ~~152~~ 140 acres of ground disturbed during construction, resulting in the potential spread of invasive species.	■ Approximately 132 acres of ground disturbed during construction, resulting in the potential spread of invasive species.	■ Approximately 115 acres of ground disturbed during construction, resulting in the potential spread of invasive species.
Air Quality				
Long-term impacts	■ Reduction of regional and local level mobile source air toxic emissions due to national emissions control programs regardless of any local increase in vehicle-miles traveled on US 97 ■ Since no alternative is predicted to affect regional VMT, background pollutant concentrations are not expected to increase and localized pollutant concentrations are not expected to exceed the National Ambient Air Quality Standards (NAAQS).			
Temporary construction impacts	■ None.	■ Temporary degradation of air quality resulting from excavation, grading, hauling and various other activities ■ Short-term emissions from construction equipment, including carbon monoxide, nitrogen oxides, volatile organic compounds, directly-emitted respirable and fine particulate matter, and toxic air contaminants such as diesel exhaust particulate matter.		

Note: This revised exhibit reflects corrections to the impacts that would result from the East DS1 and East DS2 Alternatives, includes updated information for the 2036 No Build Alternative where applicable, and includes the impacts and benefits of the Preferred Alternative.

Exhibit ES-7 FEIS: *Summary of Adverse and Beneficial Impacts of the Proposed Action*

Resource Element	No Build Alternative	East DS1 Alternative	East DS2 Alternative	Preferred Alternative
Noise				
Long-term impacts	■ Noise impacts at 18 sites, including 46 residences and 5 businesses.	■ Noise impacts at 23 sites, including 59 residences and 5 businesses.	■ Noise impacts at 26 sites, including 63 residences and 5 businesses.	■ Noise impacts at 21 sites, including 67 residences and outdoor areas at 8 businesses.
Temporary construction impacts	■ None.	■ Noise temporarily generated by construction activities, equipment, and delivery vehicles.		
Energy				
Long-term impacts	■ Vehicle-miles traveled in the API: 411,284 miles/day ■ Fuel consumption: 15,663 gallons/day ■ Energy consumption: 2,022 million British Thermal Units (Btu)/day.	■ Vehicle-miles traveled in the API: 670,449 miles/day ■ Fuel consumption: 25,487 gallons/day ■ Energy consumption: 3,293 million Btu/day.	■ Vehicle-miles traveled in the API: 634,144 miles/day ■ Fuel consumption: 24,220 gallons/day ■ Energy consumption: 3,128 million Btu/day.	■ Vehicle-miles traveled in the API: 436,457 miles/day ■ Fuel consumption: 16,442 gallons/day ■ Energy consumption: 2,119 million Btu/day.
Temporary construction impacts	■ None.	■ Fuel consumption: 7.5 million gallons ■ Energy consumption: 932,170 million Btu.	■ Fuel consumption: 7.6 million gallons ■ Energy consumption: 953,114 million Btu.	■ Fuel consumption: 7.0 million gallons ■ Energy consumption: 880,245 million Btu.

Note: This revised exhibit reflects corrections to the impacts that would result from the East DS1 and East DS2 Alternatives, includes updated information for the 2036 No Build Alternative where applicable, and includes the impacts and benefits of the Preferred Alternative.

***Exhibit ES-7 FEIS:** Summary of Adverse and Beneficial Impacts of the Proposed Action*

Resource Element	No Build Alternative	East DS1 Alternative	East DS2 Alternative	Preferred Alternative
Geology				
Long-term impacts	■ No ground disturbance.	■ ~~152~~ 140 acres of ground disturbance.	■ 132 acres of ground disturbance.	■ 115 acres of ground disturbance.
Temporary construction impacts	■ None.	■ Erosion of exposed soils.		
Hazardous Materials				
Long-term impacts	■ No disturbance or remediation of known contaminated sites.	■ Potential disturbance and remediation of 1 individual and 3 multi-property known contaminated sites.		
Temporary construction impacts	■ None.	■ Potential exposure or mobilization of contaminants from grading ■ Potential contamination of water discharge areas from dewatering ■ Potential disturbance of unknown contamination (undocumented storage tanks, asbestos-containing materials and lead-based paint) from excavation, earthwork, grading, and utility work ■ Potential mercury groundwater contamination and worker exposure to mercury from high intensity discharge mercury vapor lamps.		

Note: This revised exhibit reflects corrections to the impacts that would result from the East DS1 and East DS2 Alternatives, includes updated information for the 2036 No Build Alternative where applicable, and includes the impacts and benefits of the Preferred Alternative.

ES.5 Unresolved Issues

There are several outstanding issues that will need to be resolved prior to publishing the Final EIS. These issues were identified by the project team earlyon and are expected to be successfully resolved.

All of the unresolved issues identified in the Draft EIS have been resolved for the Preferred Alternative, as demonstrated in the following sections.

Goal Exceptions

Construction of roadways outside of the UGB would require exceptions to Oregon Statewide Planning Goals 11 (public facilities and services) and 14 (urbanization). Two goal exceptions are anticipated for the East DS1 and East DS2 Alternatives: one for the new US 97/3rd Street interchange and one for the Robal Road extension west of US 20 to OB Riley Road. Through the goal exception process, the proposed action would need to demonstrate that it meets the applicable standards for exceptions for transportation improvements, which are listed in OAR 660-012-0070. They require the applicant to:

- Identify the transportation need
- Demonstrate that the need cannot "reasonably be accommodated" through alternatives not requiring goal exceptions, such as through improvements to existing facilities or in locations not requiring new exceptions (such as on lands inside the UGB)
- Compare the economic, social, environmental and energy consequences of the recommended alternative with other alternatives, and select the recommended alternative only if the net economic, social, environmental and energy consequences of that alternative, with mitigation, are not significantly more adverse than the net consequences of the other alternatives
- Provide measures to minimize development pressures on rural lands and protect such lands for rural uses.

Definition

Oregon Statewide Planning Goals

The Oregon Statewide Planning Goals were established in 1973 and constitute the framework for the statewide land use planning program.

The Preferred Alternative will not require any exceptions to the statewide planning goals. All of the improvements will be contained within the City of Bend's UGB except for the extension of Britta Street and the modification of the Cooley Road/O.B. Riley Road intersection to construct a roundabout, which will be constructed to County standards.

Interchange Area Management Plans

Interchange area management plans would be developed to protect the function of the existing interchange at Empire Avenue and a future interchange in the northern portion of the API. The interchange area management plan for the Empire Avenue interchange would

help ensure that this facility continues to provide safe and efficient connections between US 97, US 20, and the local roadways within the vicinity of the interchange. The interchange area management plan for the new northern interchange under the East DS1 and East DS2 Alternatives would serve a similar function; to ensure that the US 97 facility would operate as intended over a long-range planning horizon. Both interchange area management plans would identify land use management strategies, short-term and long-term transportation improvements, access management goals, and strategies to fund identified improvements. The City of Bend and Deschutes County would adopt policies and ordinances necessary to implement the interchange area management plans prior to the publication of the Final EIS. The interchange area management plans would be adopted by the Oregon Transportation Commission prior to the beginning of construction.

Definition

Interchange Area Management Plan

An interchange area management plan is a joint ODOT and local government long term (20+ years) transportation and land use plan to balance and manage transportation and land use decisions in interchange areas, and is an important tool in protecting the function of state highway interchanges and the supporting local street network (ODOT 2006b).

Since the publication of the Draft EIS, ODOT determined that no changes to land use along Empire Avenue would occur, so an interchange area management plan would not be required for the US 97/Empire Avenue interchange. The Preferred Alternative does not include a northern interchange and no changes to land use along Empire Avenue will occur; thus an interchange area management plan is not required.

Highway Designations

US 97 is currently classified as a highway of statewide significance and is designated as an expressway and as a freight route on the National Highway System. The proposed new alignments associated with the build alternatives would be constructed and operated as an access controlled expressway consistent with the bypass policies in the Oregon Highway Plan and Bypass Policy. The remaining portion of US 97 would be reclassified by the Oregon Transportation Commission or transferred to the local jurisdiction.

Definition

Bypass

Bypasses are highways designed to maintain or increase mobility for through traffic. Generally they relocate the highway alignment around a downtown, an urban or metropolitan area or an existing highway to provide an alternative route for through traffic using that highway.

ODOT will coordinate with the Oregon Transportation Commission to apply the bypass, expressway, and freight route designations to the portions of US 97 that will be realigned under the Preferred Alternative.

Local Plan Amendments and Land Use Permits

The Preferred Alternative to be identified in the Final EIS would need to be adopted and amended into the Bend Metropolitan Planning Organization's *2007–2030 Metropolitan Transportation Plan.* The *2007–2030 Metropolitan Transportation Plan* is a 20-year long-range transportation plan that addresses all modes of transportation, establishes transportation policy and project priorities, and includes a financially constrained project list. Part of the long-range planning process is development of a long-range revenue forecast. Only projects

that fit within or can be funded with forecasted revenues are included in the *2007–2030 Metropolitan Transportation Plan.* ODOT is coordinating with the Bend Metropolitan Planning Organization for adoption of the Preferred Alternative into the next update of the plan (FHWA 2011).

The Preferred Alternative would also need to be adopted and amended into the *Bend Area General Plan, Bend Urban Area Transportation System Plan, Deschutes County Comprehensive Plan,* and *Deschutes County Transportation System Plan.* Any new local roads outside of existing right of way could require land use permits from the City and County.

Portions of the Preferred Alternative have identified funding and are included in the financially-constrained list in the ***2007-2030 Metropolitan Transportation Plan.*** On August 15, 2013, the Bend Metropolitan Planning Organization voted to amend the ***2007-2030 Metropolitan Transportation Plan*** to include the remaining portions of Preferred Alternative in the Plan's illustrative list, thereby making the Preferred Alternative consistent with this plan.

As determined by Deschutes County in June 2013, the Britta Street extension in unincorporated Deschutes County, which is part of the Preferred Alternative, is already included in the ***Deschutes County Transportation System Plan*** (see Appendix M). The roundabout at Cooley Road and O.B. Riley Road has been designed in coordination with Deschutes County. On June 14, 2013, ODOT and Deschutes County agreed that this improvement will be added to the ***Deschutes County Transportation System Plan*** when the project is funded for construction. Therefore, the Preferred Alternative is consistent with the ***Deschutes County Transportation System Plan*** and the ***Deschutes County Comprehensive Plan.***

The City of Bend's ***Bend Urban Area Transportation System Plan*** has been amended to include the Preferred Alternative (March 5, 2014).

Areas Remaining to be Surveyed

Some areas within the area of potential effect (APE) have not yet been surveyed for archaeological resources due to land owners not granting permission for surveys and design changes to the alternatives that occurred since the surveys were conducted. Upon gaining right of entry ODOT would survey all remaining areas and comply with Section 106 of the National Historic Preservation Act prior to construction.

All areas within the design footprint of the Preferred Alternative have been surveyed for archaeological resources, with the exception of small areas adjacent to the existing right of way on eight parcels that

Definition

Area of Potential Effect (APE)

The APE is the area within which an undertaking may cause direct or indirect effects to the character or use of historic properties.

total approximately 1.8 acres. The Final EIS includes a commitment by ODOT to survey these remaining areas for archaeological resources prior to construction as ODOT purchases right of way and takes ownership.

ES.6 Identified Areas of Concern

Throughout the alternatives development process a number of issues were raised by the public, participating agencies, and the ODOT-sponsored committees. Generally, the primary areas of concern were:

- **Changes to Approaches and Travel Routes**—Visibility of businesses from the realigned US 97, travel routes to businesses from US 97, and changes to businesses' private driveways, public street connections, and public approach roads are concerns that have been raised repeatedly
- **Emergency Service Providers**—Impacts to emergency response time as a result of altered travel routes and loss of emergency response vehicle maneuvering (U-turn) on US 97 between Empire Avenue and Cooley Road have been raised as an area of concern by emergency service providers
- **Business and Residential Displacements**—Representatives from individual businesses, established business areas, and the residential areas in and around the API have expressed concern about displacements resulting from right of way acquisition and availability of commercial, industrial and residential properties that would be suitable for relocation
- **Quality of Life**—Concerns regarding potential impacts to quality of life have been raised by residents and business representatives throughout the API. These impacts could include:
  - Increased air, noise, and visual impacts of new and expanded local roads, elevated structures, and the realignment of US 97 closer to residential neighborhoods
  - Availability of affordable housing for relocated residents
  - Roadway connectivity and travel routes to existing and future destinations, including out-of-direction travel once access is modified and private driveways on US 97 are eliminated.

The Preferred Alternative was specifically developed to address many of these concerns either through avoidance, such as replacing the northern interchange with a signalized intersection that is wholly contained within the City of Bend UGB, or minimization, such as decreasing impacts to rural residential lands.

More Information

Three ODOT sponsored committees conducted formal meetings throughout development of the proposed action, including:

- Citizen Advisory Committee
- Agency Coordination Committee
- Steering Team

ES.7 Permits and Approvals Needed

Federal, state, and local actions, permits, plan amendments, and approvals would be required for the proposed action, as listed in Exhibit ES-8 FEIS.

ODOT will obtain these permits, approvals, plan amendments, and licenses for the Preferred Alternative prior to initiating construction.

ES.8 Avoidance, Minimization, and/or Mitigation Commitments Incorporated into the Preferred Alternative

Avoidance, minimization, and mitigation commitments incorporated into the Preferred Alternative may be found in each subsection of Chapter 3.

***Exhibit ES-8** FEIS: Permits and Approvals Required*

Agency	Permit/Approval/License	Updated Final EIS Status
Federal Highway Administration	Section 106 determination with Memorandum of Agreement	Completed
Federal Highway Administration	Section 4(f) Evaluation Approval	Completed
Oregon Department of Environmental Quality	National Pollution Discharge Elimination System General Construction Permits (including 1200-CA)	To Be Obtained During Final Design
Oregon Department of Environmental Quality	Oversight of hazardous materials issues	To Be Obtained During Final Design
Oregon Department of Environmental Quality	Site preparation permits for grading, erosion, blasting, and air and noise emissions	To Be Obtained During Final Design
Oregon Department of Transportation	Permit for relocation of utility lines in a state road right of way	To Be Obtained During Final Design
Oregon Department of Transportation	Compliance with Oregon Senate Bill 408	To Be Obtained During Final Design
Oregon Department of Water Resources	Water Rights	To Be Obtained During Final Design
State Historic Preservation Office	Section 106 Historic Resource Concurrence	Completed
Bend Metropolitan Planning Organization	Amendment of *2007-2030 Metropolitan Transportation Plan*	Completed
Deschutes County	Amendment of Deschutes County Comprehensive Plan	Not Required for the Preferred Alternative
Deschutes County	Amendment of Deschutes County Transportation System Plan	Not Required for the Preferred Alternative
Deschutes County	Compliance with Deschutes County Code	To Be Obtained During Final Design
Deschutes County	Goal Exception Application for Statewide Planning Goals 11 (Public Facilities and Services) and 14 (Urbanization)	Not Required for the Preferred Alternative
Deschutes County	Grading Permit	To Be Obtained During Final Design

***Exhibit ES-8** FEIS: Permits and Approvals Required*

Agency	Permit/Approval/License	Updated Final EIS Status
Deschutes County	Land Use Permit	To Be Obtained During Final Design
Deschutes County	Noise variance	To Be Obtained During Final Design
Deschutes County	Utility Permit	To Be Obtained During Final Design
City of Bend	Amendment of Bend Area General Plan	Completed
City of Bend	Amendment of Bend Urban Area Transportation System Plan	Completed
City of Bend	Approval of a Special Planned Areas application (Lava Ridge Refinement Plan Area)	To Be Obtained During Final Design
City of Bend	Land Use Permit	To Be Obtained During Final Design
City of Bend	Landmarks Commission Approval for relocating or removing the Nels and Lillian Andersen House	To Be Obtained During Final Design
City of Bend	Demolition Permit	To Be Obtained During Final Design
City of Bend	Noise variance	To Be Obtained During Final Design
City of Bend	Compliance with Bend Development Code	To Be Obtained During Final Design
BNSF Railway	Encroachment/Crossing Permit	To Be Obtained During Final Design
Swalley Irrigation District	Encroachment/Crossing Easements	To Be Obtained During Final Design

Note: This exhibit was updated to identify the status of each permit or approval at the time of publication of the Final EIS. Additional permits and approvals identified during the development of the Final EIS are shown in the colored text.

Chapter 1
Purpose of and Need for Proposed Action

1.1 Introduction

Chapter 1 Content

1.1 Introduction
1.2 Purpose of the Proposed Action
1.3 Need for the Proposed Action
1.4 Background
1.5 Goals and Objectives

The Oregon Department of Transportation (ODOT) and Federal Highway Administration (FHWA) propose to improve an approximate sixmile corridor on US 97 in Deschutes County, Oregon between the Deschutes Market Road/Tumalo Junction interchange and the Empire Avenue interchange (Exhibit 1-1). Solutions that address the traffic problems on the US 97 corridor could result in ancillary improvements to other roadways in the vicinity.

Bend is located in Central Oregon, approximately two to three hours from all major metropolitan areas in the Willamette Valley and midway between the Washington and California borders. It is surrounded by the Cascade Mountains on the west and the high desert to the east, providing unique and diverse recreational opportunities year round. Bend is the largest city east of the Cascades and, between April 2000 and July 2006, it was the fourth-fastest growing metropolitan area in the US (US Census Bureau 2007). US 97 is a designated freight route on the National Highway System, is the only major north-south state highway east of the Cascade Mountains in Oregon, complements the I5 corridor, and is the key transportation corridor for interstate and regional travel of trucks and passenger cars in Central Oregon.

Definition

Area of Potential Impact

The area of potential impact (API) is the area within which potential direct impacts from the proposed action could occur.

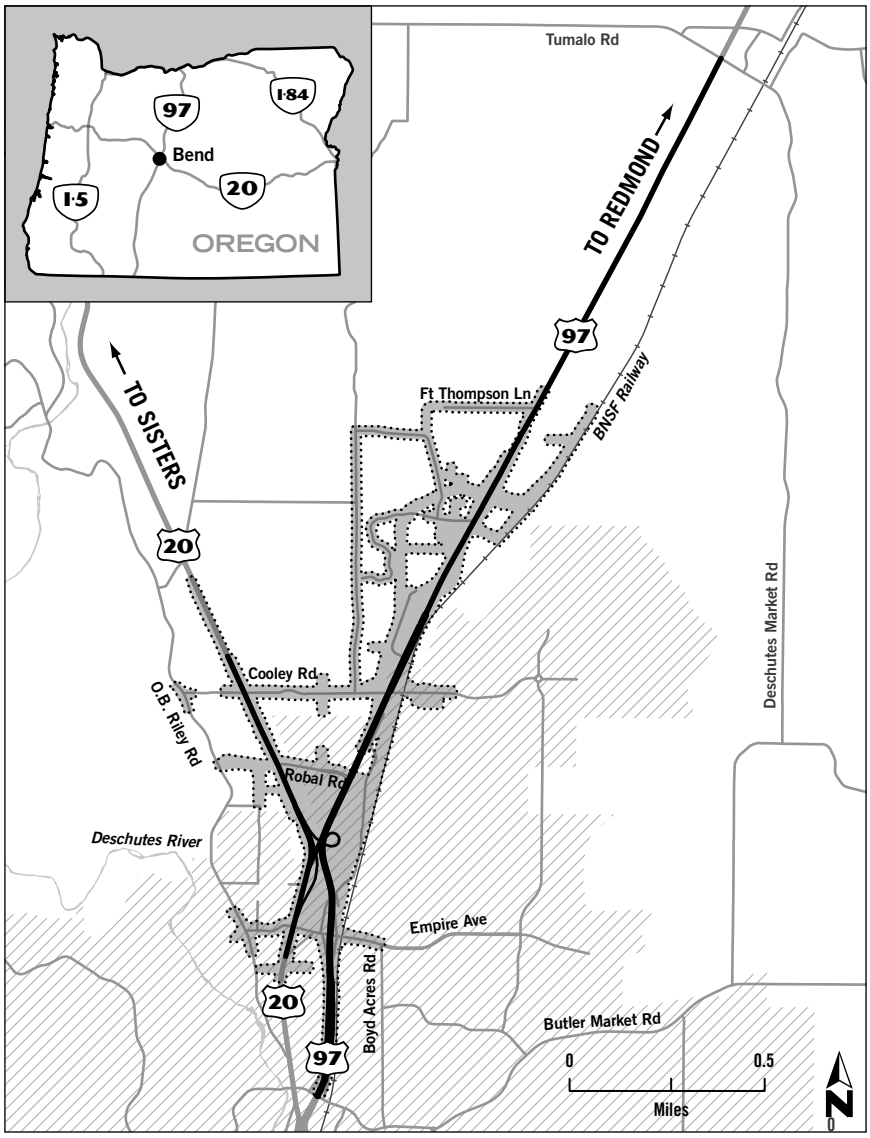
US 97 is classified as a statewide facility and freight route along its entire length, and as an expressway from the City of Redmond through Bend and in many other sections of the highway. US 97 is a critical link in moving goods and people through Central Oregon. In the Bend area, US 97 also serves as a route for local residents to travel to and from home and work, and it is a connection to area shopping, dining, businesses, schools, and recreation.

In the fall of 2004, ODOT began the refinement planning process to develop conceptual solutions to current and projected transportation problems. Traffic analysis showed that US 97 is highly congested in the north end of Bend, especially at the intersections of US 97/Cooley Road and US 97/Robal Road. This planning process culminated with the US 97 and US 20 Refinement Plan Final Report (Kittelson and Associates, Inc. 2007), which documented the development, evaluation, and narrowing of a range of system concepts. Two system concepts were forwarded for further alternatives analysis that would comply with the National Environmental Policy Act and other environmental regulations. Improvement of this transportation corridor and specific

Chapter 1 Purpose of and Need For Proposed Action
Chapter 2 Alternatives
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Chapter 4 Cumulative Impacts
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intersections is essential for the economic viability of Bend, Central Oregon communities, and for the state as a whole.

Exhibit 1-1: *Project Vicinity Map and Area of Potential Impact*



The purpose of and need for a proposed action is essential in establishing a basis for the development of a reasonable range of alternatives for detailed study and comparison in the environmental impact statement (EIS), and assists with the identification and eventual selection of a Preferred Alternative. Needs establish "why" a problem exists or is expected to occur in the future; the purpose statement asserts "what" is intended to be addressed.

The proposed action's area of potential impact (API) is the area within which direct impacts could occur. The API, which extends 100-feet outside of the construction limits (the maximum extent of

Definitions

Needs

The needs establish "why" a problem exists or is expected to occur in the future.

Purpose

The purpose asserts "what" is intended to be to addressed.

potential ground disturbing activities) for the proposed action's build alternatives, generally lies between Fort Thompson Lane to the north, the US 97/Butler Market Road interchange to the south, O.B. Riley Road to the west, and the BNSF Railway to the east. The API is shown in Exhibit 1-1, including the extent which lies within the City of Bend's urban growth boundary (UGB).

The Draft EIS documents all alternatives considered during the development and narrowing of alternatives. A reasonable range of alternatives are analyzed in detail within the Draft EIS to disclose the potential beneficial and adverse environmental impacts that would result from the proposed action. The Draft EIS is published and circulated for public comment, including a public hearing, which in turn contributes to recommending which alternative is identified as the Preferred Alternative. A Final EIS will be prepared to document the Preferred Alternative recommendation as well as responses to public and agency comments submitted on the Draft EIS.

Portions of the Preferred Alternative have identified funding and are included in the financially-constrained list in the Bend Metropolitan Planning Organization's *2007–2030 Bend Metropolitan Transportation Plan.* On August 15, 2013 the Bend Metropolitan Planning Organization amended the illustrative list in the *2007–2030 Metropolitan Transportation Plan* to include the remaining portions of the Preferred Alternative.

Since the publication of the Draft EIS, the project's API has been slightly expanded to include areas that would potentially be impacted by the Preferred Alternative.

The alternatives contained in the Final EIS are the same as those in the Draft EIS and also includes the Preferred Alternative, which is a modification of one of the alternatives considered in the Draft EIS. The Preferred Alternative was developed in response to comments received on the Draft EIS. The Draft EIS was published in July 2011 and circulated for public comment, including a public hearing. This Final EIS discloses the beneficial and adverse impacts resulting from the Preferred Alternative, documents the Preferred Alternative recommendation, and responds to public and agency comments submitted on the Draft EIS.

1.2 Purpose of the Proposed Action

The purpose of the proposed action is to improve safety and mobility for trucks and automobiles on US 97 by implementing a practical design solution that is affordable within the potential 20-year funding opportunities and that meets the following performance objectives for the mediumterm (5-10 years) and longterm (over 10 years) planning

Definitions

Proposed Action

The proposed action is a proposal developed to resolve the problem identified in the purpose and need statement.

Practical Design

Practical design is a strategy to deliver focused benefits for the State's transportation system while working with the realities of a fiscally constrained funding environment.

Congestion

Congestion is travel time or delay in excess of what is normally incurred under light or free-flow travel conditions.

Incremental Improvements

The proposed action would likely be constructed in phases to match incremental, smaller funding packages. Each incremental, or phased, improvement would be designed and implemented to provide operational and safety benefits to US 97.

periods as defined by the Bend Metropolitan Planning Organization's *2007–2030 Metropolitan Transportation Plan.* Performance objectives for the proposed action include:

- Makes incremental improvements to reduce delay, congestion, and the number and severity of crashes at the US 97/Cooley Road and US 97/Robal Road intersections within the mediumterm planning period
- Reduces delay and congestion, and improves safety and operations on US 97 as an expressway between the Deschutes Market Road/ Tumalo Junction interchange and Empire Avenue interchange
- Supports economic development consistent with local agency plans; minimizes impacts to existing and planned local economic base; and provides for existing and planned local connectivity within the longterm planning period.

Definitions

Queuing

Queuing is the amount of traffic stopped to proceed through an intersection. Small queues of a few vehicles are typically acceptable. However, when queues become long and extend through adjacent intersections, drivers become frustrated and may attempt to bypass queues by changing their travel route or travel time, or cut through neighborhoods.

Delay

Delay results from slowed or stopped traffic, and is measured as the additional time spent traveling compared to normal travel times under light or free-flow travel conditions.

Peak Hour

A peak hour (or rush hour) is a part of the day with the highest traffic volume during which traffic congestion on roads is worst. Normally, the two peak hour periods (morning [am] and evening [pm]) occur when people are traveling to or from work or school. The 2007 evening peak hour in the API is 4:00 to 5:00 pm. By 2035, the peak period will likely spread across multiple hours.

1.3 Need for the Proposed Action

Based on the current and future traffic conditions on US 97, the proposed action must address the following:

- Congestion at approaches
- Traffic flow within the corridor
- Safety.

1.3.1 Congestion at Approaches

Congestion occurs when the amount of traffic volume using a roadway exceeds the available capacity of the roadway. Congestion is typically measured at intersections by comparing the number of vehicles using or expected to use a given road segment (volume) with the number of vehicles the road segment is designed to handle (capacity). This is called the volume to capacity (v/c) ratio.

The 1999 *Oregon Highway Plan* sets highway mobility standards for v/c ratios on different types of existing roads in Oregon. The highway mobility standards v/c ratio is 0.80 for the portion of US 97 located within the Bend Metropolitan Planning Organization boundary. Exhibit 1-2 shows the urban and rural designated expressway segments, and identifies the highway mobility standard (v/c ratio) for each segment. Exhibit 1-3 illustrates the existing (2007) and future (2035), absent any major improvements, v/c ratios at intersections within the API.

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Exhibit 1-2 Designated Expressway Segments and Highway-Mobility Standards

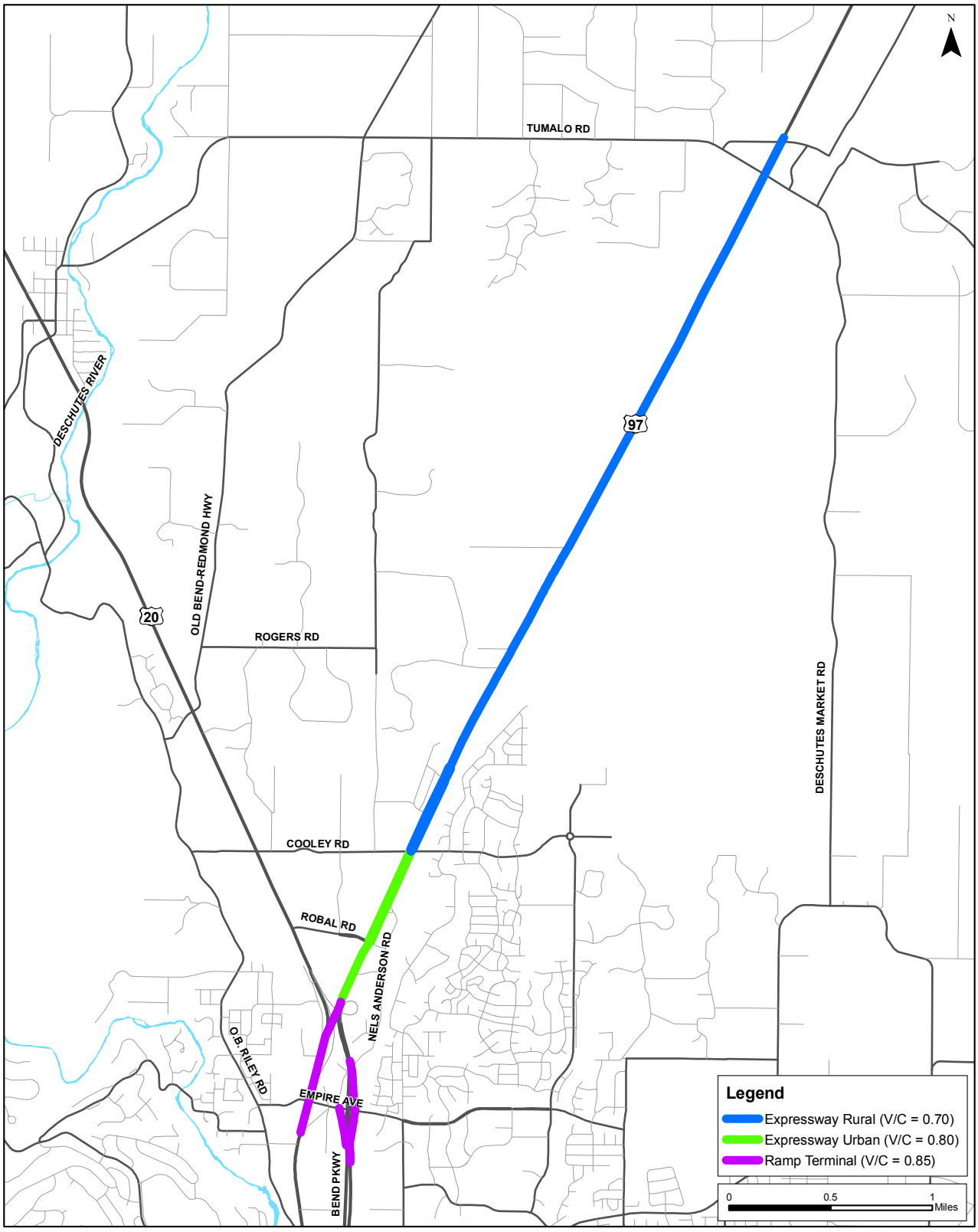
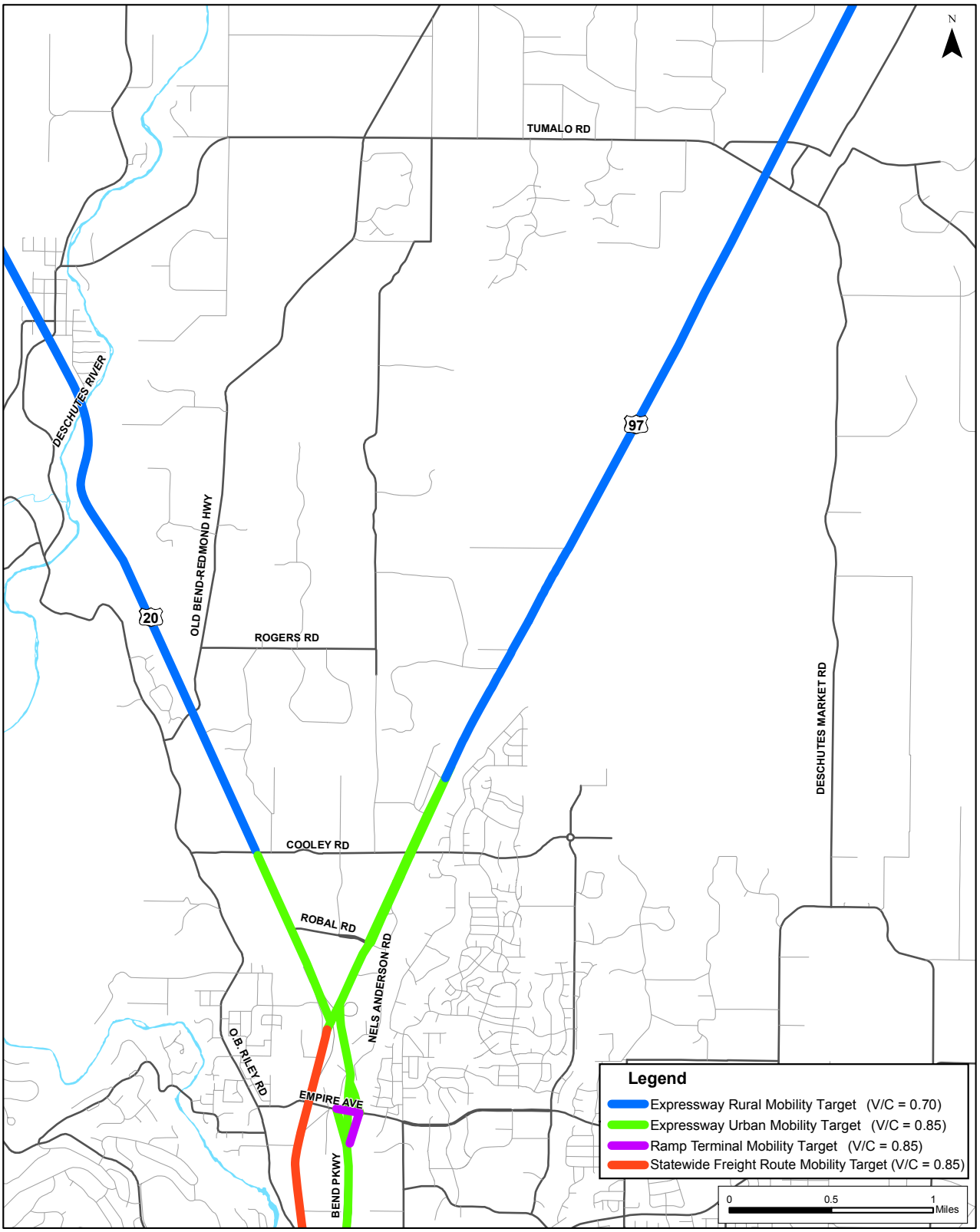


Exhibit 1-2 FEIS: *Designated Urban and Rural Expressway Segments and Highway Mobility Targets*



Note: The *2011 Amended Oregon Highway Plan* revised the mobility standard for urban expressways from a v/c ratio of 0.80 to a mobility target of 0.85 v/c ratio to indicate that the Oregon Transportation Commission is open to considering alternative mobility targets on a case-by-case basis. This exhibit was updated to show the amended mobility target for the urban expressway, show the mobility target for US 20, and correct the mobility targets for the US 97/Empire Avenue interchange, and correct the segment where the statewide freight mobility target applies.

Exhibit 1-3: *2007 and 2035 Volume to Capacity Ratios*

Intersection	Designation	OHP Standard	2007 (Peak Hour)	2035 (Peak Hour)
US 97 at Grandview Dr *	Expressway – MPO Urban	0.80	0.55	0.77
US 97 at Clausen Dr *	Expressway – MPO Urban	0.80	0.59	**0.82**
US 97 at Cooley Rd	Expressway – MPO Urban	0.80	**1.10**	**1.79**
US 97 at Lowe's Driveway *	Expressway – MPO Urban	0.80	0.44	**0.83**
US 97 at Chavre Way *	Expressway – MPO Urban	0.80	0.59	0.80
US 97 at Target Driveway *	Expressway – MPO Urban	0.80	0.42	0.91
US 97 at Robal Rd	Expressway – MPO Urban	0.80	**0.91**	**1.23**
US 97 at Nels Anderson Pl/Cascade Village*	Expressway – MPO Urban	0.80	0.79	**2.0+**
NB US 97 Ramp Terminal at Empire Ave	Ramp Terminal	0.85	0.74	**1.33**
Empire Ave at Nels Anderson Rd/SB US 97 Ramp Terminal	Ramp Terminal	0.85	**1.0+**	**2.0+**

Note: Gray shading means the v/c ratio is higher than the v/c standard for the road type.

* Unsignalized intersection

MPO: Metropolitan Planning Organization; NB: northbound; SB: southbound

Note: Exhibit 1-3 FEIS provides the data that is being considered in the Final EIS.

Exhibit 1-3 FEIS: *2011 and 2036 Volume to Capacity Ratios*

Intersection	Designation	OHP v/c Target	2011 (Peak Hour)	2036 (Peak Hour)
US 97 at Grandview Dr *	Urban Expressway	0.85	0.50	0.69
US 97 at Clausen Dr *	Urban Expressway	0.85	0.53	0.72
US 97 at Cooley Rd	Urban Expressway	0.85	0.91	1.59
US 97 at Lowe's Driveway *	Urban Expressway	0.85	0.40	0.54
US 97 at Chavre Way *	Urban Expressway	0.85	0.53	0.72
US 97 at Target Driveway *	Urban Expressway	0.85	0.37	0.47
US 97 at Robal Rd	Urban Expressway	0.85	0.76	1.08
US 97 at Nels Anderson Pl/Cascade Village*	Urban Expressway	0.85	0.71	1.11
NB US 97 Ramp Terminal at Empire Ave	Ramp Terminal	0.85	0.63	1.24
Empire Ave at Nels Anderson Rd/SB US 97 Ramp Terminal*	Ramp Terminal	0.85	0.60	2.0+[1]

Note: Shading means the v/c ratio is higher than the v/c standard for the road type.

* Unsignalized intersection

[1] The 2036 peak hour v/c ratio for this location exceeds the side street v/c target (0.95).

NB: northbound; SB: southbound

Note: The 2011 Amended Oregon Highway Plan revised the mobility standard for urban expressways from a v/c ratio of 0.80 to a mobility target of 0.85 v/c ratio to indicate that the Oregon Transportation Commission is open to considering alternative mobility targets on a case-by-case basis. This exhibit was updated to list the revised designation and mobility target for all roadway segments where the urban expressway applies. This exhibit also provides updated data for the existing traffic conditions (2011) and No Build Alternative (2036).

Exhibit 1-4: *Average Daily Traffic on US 97 (2007, 2015, 2035)*

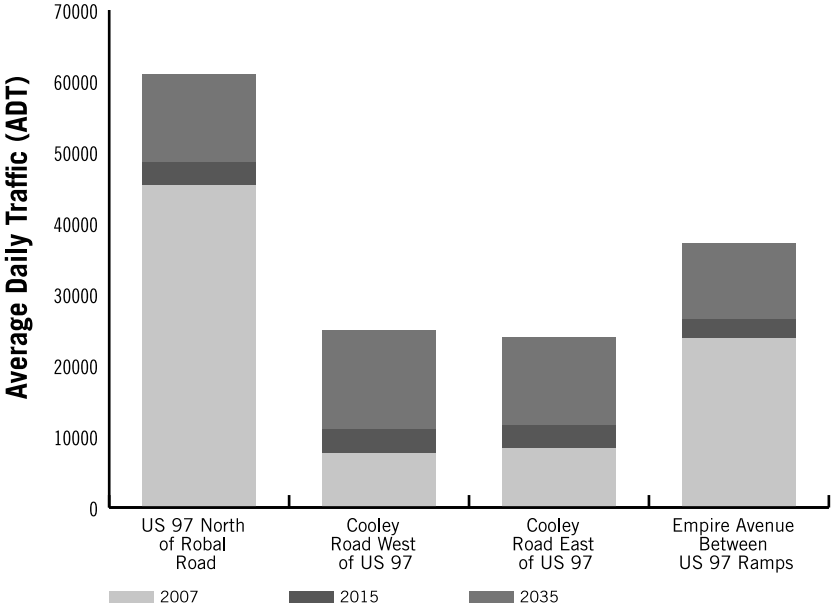
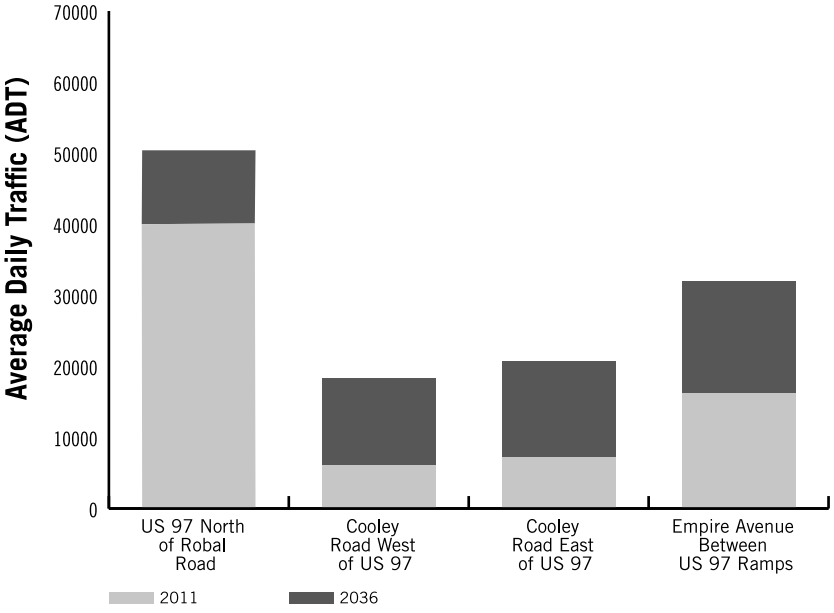


Exhibit 1-4 FEIS: *Average Daily Traffic on US 97 (2011 and 2036)*



Note: This revised exhibit shows the updated existing conditions data and traffic analysis data for the No Build Alternative.

Traffic counts were measured in 2007. In early 2009 the City of Bend performed similar traffic counts. These traffic counts were reviewed and compared to the proposed action's 2007 counts to determine if there were any significant changes in traffic volumes due to the current economic downturn. In addition, 2009 data from ODOT's permanent traffic counter stations were reviewed and compared to the 2007 information. These comparisons showed that anticipated yearly growth in traffic volumes had not occurred, and that there was no

appreciable difference in the traffic volumes from 2007 to 2009; thus the 2007 counts are functionally equivalent to 2009 values. Although growth was relatively stagnant during this period, population and employment are expected to grow over the longterm. In conjunction with this growth, traffic volumes are also expected to grow over the longterm, which is demonstrated in the traffic volumes predicted for 2015 and 2035. All traffic modeling conducted for the proposed action follows industry standards and used data generated from the Bend Metropolitan Planning Organization's regional travel demand model.

Between April 2000 and July 2006, Bend was the fourthfastest growing metropolitan area in the US (US Census Bureau 2007). Traffic projections show that the average daily traffic on US 97 in the northern portion of the API is projected to increase 34 percent (61,000 vehicles per day) by 2035 (Exhibit 1-4).

The US 97 Bend North Corridor project is the only improvement that ODOT plans to implement within the API in the near term. ODOT will implement other improvements throughout the Central Oregon region and state within the next several years. Projects from the local agencies' (City of Bend and Deschutes County) financially constrained transportation improvement plans are included in the base Bend Metropolitan Planning Organization traffic model road network being used for this proposed action.

It is clear from reviewing the traffic information that the anticipated projected growth would increase traffic congestion, resulting in significant queuing and delays in the corridor if no improvements are made by ODOT or local agencies along this section of US 97.

The two major intersections in the API are US 97 at Cooley Road and Robal Road with approximately 41,000 vehicles a day using these intersections (2007). During the peak travel time these two intersections are highly congested. Exhibit 1-5 shows the 2007 peak hour v/c ratio at Cooley Road is 1.10. Absent any major improvements, by 2035 the intersection performance would worsen to 1.79. Similarly, absent any major improvements, by 2035 the intersection performance of US 97 at Robal Road would worsen from 0.91 to 1.23.

There would be three general factors that contribute to the congestion at these intersections:

- The signals at Cooley Road and Robal Road are closely spaced on US 97 (although the signals are currently coordinated to effectively move groups of vehicles through both signals, the existing traffic volumes are so high that these intersections are still congested)
- Each intersection has a large number of vehicles making turns, particularly left turns, from US 97 and the side streets in addition

Exhibit 1-5: *Volume to Capacity Ratios (2007 and 2035)*

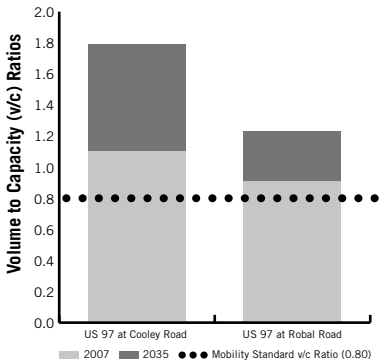
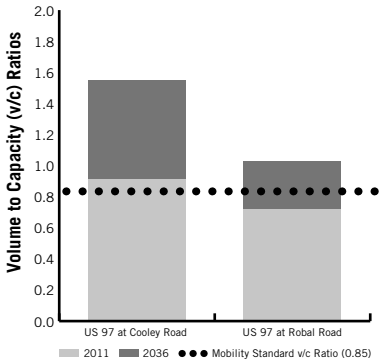


Exhibit 1-5 FEIS: *Volume to Capacity Ratios at Peak Hour (2011 and 2036)*



Note: This revised exhibit shows the updated existing conditions data and traffic analysis data for the No Build Alternative.

to the large volume of vehicles traveling on US 97 and passing through the intersection

- Vehicles use US 97 for local trips (short trips from residential areas to business areas, or business to business travel) rather using than local streets.

The number of vehicles using these intersections exceeds the capacity of the roadway to adequately move many motorists in multiple directions.

During the evening peak hours of travel there are high levels of congestion at the US 97/Cooley Road and US 97/Robal Road intersections with observed traffic queues sometimes reaching nearly onehalf mile, delays, and drivers waiting through multiple signal cycles. Because the traffic volumes are already at or exceeding the capacity of the intersections, neither intersection has the ability to handle increased growth in traffic. If nothing is done in the shortterm, by 2015 these intersections would become major "bottlenecks" for the US 97 corridor, creating a range of traffic congestion and delay related impacts to the surrounding area.

Also if longterm needs are not addressed, by 2035 US 97 and other roadway systems in the API would experience severe congestion during peak hours of travel. In 2035, most of the significant unsignalized intersections would be over capacity with many having a v/c ratio of 2.0 or greater. In addition, 10 out of 18 signalized intersections would exceed the v/c ratio standard (a v/c ratio of greater than 1.0). US 97 would experience periods of heavy congestion that spreads over multiple hours of the day. Traffic would wait through multiple signal cycles. The queuing would be so intense that adjacent intersections and turning lanes would be blocked by through traffic. This would result in long queues of stopped or crawling traffic lasting several hours. Turn lane queues would wait so long they would back up onto the US 97 travel lanes and stop through traffic on US 97. Travelers would experience delays many times greater than current conditions. Traffic delays would result in longer travel times for freight movement which would lead to higher costs for businesses and consumers. Traffic delays would also hinder access to and from businesses and future development opportunities, increase driver frustration that can lead to risktaking and accidents, and decrease the local quality of life.

Updated Congestion at Approaches Information for Final EIS

Since the publication of the Draft EIS, the *2011 Amended Oregon Highway Plan* was published. For the urban expressway portion of US 97 located within the Bend Metropolitan Planning Organization boundary the *2011 Amended Oregon Highway Plan* revised the mobility standard from a v/c ratio of 0.80 to a mobility target of 0.85

(the term was changed from mobility standard to mobility target, to indicate that the Oregon Transportation Commission is open to considering alternative mobility targets on a case-by-case basis). Exhibit 1-2 FEIS shows the urban and rural designated expressway segments, and identifies the amended mobility target (v/c ratio) for the urban segment. Exhibit 1-3 FEIS illustrates the existing (2011) and future (2036), v/c ratios at intersections within the API if no major improvements are made. On April 17, 2013 the Oregon Transportation Commission reviewed the expressway designation of this section of US 97 and decided to retain the expressway designation.

A trend analysis of traffic count data between 2007 and 2011 along US 97 through the project corridor, showed an average decrease of 10 percent in the existing traffic volumes compared to 2007. This reduction in traffic volumes is reflective of the reduced population change in the Bend area between 2007 and 2011. As a result, ODOT and the Bend Metropolitan Planning Organization determined that applying a 10 percent reduction to the 2007 existing traffic volumes more accurately represents the future conditions.

During the preparation of the Final EIS the Bend Metropolitan Planning Organization determined that their long-range forecasts for future population and employment in their travel demand model are still valid, which includes a cumulative 35 percent growth rate over the 20-year design horizon (Bend Metropolitan Planning Organization 2013). Even though a 35 percent growth rate predicted by using the travel demand model may seem unrealistic to some in times of declining population and traffic volumes, it is important to note that a 35 percent growth rate over 20 years equates to approximately 1.2 percent average annual growth. Thus, it is still possible to meet the longterm projections while having short-term periods of stagnant or declining volumes and other periods of higher growth.

For the Final EIS, the analysis for the existing traffic conditions and No Build Alternative Design Year were updated to represent 2011 and 2036 respectively. Updated traffic modeling data for the No Build Alternative shows that if longterm needs are not addressed, by 2036 US 97 and other roadway systems in the API would experience severe congestion during peak hours of travel. The updated traffic projections show that the average daily traffic on US 97 in the northern portion of the API is projected to increase 21 percent (50,400 vehicles per day) by 2036 (Exhibit 1-4 FEIS). Updated data (2011) show that approximately 40,000 vehicles a day use the Cooley Road and Robal Road intersections.

Exhibit 1-5 FEIS provides updated data showing the 2011 peak hour v/c ratio at Cooley Road is 0.91. Absent any major improvements, by 2036

the intersection performance would worsen to 1.59. Similarly, absent any major improvements, by 2036 the intersection performance of US 97 at Robal Road would worsen from 0.76 to 1.08. In 2036, two of the significant unsignalized intersections along US 97 and US 20 would be over capacity with the Empire Avenue at Nels Anderson Road/ US 97 ramp terminal intersection having a v/c ratio of 2.0 or greater. In addition, five signalized intersections along US 97 and US 20 would exceed the mobility target (a v/c ratio of greater than 0.85).

1.3.2 Traffic Flow within the Corridor

The *1999 Oregon Highway Plan* defines the primary function of an expressway for interurban travel and connections to ports and major recreation areas with minimal interruptions. Traffic flows at an acceptable level or rate on US 97 outside the API, moving freely and operating at normal speeds. However, in the API traffic flow is interrupted and slowed, especially during peak hours. Vehicles cannot effectively move along US 97 due to traffic congestion and slower speeds from the numerous public road approaches and private driveways as well as travelers using US 97 to make short, local trips, such as to local businesses. Local users are often making more turning movements onto and off of the highway, which puts local use in conflict with regional through users and contributes to congestion and traffic flow problems. Approximately 75 percent of the trips on this section of US 97 are local and regional trips, which reduces the functional effectiveness of US 97 to provide statewide and regional (interurban) trip mobility.

Traffic flow is normally measured for a corridor rather than specific intersections like congestion. Traffic flow can be measured in a number of different ways between two points: travel time, travel delay (time spent in slowed or stopped conditions), average speed, and length of queues at intersections or interchanges.

Average daily traffic in the API is estimated to grow by over 40 percent by 2035. Therefore, without improvements traffic flow on US 97 is projected to worsen; it would take longer for motorists and freight to move between points within and through the API, and vehicles would spend more time waiting in stopped conditions.

Exhibit 1-6 compares average travel times and average speed for the heavily used onemile segment of US 97 between Cooley Road and Nels Anderson Place. As travel times increase over time (3–4 minutes in the 2007 evening peak hour to 8–14 minutes in the 2035 evening peak period), the result would be a substantial decrease in average speeds on US 97 between Cooley Road and Nels Anderson Place (13–15 mph in 2007 to less than 4–6 mph in 2035) due to the severe congestion.

Exhibit 1-6: *US 97 Average Travel Time and Speed: Cooley Road to Nels Anderson Place (2007 and 2035)*

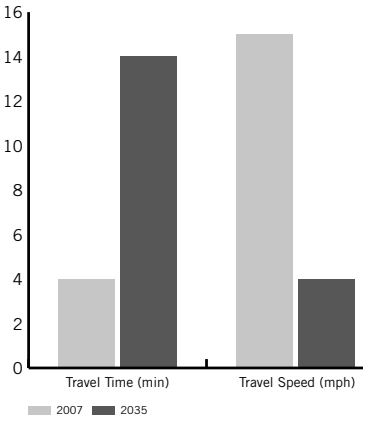
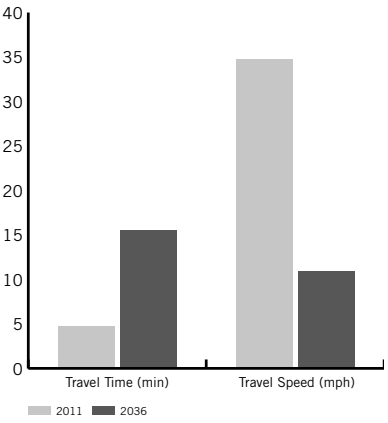


Exhibit 1-6 FEIS: *US 97 Average Travel Time and Speed: Bowery Lane to Butler Market Road (2011 and 2036)*



Note: This revised exhibit shows the updated existing conditions data and traffic analysis data for the No Build Alternative.

These worsened traffic flow conditions would have negative impacts on residents and businesses in Bend and those who rely on US 97 for local and regional movement of goods and services. Planned and future residential, commercial and industrial land development could be restricted if the transportation system cannot support the additional traffic volumes.

Traffic queuing is another factor that characterizes traffic flow. A traffic queue is a stopped line of vehicles. Traffic queues can block other traffic from moving freely through an intersection or along a highway segment. Traffic flow worsens as the time that traffic is blocked by traffic queues increases. Exhibit 1-7 summarizes the extent of existing and future queue blocking at the US 97/Cooley Road and US 97/Robal Road intersections during the evening peak hour (ODOT 2010c).

Exhibit 1-7: *Significant Queue Blocking During Evening Peak Hour (2007 and 2035)*

		2007			2035		
Intersection	**Approach Direction**	**Blocked Lane**	**Average Percent of Time Intersection Blocked**	**Other Intersections/ Driveways Blocked**	**Blocked Lane**	**Average Percent of Time Intersection Blocked**	**Other Intersections/ Driveways Blocked**
US 97 at Cooley Road	Eastbound	Left	35%	Loop Road Lowes Driveway	Left	63%	Loop Road Lowes Driveway
	Westbound	Left	11%	None	Left	84%	Boyd Acres Road
	Northbound	Left	12%	None	Left	25%	None
	Southbound	Left	18%	Clausen Drive	Left	70%	Clausen Drive
US 97 at Robal Road	Eastbound	None	None	None	Left	19%	Cascade Village Driveway
	Westbound	Shared-Through/Right[1]	32%	None	Left 1	55%	Nels Anderson Road
	Northbound	Left	14%	None	Left	>30% [2]	None
	Southbound	Left	18%	Target Driveway	Left	>10% [2]	Target Driveway

[1] In 2007, the sharedthrough/right movement is blocked at this intersection, which also has a left turn lane. In 2035, travel patterns have changed slightly due to population and employment growth, which would lead to the left turn lane becoming blocked over half the peak hour.

[2] The 2007 northbound and southbound queue blockage times are based on actual conditions. In both years, blockage times would vary depending on the signal timing allocated to the two directions. For example, in 2007 the southbound movement has less volume, so it receives less signal "green time." In the future, traffic volumes would increase this movement and so it would receive more signal "green time" which would result shorter queues and less blockage. Conversely the northbound movement (with heavier volumes) would then receive less "green time" and queues would lengthen and cause more blockage. The traffic analysis conducted for the project typically adjusts signal time; however, the 2035 model became so congested that precise blockages times could not be established for all movements.

Note: Exhibit 1-7 FEIS provides the data that is being considered in the Final EIS.

Exhibit 1-7 FEIS: *Significant Queue Blocking During Evening Peak Hour (2011 and 2036)*

		2011			2036		
Intersection	**Approach Direction**	**Blocked Lane**	**Average Percent of Time Blocked**	**Other Intersections/ Driveways Blocked**	**Blocked Lane**	**Average Percent of Time Blocked**	**Other Intersections/ Driveways Blocked**
US 97 at Cooley Road	Eastbound	Left	12%	None	Left	61%	Loop Road Lowes Driveway
	Westbound	Left	15%	None	Left	89%	Railroad Crossing
	Northbound	None	0%	None	Left	53%	None
	Southbound	None	0%	None	Left	39%	Clausen Drive
US 97 at Robal Road	Eastbound	Left	9%	Cascade Village Driveway	Left	17%	Cascade Village Driveway
	Westbound	Shared Through-Right[1]	25%	None	Left	33%	None
		Left	12%				
	Northbound	Left	6%	None	Left	63% [2]	Nels Anderson Place
	Southbound	None	0%	Target Driveway	None	0%	Target Driveway

[1] In 2011, the sharedthrough/right movement is blocked at this intersection, which also has a left turn lane. In 2036, travel patterns have changed slightly due to population and employment growth, which would lead to the left turn lane becoming blocked over half the peak hour.

[2] The 2011 northbound and southbound queue blockage times are based on optimized signal timings as there is an adaptive signal control system in place in this segment. The traffic analysis conducted for the project typically adjusts signal time; however, the 2036 model became so congested that precise blockages times could not be established for all movements.

Note: This revised exhibit shows the updated existing conditions data and traffic analysis data for the No Build Alternative.

Currently, traffic at these two intersections can be blocked anywhere from 11 to 35 percent of the time (ODOT 2010c). This signifies considerable disruption to traffic flow on US 97. In 2035, absent any major improvements, traffic flow at these intersections is forecast to be even more disrupted with traffic blocked anywhere from more than 10 percent to 84 percent of the peak hour (ODOT 2010c). By 2035, US 97 would be drastically over capacity due to the limited capacity of the signalized intersections and the impacts of the nonsignalized intersections and access to the commercial development to US 97. Many of these intersections would experience long queues that spill into other intersections and cause blockages. These blockages would increasingly slow US 97 traffic flow over time and congest and block side street traffic, which in turn would make it difficult for motorists to access nearby businesses and residential areas and pass through the corridor.

Updated Traffic Flow Information for Final EIS

The 2011 Amended Oregon Highway Plan did not revise the definition of the primary function of an expressway. In addition, On April 17, 2013 the Oregon Transportation Commission reviewed the expressway

Definition

Conflict Point

Conflict points are commonly used to explain the accident potential of a roadway. A conflict point is a location where two traffic streams cross. This could occur when a vehicle crosses, merges with, or diverges from another vehicle traveling on cross streets or driveways.

designation of this section of US 97 and decided to retain the expressway designation.

For the Final EIS the traffic analysis for the No Build Alternative was updated to reflect the 10 percent reduction in traffic volumes that corresponds to reduced growth in Bend between 2007 and 2011. The result of the updated traffic analysis for the No Build Alternative in the Final EIS was similar to that in the Draft EIS. If no improvement is made to US 97 the future (2036) traffic conditions on US 97 would result in significant congestion and traffic flow would experience extensive delay and queuing.

Exhibit 1-6 FEIS compares average travel times and average speeds for the segment of US 97 between Bowery Lane and Butler Market Road that would occur if no improvements to US 97 are made. Due to the high levels of congestion, travel times are forecasted to increase over time (from 5 minutes in the 2011 evening peak hour to 15 to 16 minutes in the 2036 evening peak period), resulting in a substantial decrease in average speeds on US 97 between Bowery Lane and Butler Market Road (from 35 miles per hour (mph) in 2011 to 12 mph in 2036).

Exhibit 1-7 FEIS shows that the US 97/Cooley Road and US 97/Robal Road intersections can be blocked anywhere from 0 to 25 percent of the time (ODOT 2014o). In 2036, absent any major improvements, traffic flow at these intersections is forecast to be even more disrupted with traffic blocked anywhere from 17 percent to 89 percent of the peak hour (ODOT 2014o). By 2036, US 97 would be over capacity due to the limited capacity of the signalized intersections and the impacts of the nonsignalized intersections and access to the commercial development to US 97.

1.3.3 Safety

Outside of the API, traffic on northbound and southbound US 97 moves freely and at normal operating speeds. As vehicles enter the API, crash rates increase because drivers are not expecting the congestion. In addition, there are many conflict points at public and private approaches; leaving little space between approaches in some areas.

Exhibit 1-8 shows the number of crashes each year between 2004 and 2009. During that time, the annual number of total crashes varied from 39 to 63. The average annual cost of these crashes is $4.1 million.

The number of crashes has generally remained constant over time (from 2004 to 2009) with a spike in 2005. The number of severe injury (Injury A) or fatal crashes has increased over the past six years (2004–2009).

Exhibit 1-8: *Number and Type of Crashes on US 97 within the API from 2004 to 2009*

Crash Type	2004	2005	2006	2007	2008	2009	Total
Angle	1	4	2	0	1	0	8
Backing	2	0	2	0	0	1	5
Fixed Object	2	6	12	6	3	3	32
Head-on	0	5	1	0	6	0	12
Miscellaneous/Other	1	5	1	2	2	2	13
Non-collision	0	0	1	1	2	2	6
Rear-end	22	32	26	24	21	23	148
Sideswipe-meeting	0	2	0	0	1	3	6
Sideswipe-overtaking	3	5	7	1	3	4	23
Turning	8	4	2	8	12	5	39
Total	**39**	**63**	**54**	**42**	**51**	**43**	**292**
Fatal/Injury A Crashes	**0**	**0**	**1**	**7**	**2**	**10**	**20**
Intersection/Related	**16**	**19**	**13**	**13**	**24**	**16**	**101**

Exhibit 1-8 FEIS: *Number and Type of Crashes on US 97 within the API from 2006 to 2011*

Crash Type	2004	2005	2006	2007	2008	2009	Total
Angle	2	0	0	0	0	3	5
Backing	2	0	0	1	0	1	4
Fixed Object	8	2	2	3	3	3	21
Head-on	0	0	0	0	1	0	3
Miscellaneous/Other	0	2	1	1	0	4	8
Non-collision	1	1	1	0	1	0	3
Rear-end	24	22	19	21	18	16	120
Sideswipe-meeting	0	0	0	2	1	1	4
Sideswipe-overtaking	5	1	3	4	4	1	18
Turning	2	8	11	3	1	3	28
Total	**44**	**36**	**38**	**35**	**29**	**32**	**214**
Fatal/Injury A Crashes	**3**	**0**	**5**	**2**	**1**	**3**	**14**
Intersection/Related	**17**	**20**	**24**	**16**	**20**	**22**	**119**

Note: This revised exhibit shows updated crash data for 2006–2011.

Chapter 1 Purpose of and Need For Proposed Action
Chapter 2 Alternatives
Chapter 3 Affected Environment, Environmental Consequences and Mitigation
Chapter 4 Cumulative Impacts
Chapter 5 Local Short-term Uses and Long-term Productivity
Chapter 6 Irreversible and Irretrievable Commitment of Resources
Chapter 7 Comments and Coordination

In the API, a majority of crashes on US 97 between 2004 and 2009 were rearend crashes (Exhibit 1-9). Rear-end collisions and fixed object collisions are generally caused by motorists driving too fast for conditions, losing control of the vehicle and either hitting another vehicle or object (tree, abutment, ditch, etc). Turning and angle crashes are caused by motorists making turns with improper gaps in traffic or failing to yield the right of way. Many times the traffic volume on the highway is high enough so that there are a limited number of available gaps, so the motorist chooses to move into a smaller gap that has a higher crash risk. Driving under the influence or fatigue can be a factor in these kinds of collisions and these also have the greatest chance of a fatality or severe injury because of the high rate of speed. Sideswipe collisions are caused by driver error and result from improper passing movements (sideswipemeeting), making an improper lane change, or trying to avoid a stopped vehicle (sideswipeovertaking) in the roadway.

Of the 292 crashes during this sixyear period (2004–2009), 19 percent (56) occurred at or near the intersection of US 97 and Cooley Road and 18 percent (52) occurred at or near the intersection of US 97 and Robal Road. The types of accidents that have occurred at these two intersections are shown in Exhibit 1-10 and Exhibit 1-11.

These two intersections are listed in the top 5 percent of ODOT's 2010 Safety Priority Index System, which uses 2007–2009 crash data. The Safety Priority Index System is a method developed by ODOT for identifying locations with the highest crash history on state highways. The Safety Priority Index System score is based on three years of crash data and considers crash frequency, crash rate, and crash severity. Each year, ODOT generates a list of the top 10 percent Safety Priority Index System sites, and the top 5 percent sites (those that have the highest scores and present the worst safety conditions to motorists) receive priority investigation to determine if a correctable and feasible solution can be implemented. Exhibit 1-12 shows that the intersections of US 97 at Cooley Road and US 97 at Robal Road have been listed in the top 5 percent or 10 percent of the Safety Priority Index System every year between 2006 and 2010.

Exhibit 1-9: *Types of Crashes on US 97 within the API between 2004 and 2009*

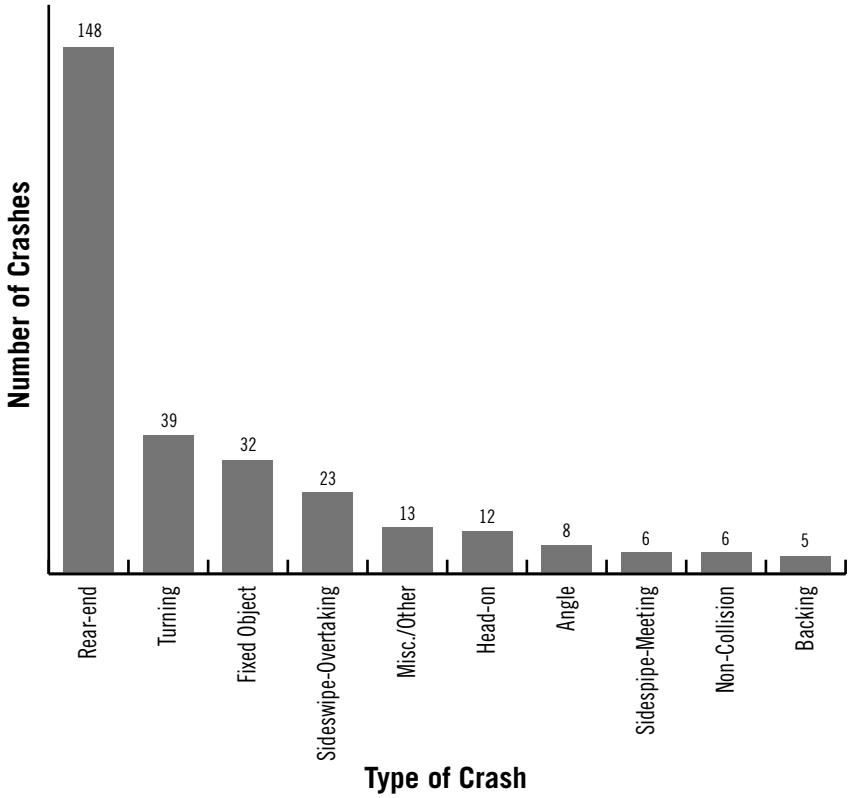
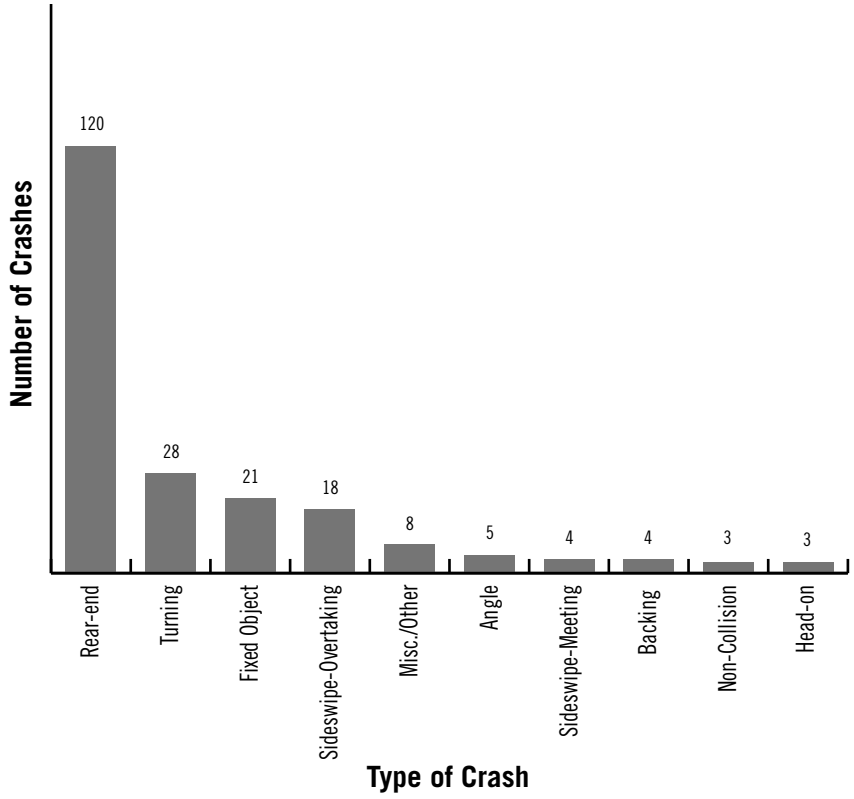


Exhibit 1-9 FEIS: *Types of Crashes on US 97 within the API between 2006 and 2011*



Note: This revised exhibit shows updated crash data for the 2006–2011.

Exhibit 1-10: *Types of Crashes on US 97 near the Intersection of Cooley Road (2004–2009)*

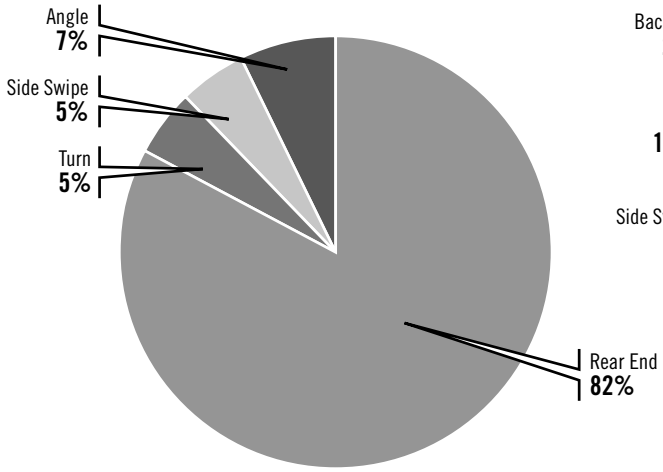
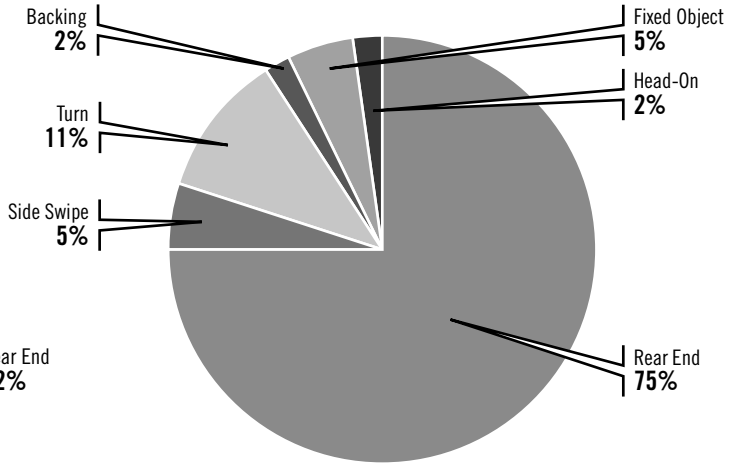


Exhibit 1-10 FEIS: *Types of Crashes on US 97 near the Intersection of Cooley Road (2006–2011)*



Note: This revised exhibit shows updated crash data for the 2006–2011 period.

Exhibit 1-11: *Types of Crashes on US 97 near the Intersection of Robal Road (2004–2009)*

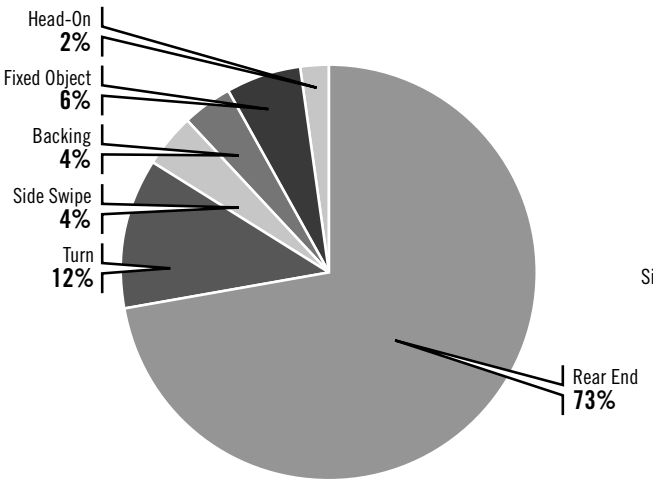
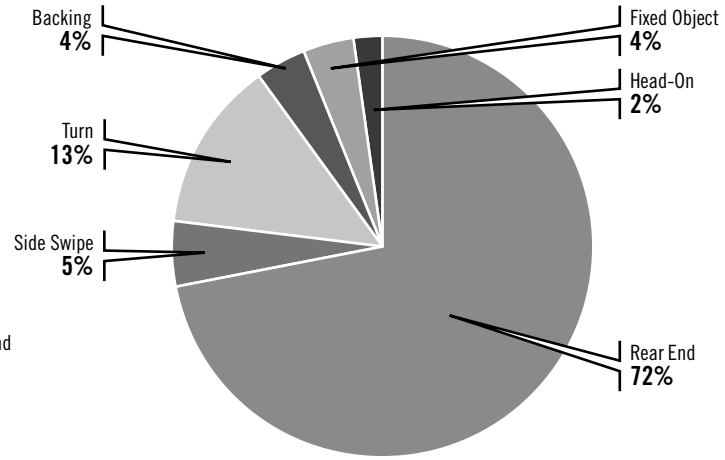


Exhibit 1-11 FEIS: *Types of Crashes on US 97 near the Intersection of Robal Road (2006–2011)*



Note: This revised exhibit shows updated crash data for the 2006–2011 period.

Another safety concern along US 97 pertains to the numerous atgrade public road approaches and private driveways. US 97 is designated as an expressway, where the primary purpose is to provide a high speed, high volume, safe transportation facility for interurban travel with minimal interruptions. Public road approaches are highly controlled, so much so that signalized intersections and private driveways are not appropriate for these types of facilities. Users of the facility develop expectations and driving habits based on the high operating speeds and design character of the facility that are not consistent with atgrade approaches on the corridor.

The *1999 Oregon Highway Plan* sets out access management spacing standards for approach road spacing and atgrade intersections. For an expressway, or a new bypass road that would be managed as an expressway, the rural (outside of the Bend city limits) spacing standard is 5,280 feet (onemile) and the urban spacing standard is 2,640 feet (1/2mile). In all segments of US 97 within the API the approach locations are such that the existing spacing is substantially less than the applicable standards. As shown in Exhibit 1-13 between Fort Thompson Lane and Grandview Drive, a distance of approximately 6,780 feet, there are 5 public road approaches with US 97 and 27 private driveways. Between Grandview Drive and Empire Avenue, a distance of approximately 9,250 feet, there are 9 public road approaches with US 97 and 3 private driveways. The extremely high density of the atgrade approaches creates a significant potential for crashes and reduces the efficiency of the facility by contributing to higher congestion. As the traffic volumes on US 97 increase, the number of crashes would increase as there would be fewer opportunities and gaps for vehicles entering from public and private approaches. In addition, the severity of crashes associated with these types of conflicts on a high speed facility is very high.

Within the API the US 97 facility is currently in good condition and the geometrics meet standards, therefore the safety issues are a result of the existing operational conditions. With no operational improvements (such as eliminating approaches, turn movements, and traffic signals) the number of crashes would increase over time. In addition, the volume of traffic would first exceed the capacity of the intersections and then the capacity of the roadway segments, resulting in queues that would block the intersections, creating severe impacts and disruptions to travel times on this corridor.

Definition

Bend Parkway

The Bend Parkway is a 6.9-mile long, four-lane limited access facility, with a raised median, bike lanes on the shoulders, sidewalks in some areas, and left-turn lanes at selected intersections. It includes signalized intersections and interchanges. It begins just north of the US 20/US 97 junction (approximately at Empire Avenue) and extends south to near Romaine Village Way.

Updated Safety Summary for the Final EIS

In October 2011, the Oregon Transportation Commission approved the *Transportation Safety Action Plan*, an element of the *Oregon Transportation Plan*. This document also serves as the State of Oregon's *Strategic Highway Safety Plan,* a document required by federal law. The Transportation Safety Action Plan envisions a future where Oregon's transportation-related death and injury rate continues to decline. ODOT envisions a time when days, then weeks and months, pass with not a single fatal or debilitating injury occurring. Someday, ODOT envisions a level of zero annual fatalities and few injuries as the norm.

Exhibit 1-12 FEIS: *US 97 at Cooley Road and Robal Road: Safety Priority Index System Scores for 2006–2012*

Intersection		2006	2007	2008	2009	2010	2011	2012
US 97 at Cooley Road	Top 5%	■	■			■	■	
	Top 10%			■	■			
US 97 at Robal Road	Top 5%	■	■	■	■	■	■	■
	Top 10%							

Note: This exhibit was updated to include Safety Priority Index System Scores for 2011–2012.

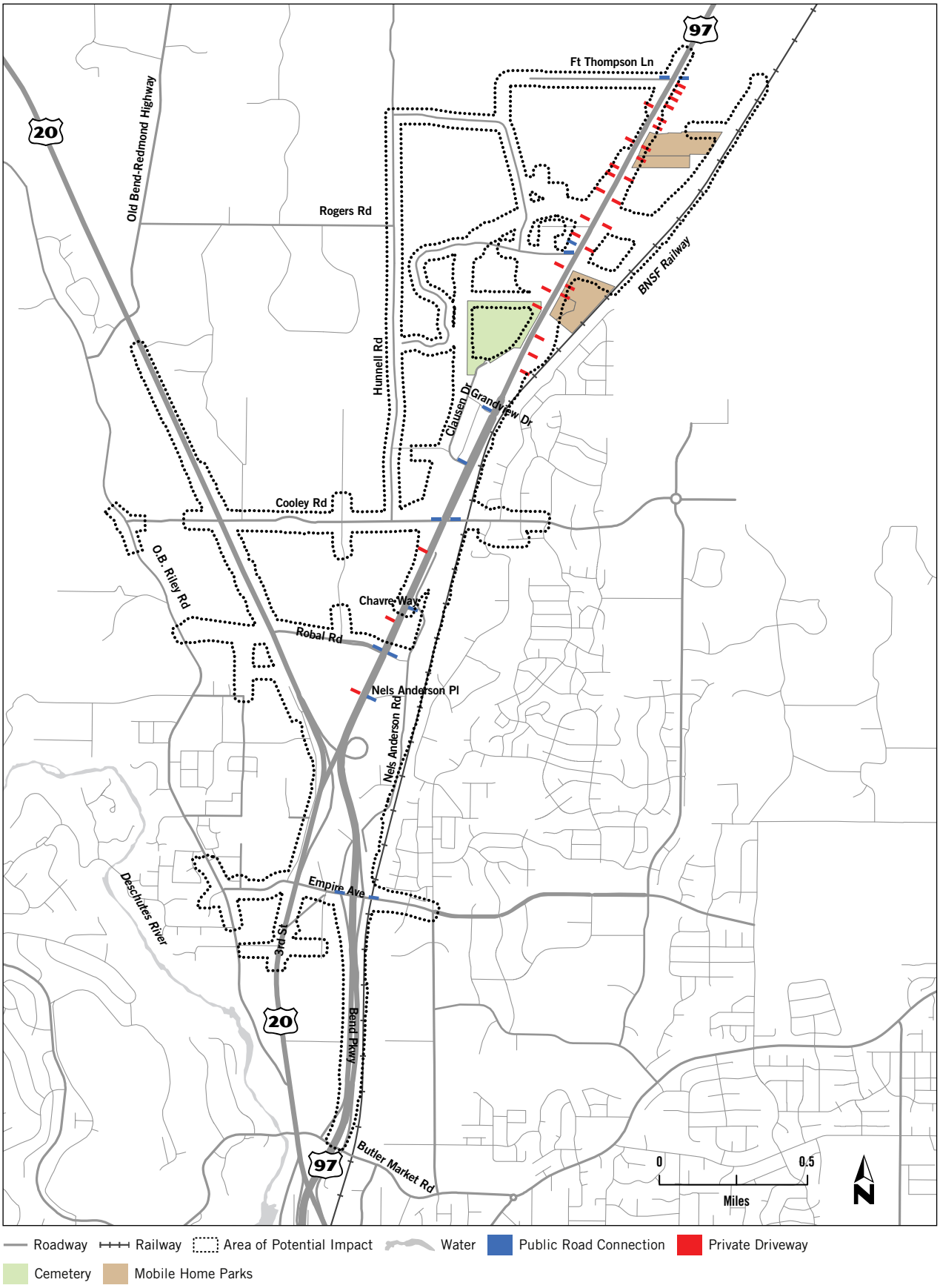
For the Draft EIS, ODOT conducted a crash analysis to document the existing safety issues in the transportation study area. The Updated Traffic Analysis Report prepared for the Final EIS includes an updated crash analysis and a new predictive analysis that identifies crash frequencies expected for the No Build Alternative.

Updated data from 2006 to 2011 shows that the total number of crashes each year between 2006 and 2011 varied from 29 to 44 (Exhibit 1-8 FEIS), with an average annual cost of $2.9 million. From 2006 to 2011 the majority of crashes continued to be rear-end crashes (Exhibit 1-9 FEIS). The number of severe injury (Injury A) or fatal crashes has also remained relatively constant during this six-year period, with a spike in 2008.

Of the 214 crashes that occurred from 2006 to 2011, 21 percent (44) occurred at or near the intersection of US 97 and Cooley Road and 25 percent (54) occurred at or near the intersection of US 97 and Robal Road. The types of accidents that have occurred at these two intersections are shown in Exhibit 1-10 FEIS and Exhibit 1-11 FEIS.

The Cooley Road and Robal Road intersections on US 97 have a history of crash problems. The US 97 at Robal Road intersection has been recorded in ODOT's Safety Priority Index System top 5 percent rating since at least 2006; the US 97 at Cooley Road intersection has been recorded in the top 5 or 10 percent ratings from 2006–2011 (Exhibit 1-12 FEIS).

Exhibit 1-13: *Current At-grade Approaches on US 97*



The predictive crash analysis prepared for the Final EIS identified safety issues on the existing US 97 facility. Applying the predictive equations at the Cooley Road and Robal Road intersections resulted in 7.4 and 7.2 expected crashes in 2011. However, ODOT found that the actual observed crashes for both intersections were 8. Since the observed crashes are slightly greater than expected crashes, the analysis indicates a safety issue. Thus, both the predictive crash analysis and Safety Priority Index System rankings confirm significant safety issues are present at the Cooley Road and Robal Road intersections on US 97.

1.4 Background

Project stakeholders have consistently requested the transportation infrastructure improvements associated with the proposed action should be economically feasible and support economic development. Thus, the following discussion defines how the proposed action could be economically feasible in terms of regional funding projections and local land use plans.

1.4.1 Ability to Implement the Proposed Action within the Medium-term and Long-term Planning Periods

Over the past 20 years, highway modernization projects for all of Central Oregon have totaled approximately $275 million. Recent highway modernization projects in Central Oregon have received approximately $115 million (US 97 Bend Parkway) and approximately $90 million (US 97 Reroute Phase 1 in Redmond). In addition, some of the approximately $40 to $42 million projected in the Bend Metropolitan Planning Organization's long range revenue forecast for the 2007–2030 planning period would likely be available for this project. This forecast may not necessarily account for the potential full range of alternative financing mechanisms (e.g., impact fees, tax increment financing, local improvement districts, state infrastructure bank, local option transportation taxes, fair share mitigation, publicprivate partnership, transportation concurrency).

Based on past experience and forecasts for Central Oregon, it is conceivable that a project of this importance could receive up to $250 million over the 20–30 year timeframe. An expectation that the project would receive more than $250 million is not reasonable given the numerous highway modernization needs in other Central Oregon communities.

Understanding this limitation is also important in terms of the $115 million investment made in the US 97 Bend Parkway over the past 15 years. The proposed action would connect into the north end of the Bend Parkway. In accordance with policies outlined in the *Oregon Highway Plan* and consistent with current ODOT guidance

City of Bend's Proposed UGB Expansion Chronology

- 2004: City of Bend began the process of demonstrating the need for expanding its UGB
- 2007-2008: City of Bend conducted 66 public meetings, some in conjunction with Deschutes County, on the UGB expansion. Additional public work sessions occurred with the Bend Planning Commission along with liaisons from the Deschutes County Planning Commission.
- January 9, 2009: City amended *Bend General Plan* to include the *2008 Economic Opportunities Analysis*
- April 16, 2009: City submitted UGB Expansion Proposal to the Oregon Department of Land Conservation and Development (DLCD) for approval
- January 8, 2010: Oregon DLCD issued a Director's Report that remanded the proposal back to the City
- January 29, 2010: City of Bend appealed the DLCD decision
- November 3, 2010: Oregon Land Conservation and Development Commission issued Remand and Partial Acknowledgement Order 10-Remand-Partial ACKNOW-001795 pertaining to the Bend UGB expansion and related adopted materials. The *2008 Economic Opportunities Analysis* was found to meet Goal 9 and is not required to be modified by the remand order.
- 2011-2012: City of Bend working to resolve issues remanded by DLCD.
- As of the publication of the Final EIS (2014), the City of Bend is still working to resolve issues remanded by DLCD.

Source: City of Bend 2011a and 2011b.

on practical design solutions, any new project must have a consistent approach to the design and to the urban corridor context created by the Bend Parkway. Staying within the corridor context would ensure a balanced investment which, for example, would solve an existing safety and congestion problem without creating new safety, congestion, and traffic flow problems somewhere else in the corridor, and would include the importance of consistent design values for overall driver expectations and safety.

Although it is conceivable that this proposed action could receive total project funding of up to $250 million, it would be unreasonable to assume that such a significant amount of funding could be raised within the first 10 years. Smaller funding packages, however, would be more likely, which would enable incremental improvements to be made. Each increment would need to provide some congestion relief and improve traffic flow and safety on US 97 to support the longterm solution.

Recently, Central Oregon received approximately $90 million for the first phase of the US 97 Reroute Phase I in Redmond. Thus, it would be reasonable to assume that the US 97 Bend North Corridor project could receive a similar amount of up to approximately $90 million for an initial project phase (first 10 to 15 years) that would provide some congestion relief and improvement in traffic flow and safety.

Portions of the Preferred Alternative have identified funding and are included as medium- and long-term projects in the financially constrained project list (Table 6-16) in the Bend Metropolitan Planning Organization's *2007–2030 Bend Metropolitan Transportation Plan* (MPO MTP). A total of $6.26 million is identified in the fiscally constrained MTP for the US 97 Bend North Corridor project. The remaining improvements associated with the Preferred Alternative are included in the Bend Metropolitan Transportation Plan's Illustrative Project List (Table 6-18). As funding is obtained for additional components of the Preferred Alternative, ODOT will request that the Bend Metropolitan Planning Organization move those funded elements from the illustrative list to the financially constrained list.

For the 2007–2030 planning period, Table 6-17 in the Bend MPO MTP identifies a total of $253.3 to $271.7 million of capital funding, of which $40.4 to $42.2 million is allocated to ODOT. Some of this funding would likely be available for this project. In addition, Table 6-17 identifies funding allocated to Deschutes County ($1.0 million) and the City of Bend ($253.3 to $271.7 million). The local agencies could also contribute portions of their funding to the US 97 Bend North Corridor project.

1.4.2 Current and Future Economic Lands

The City of Bend has identified the economic lands between US 97 and US 20 as an important component to its current and future economic base. In this vicinity, land can be generally described as being inside the current UGB or being inside a proposed expansion of the UGB that was approved by the Bend City Council on January 5, 2009. Each area is unique in terms of the current and future land use entitlement and development status and each area's role and importance to the regional economy.

Economic Lands within the Existing Urban Growth Boundary

Land inside the current UGB is mostly developed as a regional retail center. This is the largest regional retail commercial center in the region consisting of Jefferson, Crook, and Deschutes counties and serves as a destination for these and more distant rural locations. Retail trade (as a component of trade, transportation and utilities) is one of the largest employment sectors and has one of the highest percentages of payroll in Deschutes County, and is therefore important to the local economy (City of Bend 2008a). There are approximately 150 acres of land in this area with a Bend General Area Plan and zone designation of Commercial General. Approximately 120 acres are developed with large national retail chains and other smaller retail and service uses employing over an estimated 1,000 people (City of Bend 2008a). The remaining 30 acres is undeveloped, with a portion of this owned by a large retail company. In addition to the 150 acres are approximately 55 acres of land in an urban reserve zone with a Bend General Area Plan designation of Mixed Employment.

The City of Bend expects retail trade to be one of the fastest growing employment sectors in the region and city between 2006 and 2016 and beyond (City of Bend 2008a). This is in part due to population growth, but also due to Bend's role as the "central city" or regional center of Central Oregon (City of Bend 2008a). The area between US 97 and US 20 is widely viewed as one of the most ideal locations in the region for retail uses due to its proximity to the largest market (Bend), but also its relatively close proximity to Sisters, Redmond, and intervening rural areas. Considering the expectations for future growth in the retail sector, existing concentration of retail uses in the US 97/US 20 area, the number of employees present in existing uses in the area, and potential for additional employment growth, protecting and enhancing employment opportunities in this area are important to the City of Bend.

Economic lands are identified as those lands designated in the *General Area Plan* as Commercial, Industrial/Mixed Employment, Public Facilities, and Medical. Of the total 5,000 acres of economic lands

Definition

Juniper Ridge

The Juniper Ridge project is a major asset for the entire Bend community and a long-term investment in the City's economic future. Juniper Ridge is a master-planned, mixed-use community, and represents the community's vision of "smart growth": growth that is responsible, sustainable, and of high quality. The master plan for Juniper Ridge is designed to attract diversified, family-wage employment, a university campus with research-and-development capabilities, and opportunities for high-quality residential neighborhoods that embrace the qualities of development already proven to be successful and desirable in Bend. Estimates are that the project can create 12,000 to 15,000 new jobs over its lifetime.

Source: City of Bend 2011b.

within the City's UGB, 74 percent is developed and 26 percent is vacant. Vacant Commercial lands are particularly scarce (272 acres) to support a 20year planning period. Of the 698 acres of Industrial lands, 494 acres are located at the Juniper Ridge site; the remaining 204 acres are located elsewhere in the City and tend to be in small parcels versus larger, more suitably sized parcels. The City's *2008 Economic Opportunities Analysis* describes economic land supplies and illustrates that Bend has relatively few parcels over 5 acres and a relatively high amount of parcels under 5 acres than is considered "ideal" for economic development. This inventory of economics lands suggests that, all else being equal, it is critical for the City to preserve its relatively short supply of economic lands over 5 acres in size.

The *2008 Economic Opportunities Analysis* also shows that within the City's current inventory of available Industrial and Mixed Employment lands, there are three parcels of 20+ acres, four parcels of 10-20 acres, eight parcels of 510 acres, and 103 parcels less than 5 acres. Part of the City's analysis seeks to address limited land supplies by adding additional Commercial and Mixed Employment lands to the vicinity between US 97 and US 20 north of Cooley Road, which is zoned Urban Area Reserve. Many of these parcels are greater than 5 acres.

Economic Lands within the Urban Growth Boundary Expansion Area

The City recognizes that the opportunity for employment and economic growth are constrained by the quantity and size of existing economic lands within its UGB. On January 5, 2009, the City of Bend amended its *General Area Plan* and adopted the UGB expansion area to include approximately 250 acres of land between US 97 and US 20 as well as in other locations around Bend. Simultaneously, the City adopted the *2008 Economic Opportunities Analysis* (City of Bend 2008a), which analyzes the current development status of economic lands, provides a factual basis to grow the City's economy between 2008 and 2028, and briefly discusses ideal locations for new commercial and industrial development as well as issues related to economic land supplies.

A critical component of promoting economic growth is providing an adequate supply of serviceable lands in competitive locations for employment uses within the City. The area between US 97 and US 20 has nearly all of the requisite site characteristics to attract a variety of economic development opportunities such as flat topography, access to transportation facilities, adequate parcel sizes, high visibility, and central location relative to employees and customers (City of Bend 2008a). The existing land development pattern and uses in the area already demonstrate its suitability for retail and support uses. While

this area shows great promise to attract new development of many different types and intensities, limited capacity of the transportation network prevents existing vacant acreage from being developed to its highest and best use.

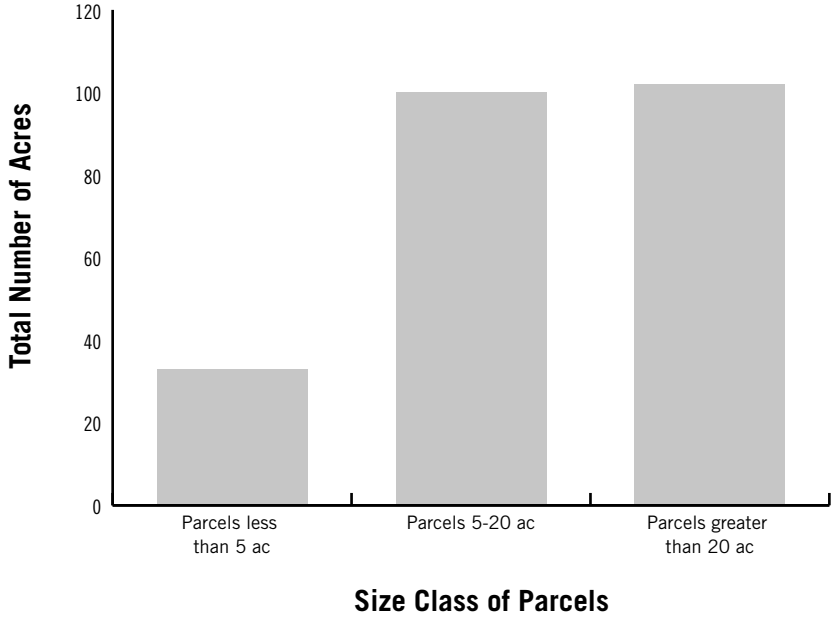
Part of the *2008 Economic Opportunities Analysis* seeks to address limited land supplies by adding Commercial and Mixed Employment lands to the vicinity between US 97 and US 20 north of Cooley Road, which are zoned Urban Area Reserve but are designated as Commercial and Mixed Employment lands in the *General Area Plan* as a result of the proposed UGB expansion. Exhibit 1-14 summarizes the 34 parcels and 235 acres of economic lands designated as Urban Area Reserve between US 97 and US 20 north of Cooley Road that could potentially be affected by the proposed action. Many of these parcels are greater than 5 acres and are currently in short supply inside the existing Bend UGB. The *2008 Economic Opportunities Analysis* identifies the characteristics of good employment land that includes criteria such as flat topography, adequate parcel size, close proximity to transportation (including air), adequate services, visibility for commercial centers, access to alternate modes of transportation and other criteria. The City of Bend identified the Urban Area Reserve lands between US 97 and US 20 as the most ideal location for new commercial and industrial development in the Bend area.

The *2008 Economic Opportunities Analysis* also emphasizes that Bend is a cultural and economic center of the region, providing 54 percent of the region's jobs while only having 37 percent of the region's population in 2004. Existing Commercial lands between US 97 and US 20 that are occupied provide an important employment base within the current UGB. Employment densities for day employees range from 1,320 employees per net acre, while employment densities for industrial uses tend to be lower at 1,115 employees per net acre. Commercial lands were nearly half of the land added to the UGB for economic purposes. The UGB expansion added to the existing regional retail center in the north, while also adding a component of mixed use and residential. These proposed land uses attempt to strengthen the City's role as a regional retail center, while also attempting to provide a better mix of housing and jobs in the north of Bend.

The City's *2008 Economic Opportunities Analysis* and UGB expansion proposal illustrates the value of this area to the city's longterm economic development strategy. In short, it builds upon an existing economic strength, and combats an economic weakness of limited commercial land supplies in the north of Bend. Bend has demonstrated its role as a regional retail center and has shown sustained employment growth in the retail sector for years. Moreover, the area between US 97

and US 20 north of Cooley Road is identified as the best location for commercial and industrial development in Bend (City of Bend 2008a).

Exhibit 1-14: *Current Inventory of Urban Area Reserve/Economic Lands between US 97 and US 20*



1.5 Goals and Objectives

Project goals and objectives are desirable outcomes that the proposed action would like to achieve beyond the minimum threshold requirements addressed in the purpose and need statement. The Draft EIS documents all of the alternatives considered during the alternatives screening phase; identifies those alternatives that are included in the reasonable range of alternatives for detailed study and comparison; and includes detailed environmental analysis on the reasonable range of alternatives. The Draft EIS is published and circulated for public comment, including a public hearing. The public comments received will contribute to the decision on which alternative is identified as the Preferred Alternative (or solution) for the project. A Final EIS will be prepared to document the Preferred Alternative as well as responses to public and agency comments submitted on the Draft EIS.

Upon public review and comments on the analysis of the range of alternatives studied in the Draft EIS, ODOT and FHWA will also consider the following goals and objectives when identifying a Preferred Alternative (or solution) for the proposed action.

Key Point

Emergency service providers strive towards a 3 minute response time for fire and emergency medical response.

Goal 1 – Improve transportation system linkage and operation

- Minimize impacts and consider improvements to local street operations and connectivity

- Consider improved connection between US 97 and US 20
- Maintain or improve the function of US 20 as a regional transportation route
- Maintain or improve emergency service response times.

Goal 2 – Provide local and regional access

- Provide regional connectivity to US 97 and US 20
- Maintain access to commercial and industrial areas.

Goal 3 – Consider planned economic development opportunities

- Balance planned land use and zoning as currently identified in the City of Bend's *Bend Area General Plan* and *Bend Urban Area Transportation System Plan*, Deschutes County *Comprehensive Plan*, and Bend Metropolitan Planning Organization's *2007–2030 Metropolitan Transportation Plan* with US 97 transportation system improvements
- Provide design in transportation system to accommodate planned future land use and economic development.

Goal 4 – Develop a cost effective and sustainable project

- Consider opportunities for public and private cost sharing
- Consider long-term maintenance feasibility and cost.

Goal 5 – Develop a project that fits into the context of the community

- Involve stakeholders to deliver a project that fits into the existing human and natural surroundings
- Consider past system and corridor work when framing solutions
- Use practical design principles to minimize cost and impacts and deliver focused benefits.

Goal 6 – Improve bicycle and pedestrian safety and connectivity

- Enhance safety, access, and mobility for pedestrians and bicyclists.

Chapter 2
Alternatives

2.1 Description of Alternatives

The US 97 Bend North Corridor project is considering three alternatives including two build alternatives, referred to as the East DS1 and East DS2 Alternatives, and the No Build Alternative as required by the National Environmental Policy Act. Exhibit 2-1 through Exhibit 2-3 show the general alignments of the three alternatives.

As a result of public comments received on the Draft EIS, the East DS2 Alternative was modified to minimize impacts and address concerns raised by the public. This modified alternative, the East DS2 Modified Alternative, is identified as the Preferred Alternative (Exhibit 2-3 FEIS), and the associated design changes are described and illustrated in this chapter.

Chapter 2 Content

2.1 Description of Alternatives
2.2 Alternatives Development and Screening
2.3 Practical Design Elements
2.4 Alternatives Developed but Eliminated from Further Consideration
2.5 Comparison of Alternatives
2.6 Identification of the Preferred Alternative—East DS2 Modified Alternative
2.7 Permits and Approvals Needed

2.1.1 No Build Alternative

The No Build Alternative would maintain the current US 97 facility as the roadway presently exists, which is described below in three sections from south to north. The transportation analysis conducted for the No Build Alternative assumed construction of both planned publicly funded and privately funded roadway improvement and traffic signal projects; projects funded through the Oregon Statewide Transportation Improvement Program or the City of Bend's *Capital Improvement Program*; and roadway improvements in approved developments. These improvements are detailed in Exhibit 3-9B FEIS in Section 3.1 Transportation Facilities.

South Section—Butler Market Road to Nels Anderson Place

From Butler Market Road north to Nels Anderson Place, US 97 (also named the Bend Parkway) has two northbound travel lanes, two southbound travel lanes, a vegetated median, and paved shoulders marked as bicycle lanes. A sidewalk is present on the west side from the Sisters loop ramp to Nels Anderson Place. US 97 crosses over Butler Market Road on an elevated structure. An auxiliary lane would be built in each direction between Butler Market Road and Empire Avenue, although this would occur independent of the proposed action. Empire Avenue crosses over US 97 on an elevated structure and signal; ramps from US 97 provide access from northbound US 97 to Empire Avenue, from Empire Avenue to northbound US 97, and from Empire Avenue to southbound US 97 (Exhibit 2-4).

Chapter 1 Purpose of and Need For Proposed Action
Chapter 2 Alternatives
Chapter 3 Affected Environment, Environmental Consequences and Mitigation
Chapter 4 Cumulative Impacts
Chapter 5 Local Short-term Uses and Long-term Productivity
Chapter 6 Irreversible and Irretrievable Commitment of Resources
Chapter 7 Comments and Coordination

Exhibit 2-1: *No Build Alternative*

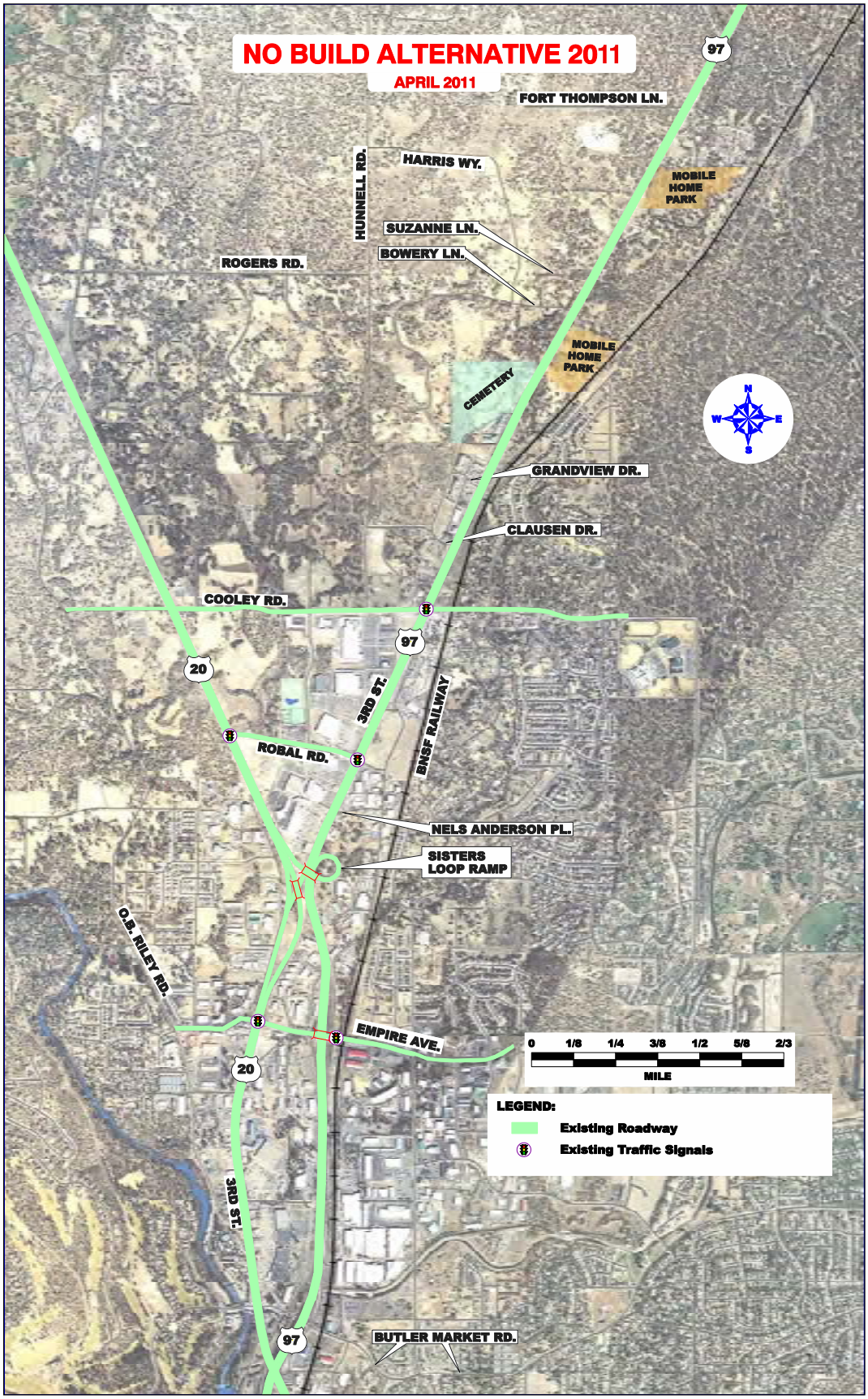


Exhibit 2-2: *East DS1 Alternative*

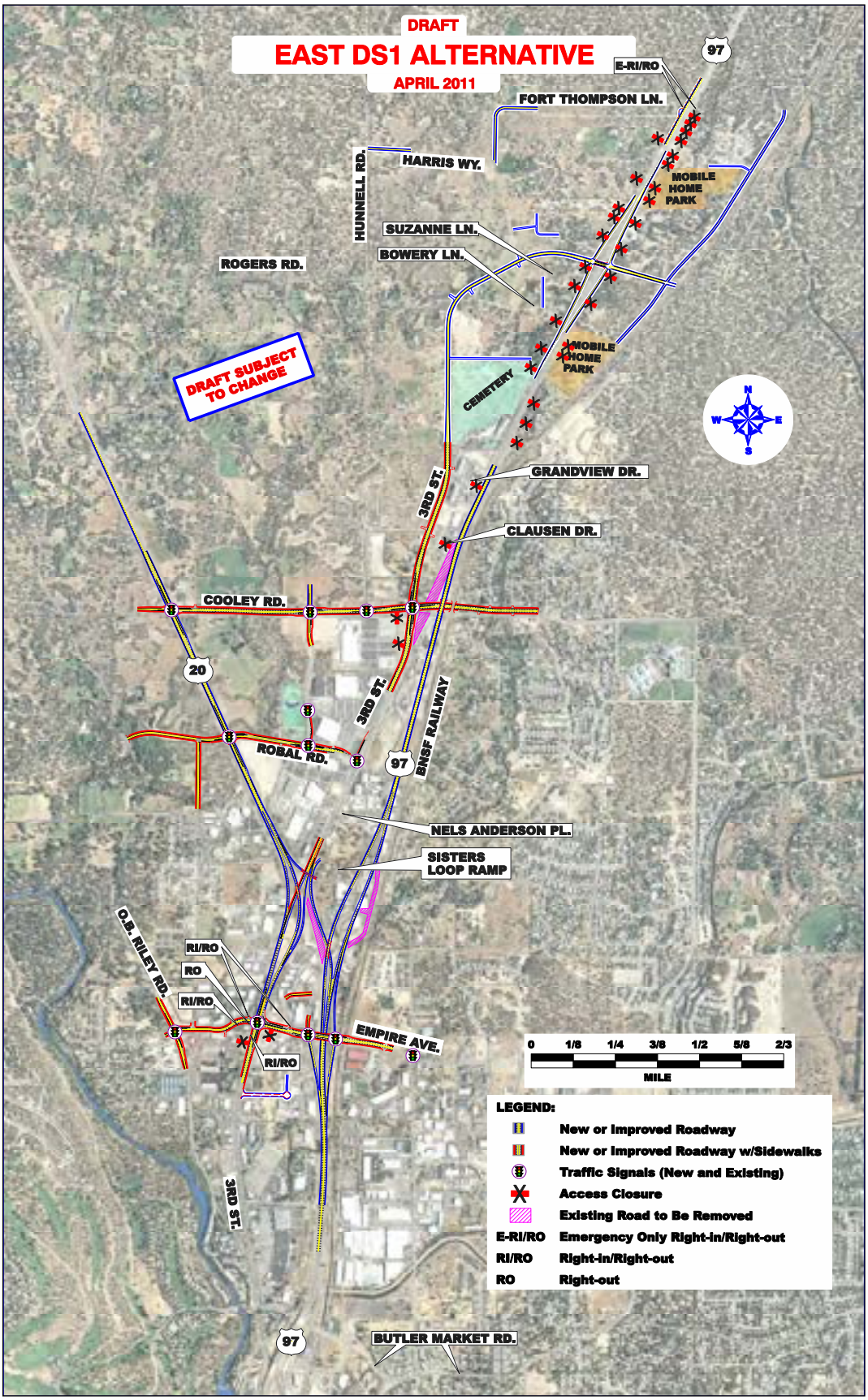
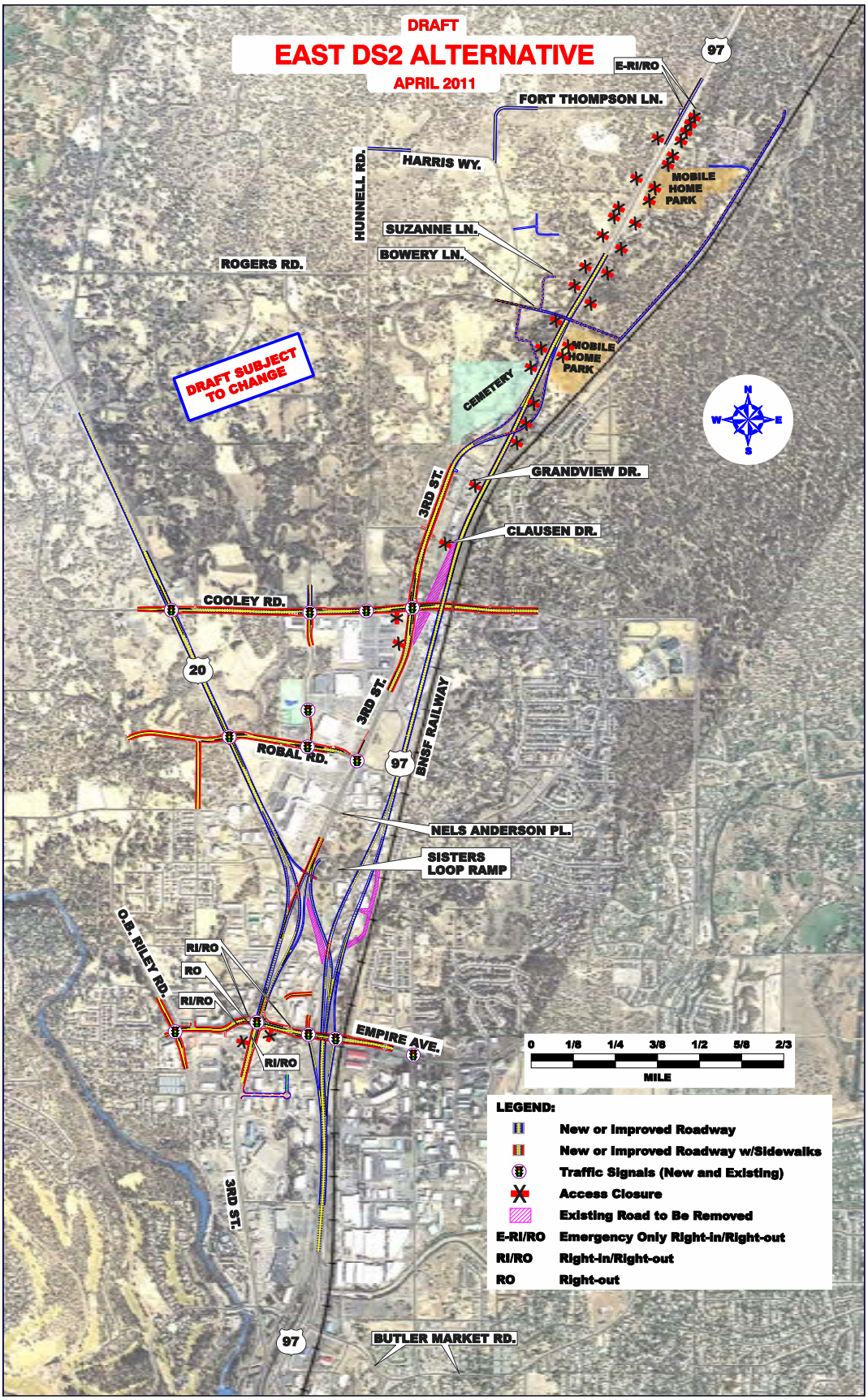


Exhibit 2-3: *East DS2 Alternative*



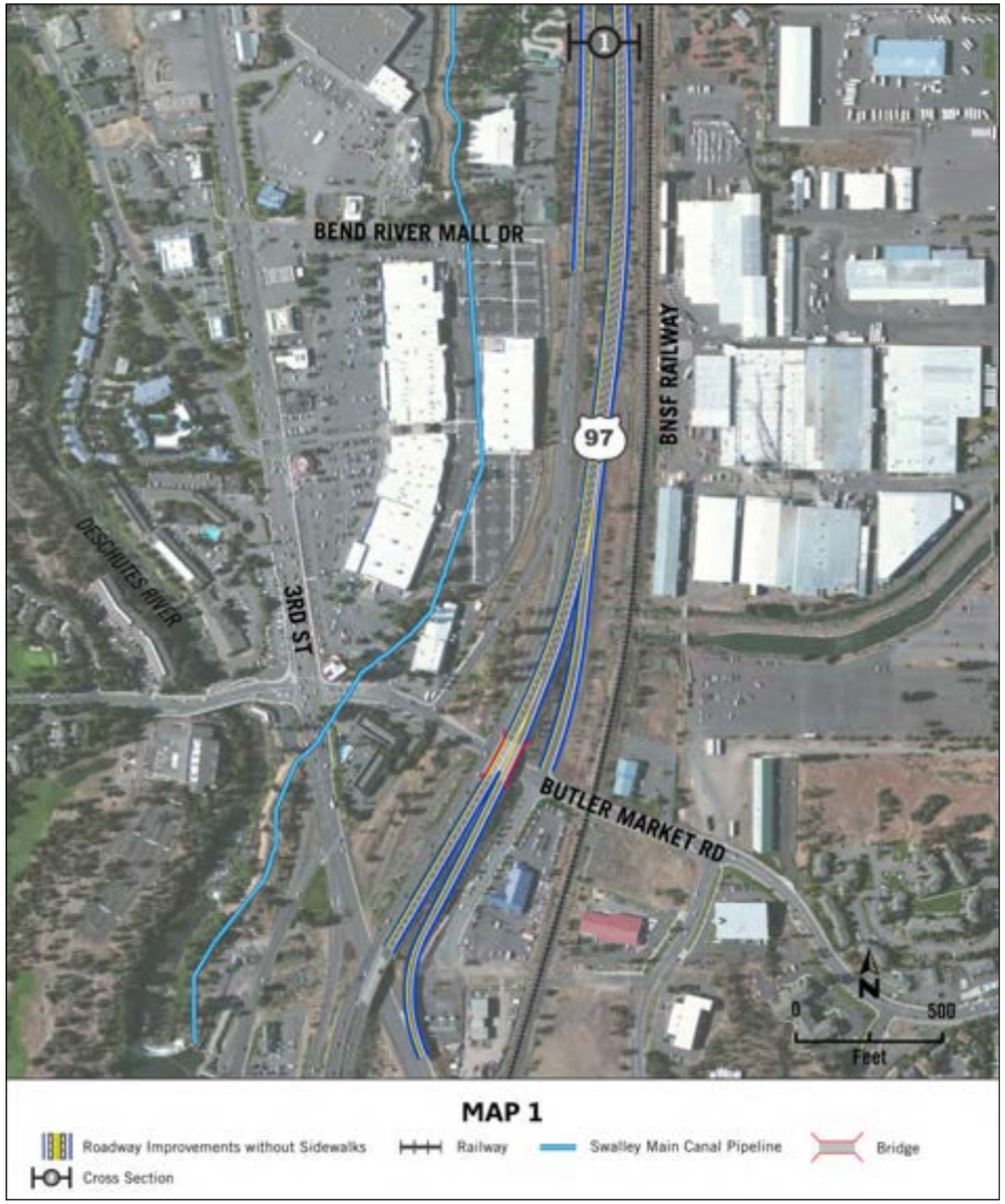
Chapter 1 Purpose of and Need For Proposed Action
Chapter 2 Alternatives
Chapter 3 Affected Environment, Environmental Consequences and Mitigation
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Chapter 6 Irreversible and Irretrievable Commitment of Resources
Chapter 7 Comments and Coordination

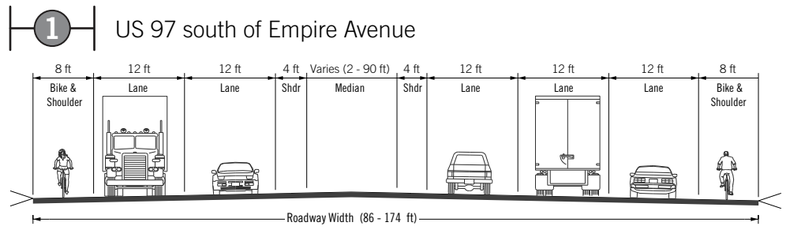
Exhibit 2-3 FEIS: Preferred Alternative



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Exhibit 2-3 FEIS: *Preferred Alternative (Map 1)*

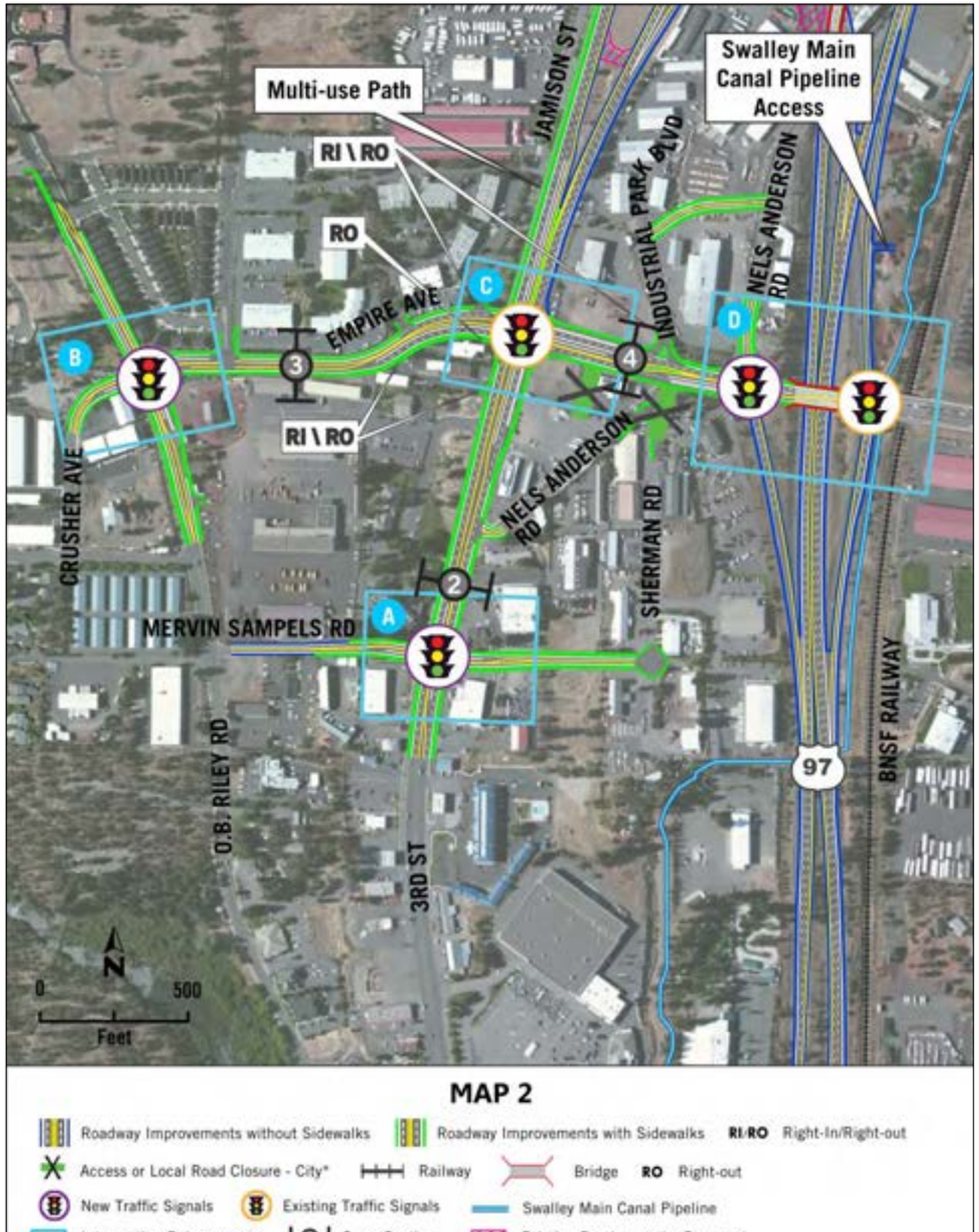




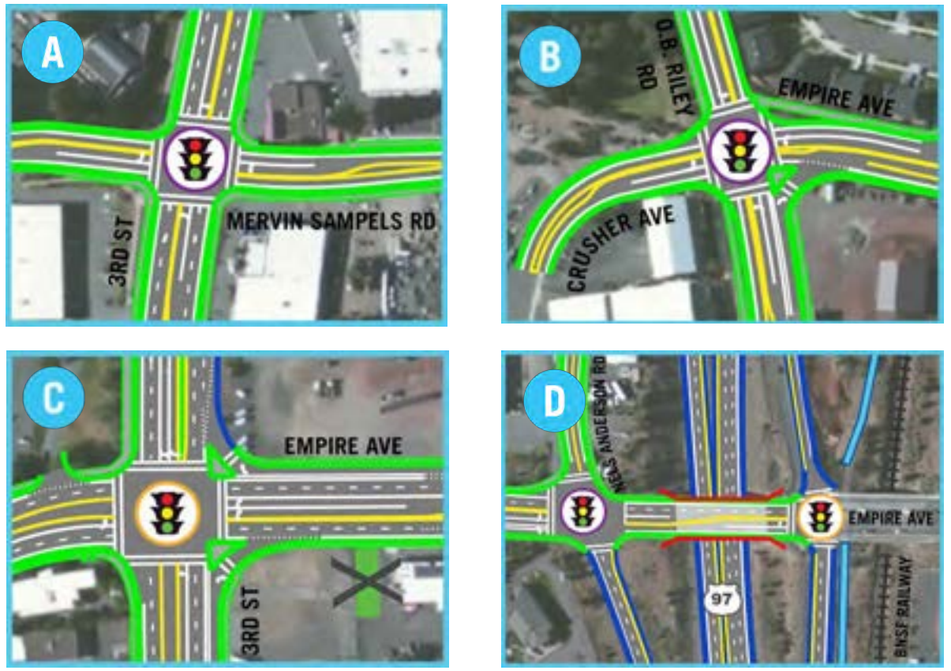
Note: The design shown in this exhibit is conceptual in nature. Further refinements may be made during the final design process. Where roadway improvements shown in this exhibit end, the improvements will transition to the existing roadway cross section.

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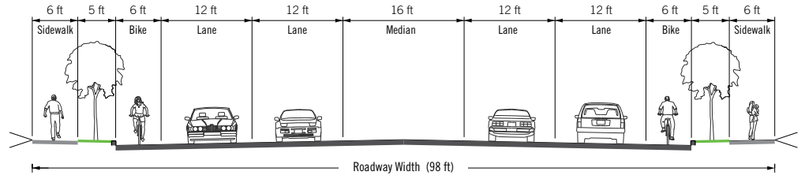
Exhibit 2-3 FEIS: *Preferred Alternative (Map 2)*



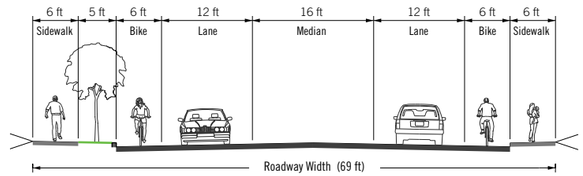
Note: The design shown in this exhibit is conceptual in nature. Further refinements may be made during the final design process. Where roadway improvements shown in this exhibit end, the improvements will transition to the existing roadway cross section.



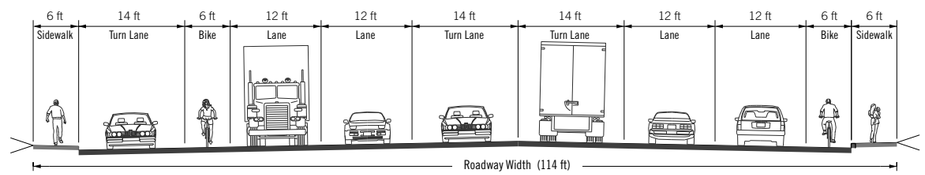
2 3rd Street south of Loco Road



3 Empire Avenue between O.B. Riley Road and 3rd Street

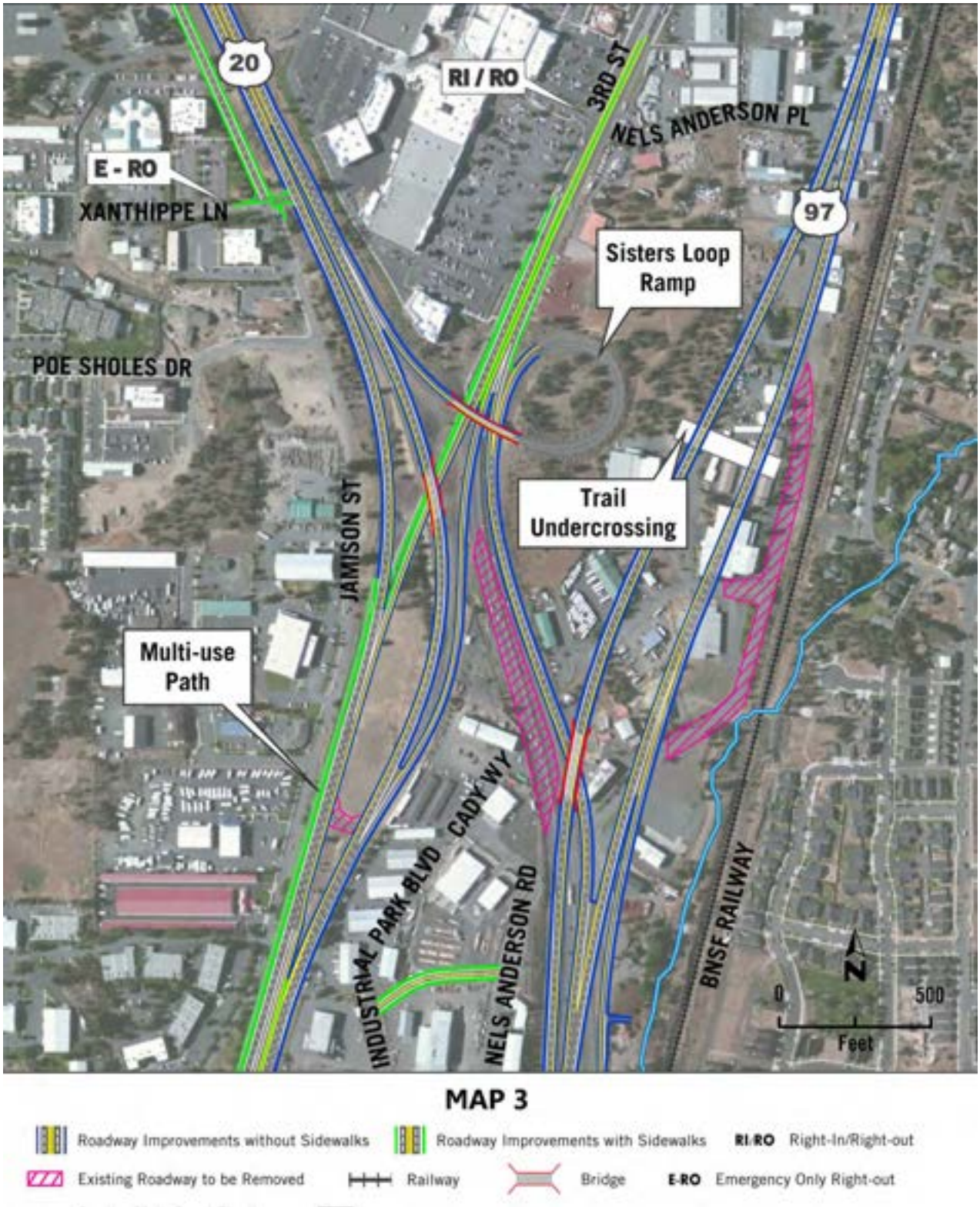


4 Empire Avenue east of 3rd Street



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Exhibit 2-3 FEIS: *Preferred Alternative (Map 3)*



Note: The design shown in this exhibit is conceptual in nature. Further refinements may be made during the final design process. Where roadway improvements shown in this exhibit end, the improvements will transition to the existing roadway cross section.

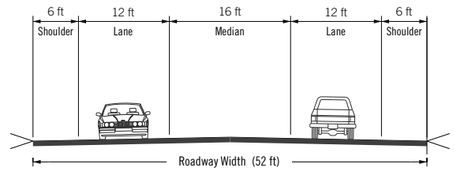
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Exhibit 2-3 FEIS: *Preferred Alternative (Map 4)*

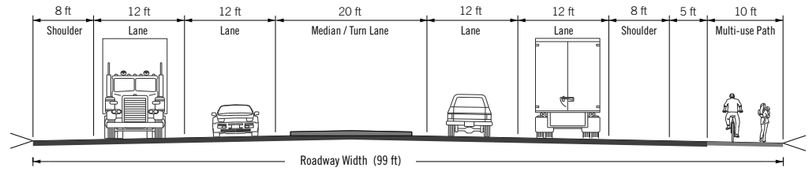




5 Britta Street



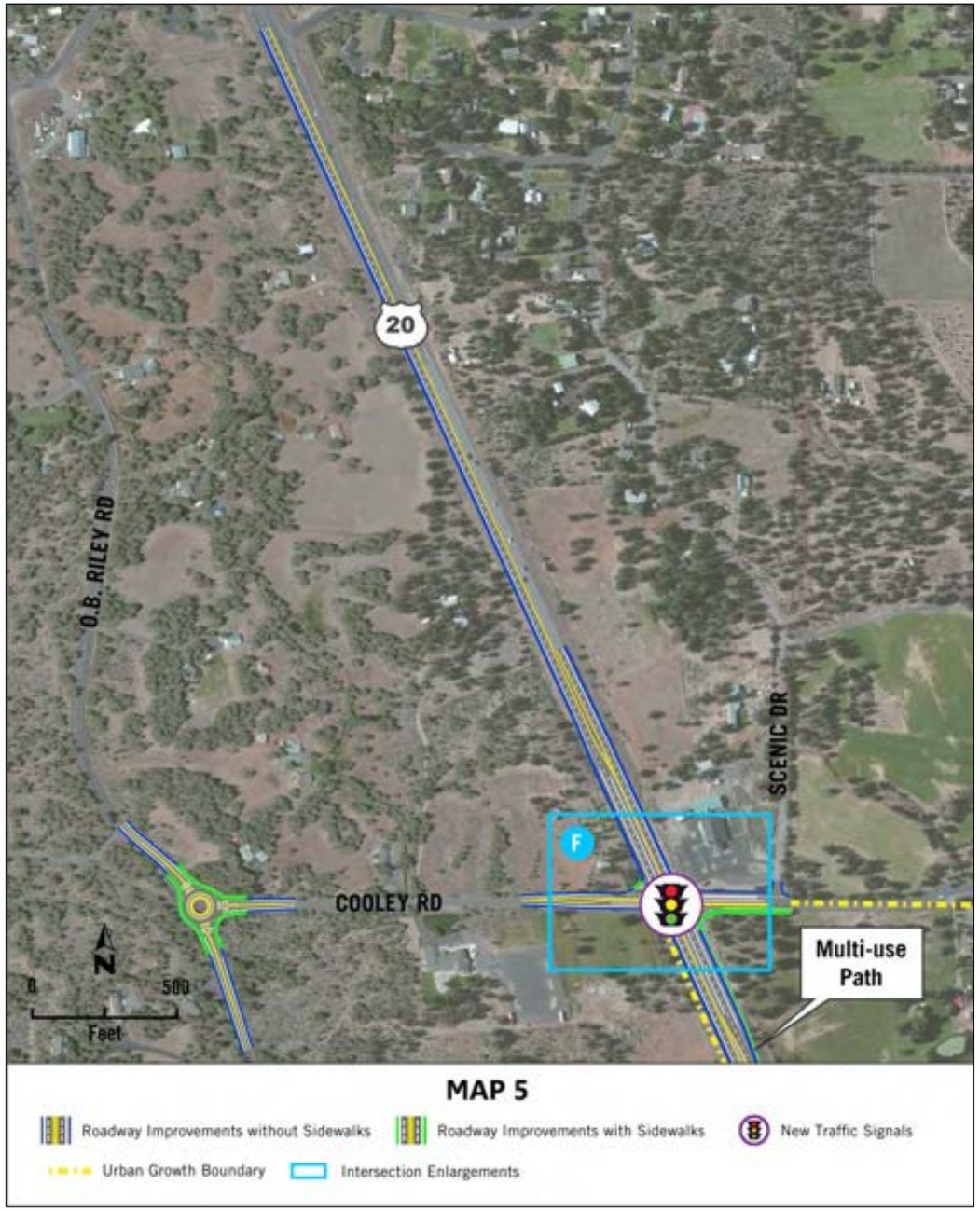
6 US 20 between Cooley Road and Robal Road



Note: The design shown in this exhibit is conceptual in nature. Further refinements may be made during the final design process. Where roadway improvements shown in this exhibit end, the improvements will transition to the existing roadway cross section.

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Exhibit 2-3 FEIS: *Preferred Alternative (Map 5)*





Note: The design shown in this exhibit is conceptual in nature. Further refinements may be made during the final design process. Where roadway improvements shown in this exhibit end, the improvements will transition to the existing roadway cross section.

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Exhibit 2-3 FEIS: *Preferred Alternative (Map 6)*

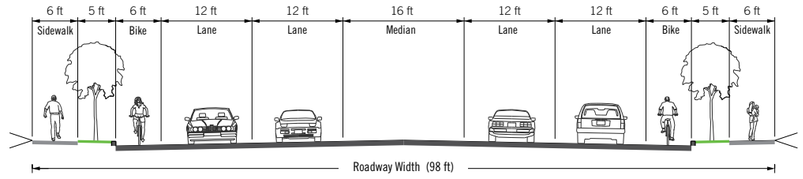


Note: The design shown in this exhibit is conceptual in nature. Further refinements may be made during the final design process. Where roadway improvements shown in this exhibit end, the improvements will transition to the existing roadway cross section.

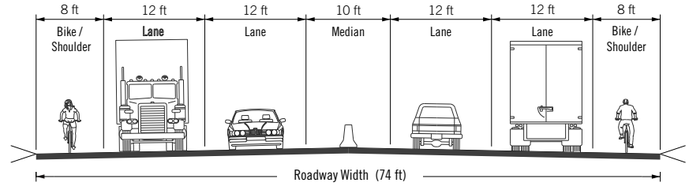




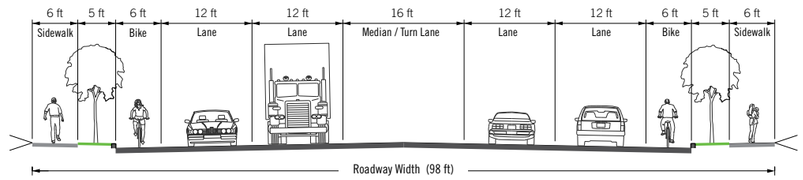
2 3rd Street south of Loco Road



7 US 97 between Empire Avenue and 3rd Street

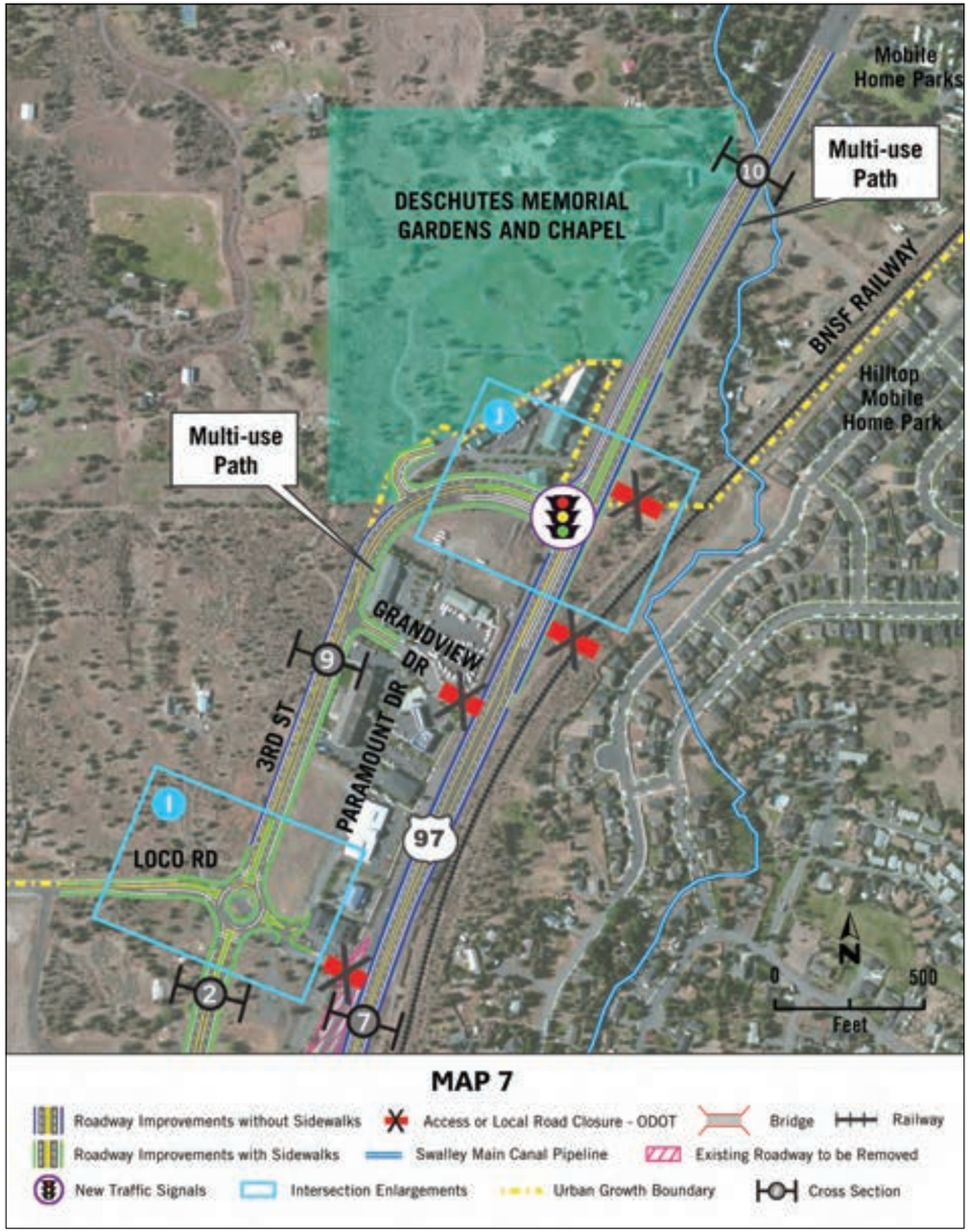


8 Cooley Road east of Hunnell Road



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Exhibit 2-3 FEIS: *Preferred Alternative (Map 7)*

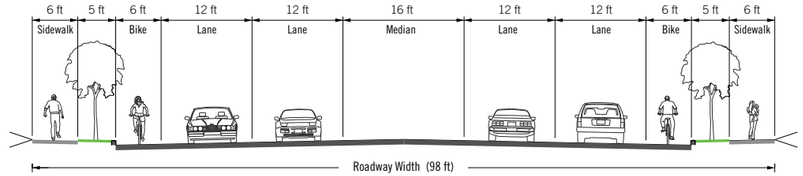


Note: The design shown in this exhibit is conceptual in nature. Further refinements may be made during the final design process. Where roadway improvements shown in this exhibit end, the improvements will transition to the existing roadway cross section.

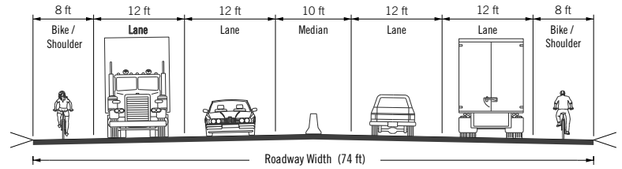




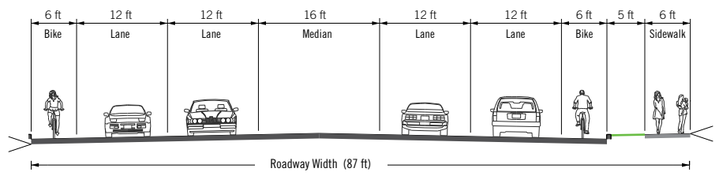
2 3rd Street south of Loco Road



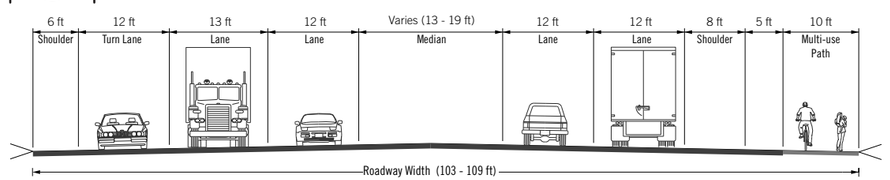
7 US 97 between Empire Avenue and 3rd Street



9 3rd Street north of Loco Road

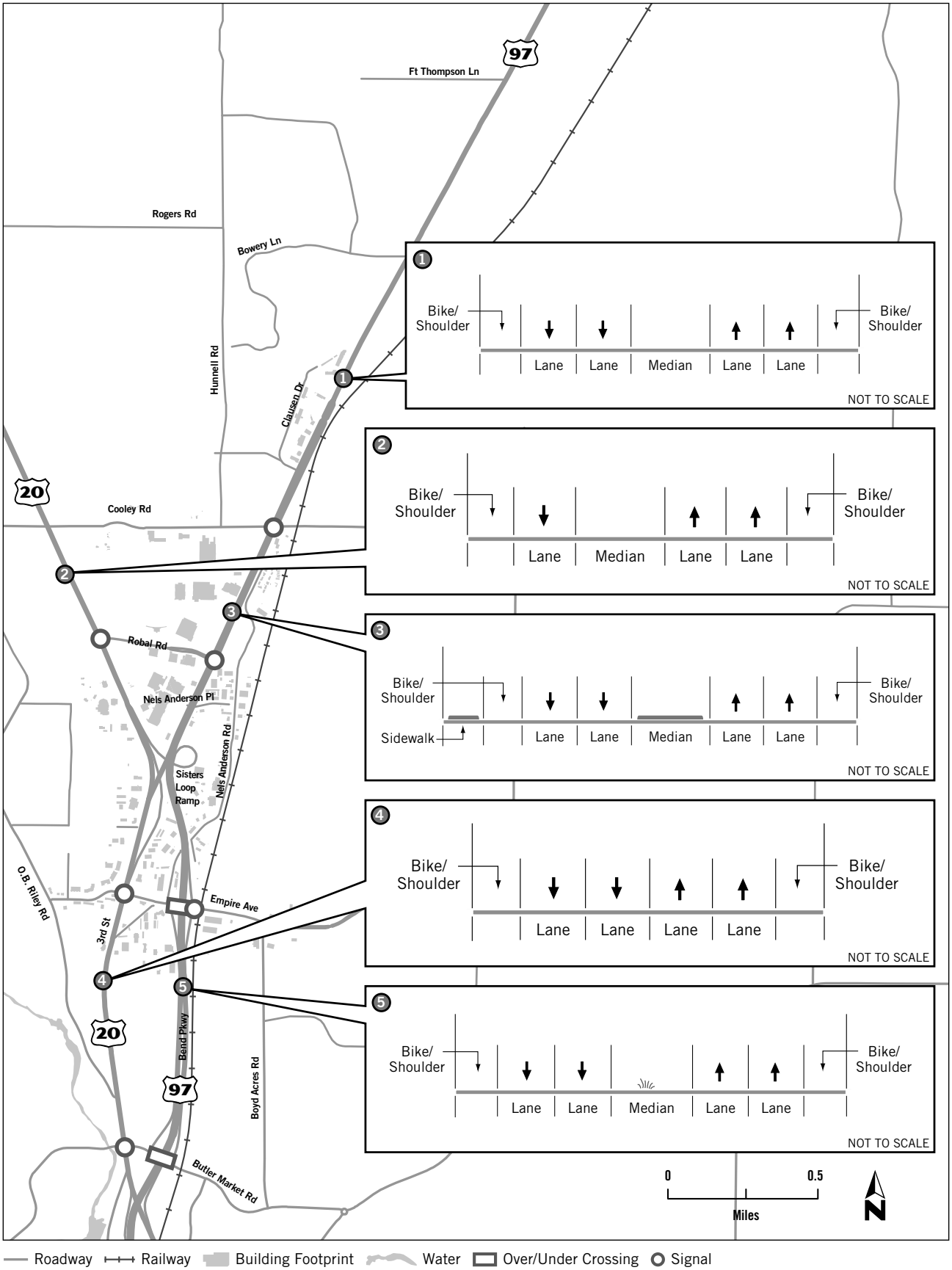


10 US 97 north of 3rd Street



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Exhibit 2-4: *No Build Alternative*





Current lane configuration of US 97 between Butler Market Road and Empire Avenue

Definition

Median

A median is a structure in the center of a roadway that physically separates the two directions of travel. The primary purpose of a median is to prevent vehicles from straying into opposing lanes. In addition, medians can prevent turns where they are undesirable from a traffic flow or safety standpoint.

Definition

Median Barrier



A median barrier is typically a three-foot-high concrete barrier that separates and controls traffic movements. The concrete Jersey barrier shown above is an example of a median barrier.



US 97 at Cooley Road

In this section, US 20 is collocated with 3rd Street and consists of two travel lanes in each direction with paved shoulders marked as bicycle lanes and intermittent sidewalks. US 20 and Empire Avenue intersect at a signalized at-grade intersection. The northbound 3rd Street/US 20 and southbound 3rd Street/eastbound US 20 travel lanes are separated north of Empire Avenue by a vegetated median, and the two northbound 3rd Street/westbound US 20 lanes narrow to a single lane before intersecting with westbound vehicles coming from US 97 via the Sisters loop ramp, as shown in Exhibit 2-4. West of the Sisters loop ramp, US 20 continues northwest with two westbound lanes, one eastbound lane, and a median.

Exhibit 2-5 shows the travel movements between US 97, US 20, 3rd Street, and Empire Avenue. There are no direct connections between southbound US 97 and westbound US 20 or eastbound US 20 and US 97 (north or southbound); however, the signed routes for these movements are through the US 97/Empire Avenue interchange.

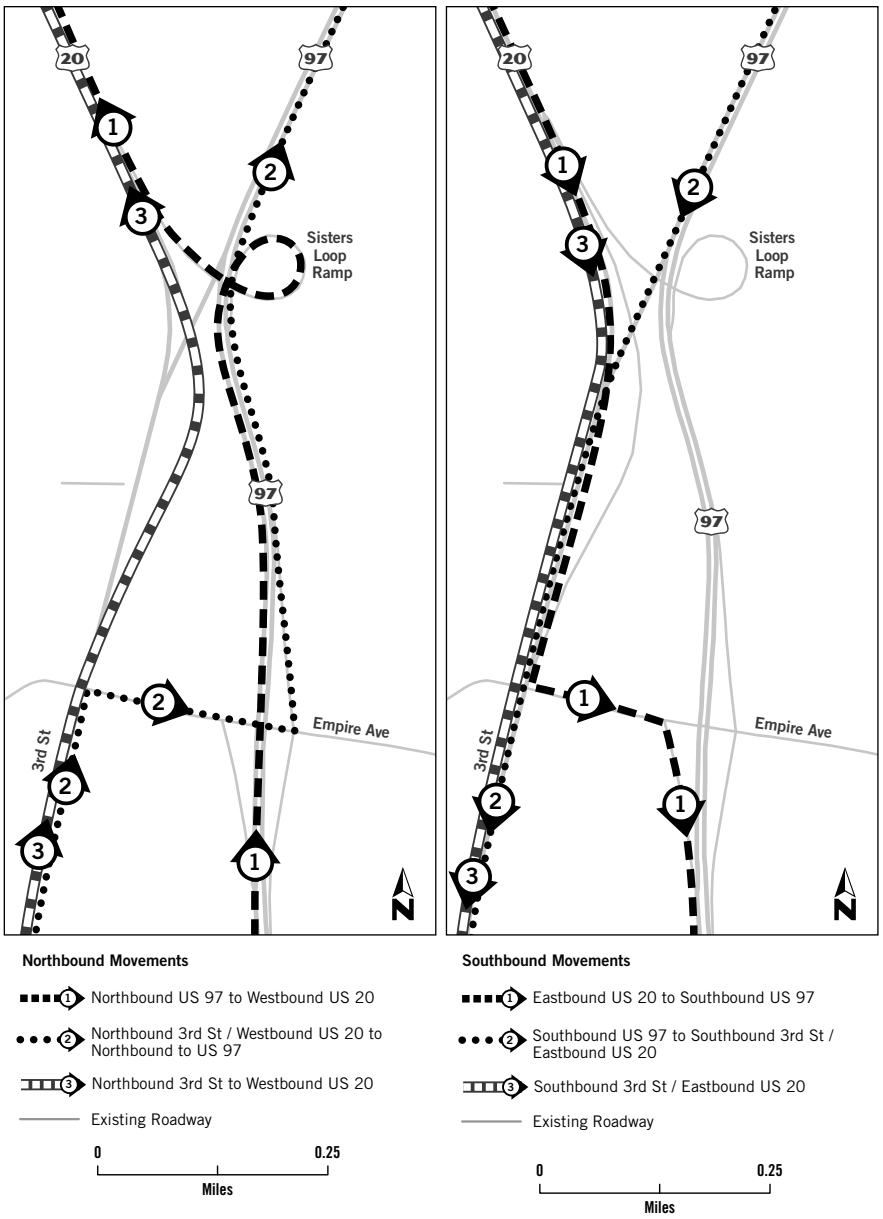
The Final EIS description of the No Build Alternative is supplemented as a result of public comments received on the Draft EIS. North of Empire Avenue and east of 3rd Street there is an existing fire lane that connects to Cady Way for those businesses between US 97, 3rd Street, and Empire Avenue. This fire lane does not meet current City of Bend design standards.

Central Section—Nels Anderson Place to Cooley Road

From Nels Anderson Place north to Cooley Road, US 97 includes two northbound travel lanes, two southbound travel lanes, a curb median, bicycle lanes, and a sidewalk on the west side. On the east side of US 97 there is a short segment of a sidewalk south of Robal Road. The intersection of US 97 and Robal Road is an at-grade signalized intersection with turn lanes and crosswalks. The intersection of US 97 and Cooley Road is also an at-grade signalized intersection with turn lanes and crosswalks.

In this central section, US 20 includes one eastbound travel lane, two westbound travel lanes, paved shoulders marked as bicycle lanes, and a paved median (no barrier). US 20 intersects with Robal Road in a three-way at-grade signalized intersection with crosswalks and turn lanes. Robal Road includes an eastbound travel lane, a westbound travel lane, a vegetated median, bicycle lanes, and sidewalk segments. The intersection of US 20 and Cooley Road is at-grade with turn lanes. The intersection is not signalized, but stop controls are provided on Cooley Road in both directions. Cooley Road includes an eastbound travel lane, a westbound travel lane, bicycle lanes, sidewalk segments near US 97, and sections of median curbing to channelize turn lanes.

Exhibit 2-5: *No Build Alternative: Travel Movements in South Section*



North Section—Cooley Road to Tumalo Road/Deschutes Market Road

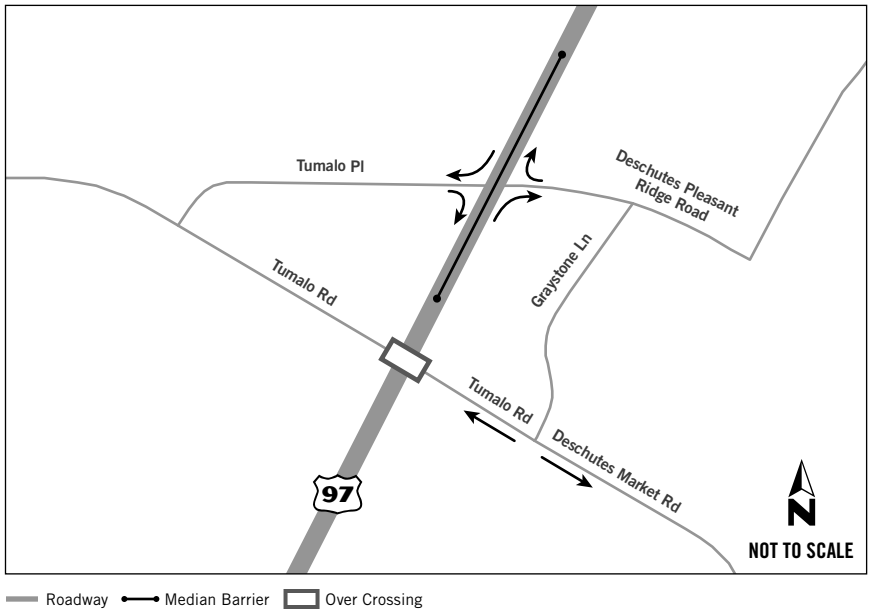
In the north section, US 97 continues from Cooley Road north to Grandview Drive with two northbound travel lanes, two southbound travel lanes, curbed median, paved shoulders that serve as bicycle lanes, and a sidewalk on the west side. The intersections on the west side of US 97 with Clausen Drive and Grandview Drive are stop controlled only on these local streets. Access to Clausen Drive is right-in/right-out only. Drivers on northbound US 97 may make a left onto Grandview Drive, but access from Grandview Drive is right-out only to southbound US 97.

North of Grandview Drive, US 97 continues with two northbound travel lanes, two southbound travel lanes, a paved median (no barrier), and paved shoulders that serve as bicycle lanes. The intersection on the west side of US 97 with Bowery Lane is stop controlled from Bowery Lane only, and drivers can make turns in all directions. Further north, Fort Thompson Lane intersects with US 97 on the west side; drivers may turn in all directions. Between Bowery Lane and Fort Thompson Lane, there are numerous private driveways and turning movements are allowed in all directions.

Local roads north of Cooley Road vary in their existing condition. Some are paved while others, like Bowery Lane and Hunnell Road, have segments that are unpaved.

North of the API, the Deschutes Market/Tumalo Junction interchange allows for all directions of traffic movement on and off of US 97. Median barrier is present on US 97 in the vicinity of the Deschutes Market/Tumalo Junction interchange, limiting all movements to right-turns only, as shown in Exhibit 2-6.

Exhibit 2-6: *No Build Alternative: Deschutes Market/Tumalo Junction Interchange*



Key Point

The improvements proposed for the East DS1 and East DS2 Alternatives would not preclude other future improvements to US 97, such as a direct connection between US 97 and US 20 or an east connection to the new northern interchange.

The Preferred Alternative will not preclude other future, independent improvements to US 97, such as a direct connection between US 97 and US 20, a new northern interchange, or a connection between US 97 and Robal Road



US 97 north of Cooley Road

Key Point

ODOT's *Bypass Policy* is applicable to the build alternatives. Consistency with this policy is discussed in Section 3.2.3 Land Use.

2.1.2 Build Alternatives

The East DS1 and East DS2, Alternatives would reroute US 97 east of its current alignment, adjacent to the existing railroad tracks. The current US 97 roadway would become a local arterial, an extension of 3rd Street. Within the City of Bend UGB, jurisdiction over this converted segment of US 97 is proposed to be transferred to the City of Bend under either build alternative. ODOT would retain jurisdiction of the converted roadway outside of the UGB.

South of Cooley Road, the build alternatives generally have the same design. North of Cooley Road, US 97 has the same alignment under both build alternatives, but the build alternatives differ in the location and type of the US 97 connection to 3rd Street.

Preferred Alternative

The Preferred Alternative will also reroute US 97 east of its current alignment, adjacent to the existing railroad tracks. The current US 97 roadway will become a local arterial and will also serve as an extension of 3rd Street. Decisions on jurisdictional transfers of roadways will be made during final design.

South of Cooley Road, the Preferred Alternative will generally have the same design as the East DS1 and East DS2 Alternatives. North of Cooley Road, US 97 will have the same alignment under the Preferred Alternative as the East DS1 and East DS2 Alternatives, but will connect US 97 to 3rd Street with a signalized intersection instead of an interchange.

Logical Termini and Independent Utility

The primary areas of congestion, poor traffic flow, and safety problems in the northern end of Bend occur around the intersections of US 97 with Cooley Road and with Robal Road. To address these areas, improvements would be needed both north and south of these intersections. To separate local and regional trips, a new interchange or intersection would be needed north of Cooley Road before the Deschutes Market/Junction interchange, and minor safety improvements would be needed at the Deschutes Market/Tumalo Junction interchange. Thus, Deschutes Market Road was selected as the logical northern terminus. Empire Avenue is the interchange on US 97 south of Robal Road, and traffic at this intersection also contributes to congestion through the northern end of Bend. Thus, Empire Avenue was selected as the logical southern project terminus. These end points serve as both logical termini for assessing transportation improvements and for reviewing environmental impacts on a broad scope. Further, these termini define a project corridor which has independent utility. Construction of the alternatives studied in the EIS would be a usable and reasonable expenditure that would address the congestion, traffic flow, and safety problems identified in the purpose and need statement without causing problems elsewhere or requiring the construction of additional transportation improvements in the area.

Incremental Construction

The project would likely be funded in increments, which would necessitate either build alternative being constructed in multiple increments or phases. Specific increments or the sequencing of increments have not been determined at this time. Upon completion

Key Point

Beneficial and adverse impacts on environmental resources are discussed in Chapter 3 Affected Environment, Environmental Consequences, and Avoidance, Minimization and/or Mitigation Measures for each of the three alternatives studied.

Definitions

Auxiliary Lane

An auxiliary lane is a lane along a highway that extends between an on-ramp and off-ramp. They are added to reduce heavy traffic merging associated with highway ramps.

Diamond Interchanges

A full diamond interchange is an interchange involving four ramps where they enter and leave the highway at a small angle and meet the non-highway at almost right angles. These ramps at the non-highway can be controlled through stop signs, traffic signals, or turn ramps. A partial diamond interchange is a diamond interchange with fewer than four ramps.

of the Final EIS and Record of Decision, ODOT will begin the process of obtaining funding and developing project increments. Public input will continue to be an integral part of the decision-making process on identifying project increments, determining the incremental benefit to US 97, assessing associated adverse and beneficial impacts, and developing mitigation measures.

Phasing and funding considerations for the Preferred Alternative are discussed in Section 2.6.2 Funding and Phasing of the Preferred Alternative.

Common Design Features of the Build Alternatives

Between Butler Market Road and Cooley Road, the build alternatives have the same design for the US 97 corridor. Design features that are common include intersection configurations, ramps, auxiliary lanes, grade-separations, and pedestrian and bicycle facilities.

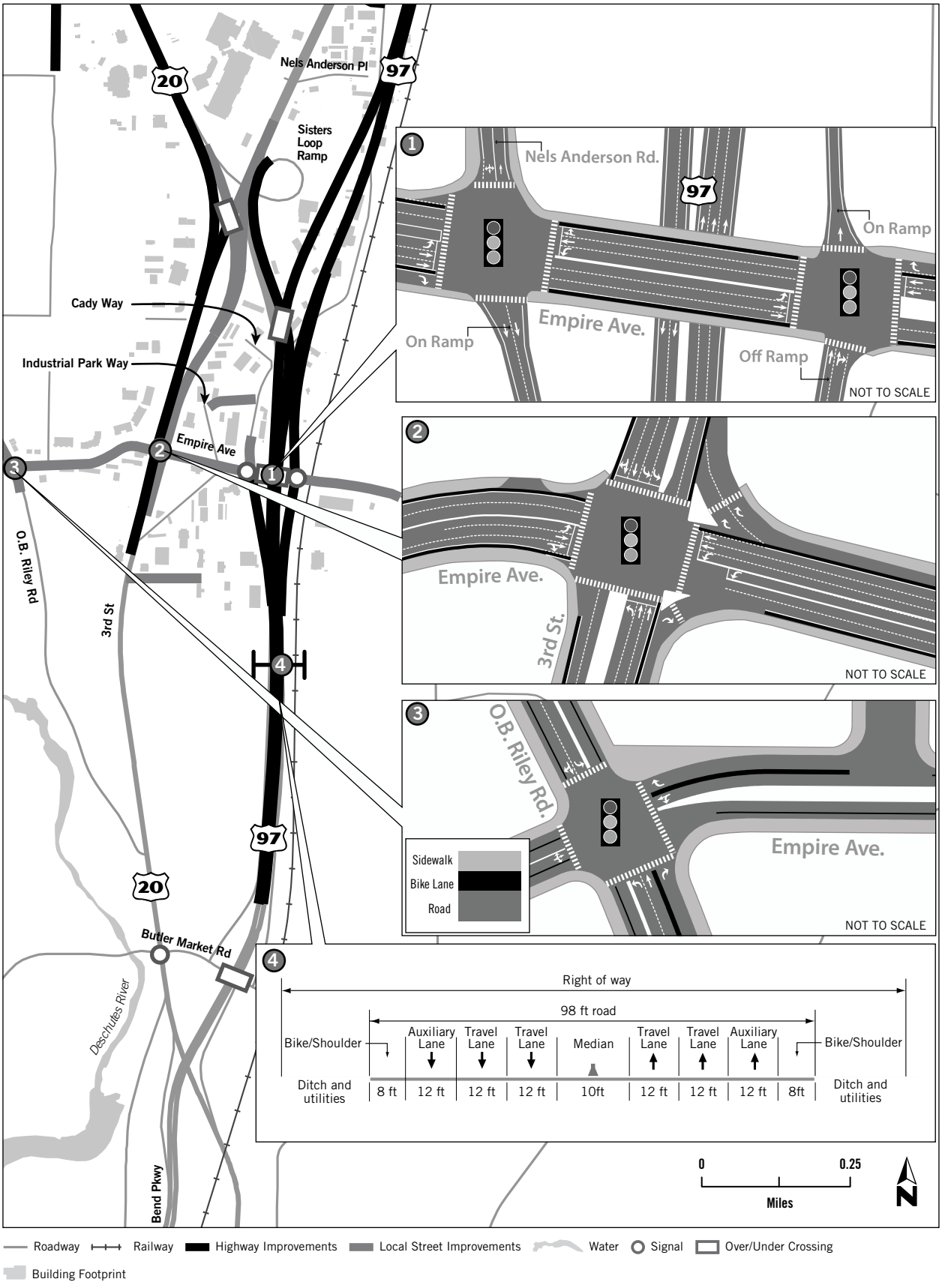
South Section—Butler Market Road to Nels Anderson Place

Butler Market Road to Empire Avenue—US 97 would be a free flow highway facility with access to and from the highway occurring through the Butler Market Road interchange and the Empire Avenue interchange. Northbound US 97 and southbound US 97 would have two travel lanes in each direction. In addition, there would be an outermost northbound lane that would be an auxiliary lane to the Empire Avenue interchange and an outermost lane in the southbound direction that would be an auxiliary lane to the Butler Market Road interchange. The northbound and southbound travel lanes would be separated by an approximately 10-foot-wide median. A typical cross-section of US 97 south of Empire Avenue is shown in Exhibit 2-7. Between Butler Market Road and Empire Avenue, US 20 and 3rd Street would be a collocated four-lane facility with two travel lanes in both directions.

Empire Avenue Interchange—The Empire Avenue interchange would retain its configuration as a partial diamond interchange with Empire Avenue crossing over US 97 (Exhibit 2-7). An off-ramp would allow vehicles on northbound US 97 to exit the highway at Empire Avenue. There would be no off-ramp from southbound US 97 to Empire Avenue. On-ramps would allow eastbound and westbound vehicles on Empire Avenue to enter northbound or southbound US 97. Exhibit 2-8 shows the various directional movements that would be possible via the Empire Avenue interchange. The Empire Avenue overcrossing would be expanded to a total of six lanes; two travel lanes plus a turning lane in each direction.

The intersection of Empire Avenue with O.B. Riley Road would be expanded and improved. A signal would be installed at the intersection of Empire Avenue and O.B. Riley Road.

Exhibit 2-7: *East DS1 and East DS2 Alternatives: South Section Design*



US 97, US 20 and 3rd Street between Empire Avenue and Nels Anderson Place—Northbound US 97 would have three travel lanes. About half way between Empire Avenue and the Sisters loop ramp, the travel lanes would split, and the two right lanes would continue on northbound US 97. The left lane would veer to the northwest, expand to two lanes and would connect to the Sisters loop ramp and northbound 3rd Street. Southbound US 97 would have two travel lanes and would cross over the left lane exiting from northbound US 97 to northbound 3rd Street/westbound US 20 on an elevated structure.

Between Empire Avenue and the Sisters loop ramp, the US 20/3rd Street travel lanes would be separated by a vegetated or aesthetic concrete median when feasible. The combined westbound US 20/ northbound 3rd Street would have three lanes. The right lane would continue northbound to 3rd Street. The left lanes would continue as westbound US 20.

The two-lane, eastbound US 20 would merge with the two-lane southbound 3rd Street. Once merged, there would be two through travel lanes on southbound 3rd Street and two left turn lanes at the Empire Avenue signal. There would be numerous directional movements available through the US 97/US 20/3rd Street connection (Exhibit 2-8).

Exhibit 2-9 illustrates the proposed design of US 97 and nearby road network for both the East DS1 and East DS2 Alternatives.

Exhibit 2-8: *East DS1 and East DS2 Alternatives and Preferred Alternative Movements in the South Section*

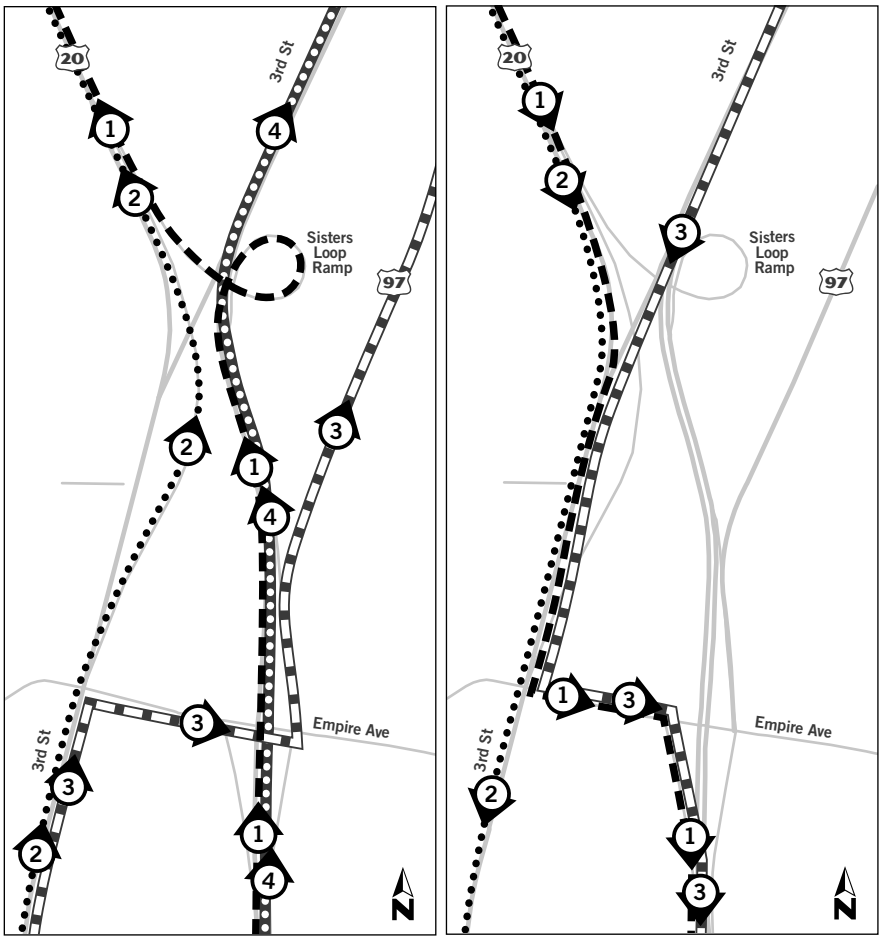


Exhibit 2-8 FEIS: *Preferred Alternative Travel Routes to Commercial Area between US 97 and US 20*



Exhibit 2-9: *Photo Simulation of the South Section for the East DS1 and East DS2 Alternatives*

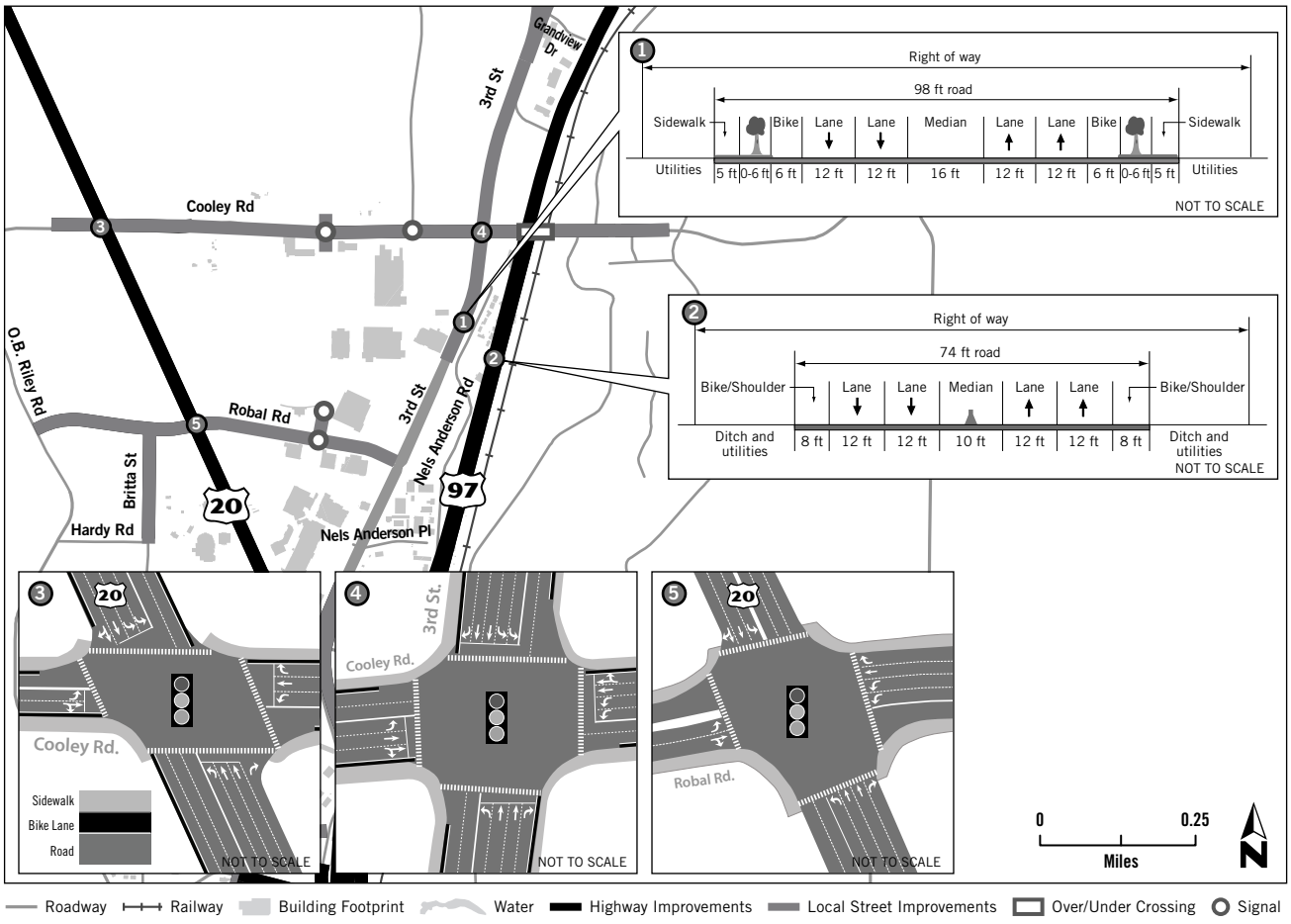


Exhibit 2-9 FEIS: *Photo Simulation of the South Section for the Preferred Alternative*



Note: For the Preferred Alternative the Empire Avenue bridges over US 97 and the BNSF Railway are unchanged from their current widths. These elements differ from the East DS2 Alternative, which would have widened both bridges.

Exhibit 2-10: *East DS1 and East DS2 Alternatives: Central Section Design*



Central Section—Nels Anderson Place to Cooley Road

US 97 and 3rd Street between Nels Anderson Place and Cooley Road—US 97 would be four lanes, with two northbound and two southbound lanes separated by a median or a median barrier. The highway would be shifted east, immediately adjacent to the railroad right-of-way. A typical cross-section of US 97 in this area and intersection details are shown in Exhibit 2-10. There would be four through lanes on 3rd Street, with two northbound and two southbound lanes separated by a center turn lane. The intersections of 3rd Street with Robal Road and Cooley Road would be signalized. Cooley Road would travel under US 97 and the railroad tracks; to do this Cooley Road would be lowered approximately 25 feet and 3rd Street would be lowered approximately 10 feet. There would be no direct connection to US 97 at Cooley Road. A photo-simulation illustrates the proposed grade-separation of US 97 at Cooley Road (Exhibit 2-11).

US 20 between Robal Road and Cooley Road—US 20 would be four lanes, with two eastbound and two westbound lanes separated by a 20-foot-wide median. The intersections of US 20 with Robal Road and Cooley Road would be expanded and signalized. These

Exhibit 2-11: *Photo Simulation of the Central Section for the East DS1 and East DS2 Alternatives*



Exhibit 2-11 FEIS: *Photo Simulation of the Central Section for the Preferred Alternative*



Note: For the Preferred Alternative, Cooley Road east of the US 97 and BNSF Railway overpasses tapers so that impacts to the Hunters Circle access are minimized. This design element differs from the East DS2 Alternative, which would have continued the widening of Cooley Road further east.

intersections are shown in detail in Exhibit 2-10. Robal Road would be extended west of US 20 as a new two-lane road and would connect with O.B. Riley Road at an unsignalized intersection. Britta Street would be extended north of Hardy Road as a new two-lane road and would connect with the extended Robal Road at a signalized intersection.

Design Features Unique to the East DS1 Alternative

The difference in the two build alternatives is the design of the north section, from Cooley Road to Fort Thompson Lane, which is described below and illustrated in Exhibit 2-12 through Exhibit 2-15.

North Section—Cooley Road to Fort Thompson Lane

For the East DS1 Alternative, US 97 would have two northbound and two southbound travel lanes, separated by median barrier. Between Cooley Road and the City of Bend's UGB, 3rd Street would have two northbound lanes and two southbound lanes. North of the UGB, 3rd Street would have one northbound travel lane and one southbound travel lane. US 97 would have a full diamond interchange with 3rd Street just north of Bowery Lane. The interchange would allow all northbound and southbound movements on to and off of US 97.

From Cooley Road, travelers would travel approximately 1.4 miles on northbound 3rd Street to access US 97 via the full diamond interchange. At the interchange, 3rd Street would be elevated above US 97 and would have one eastbound and one westbound travel lane. Access to properties east of US 97 would be provided by new roads which would be connected to 3rd Street. Just west of the railroad tracks, 3rd Street would terminate (Exhibit 2-12 and Exhibit 2-13).

Between Grandview Drive and Fort Thompson Lane, a number of new connections or new roads would be constructed:

- A new road would extend east of 3rd Street to access existing properties north of the Deschutes Memorial Gardens and Chapel
- A new road would connect Bowery Lane to Suzanne Lane
- A new road would extend east of Harris Way to access existing properties between Harris Way and US 97
- An upgraded connection would be provided between Fort Thompson Lane and Harris Way, and between Harris Way and Hunnell Road
- A new road would extend north and south of 3rd Street to access existing properties east of US 97.

New county roads and private driveways have been designed to meet the appropriate standards. Existing substandard county roads would

Exhibit 2-12: *East DS1 Alternative: North Section Design*

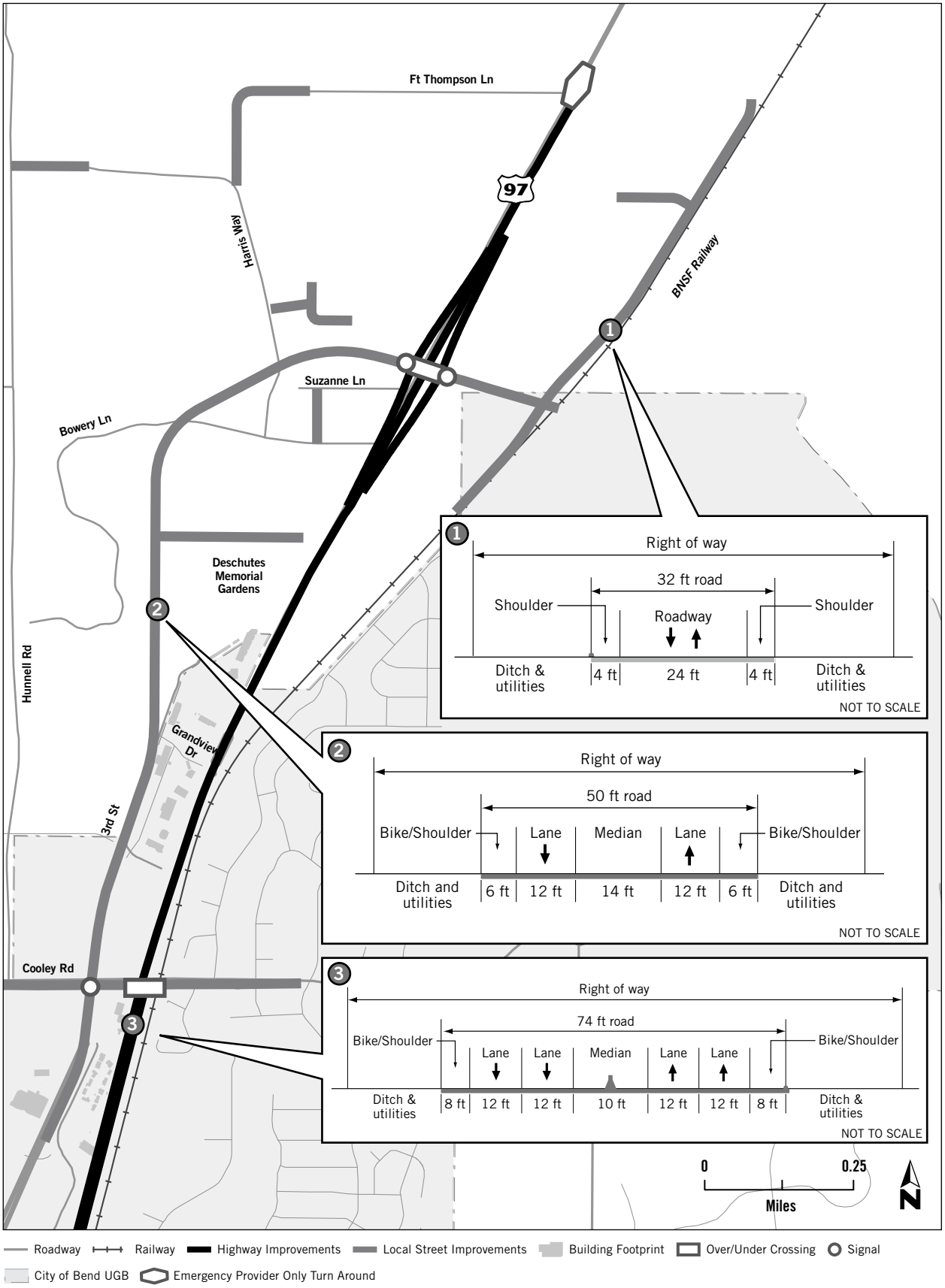


Exhibit 2-13: *Photo Simulation of the North Section for the East DS1 Alternative*



not be upgraded by this project, but could be prioritized and developed as standalone projects in the County TSP and State STIP.

Design Features Unique to the East DS2 Alternative

North Section—Cooley Road to Fort Thompson Lane

For the East DS2 Alternative, US 97 would have two northbound and two southbound travel lanes separated by a median barrier. North of Cooley Road, 3rd Street would have two travel lanes in each direction separated by a two-way left turn lane. The new extension of 3rd Street would connect with US 97 through a directional interchange on the southeast side of the Deschutes Memorial Gardens and Chapel (Exhibit 2-14 and Exhibit 2-15).

The directional interchange would allow southbound US 97 traffic to flow freely via an off-ramp to southbound 3rd Street. The directional interchange would also allow northbound 3rd Street traffic to cross over US 97 and flow freely via an onramp to northbound US 97. From Cooley Road, travelers would travel approximately 0.6 miles on northbound 3rd Street to access northbound US 97 via the new directional interchange. From Cooley Road, travelers would travel approximately 1.5 miles on southbound 3rd Street to access southbound US 97 via the Empire Avenue interchange.

Definition

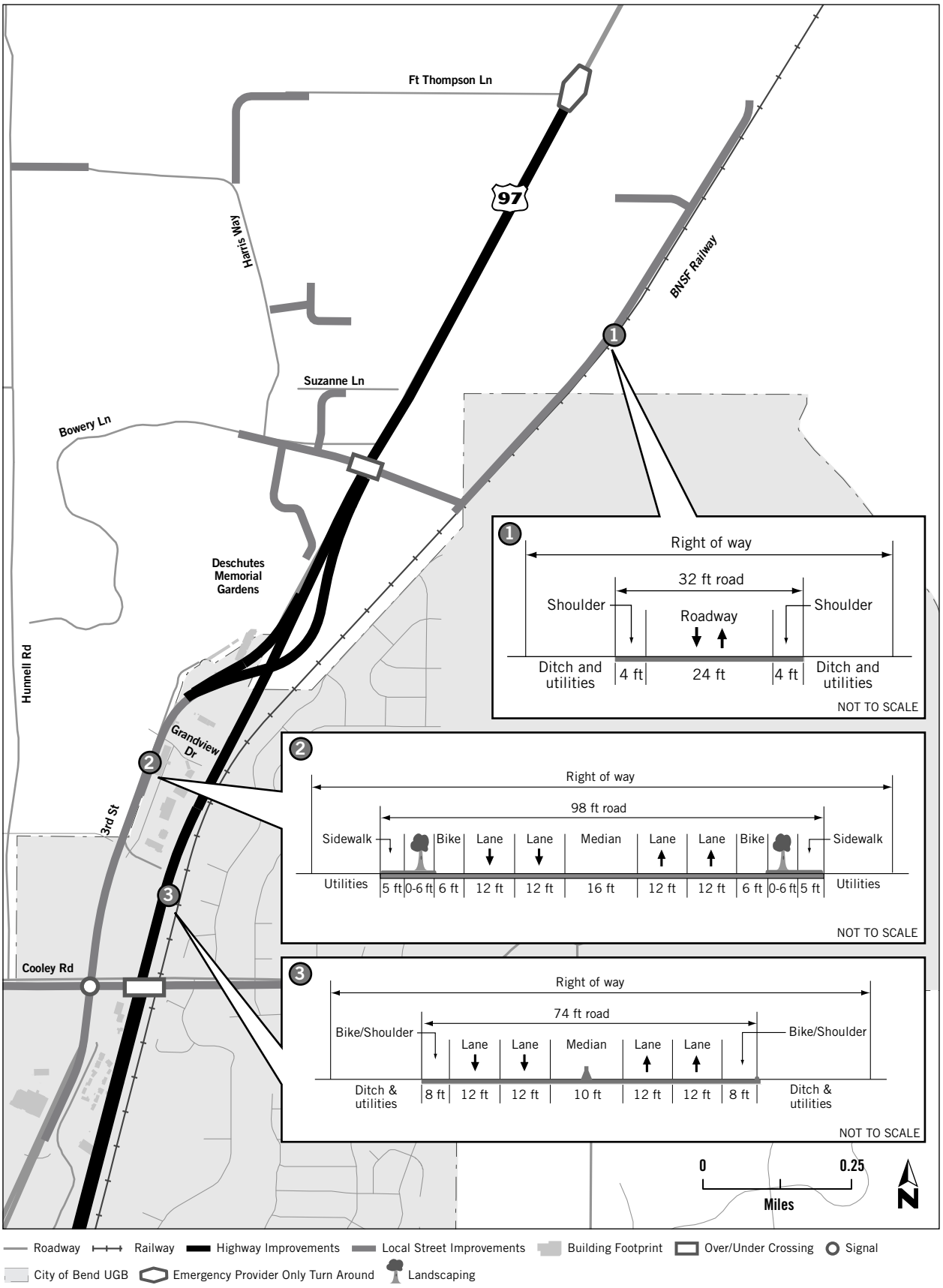
Directional Interchange

A directional interchange is an interchange between two major highway or freeway facilities where all of the movements are maintained without stopping or delays.

More Information

More detail on the elements associated with transportation system management and transportation demand management is provided in Section 2.4.4.

Exhibit 2 14: *East DS2 Alternative: North Section Design*



Chapter 1 Purpose of and Need For Proposed Action
Chapter 2 Alternatives
Chapter 3 Affected Environment, Environmental Consequences and Mitigation
Chapter 4 Cumulative Impacts
Chapter 5 Local Short-term Uses and Long-term Productivity
Chapter 6 Irreversible and Irretrievable Commitment of Resources
Chapter 7 Comments and Coordination

Exhibit 2 15: *Photo Simulation of the North Section for the East DS2 Alternative*



Exhibit 2-15 FEIS: *Photo Simulation of the North Section for the Preferred Alternative*



Note: The view and direction used in this photo simulation for the US 97/3rd Street intersection element of the Preferred Alternative was selected so that more detail could be readily seen. This view and direction differs from that selected for the photo simulation of the East DS2 Alternative northern interchange.

Between Grandview Drive and Fort Thompson Lane, a number of new connections, new local roads, or upgrades to existing local roads would be constructed:

- Bowery Lane would be upgraded and extended to the east, across US 97
- A new road would extend north and south of Bowery Lane to access existing properties east of US 97
- A new road would extend south of Bowery Lane to access existing properties southwest of the Bowery Lane overcrossing
- A new road would extend north of Bowery Lane to access existing properties northwest of the Bowery Lane overcrossing of US 97
- A new road would extend east of Harris Way to access existing properties between Harris Way and US 97
- An upgraded connection would be provided between Fort Thompson Lane and Harris Way, and between Harris Way and Hunnell Road.

New county roads and private driveways have been designed to meet the appropriate standards. Existing substandard county roads would not be upgraded by this project, but could be prioritized and developed as standalone projects in the County TSP and State STIP.

Description of the Preferred Alternative—East DS2 Modified Alternative

South Section—Butler Market Road to Nels Anderson Place

The south section of the Preferred Alternative is shown in Exhibit 2-3 FEIS, Maps 1 through 3. The Preferred Alternative constructs a new alignment of US 97 which will be a free flow highway facility with access to and from the newly aligned US 97 occurring through the existing Butler Market Road interchange and the existing Empire Avenue interchange. A third travel lane will be added to the existing two travel lanes on northbound US 97 starting at the point where the 3rd Street northbound on-ramp merges, which is just north of the Butler Market Road overcrossing of US 97. The merge distance for the northbound on-ramp at the Butler Market Road interchange will be lengthened as shown in Exhibit 2-3 FEIS, Map 1. Southbound US 97 between the Butler Market Road and Empire Avenue interchanges will retain the current two travel lanes. The southbound on-ramp from Empire Avenue will be lengthened to provide additional merging distance as shown in Exhibit 2-3 FEIS, Map 2. The northbound and southbound travel lanes will be separated by a median that varies between 2 feet and 90 feet in width. Please see Exhibit 2-3 FEIS, Map 1, Cross Section 1, for a typical cross section of

US 97 south of Empire Avenue for the Preferred Alternative. Between Butler Market Road and Empire Avenue, US 20 and 3rd Street will be a collocated four-lane facility with two travel lanes in both directions as shown in Exhibit 2-3 FEIS, Map 2, Cross Section 2.

Empire Avenue Interchange—The Empire Avenue interchange will retain its configuration as a partial diamond interchange with Empire Avenue crossing over US 97, as shown in Exhibit 2-3 FEIS, Map 2, Intersection Enlargement D. An off-ramp will allow vehicles on northbound US 97 to exit the highway at Empire Avenue. There will be no off-ramp from southbound US 97 to Empire Avenue. On-ramps will allow eastbound and westbound vehicles on Empire Avenue to enter northbound or southbound US 97. Exhibit 2-8 shows the various directional movements that will be possible via the Empire Avenue interchange. Exhibit 2-8A FEIS shows travel routes to the commercial area between US 97 and US 20 under the Preferred Alternative.

In order to provide access into the industrial area south of Empire Avenue, Mervin Sampels Road will be improved east of 3rd Street with a signalized intersection at 3rd Street as shown in Exhibit 2-3 FEIS, Map 2, Intersection Enlargement A. The Preferred Alternative will retain the existing Empire Avenue bridge over existing US 97 and will enlarge the Empire Avenue/3rd Street intersection from the current three lanes of traffic to seven lanes as shown in Exhibit 2-3 FEIS, Map 2, Intersection Enlargement D. The intersection of Empire Avenue and O.B. Riley Road will be expanded and improved, including the installation of a traffic signal, as shown on Exhibit 2-3 FEIS, Map 2, Intersection Enlargement B.

US 97, US 20 and 3rd Street between Empire Avenue and Nels Anderson Place—Under the Preferred Alternative, northbound US 97 will have three travel lanes on its existing alignment. About halfway between Empire Avenue and the Sisters loop ramp, US 97 veers east from its existing alignment to the new alignment. The three travel lanes on the newly aligned US 97 split with the two right lanes continuing on northbound US 97, as shown on Exhibit 2-3 FEIS, Maps 2 and 3. The left lane will veer to the northwest and expand to two lanes with one of those lanes connecting to westbound US 20 via the Sisters loop ramp and the other lane connecting to northbound 3rd Street. The newly aligned southbound US 97 will have two travel lanes and will cross over the left lane exiting from northbound US 97 to northbound 3rd Street/westbound US 20 on an elevated structure as shown in Exhibit 2-3 FEIS, Map 3.

Between Empire Avenue and the Sisters loop ramp, the collocated US 20/3rd Street will remain on its existing alignment that is separated by a vegetated and concrete median. The combined westbound US 20/

northbound 3rd Street facility will be widened from two lanes to three lanes beginning at Empire Avenue. North of Empire Avenue, a new off-ramp will route the right lane northbound to the newly extended 3rd Street, which uses the existing US 97 facility. The two left lanes continue as westbound US 20, which requires replacing the structure over 3rd Street to accommodate a second lane on US 20 as well as span the newly extended 3rd Street as shown in Exhibit 2-3 FEIS, Map 3. In this segment, eastbound US 20 is a one-lane roadway that merges with the newly extended two-lane southbound 3rd Street as shown in Exhibit 2-3 FEIS, Map 3. Once merged, there will be two through travel lanes on southbound 3rd Street and two left turn lanes at the Empire Avenue signal, as shown in Exhibit 2-3 FEIS, Map 2, Intersection Enlargement C. There will be numerous directional movements available through the US 97/US 20/3rd Street connection as shown in Exhibit 2-8.

North of Empire Avenue a new east-west local street will be constructed to connect Industrial Park Boulevard and Nels Anderson Road, improving traffic flow in this area, as shown in Exhibit 2-3 FEIS, Map 2. South of Empire Avenue, improvements will be made to the intersection at Sherman Road and Nels Anderson Road to facilitate truck turning movements, including a widened pavement section for tractor/trailer turning radii differences (off-tracking). The intersection of Sherman Road and Empire Avenue and private accesses slightly west of Sherman Road are shown as closed under the Preferred Alternative. As the Preferred Alternative moves into final design and construction phases, the timing of implementation of access changes on Empire Avenue will be important. The City of Bend and ODOT will work jointly with stakeholders to develop a strategy for the phasing and criteria that will trigger the implementation of these changes.

An access road for the Swalley Irrigation District to perform maintenance on the Swalley Main Canal Pipeline will be constructed off of the new northbound US 97 on-ramp at the Empire Avenue interchange, as shown in Exhibit 2-3 FEIS, Map 2.

A trail undercrossing of the newly aligned US 97 will be installed to support the City's future trail plan as shown in Exhibit 2-3 FEIS, Map 3, and Exhibit 3-61D FEIS.

Exhibit 2-9 FEIS is a photo simulation of the south section design for the Preferred Alternative.

Central Section—Nels Anderson Place to Cooley Road

The central section of the Preferred Alternative is shown in Exhibit 2-3 FEIS, Maps 3 through 6.

US 97 and 3rd Street between Nels Anderson Place and Cooley Road—Under the Preferred Alternative, US 97 will be four lanes, with two northbound and two southbound lanes separated by a median or a median barrier. The realigned segment of the highway will be east of the current alignment and will be located immediately adjacent to the railroad right-of-way. A typical cross-section of US 97 in this area and intersection details are shown in Exhibit 2-3 FEIS, Map 6, Cross Section 7. Third Street will have two northbound and two southbound lanes separated by a center turn lane, as shown in Exhibit 2-3 FEIS, Map 6, Cross Section 2. The intersections of 3rd Street with Robal Road and Cooley Road will be signalized. Exhibit 2-3 FEIS, Map 6, Intersection Enlargement H shows the reconfiguration of the signalized intersection of Cooley Road and 3rd Street. Cooley Road will travel under the realigned US 97 and the railroad tracks, which requires lowering Cooley Road approximately 25 feet and lowering 3rd Street 10 feet. There will be no direct connection to US 97 at Cooley Road.

Britta Street will be extended north from its current termination at Hardy Road, as a new two-lane road and will connect to US 20 at Robal Road at a signalized intersection, as shown in Exhibit 2-3 FEIS, Map 4, Intersection Enlargement E. The portion of existing Jamison Street that parallels US 20 on the west side will be extended north, then west to connect to the extended segment of Britta Street.

The intersection of Cooley Road and O.B. Riley Road will be improved with a one-lane roundabout to improve traffic flow as shown in Exhibit 2-3 FEIS, Map 5. The Preferred Alternative will widen Cooley Road from the current three lanes to five lanes between the new signalized intersection with Hunnell Road and the new crossing under the BNSF Railway as shown in Exhibit 2-3 FEIS Map 6, Cross Section 8. The Preferred Alternative minimizes impacts by maintaining access to Hunters Circle from Cooley Road, east of the realigned US 97, as shown in Exhibit 2-3 FEIS, Map 6. Exhibit 2-3 FEIS, Map 6, Cross Section 7 provides the typical cross section of the newly aligned US 97 in this area for the Preferred Alternative. Please see Exhibit 2-11 FEIS, for the photo-simulation which illustrates the grade-separation of US 97 at Cooley Road for the Preferred Alternative.

North Section—Cooley Road to Fort Thompson Lane

The north section of the Preferred Alternative is shown in Exhibit 2-3 FEIS, Maps 6 and 7. Newly aligned US 97 will have two northbound and two southbound travel lanes separated by a median barrier as shown in Exhibit 2-3 FEIS, Map 7, Cross Section 7. Approximately 500 feet south of Cooley Road, 3rd Street will be shifted west from the current US 97/3rd Street. Third Street will continue

north of Cooley Road with two travel lanes in each direction, separated by a two-way left turn lane as shown in Exhibit 2-3 FEIS, Map 7, Cross Section 2. The realigned US 97 will reconnect with the existing US 97 alignment just south of Grandview Drive as shown on Exhibit 2-3 FEIS, Map 7. A new signalized intersection will connect US 97 with the extended 3rd Street, which is aligned on the existing Clausen Road facility, on the southeast side of the Deschutes Memorial Gardens and Chapel (Exhibit 2-3 FEIS, Map 7, Intersection Enlargement J; and Exhibit 2-15 FEIS).

The intersection of Loco Road and 3rd Street will have a two-lane roundabout designed to City of Bend standards as shown on Exhibit 2-3 FEIS, Map 7, Intersection Enlargement I. Access to US 97 at Grandview Drive and at Loco Road will be closed. In addition, two access driveways to US 97 from rural residential lots on the east side of US 97 will be closed as shown on Exhibit 2-3 FEIS, Map 7.

Other Components of the Build Alternatives

Access Management

For the build alternatives, along US 97 between Empire Avenue and the new northern interchange access would be limited to public approach roads at intersections. No private driveways would be allowed. Additionally, private driveways and public approach roads connecting to US 20 in the vicinity of newly signalized intersections would be closed. In cases where private driveways or public road approaches to state highways are closed, alternate access would be provided to the local street network. In some cases, this would require new roads to be built to connect existing local streets.

For the Preferred Alternative, along US 97 between Empire Avenue and the new intersection at 3rd Street, access will be limited to public approach roads at intersections.

Emergency Service Turnaround

An emergency service turnaround would be provided on US 97 at Fort Thompson Lane. There would be a break in the median barrier for emergency vehicles only. Expanded shoulders in this area would accommodate emergency vehicles turning around to change direction.

For the Preferred Alternative, the signalized intersection of US 97 and 3rd Street will provide for emergency service turnaround capability. The improvements for the Preferred Alternative will not change the current configuration of US 97 at Fort Thompson Lane; consequently no emergency service turnaround on US 97 at Fort Thompson Lane will be provided.

Transportation System Management/Transportation Demand Management

Several transportation system management strategies have been incorporated into the build alternatives. These include ramp metering, auxiliary lanes, turning lanes, traffic signal timing optimization, access management, and traveler information. ODOT is coordinating with other agencies to implement transportation demand management strategies independent of the proposed action.

The traffic analysis conducted for the Preferred Alternative included transportation system management and the transportation demand management elements, which resulted in revised roadway configurations, additional bike and pedestrian facilities, and transit accommodations.

Transportation system management measures incorporated into the Preferred Alternative include:

- Metering the on-ramps to US 97/Butler Market Road interchange and US 97/Empire Avenue interchange on-ramps to control the timing of traffic merging onto US 97
- Adding one new northbound travel lane on the existing US 97 to provide more capacity between 3rd Street and Empire Avenue where there are a significant number of short trips (470 trips or 17 percent of US 97 northbound traffic)
- Adding turning lanes and making turning lanes longer to reduce congestion and delay at intersections such as at Cooley Road and 3rd Street, US 20/3rd Street and Empire Avenue, and Empire Avenue to US 97 northbound on-ramps
- Optimizing the timing of signals to better respond to traffic demands
- Reducing the number of driveways and local street connections to US 97.

Transportation demand management measures incorporated into the Preferred Alternative include:

- Continue coordinating with the Central Oregon Intergovernmental Council (COIC) regarding their existing and future planned services and facilities in the area for Cascades East Transit and design the Preferred Alternative so as to not impact existing transit facilities and to not preclude planned local and regional transit facilities within the north Bend area

- Creating transportation management areas for new businesses that limit parking spaces, encourage staggered work start and end times, and provide incentives to encourage alternate commuting options
- Continue coordination with COIC and the Bend MPO to accommodate intercity and local transit
- Providing additional pedestrian and bicycle facilities throughout the API.

Stormwater Management

For the East DS1 and East DS2 Alternatives, stormwater would be conveyed for treatment via new ditches to new stormwater detention ponds and swales for the portion of the API that currently discharges stormwater to drywells and drainwells (the method of stormwater management within the urban area, which consists of curbs and inlets). For the remainder of the API, stormwater would drain to roadside ditches and infiltrate into the soil similar to existing conditions.

The Preferred Alternative will include stormwater conveyance and treatment similar to East DS1 and East DS2 Alternatives.

Aesthetic Treatment

For the build alternatives, aesthetic treatments would be applied to US 97 and improved or new local roads within the API. These treatments would be consistent with existing treatments on ODOT facilities and local roads in Bend and would promote visual unity across the transportation network. Moreover, these treatments would help visually blend roads and highways with surrounding vegetation and rock features. Local road improvements included in the proposed action would be consistent with the roadway standards for the City of Bend or Deschutes County, including any associated aesthetic requirements such as street lighting or vegetation. Examples of aesthetic treatments that could be incorporated into the build alternatives include raised medians of aesthetic concrete or vegetation for local roads, textured, scored or stained surfaces for retaining walls, and slope paving with lava rock and curb for structures such as bridges. The landscaping treatment to be applied to the highway right of way would include a mix of grass, sagebrush, and some trees.

Landscaping treatments are no longer being considered by ODOT and will not be included with the Preferred Alternative.

Definitions

Drywell

A drywell is an underground structure that disposes of stormwater runoff by dissipating it into the ground where it merges with the local groundwater. A drywell is typically constructed of a metal or concrete cylinder with perforated sides and bottom.

Drainwell

A drainwell is similar to a drywell but a drainwell consists of a pit filled with gravel, riprap, rubble, or other stony debris.

2.2 Alternatives Development and Screening

2.2.1 Alternatives Development

The alternatives development phase gathered input from technical staff, project committees, participating agencies, and the public to identify alternatives that would address the purpose of and need for the proposed action. Initially, a preliminary range of alternatives was developed that comprised 21 build alternatives located along three project corridors (Exhibit 2-16):

- **West corridor**—Reroute US 97 west of its existing alignment and closer to US 20
- **Existing corridor**—Retain US 97 on its existing alignment
- **East corridor**—Reroute US 97 east of its existing alignment and closer to the BNSF Railway.

A No Build Alternative was also considered by ODOT and was automatically forwarded into the Draft EIS for evaluation per requirements under the National Environmental Policy Act.

This preliminary range of 21 build alternatives were assessed in terms of engineering feasibility (operational benefits, geometrical design feasibility), significant environmental impacts, and economic feasibility. From this initial assessment, the range of alternatives was revised based on how the alternatives compared to one another, and the best performing alternative(s) in each corridor were carried forward (Exhibit 2-17 FEIS). The result yielded a combined preliminary range of alternatives, which were then forwarded to alternatives screening to determine which alternatives would satisfy the purpose and need for the proposed action and meet other screening criteria.

As a clarification to address public comments received on the Draft EIS, approximately two thirds of these build alternatives were designed to address a large number of operational issues for US 97, US 20, and the local street network. Some of these build alternatives had greater impacts, larger construction footprints, and costs in excess of $300 million. Under direction from the Oregon Transportation Commission, ODOT developed several down-scaled alternatives that would have fewer impacts, smaller footprints, and more affordable costs. For example, the East DS1, East DS2, and East 1 Alternatives provided similar operational performance; however, the East DS1 and East DS2 Alternatives had substantially fewer impacts and were approximately 30 percent lower in cost, so the East 1 Alternative was not advanced for screening against the purpose and need.

Exhibit 2-16: *Corridors Evaluated for the Proposed Action*

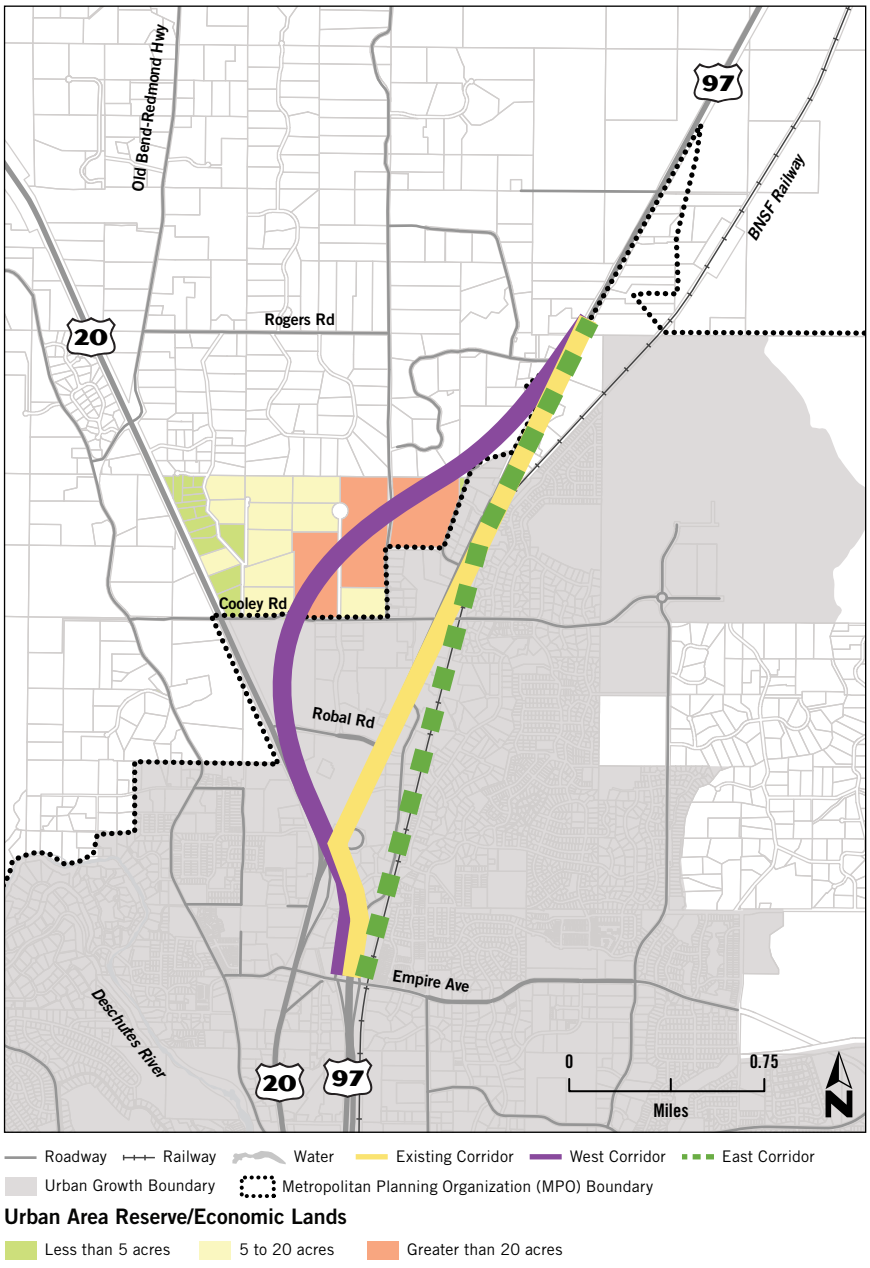


***Exhibit 2-17** FEIS: Narrowing the Preliminary Range of Alternatives*

	Preliminary Range of Alternatives	Assessment	Revised Preliminary Range of Alternatives
West Corridor Alternatives	WS West Modified WS West E (Modified)	These two alternatives were developed by a public stakeholder and were forwarded directly to alternatives screening.	→ WS West Modified → WS West E (Modified)
	RWA-1 DL-1 West A West A-2B West B West C West 1	Each of these ODOT-developed alternatives had similar design elements; however, the West 1 Alternative provided the best operations for similar costs, geometrical design elements, and environmental impacts and is representative of all other alternatives. Thus, only the West 1 Alternative was forwarded to alternatives screening.	→ West 1
	West DS1	West DS1 Alternative minimized the design footprint compared to all other West Corridor alternatives and had substantially less cost. Thus, West DS1 was forwarded to alternatives screening.	→ West DS1
Existing Corridor Alternatives	GM-2	This alternative was developed by a public stakeholder and was forwarded directly to alternatives screening.	→ GM-2
	Existing A Existing DS1 TSM/TDM	Each of these alternatives were distinctly different from other Existing Corridor alternatives in terms of traffic operations, design elements and cost. Thus each was forwarded to alternatives screening.	→ Existing A → Existing DS1 → TSM/TDM
Existing Corridor Alternatives	WS East A Modified	This alternative was developed by a public stakeholder and was forwarded directly to alternatives screening.	→ WS East A Modified
	RRA-2B East 1 East 2 East 3 East DS1 East DS2 East DS2 Modified	These alternatives have similar design features and operational performance compared to each other except for RRA-2B Alternative which had poorer performance. The operational performance of East 1, East 2 and East 3 Alternatives were similar to the East DS1 and East DS2 and East DS2 Modified Alternatives; however, the East DS1 and East DS2 and East DS2 Modified Alternatives have significantly lower cost (30 percent less). Thus, the East DS1 and East DS2 and East DS2 Modified Alternatives were representative of other alternatives and forwarded to alternatives screening.	→ East DS1 → East DS2 → East DS2 Modified

Note: The East DS2 Modified Alternative was added to the East Corridor Alternatives considered and advanced for further analysis.

2.2.2 Alternatives Screening

Screening criteria were developed to assess whether an alternative would meet the purpose and need for the proposed action as well as demonstrate economic and technical feasibility. The screening process included pass/fail criteria to determine if an alternative would achieve the following:

- Reduce congestion
- Improve traffic flow
- Improve safety
- Be economically feasible
- Improve expressway operations
- Support current and future economic development
- Maintain local street connectivity.

Each alternative was sequentially screened through a three-step screening process. Exhibit 2-18 FEIS summarizes the screening criteria and screening results for each alternative. The criteria were developed from project issues detailed in Section 1.3 Need for the Proposed Action, and Section 1.4 Background. A more detailed explanation on why an alternative failed one or more of the screening criteria as well as why an alternative was eliminated from further study is provided in Section 2.4 Alternatives Developed but Eliminated from Further Consideration.

The first step was a technical feasibility screen and measured whether or not an alternative could carry projected traffic volumes on US 97 while reducing delay by eliminating traffic signals on US 97, achieving minimum standards and policies set by the *Oregon Highway Plan* and American Association of State Highway and Transportation Officials, and providing safety improvements. The alternatives screened at this step had planning-level design analysis. Those alternatives that passed the first screening step were refined with additional design to allow for system-level traffic analysis to be conducted.

The second screening step also assessed technical feasibility. Using system-level traffic modeling analysis, this screening step measured an alternative's ability to reduce congestion and improve traffic operations on US 97. Those alternatives that passed the second screening step were further refined through additional design analysis so that more detailed impacts and operational performance could be assessed.

For the final third screening step, critical operational feasibility, environmental impacts, and economic feasibility was assessed across six criteria:

More Information

In addition to public comment on the information presented in the Draft EIS, ODOT will evaluate the extent to which each alternative achieves the project goals and objectives. This evaluation will assist differentiating the alternatives and be part of the process in recommending the Preferred Alternative, which will then be documented in the Final EIS. For more information on the project goals and objectives, refer to Section 1.4.

More Information

See Section 3.2 Land Use for more information on exceptions to Oregon's Statewide Planning Goals.

- **Total cost**—the cost for an alternative would not exceed more than $250 million
- **Incremental benefits**—the alterative could be constructed in multiple increments where each increment provides operational benefits to US 97
- **Capacity**—the alternative would have the capacity for traffic demands projected for the next 20 years
- **Expressway operations**—approaches to commercial areas could be acquired without encountering unique challenges or impacts
- **Economic development**—critically important economic lands identified by the City of Bend would not be bisected or removed from the economic base; and other significant impacts that would jeopardize the viability of existing large employment lands would be avoided
- **Connectivity**—barriers to local street connectivity and/or inner-connectivity on large economic lands would be avoided.

Of the 11 build alternatives screened, 9 alternatives failed one or more of the screening criteria. These alternatives were withdrawn from further consideration (see Section 2.4 Alternatives Developed but Eliminated from Further Consideration for additional discussion). Two alternatives, the East DS1 and East DS2 Alternatives, passed all screening criteria and were advanced for detailed study and comparison in the Draft EIS. No evaluation of the alternatives' ability to achieve project goals and objectives was performed at this screening phase.

The evaluation criteria outlined above were developed and vetted by the following groups: the Steering Team, which included representatives from the City, County, ODOT, and the Citizen Advisory Committee Chair; the Citizen Advisory Committee, which included community members representing various interest groups within the area of potential impact; and the Technical Advisory Committee, which included members from the City, County, Oregon Department of Land Conservation and Development, Bend Metropolitan Planning Organization, and ODOT. Chapter 7 of the Final EIS provides a summary of agency and public coordination throughout the National Environmental Policy Act (NEPA) process for the project.

As part of the Final EIS analysis, the Preferred Alternative was evaluated against all of the screening criteria as shown in Exhibit 2-18 FEIS.

2.3 Practical Design Elements

While not used as a screening criterion, practical design was applied as an overall approach to develop alternatives for the proposed action to deliver focused transportation benefits. Practical design uses a systematic approach to deliver the broadest benefits to the transportation system or corridor, within existing resources, by establishing appropriate project scopes to deliver specific results. For example, one practical design element included matching the existing roadway context of the Bend Parkway, which in turn applied to elements such as shoulder widths which also served to minimize the design footprint, associated impacts to the community and environment, and overall cost. The key considerations in applying practical design include:

- **Safety**—ODOT's goal is to make the system as safe as practical. Choices around safety would use sound engineering judgment (i.e., look for high value add ins with minimal cost). No individual project would degrade the overall system safety.
- **Corridor context**—Projects take a system wide corridor approach in establishing or evaluating design criteria. Community character and current and planned land uses as well as the unique features of the project would need to be consistent with the existing Bend Parkway corridor context, the natural and built environment surrounding it and with the guidance and policies for the highway provided in the *2011 Amended Oregon Highway Plan.*
- **Optimize the system**—Managing pavement, bridge and roadway safety feature assets allows ODOT to assess the current state of an individual asset and to develop specific maintenance, repair, rehabilitation and replacement strategies that optimize the lifecycle investment in that particular asset

Public input—ODOT does business in partnership with the local communities and wants system improvements to be visible to the traveling public. ODOT would provide opportunities for the community to shape the chosen solution and consider needs for pedestrians, bicyclists, transit users, freight, and mobility.

- **Efficient cost**—Develop projects that meet the desired purpose, but would be open to considering incremental improvements. Practical design would require applying the appropriate standards to the critical elements to meet the proposed action's specific purpose and need.

Definitions

Oregon Statewide Planning Goals

The Oregon statewide planning goals were established in 1973 and constitute the framework for the statewide land use planning program. Two goals would require exceptions to be approved for the proposed action.

Goal 11: Public Facilities and Services

To plan and develop a timely, orderly and efficient arrangement of public facilities and services to serve as a framework for urban and rural development.

Goal 14: Urbanization

To provide for an orderly and efficient transition from rural to urban land use, to accommodate urban population and urban employment inside urban growth boundaries, to ensure efficient use of land, and to provide for livable communities.

The Preferred Alternative does not require any goal exceptions.

***Exhibit 2-18** FEIS: Purpose and Need Screening of Alternatives*

Purpose and Need Screening Criteria		Assumptions and Context
STEP 1		
1a	Could the alternative carry the volume of traffic and reduce delay on US 97? – (minimum criteria for traffic in year ~~2032~~ 2035) ~~The alternative must be free flow on US 97 Mainline for through traffic – No signals to stop through traffic on US 97~~. During the analysis for the Final EIS, this criteria was revised to exclude the requirement of excluding signals on US 97 due to public comments received on the Draft EIS	~~2032~~ 2035 Traffic projection at 61,000 ADT 2003 HDM pg 10-40 & 41 4-lane expressway maximum ideal daily capacity is approx. 74,500. With 6-10% trucks, a signal will reduce capacity to approximately (.90)*(.51)*74,500= 38,000 ADT 6-lane expressway maximum ideal daily capacity is approx. 117,500. With 6-10% trucks, a signal will reduce capacity to approximately (.90)*(.51)*117,500= 54,000 ADT
1b	Would the alternative meet respective policies on interchanges?	Any new interchange on US 97 must serve roadways of regional significance (highway/major arterial) and require an interchange access management plan as outlined in the Oregon Highway Plan. Alternative must meet OAR Division 51 regulations.
1c	Would the alternative meet respective interchange function standards?	Spacing between interchange ramps (weave on mainline facility) *(Highway Design Manual Figure 9-29 (AASHTO (Exhibit 10-68) 1600' minimum spacing)*
		Ramp terminal to intersection spacing (Cross-street spacing) *(outlined in the Oregon Highway Plan (Table 19, p. 199) minimum 750 ft)*
		Ramp taper to at-grade intersection spacing (mainline facility) *(outlined in the Oregon Highway Plan (Table 19, p. 199). Minimum 1 mile)*
		At-grade intersection spacing between new interchanges on US 97 (Mainline facility) *(outlined in the Oregon Highway Plan) (Table 19, Note 3 p. 199). Minimum 5 mile)*
1d	Would the alternative meet facility design standards?	Geometry of alternative has the potential to meet the facility design speed for US 97 *(minimum design speed – 60 mph which equates to a 45 mph travel speed)*
1e	Would the alternative provide facility safety improvements?	The alternative reduces the number of potential conflict points on US 97 The alternative provides for access control on US 97
Does Alternative Move Forward to Purpose and Need Step #2?		
STEP 2		
2a	Based on system level traffic model analysis, would the alternative reduce congestion and improve traffic operations?	System level traffic modeling demonstrates that the alternative reduces congestion on US 97
Does Alternative Move Forward to Purpose and Need Step #3?		
STEP 3		
3a	Would the estimated total project cost range fit within the projected long-term funding allocations?	A project is considered unreasonable if the estimated cost is more than $250 million dollars
3b	Would the alternative have fundable phases that provide incremental operations and safety benefits at US 97/Cooley and US 97/Robal road within the medium-term planning period?	Can the project be built in increments that provide benefit to the operations of US 97.
3c	Would the segments on US 97 have the capacity necessary to provide for the projected 20-year traffic demands?	Within the project area, there would not be more than two roadway segments on US 97 with a Demand to Capacity ratio greater than 0.9 between Deschutes Market Overcrossing to just south of Empire Avenue?
3d	Would the alternative provide satisfactory expressway operations along US 97?	Unique challenges to acquire approaches to commercial areas on US 97 would be avoided.
3e	Would the alternative support economic development?	Critical large developable and/or economically important lands would not be bisected or removed from the City of Bend's economic base.
		Would the project result in other significant impacts that jeopardize economic viability to existing critical large employment lands within the City or Deschutes County.
3f	Would the alternative maintain local street connectivity?	Barriers to local street connectivity would be avoided.
Does Alternative Move Forward to the Reasonable Range of Alternatives to be Evaluated in the Draft EIS?		

Preferred Alternative	East DS2	East DS1	WS East A	Existing DS1	Existing A	GM-2	TSM/TDM	No Build	West DS1	West 1	WS West E Modified	WS West Modified
✔	✔	✔	✔	✔	✔	✔	✘	✘	✔	✔	✔	✔
N/A	✔	✔	✔	✔	✔	✔	N/A	N/A	✔	✔	✘	✘
	✔	✔	✘	✔	✔	✘	N/A	N/A	✔	✔	✘	✔
	✔	✔	✘	✔	✔	✘	N/A	N/A	✔	✔	✘	✔
	✔	✔	✔	✔	✔	✔	N/A	N/A	✔	✔	✔	✔
	✔	✔	✔	✔	✔	✔	N/A	N/A	✔	✔	✔	✔
✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
✔	✔	✔	✔	✔	✔	✔	✘	✘	✔	✔	✔	✔
Yes	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**No**	**No**	**Yes[1]**	**Yes**	**Yes**	**No**	**No**
✔	✔	✔	✔	✔	✔	✔	✘	✘	✔	✔	✔	✔
Yes	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**No**	**Yes[1]**	**Yes**	**Yes**	**No**	**No**
✔	✔	✔	✔	✔	✘	✔	✔	N/A	✔	✘	✔	✔
✔	✔	✔	✔	✔	✔	✔	✔	N/A	✘	✘	✔	✔
✔	✔	✔	✔	✘	✔	✔	✔	✘	✔	✔	✔	✔
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✔	✔	✔	✔	✔	✔	✔	✔	✔	✘	✘	✔	✔
Yes	**Yes**	**Yes**	**No**	**No**	**No**	**No**	**No**	**Yes[1]**	**No**	**No**	**No**	**No**

[1]The No Build Alternative is required to be included for study in the Draft EIS; thus, it was forwarded to the next step regardless of failing any criteria.

✔ = Pass ✘ = Fail N/A = Not applicable; the alternative does not require an interchange

2.4 Alternatives Developed but Eliminated from Further Consideration

Nine of the 11 build alternatives that were screened against the purpose and need and other screening criteria were eliminated from further consideration. Justification for the elimination of alternatives is provided in the following sections. In addition, other considerations about how practical design elements were applied to each alternative and the potential impacts to low-income and minority populations are also presented below as ODOT did consider these elements during the alternatives development process. The rationale to eliminate an alternative was based solely on its ability to meet the screening criteria described in Section 2.2.2, Alternatives Screening; other considerations were for informational purposes only and not a decision variable.

All of the screened build alternatives (excluding the Transportation System Management/Transportation Demand Management Alternative) would require one to four exceptions to Oregon's Statewide Planning Goals 11 and 14. Exceptions would be needed for new roadway improvements outside of the UGB north of Cooley Road and/or north of the UGB along US 97, a new interchange north of Cooley Road and/or north of the UGB along US 97, and the western extension of Robal Road outside of the UGB.

2.4.1 West Corridor Alternatives Eliminated from Further Consideration

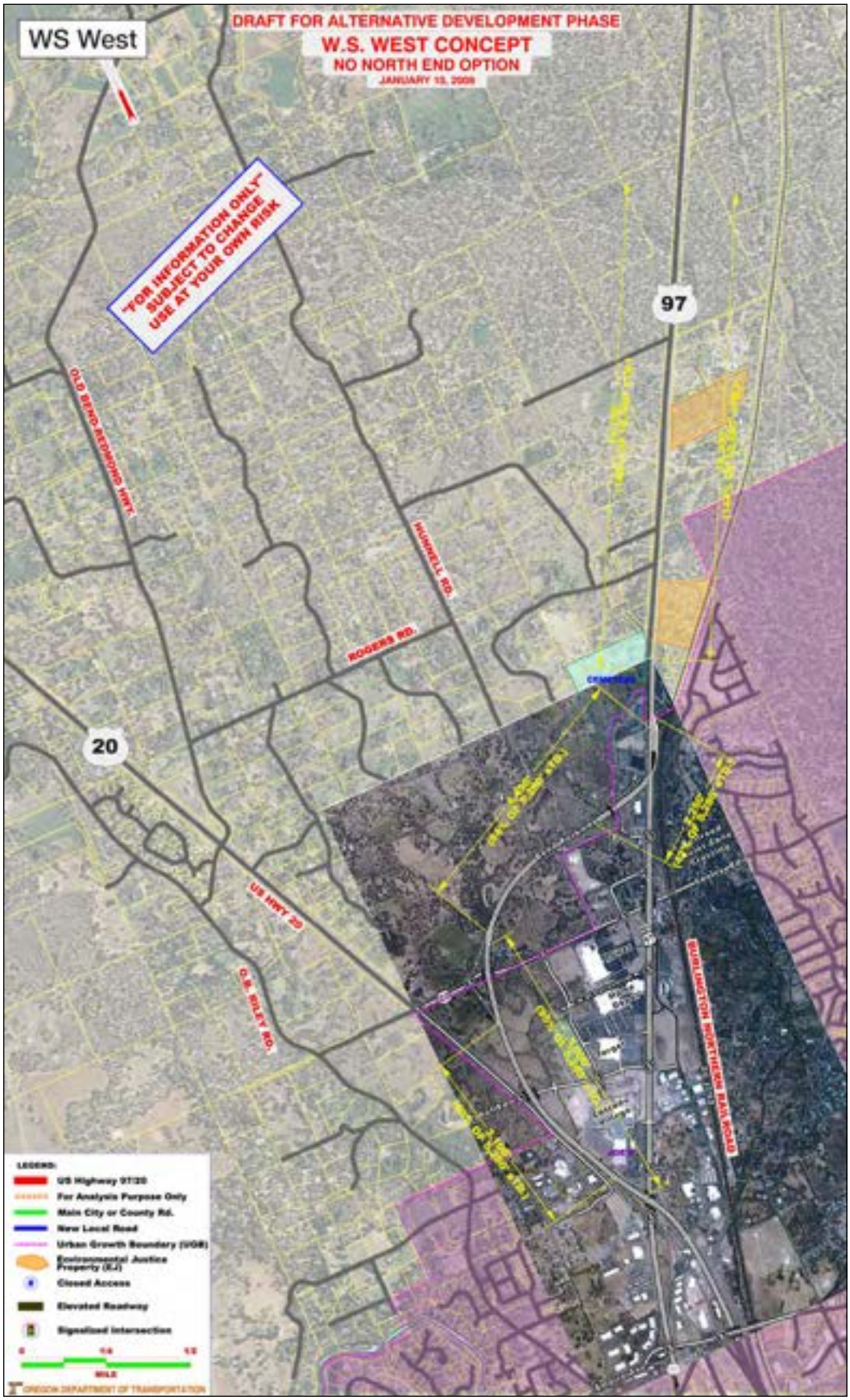
WS West Modified Alternative

Key Features

- Full interchange on US 97 with realigned US 20 and Cooley Road
- Directional interchange on US 97 north of Cooley Road
- Existing US 97 would become a local arterial.

Justification for Elimination—The WS West Modified Alternative (Exhibit 2-19) failed to meet the purpose and need of the proposed action because it would not meet critical design and operational standards necessary for expressway facilities; and, therefore would be technically infeasible. This alternative would have an inadequate ramp terminus location and would not meet associated design spacing standards. These problems could not be resolved through design refinements without causing other spacing problems. Specifically, this alternative would not meet respective policies on interchanges (Criterion 1b) (Exhibit 2-18 FEIS).

Exhibit 2-19: *WS West Modified Alternative*



Criterion 1b—OAR Division 51 states, "The Department shall not approve an Application for a Grant of Access for a private approach opposite a freeway or expressway ramp terminal" (OAR 734-051-0295 Grants of Access 3(c)). Under the WS West Modified Alternative, the US 97 ramp terminals directly across from Hunnell Road would be in direct violation of OAR 734-051-0295 Grants of Access 3(c). Design refinements could not resolve the violation without causing other spacing problems.

Practical Design Elements—Practical design principles stress finding the appropriate sized transportation solution that fits the constraints and/or context of the area. The WS West Modified Alternative would include many improvements to the state highway facilities and local road network; however, the impacts of these improvements would result in exceeding constraints (e.g., violation of OAR Division 51 [see Criterion 1b]) and incurring impacts that would not fit the Bend area context (e.g., bisecting rural lands with an access controlled transportation facility and creating a large design footprint with associated property acquisition impacts). Design refinements were investigated to develop a more practical design, which resulted in considering the West DS1 Alternative. Please see subsequent screening analysis on this separate alternative.

Therefore, the WS West Modified Alternative was eliminated from further consideration during Step 1 of the purpose and need screening. This alternative was not advanced for further screening under Steps 2 and 3.

WS West E (Modified) Alternative

Key Features

- Four-ramp partial cloverleaf interchange on US 97 with US 20
- Split diamond interchange of US 97/US 20 at Empire Avenue and 3rd Street extension
- Directional interchange near Clausen Drive.

Justification for Elimination—The WS West E (Modified) Alternative (Exhibit 2-20) failed to meet the purpose and need for the proposed action because it would not meet critical design and operational standards necessary for expressway facilities; and, therefore would be technically infeasible. This alternative would have inadequate weave/merge distances and inadequate ramp terminus to cross-road spacing. These problems could not be resolved through design refinements without causing other spacing problems. Specifically, this alternative would not meet respective policies on interchanges (Criterion 1b and Criterion 1c) (Exhibit 2-18 FEIS).

Exhibit 2-20: *WS West E (Modified) Alternative*



Criterion 1b—OAR Division 51 states, "The Department shall not approve an Application for a Grant of Access for a private approach opposite a freeway or expressway ramp terminal" (OAR 734-051-0295 Grants of Access 3(c)). Under the WS West E (Modified) Alternative, the US 97 ramp terminals directly across from Hunnell Road would be in direct violation of OAR 734-051-0295 Grants of Access 3(c). Design refinements could not resolve the violation without causing other spacing problems.

Criterion 1c—The *Oregon Highway Design Manual* (ODOT 2003b) specifies minimum distances between interchange ramps (entrance to entrance/exit to exit (1,000 feet), exit to entrance (500 feet) and entrance to exit (1,600 feet)). The purpose of this standard is to ensure that traffic flows smoothly and does not back up into travel lanes, which in turn reduces safety and contributes to congestion. The *Oregon Highway Plan* specifies a minimum 750 foot ramp terminal to intersection spacing. This minimum spacing between a ramp terminal and the first intersection on the right is needed to ensure that traffic operations at the intersection do not impede/impact the operation of the ramp terminal and/or the mainline highway. The distance of 750 feet represents the distance required to accommodate for perception and reaction time, lateral traffic movement to turn left or right at the ramp terminal/intersection, and deceleration to a stop prior to the end of the traffic queue.

Under the WS West E (Modified) Alternative, the northbound US 97 exit (Cooley Road) to the westbound US 20 exits distance would be approximately 500 feet. Engineering spacing standards require a minimum of 1,000 feet to assure adequate distance to provide safe "weave" distance for traffic and to not impact traffic flow on the high speed facility. Additionally, the distance from the northbound US 97 off-ramp to 3rd Street and connection to Cascade Village Shopping Center would be approximately 300 feet and would not meet the minimum standard of 750 feet, resulting in increased congestion and poor operations. Design refinements could not resolve these spacing problems without causing other spacing problems elsewhere.

Practical Design Elements—Practical design principles stress finding the appropriate sized transportation solution that fits the constraints and/or context of the area. The WS West E (Modified) Alternative would include many improvements to the state highway facilities and local road network; however, the impacts of these improvements would result in exceeding constraints (e.g., Highway Design Manual standards [see Criterion 1c]) and incurring impacts that would not fit the Bend area context (e.g., bisecting rural lands with an access controlled transportation facility and creating a large design footprint

with associated property acquisition impacts). Design refinements were investigated to develop a more practical design, which resulted in considering the West DS1 Alternative. Please see subsequent screening analysis on this separate alternative.

Therefore, the WS West E (Modified) Alternative was eliminated from further consideration during Step 1 of the purpose and need screening. This alternative was not advanced for further screening under Steps 2 and 3.

West 1 Alternative

Key Features

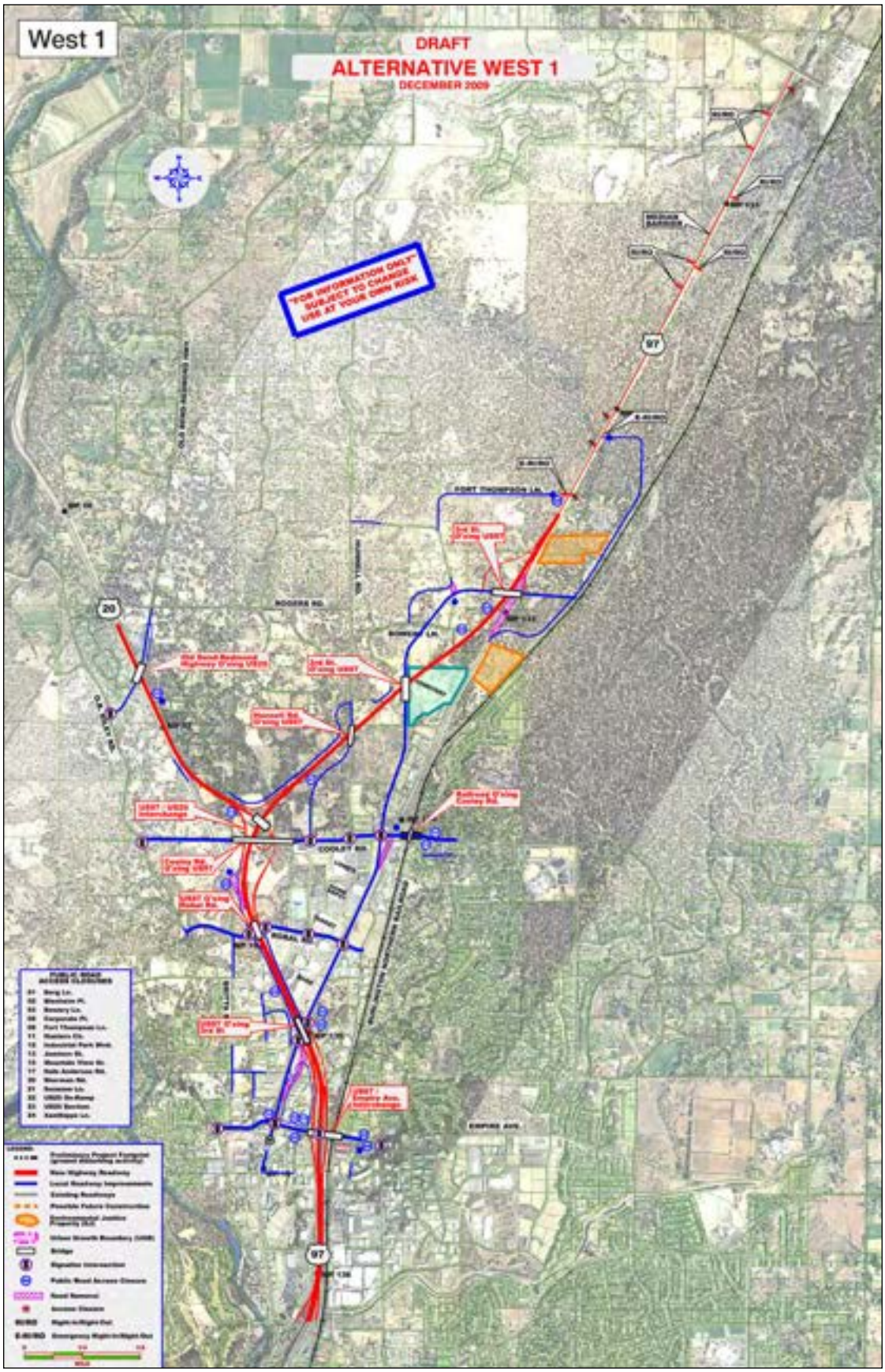
- Two ramp diamond interchange on US 97 north of Rogers Road
- Existing US 97 would become a local arterial
- Split diamond interchange of US 97/US 20 at Empire Avenue and 3rd Street extension
- Four ramp interchange at US 97/US 20.

Justification for Elimination—The West 1 Alternative (Exhibit 2-22) failed to meet the purpose and need for the proposed action because the estimated total project cost would exceed the projected long-term funding allocation by 25-40 percent (Criterion 3a), incremental operational and safety benefits to US 97 would not be provided (Criterion 3b), significant economic lands would be bisected (Criterion 3e), and barriers to local connectivity would result (Criterion 3f) (Exhibit 2-18 FEIS).

Criterion 3a—The estimated total project cost of the West 1 Alternative would be approximately $310 to $360 million. An expectation that the proposed action would receive 25-40 percent more than $250 million funding threshold is not reasonable given the numerous highway modernization needs in other Central Oregon communities. Section 1.4 Background, provides additional information on past funding allocation and project funding availability. Design refinements were investigated to reduce the overall cost, which led to developing a new alternative West DS1. Please see subsequent screening analysis on this separate alternative.

Chapter 1 Purpose of and Need For Proposed Action
Chapter 2 Alternatives
Chapter 3 Affected Environment, Environmental Consequences and Mitigation
Chapter 4 Cumulative Impacts
Chapter 5 Local Short-term Uses and Long-term Productivity
Chapter 6 Irreversible and Irretrievable Commitment of Resources
Chapter 7 Comments and Coordination

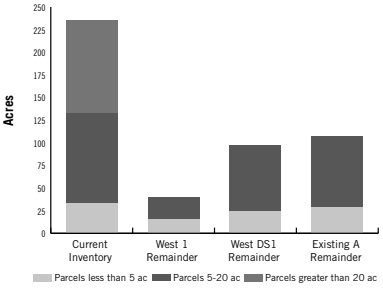
Exhibit 2-22: *West 1 Alternative*



Criterion 3b—One of the key elements for an alternative to be technically viable for the long-term is its ability to be built in increments to match available funding and provide operational benefit to the new US 97 alignment. This is critical because each increment when constructed would need to provide operational benefit over extended periods of time. To provide operational and safety benefits to US 97, the West 1 Alternative would require a significant portion of the new US97 alignment to be built in a single increment. This increment would require building the new US 97 roadway and the associated improvements at the new northern interchange, the Empire Avenue and 3rd Street interchange, and the extension of 3rd Street to the new northern interchange to enable US 97 to function. Aside from other minor local street connections that do not provide any independent operational or safety benefits to US 97, this set of interdependent improvements with the West 1 Alternative could not be split into multiple increments such that each increment would provide safety and operational benefits to US 97 in the short-term or medium-term planning periods.

Criterion 3e—North of Cooley Road, the West 1 Alternative would bisect 176 acres (75 percent) of the Urban Area Reserve lands between US 97 and US 20, including 6 parcels (57 acres) in the 520 acre size range and 3 parcels (102 acres) that are 20+ acres (Exhibit 2-21). Urban Area Reserve lands are designated by Deschutes County and serve as a holding category for lands identified for future urban growth and preserves them as useful open space until needed for orderly growth. The City of Bend has identified these parcels as critically important future employment lands as they are suitable for development. As noted by the City in its 2008 Economic Opportunities Analysis, there is a scarcity of large parcels (520+ acres) that are currently available for developers who seek a single large parcel rather than a set of disaggregated small parcels. Bisecting these large parcels would further reduce the availability of large developable lands, which would severely limit large scale employment and economic development in Bend.

Exhibit 2-21: *Remaining Urban Area Reserve/Economic Lands by Alternative*



Criterion 3f—In addition to bisecting the Urban Area Reserve lands (see Criterion 3e) and adversely affecting future economic development, the severing of these parcels would also reduce the current and future transportation connectivity and traffic circulation north of Cooley Road. Typically in large development areas, it is critical to have road/grid networks that serve all modes of transportation and provide inner-connectivity. Specific design elements to foster inner-connectivity include shorter block lengths, minimum street widths, pedestrian amenities, building orientation to the roadways, high level of street connectivity to distribute traffic volumes, provide redundancy

in the roadway network, tightly spaced grid networks to calm traffic and create pedestrian-oriented areas that are safe and convenient.

As the new portion of US 97 would be a limited access facility, transportation connectivity for the future development areas north of Cooley Road would be severely limited and not meet critical elements outlined above that are necessary for large scale development of economic lands. There would be no inner-connectivity or grid network necessary for large developments due to the "barrier effect" of US 97. Travel would be limited to over/under-crossings of US 97 which in turn create another barrier by bisecting additional lands and exacerbating the ability to maintain further inner-connectivity on those lands. Such segregation would make orderly development in this area impossible in the future.

Practical Design Elements—Practical design principles stress finding the appropriate sized transportation solution that fits the constraints and/or context of the area. The West 1 Alternative would include many improvements to the state highway facilities and local road network; however, the cost and impacts of these improvements would result in exceeding constraints (e.g., cost and, incremental benefits [see

Criterion 3a and Criterion 3b]) and incurring impacts that would not fit the Bend area context (e.g., bisecting rural lands with an access controlled transportation facility and creating a large design footprint with associated property acquisition impacts). Design refinements were investigated to develop a more practical design, which resulted in considering the West DS1 Alternative. Please see subsequent screening analysis on this separate alternative.

Therefore, the West 1 Alternative was eliminated from further consideration.

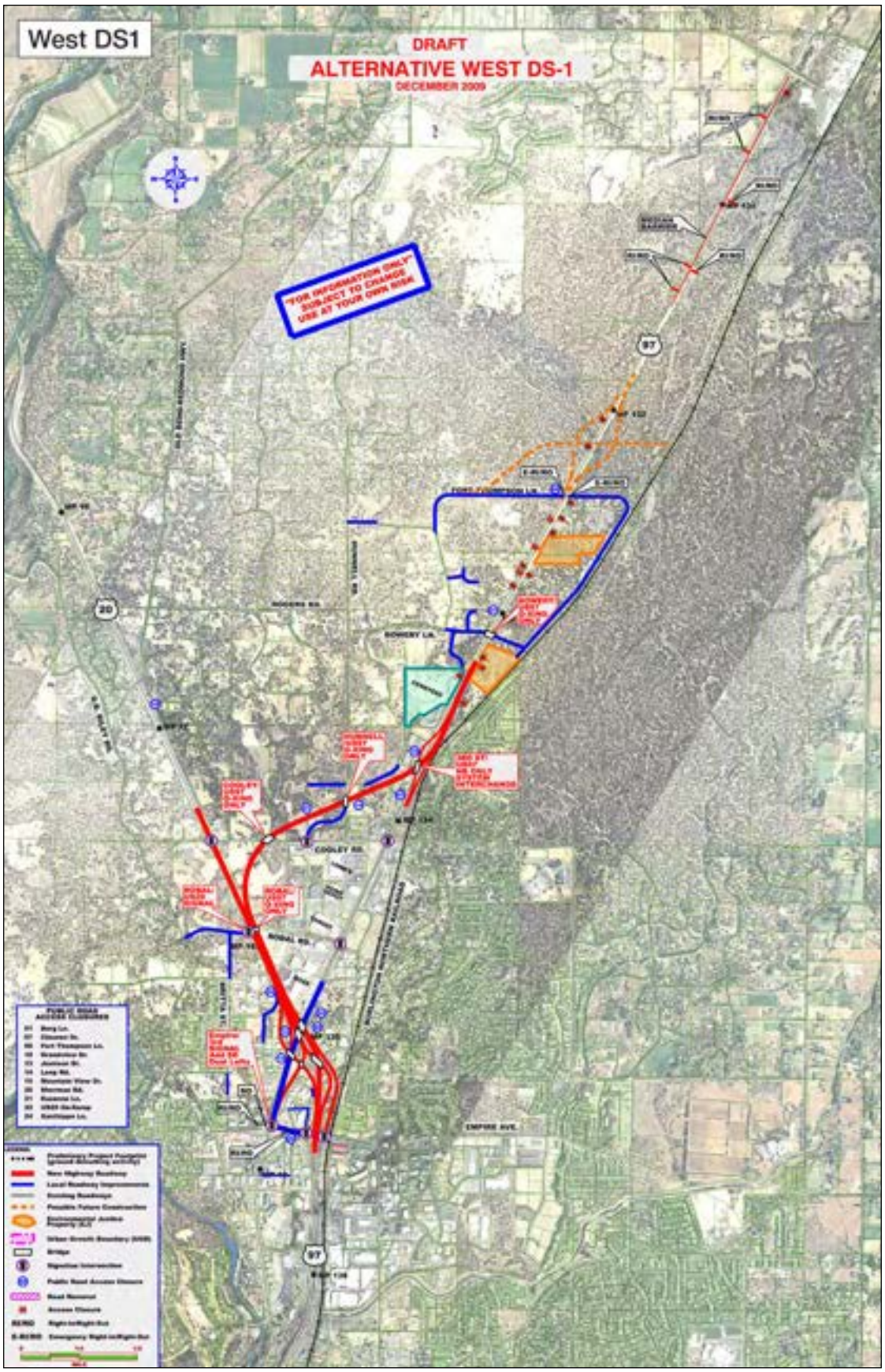
West DS1 Alternative

Key Features

- Existing US 97 would become a local arterial
- 3rd Street/northbound US 97 directional interchange near Clausen Drive
- Diamond interchange at US 97/Empire Avenue
- Adjacent US 97 and US 20 corridors.

Justification for Elimination—The West DS1 Alternative (Exhibit 2-23) failed to meet the purpose and need for the proposed action because incremental operational and safety benefits to US 97 would not be provided (Criterion 3b), significant economic lands would be bisected (Criterion 3e), and barriers to local connectivity would result (Criterion 3f) (Exhibit 2-18 FEIS).

Exhibit 2-23: *West DS1 Alternative*



Criterion 3b—One of the key elements for an alternative to be technically viable for the long-term is its ability to be built in increments to match available funding and provide operational benefit to the new US 97 alignment. This is critical because each increment when constructed would need to provide operational benefit over extended periods of time. To provide operational and safety benefits to US 97, the West DS1 Alternative would require a significant portion of the new US 97 alignment to be built in a single increment. This increment would require building the new US 97 roadway and the associated improvements at the new northern interchange and the Empire Avenue and 3rd Street interchange to enable US 97 to function. Aside from other minor local street connections that do not provide any independent operational or safety benefits to US 97, this set of interdependent improvements with the West DS1 Alternative could not be split into multiple increments such that each increment would provide safety and operational benefits to US 97.

Criterion 3e—North of Cooley Road, the West DS1 Alternative would bisect 138 acres (59 percent) of the Urban Area Reserve lands between US 97 and US 20, including 3 parcels (27 acres) in the 520 acre size range and 3 parcels (102 acres) that are 20+ acres (Exhibit 2-21). Urban Area Reserve lands are designated by Deschutes County and serve as a holding category for lands identified for future urban growth and preserves them as useful open space until needed for orderly growth. The City of Bend has identified these parcels as critically important future employment lands as they are suitable for development. As noted by the City in its 2008 Economic Opportunities Analysis, there is a scarcity of large parcels (520+ acres) that are currently available for developers who seek a single large parcel rather than a set of disaggregated small parcels. Bisecting these large parcels would further reduce the availability of large developable lands, which would severely limit large scale employment and economic development in Bend.

Criterion 3f—In addition to bisecting the Urban Area Reserve lands (see Criterion 3e) and adversely affecting future economic development, the severing of these parcels would also reduce the current and future transportation connectivity and traffic circulation north of Cooley Road. Typically in large development areas, it is critical to have road/grid networks that serve all modes of transportation and provide inner-connectivity. Specific design elements to foster inner-connectivity include shorter block lengths, minimum street widths, pedestrian amenities, building orientation to the roadways, high level of street connectivity to distribute traffic volumes, provide redundancy in the roadway network, tightly spaced grid networks to calm traffic and create pedestrian-oriented areas that are safe and convenient.

As the new portion of US 97 would be a limited access facility, transportation connectivity for the future development areas north of Cooley Road would be severely limited and not meet critical elements outlined above that are necessary for large scale development of economic lands. There would be no inner-connectivity or grid network necessary for large developments due to the "barrier effect" of US 97. Travel would be limited to over/under-crossings of US 97 which in turn create another barrier by bisecting additional lands and exacerbating further inner-connectivity on those lands.

Practical Design Elements—Practical design principles stress finding the appropriate sized transportation solution that fits the constraints and/or context of the area. The West DS1 Alternative would include many improvements to the state highway facilities and local road network. Practical design elements would reduce the overall cost. However, the improvements associated with West DS1 Alternative would result in incurring impacts that would not fit the Bend area context (e.g., bisecting rural lands with an access controlled transportation facility and creating a moderate design footprint with associated property acquisition impacts).

Therefore, the West DS1 Alternative was eliminated from further consideration.

2.4.2 Existing Corridor Alternatives Eliminated from Further Consideration

GM-2 Alternative

Key Features

- Frontage roads would be added between Cooley Road and Robal Road
- Interchange for US 20, US 97 and 3rd Street just north of Empire Avenue
- Diamond interchange at US 97/Empire Avenue.

Justification for Elimination—The GM-2 Alternative (Exhibit 2-24) failed to meet the purpose and need of the proposed action because it would have traffic flow and safety problems that could not be resolved through design refinements. Specifically, this alternative would not meet respective interchange design standards (Criterion 1c) (Exhibit 2-18 FEIS).

Exhibit 2-24: *GM-2 Alternative*



Criterion 1c—The *Oregon Highway Design Manual* (ODOT 2003b) specifies minimum distances between interchange ramps (entrance to entrance/exit to exit (1,000 feet), exit to entrance (500 feet) and entrance to exit (1,600 feet)). The purpose of this standard is to ensure that traffic flows smoothly and does not back up into travel lanes, which in turn reduces safety and contributes to congestion. The *Oregon Highway Plan* specifies a minimum 750 foot ramp terminal to intersection spacing. This minimum spacing between a ramp terminal and the first intersection on the right is needed to ensure that traffic operations at the intersection do not impede/impact the operation of the ramp terminal and/or the mainline highway. The distance of 750 feet represents the distance required to accommodate for perception and reaction time, lateral traffic movement to turn left or right at the ramp terminal/intersection, and deceleration to a stop prior to the end of the traffic queue.

Under GM-2 Alternative, the distance between northbound US 97 onramp from 3rd Street and the northbound US 97 off-ramp to Robal Road would be less than 1,000 feet. The distance between the southbound onramp from US 20 and the southbound off-ramp at Empire Avenue would be less than 1,000 feet. These distances would not meet the minimum of 1,600 feet. Furthermore, under the GM-2 Alternative the northbound and southbound ramps at Cooley Road and Robal Road, and the southbound off-ramp to Empire Avenue and Industrial Park/Nels Anderson Road would all be about 500 feet. These distances would not meet the minimum of 750 feet. Design refinements could not resolve these spacing problems without causing other spacing problems elsewhere.

Practical Design Elements—Practical design principles stress finding the appropriate sized transportation solution that fits the constraints and/or context of the area. The GM-2 Alternative would include many improvements to the state highway facilities and local road network; however, the impacts of these improvements would result in exceeding constraints (e.g., Highway Design Manual standards [see Criterion 1c]) and incurring impacts that would not fit the Bend area context by creating a large vertical and horizontal design footprint to connect US 97 and US 20 near Empire Avenue, which had adverse aesthetic and property acquisition impacts. Design refinements were investigated to develop a more practical design, which resulted in considering the Existing DS1 Alternative. Please see subsequent screening analysis on this separate alternative.

Therefore, the GM-2 Alternative was eliminated from further consideration during Step 1 of the purpose and need screening. This alternative was not advanced for further screening under Steps 2 and 3.

Existing A Alternative

Key Features

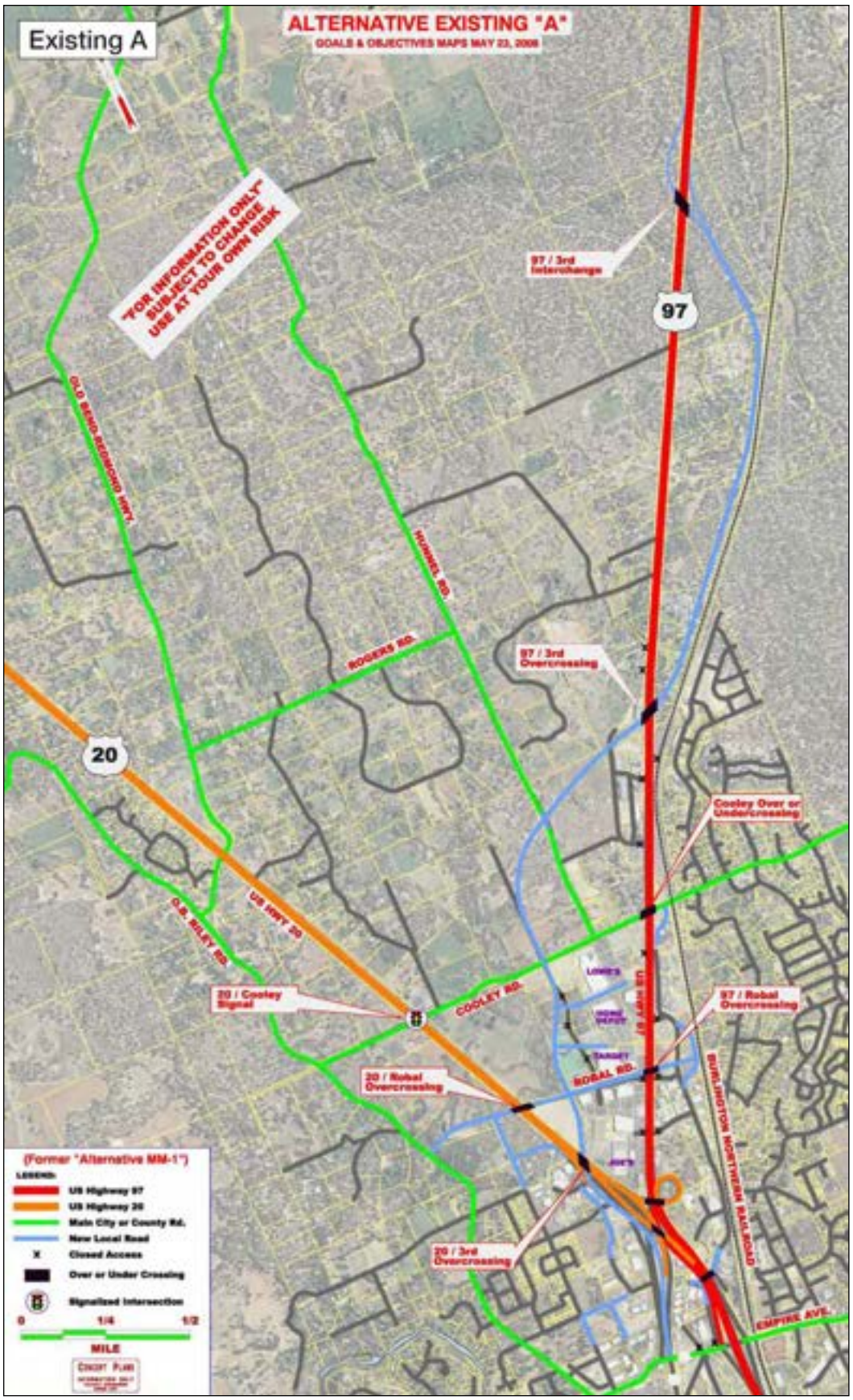
- Directional interchange on US 97 near Rogers Road
- 3rd Street extended north
- Diamond interchange at US 97/Empire Avenue.

Justification for Elimination—The Existing A Alternative (Exhibit 2-25) failed to meet the purpose and need for the proposed action because the estimated total project cost would exceed projected long-term funding allocations (Criterion 3a), unique adverse technical and economic impacts would occur in order to provide satisfactory expressway operations (Criterion 3d and Criterion 3e), and significant economic lands would be bisected (Criterion 3e) (Exhibit 2-18 FEIS).

Criterion 3a—The estimated total project cost of the Existing A Alternative would be approximately $300 to $350 million. An expectation that the proposed action would receive 25-40 percent more than $250 million funding threshold is not reasonable given the numerous highway modernization needs in other Central Oregon communities. Section 1.4 Background, provides additional information on past funding allocation and project funding availability. Design refinements were investigated to reduce the overall cost, which led to developing a new alternative Existing DS1. Please see subsequent screening analysis on this separate alternative.

Criterion 3d and Criterion 3e—In order to achieve the operational performances required of an expressway, approaches to the commercial areas east and west of the current US 97 would be closed under the Existing A Alternative. However, closing these approaches has multiple adverse technical and economic impacts to the community, particularly to commercial owners and tenants. These approaches are primarily for commercial parcels, including both small and large commercial operations. Approaches to businesses on the east side of US 97 would be relocated to the local street network. These relocated approaches would increase travel times and result in lengthy out-of-direction travel for both passenger and freight traffic, which in turn could have an adverse economic impact in terms of additional fuel and freight shipment costs. Approaches to businesses on the west side of US 97 would be relocated to the new extension of 3rd Street. Most commercial structures currently face US 97 with abundant parking and shared common areas located between US 97 and the commercial structure entrances. Under the Existing A Alternative, business

Exhibit 2-25: *Existing A Alternative*



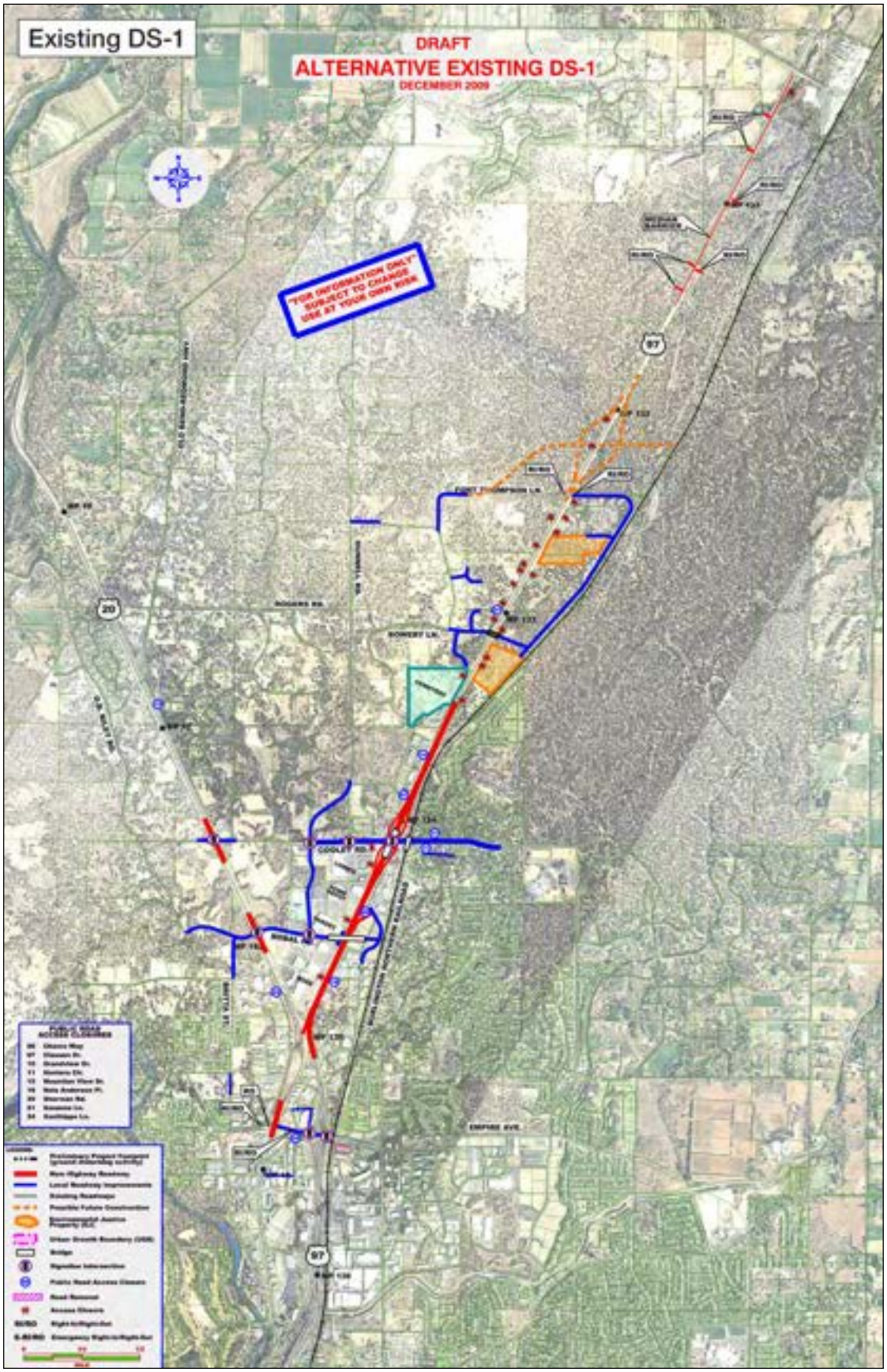
visibility would diminish, parking lots would be less balanced, and shared common areas would no longer be positioned for customers entering on the sides or rears of the commercial structures. The potential economic loss to these businesses associated with the Existing A Alternative could entail substantial diminished property value, tenant lease terminations and relocations, reduction in annual property tax, job losses, and reduction in annual payroll. This alternative impacts several existing large employment centers in Bend, the largest being Cascade Village Shopping Center, which currently employs 600800 citizens of Central Oregon.

Furthermore, north of Cooley Road, the Existing A Alternative would bisect 128 acres (54 percent) of the Urban Area Reserve lands between US 97 and US 20, including 2 parcels (22 acres) in the 520 acre size range and 3 parcels (102 acres) that are 20+ acres (Exhibit 2-21). Urban Area Reserve lands are designated by Deschutes County and serve as a holding category for lands identified for future urban growth and preserves them as useful open space until needed for orderly growth. The City of Bend has identified these parcels as critically important future employment lands as they are suitable for development. As noted by the City of Bend in its 2008 Economic Opportunities Analysis, there is a scarcity of large parcels (520+ acres) that are currently available for developers who seek a single large parcel rather than a set of disaggregated small parcels. Bisecting these large parcels would further reduce the availability of large developable lands and prevent inter-connectivity of these large developable lands, which would severely limit large scale employment and economic development in Bend.

Other Unique Considerations—The Existing A Alternative also would require displacing 45 households within mobile home parks near Bowery Lane. Concentrations of low-income (11 percent of households) and minority (45 percent) households have been identified within these mobile home parks (Parsons Brinckerhoff 2008b); thus, these displacements could affect persons protected under Presidential Executive Order 12898 on Environmental Justice. As all other alternatives considered for the proposed action would displace no households at the mobile home parks, the Existing A Alternative could have significantly more adverse impacts to environmental justice populations.

Practical Design Elements—Practical design principles stress finding the appropriate sized transportation solution that fits the constraints and/or context of the area. The Existing A Alternative would include many improvements to the state highway facilities and local road network; however, the cost and impacts of these improvements would result in exceeding constraints (e.g., cost [see Criterion 3a])

Exhibit 2-26: *Existing DS1 Alternative*



and incurring impacts that would not fit the Bend area context (e.g., changing access to large commercial areas to the back side of the current building orientations by rerouting 3rd Street, which in turn would reduce visibility of the business to patrons; and, creating a large vertical and horizontal design footprint to connect US 97 and US 20 near Empire Avenue, which would have adverse aesthetic and property acquisition impacts). Design refinements were investigated to develop a more practical design, which resulted in considering the Existing DS1 Alternative. Please see subsequent screening analysis on this separate alternative.

Therefore, the Existing A Alternative was eliminated from further consideration.

Existing DS1 Alternative

Key Features

- Single-point urban interchange of US 97 at Cooley Road
- Robal Road overcrossing of US 97.

Justification for Elimination—The Existing DS1 Alternative (Exhibit 2-26) failed to meet the purpose and need of the proposed action because it would not reduce congestion on US 97 (Criterion 3c) (Exhibit 2-18 FEIS).

Criterion 3c—Demand-to-capacity ratios were measured for four segments along US 97. Any alternative with more than two roadway segments on US 97 with a demand-to-capacity ratio greater than 0.9 would not provide for the projected 20 year traffic demands. Under Existing DS1 Alternative three segments of US 97 would have a demand-to-capacity ratio above 0.9: Deschutes Market Road to Cooley Road, Nels Anderson Road to Empire Avenue, and US 97 south of Empire Avenue.

Practical Design Elements—Practical design principles stress finding the appropriate sized transportation solution that fits the constraints and/or context of the area. The Existing DS1 Alternative would include many practical design elements and improvements to the state highway facilities and local road network. These practical design elements would reduce the overall cost. However, the impacts of these improvements would result in exceeding constraints (e.g. traffic operations measured by demand-to-capacity ratios [see Criterion 3c]).

Therefore, the Existing DS1 Alternative was eliminated from further consideration.

Transportation System Management/Transportation Demand Management Alternative

Key Features—This alternative would implement the following measures within the API as it currently exists: ramp metering, auxiliary lanes, turning lanes, traffic signal timing optimization, access management, and traveler information.

Justification for Elimination—The Transportation System Management/Transportation Demand Management Alternative failed to the meet the purpose and need for the proposed action because it would not provide the necessary capacity to reduce congestion and delay (Criterion 1a), and it would not provide facility safety improvements (Criterion 1e) (Exhibit 2-18 FEIS).

Criterion 1a—The projected average daily traffic for US 97 in 2035 would be 61,000 vehicles. A four-lane expressway with 6-10 percent trucks in its vehicle mix and at least one signal can only provide capacity for 38,000 vehicles per day. The Transportation System Management/Transportation Demand Management Alternative would retain the current four lanes on US 97 and the two signals at Cooley Road and Robal Road; no alternate facility would be added for local trips, which would remain mixed with the through trips on US 97 similar to existing conditions. Thus, this alternative would provide capacity for 38,000 vehicles per day, which would fail to meet the projected average daily traffic needs for 61,000 vehicles per day in 2035.

Criterion 1e—Providing access control and reducing the number of potential conflict points along a roadway improves safety along a roadway. The Transportation System Management/Transportation Demand Management Alternative would not provide access control or reduce the number of potential conflict points, and therefore would not provide facility safety improvements. No additional level of transportation system management or transportation system demand measures could be incorporated into this alternative to resolve the capacity issues.

Practical Design Elements—Practical design principles stress finding the appropriate sized transportation solution that fits the constraints and/or context of the area. The Transportation System Management/Transportation Demand Management Alternative would include many practical design improvements to the state highway facilities and local road network that would reduce the overall cost. Examples of these improvements include ramp metering, auxiliary lanes, turning lanes, traffic signal timing optimization, access management, and traveler information. However, the Transportation System Management/Transportation Demand Management Alternative fails on other criteria as explained above.

Therefore, the Transportation System Management/Transportation Demand Management Alternative was eliminated from further consideration as a stand-alone alternative during Step 1 of the purpose and need screening. This alternative was not advanced for further screening under Steps 2 and 3.

2.4.3 East Corridor Alternative Eliminated from Further Consideration

WS East A Modified Alternative

Key Features

- Directional interchange on US 97 at Clausen Drive
- Partial diamond interchange at US 97/Robal Road
- Existing US 97 would become a local arterial
- Partial diamond interchange at US 97/Empire Avenue.

Justification for Elimination—The WS East A Modified Alternative (Exhibit 2-27) failed to meet the purpose and need of the proposed action because it would not improve traffic flow or improve safety. Design refinements would not be able to mitigate these failures. Specifically, this alternative would not meet respective interchange function standards (Criterion 1c) (Exhibit 2-18 FEIS).

Criterion 1c—The *Oregon Highway Design Manual* (ODOT 2003b) specifies minimum distances between interchange ramps (entrance to entrance/exit to exit (1,000 feet), exit to entrance (500 feet) and entrance to exit (1,600 feet)). The purpose of this standard is to ensure that traffic flows smoothly and does not back up into travel lanes, which in turn reduces safety and contributes to congestion. The *Oregon Highway Plan* specifies a minimum 750 foot ramp terminal to intersection spacing. This minimum spacing between a ramp terminal and the first intersection on the right is needed to ensure that traffic operations at the intersection do not impede/impact the operation of the ramp terminal and/or the mainline highway. The distance of 750 feet represents the distance required to accommodate for perception and reaction time, lateral traffic movement to turn left or right at the ramp terminal/intersection, and deceleration to a stop prior to the end of the traffic queue.

With the WS East A (Modified) Alternative the distances between the northbound US 97 off-ramp and onramp at Cooley Road would be only about 500 feet, which would not meet the standard of 1,600 feet. Furthermore, the distances between the southbound US 97 off-ramp to 3rd Street and the connection to Cascade Village Shopping Center would be less than 300 feet, which would not meet the standard of 750 feet.-Design refinements could not resolve these spacing problems without causing other spacing problems elsewhere.

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Exhibit 2-27: *WS East A Modified Alternative*



The description of this alternative as it relates to criterion 1c has been revised as a result of discussions between ODOT and a property owner during and subsequent to the public comment period for the Draft EIS.

With the WS East A Modified Alternative the distances between the southbound US 97 off-ramp at Robal Road to 3rd Street and the connection to Target/Home Depot signal is 530 feet. The distance between the northbound US 97 off-ramp to 3rd Street and the connection to Nels Anderson Road is 660 feet; neither of these distances meets the standard of 750 feet.

Practical Design Elements—Practical design principles stress finding the appropriate sized transportation solution that fits the constraints and/or context of the area. The WS East A Modified Alternative would include many improvements to the state highway facilities and local road network; however, the impacts of these improvements would result in exceeding constraints (e.g., Highway Design Manual standards [see Criterion 1c]) and incurring impacts that would not fit the Bend area context (e.g., creating a large vertical and horizontal design footprint to connect US 97 and US 20 near Empire Avenue, which would have adverse aesthetic and property acquisition impacts). Design refinements were investigated to develop a more practical design, which resulted in considering the East DS1 and East DS2 Alternatives. Please see subsequent screening analysis on these separate alternatives.

Therefore, the WS East A Modified Alternative was eliminated from further consideration during Step 1 of the purpose and need screening. This alternative was not advanced for further screening under Steps 2 and 3.

Definitions

Transportation System Management

Transportation system management uses various actions that increase the efficiency of existing facilities. They are actions that increase the number of vehicle trips a facility can carry without increasing the number of through lanes.

Transportation Demand Management

Transportation demand management focuses on strategies for reducing the number of vehicle trips and vehicle miles traveled as well as increasing vehicle occupancy. It facilitates higher vehicle occupancy or reduces traffic congestion by expanding the traveler's transportation choice in terms of travel method, travel time, travel route, travel costs, and the quality and convenience of the travel experience.

2.4.4 Transportation System Management/ Transportation Demand Management Alternative and Mass Transit Alternative

As discussed earlier in Section 2.4.2 Existing Corridor Alternatives Eliminated from Further Consideration, a Transportation System Management/Transportation Demand Management Alternative was evaluated for the proposed action. As a standalone alternative, this alternative could not satisfy the purpose and need of the proposed action because it would not significantly reduce congestion, improve traffic flow, or improve safety.

Transportation system management strategies tend to be most effective for populations over 200,000, whereas the population of Bend is approximately 83,000. The FEIS acknowledges that transportation system management strategies can be effective for populations less than 200,000.

Although the Transportation System Management/Transportation Demand Management Alternative alone could not satisfy the purpose and need of the proposed action, transportation system management strategies from this alternative have been incorporated into the build alternatives, including ramp metering, auxiliary lanes, turning lanes, traffic signal timing optimization, access management, and traveler information.

Transportation demand management strategies include carpooling, vanpooling, biking, walking, transit, management of work start and end times, parking space management, and telecommuting. The implementation of these strategies is typically outside of the jurisdiction of ODOT. As detailed in Exhibit 2-28 FEIS, efforts to implement transportation demand management strategies in the Bend area are currently underway by various jurisdictions, and ODOT is coordinating with these entities to facilitate the successful implementation of these strategies in the future and independent of the proposed action.

More Information

See Section 2.1.2 for more information on the transportation system management/transportation demand management components that are included in the Preferred Alternative.

***Exhibit 2-28** FEIS: Summary of Transportation Demand Management Measures Being Considered in the Bend Area*

Measure	Description	ODOT's Efforts to Facilitate this Measure
Central Oregon Commute Options (Deschutes, Jefferson and Crook Counties)	Provides a carpooling matching service, and facilitates marketing and implementation of vanpooling, bicycle/ pedestrian facilities, and park and ride lots	Working with stakeholders on locating additional park and ride opportunities within the API; the Preferred Alternative will not preclude a future transit facility in the northern area of Bend
Juniper Ridge Transportation Management Area	Creates a transportation management area for Juniper Ridge and other north urban commercial and industrial areas affecting the US 97/Cooley Road area	Coordinating with the City to plan for expansion of the transportation management area to cover additional parts of the Bend urban area
Central Oregon Intergovernmental Council Regional Transit	Provides limited intercity transit between several Central Oregon cities	Working with the Central Oregon Intergovernmental Council to explore the feasibility of planning a commuter rail system
Central East Transit	Provides a local fixed-route system for portions of the Bend area, including 3rd Street in the API and a regional service between Bend and Redmond	Exploring options with Cascade East Transit for potential new routes to serve the API ; the Preferred Alternative will not preclude a future transit facility in the northern area of Bend
Bicycle and Pedestrian Advisory Committee	Identifies bicycle and pedestrian improvements to incorporate into the proposed action	Incorporating bicycle and pedestrian improvements into the proposed action
Safe Routes to Schools	Provides educational outreach and pursues funding opportunities for reducing vehicle travel to or from schools	Incorporating bicycle and pedestrian improvements into the proposed action
Bicycle and Pedestrian Improvement Priorities	Inventories existing bicycle lanes and sidewalks in Bend and within the API, proposes trails (through the Bend Urban Trails Plan), prioritizes improvements or new construction and identifies funding sources	Incorporating improved bicycle and pedestrian facilities into the build alternatives and working with the City of Bend and the Bend Park and Recreation District to identify funding sources to implement the Bend Urban Trails Plan

Key Point

Beneficial and adverse impacts on environmental resources are discussed in Chapter 3 Affected Environment, Environmental Consequences, and Avoidance, Minimization and/or Mitigation Measures for each of the three alternatives studied.

A mass transit alternative was not considered for the proposed action because the API is not within an urban area with a population over 200,000. However, ODOT is coordinating with the Central Oregon Intergovernmental Council to explore the long-term feasibility of a commuter rail system.

Additional mass transit facilities were identified subsequent to publishing the Draft EIS. The Central Oregon Intergovernmental Council published a *Draft Park and Ride Lot Plan* in June 2013. This plan identifies a priority need for a park and ride lot in the Cascade Village shopping center area. The Bend Metropolitan Planning Organization (MPO) published a *Public Transit Plan and Transit Corridor Land Use Assessment* in March 2013. This plan identified the near-term need for a Redmond - Bend Community Connector (Route #24) stop serving Cascade Village and a future transit hub at the same location. The Preferred Alternative will not preclude the development of transit facilities within the Cascade Village shopping center area.

ODOT will continue to provide ongoing financial support to Commute Options, a non-profit organization that promotes a variety of transportation options in Central Oregon to encourage increased intercity and local transit.

2.5 Comparison of Alternatives

Three alternatives were forwarded for further study in the Draft EIS: the East DS1 Alternative, East DS2 Alternative, and No Build Alternative. A comparison of the results of the screening criteria is provided in Exhibit 2-18 FEIS for the three alternatives and the Preferred Alternative. Although the No Build Alternative fails to pass all screening criteria, the National Environmental Policy Act requires that the No Build Alternative be evaluated in an EIS.

Other relevant factors that must be balanced with results of the screening criteria include: public comments on the Draft EIS, balance of adverse and beneficial impacts, alternative constructability, public support or opposition, and maintenance factors.

2.5.1 No Build Alternative

As described in Section 2.1.1 No Build Alternative, the No Build Alternative would not construct any improvements within the API beyond those identified in the Oregon Statewide Transportation Improvement Program or the City of Bend's *Capital Improvement Program* (Exhibit 3-9B). As shown in Exhibit 2-18 FEIS, this alternative would not meet the purpose and need for the proposed action, and thus would not reduce congestion, improve traffic flow, and enhance safety within the API. This alternative does not require construction

of any improvements, so constructability is not an area of concern. To date, there has been no public opposition to the No Build Alternative, but the public has voiced support for improvements to traffic flow and safety in the north end of Bend, so the No Build Alternative is not generally supported by the public. Maintenance of the No Build Alternative would become more costly over time as the existing facilities operate at over-capacity levels and continue to deteriorate.

2.5.2 East DS1 Alternative

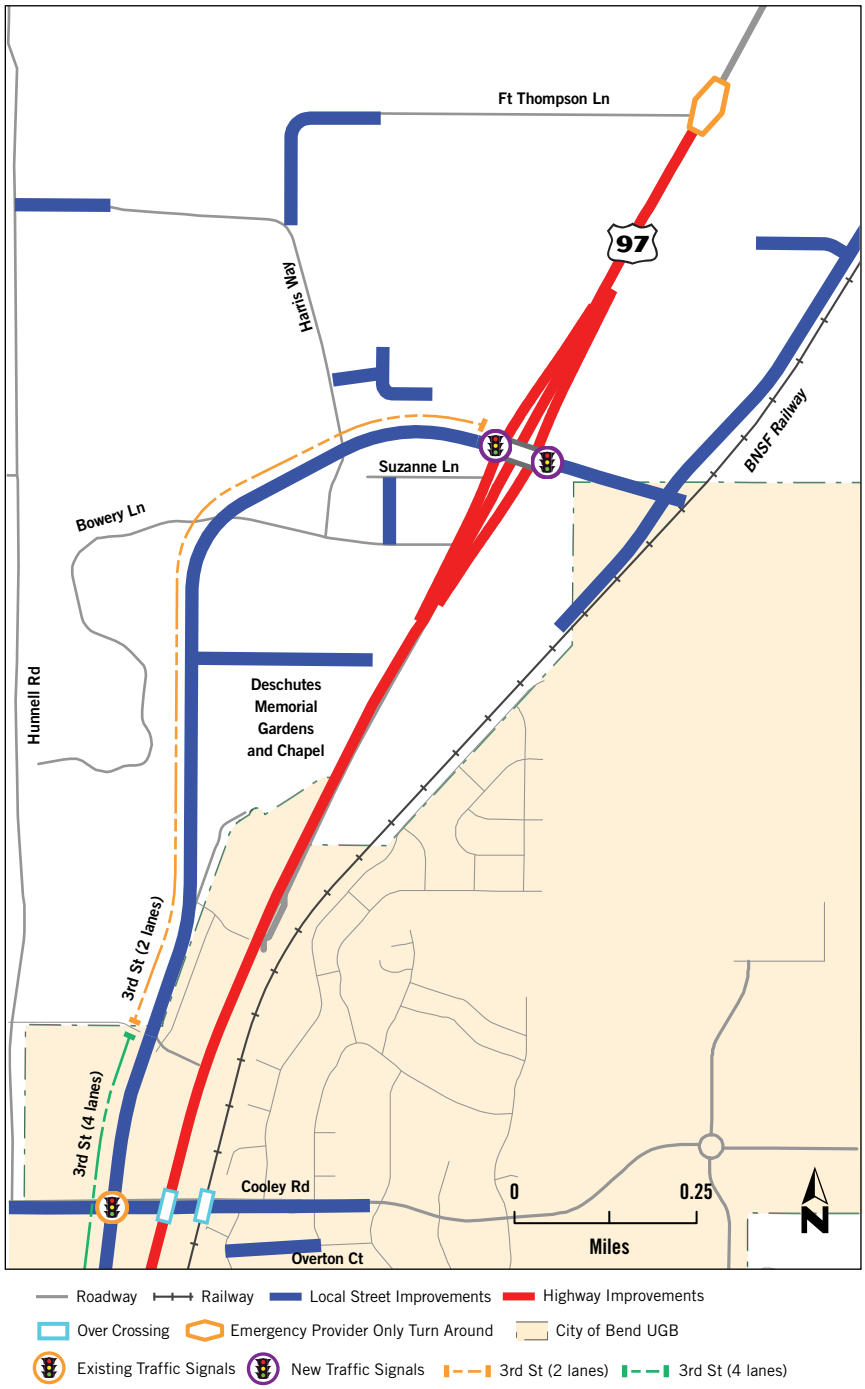
As described in Section 2.1.2 Build Alternatives, the East DS1 Alternative would reroute US 97 east of its current alignment, and the current US 97 roadway would become an extension of 3rd Street, a local arterial. The 3rd Street extension would continue north on the west side of the Deschutes Memorial Gardens and Chapel, and US 97 would have a full diamond interchange with 3rd Street just north of Bowery Lane (Exhibit 2-29 FEIS). As shown in Exhibit 2-18 FEIS, this alternative passed all screening criteria and would meet the purpose and need for the proposed action, and thus would reduce congestion, improve traffic flow, enhance safety, and could be feasibly constructed within ODOT design standards. To date, public input to this alternative has focused on the alignment of 3rd Street through the edge of an established residential neighborhood, the location of the northern interchange in relation to existing commercial areas near Cooley and Robal Roads, and business displacements in the Nels Anderson Road business area.

Maintenance of the East DS1 Alternative would be greater than the existing facility today because there would be more roadway and a new interchange, including new highway bridges, ramps, and undercrossings, to maintain. The East DS1 Alternative provides an advantage to future maintenance activities as the northern interchange would allow for better access and turn-around capabilities for winter maintenance, which is especially valuable on this section of US 97 that has a median barrier blocking existing turn-around options. Further coordination between ODOT and the City of Bend would be needed to address any jurisdictional transfer of the US 97 facility, which would become a local arterial, and the associated maintenance.

The estimated total project cost for the East DS1 Alternative would be $170 to $220 million (2014 dollars).

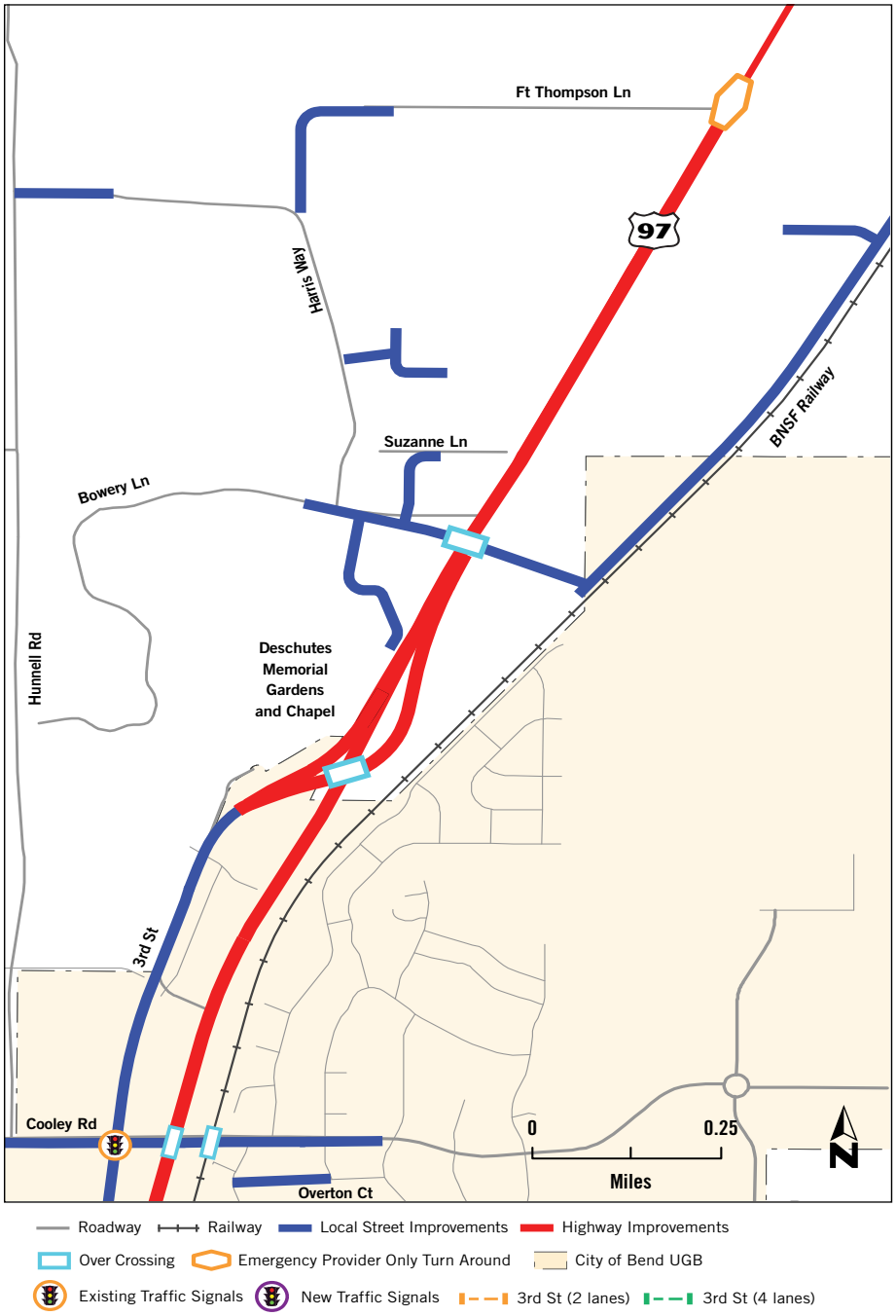
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***Exhibit 2-29** FEIS: East DS1 Alternative Northern Interchange*



Note: This exhibit has been updated to show a larger view of the East DS1 Alternative, which can be compared to the Preferred Alternative. Interchange ramps for the northbound and southbound movements onto and off US 97 would be elevated to connect with 3rd Street.

Exhibit 2-30 *FEIS: East DS2 Alternative Northern Interchange*



Note: This exhibit has been updated to show a larger view of the East DS2 Alternative, which can be compared to the Preferred Alternative.

2.5.3 East DS2 Alternative

Like the East DS1 Alternative, the East DS2 Alternative would reroute US 97 east of its current alignment, and the current US 97 roadway would become a local arterial, as described in Section 2.1.2 Build Alternatives. Under this build alternative, however, the extension of 3rd Street would continue north on the east side of the Deschutes Memorial Gardens and Chapel, and would connect to US 97 through a directional interchange near Bowery Lane (Exhibit 2-30 FEIS). As shown in Exhibit 2-18 FEIS, this alternative passed all screening criteria and would meet the purpose and need for the proposed action, and thus would reduce congestion, improve traffic flow, enhance safety, and could be feasibly constructed within ODOT design standards. To date, public input to this alternative has focused on the extended travel routes via Bowery Lane and Hunnell Road rather than US 97 that would be required for drivers accessing the mobile home parks on the east side of US 97. There has also been public concern about the location of the northern interchange in relation to existing commercial areas near Cooley and Robal Roads and business displacements in the Nels Anderson Road business area similar to the East DS1 Alternative. The East DS2 Alternative would also have similar increased maintenance, advantages for winter maintenance options, and a potential change in maintenance responsibilities for the portion of US 97 that would become a local arterial compared to the existing conditions.

The estimated total project cost for the East DS2 Alternative would be $170 to $220 million (2014 dollars).

2.5.4 Unresolved Issues

The Draft EIS identified several outstanding issues that needed to be resolved prior to publishing the Final EIS. These issues were identified by the project team early on and are expected to be successfully resolved.

Goal Exceptions

Construction of roadways outside of the UGB would require exceptions to Oregon Statewide Planning Goals 11 (public facilities and services) and 14 (urbanization). Two goal exceptions are anticipated for the East DS1 and East DS2 Alternatives: one for the new US 97/3rd Street interchange and one for the Robal Road extension west of US 20 to O.B. Riley Road. Through the goal exception process, the proposed action would need to demonstrate that it meets the applicable standards for exceptions for transportation improvements, which are listed in OAR 660-012-0070. They require the applicant to:

- Identify the transportation need

- Demonstrate that the need cannot "reasonably be accommodated" through alternatives not requiring goal exceptions, such as through improvements to existing facilities or in locations not requiring new exceptions (such as on lands inside the UGB)
- Compare the economic, social, environmental and energy consequences of the recommended alternative with other alternatives, and select the recommended alternative only if the net economic, social, environmental and energy consequences of that alternative, with mitigation, are not significantly more adverse than the net consequences of the other alternatives
- Provide measures to minimize development pressures on rural lands and protect such lands for rural uses.

The Preferred Alternative will not require any exceptions to the Oregon Statewide Planning Goals.

Interchange Area Management Plans

Interchange area management plans would be developed to protect the function of the existing US 97 interchange at Empire Avenue and a future interchange on US 97 in the northern portion of the API. The interchange area management plan for the Empire Avenue interchange would help ensure that this facility continues to provide safe and efficient connections between US 97, US 20, and the local roadways within the vicinity of the interchange. The interchange area management plan for the new northern interchange would serve a similar function to ensure that the US 97 facility would operate as intended over a long-range planning horizon. Both interchange area management plans would identify land use management strategies, short-term and long-term transportation improvements, access management goals, and strategies to fund identified improvements. The City of Bend and Deschutes County would adopt policies and ordinances necessary to implement the interchange area management plans prior to the publication of the Final EIS. The interchange area management plans would be adopted by the Oregon Transportation Commission prior to the beginning of construction.

The Preferred Alternative will not require any interchange area management plans be developed or adopted. Interchange area management plans are required for new interchanges or interchanges with substantial changes. For the Preferred Alternative, no substantial improvements will occur at the US 97/Empire Avenue interchange and no changes to land use along Empire Avenue will occur; thus, an interchange area management plan is not required. Minor interchange improvements associated with the Preferred Alternative include: realigning one existing ramp; restriping the travel and turn lanes on

Definition

Interchange Area Management Plan

An interchange area management plan is a joint ODOT and local government long term (20+ years) transportation and land use plan to balance and manage transportation and land use decisions in interchange areas, and is an important tool in protecting the function of state highway interchanges and the supporting local street network (ODOT 2006b).

the Empire Avenue overcrossing; and adding ramp metering to the on-ramps. Empire Avenue over US 97 will not be widened so there is no significant reconstruction of the overcrossing. In addition, the Preferred Alternative does not include a new northern interchange.

Highway Designations

US 97 is currently designated as a bypass from Nels Anderson Place south to Romaine Village Way (beyond the extent of the proposed action). US 97 is also designated as an expressway and a freight route on the National Highway System. For the realigned portions of US 97 under the proposed action these designations would need to be transferred from the existing alignment to the new alignment, and the Oregon Transportation Commission would need to extend the bypass designation north to the new northern interchange. The proposed action would be consistent with the Oregon Department of Transportation's Bypass Policy as US 97 would be access controlled and would function as an expressway.

Local Plan Amendments and Land Use Permits

The Preferred Alternative to be identified in the Final EIS would need to be adopted and amended into the Bend Metropolitan Planning Organization's *2007–2030 Metropolitan Transportation Plan.* The *2007–2030 Metropolitan Transportation Plan* is a 20 year long-range transportation plan that addresses all modes of transportation, establishes transportation policy and project priorities, and includes a "financially constrained" project list (FHWA 2011). Part of the long-range planning process is development of a long-range revenue forecast. Only projects that fit within or can be funded with forecasted revenues are included in the *2007–2030 Metropolitan Transportation Plan*. ODOT is coordinating with the Bend Metropolitan Planning Organization for adoption of the Preferred Alternative into the next update of the plan (FHWA 2011).

The Preferred Alternative would also need to be adopted and amended into the *Bend Area General Plan, Bend Urban Area Transportation System Plan, Deschutes County Comprehensive Plan,* and *Deschutes County Transportation System Plan.* Any new local roads outside of existing right of way could require land use permits from the City and County.

Following is a summary of how the issues noted above have been resolved for the Preferred Alternative:

- Portions of the Preferred Alternative have identified funding and are included in the financially-constrained list in the Bend Metropolitan Planning Organization's *2007-2030 Metropolitan Transportation Plan*. On August 15, 2013, the Bend Metropolitan Planning Organization voted to amend the *2007-2030*

Metropolitan Transportation Plan to include the remaining portions of the Preferred Alternative in the Plan's illustrative list thereby making the Preferred Alternative consistent with this plan (see Appendix M).

- The City of Bend's *Bend Urban Area Transportation System Plan* and the *Bend Area General Plan* were amended on March 5, 2014, to include the Preferred Alternative as well as designated the new alignment of US 97 as a bypass, expressway and freight route.
- As determined by Deschutes County in June 2013, the Britta Street extension in unincorporated Deschutes County, which is part of the Preferred Alternative, is already included in the *Deschutes County Transportation System Plan* (see Appendix M). The roundabout at Cooley Road and O.B. Riley Road has been designed in coordination with Deschutes County. On June 14, 2013, ODOT and Deschutes County agreed that this improvement will be added to the *Deschutes County Transportation System Plan* when the project is funded for construction. Therefore, the Preferred Alternative is consistent with the *Deschutes County Transportation System Plan* and the *Deschutes County Comprehensive Plan*.

Areas Remaining to be Surveyed

Some areas within the APE have not yet been surveyed for archaeological resources due to land owners not granting permission for surveys and design changes to the alternatives that occurred since the surveys were conducted. Upon gaining right of entry ODOT would survey all remaining areas and comply with Section 106 of the National Historic Preservation Act prior to construction.

With the exception of small areas adjacent to the existing right of way on eight parcels that total approximately 1.8 acres, all areas within the design footprint of the Preferred Alternative have been surveyed for archaeological resources. The Final EIS includes a commitment by ODOT to survey these remaining areas for archaeological resources prior to construction as ODOT purchases right of way and takes ownership.

2.5.5 Identified Areas of Concern

Throughout the alternatives development process a number of issues were raised by the public, participating agencies, and the ODOT-sponsored committees. Generally, the primary areas of concern were:

Changes to Approaches and Travel Routes—Visibility of businesses from the realigned US 97, travel routes to businesses from US 97, and changes to businesses' private driveways, public street connections, and public approach roads are concerns that have been raised repeatedly.

More Information

An amendment to the Deschutes County Transportation System Plan would be required to place collectors or arterials on a new alignment, if any roads were reclassified to a higher classification, or for any new interchange.

No amendments to the Deschutes County Transportation System Plan will be required for the Preferred Alternative.

Emergency Service Providers—Impacts to emergency response time as a result of altered travel routes and loss of emergency service vehicle maneuvering within streets (emergency u-turns) have been raised as an area of concern by emergency service providers.

Business and Residential Displacements—Representatives from individual businesses, established business areas, and the residential areas in and around the API have expressed concern about displacements resulting from right of way acquisition and availability of commercial, industrial and residential properties that would be suitable for relocation.

Quality of Life—Concerns regarding potential impacts to quality of life have been raised by residents and business representatives throughout the API. These impacts could include:

- Increased air, noise, and visual impacts of new and expanded local roads, elevated structures, and the realignment of US 97 closer to residential neighborhoods
- Availability of affordable housing for relocated residents
- Roadway connectivity and travel routes to existing and future destinations, including out-of-direction travel once access is modified and private driveways on US 97 are eliminated.

The Preferred Alternative was specifically developed to address many of these concerns either through avoidance, such as replacing the northern interchange with a signalized intersection that is contained within the City of Bend UGB, or minimization, such as decreasing impacts to rural residential lands.

2.5.6 Final Decision-making Process

After the Draft EIS public comment period closed, all comments were considered. ODOT and FHWA have identified a preferred alternative and made a determination of the project's impact on the human and natural environment. ODOT and FHWA will document and explain the decision regarding the selected alternative, project impacts, and mitigation measures in a Record of Decision.

In response to comments on the Draft EIS, opportunities to reduce and/or mitigate the impacts resulting from the East DS1 and East DS2 Alternatives were thoroughly examined. This effort included discussions with the City of Bend, Bend Metropolitan Planning Organization, Deschutes County, Oregon Department of Land Conservation and Development, and Swalley Irrigation District to make sure a shared long-term vision and investment strategy for US 97 in relation to this project supports the economic and livability goals of the community and the state. This effort resulted in identifying

the East DS2 Modified Alternative, which is a modified version of the East DS2 Alternative evaluated in the Draft EIS, as the Preferred Alternative. The Preferred Alternative does not include an interchange north of Cooley Road but instead includes a signalized intersection of US 97 and 3rd Street just south of Deschutes Memorial Gardens and Chapel and just north of Grandview Drive. In the rural residential area north of Cooley Road, the Preferred Alternative will limit local road improvements to the extension of 3rd Street along Clausen Drive and a new roundabout at Loco Road and 3rd Street. The Preferred Alternative will not include any access closures on US 97 north of Deschutes Memorial Gardens and Chapel or any of the associated local road improvements to Fort Thompson Lane, Harris Way, Suzanne Lane, and Bowery Lane as compared to the East DS1 and East DS2 Alternatives evaluated in the Draft EIS.

The Preferred Alternative minimizes impacts to neighborhoods east of US 97, including the Boyd Acres Neighborhood. For example, compared to the East DS1 and East DS2 Alternatives there will be three fewer residential displacements from the Boyd Acres Neighborhood and access to the mobile home parks will not change.

The Preferred Alternative also substantially minimizes impacts to rural residential properties north of Cooley Road (including the Hunnell Neighborhood and the Rock O' the Range area) by containing all improvements within the adopted UGB, except for the extension of Britta Street to intersect with US 20 and Robal Road and the roundabout at Cooley Road and O.B. Riley Road. With the Preferred Alternative improvements to Hunnell Road will only occur at the intersection with Cooley Road where a traffic signal will be installed. With the Preferred Alternative the land zoned Multiple Use Agriculture (MUA) in Deschutes County that will be acquired is less than 1 acre, compared to approximately 77 acres with the East DS1 Alternative and 31 acres with the East DS2 Alternative. The Preferred Alternative will not displace any residences in the MUA zone, compared to 10 residential displacements with the East DS1 Alternative and 6 residential displacements with the East DS2 Alternative. By containing the roadway improvements within the adopted UGB the Preferred Alternative also reduces the roadway noise and changes in scenery compared to the East DS1 and East DS2 Alternatives, thereby minimizing impacts to the rural character of area north of Cooley Road.

2.6 Identification of the Preferred Alternative—East DS2 Modified Alternative

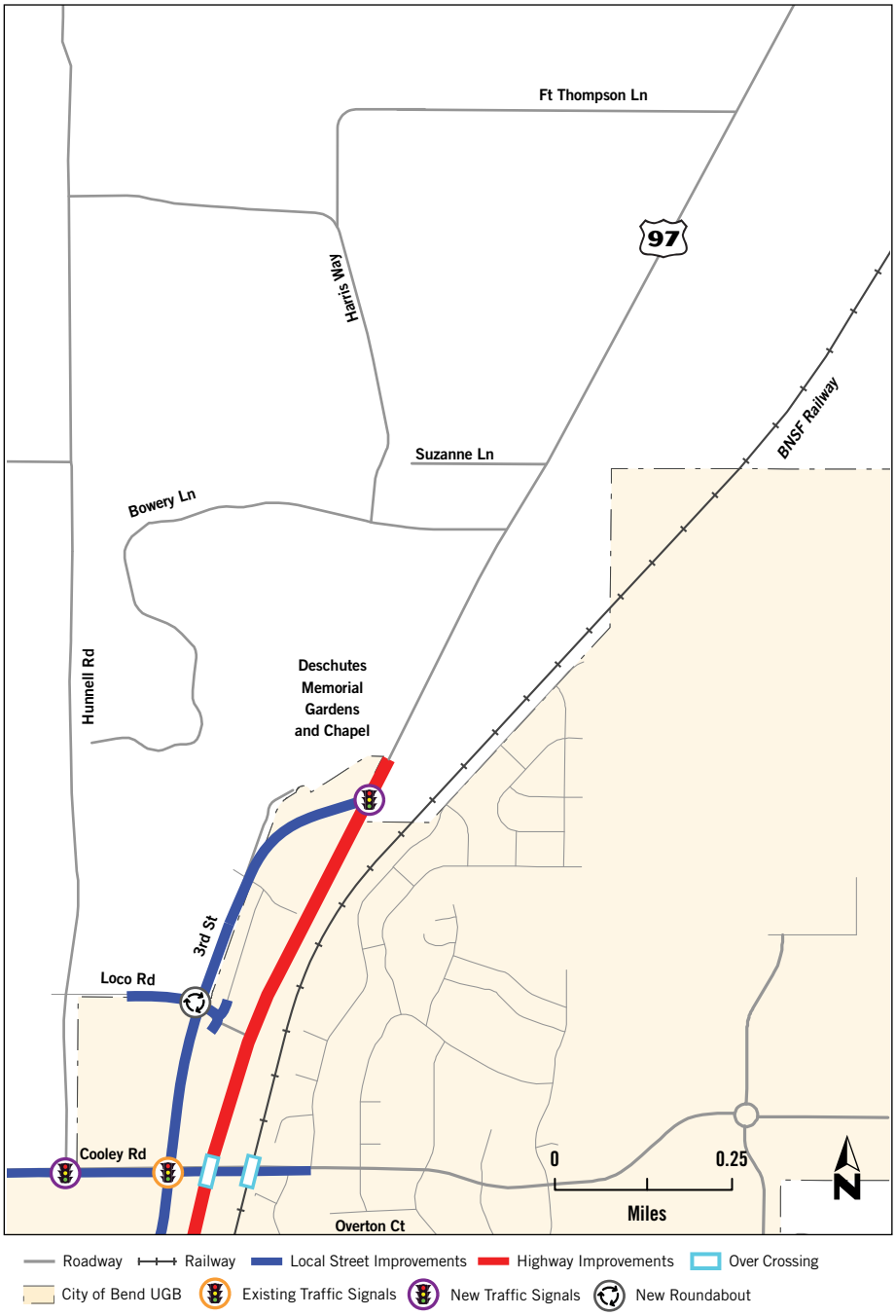
2.6.1 Rationale for Identifying the Preferred Alternative

The Preferred Alternative is a modified version of the East DS2 Alternative that was studied in the Draft EIS and is depicted in Exhibit 2-3 FEIS and the associated inset maps. The primary modification is replacing the directional interchange in the northern area to a signalized intersection at US 97 and 3rd Street as shown in Exhibit 2-30A FEIS. This modified version will:

- Minimize impacts to neighborhoods east of US 97
- Substantially minimize impacts to rural residential properties north of Cooley Road and west of US 97 by containing all improvements within the City of Bend's UGB, except for the extension of Britta Street west of US 20 and intersection improvements at Cooley Road and O.B. Riley Road
- Separate the highway and local street functions; allow peak operating speeds to be reasonably close to the posted speeds
- Improve the access spacing on US 97 to meet spacing standards between the connection to US 20/3rd Street and the north 3rd Street signalized intersection.

As shown in Exhibit 2-18 FEIS, this alternative passed all screening criteria and meets the purpose and need for the proposed action, and thus will reduce congestion, improve traffic flow, enhance safety, and can be feasibly constructed within ODOT design standards.

Exhibit 2-30A FEIS: *Preferred Alternative Northern Intersection*



Note: This Exhibit was added to show the new intersection for the Proposed Alternative

2.6.2 Funding and Phasing of the Preferred Alternative

The estimated total project cost for the Preferred Alternative is $174 million with right-of-way costs estimated at $74 million in 2016 dollars (42 percent of total project cost). This alternative provides flexibility to accommodate phased funding and construction.

Portions of the Preferred Alternative have identified funding and are included as medium- and long-term projects in the Bend Metropolitan

Planning Organization's *2007-2030 Metropolitan Transportation Plan* financially constrained project list (FHWA 2011). A total of $6.26 million is identified in the fiscally constrained *2007-2030 Metropolitan Transportation Plan* for the US 97 Bend North Corridor project (Exhibit 2-30B).

Exhibit 2-30B: *List of Financially Constrained Projects Related to the Preferred Alternative*

MPO MTP Project #	Location (Jurisdiction)	From	To	Improvement	Project Priority	Planning Level Cost ($1,000s)[1]
2	Empire Ave (Bend)	3rd Street	Parkway	Add one travel lane in each direction	Medium	$4,620
24	Empire Avenue (Bend/ODOT)	Parkway SB Ramps		Install traffic signal	Medium	$250
23	O.B. Riley Road (Bend)	Empire Avenue		Install traffic signal	Medium	$250
5	US 97 NB off-ramp (ODOT)	Empire Avenue		Add one ramp lane	Long	$1,140

[1]The project cost estimates do not include right of way costs. Right of way costs vary significantly with each project. Right of way costs will be addressed in the development/engineering phases of each project.
Source: Information is excerpted from Table 6-16 in the Bend Metropolitan Planning Organization's (MPO) *2007-2030 Metropolitan Transportation Plan* (MTP).

The remaining improvements associated with the Preferred Alternative are included in the Bend Metropolitan Transportation Plan's Illustrative Project List. As funding is obtained for additional components of the Preferred Alternative, ODOT will request that the Bend Metropolitan Planning Organization move those funded elements from the illustrative list to the financially constrained list (FHWA 2011).

As outlined in Section 1.4.1, over the past 20 years highway modernization projects for all of Central Oregon have totaled approximately $275 million. Recent highway modernization projects in Central Oregon have received approximately $115 million (US 97 Bend Parkway) and approximately $90 million (US 97 Reroute Phase 1 in Redmond). When developing these highway modernization projects initial funding fell short of the total funding necessary to complete the project but eventually each project was fully funded and constructed.

For the 2007-2030 planning period, the Bend Metropolitan Transportation Plan identifies a total of $253.3 to $271.7 million of capital funding, of which $40.4 to $42.2 million is allocated directly to ODOT. Some of this funding is available for this project. In addition, the Bend Metropolitan Transportation Plan identifies funding allocated to Deschutes County ($1.0 million) and the City of Bend ($253.3 to $271.7 million). The local agencies can contribute portions of their funding to the US 97 Bend North Corridor project. In addition, this forecast does not account for the potential full range of alternative financing mechanisms such as impact fees, tax increment financing,

local improvement districts, state infrastructure bank, local option transportation taxes, fair share mitigation, publicprivate partnership and/or transportation concurrency.

Based on past experience and forecasts for Central Oregon, it is reasonable that a project of this importance could receive up to $250 million over the 20–30 year timeframe. Although it is reasonable that the Preferred Alternative could receive total project funding of up to $250 million, it is unlikely that such a significant amount of funding could be raised entirely within the first 10 years. Smaller funding packages would be more likely, which would enable phased improvements to be made, with each phase providing some congestion relief and improving traffic flow and safety on US 97 to support the longterm solution. The Preferred Alternative can be constructed in phases with improvements that are within the fiscal constraints of the state, county, and city.

The Preferred Alternative will be constructed in phases to match available funding. Phasing decisions will be made as funding is secured; these decisions will be based on the highest need in the area.

ODOT will continue to involve the public during final design of each phase. Prior to construction of a first phase of the project that would include federal-aid funding, FHWA will re-evaluate this NEPA document. The re-evaluation will include an analysis of any impacts that would occur due to the phase being constructed.

2.6.3 Elements to be Coordinated during Final Design

ODOT has identified several design issues related to the Preferred Alternative that ODOT will continue to work on in collaboration with the City of Bend, Deschutes County, and other partners through various planning, project, and operational processes. The following design issues are anticipated to be completed during the final design phase:

- Empire Avenue access closures including Sherman Road and private driveways on the south side of Empire Avenue
- Jurisdictional transfer of 3rd Street to the City of Bend.

2.7 Permits and Approvals Needed

More Information

If a building permit is needed, compliance with Title 18.84 – Landscape Management Combining Zone of the Deschutes County Code would be required.

The permits, approvals, plan amendments, and licenses listed in Exhibit 2-31 FEIS would be required to construct either of the build alternatives.

The permits, approvals, plan amendments, and licenses listed in Exhibit 2-31 FEIS will be required to construct the Preferred Alternative. ODOT will obtain these permits, approvals, plan amendments, and licenses prior to initiating construction.

***Exhibit 2-31** FEIS: Permits and Approvals Required*

Agency	Permit/Approval/License	Updated Final EIS Status
Federal Highway Administration	Section 106 determination with Memorandum of Agreement	Completed
Federal Highway Administration	Section 4(f) Evaluation Approval	Completed
Oregon Department of Environmental Quality	National Pollution Discharge Elimination System General Construction Permits (including 1200-CA)	To Be Obtained During Final Design
Oregon Department of Environmental Quality	Oversight of hazardous materials issues	To Be Obtained During Final Design
Oregon Department of Environmental Quality	Site preparation permits for grading, erosion, blasting, and air and noise emissions	To Be Obtained During Final Design
Oregon Department of Transportation	Permit for relocation of utility lines in a state road right-of-way	To Be Obtained During Final Design
Oregon Department of Transportation	Compliance with Oregon Senate Bill 408	To Be Obtained During Final Design
Oregon Department of Water Resources	Water Rights	To Be Obtained During Final Design
State Historic Preservation Office	Section 106 Historic Resource Concurrence	Completed
Bend Metropolitan Planning Organization	Amendment of 2007-2030 *Metropolitan Transportation Plan*	Completed
Deschutes County	Amendment of *Deschutes County Comprehensive Plan*	Not Required for the Preferred Alternative
Deschutes County	Amendment to the *Deschutes County Transportation System Plan*	Not Required for the Preferred Alternative
Deschutes County	Compliance with Deschutes County Code	To Be Obtained During Final Design
Deschutes County	Goal Exception Application for Statewide Planning Goals 11 (Public Facilities and Services) and 14 (Urbanization)	Not Required for the Preferred Alternative
Deschutes County	Grading Permit	To Be Obtained During Final Design
Deschutes County	Land Use Permit	To Be Obtained During Final Design
City of Bend	Landmarks Commission Approval for relocating or demolishing the Nels and Lillian Andersen house	To Be Obtained During Final Design
Deschutes County	Noise variance	To Be Obtained During Final Design
Deschutes County	Utility Permit	To Be Obtained During Final Design
City of Bend	Amendment of *Bend Area General Plan*	Completed

***Exhibit 2-31** FEIS: Permits and Approvals Required*

Agency	Permit/Approval/License	Updated Final EIS Status
City of Bend	Amendment of *Bend Urban Area Transportation System Plan*	Completed
City of Bend	Approval of a Special Planned Areas application (Lava Ridge Refinement Plan Area)	To Be Obtained During Final Design
City of Bend	Land Use Permit	To Be Obtained During Final Design
City of Bend	Demolition Permit	To Be Obtained During Final Design
City of Bend	Noise variance	To Be Obtained During Final Design
City of Bend	Compliance with Bend Development Code	To Be Obtained During Final Design
BNSF Railway	Encroachment/Crossing Permit	To Be Obtained During Final Design
Swalley Irrigation District	Encroachment/Crossing Easements	To Be Obtained During Final Design

Note: This exhibit was updated to identify the status of each permit or approval at the time of publication of the Final EIS. Additional permits and approvals were identified during the development of the Final EIS.

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Chapter 3

Affected Environment, Environmental Consequences, and Avoidance, Minimization and/or Mitigation Measures

Chapter 3 evaluates the beneficial and adverse impacts of the proposed action on environmental and community resources. Each section describes the following:

- Regulatory setting of regulations and policies applicable to the resource that guide the way issues are analyzed
- Affected environment of the resource, which describes the setting and existing conditions of the resource
- Environmental consequences of each of the alternatives on the resource, including:
  - Direct impacts—impacts that would be caused by an alternative at the same time and place
  - Indirect impacts—impacts that would be caused by an alternative but that would occur later in time or farther removed in distance
  - Construction impacts—temporary impacts that would be caused during construction of the proposed action
- Avoidance, minimization, and mitigation measures that have been or could be incorporated into the build alternatives to reduce or avoid adverse, long-term and short-term impacts to the resource
- The Final EIS clarifies which avoidance, minimization, and mitigation commitments ODOT has incorporated into the Preferred Alternative.

As part of the public scoping and environmental analysis conducted for the proposed action, the following environmental issues were considered but no adverse or beneficial impacts were identified. Consequently there is no further discussion regarding these issues in the EIS:

- Coastal Zone—The API is not located within a coastal zone
- Floodplains and Floodways—The API is not located within a floodplain or a floodway
- Paleontology—The API is not located within a designated paleontology area
- Wild and Scenic Rivers—There are no Wild and Scenic Rivers or Oregon Scenic Waterways located within the API.

Chapter 3 Content

3.1 Transportation Facilities
3.2 Land Use
3.3 Right of Way and Utilities
3.4 Environmental Justice
3.5 Socioeconomic Analysis
3.6 Parks and Recreational Facilities
3.7 Historic Resources
3.8 Visual Resources
3.9 Water Quality, Hydrology and Stormwater Runoff
3.10 Natural Systems and Communities
3.11 Wetlands and Other Waters
3.12 Threatened and Endangered Species
3.13 Non-Threatened or Endangered Species
3.14 Invasive Species
3.15 Air Quality
3.16 Noise
3.17 Energy
3.18 Geology
3.19 Hazardous Materials

Definitions

Existing Traffic Conditions Year (2007)

The year in which baseline traffic conditions for the project are established. The existing traffic conditions provide a comparative measure for future No Build and build alternatives projected traffic conditions.

Year of Opening (2015)

The year of opening is the year in which construction of the build alternatives would be completed.

Design Year (2035)

The design year is the year for which the project was designed to meet anticipated needs.

For the Final EIS, the existing traffic conditions have been updated to year 2011 and the No Build Alternative has been updated to 2036. The Preferred Alternative has been updated to a 2016 Year of Opening and 2036 Design Year. Comparative 2036 Design Year data for the East DS1 and East DS2 Alternatives is provided in the Final EIS.

3.1 Transportation Facilities

3.1.1 Regulatory Setting

The primary missions of ODOT and FHWA are related to transportation facilities and safety; therefore, this proposed action is transportation oriented and the National Environmental Policy Act analysis focuses on transportation-related impacts. Compliance with the National Environmental Policy Act is required because the proposed action is funded or partially funded with FHWA funds. The National Environmental Policy Act provides the overall regulatory setting for this section. With regard to traffic forecasts, in general, the design year traffic should accommodate a 20year forecast from the expected date of completion of the facility (Title 23, United States Code (USC)—Highways Section 109 Standards).

FHWA regulations provide policies and procedures relating to the provision of pedestrian and bicycle accommodations, and federal participation in the cost of these accommodations. FHWA directs that full consideration should be given to the safe accommodation of pedestrians and bicyclists. FHWA further directs that the special needs of the elderly and the disabled must be considered in all federal-aid projects that include pedestrian facilities. When current or anticipated pedestrian and/or bicycle traffic presents a potential conflict with motor vehicle traffic, every effort must be made to avoid, minimize, and mitigate the detrimental effects on all highway users who share the facility (23 Code of Federal Regulations (CFR) 652).

Oregon Revised Statute (ORS) 366.514, also known as the "Bike Bill," was passed by the Oregon Legislature in 1971. Footpaths and bicycle trails, including curb cuts or ramps as part of the project, shall be provided wherever a highway, road or street is being constructed, reconstructed or relocated. This statute applies to ODOT, cities, and counties and allows these agencies to spend reasonable amounts of their share of the state highway fund on facilities for pedestrians and bicyclists.

The 1990 Americans with Disabilities Act extends to individuals with disabilities and provides civil rights protection similar to those provided to persons on the basis of race, sex, national origin, and religion under the Civil Rights Act of 1964. Federal-aid highway projects must comply with the Americans with Disabilities Act and do so by building transportation facilities that provide equal access for all persons. All projects shall comply with the most current Americans with Disabilities Act guidelines. The same degree of convenience, accessibility, and safety available to the general public will be provided to persons with disabilities. Design, signing, and marking of pedestrian

and bicycle facilities shall be in conformance with the Oregon Bicycle and Pedestrian Design Guide.

3.1.2 Affected Environment

More information: Additional detail on the transportation analysis is provided in the *Traffic Analysis Report* (ODOT 2010c), the *Updated Traffic Analysis Report* (ODOT 2014o), *Overview of Interchange Area Management Plans* (ODOT 2010b), and *Bicycle and Pedestrian Technical Report* (ODOT 2014c). *The Traffic Analysis Report*, *the Updated Traffic Analysis Report*, *Overview of Interchange Area Management Plans*, and *Bicycle and Pedestrian Technical Report* are listed in Appendix K and available in the document library of the project's website (www.us97solutions.org).

The transportation area of potential impact (Transportation API) is shown in Exhibit 3-1 FEIS. This area comprises those locations where state and local roadways, bicycle and pedestrian facilities, and transit services could potentially experience adverse and beneficial impacts associated with the proposed action.

The Transportation API generally extends north-south along US 97 from the Deschutes Market Road/Tumalo Junction interchange to Butler Market Road in Bend. The Transportation API also extends along US 20 for approximately 2 miles north of the Empire Avenue interchange and typically ranges 1/4 to 1/2 mile to either side of US 20 and US 97 (including O.B. Riley Road on the west and Boyd Acres Road on the east).

Since the publication of the Draft EIS, the Transportation API along US 97 has been modified and generally extends from approximately 1,000 feet north of Bowery Lane to Butler Market Road in Bend (Exhibit 3-1 FEIS).

Roadways and Highways

US 97 is a four-lane major arterial carrying about 42,200 vehicles a day north of Robal Road within the Transportation API. The facility is regionally significant in that US 97 connects greater Bend to The Dalles, Redmond, La Pine, and Klamath Falls, and is the primary north-south route through Central Oregon with connections to California and Washington. Reflecting this important regional role, US 97 is classified as a statewide expressway and a freight route on the National Highway System.

US 20 is a two-lane major arterial and a statewide expressway from the northern limits of the Transportation API to the junction with 3rd Street. From the start of 3rd Street south through the Transportation API, US 20 (also called US 97 Business or 3rd Street) is a five-lane major arterial with a statewide non-freight level of importance. The 2007 average daily traffic on US 20 is about 27,500 vehicles per day west of Robal Road.

More Information

Information on existing and planned facilities, and transportation policies, that were referred to for this analysis include:

- Transportation System Plans for the Bend Urban Area (adopted 2000) and Deschutes County
- The Bend Metropolitan Planning Organization's *2007-2030 Metropolitan Transportation Plan*
- Transportation or capital improvement programs for the City of Bend, Deschutes County, ODOT, and the Bend Metropolitan Planning Organization
- Bicycle and pedestrian plans including the *Oregon Bicycle and Pedestrian Plan* (1995), as well as the *Bend Urban Area Metropolitan Transportation Plan*, the *Deschutes County Transportation System Plan*
- Transit plans including the Bend Metropolitan Planning Organization and the *Bend Urban Area Metropolitan Transportation Plan.*

Definitions

Interchange

According to OAR 734-051-0155, an "interchange" is defined as "a system of interconnecting roadways in conjunction with one or more grade separations that provides for the movement of traffic between two or more roadways or highways on different levels." For the purposes of the proposed action, the US 97 at Empire Avenue junction which provides grade-separated ramp access in most directions is defined as an interchange, while the US 97/US 20 connection which is spread over a number of locations and has only one existing ramp connection (a ramp between northbound US 97 and westbound US 20) is not considered to be an interchange. This distinction will be important for the upcoming interchange area management plans to be prepared for the proposed action.

The Preferred Alternative will not require any interchange area management plans.

Local Trips

Local trips are those that have both an origin and destination within the Transportation API.

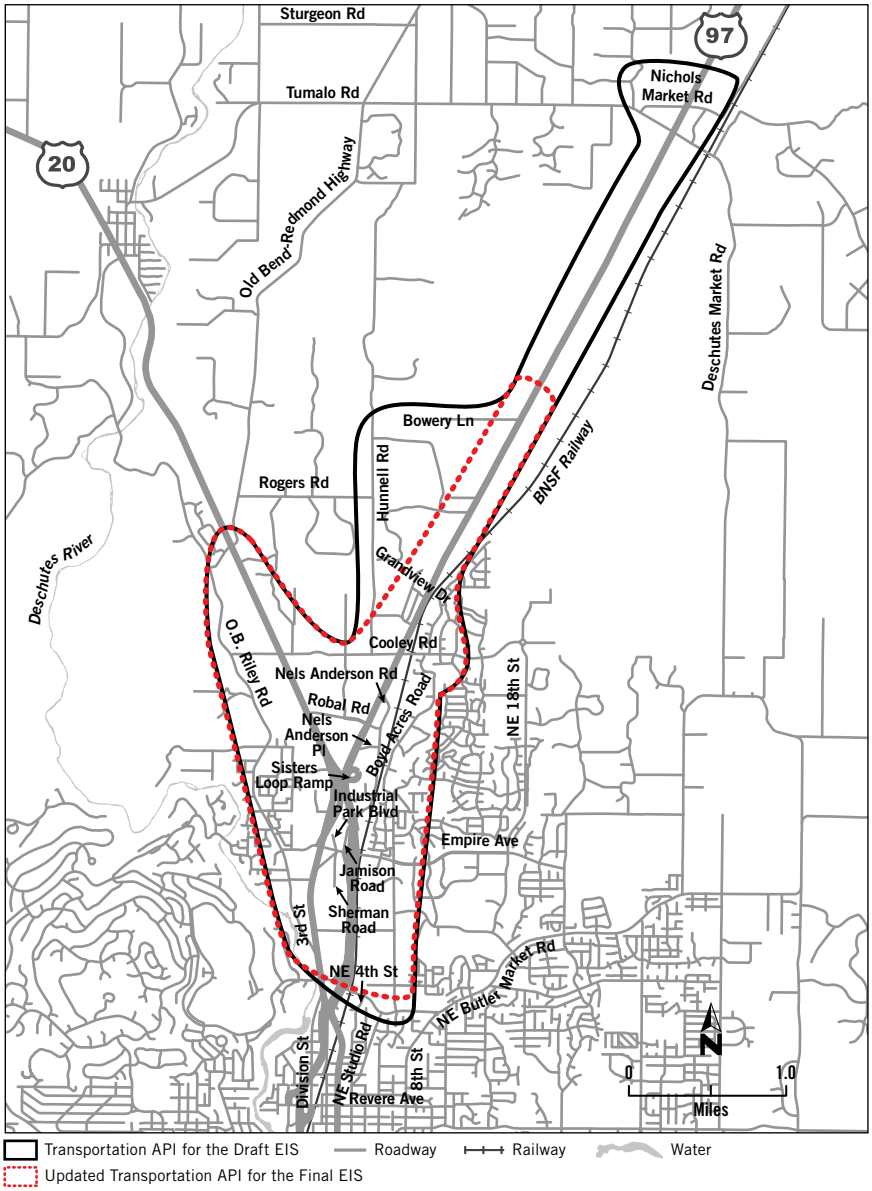
Through Trips

Through trips are those that are using the highways in the Transportation API, which have an origin outside of the Transportation API, to reach a destination outside of the Transportation API.

Regional Trips

Regional trips are those that have one end of a trip within the Transportation API with the other end being outside of the Transportation API.

***Exhibit 3-1 FEIS:** Transportation Area of Potential Impact*



Note: This exhibit was revised to depict the revised, smaller Transportation API used for the Final EIS traffic analysis.

Other roadways in the Transportation API include portions of O.B. Riley Road, Cooley Road, Deschutes Market Road, Nichols Market Road, Tumalo Road, and Old Bend-Redmond Highway, which are Deschutes County two-lane rural major collectors. Empire Avenue is a City of Bend two and four-lane major arterial east of 3rd Street carrying 18,300 vehicles per day and a two-lane minor arterial from O.B. Riley Road to 3rd Street. Other City two-lane minor arterials include Robal Road, Hunnell Road, Butler Market Road, Boyd Acres Road, and 4th Street, and portions of Cooley and O.B. Riley Roads. Studio Road and Hunnell Road north of Cooley Road are two-lane collectors. Other roads in the Transportation API, such as Nels Anderson Place and Grandview Drive, are local streets.

Exhibit 3-2 FEIS shows the existing average daily traffic volumes for major roadway segments.

Exhibit 3-2 FEIS: *Existing Daily Weekday Traffic Volumes*

Roadway Segment	2007 Average Daily Traffic	2011 Average Daily Traffic
US 97 South of Empire Avenue	~~41,000~~ 59,500	53,200
US 97/3rd Street north of Robal Road	42,200	40,000
US 20 west of Robal Road	27,500	23,200
Empire Avenue at US 97	18,300	16,300
Cooley Road west of US 97/3rd Street	7,100	6,100
Cooley Road east of US 97/3rd Street	8,200	7,300

Note: This exhibit was revised in the Final EIS to provide updated existing conditions data. Traffic volumes for the US 97 segment south of Empire Avenue were incorrectly presented in the Draft EIS and have been corrected in the Final EIS.

The Bend Metropolitan Planning Organization's travel demand model has been used to estimate Design Year 2035 travel patterns for trips using US 97 and US 20. Twentyfive percent of the trips on US 97 and 10 percent of the trips on US 20 are through trips, indicating that these important regional facilities are used by a significant amount of both regional and local trips.

For the Final EIS the existing traffic conditions for the No Build Alternative were reanalyzed by reducing peak hour volumes and peak month average daily traffic by 10 percent to approximate 2011 conditions (2011 was the most recent complete year of data at the time Final EIS traffic analysis was conducted). US 97 carried about 40,000 vehicles a day north of Robal Road within the Transportation API in 2011.

The 2011 average daily traffic on US 20 is about 23,200 vehicles per day west of Robal Road. Empire Avenue east of 3rd Street carried approximately 16,300 vehicles per day in 2011.

Travel Patterns

Overall, most trips on US 97 and US 20 (50 to 70 percent, depending on roadway) originate from central or southern Bend, or from the Awbrey Butte/Boyd Acres area neighborhoods, and are destined for northern Bend, or points beyond, via US 20 or US 97. Trips using US 97 are more likely to originate or terminate in Bend as they are primarily local or commuter-based. Over 50 percent of the trips using Empire Avenue are local trips beginning or ending in adjacent neighborhoods that do not access US 97.

The Final EIS provides clarification on travel patterns on US 97 in the Transportation API. Travel pattern data from the Bend Metropolitan Planning Organization's travel demand model indicate that there are three types of trips that travel in or through the project area:

through, regional, and local trips. Through trips are those trips that travel entirely through the project area and Bend without stopping (3.5 percent); these trips do not make any stops (e.g., gas, food, freight pickup/drop-off, etc.) within Bend. Regional trips are those trips that start or end in Bend south of the project area (21.5 percent). The through and regional trips account for one-quarter of all US 97 trips in the project area. The other 75 percent of US 97 trips are local trips, which begin or end their trips in the project area. The Preferred Alternative will benefit all three trip types through shortened travel times, reduced delays, and improved safety.

2007 Existing Traffic Operations

The roadways in the Transportation API are owned and managed by three different agencies, each of which uses different measures to assess roadway adequacy and performance in terms of traffic operations. ODOT has jurisdiction over state routes, including US 97 and US 20. ODOT assesses the operation of its existing roadways based on volume to capacity (v/c) ratios, and has set v/c standards on state highways at 0.70 for rural state highway segments; 0.80 for the expressway segments of US 20 and US 97; and 0.85 for the segment of US 20 from the Sisters loop ramp south to the southern Transportation API boundary. ODOT has also established a 0.85 v/c standard for the ramp terminals on Deschutes Market Road, Nichols Market Road, Empire Avenue, and Butler Market Road. A v/c ratio above these thresholds is considered deficient; v/c ratios within 10 percentage points (0.1) of these thresholds are considered an "area of concern" and are viewed as indicators of locations where a deficiency may occur within 5 to 10 years. Deschutes County evaluates its roadways using level of service, a standard measure of traffic operating conditions based on average vehicle delay at intersections. The City of Bend uses both average vehicle delay and v/c ratios for evaluating signalized and unsignalized intersections.

Under the 2007 existing conditions, all of the mainline segments of US 97 and US 20 met the v/c standard except for the northbound section of US 97 between the Butler Market Road on-ramp and the Empire Avenue off-ramp. Areas of concern included US 97 between Butler Market Road and the Sisters loop ramp connection to US 20.

In the 2007 existing conditions, a number of intersections fall below agency operational performance standards, including (* indicates intersection is currently signalized):

- US 20/Old Bend-Redmond Highway
- US 20/Cooley Road
- US 20/Jamison Street

- Empire Avenue/Sherman Road/Industrial Park Boulevard
- Empire Avenue/Nels Anderson Road/Southbound US 97 Ramp Terminal
- US 97/Cooley Road*
- US 97/Robal Road*
- US 20/Empire Avenue*.

The US 97/Cooley Road and the US 97/Robal Road intersections are at or approaching capacity (2007). As indicated in the list above, many unsignalized intersections along US 20 west of the US 97/3rd street connections are at or over capacity, as is Empire Avenue from US 20 to the northbound US 97 ramp terminal. Insufficient capacity at these unsignalized intersections means that vehicles must use shorter gaps in traffic to turn onto or travel across the roadway, increasing the risk of a crash.

2011 Existing Traffic Operations

The Final EIS updates the existing traffic conditions analysis, from 2007 to 2011. The v/c targets remained the same as used in the 2007 existing conditions: 0.70 for rural state highway segments and 0.85 for the segment of US 20 from the Sisters loop ramp south to the southern Transportation API boundary. However, the 2011 Amended Oregon Highway Plan revised the mobility standard for the urban expressway portion of US 97 and US 20 located within the Bend Metropolitan Planning Organization boundary from a v/c ratio of 0.80 to a mobility target of 0.85. The term was changed from mobility standard to mobility target, to indicate that the Oregon Transportation Commission is open to considering alternative mobility targets on a case by case basis.

Under the 2011 existing conditions, all of the mainline segments of US 97 and US 20 meet the v/c target. Areas of concern include US 97 between Butler Market Road and the Sisters loop ramp connection to US 20.

Most of the intersections meet agency operational performance targets with the exception of:

- Empire Avenue/Nels Anderson Road/southbound US 97 ramp terminal
- US 97/Cooley Road (signalized intersection).

Almost half of the unsignalized intersections along US 20 west of the US 97/3rd Street connections are approaching the maximum capacity for the stopped side-street approaches. Another problem area is Empire Avenue from US 20 to the northbound US 97 ramp

Definitions

Level of Service

As defined by the 2000 Highway Capacity Manual, the concept of level of service is defined as a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers. A level of service definition generally describes these conditions in terms of such factors as speed and travel time, delays at signalized and unsignalized intersections, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. ODOT and the City of Bend use a volume to capacity (v/c) ratio method to define level of service (ODOT's is defined as a mobility standard), while Deschutes County uses a letter grade on a scale of A (no traffic delays) through F (near or at gridlock conditions).

Delay

Delay results from slowed or stopped traffic, and is measured as the additional time spent traveling compared to normal travel times under light or free-flow travel conditions.

Volume to Capacity (v/c) Ratio

The v/c ratio illustrates how many vehicles are using the roadway compared to the room available for them.

terminal, which is operating above capacity. Insufficient capacity at these unsignalized intersections means that vehicles must use shorter gaps in traffic to turn onto or travel across the roadway, increasing the risk of a crash.

2007 Traffic Queuing

Current traffic queuing problem areas were identified from field observations and traffic simulation models. Substantial queuing on US 97 occurs between Cooley Road and Butler Market Road, along US 20 (3rd Street) north of Butler Market Road, and along the Empire Avenue. Along US 97, the high volume of commuter through traffic between Redmond and Bend causes queuing as vehicles bunch up between north and south of the Cooley Road/Robal Road area. Elsewhere, queuing is concentrated at specific bottleneck locations such as US 20/Empire Avenue. Many of these are located in areas with closely spaced intersections, and queuing can affect operations at adjacent intersections and lead to generalized congestion.

One measure of quantifying the extent of queuing is gauging the percent of time where vehicles block opposing or oncoming traffic movement. Blocking percentages of five percent or greater are considered problematic, as these levels can have a measurable effect on an intersection's operation.

Considerable blocking is experienced throughout the Transportation API, with the most common issue being access to left turn lanes blocked by queues from adjacent through lanes (Exhibit 3-3). Many closely spaced intersections also are showing significant blocking times such as between US 20 and Jamison Street on Empire Avenue on the west and Industrial Park Boulevard on the east on Empire Avenue; between the ramp terminals at the Empire Avenue interchange; and between the closely spaced US 20 and Butler Market on-ramps on northbound US 97. There is substantial congestion on 3rd Street (US 20) and Empire Avenue with queues running into adjacent intersections for at least some portion of the peak hour.

In cases where through movements are blocked, congestion can increase rapidly leading to potential bottlenecks. Another consequence of queuing and queuing-related congestion is increased likelihood of rear-end crashes due to unexpected stops and starts or sideswipe crashes due to unexpected lane changes to avoid vehicle queues. Blockage of through travel lanes is currently most problematic at three locations:

- The northbound left turn lane from US 97 into the Cascade Village Shopping Center blocks the inside northbound US 97 through movement nine percent of the peak hour

- Demand for the southbound left turn at the US 20/Empire Avenue intersection exceeds the turn bay storage length and blocks the southbound US 20 through movement over a third of the peak hour
- The northbound US 97 off-ramp at Empire Avenue queues back to the end of the ramp in almost half of the peak hour.

2011 Traffic Queuing

The Final EIS includes updated analysis of traffic queuing for 2011. Traffic queuing that occurs in the 2011 existing conditions is similar to the traffic queuing 2007 existing conditions, often resulting from the same contributing elements (e.g., high volume of commuter traffic between Redmond and Bend and closely spaced intersections). In addition to the long queues that occur on US 97 at the Robal Road and Cooley Road intersections, traffic queuing in the 2011 existing conditions occurs on the southbound US 20 approach to Empire Avenue.

Similar to the 2007 existing conditions, considerable blocking is experienced throughout the Transportation API in the 2011 existing conditions, with the most common issue being access to left turn lanes blocked by queues from adjacent through lanes (Exhibit 3-3 FEIS). Most of the significant queue blocking is concentrated at the US 97/Cooley Road and US 97/Robal Road intersections and along Empire Avenue east of US 20. Many closely spaced intersections also show significant blocking times such as: the segments of Empire Avenue between US 20 and Jamison Street and between US 20 and Industrial Park Boulevard; and, between the ramp terminals at the Empire Avenue interchange. Slow moving congestion is experienced on northbound US 97 between the closely spaced US 20 and Butler Market Road on ramps. There is substantial congestion on 3rd Street (US 20) and Empire Avenue with queues running into adjacent intersections for at least some portion of the peak hour.

Blockage of the travel lanes at the intersections is currently observed at three locations:

- US 20/Empire Avenue southbound through lane queues block the left turn bay limiting access to the left turn vehicles for seven percent of the peak hour
- Jamison Street southbound approach is blocked for over 50 percent of the peak hour due to eastbound approach queues at US 20 (3rd Street) and Empire Avenue
- The northbound US 97 off-ramp at Empire Avenue queues back to the end of the ramp in almost 5 percent of the peak hour.

Definitions

At Capacity

This is the operational performance standard set by each agency. For ODOT facilities, when a state highway segment or intersection has a one-hour v/c ratio of 0.7 (rural segments), 0.85 (urban expressway segments[1]), or 0.85 (US 20 in the UGB and at ramp terminals). For City of Bend facilities, v/c of 1.0 or 80 seconds of delay; for Deschutes County, level of service D.

Over Capacity

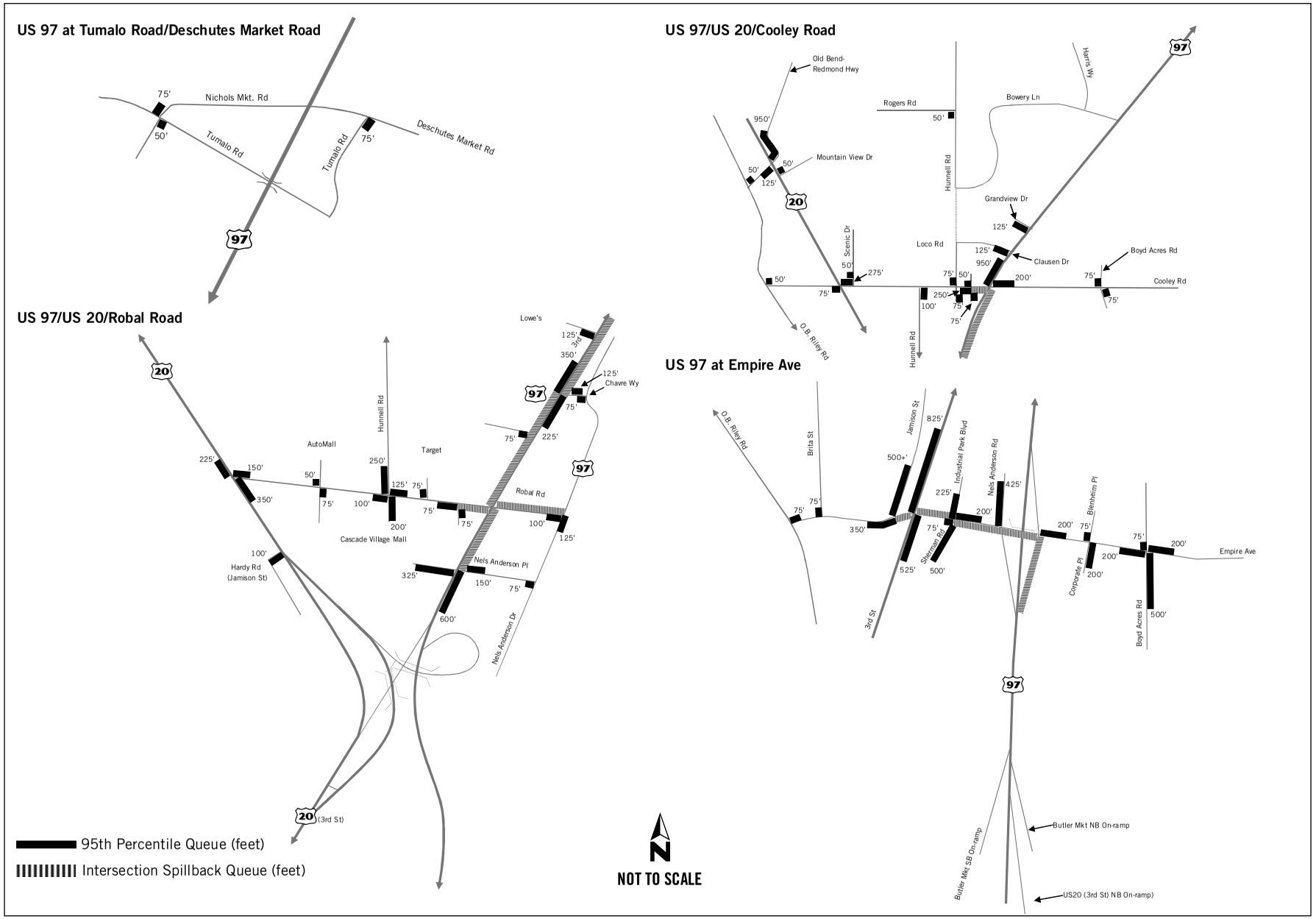
A roadway segment is over capacity when the v/c ratio exceeds ODOT or City of Bend standards, or for Deschutes County, when a facility or intersection is at level of service E or F.

Queuing

Queuing is the amount of traffic stopped to proceed through an intersection. Small queues of a few vehicles are typically acceptable. However, when queues become long and extend through adjacent intersections or when vehicles must wait two or more signal cycles to pass through an intersection, drivers become frustrated and may attempt to bypass queues by changing their travel route or travel time, or cut through neighborhoods.

[1] *The 2011 Amended Oregon Highway Plan revised the mobility standard for urban expressways from a v/c ratio of 0.80 to a mobility target of 0.85 v/c ratio to indicate that the Oregon Transportation Commission is open to considering alternative mobility targets on a case-by-case basis.*

Exhibit 3-3: *Existing Conditions 95th Percentile Queues (2007)*



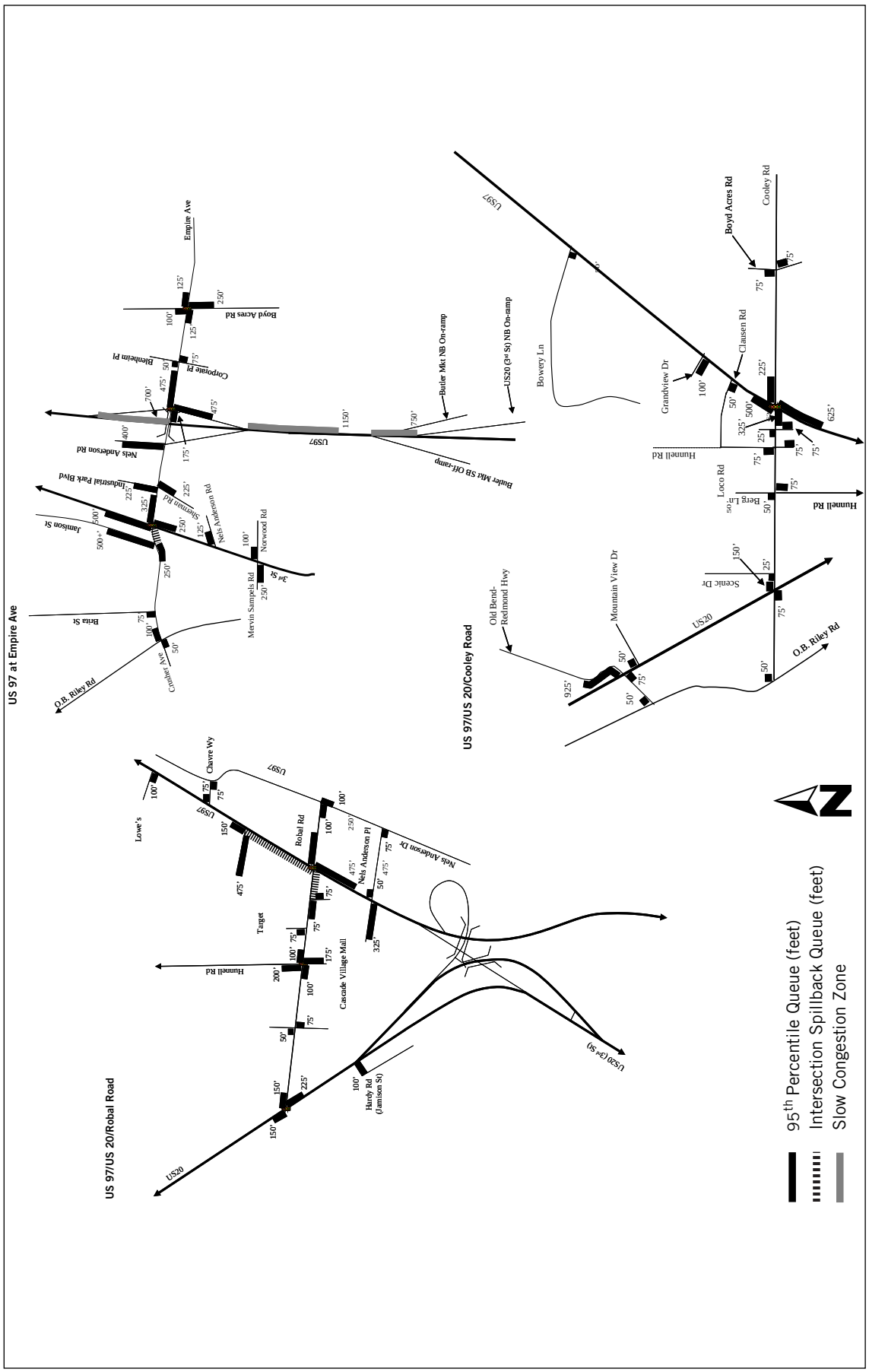


Exhibit 3-3 FEIS: *Existing Conditions 95th Percentile Queues (2011)*

Note: This exhibit was added in the Final EIS to depict traffic queuing for the 2011 existing conditions. The US 97/Tumalo Road/Deschutes Market Road intersection is not shown in Exhibit 3-3 FEIS as it is outside of the Final EIS Transportation API and no changes or impacts would occur at that intersection under the Preferred Alternative.

2004-2009 Safety

This document and underlying safety studies are subject to the provisions in 23 U.S.C. § 409.

An analysis of crashes occurring between 2004 and 2009 was conducted to identify current traffic safety issues. The analysis uses data from official crash records recorded by ODOT's Crash Analysis and Reporting Unit, and includes all crash types involving motor vehicles (including those with bicycles and pedestrians).

Chapter 1 (Purpose and Need) provides a detailed summary of crash history on US 97; this section expands to include other facilities. Within the Transportation API, US 97 experienced a total of 292 crashes between 2004 and 2009. The average number of crashes per year remained generally unchanged over time with a spike in 2005 because of an increase in headon collisions.

However, the number of severe injury or fatal crashes has increased over the past six years. Of these, 4 crashes involved fatalities and 15 others involved severe injuries. In total, 50 percent of crashes on US 97 involved some degree of injury. Rear-end collisions are by far the most predominant type, with 51 percent (148); 13 percent (39) were turn movement related; 11 percent (32) were fixed object collisions; and 10 percent (29) were side-swipe collisions. The high occurrence of rear-end collisions could be related to congestion levels, speed changes as the highway enters town, and driver factors such as driving too fast for conditions or following too closely. By location, 19 percent (56) were located at or near Cooley Road, 19 percent (55) were located at or near Robal Road, and 5 percent (16) were located at or near Empire Avenue. There were no pedestrian-involved crashes.

There were a total of 79 crashes on US 20 in the Transportation API between 2004 and 2009, with the number of crashes generally increasing since 2004. Thirty three percent (26) of crashes on US 20 were rear-end collisions, 27 percent (21) were turn movement related, and 10 percent (8) were angle collisions. Crashes are distributed along the corridor, with 52 percent (41) located at or near Empire Avenue, Robal Road, and Cooley Road. There were two crashes involving fatalities, and 53 percent (42) were injury crashes. There was one pedestrian-involved collision on US 20.

There were a total of 148 crashes on the local road system in the Transportation API. The majority of the crashes on the local road system were rear-end, angle or turning, occurring at intersections or access points. These crashes mainly occurred in dry, daytime conditions. There were no reported pedestrian collisions on the local road system.

Definitions

Safety Priority Index System

ODOT uses a Safety Priority Index System, which is a method to identify potential safety problems on state highways by identifying and evaluating state highway segments with higher than typical crash histories. Those state highway segments with the Safety Priority Index System values that rank in the top 5 percent, by ODOT region, are considered priorities for potential safety improvement projects.

Safety Investment Program

ODOT also has developed the Safety Investment Program, which identifies higher severity highway segments by using a measure of fatalities and severe injuries per five-mile segment. The Safety Investment Program has 5 categories: Category 1 has the lowest severity rates, while Category 5 has the highest severity rates.

Exhibit 3-4 summarizes collisions by type and by severity for US 20 and US 97 while Exhibit 3-5 FEIS summarizes the same for the local road system.

Exhibit 3-4: *Crash Summary, State Highways in Transportation API (2004–2009)*

Facility	TOTAL	Type of Crash						Severity of Crash	
		Angle	Fixed Object	Rear-End	Sideswipe	Turning	Other	Property Damage	Fatal/ Severe Injury
US 97	292	8	32	148	6	39	98	141	20
US 20	79	8	7	26	4	21	34	35	7
Total State Highways	371	16	39	174	10	60	132	176	27

Exhibit 3-4 FEIS: *Crash Summary, State Highways in Transportation API (2006–2011)*

Facility	TOTAL	Type of Crash						Severity of Crash	
		Angle	Fixed Object	Rear-End	Sideswipe	Turning	Other	Property Damage	Fatal/ Severe Injury
US 97	214	5	21	120	22	28	18	123	14
US 20	76	7	7	23	6	21	12	35	8
Total State Highways	290	12	28	143	28	49	30	158	22

Note: This exhibit was added in the Final EIS to provide updated crash data.

Exhibit 3-5 FEIS: *Crash Summary on Local Roadways*

Local Roads	2004–2009		2006–2011	
	Total Number of Crashes	Number of Crashes Involving Fatalities	Total Number of Crashes	Number of Crashes Involving Fatalities
Boyd Acres Road	26	0	14	0
Cooley Road	15	2	9	1
Deschutes Market Road	14	0	n/a	n/a
Empire Avenue	32	2	44	0
Hunnell Road (South)	1	0	1	0
Nels Anderson Place	-	-	3	0
Nels Anderson Road	5	0	5	0
O.B. Riley Road	24	3	16	2
Old BendRedmond Highway	10	0	3	0
Robal Road	16	0	17	0
Tumalo Road	5	0	n/a	n/a
Total	148	7	112	3

Note: This exhibit was revised in the Final EIS to include updated crash data. Crash data for Deschutes Market Road and Tumalo Road was not updated for the Final EIS because these local roads are outside of the smaller FEIS Transportation Area of Potential Impact (API); thus, the exhibit notes the crash data for these locations as not applicable (n/a).

There are several Safety Priority Index System sites. Most of US 97 is rated "Category 3" under the Safety Investment Program. Two locations on US 97 fall in the top 10 percent and two others fall in the top 5 percent. All of the US 20 corridor in the Transportation API is Category 4 under the Safety Investment Program, with one location falling in the region's Top 10 percent under Safety Priority Index System. Thus, while crash rates on US 20 and US 97 are below statewide averages for similar state highways, they both experience a higher percentage of severe crashes (injuries and fatalities) than the local arterial system. Along US 97 the segment crash rates are lower than comparable statewide rates. Along US 20 the rural segment (north of Cooley Road) has experienced segment crash rates higher than comparable statewide rates for the last three years.

Overall, the crashes are typical for a mixed urban and rural area with rear-end, turning and angle collisions being most predominant. Most crashes occurred in dry daylight conditions and were intersection related. These crash types are often indicative of motorists following too closely, traveling too fast for conditions, or failing to yield the right of way. Turning collisions are generally caused by vehicles turning from streets, public approach roads, and private driveways. Many times the traffic volume on the main street is high enough so that there are a limited number of available gaps, so the motorist ends up taking a smaller gap which has a higher crash risk.

Higher speed roadways such as US 97, US 20 and O.B. Riley Road experience higher instances of headon, fixed object, and sideswipe collisions. Driving too fast for conditions is a common factor is these types of collisions generally, which have the greatest chance of a fatality or severe injury because of the high rate of speed. Driving under the influence or fatigue can also be contributing factors.

Exhibit 3-6 shows the existing high crash rate and severity by location.

2006-2011 Safety

This document and underlying safety studies are subject to the provisions in 23 U.S.C. § 409.

An analysis of crashes occurring between 2006 and 2011 was completed for the Final EIS to identify current traffic safety issues; the data sources were the same as the crash analysis data for 2004-2009. In addition, a new predictive analysis that identifies crash frequencies expected was also prepared for the Final EIS.

Chapter 1 (Purpose and Need) provides an updated summary of crash history on US 97; this section expands to include other facilities. Within the Transportation API, US 97 experienced a total of 214 crashes between 2006 and 2011. The number of crashes per year has been declining over time with a high in 2006 because of an increase in rear-end collisions.

A total of 14 crashes involving severe injury or fatality occurred over this time period with the highest number of these crashes occurring in 2008 (5 crashes). Of these, 3 crashes involved fatalities and 11 others involved severe injuries. In total, 41 percent of crashes on US 97 involved some degree of injury. Rear-end collisions are by far the most predominant type, with 56 percent (120); 13 percent (28) were turn movement related; 10 percent (21) were fixed object collisions; and 10 percent (22) were side-swipe collisions. The high occurrence of rear-end collisions could be related to congestion levels, speed changes as the highway enters town, and driver factors such as driving too fast for conditions or following too closely. By location along US 97, 21 percent (44) were located at or near Cooley Road, 25 percent (54) were located at or near Robal Road, and 10 percent (21) were located at or near Empire Avenue. There were no pedestrian or bicycle-involved crashes.

There were a total of 76 crashes on US 20 in the Transportation API between 2006 and 2011, with the number of crashes generally decreasing since 2008. Thirty percent (23) of crashes on US 20 were rear-ending collisions, 28 percent (21) were turn movement related, and 11 percent (8) were animal collisions. Crashes were distributed along the US 20 corridor, with 57 percent (43) located at or near Empire Avenue, Robal Road, and Cooley Road. There were two crashes involving fatalities, and 51 percent (39) were injury crashes. There was one bicycle-involved collision on US 20. There were no pedestrian-involved crashes.

There were a total of 112 crashes on the local road system in the Transportation API. The majority of the crashes on the local road system were rear-end, angle or turning, occurring at intersections or access points. These crashes mainly occurred in dry, daytime conditions. There were no reported pedestrian collisions on the local road system.

Exhibit 3-4 FEIS summarizes collisions by type and by severity for US 20 and US 97 while Exhibit 3-5 FEIS summarizes crash data for the local road system.

Over the past five years, both Cooley Road and Robal Road on US 97 have been in the top 5 percent of ODOT's Safety Priority Index System (SPIS) list. ODOT requires the top 5 percent SPIS sites to be investigated and plan for correction. While the crash rates on US 20 and US 97 are below statewide averages for similar state highways, they both experience a higher percentage of severe crashes (injuries and fatalities) than the local arterial system. Along US 97 and US 20 the segment crash rates are lower than comparable statewide rates.

Exhibit 3-6: *High Crash Rate Locations (2004-2009)*

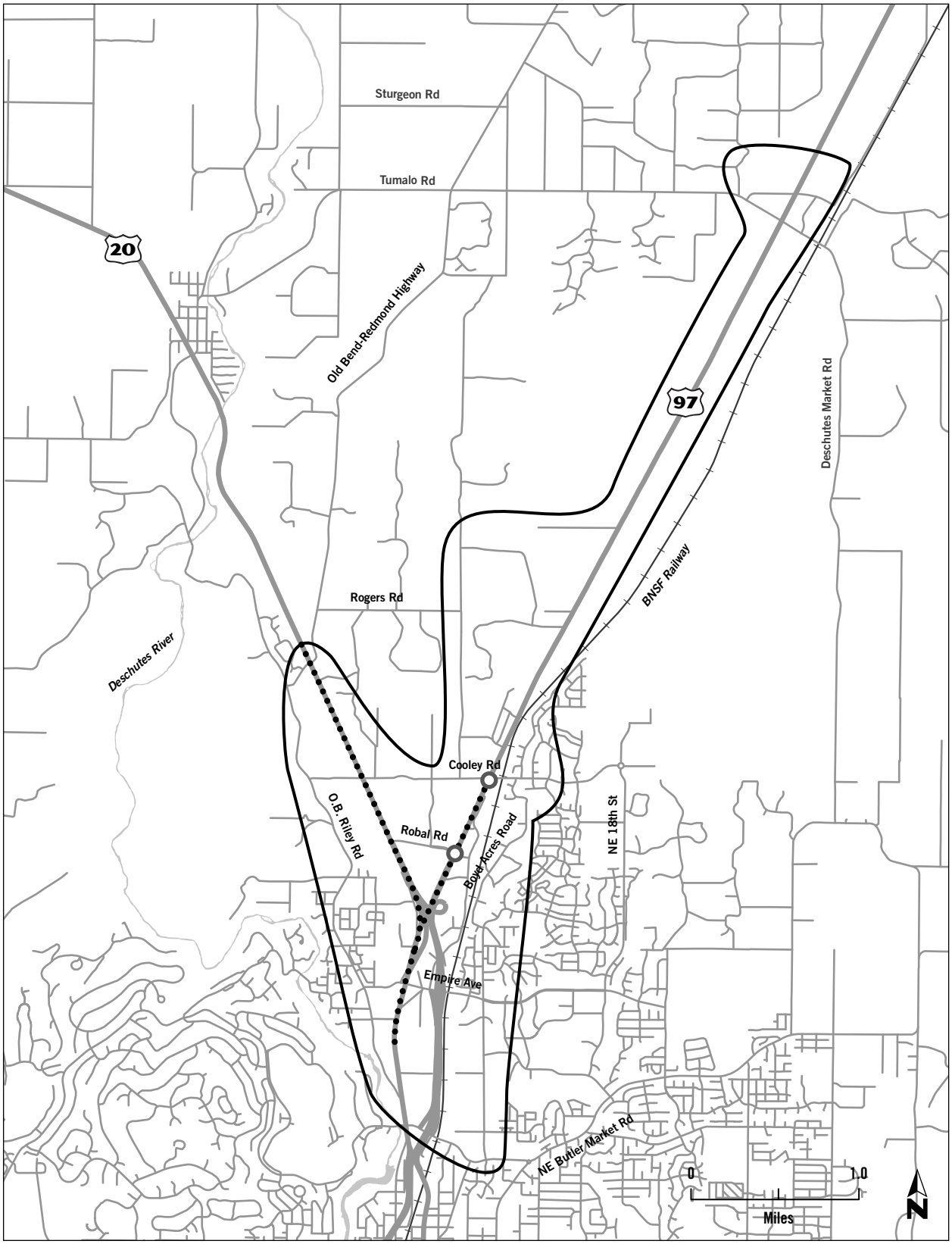
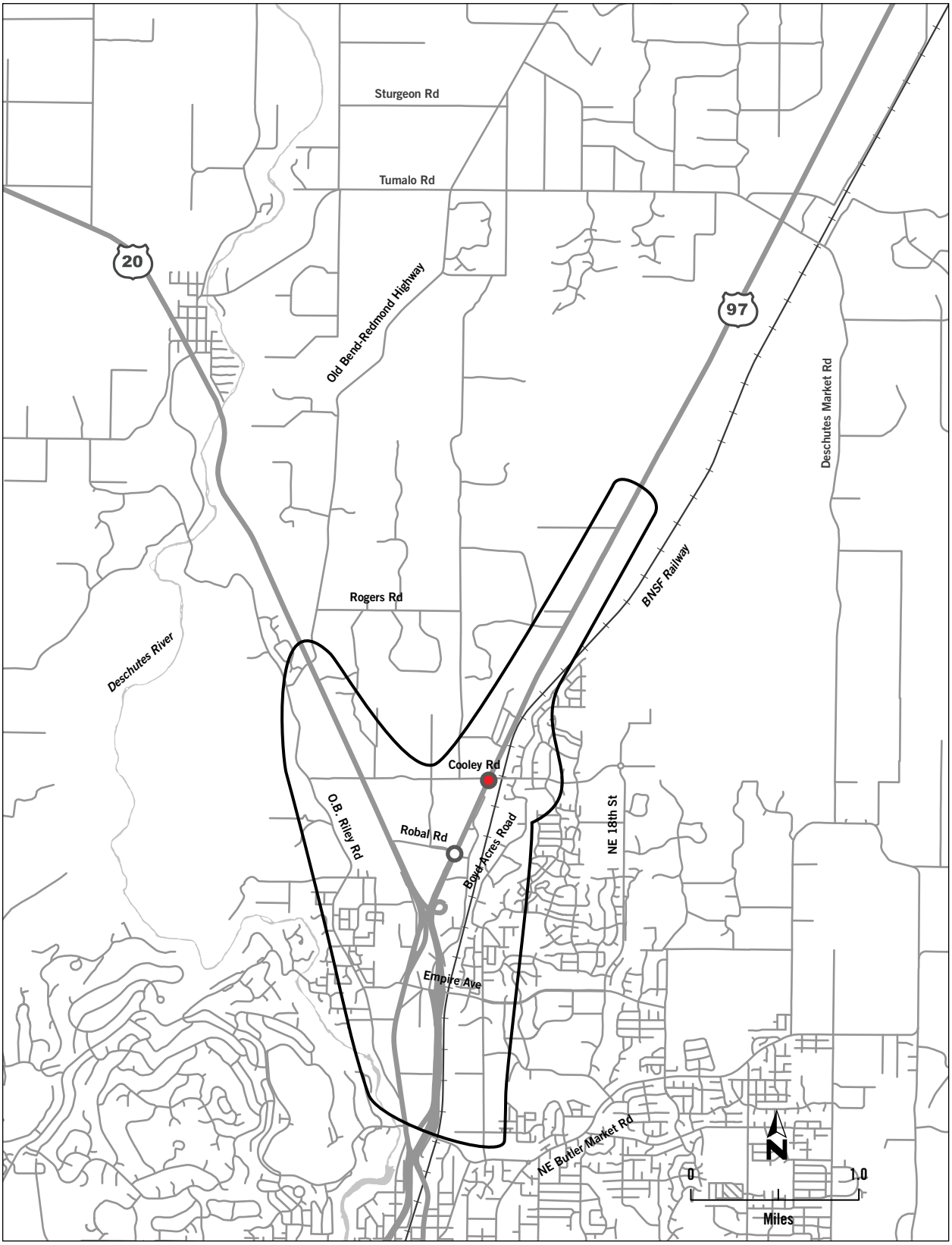


Exhibit 3-6 FEIS: *High Crash Rate Locations (2006-2011)*



Note: This exhibit was included in the Final EIS to depict updated high crash locations. As of 2010, ODOT discontinued using the Safety Investment Program categories to justify eligibility criteria on safety projects; therefore, those roadway segments associated with those categories are not depicted on Exhibit 3-6 FEIS.

Overall, the crashes occurring in the 2006-2011 timeframe are of similar type, happen in similar conditions, and result at similar locations and from similar causes as the crashed that occurred in the 2004-2009 timeframe.

Exhibit 3-6 FEIS shows the existing high crash rate locations within the Transportation API based on the SPIS rankings. In 2010, ODOT discontinued using the Safety Investment Program categories to justify eligibility criteria on safety projects.

In addition, an analysis using predictive equations was completed using the Highway Safety Manual (AASHTO 2010) for the US 97 roadway segment from Robal Road to Cooley Road to estimate the expected crash frequency. By applying the predictive equations, which require specific data (e.g., intersection and roadway type, traffic volumes, lane configurations, median widths, signal phasing, lighting, pedestrian and transit facilities and volumes, parking, speed, and driveways/approaches), ODOT is able to estimate the predicted number of crashes that would occur at an intersection or on a roadway segment given the parameters considered. ODOT considered the specific 2011 data for the US 97/Cooley Road and US 97/Robal Road intersections and applied the predictive equations and factored in the past crashes (8 crashes per year at each intersection), which resulted in in 7.2 and 7.4 expected crashes respectively at the Cooley Road and Robal Road intersections in 2011. Because the actual observed crashes for both intersections were 8,this predictive analysis indicates there is a safety issue since the actual observed crashes (8) are greater than expected crashes (7.2 and 7.4). This predictive crash analysis and the SPIS rankings continue to confirm significant safety issues are present at the Cooley Road and Robal Road intersections on US 97. The inclusion of safety improvements in the purpose and need of the project remains valid.

Freight

US 97 serves as one of the state's top three north-south statewide freight movement routes, as identified in the *Commodity Flow Forecast 2002–2035* (Parsons Brinckerhoff 2009). US 20 serves a smaller east-west regional freight mobility role. Other roadways serve local freight deliveries with some limited distribution, but are not key truck routes for freight movement.

Truck traffic on US 97 within the API represents approximately 12 percent of the total vehicle mix. The peak hour truck traffic is 8:00 to 9:00 a.m.

A few minutes of extra delay does not affect a single freight trip much, but repeated over days and months, even a few minutes adds up to time

delays for all of the trucks that use that route. Over time, trucks may shift to less-travelled hours to avoid congestion if possible.

Transit

Public transportation is provided by several different operators, depending on type of service. Local demand-response transit with service focused on elderly, disabled, and other targeted populations are provided by the City's Dial-a-Ride system as well as agencies and organizations providing services for the elderly, disabled, and assistance based on income.

Scheduled local and regional bus service transit is provided by Cascade East Transit, with service focused on a downtown Bend hub. The seven-route transit system was initiated in September 2006. There is one local route (Route 4) with service from a park-and-ride located in the Cascade Village Shopping Center to downtown Bend. Stops in the Transportation API include the ODOT park-and-ride south of Empire Avenue, stops along the US 20 connection to 3rd Street, and the Cascade Village Shopping Center.

Intercity bus services are provided by private operators with service to Portland, Redmond and points north, and Klamath Falls and points south. These bus services travel on US 97 and US 20.

Cascade East Transit also provides regional service between Bend and Redmond (Route 24).

The Central Oregon Intergovernmental Council published a Park and Ride Lot Plan in January 2014. This plan includes a proposed park and ride lot in the Cascade Village Shopping Center area of north Bend. The area is currently served by Bend's fixed-route system and could provide a southbound stop on the Bend-Redmond Community Connector in the future.

More Information

Please refer to section 4.1 Cumulative Impacts for additional information on other current and reasonably foreseeable actions, including planned transportation improvements.

Bicycles and Pedestrians

Existing bicycle and pedestrian facilities on key roadways are detailed in Exhibit 3-7 and illustrated in Exhibit 3-8 FEIS. In general, the state highways tend to not provide sidewalks. Many of the more recent commercial developments on US 97 and US 20 have included sidewalks abutting the highways, but considerable gaps exist between these isolated pedestrian routes. Even though these corridors typically have an outside shoulder that provides additional space for bicyclists, they are not specifically designated for use by bicyclists (except where bicycle lanes are noted in Exhibit 3-7). These shoulders also tend to collect debris that can make bicycling difficult. Pedestrian and bicycle facilities on local roadways in less developed, rural areas are less common, while sidewalks and bike lanes are more prevalent within the more developed areas and particularly within Bend proper.

The southern sections of the Transportation API are more urbanized and therefore likely to generate more pedestrian and bicycle traffic than the less developed northern sections. Commercial uses predominate along US 97 and US 20, while residential areas—including the areas along O.B. Riley Road on the west side of US 20, the Boyd Acres neighborhood areas on the east side of US 97, and the Hunnell neighborhood along Hunnell Road between US 97 and US 20—are located adjacent to the corridors. These residential-commercial linkages create potential for pedestrian and bicycle demand, however, a general lack of pedestrian and bicycle facilities in many areas limits use today. The potential demand for non-motorized travel is expected to increase as the areas continue to develop.

Exhibit 3-8 FEIS details updated existing bicycle and pedestrian facilities on key roadways within the updated Transportation API.

3.1.3 Environmental Consequences

For the Final EIS, the existing traffic conditions have been updated to year 2011 to respond to public comments submitted on the Draft EIS that indicated that the traffic information was outdated due to the region's economic recession and corresponding decline in traffic volumes. The No Build Alternative has been updated to a 2036 design year, and the Preferred Alternative was analyzed with a 2016 year of opening and 2036 design year in the Final EIS to reflect the reduction in traffic volumes associated with the 2011 existing conditions and adjust the year of opening to reflect a 20-year design year.

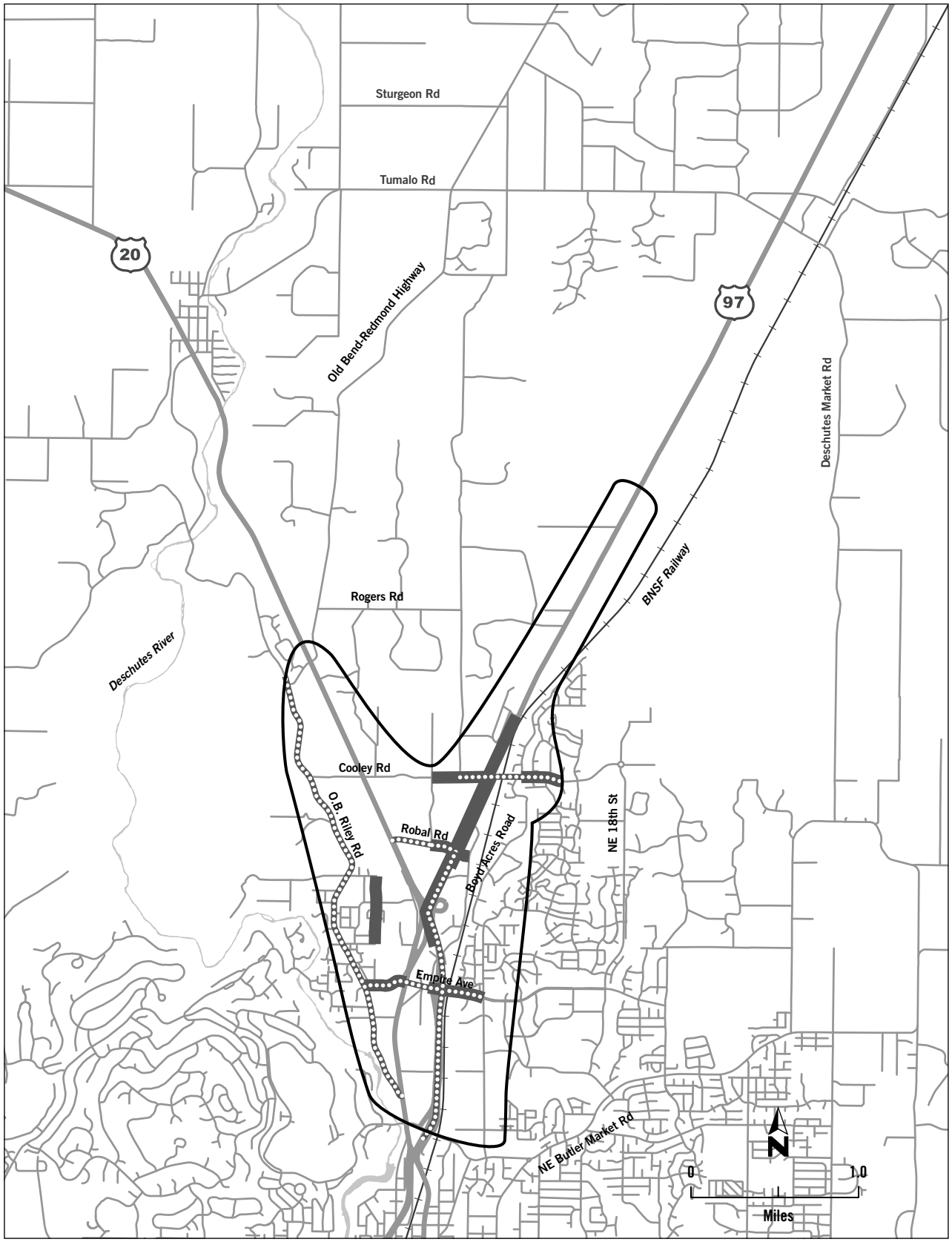
Based on a trend analysis of traffic count data between 2007 and 2011, ODOT and the Bend Metropolitan Planning Organization determined that applying a 10 percent reduction to the 2007 existing traffic volumes would more accurately represent the future conditions. This reduction in traffic volumes is reflective of the reduced population change in the Bend area between 2007 and 2011. The updated traffic analysis for the No Build Alternative still showed that if the long-term needs are not addressed, then US 97 and other roadway systems in the Transportation API would experience severe congestion during peak hours of travel by 2036.

The results of the traffic analysis for the East DS1 and East DS2 Alternatives were reported for a 2015 year of opening and 2035 design year in the Draft EIS.

Exhibit 3-7: *Bicycle and Pedestrian Facilities*

Highway/Street	Type of Facility	Characteristic or features
US 97	Bike Facility	US 97 includes both a northbound and southbound bike lane running north from Romaine Village Way and continuing past the Cascade Village Shopping Center to Robal Road. This bike lane is designated by an 8inch white stripe with bike legends. The bike lane is also colored red to provide traffic calming and help in reducing speeds.
US 97	Pedestrian Facility	From Cooley Road north to Deschutes Market interchange there is a paved safety shoulder designated by a 4inch white stripe but there are no pedestrian facilities currently constructed in this section. Pedestrian facilities are not located adjacent to US 97 from NE Revere Avenue to the north to the US 20 Sisters loop ramp. However, there is a sidewalk on the west side of US 97 extending from just south of the Exit 135A to just north of Grandview Drive. There is an adjacent sidewalk on the east side of US 97 from just south of Robal Road and ending just south of Cooley Road.
US 20	Pedestrian/ Bike Facility	US 20 from Empire Avenue maintains a safety shoulder consisting of a 4inch striped fog line with a paved shoulder. This lane is not designated as a bike lane and there is no sidewalk to accommodate pedestrian traffic adjacent to the highway. There is no designated crossing for pedestrian traffic from US 20/US 97 ramp junction to the signal at Robal Road.
Empire Avenue	Pedestrian/ Bike Facility	Empire Avenue has a sidewalk as well as a paved bike lane on both sides of the road from Boyd Acres Road to Nels Anderson Road. West of Nels Anderson Road to Jamison Street maintains a bike lane on each side of the road but no adjacent pedestrian facilities. West from Jamison Street to O.B. Riley Road has a bike lane on each side of the road as well as a sidewalk on the north side of Empire Avenue.
Cooley Road	Bike Facility	Cooley Road has a designated bike lane on each side from 18th Street to Hunnell Road.
Cooley Road	Pedestrian Facility	From Hunnell Road west to US 20, Cooley Road has no paved shoulders on each side of the road. A pedestrian sidewalk extends from US 97 to just west of Berg Lane on the south side of Cooley Road. Sidewalks exist on both sides of Cooley Road from NE 18th Street to just west of High Standard Drive. There is also a paved pedestrian path on the north side of Cooley Road from just west of High Standard Drive to Hunters Circle. There is no pedestrian facility from Hunters Circle to US 97 on either side of Cooley Road.
Robal Road	Bike Facility	From Nels Anderson Road to US 97, Robal Road does not have a designated bicycle lane or a safety shoulder. A striped bike lane with legends exists on both sides of Robal Road from US 97 to US 20.
Robal Road	Pedestrian Facility	Throughout the commercial section of Robal Road (Nels Anderson Road to the Cascade Village Shopping Center access road) a sidewalk exists on both sides of the road for pedestrian usage.
NW Britta Street	Pedestrian Facility	Sidewalks on each side of the roadway but no bike lanes.
Hunnell Road	Pedestrian/ Bike Facility	No pedestrian or bike facilities in the neighborhood.
O.B. Riley Road	Bike Facility	O.B. Riley Road to Tumalo State Park is a common route for bicyclists to ride to the community of Tumalo and west to Sisters. Currently O.B. Riley Road has a bike lane on each side of the road designated by an 8inch white stripe along with bike legends in the bike lane.
Old Bend-Redmond Highway	Bike Facility	Currently there is a bike lane on each side of the highway marked with an 8inch fog line, which is used by bicyclists to access Redmond and Tumalo.
Fred Meyer Road	Trail Facility	An unimproved path is used by residents on the east side of the railroad tracks between Cooley Road and Empire Avenue. The crossing is used to access the businesses on Nels Anderson Road and the Cascade Village Shopping Center. Alternate routes are less convenient and time consuming because of out of distance travel to Cooley Road or Empire Avenue.
Jamison business area	Pedestrian Facility	There is an existing bus stop on the offramp from US 20 to 3rd Street. A path has been created at this location from pedestrians crossing US 20 from the Jamison business area and the residential neighborhood around O.B. Riley Road to the Cascade Village Shopping Center. This crossing is convenient for pedestrians, but potentially dangerous because it is an unmarked crossing across three lanes of high speed traffic.

Exhibit 3-8 FEIS: *Existing Bicycle and Pedestrian Facilities*



Note: This exhibit was included in the Final EIS to illustrate the bicycle and pedestrian facilities in relation to the smaller Transportation API in the Final EIS. The larger Transportation API considered in the Draft EIS is depicted in Exhibit 3-1 FEIS. No changes to the existing facilities have occurred for the Final EIS.

ODOT conducted a sensitivity analysis of select locations and performance measures for the East DS1 and East DS2 Alternatives using a 10 percent reduced traffic volume input to test how these alternatives compared to the updated No Build Alternative and Preferred Alternative. This sensitivity analysis is presented for:

- Intersection operational performance (Exhibit 3-14A FEIS)
- Transportation API system performance measures (Exhibit 3-15A FEIS).

Traffic analysis on several elements does not significantly differ when the input traffic volumes are reduced by 10 percent. Thus, the following results reported for the East DS1 and East DS2 Alternatives in the 2035 design year have negligible differences from the results that would have been generated for the 2036 design year:

- Traffic volumes on select roadway links (Exhibit 3-52 FEIS in Section 3.5, Socioeconomics)
- Emergency response times (Exhibit 3-54 FEIS in Section 3.5, Socioeconomics)
- Vehicle-miles traveled (Exhibit 3-77 in Section 3.15, Air Quality)
- Noise impacts (Exhibit 3-87, Exhibit 3-88, Exhibit 3-89, and Exhibit 3-90 in Section 3.16, Noise)
- Energy consumption (Exhibit 3-98 and Exhibit 3-99 in Section 3.17, Energy).

The specific traffic analysis results for the East DS1 and East DS2 Alternatives that address entire network traffic conditions and intersection operations would not represent 2016 year of opening and 2036 design year conditions if those alternatives had been reanalyzed with reduced traffic volume inputs reflecting 2011 existing conditions. Thus, several exhibits in this section note that the FEIS versions of those exhibits provide the data that is being considered in the Final EIS. The following exhibits have associated FEIS versions of those exhibits, which include the assumption of lower traffic volume inputs than were used in the Draft EIS traffic analysis:

- Average daily traffic volumes (Exhibit 3-9)
- Intersection operational performance (Exhibit 3-13 and Exhibit 3-14)
- Transportation API system performance measures (Exhibit 3-15).

Overall, most trips on US 97 and US 20 (50 to 70 percent, depending on roadway) originate from central or southern Bend, or from the Awbrey Butte/Boyd Acres area neighborhoods, and are destined for

northern Bend or points beyond via US 20 or US 97. Trips using US 97 are more likely to originate or terminate in Bend as they are primarily local or commuter-based. Over 50 percent of the trips using Empire Avenue are local trips beginning or ending in adjacent neighborhoods that do not access US 97.

Twenty-five percent of the (future) trips on US 97 and 10 percent of the trips on US 20 are through trips, indicating that these important regional facilities are used by a significant amount of both regional and local trips.

No Build Alternative

The No Build Alternative consists of assigning design year 2036 travel forecasts (using 2036 population, household and employment forecasts) to the financially constrained Bend Metropolitan Transportation Plan scenario (Exhibit 3-9B FEIS). Transportation improvements for the No Build Alternative include only those city, county and state transportation projects (outside of the proposed action) that can be funded within the next 20 years in and around the Bend metropolitan area given anticipated revenue streams. Year 2036 projected transportation demand and traffic volumes were developed using the Bend Metropolitan Planning Organization travel demand model.

Traffic Operations

The projected residential and commercial growth in the greater Bend area is forecast to result in substantial increases in average weekday traffic volumes on roadways. Higher travel demand would lead to more traffic throughout the day, including during the morning (AM) and evening (PM) peak periods, which would also have longer durations.

Exhibit 3-9A FEIS summarizes the projected growth in average daily traffic between 2011and 2036 for the No Build Alternative. Average weekday traffic is expected to increase by 26 percent on US 97 and 59 percent on US 20 at the locations shown. The large number of local trips using these corridors is likely to cause intersection/interchange design issues regardless of alternative.

The local street system is expected to experience considerable relative growth in traffic as well. Notably, Cooley Road and Empire Avenue would carry a much larger share of the east-west traffic in 2036 compared to existing conditions as the demand shifts north, despite no changes to the future urban growth boundary. Most of the increase on Empire Avenue would be due to the future extension linking Empire Avenue to 27th Street, a major north-south roadway.

Definitions

Peak Hour

A peak hour (or rush hour) is a part of the day with the highest traffic volume during which traffic congestion on roads is worst. Normally, the two peak hour periods (morning and evening) occur when people are traveling to or from work or school.

The 2007 evening peak hour in the API is 4:00 to 5:00 pm. Absent major improvements, by 2035 the peak period would likely spread across multiple hours.

The 2011 evening peak hour is the same as the 2007 evening peak hour. By 2036 the peak period would also likely spread across multiple hours.

95th Percentile Queue

A 95th percentile queue represents the distance that covers 95 percent of all queues that exist for a particular traffic movement. This length has only a 5 percent chance of being exceeded during the analysis time period. It is often used for determining the appropriate length of turn pockets or storage bays.

Intersection Spillback Queue

Intersection spillback queues are those queues that extend through more than one intersection.

Congestion

Congestion is travel time or delay in excess of what is normally incurred under light or free-flow conditions.

Exhibit 3-9. Comparison of Existing (2007) and Year 2035 Future Average Daily Traffic Volumes

Roadway Segment	2007 Average Daily Traffic (vehicles/day)	2035 No Build Average Daily Traffic (vehicles/day)	Percentage Increase, 2007–2035
US 97 south of Empire Avenue	~~41,000~~ 59,500	~~55,400~~ 85,000	35%
US 97/3rd Street north of Robal Road	42,200	58,700	39%
US 20 north of Robal Road	27,500	41,200	50%
Empire Avenue at US 97	18,300	35,900	96%
Cooley Road west of US 97/3rd Street	7,100	23,800	235%
Cooley Road east of US 97/3rd Street	8,200	23,100	181%

Note: The traffic volumes for the US 97 segment south of Empire Avenue were incorrectly presented in the Draft EIS and have been corrected in the Final EIS. Exhibit 3-9A FEIS provides the data being considered in the Final EIS.

***Exhibit 3-9A FEIS:** Comparison of Existing (2011) and Year 2036 Future Average Daily Traffic Volumes*

Roadway Segment	2011 Average Daily Traffic (vehicles/day)	2036 No Build Average Daily Traffic (vehicles/day)	Percentage Increase, 2011–2036
US 97 south of Empire Avenue	53,200	67,000	26%
US 97/3rd Street north of Robal Road	40,000	50,400	26%
US 20 north of Robal Road	23,200	37,000	59%
Empire Avenue at US 97	16,300	32,000	96%
Cooley Road west of US 97/3rd Street	6,100	18,300	200%
Cooley Road east of US 97/3rd Street	7,300	20,800	185%

Note: This exhibit was included in the Final EIS to provide updated data for the existing conditions and No Build Alternative traffic volumes. This exhibit provides the data being considered in the Final EIS.

Exhibit 3-13 FEIS, Exhibit 3-14A FEIS, and Exhibit 3-14B FEIS (later in this section) summarize intersection traffic operating conditions for the 2036 No Build Alternative. Traffic modeling of this alternative indicates that much of the southern part of the Transportation API, including signalized and unsignalized intersections associated with Empire Avenue, Robal Road, and Cooley Road, would experience severe congestion[1] during peak periods. Sixteen of the 44 intersections evaluated are forecast to exceed their respective agency (ODOT, City of Bend, and/or Deschutes County) performance standards, many by substantial margins.

[1] Severe Congestion refers to an intersection substantially exceeding its operational standard. For Example, the signalized intersection of US 97 at Cooley Road would operate at 1.79 v/c ratio in 2035, which substantially exceeds the 0.80 v/c ratio standard (Exhibit 3 14). The 2011 Amended Oregon Highway Plan revised the mobility standard from a v/c ratio for urban expressways of 0.80 to a mobility target of 0.85 v/c ratio to indicate that the Oregon Transportation Commission is open to considering alternative mobility targets on a case-by-case basis.

Exhibit 3-9B FEIS: *List of MTP Projects Included in the No Build Alternative Traffic Analysis*

Road Name	Type of Improvement	Starting From	Ending At
Cooley Road	New 3-lane roadway	18th Street	Deschutes Market Road
Cooley Road Loop	Road Extension	O.B. Riley Road	O.B. Riley Road
Empire Avenue	New 3-lane roadway	Purcell Blvd	27th Street
Empire Avenue	Widen to 5 lanes	3rd Street	27th Street
Empire Avenue	Add US 97 SB off-ramp and widen NB off-ramp	US 97 SB Ramps	US 97 NB Ramps
Reed Market Road	Widen to 3-lanes	15th Street	27th Street
Reed Market Road	Multi-lane roundabout	15th Street	n/a
Reed Market Road	Traffic Signal	American Lane	n/a
Reed Market Road	Widen to 5 lanes	US 97	27th Street
Reed Market Road	Realignment	27th Street	n/a
27th Street	Widen to 5 lanes	Reed Market Road	Neff Road
Murphy Road	Road Extension	Brookswood Blvd	3rd Street
Murphy Road	Road Extension	Brosterhous Road	27th Street
US 97	New interchanges including access restrictions to south end of Parkway.	Powers Road	3rd Street
Putnam Road	New Roadway	UGB	Johnson Market Road
Summit Drive	New Roadway	Mt. Washington Drive	Skyline Ranch Road
Skyline Ranch Road	New Roadway	Shevlin Park Road	Century Drive
Skyline Ranch Road	New Roadway	Shevlin Park Road	Tumalo Creek Road
New E-W Collector	New Roadway	Skyline Ranch Road	Mt. Washington Drive
New E-W Collector	New Roadway	Mt. Washington Drive	Shevlin Park Road
New N-S Collector	New Roadway	New N-S Collector	Galveston Street
Britta Street	New Roadway	Robal Road	Cooley Road
Britta Street	New Roadway	Robal Road	Empire Avenue
Hunnell Road	New Roadway	Cooley Road	UGB
Yeoman Road	Road Extension	18th Street	Existing section
Yeoman Road	Road Extension	Existing section	Butler Market Road
18th Street	Road Extension	Empire Avenue	Brinson Blvd
New E-W Collector	New Roadway	27th Street	Hamby Road
New E-W Collector	New Roadway	Brosterhous Road	American Lane
9th Street	Road Extension	Existing section	Awbrey Road
Purcell Blvd	Road Extension	Existing section	Existing section
Chase Road	Road Extension	Existing section	Brosterhous Road
American Lane	Realignment	n/a	Reed Market Road
Bear Creek Road	New Roadway	12th Street	Bear Creek Road

Note: This exhibit was included in the Final EIS to provide the list of locally and federally funded projects included in the No Build Alternative.

The US 97 northbound mainline would be at or exceed operational standards from south of Butler Market Road through the US 20/3rd Street junction area, which would also affect the merge/diverge areas for the ramps to and from Empire Avenue. In addition, the US 97

southbound mainline would also be at or exceed operational standards from south of the Empire Avenue interchange to the southern project limits.

The updated traffic analysis for the No Build Alternative indicated that the section of US 97 northbound between the Butler Market Road on-ramp merge and the Sisters loop off-ramp would exceed the v/c target. In addition, US 97 at Butler Market Road interchange and south would be just under the v/c target. Only the northbound mainline section of US 97 between Empire Avenue and Butler Market Road interchanges would be over capacity by 2036, which increases congestion in this section of US 97.

As shown in Exhibit 3-10, peak hour queuing is expected to cause blockage on US 97 with queues extending from Empire Avenue toward the Robal Road intersection southbound, and northbound starting approximately onehalf mile prior to the Empire Avenue intersection. Peak hour queuing would also cause blockages on southbound US 20 starting at Robal Road through the approach to 3rd Street, on Empire Avenue from O.B. Riley Road through the US 97 ramps to Boyd Acres Road, and on Cooley Road and Robal Road between US 20 and 3rd Street. The queues on southbound 3rd Street approaching Empire Avenue would block eastbound US 20 approaching 3rd Street, which would spillback on the US 20 mainline through the Hardy Road intersection.

As shown in Exhibit 3-10 FEIS for the updated No Build Alternative, peak hour queuing on US 97 northbound would continue from the southern limits of the Transportation API to Cooley Road. US 97 southbound would have queues that extend from north of Bowery Lane to Cooley Road. Queuing along Cooley Road from US 97 would extend west past US 20 to O.B. Riley Road and east to Boyd Acres Road. The queues from the US 20 (3rd Street)/Empire Avenue intersection would have queues extending to the US 20 grade-separated connections with 3rd Street. Cooley Road, Robal Road, and Empire Avenue would have extensive queuing over their entire length in the Transportation API, and long queues would be found on most side-street approaches.

Safety

Increased congestion under the No Build Alternative would likely result in higher crash rates on US 97 and US 20 than under existing conditions, particularly for congestion related crash types such as rear-end collisions. Speeds would be lower in the No Build Alternative compared to existing conditions due to traffic congestion, which in turn could reduce overall crash severity at some locations. However, traffic simulation modeling indicates severe congestion and delays well in excess of two minutes per vehicle per intersection (as much as fifteen

More Information

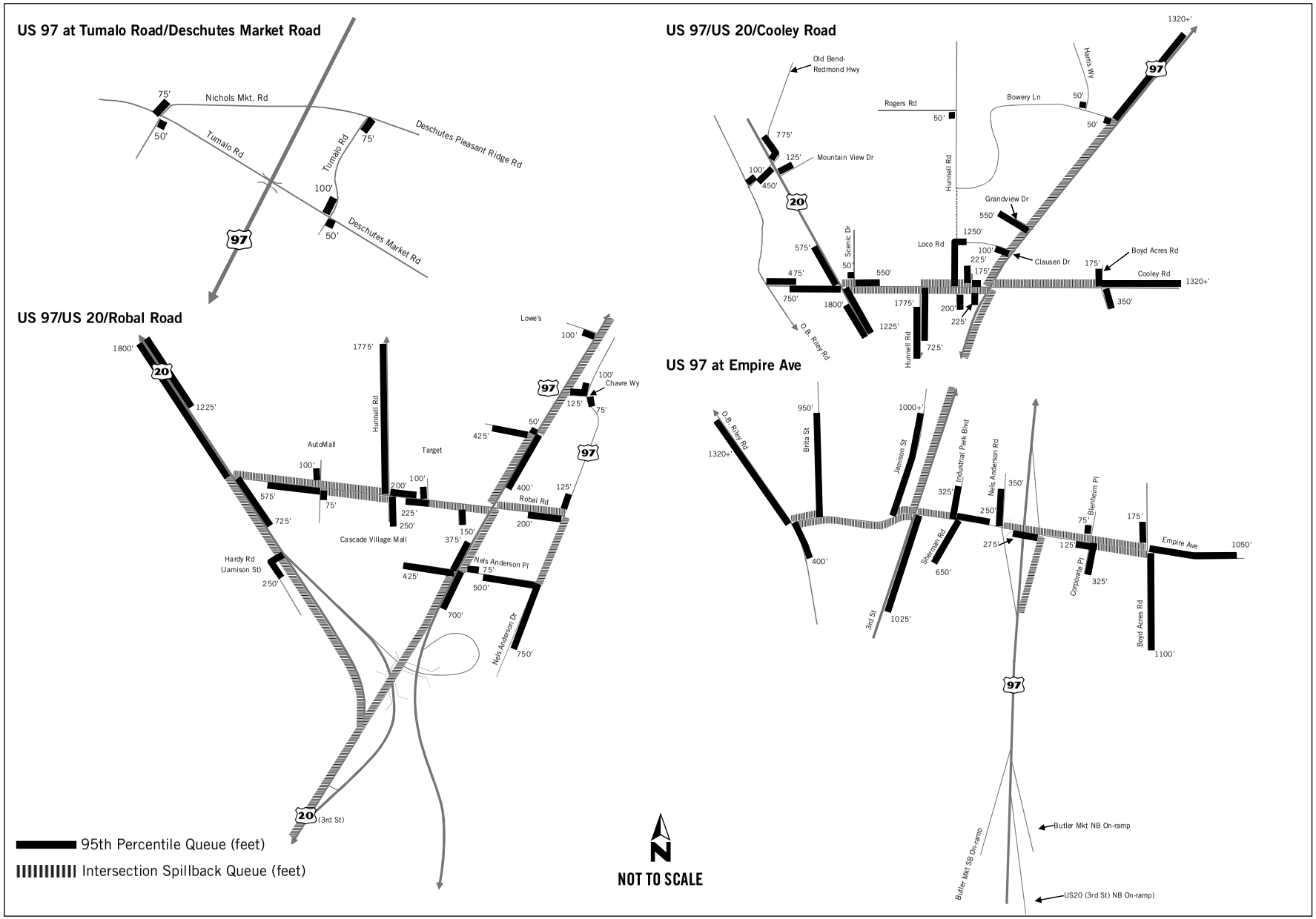
In 2004, The City of Bend began an effort to further expand the UGB to accommodate the growing need for development since the UGB was first established in 1981. In 2009, the Bend City Council and the Deschutes County Board of County Commissioners adopted a new UGB; however in 2010, Oregon Department of Land Conservation and Development remanded the UGB expansion to the City and County for further work to comply with state law. See Section 1.4.2 for more detail on the City of Bend's proposed UGB expansion.

As of the publication of the Final EIS (2014), the City of Bend is still working to resolve issues remanded by DLCD.

More Information

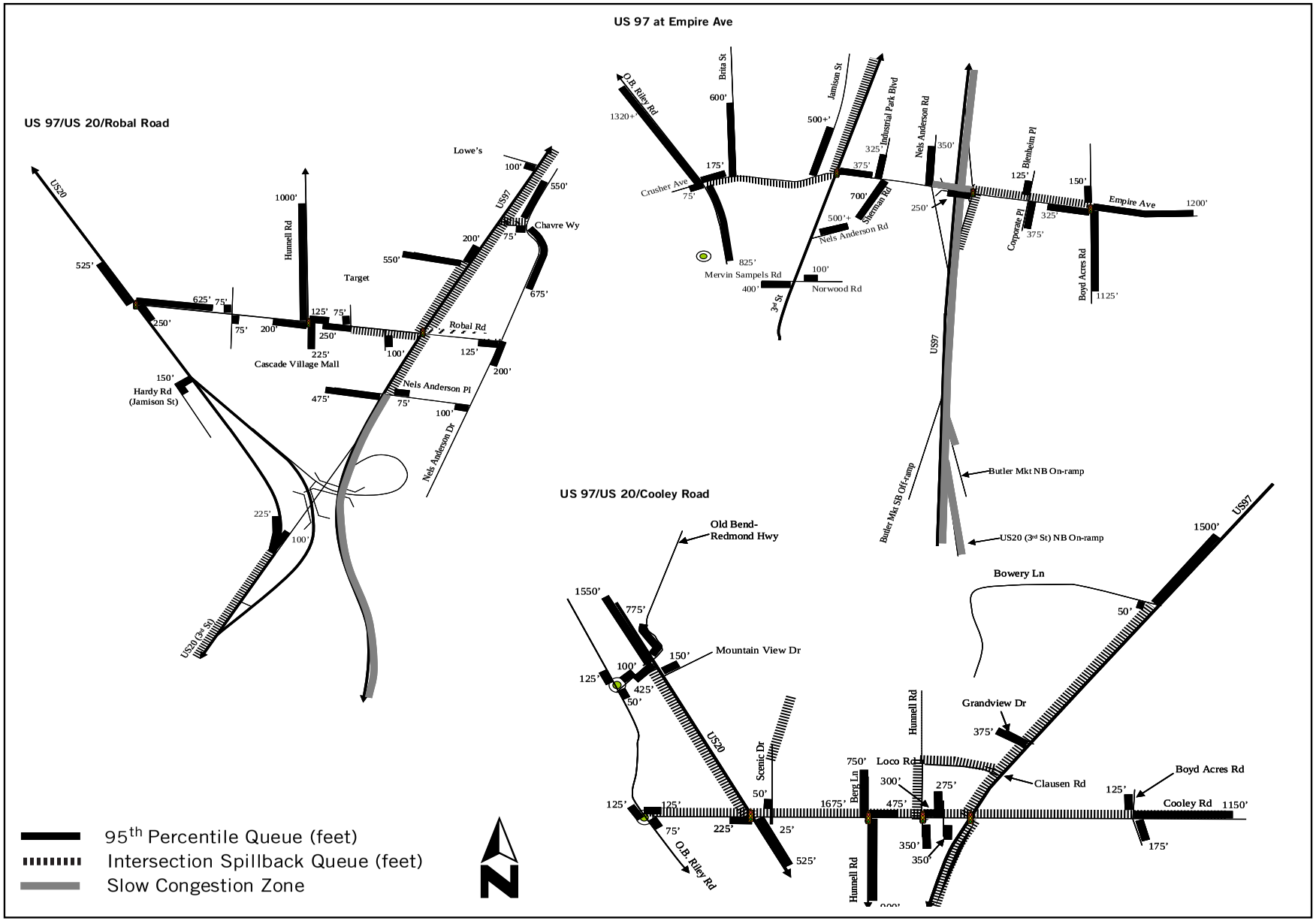
An average two minute delay per vehicle per intersection would result in an overall delay of up to fifteen minutes for each trip made during the PM peak hour.

Exhibit 3-10: *No Build Alternative 95th Percentile Queues (2035)*



Note: This data in this exhibit has been updated for the Final EIS; please see Exhibit 3-10 FEIS.

Exhibit 3-10 FEIS: *No Build Alternative 95th Percentile Queues (2036)*



Note: This exhibit was added in the Final EIS to depict updated traffic queuing for the No Build Alternative. The US 97/Tumalo Road/Deschutes Market Road intersection is not shown in Exhibit 3-10 FEIS because that location is outside the smaller Final EIS Transportation API; no changes or impacts would occur at that intersection under the Preferred Alternative.

minutes for each trip) would occur on a number of corridors, including the 3rd Street, Robal Road, and Cooley Road corridors. Based on the safety performance functions provided in the *Highway Safety Manual* (AASHTO 2010), an increase in average daily trips would increase rear-end, angle and turning crash rates where corridor and intersection congestion results in substantial queuing and where side street delays exceed two minutes per vehicle per intersection.

A predictive crash analysis was conducted for the existing US 97 roadway segment from Robal Road to Cooley Road and the US 97 intersections with Robal Road and Cooley Road. Under the No Build Alternative, in 2036, the expected crash rates for US 97 from Robal Road to Cooley Road and those intersections would total 18.2 crashes per year, which is higher than the expected 15.5 crashes per year under the 2011 existing conditions. In the 2011 existing conditions, the expected crashes per year are higher at the US 97/Robal Road intersection (7.4) than at the US 97/Cooley Road intersection (7.2). However, by 2036 under the No Build Alternative, the expected crashes per year at the US 97/Cooley Road intersection (8.7) would outpace the expected crashes per year at the US 97/Robal Road (8.4) because of the large future volume increases on Cooley Road.

Boyd Acres Road and O.B. Riley Road are parallel facilities to US 97 and US 20 and serve as alternate routes. Higher volumes on these routes due to increasing congestion on the state highways under the No Build Alternative could increase crash risk on these roadways as well.

Freight

Congestion along the US 97 corridor through the southern half of the Transportation API under the No Build Alternative would affect through and local freight trips. In some cases, total delay would be up to 15 minutes relative to uncongested conditions during peak weekday periods. These delays could add to the aggregate costs of moving freight in and through the region. Also blockages along many of the arterials would block freight access/egress for local deliveries.

Bicycle and Pedestrian Facilities

Based on the adopted transportation system plans and the Bend Metropolitan Planning Organization's *2007–2030 Metropolitan Transportation Plan*, a number of onstreet bike lanes and pedestrian ways would be built in conjunction with future transportation improvements contained in the No Build Alternative.

In addition to these improvements, a number of off-roadway trails are planned. A planned north-south hard surface trail would connect the Deschutes River to the intersection of Robal Road and the existing US 97 facility. This trail would overlap with the existing North Unit Canal Connector Trail and the North Parkway Trail. This multi-use

More Information

In 2004, The City of Bend began an effort to further expand the UGB to accommodate the growing need for development since the UGB was first established in 1981. In 2009, the Bend City Council and the Deschutes County Board of County Commissioners adopted a new UGB; however in 2010, Oregon Department of Land Conservation and Development remanded the UGB expansion to the City and County for further work to comply with state law. See Section 1.4.2 for more detail on the City of Bend's proposed UGB expansion.

trail is proposed as a hard surface trail on the *Bend Area General Plan Bicycle and Pedestrian System Plan Map*. Descriptions and mapping of future planned trails are provided in Section 3.6 Parks and Recreational Facilities.

Transit

The No Build Alternative would result in increased congestion on US 97, US 20, and Robal Road, which would substantially increase delays and decrease service reliability for buses traveling these routes.

East DS1 Build Alternative

Traffic Operations

The East DS1 Alternative would be expected to alleviate much of the queuing and associated congestion forecast under the No Build Alternative. However queuing and resulting congestion would still be expected to form at the following locations:

- On northbound US 97 between the southern US 20 connection and the Empire Avenue northbound off-ramp due to the extensive weaving that occurs
- On westbound US 20 approaching Robal Road, significant slowing would occur approaching the Old Bend-Redmond Highway, in all directions from the Empire Avenue/3rd Street intersection, northbound queue on US 20/Empire Avenue intersection, and the southbound queue would extend through the US 20/3rd Street intersection
- On Robal Road and on Empire Avenue; however, this queuing would be substantially reduced relative to the No Build Alternative.

Congestion would be expected to increase at the Empire Avenue/O.B. Riley Road intersection; improvements to the 3rd Street/Empire Avenue intersection would alleviate the bottleneck at 3rd street that has been reported under the No Build Alternative. This would in turn allow more traffic to travel to the O.B. Riley Road intersection during the peak period, resulting in higher queues at the Empire Avenue/O.B. Riley Road intersection.

Exhibit 3-14A FEIS (later in this section) provide intersection operational performance for the East DS1 Alternative with the No Build Alternative. Exhibit 3-11 shows Year 2035 projected peak hour queuing and blockage locations for the East DS1 Alternative. Comparing Exhibit 3-11 (East DS1 Alternative) to Exhibit 3-10 (2035 No Build Alternative) shows that a measurable reduction in the number and extent of locations with substantial queuing and blocking of traffic would occur.

Because lower existing conditions traffic volumes were assumed for the updated No Build Alternative and Preferred Alternative traffic analysis, the peak hour queuing and blocking data for the East DS1 Alternative are not directly comparable to the No Build Alternative and Preferred Alternative. However, based on the sensitivity analysis of the East DS1 Alternative with reduced traffic volumes input into the traffic analysis, queue lengths for the East DS1 Alternative are expected to be similar to the Preferred Alternative.

Safety

By shifting traffic onto limited access and accessed controlled facilities (US 97 and US 20) and off of the local arterial system (3rd Street and others), the overall crash rate would be expected to decrease in the East DS1 Alternative compared to the No Build Alternative. Additionally, reduced congestion throughout the street network should reduce the incidence of rear-end and angle collisions, especially at unsignalized intersections, compared to the No Build Alternative. The Safety Priority Index System sites on US 97 between Cooley Road and Robal Road would be addressed by a combination of volume reductions and intersection improvements under the East DS1 Alternative.

Freight

In the East DS1 Alternative, freight mobility would be improved overall. Travel time delays to through and local freight would be substantially reduced by providing a separate facility for through freight trips, a free flow condition on US 97, and an improved connection with US 20.

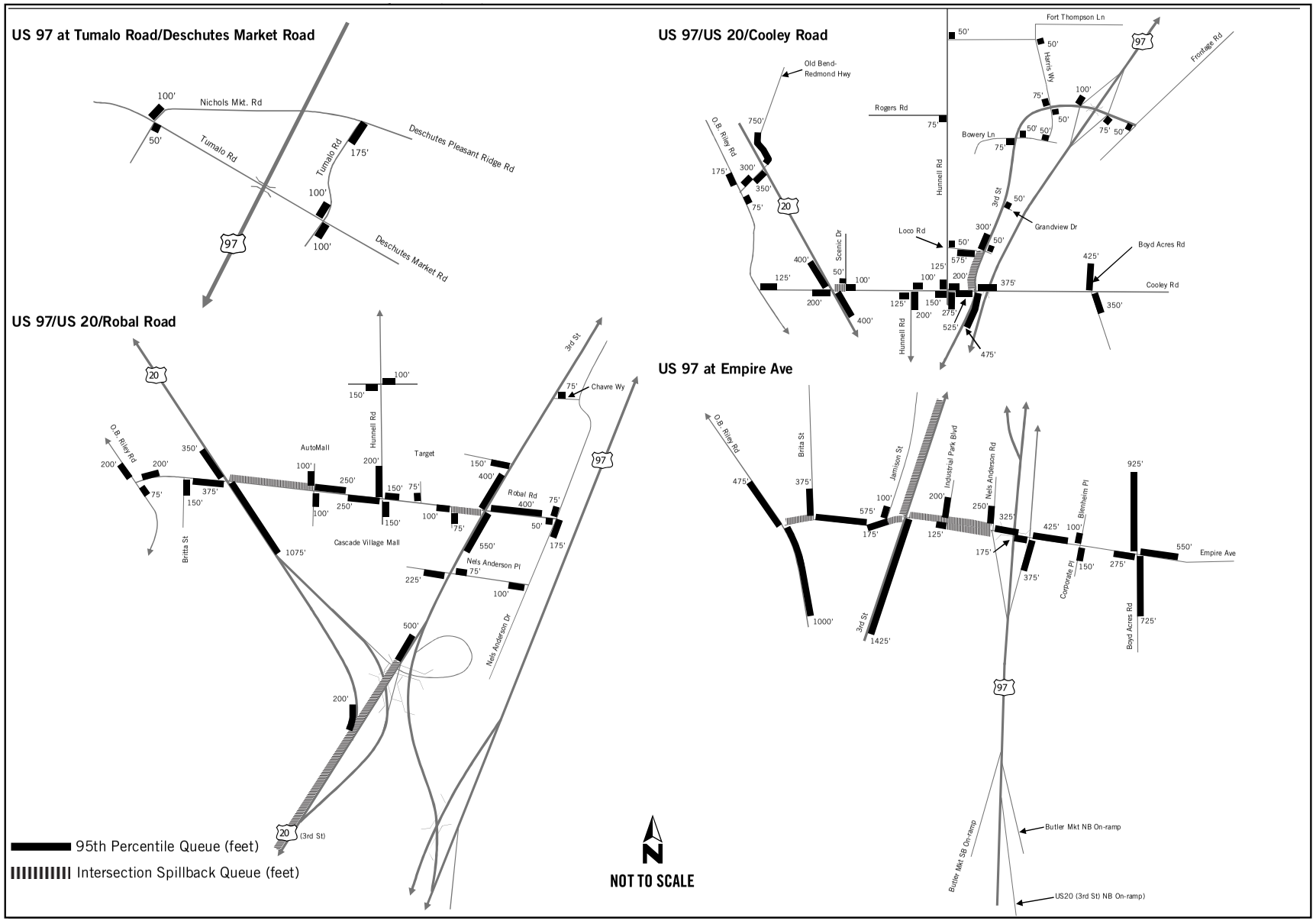
Exhibit 3-14A FEIS shows improved operations at signalized intersections under the East DS1 Alternative, resulting in reduced travel time delays for all traffic including freight. Additionally, the realignment and access management of US 97 would provide a separate facility for through freight trips; these through freight trips would be expected to experience considerably less delay, less than five minutes overall for travel through the Transportation API. Local freight distribution and deliveries would also experience substantial improvement under the East DS1 Alternative due to reduction in driveway blockages for local freight access/egress along many of the arterials, reduced congestion and delays along 3rd Street, and the local street system in general.

Bicycle and Pedestrian Facilities

The East DS1 Alternative would provide several new facilities serving bicycles and pedestrians:

- US 97: 6-foot bicycle lanes on either side of the roadway would be extended (no sidewalks) within city limits
- US 20: widened safety shoulders (no sidewalks)

Exhibit 3-11: *East DS1 Alternative 95th Percentile Queues (2035)*



Note: Because lower existing conditions traffic volumes were assumed for the updated No Build Alternative and Preferred Alternative traffic analysis, the peak hour queuing and blocking data for the East DS1 Alternative are not directly comparable to the No Build Alternative and Preferred Alternative.

- 3rd Street extension north of Cooley Road: 6-foot paved shoulders would be provided (no sidewalks)
- New connections in locations where the roadway improvements intersect existing facilities.

The East DS1 Alternative would provide other advantages for pedestrians and bicyclists as well. Bicyclists from the east side of US 97 could better access O.B. Riley Road and the Old Bend-Redmond Highway because of the US 97 overcrossing at Cooley Road. The existing US 97 alignment would have lower traffic volumes, which should improve the environment for bicycle and pedestrian use, though addition of sidewalks would not be part of the proposed action. Also, access to the west side of US 20 would be better for bicyclists and pedestrians because of the extension of Robal Road to O.B. Riley Road and the added signal at Cooley Road and US 20.

An unimproved path between Fred Meyer Road and Nels Anderson Road would be severed by the new US 97 alignment adjacent to the railroad tracks. This route does not follow public right of way, but is used informally by some pedestrians as a means to cross between areas that are separated by the existing railroad tracks. Under the East DS1 Alternative, pedestrians would be rerouted to use either Cooley Road or Empire Avenue. Both Cooley Road and Empire Avenue would be an approximate 1.5 mile detour from the existing crossing to return to Robal Road, however pedestrian safety would be improved.

The US 20 pull-off/former bus stop would be essentially unaffected from a pedestrian access standpoint. The East DS1 Alternative would neither help nor hinder pedestrians and bicyclists from crossing at this location. However, the extension of Robal Road to O.B. Riley Road coupled with the extension of Britta Street and the signal at the intersection of US 20 and Robal Road would create a safer crossing for pedestrians and bicyclists originating from the Jamison Street business area and the residential neighborhood around O.B. Riley Road. This crossing is nearly an extra half mile from the US 20 pull off/former bus stop, but could draw more pedestrians with the Britta Street improvements to cross at the US 20/Robal Road signalized intersection.

The East DS1 Alternative would not preclude the use of existing trails or prohibit construction of planned trails. The conceptual alignment of the planned north-south, off-roadway multi-use trail from Bend River Mall Drive to Empire Avenue would still be feasible, but the section of the trail proposed between Empire Avenue and Robal Road would have to be realigned or potentially rerouted to 3rd Street.

Transit

The East DS1 Alternative would not provide any additional transit services or facilities beyond those future transit improvements already planned by the respective transit providers. However, with the improvements, congestion along Robal Road and 3rd Street would be substantially reduced, which in turn would improve ontime bus performance for the North 3rd Street route (Route 4) compared to the No Build Alternative. Private inter-city bus services would benefit from reduced congestion on US 97 and US 20 as well.

East DS2 Build Alternative

Traffic Operations

The East DS2 Alternative would be expected to alleviate much of the queuing and associated congestion forecast under No Build Alternative and would be similar in the adverse and beneficial impacts resulting from the East DS1 Alternative.

Exhibit 3-12 shows Year 2035 projected peak hour queuing and blockage locations. Comparing Exhibit 3-12 (East DS2 Alternative) to Exhibit 3-10 (2035 No Build Alternative) shows that a measurable reduction in the number and extent of locations where substantial queuing and blocking of traffic would occur.

Because lower existing conditions traffic volumes were assumed for the updated No Build Alternative and Preferred Alternative traffic analysis, the peak hour queuing and blocking data for the East DS2 Alternative are not directly comparable to the No Build Alternative and Preferred Alternative. However, based on the sensitivity analysis of the East DS2 Alternative with reduced traffic volumes input into the traffic analysis, queue lengths for the East DS2 Alternative are expected to be similar to the Preferred Alternative.

Exhibit 3-14A FEIS compare intersection operational performance for the No Build, East DS1, and East DS2 Alternatives.

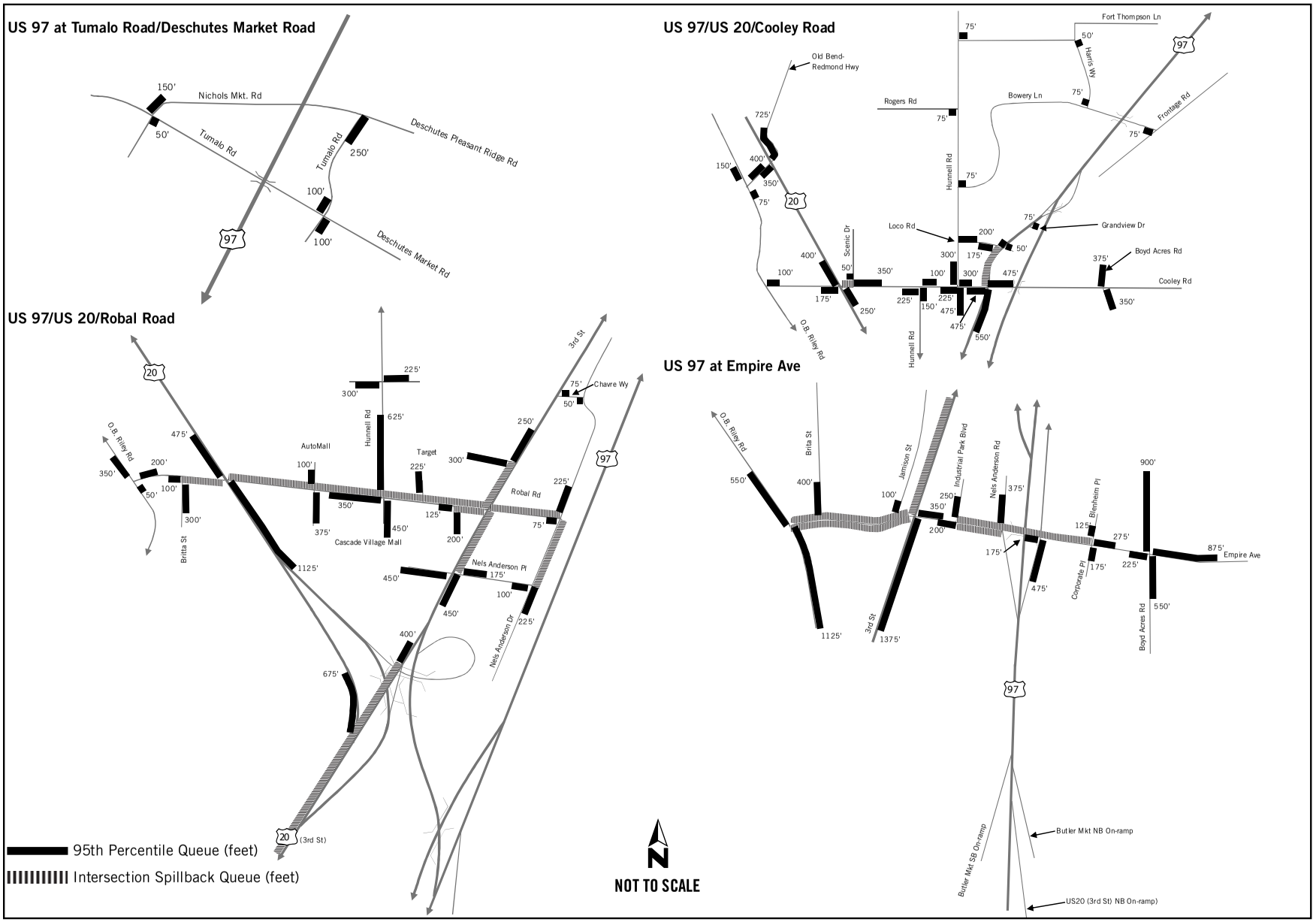
Safety

As with the East DS1 Alternative, by shifting traffic onto limited access and accessed controlled facilities (US 97 and US 20) and off of the local arterial system (3rd Street and others), the overall crash rate is expected to decrease as a result of the East DS2 Alternative compared to the No Build Alternative. The safety benefits would be the same as the East DS1 Alternative.

Freight

As with the East DS1 Alternative, freight mobility would be improved overall. Effects on freight would be the same as for the East DS1 Alternative.

Exhibit 3-12: *East DS2 Alternative 95th Percentile Queues (2035)*



Note: Because lower existing conditions traffic volumes were assumed for the updated No Build Alternative and Preferred Alternative traffic analysis, the peak hour queuing and blocking data for the East DS1 Alternative are not directly comparable to the No Build Alternative and Preferred Alternative.

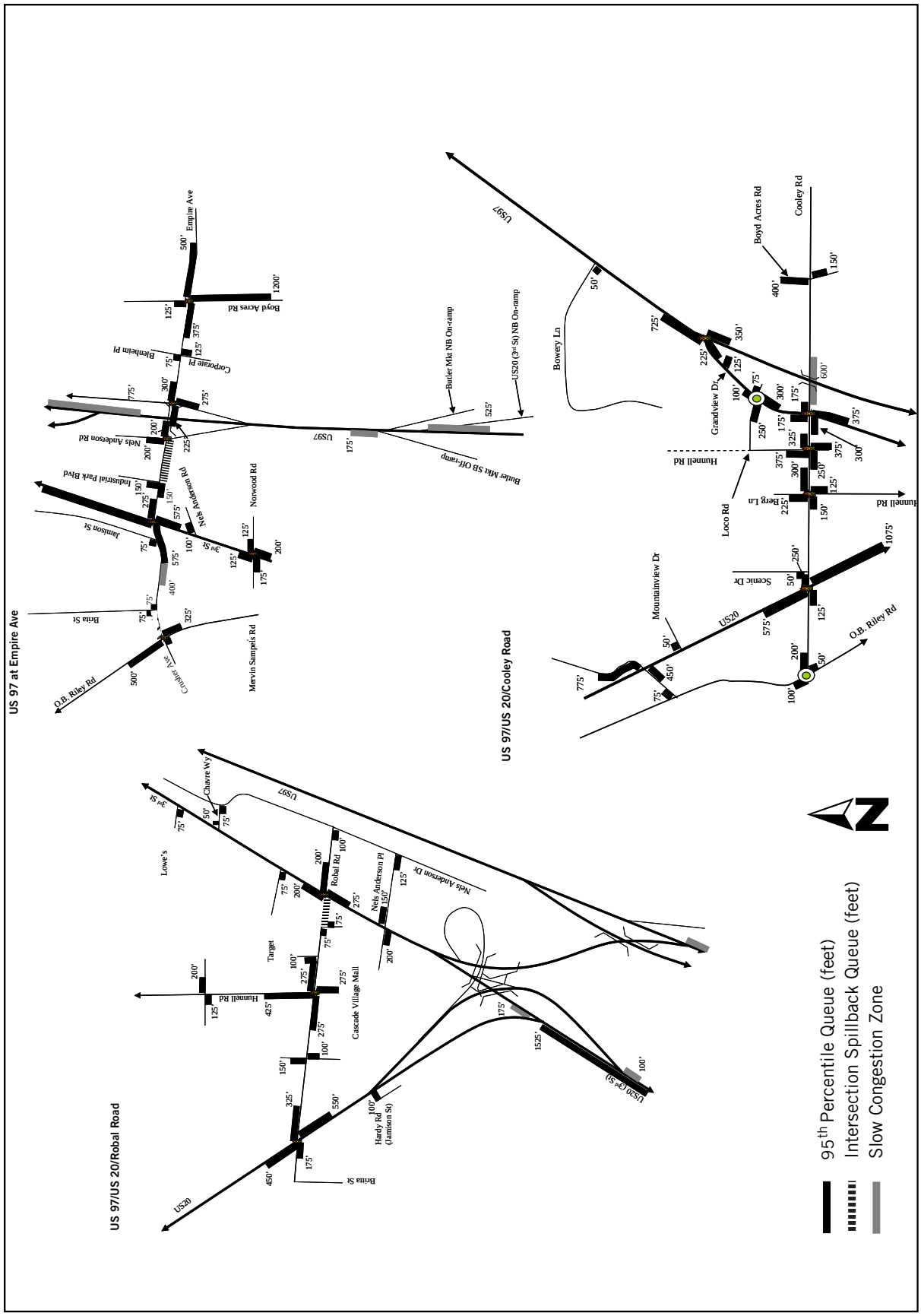


Exhibit 3-12 FEIS: *Preferred Alternative 95th Percentile Queues (2036)*

Note: This exhibit was added in the Final EIS to depict traffic queuing for the Preferred Alternative. This exhibit provides the data that is being considered in the Final EIS

Bicycle and Pedestrian Facilities

The East DS2 Alternative would provide several new facilities for serving bicycles and pedestrians and would be the same as listed for the East DS1 Alternative.

One difference in impacts between the East DS1 and East DS2 Alternatives would be that the access control and median barrier contained within the East DS2 Alternative would not allow bicyclists traveling on the new US 97 north of Empire Avenue to turn around. Instead, bicyclists would need to travel approximately 5.3 miles to the interchange at Deschutes Market Road to change direction.

Transit

As with the East DS1 Alternative, the East DS2 Alternative would not provide any additional transit services or facilities beyond those future transit improvements already planned by the respective transit providers. Impacts on transit would be the same as with the East DS1 Alternative.

Preferred Alternative—East DS2 Modified Alternative

Traffic Operations

The Preferred Alternative will alleviate much of the queuing and associated congestion forecast under the No Build Alternative.

Exhibit 3-12 FEIS shows Year 2036 projected peak hour queuing and blockage locations. Comparing Exhibit 3-12 FEIS (Preferred Alternative) to Exhibit 3-10 FEIS (No Build Alternative) shows that a measurable reduction in the number and extent of locations where substantial queuing and blocking of traffic will occur. However, queuing and resulting congestion would still be expected to form at the following locations:

- On northbound US 97 between the southern US 20 connection and the Empire Avenue northbound off-ramp due to the weaving that occurs
- On westbound US 20 approaching Robal Road, significant slowing would occur approaching the Old Bend-Redmond Highway, in all directions from the Empire Avenue/3rd Street intersection, northbound queue on US 20/Empire Avenue intersection, and the southbound queue would extend through the US 20/3rd Street intersection
- On Robal Road, Cooley Road, and Empire Avenue; however, this queuing would be substantially reduced relative to the No Build Alternative.

Exhibit 3-13 FEIS, Exhibit 3-14A FEIS, and Exhibit 3-14B FEIS provide intersection operational performance for the No Build Alternative and Preferred Alternative. Operational improvements are expected at

the following unsignalized intersections: 3rd Street/Cascade Village Drive, Empire Avenue/Jamison Drive, Empire Avenue/Sherman Drive, and US 20/Jamison Street. Because some unsignalized/signalized intersections are converted or closed in the Preferred Alternative, such as the current Cooley Road and Robal Road intersections with US 97, operational performance for US 97 will improve dramatically. Although operational performance will improve as a result of the Preferred Alternative relative to the No Build Alternative at the signalized intersections of US 20/Cooley Road (v/c = 0.91 for the Preferred Alternative and v/c = 1.21 for the No Build Alternative), US 20/Robal Road (v/c = 0.90 for the Preferred Alternative and v/c = 0.93 for the No Build Alternative), and US 20/Empire Avenue (v/c = 0.93 for the Preferred Alternative and v/c = 1.51 for the No Build Alternative), these intersections are not forecast to meet their associated 0.85 mobility target. However, the Preferred Alternative will be a substantial improvement over the operational performance of the No Build Alternative.

Safety

By shifting traffic onto limited access and accessed controlled facilities (US 97 and US 20) and off of the local arterial system (3rd Street and others), the overall crash rate is expected to decrease under the Preferred Alternative compared to the No Build Alternative.

A predictive crash analysis was conducted for the existing US 97 roadway segment from Robal Road to Cooley Road and the US 97 intersections with Robal Road and Cooley Road. Under the Preferred Alternative, in 2036, the expected crash rates for this segment and intersections would total 12.5 crashes per year, which is 31 percent lower than the expected 18.2 crashes per year for the No Build Alternative. This decrease in expected crash rates result from separating regional and through trips off of the existing US 97 facility to the realigned US 97 facility and shifting local trips to 3rd Street. As a result of the Preferred Alternative, the crash frequency at the US 97/Robal Road intersection is estimated to be lower with 6.3 expected crashes per year compared to 8..4 crasher per year under the No Build Alternative. Similar results are anticipated for the US 97/Cooley Road intersection, which is estimated to result in 6.1 expected crashes per year under the Preferred Alternative compared to 8.7 crashes per year under the No Build Alternative.

The Preferred Alternative will add a signal at the north end of 3rd Street with US 97. This three-leg signalized intersection was analyzed along with a comparative segment of the new US 97 alignment. The overall predicted crash rate will be about 7.4 crashes per year (expected crashes cannot be calculated as this is a future route with no crash

history). The overall result between the No Build Alternative and the Preferred Alternative on the US 97 existing and new alignments will be a net reduction of over 14 crashes per year at and around signalized intersections on US 97 in the Transportation API.

Freight

Freight mobility will be improved overall under the Preferred Alternative. Impacts on freight will be the same as for the East DS1 and East DS2 Alternatives.

Bicycle and Pedestrian Facilities

The Preferred Alternative will provide many new facilities for serving bicycles and pedestrians as depicted in Exhibit 2-3 FEIS. These include:

South of Empire Avenue:

- Bike lanes and standard sidewalks on 3rd Street
- A traffic signal with crosswalks at the Mervin Sampels Road/3rd Street intersection
- Sidewalks on the northwest and southeast quadrants at the Empire Avenue/O.B. Riley Road intersection.

Between Empire Avenue and Cooley Road:

- Bike lanes and standard sidewalks on 3rd Street
- Bike lanes on the realigned US 97
- A multi-use path along the BNSF Railway, as shown on the City of Bend's Transportation System Plan for Pedestrian and Bicycle Systems, will not be precluded. Trail undercrossings of US 97 will be included to support the City's future trail plan
- Grade-separated (from US 97 and the BNSF Railway) bike lanes and sidewalks along Cooley Road from Hunters Circle to Hunnell Road and Cooley Road
- A multi-use path from Robal Road to Cooley Road on the east side of US 20
- Wide shoulders for bike lanes and pedestrian travel on the extension of Britta Street to Robal Road
- Bike lanes and standard sidewalks on Empire Avenue
- A multi-use path on the west side of US 20/3rd Street from Empire Avenue to the north to connect with Cascade Village Shopping Center
- Pedestrian islands and crosswalks at the 3rd Street/Empire Avenue intersection.

North of Cooley Road:

- A separate multi-use path adjacent to US 97 northbound lanes connecting the US 97/3rd Street signalized intersection to the Hilltop and Juniper mobile home parks and allowing bicyclists and pedestrians to safely cross US 97
- Islands and crosswalks at the US 97/3rd Street signalized intersection, connecting to multi-use paths, sidewalks, and bike lanes
- A separated multi-use path along 3rd Street connecting Grandview Drive to the new US 97/3rd Street signalized intersection
- Standard bike lanes and sidewalks on 3rd Street south of Grandview Drive
- Bike lanes on US 97 to the 3rd Street signalized intersection
- Bike and pedestrian treatments at the 3rd Street/Loco Road roundabout.

The Preferred Alternative will include access control and median barrier that will not allow bicyclists, who choose to use the newly realigned US 97 instead of 3rd Street, traveling northbound on the newly realigned US 97 north of Empire Avenue to turn around. Bicyclists, choosing to cycle on the newly realigned US 97 instead of 3rd Street, will need to travel approximately 2.0 miles to the signalized intersection at US 97/3rd Street to change direction. ODOT anticipates most bicyclists will choose to use 3rd Street which has separate bike facilities for a safer travel and avoidance of out-of-direction travel, instead of cycling on the newly realigned US 97.

Transit

The Preferred Alternative will not provide any additional transit services or facilities beyond those future transit improvements already planned by the respective transit providers. Impacts on transit will be the same as with the East DS1 and East DS2 Alternatives.

Comparative Performance Measures

To assist in the comparison of the East DS1 and East DS2 Alternatives to the No Build Alternative, two sets of comparison measures are used. The first is intersection operational performance, and the second is a summary of system-wide measures.

Exhibit 3-13 lists unsignalized intersections and Exhibit 3-14 lists signalized intersections that are projected to fall below agency operational performance standards for the 2035 No Build, East DS1, and East DS2 Alternatives. At some intersections a change in jurisdiction would occur under the East DS1 and East DS2 Alternatives. For example, the US 97 and Clausen Drive intersection is under ODOT jurisdiction under the 2035 No Build Alternative whereas under build

alternatives this intersection would be under the City's jurisdiction. Whenever a change in jurisdiction would occur, Exhibit 3-13 lists both the operational performance measure under the 2035 No Build Alternative as well as the operational performance measure under the East DS1 and East DS2 Alternatives. At the US 97 and Clausen Drive intersection the v/c ratio (ODOT's operational performance measure) under the 2035 No Build Alternative would be 0.82 and under the East DS1 Alternative it would be 0.77 with a delay of 120+ seconds as the City considers both the v/c ratio and intersection delay in its operational performance measure.

Definitions

Overall Network Delay

Overall network delay is the additional amount of time spent traveling in slow or stopped conditions compared to normal travel times under light of free flow travel conditions across the modeled network of roads in the Transportation API.

Network Travel Time

The network travel time is the total amount of time spent traveling the entire network of roads in the Transportation API

All City signalized intersections meet the City's standards in 2035 under the East DS1 and East DS2 Alternatives except for the O.B. Riley Road and Empire Avenue intersection which experiences a v/c ratio of 1.01, only slightly exceeding the City standard of 1.00, as shown in Exhibit 3-14. The East DS1 and East DS2 Alternatives would move higher traffic volumes through this intersection than in the 2035 No Build Alternative. In the future, this intersection would also experience pressure from additional development and from diverting traffic from US 20. There is a future need for the City of Bend to widen this roadway to four lanes. In addition, the East DS1 and East DS2 Alternatives would reduce the bottleneck at 3rd Street and Empire Avenue, which would allow a greater flow of westbound traffic to arrive at the O.B. Riley Road and Empire Avenue intersection.

After the Draft EIS was published, the anticipated development that was expected to increase traffic volumes on O.B. Riley Road was not pursued. Thus, the City of Bend does not have any plans to widen O.B. Riley Road to four lanes.

On a system-wide basis, Exhibit 3-15 summarizes a number of performance measures for the entire Transportation API for a 60minute model simulation period during PM peak conditions for the East DS1 and East DS2 Alternatives. A similar model simulation was performed for the 2035 No Build Alternative, however, the model reached extreme congestion within 30 minutes and was not able complete the full 60-minute simulation. The performance measures reported for the 2035 No Build Alternative after a 30-minute simulation represent conservative estimates for what the model would have predicted if a full 60-minute simulation cycle could have been completed; actual 60-minute model results would be equivalent or worse than the results of the 30-minute simulation. Both the East DS1 and East DS2 Alternatives would substantially improve overall system performance over the 2035 No Build Alternative. Under the East DS1 and East DS2 Alternatives, US 97 travel times would be about 75 percent less than the 2007 existing condition

values because of the elimination of the Cooley Road and Robal Road signals and other public approach roads and private driveways. The East DS1 and East DS2 Alternatives would have a peak operating speed reasonably close to the posted speeds. The East DS1 and East DS2 Alternatives would improve the access spacing on US 97 to exceed spacing standards north of the US 20 connections. South of the US 20 connections on US 97 and along US 20 the spacing would not meet standards as it would be relatively unchanged.

As a result of the updated traffic analysis for the No Build Alternative, the comparisons between the East DS1 and East DS2 Alternatives with the No Build Alternative is limited to the key intersection locations shown in Exhibit 3-14A FEIS. Exhibit 3-13 FEIS and Exhibit 3-14 FEIS provide the data being considered in the Final EIS. Similarly, comparisons of Transportation API system performance measures between the East DS1 and East DS2 Alternatives with the No Build Alternative is limited to the select performance measures shown in Exhibit 3-15A FEIS. Exhibit 3-15A FEIS provides the data being considered in the Final EIS.

Exhibit 3-13 FEIS lists unsignalized intersections and Exhibit 3-14 FEIS lists signalized intersections that are projected to fall below agency operational performance standards for the No Build Alternative and Preferred Alternative. At some intersections a change in jurisdiction will occur under the Preferred Alternative. For example, the US 97/3rd Street and Chavre Way intersection is under ODOT jurisdiction under the No Build Alternative whereas under the Preferred Alternative this intersection will be transferred to the City's jurisdiction. Whenever a change in jurisdiction will occur, Exhibit 3-13 FEIS lists both the operational performance measure under the No Build Alternative as well as the operational performance measure under the Preferred Alternative. At the US 97/3rd Street and Chavre Way intersection the v/c ratio (ODOT's operational performance measure) under the No Build Alternative would be 0.72 and under the Preferred Alternative this intersection v/c ratio will be 0.37 with a delay of 9.5 seconds.

All City signalized intersections will meet the City's standards in 2036 as a result of the Preferred Alternative including the O.B. Riley Road and Empire Avenue intersection, which will experience a v/c ratio of 0.65 with a delay of 33.6 seconds with a traffic signal. The Preferred Alternative will move higher traffic volumes through this intersection than the No Build Alternative. In addition, the Preferred Alternative will reduce the bottleneck at 3rd Street and Empire Avenue, which will allow a greater flow of westbound traffic to arrive at the O.B. Riley Road and Empire Avenue intersection.

On a system-wide basis, Exhibit 3-15A FEIS and Exhibit 3-15B FEIS summarize a number of performance measures for the entire Transportation API for a 60-minute model simulation period during PM peak conditions for the Preferred Alternative. A similar model simulation was performed for the No Build Alternative; however, the model reached extreme congestion within 40 minutes and was not able complete the full 60-minute simulation. The performance measures reported for the No Build Alternative after a 40-minute simulation represent conservative estimates for what the model would have predicted if a full 60-minute simulation cycle could have been completed; actual 60-minute model results would be equivalent or worse than the results of the 40-minute simulation. The Preferred Alternative will substantially improve overall system performance over the No Build Alternative. Under the Preferred Alternative, US 97 travel times will be at least 70 percent less than the No Build Alternative because of the elimination of the US 97/Cooley Road and US 97/Robal Road signals and other public approach roads and private driveways. The Preferred Alternative will have a peak operating speed reasonably close to the posted speeds. The Preferred Alternative will improve the access spacing on US 97 to be in compliance with minimum spacing standards north of the US 97/Empire Avenue interchange. South of the US 97/Empire Avenue interchange on US 97 and along US 20 the spacing will not meet minimum spacing standards as it will be relatively unchanged.

Interchange Area Management Plan

Both the East DS1 and East DS2 Alternatives would include improvements to the existing US 97/Empire Avenue interchange, where US 20 connects to US 97 in Bend, as well as construction of a new northern interchange near Bowery Lane on US 97 to connect to the extended 3rd Street. An interchange area management plan is required for a new or significantly reconstructed interchange by Oregon Administrative Rules (OAR) 734-051-0155; thus, both the East DS1 and East DS2 Alternatives would require completion and adoption by the Oregon Transportation Commission of two interchange area management plans.

The two interchange area management plan management areas, for the US 97/3rd Street interchange and the US 97/Empire Avenue interchange, are shown in Exhibit 3-16. For the purposes of assessing traffic operations and access, the interchange area management plan management areas generally include access points and intersections within approximately 0.25 mile from the existing and proposed interchanges and include key intersections that have the potential to impact traffic operations in the interchange areas. The management area boundary identifies the area that could be expected to directly

Definitions

Interchange Area Management Plan

An interchange area management plan is a joint ODOT and local government long term (20+ years) transportation and land use plan to balance and manage transportation and land use decisions in interchange areas, and is an important tool in protecting the function of state highway interchanges and the supporting local street network (ODOT 2006b).

influence the proposed interchange improvements and where traffic operational analyses would be completed.

The interchange area management plan for the Empire Avenue interchange would help ensure that this facility continues to provide safe and efficient connections between US 97, US 20, and the local roadways within the vicinity of the interchange. The interchange area management plan for the new northern interchange would serve a similar function; to ensure that the US 97 facility would operate as intended over a long-range planning horizon. Both interchange area management plans would identify land use management strategies, short-term and long-term transportation improvements, access management goals, and strategies to fund identified improvements.

The goals and objectives developed would be to protect the function of the new and reconstructed interchanges for at least the next 20 years while accounting for changes in traffic patterns. Potential development capacity of existing commercial and industrial land within the vicinity of the US 97/Empire Avenue interchange, the development of the Juniper Ridge Employment Sub-District to the south and east of the new northern interchange, and regional growth would affect the traffic patterns over this period.

Exhibit 3-13: *Unsignalized Intersections Showing as Deficient Under Agency Standards*

Intersection	Jurisdiction under 2035 No Build Alternative	Operational Standard of Jurisdiction under 2035 No Build Alternative	2035 No Build Operational Performance	Jurisdiction under Build Alternatives	Operational Standard of Jurisdiction under Build Alternatives	2035 East DS1 Operational Performance	2035 East DS2 Operational Performance
Unsignalized intersections under No Build Alternative conditions							
US 97 (3rd St)/Clausen Dr*	ODOT	0.80	0.82	City	1.00 (50)	0.77 (120+)	0.62 (80.0)
US 97 (3rd St)/Chavre Way*	ODOT	0.80	0.80	City	1.00 (50)	0.36 (9.9)	0.38 (10.0)
US 97 (3rd St)/Target Driveway*	ODOT	0.80	0.91	City	1.00 (50)	0.41 (15.9)	0.44 (15.9)
Old BendRedmond Hwy/ O.B. Riley Rd	County	D	C	County	D	C	C
US 20/Old BendRedmond Hwy	ODOT	0.70	2.00+	ODOT	0.60	2.00+	2.00+
Cooley Rd/O.B. Riley Rd	County	D	F	County	D	D	D
Cooley Rd/Boyd Acres Rd	City	1.00 (50)	2.00+ (120+)	City	1.00 (50)	2.00+ (120+)	2.00+ (120+)
Robal Rd/Auto Mall Driveway	City	1.00 (50)	0.43 (22.9)	City	1.00 (50)	0.36 (47.3)	0.38 (49.7)
US 97 (3rd St)/Nels Anderson/Cascade Village*	ODOT	0.80	2.00+	City	1.00 (50)	0.37 (19.9)	0.63 (20.6)
Empire Ave/Britta St	City	1.00 (50)	0.90 (80.0)	City	1.00 (50)	0.04 (20.3)	0.04 (20.8)
Empire Ave/Jamison Rd	City	1.00 (50)	2.00+ (120+)	City	1.00 (50)	0.25 (11.6)	0.25 (11.6)
Empire Ave/Sherman Rd/ Industrial Park Blvd	City	1.00 (50)	2.00+ (120+)	City	1.00 (50)	0.55 (10.2)	0.43 (10.1)
Empire Ave/Nels Anderson Rd/SB US 97 Ramp Terminal	ODOT	0.85	2.00+	ODOT	0.75	0.68	0.66
Empire Avenue/Blenheim Place/Corporate Place	City	1.00 (50)	1.96 (120+)	City	1.00 (50)	0.72 (120+)	0.63 (96.0)
US 97/Bowery Lane	ODOT	0.70	0.78	Intersection closed under build alternatives			
US 20/Jamison Street	ODOT	0.80	2.00+	Intersection closed under build alternatives			
Cooley Road/Loop Road/ Lowe's Driveway	City	1.00 (50)	0.54 (120+)	Intersection closed under build alternatives			

*Becomes a local roadway under the East DS1 and East DS2 Alternatives.

Notes: 1. Gray shaded cells represent operational performance that is deficient under operational standard of jurisdiction.
2. All numbers not in parentheses represent volume/capacity ratios. Numbers shown in parentheses represent seconds of delay. Letters represent level of service (LOS).

Note: Exhibit 3-13 FEIS provides the data being considered in the Final EIS.

Exhibit 3-13 FEIS: *Unsignalized Intersections Showing as Deficient Under Agency Standards*

Intersection	Jurisdiction under 2036 No Build Alternative	Operational Target of Jurisdiction under 2036 No Build Alternative	2036 No Build Operational Performance	Jurisdiction under Preferred Alternative	Operational Target of Jurisdiction under Preferred Alternatives	2036 Preferred Alternative Operational Performance
Unsignalized intersections under No Build Alternative conditions						
US 97 (3rd St)/Clausen Dr[1]	ODOT	0.85/0.95	0.72/0.14	City	1.00 (50)	0.71(14.4)[2]
US 97 (3rd St)/Chavre Way[1]	ODOT	0.85/0.95	0.72/0.07	City	1.00 (50)	0.37(9.5)
US 97 (3rd St)/Target Driveway[1]	ODOT	0.85/0.95	0.47/0.70	City	1.00 (50)	0.20(10.4)
Old BendRedmond Hwy/O.B. Riley Rd	County	D/D	A/A	County	D/D	A/B
Cooley Rd/O.B. Riley Rd[3]	County	D/D	B/A	County	D/D	A/B
Cooley Rd/Boyd Acres Rd	City	1.00 (50)	0.22(120+)	City	1.00 (50)	1.20(120+)
Robal Rd/West Cascade Village Driveway	City	1.00 (50)	0.39 (0.0)	City	1.00 (50)	0.36 (19.9)
US 97 (3rd St)/Nels Anderson Rd/Cascade Village Dr	ODOT	0.85/0.95	1.11/0.86	ODOT	0.75	0.51
Empire Ave/O.B.Riley Rd[4]	City	1.00 (50)	0.88(26.9)	Intersection Signalized in Preferred Alternative		
Empire Ave/Britta St	City	1.00 (50)	0.26/0.68(0.0/41.1)	City	1.00 (50)	0.39(15.2)
Empire Ave/Jamison Rd	City	1.00 (50)	2.0+(120+)	City	1.00 (50)	0.20(8.9)
Empire Ave/Sherman Rd/Industrial Park Blvd[4]	City	1.00 (50)	2.0+(120+)	City	1.00 (50)	0.42(10.5)[4]
Empire Ave/Nels Anderson Rd/SB US 97 Ramp Terminal	ODOT	0.85/0.95	2.00+/2.00+	Intersection Signalized in Preferred Alternative		
US 20/Mervin Sampels Rd	ODOT	0.85/0.95	0.67/0.62	Intersection Signalized in Preferred Alternative		
Empire Avenue/Blenheim Place/Corporate Place	City	1.00 (50)	1.28[5] (120+)	City	1.00 (50)	0.86(120+)
US 97/Bowery Lane	ODOT	0.70/0.75	0.70/0.06	ODOT	0.75	0.65
US 20/Jamison Street	ODOT	0.75/0.95	0.84/2.00+	ODOT	0.75/0.95	0.50 (0.17)
Cooley Road/Loop Road/Lowe's Driveway	City	1.00 (50)	2.0+(120+)	Intersection Closed Under Preferred Alternative		

[1] Becomes a local roadway under the Preferred Alternative [2] Multi-lane roundabout in Preferred Alternative [3] Single lane roundabout
[4] Sherman Road approach does not exist in Preferred Alternative [5] Does not exceed the City 100 vehicles per hour minimum threshold

Notes: 1. Gray shaded cells represent operational performance that is deficient under operational target/standard of jurisdiction.
2. All numbers not in parentheses represent maximum volume/capacity ratios. Numbers shown in parentheses represent seconds of delay. Letters represent level of service (LOS).
3. The 2011 Amended Oregon Highway Plan revised the mobility standard for urban expressways from a v/c ratio of 0.80 to a mobility target of 0.85 v/c ratio to indicate that the Oregon Transportation Commission is open to considering alternative mobility targets on a case-by-case basis.

Note: This exhibit was added in the Final EIS to provide updated data for the No Build Alternative and Preferred Alternative being considered in the Final EIS.

Exhibit 3-14: *Signalized Intersections Showing as Deficient Under Agency Standards*

Intersection	Jurisdiction under 2035 No Build Alternative	Operational Standard of Jurisdiction under 2035 No Build Alternative	2035 No Build Operational Performance	Jurisdiction under Build Alternatives	Operational Standard of Jurisdiction under Build Alternatives	2035 East DS1 Operational Performance	2035 East DS2 Operational Performance
Signalized intersections under No Build Alternative conditions							
US 97 (3rd St)/Cooley Rd*	ODOT	0.80	1.79	City	1.00 (80)	0.84 (59.2)	0.78 (50.3)
US 97 (3rd St)/Robal Rd*	ODOT	0.80	1.23	City	1.00 (80)	0.73 (44.1)	0.81 (51.2)
US 20/Cooley Rd	ODOT	0.80	1.28	ODOT	0.75	0.93	0.91
US 20/Robal Rd	ODOT	0.80	1.02	ODOT	0.75	1.00	1.00
US 20/Empire Ave	ODOT	0.85	1.85	ODOT	0.75	1.10	1.20
Cooley Rd/Hunnell Rd (north)	City	1.00 (80)	1.34 (120+)	City	1.00 (80)	0.41 (18.8)	0.57 (29.8)
Cooley Road/Hunnell Rd (south)	City	1.00 (80)	0.90 (41.4)	City	1.00 (80)	0.38 (16.3)	0.39 (27.7)
Robal Rd/Hunnell Rd	City	1.00 (80)	0.83 (38.3)	City	1.00 (80)	0.56 (21.9)	0.57 (21.6)
Empire Ave/NB US 97 Ramp Terminal	ODOT	0.85	1.33	ODOT	0.75	0.79	0.75
Empire Ave/Boyd Acres Rd	City	1.00 (80)	0.96 (61.8)	City	1.00 (80)	0.93 (47.1)	0.89 (43.8)
O.B. Riley Rd/Empire Ave	City	1.00 (80)	0.86 (23.5)	City	1.00 (80)	1.01 (60.4)	1.01 (60.4)

*Becomes a local roadway under the East DS1 and East DS2 Alternatives.

Notes: 1. Gray shaded cells represent operational performance that is deficient under operational standard of jurisdiction.
2. All numbers not in parentheses represent volume/capacity ratios. Numbers shown in parentheses represent seconds of delay. Letters represent level of service (LOS).

Note: Exhibit 3-14A FEIS provides the data being considered in the Final EIS.

Exhibit 3-14A FEIS: *Key Signalized Intersection Showing as Deficient Under Agency Standards*

Intersection	Jurisdiction under 2036 No Build Alternative	Operational Target of Jurisdiction under 2036 No Build Alternative	2036 No Build Alternative Operational Performance	Jurisdiction under 2036 Build Alternatives	Operational Standard of Jurisdiction under 2036 Build Alternatives	2036 East DS1 Alternative Operational Performance	2036 East DS2 Alternative Operational Performance	2036 Preferred Alternative Operational Performance
Signalized intersections under No Build Alternative conditions								
US 97 (3rd St)/Robal Rd[1]	ODOT	0.85	1.08	City	1.00 (80)	0.68	0.69	0.68
US 20/Cooley Rd	ODOT	0.85	1.21	ODOT	0.75	0.83	0.78	0.91
US 20/Empire Ave	ODOT	0.85	1.51	ODOT	0.75	1.01	1.02	0.93
Empire Ave/NB US 97 Ramp Terminal	ODOT	Unsignalized in No Build Alternative		ODOT	0.75	0.71	0.67	0.54
US 97 South of Empire Ave	ODOT	0.85	n/a	ODOT	0.85	0.76 NB/0.58 SB[2]	0.76 NB/0.60 SB[2]	0.81 NB/0.70 SB
US 97 South of Cooley Rd	ODOT	0.85	n/a	ODOT	0.85	0.44 NB/0.32 SB	0.41 NB/0.32 SB	0.48 NB/0.48 SB
US 97 North of Bowery Ln	ODOT	0.80	n/a	ODOT	.80	0.52 NB/0.40 SB	0.52 NB/0.40 SB	0.55 NB/0.45 SB

[1]Becomes a local roadway under the Preferred Alternative.

[2]Southbound direction is a three-lane weaving section in the East DS1 and East DS2 Alternatives versus two lanes in the Preferred Alternative. The two-lane segment v/c ratio for the Preferred Alternative is about the same as 0.58 v/c ratio in the three-lane segment for the East DS1 and East DS2 Alternatives.

Notes: 1. Gray shaded cells represent operational performance that is deficient under operational target of jurisdiction.
2. All numbers not in parentheses represent volume/capacity ratios. Numbers shown in parentheses represent seconds of delay. Letters represent level of service (LOS).

3. The 2011 Amended Oregon Highway Plan revised the mobility standard for urban expressways from a v/c ratio of 0.80 to a mobility target of 0.85 v/c ratio to indicate that the Oregon Transportation Commission is open to considering alternative mobility targets on a case-by-case basis.

NB=northbound; SB=southbound; n/a=no data available.

Note: This exhibit was added in the Final EIS to provide updated data for the No Build Alternative and Preferred Alternative being considered in the Final EIS.

Exhibit 3-14B FEIS: *Signalized Intersection Showing as Deficient Under Agency Standards*

Intersection	Jurisdiction under 2036 No Build Alternative	Operational Target of Jurisdiction under 2036 No Build Alternative	2036 No Build Alternative Operational Performance	Jurisdiction under Preferred Alternatives	Operational Standard of Jurisdiction under Preferred Alternatives	2036 Preferred Alternative Operational Performance
Signalized intersections under No Build Alternative conditions						
US 97 (3rd St)/Cooley Rd[1]	ODOT	0.85	1.59	City	1.00 (80)	0.80(35.2)
US 97 (3rd St)/Robal Rd[1]	ODOT	0.85	1.08	City	1.00 (80)	0.68(28.5)
US 20/Cooley Rd	ODOT	0.85	1.21	ODOT	0.75	0.91
US 20/Robal Rd	ODOT	0.85	0.93	ODOT	0.75	0.90
US 20/Empire Ave	ODOT	0.85	1.51	ODOT	0.75	0.93
Cooley Rd/Hunnell Rd (north)	City	1.00 (80)	0.90(51.0)	City	1.00 (80)	0.94(37.4)
Cooley Road/Hunnell Rd (south)	City	1.00 (80)	0.76(28.9)	City	1.00 (80)	0.71(19.1)
Robal Rd/Hunnell Rd	City	1.00 (80)	0.70(33.4)	City	1.00 (80)	0.83(39.4)
Empire Ave/NB US 97 Ramp Terminal	ODOT	Unsignalized in No Build Alternative		ODOT	0.75	0.54
Empire Ave/Boyd Acres Rd	City	1.00 (80)	0.89(52.6)	City	1.00 (80)	0.81(45.8)
O.B.Riley Rd/Empire Ave	City	Unsignalized in No Build Alternative		City	1.00 (80)	0.65 (33.6)
US 20/Mervin Samples Rd	ODOT	Unsignalized in No Build Alternative		ODOT	0.75	0.77
US 97/3rd St	Intersection does not exist under No Build Alternative			ODOT	0.75	0.86

[1]Becomes a local roadway under the Preferred Alternative.

Notes: 1. Gray shaded cells represent operational performance that is deficient under operational target of jurisdiction.
2. All numbers not in parentheses represent volume/capacity ratios. Numbers shown in parentheses represent seconds of delay. Letters represent level of service (LOS).

3. The 2011 Amended Oregon Highway Plan revised the mobility standard for urban expressways from a v/c ratio of 0.80 to a mobility target of 0.85 v/c ratio to indicate that the Oregon Transportation Commission is open to considering alternative mobility targets on a case-by-case basis.

Note: This exhibit was added in the Final EIS to provide updated data for the No Build Alternative and Preferred Alternative being considered in the Final EIS.

Exhibit 3-15: *Transportation API System Performance Measures*

Measure	2035 No Build	2035 East DS1	2035 East DS2
Number of intersections over standards	21	9	8
Number of US 97 mainline and merge/diverge/weave segments over standards	11	4	4
Number of locations over capacity	15	5	5
Number of turn storage bays blocked more than 50% of the peak hour	17	10	10
Number of intersections blocked by queues	23	7	19
Overall average network speed (mph)	8	18	15
Overall network total stops	38,600	47,900	56,300
Overall network delay (hr)	1,975	1,550	2,140
Overall network travel time (hr)	2,290	2,630	3,190
US97 (Deschutes Market Rd–Butler Market Rd) Segment Speed (mph)	20	43	43
US97 (Deschutes Market Rd Butler Market Rd) Segment Travel Time (min:sec)	18:05	8:10	8:15
Sections where minimum spacing standards exceeded or met[2]	2	4	4

[1] Note: Data for the 2035 No Build Alternative was based on a 30 minute model run; data for the East DS1 and East DS2 Alternatives was based on 60 minute model runs. Due to severe congestion, the traffic model for the 2035 No Build Alternative was not able to run for a full 60 minute simulation. Actual 60 minute simulations would be equivalent or worse than the results shown for the 2035 No Build Alternative 30 minute simulation.

[2]This measure identifies the number pf roadway sections that do not meet minimum spacing standards in the existing conditions but will be brought into compliance by each alternative.

Note: Exhibit 3-15A FEIS provides the data being considered in the Final EIS.

Exhibit 3-15A FEIS: *Transportation API Select System Performance Measures for the No Build, East DS1 and East DS2 Alternatives and the Preferred Alternative*

Measure	2036 No Build Alternative	2036 East DS1 Alternative	2036 East DS2 Alternative	2036 Preferred Alternative
Overall average network speed (mph)	5[1]	25	22	19
Overall network total stops	~66,100[1]	30,400	45,100	35,500
Overall network delay (hr)	~4,700[1]	800	1,000	1,100
Overall network travel time (hr)	~5,300[1]	1,800	2,000	1,900

[1] Note: Data for the No Build Alternative was based on a 40 minute model run; data for the Preferred Alternative was based on 60 minute model runs. Due to severe congestion, the traffic model for the No Build Alternative was not able to run for a full 60 minute simulation. Actual 60 minute simulations would be equivalent or worse than the results shown for the No Build Alternative 40 minute simulation.

Note: This exhibit was added in the Final EIS to provide a comparison between the No Build, East DS1 and East DS2 Alternatives and the Preferred Alternative. This exhibit provides the data that is being considered in the Final EIS.

Exhibit 3-15B FEIS: *Transportation API System Performance Measures*

Measure	2036 No Build Alternative	2036 Preferred Alternative
Number of locations over standards/targets	17	7
Number of locations over capacity	13	1
Number of turn storage bays blocked more than 50% of the peak hour	22[1]	2
Number of intersections blocked by queues	15[1]	0
Overall average network speed (mph)	5[1]	19
Overall network total stops	~66,100[1]	35,500
Overall network delay (hr)	~4,700[1]	1,100
Overall network travel time (hr)	~5,300[1]	1,900
US 97 (Bowery Lane–Butler Market Rd) Segment Speed (mph)[2]	12[1]	39
US 97 (Bowery Lane Butler Market Rd) Segment Travel Time (min:sec)[2]	15:30[1]	4.35
Sections where minimum spacing standards exceeded or met[4]	0	2
Number of predicted crashes per year at US 97 signalized intersections[3]	18	4

[1] Data for the No Build Alternative was based on a 40 minute model run; data for the Preferred Alternative was based on 60 minute model runs. Due to severe congestion, the traffic model for the No Build Alternative was not able to run for a full 60 minute simulation. Actual 60 minute simulations would be equivalent or worse than the results shown for the No Build Alternative 40 minute simulation.

[2] The US 97 segment analyzed for segment speed and travel time was revised in the Final EIS due to the smaller Transportation API.

[3] Data for the predicted number of crashes per year is based on new analysis conducted for the Final EIS.

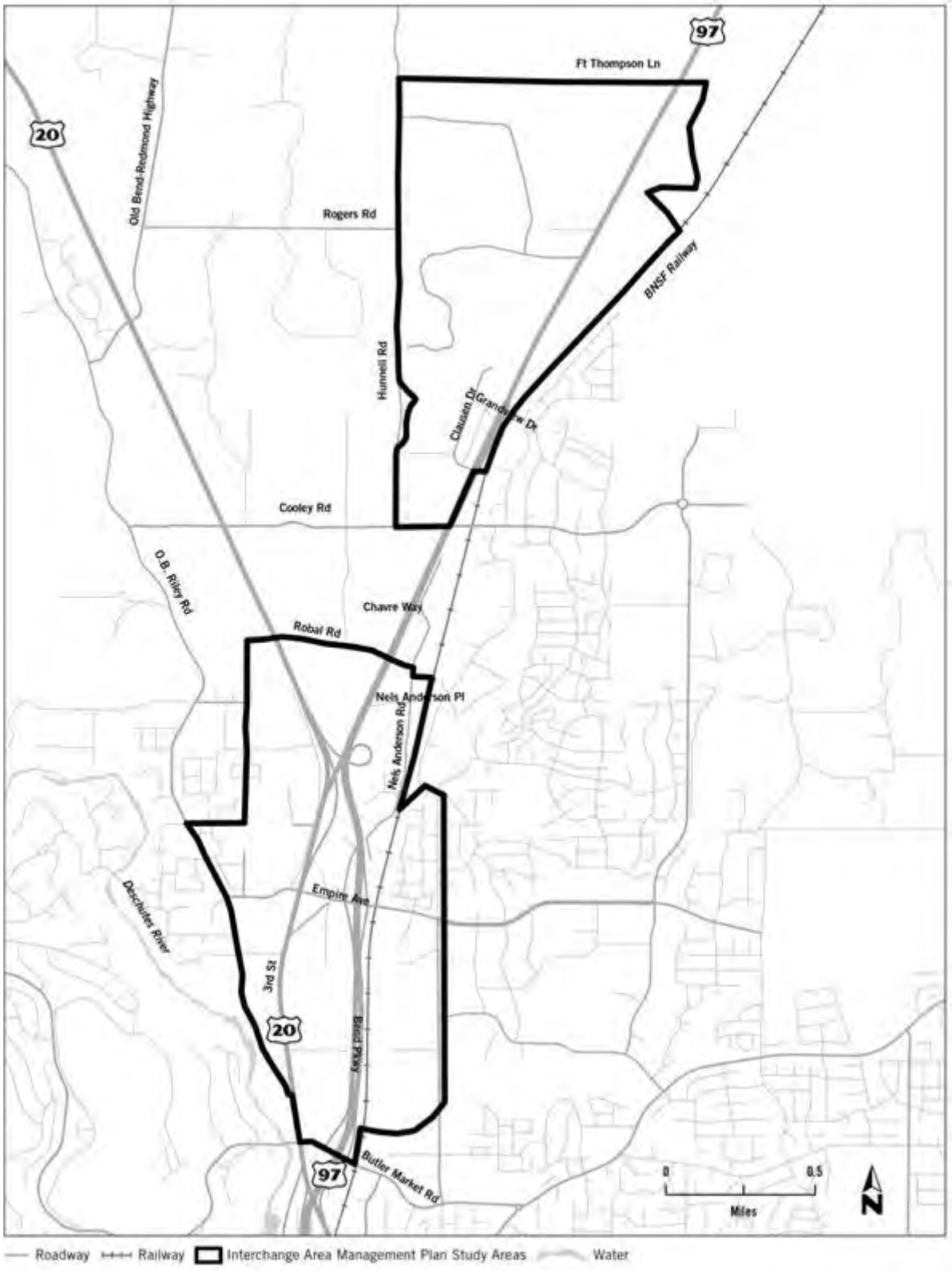
[4]This measure identifies the number pf roadway sections that do not meet minimum spacing standards in the existing conditions but will be brought into compliance by each alternative.

Note: This exhibit was added in the Final EIS to provide updated data for the No Build Alternative and Preferred Alternative being considered in the Final EIS. The performance measure for the number of US 97 mainline and merge/diverge/weave segments over standards was not evaluated for the Final EIS.

The City of Bend and Deschutes County would adopt policies and ordinances necessary to implement the interchange area management plans prior to the publication of the Final EIS. The interchange area management plans would be adopted by the Oregon Transportation Commission prior to the beginning of construction.

An interchange area management plan is required for a new or significantly reconstructed interchange by Oregon Administrative Rules (OAR) 734-051-0155. The Preferred Alternative will not require a new interchange north of Cooley Road, and the improvements to the US 97/Empire Avenue interchange will be minor including realigning one existing ramp; restriping the travel and turn lanes on the Empire Avenue overcrossing; and adding ramp metering to the on-ramps. The Empire Avenue overcrossing of US 97 will not be widened as was proposed under the East DS1 and East DS2 Alternatives so there will be no significant reconstruction of the overcrossing. No changes to land use along Empire Avenue will occur; thus an interchange area management plan is not required for the US 97/Empire Avenue interchange.

Exhibit 3-16: *Interchange Area Management Plan Study Areas*



Note: For the Preferred Alternative no interchange area management plans are required.

Construction Impacts

Specific phasing and staging details for construction are not outlined in the EIS but will be integrated into the final design process. While the new portions of US 97 could be built without substantial impacts to vehicular, bicycle or pedestrian travel, improvements to connecting intersections with public approach roads and existing corridors could have traffic impacts during construction.

3.1.4 Avoidance, Minimization, and/or Mitigation Measures Proposed in the Draft EIS

Construction Mitigation and Commitments

The following measures could be taken to the extent practicable to avoid, minimize, and mitigate temporary adverse impacts to the transportation system:

- Distribute periodic press releases, newsletters or notices to residents in and near the API to advise them of changes in pedestrian, bicycle or transit routes during construction
- Prepare and distribute written notices in English and Spanish that concern construction activities and changes or closures to roads, transit routes, and pedestrian and bicycle facilities
- Shield and/or focus construction on work areas to minimize glare and spillover of ambient light into adjacent areas.

As part of design efforts, ODOT would prepare an overall traffic management plan, as well as work zone traffic control plans, to be used during construction, which would consider: detours, flaggers, time of day lane closure restrictions, weekend closure restrictions, staging plans, identifying detours, preserving pedestrian linkages, Americans with Disabilities Act considerations, and local access considerations.

ODOT would also prepare a public involvement plan for project construction outreach to engage those affected during project construction. ODOT would keep the project website up to date to reflect current information including construction activities.

Mitigation for Long-term Impacts

Avoidance and Minimization Measures

The East DS1 and East DS2 Alternatives have been designed to incorporate the following measures that would avoid or minimize adverse impacts:

- Transportation system management components such as intelligent transportation system improvements and ramp metering
- Signal coordination on 3rd Street to encourage southbound trips to stay on that corridor south of Empire Avenue instead of turning onto Empire Avenue to access US 97 to the south

- A maximum of four travel lanes and no signals on US 97 north of Empire Avenue, and a maximum of two through travel lanes plus an auxiliary lane in each direction on US 97 between Empire Avenue and Butler Market Road
- Optimizing turn lane improvements at the 3rd Street/Empire Avenue intersection to reduce the total number of through traffic lanes
- Reducing the number of left-turn lanes on Empire Avenue at the US 97 interchange to a single left-turn lane in each direction
- Improving Hunnell Road north of Cooley Road to county standards
- Extension of Robal Road to O.B. Riley Road.

Specifically, the East DS1 Alternative included the following elements to avoid or minimize impacts:

- 3rd Street from Grandview Drive north to the US 97 interchange was reduced to one through travel lane in each direction plus a center left turn lane at key intersections.

Specifically, the East DS2 Alternative included the following elements to avoid or minimize impacts:

- 3rd Street north of Grandview Drive to the US 97 on- and off-ramps was reduced to one through travel lane in each direction.

The Preferred Alternative was designed to include the following elements to avoid or minimize impacts:

- Transportation system management components such as intelligent transportation system improvements and ramp metering (see Section 2.1.2 for more detail on specific transportation system management measures incorporated into the Preferred Alternative)
- Signal coordination on 3rd Street to encourage southbound trips to stay on that corridor south of Empire Avenue instead of turning onto Empire Avenue to access US 97 to the south
- A maximum of three through travel lanes on northbound US 97 between Butler Market Road and Empire Avenue; a maximum of two travel lanes plus an auxiliary lane on southbound US 97 between Empire Avenue and Butler Market Road
- Optimizing turn lane improvements at the 3rd Street/Empire Avenue intersection to reduce the total number of through traffic lanes
- Reducing the number of left-turn lanes on Empire Avenue at the US 97 interchange to a single left-turn lane in each direction
- Sufficient storage lengths for turn lanes at the 3rd Street intersection with US 97 north of Grandview Drive

- Extension of Britta Street to the US 20/Robal Road intersection
- Avoid locating roadway improvements on natural lands outside the UBG.

Mitigation Measures

The East DS1 and East DS2 Alternatives would improve the overall operations and safety of the transportation system. There is one location where the v/c ratio would be worse under the East DS1 Alternative compared to the 2035 No Build Alternative: O.B. Riley Road at Empire Avenue. The v/c ratio at this intersection for the 2035 No Build Alternative would be 0.86 whereas the v/c ratio would be 1.01 for East DS1 and East DS2 Alternatives. The following measure could be taken to the extent practicable to mitigate this long-term adverse impact to the transportation system:

- Mitigation to be undertaken by the City of Bend is recommended at O.B. Riley Road at Empire Avenue, including additional turn lanes for northbound O.B. Riley Road and for westbound Empire Avenue, along with signal modifications.

The following measures could be taken to the extent practicable to mitigate other long-term adverse impacts to the transportation system:

- Intersection improvements at 3rd Street and Clausen Drive would not meet criteria for installation of a traffic signal (warrants); thus, no mitigation beyond improvements contained in each build alternative are recommended
- Although transit improvements are not part of the purpose and need for the proposed action, establishing directional signage such as to direct transit users to the transit park-and-ride facility at Cascade Village Shopping Center is recommended due to changes in travel routes around the US 20/3rd Street/Robal Road area.

The Preferred Alternative includes adding turn lanes and a new signal at the Empire Avenue/O.B. Riley Road intersection.

3.1.5 Avoidance, Minimization, and/or Mitigation Commitments Incorporated into the Preferred Alternative

ODOT makes the following commitments:

- ODOT will prepare the overall traffic management plan, work zone traffic control plans, and a public involvement plan
- ODOT will shield and/or focus construction lighting in work areas to minimize glare and spillover of ambient light into adjacent areas.

3.2 Land Use

3.2.1 Regulatory Setting

This section provides background information on existing and planned land use, discusses possible impacts to land use by the proposed action, and includes potential mitigation measures that would prevent, diminish, or offset adverse land use impacts. This section also addresses the proposed action alternatives' compatibility and consistency with applicable land use plans and compliance with Oregon statewide planning goals.

Key Point

Land Use Actions

All land use actions required for the proposed action would occur prior to publication of the Final EIS.

Land use actions for the Preferred Alternative were completed prior to publication of the Final EIS.

Federal, State, Regional and Local Plans

Since 1973, Oregon has maintained a strong statewide program for land use planning. The foundation of that program is a set of 19 statewide planning goals. The goals express the state's policies on land use and on related topics, such as citizen involvement, housing, and natural resources. The statewide planning goals are implemented through administrative rules adopted by the Oregon Land Conservation and Development Commission and set out in OAR Chapter 660. Of particular importance to highway projects is OAR 660, Division 12, the Transportation Planning Rule.

Oregon's planning laws strongly emphasize coordination: keeping plans and programs consistent with each other, with the statewide planning goals, and with acknowledged local plans. OAR 731 Division 15 establishes the procedures used by ODOT to implement the provisions of its State Agency Coordination Program, which assure that its land use programs are carried out in compliance with the statewide planning goals and in a manner compatible with acknowledged comprehensive plans, as required by ORS 197.180 and OAR 660, Divisions 30 and 31.

Existing and Planned Land Use

The National Environmental Policy Act, 42 USC 4321 et seq., requires that all actions sponsored, funded, permitted, or approved by federal agencies be reviewed to ensure that environmental considerations such as impacts on land use are given due weight in project decision making. Federal implementing regulations are at 40 CFR 1500 1508 (Council on Environmental Quality) and 23 CFR 771 (FHWA). Council on Environmental Quality regulations and FHWA Technical Advisory T6640.8A require that an EIS include discussion of possible conflicts between the proposed action and the objectives of federal, tribal, regional, state, and local land use plans, policies, and controls for the area concerned, and the extent to which the agency would reconcile its proposed action with the plan or law.

Farmlands/Exclusive Farm Use Lands

The National Environmental Policy Act and the Farmland Protection Policy Act (7 USC 4201-4209; and its regulations, 7 CFR Part 658) require federal agencies to coordinate with the Natural Resources Conservation Service if their activities may irreversibly convert farmland (directly or indirectly) to non agricultural use. For purposes of the Farmland Protection Policy Act, farmland includes prime farmland, unique farmland, and land of statewide or local importance.

Oregon Statewide Planning Goal 3 defines "agricultural lands" and requires counties to inventory such lands and to "preserve and maintain" them through farm zoning as documented in the jurisdiction's comprehensive plan. Details on the uses allowed in farm zones are found in ORS Chapter 215 and in OAR, Chapter 660, Division 12 and Division 33.

3.2.2 Affected Environment

More information: Additional detail on land use is provided in the *Land Use/Planning/Parks and Recreational Facilities Technical Report* (ODOT 2014h). T*he Land Use/Planning/Parks and Recreational Facilities Technical Report* is listed in Appendix K and is available in the document library of the project's website (www.us97solutions.org).

The API includes land within the construction limits that could be converted from one land use to another as a direct impact of the proposed action. The area within which potential indirect land use impacts from the project may occur is the same as the cumulative impacts study area shown in Exhibit 4-4 FEIS. This area extends north of Tumalo Road to the Deschutes Market Road/Tumalo Junction interchange; east to 18th Street and to Deschutes Market Road; south to Revere Avenue; and west to follow O.B. Riley Road and the Old Bend Redmond Highway and includes the Urban Area Reserve lands west of the API.

The API is located within the planning jurisdiction of both Deschutes County and the northern portion of the City of Bend's city limits and UGB. The Bend Metropolitan Planning Organization is the federally designated regional transportation planning organization for Bend.It serves as a forum for cooperative transportation decision making by state and local governments, and regional transportation and planning agencies. Metropolitan planning organizations are charged with maintaining and conducting a continuing, cooperative, and comprehensive regional transportation planning and project programming process for the metropolitan area (Bend Metropolitan Planning Organization 2010).

Since the publication of the Draft EIS, the API along US 97 has been modified and generally extends along US 97 from Fort Thompson Lane to Butler Market Road in Bend (Exhibit 1-1 FEIS).

Federal, State, Regional and local Plans

Exhibit 3-17 FEIS summarizes the state, regional, and local plans and policies that guide land use and would be applicable to the proposed action. There are no applicable federal plans that guide land use in the API.

Exhibit 3-17 FEIS: *State, Regional, and Local Land Use Plans and Policies*

Regulatory Agency	Title and Date	Applicability
State		
Oregon Department of Land Conservation and Development	Oregon Statewide Planning Goals, established 1973 (Last amended 2005)	These goals constitute the framework of Oregon's statewide program of land use planning. The following statewide goals apply to the project: Goal 1 (Citizen Involvement)—Requires opportunity for citizens to be involved in all phases of the planning process. Goal 2 (Land Use Planning)—Requires planning coordination between local governments and state agencies; requires land use decisions and actions to be supported by an "adequate factual base;" requires land use actions to be consistent with adopted city, county and regional plans; and includes standards to taking an "exception" to one or more of the statewide planning goals. Goal 3 (Agricultural Lands)—Requires agricultural lands to be inventoried, preserved and maintained for farm use. Goal 6 (Air, Water and Land Resources Quality)—Addresses the quality of air, water and land resources. Goal 9 (Economy of the State)—Directs local governments to provide adequate opportunities for a variety of economic activities vital to the health, welfare and prosperity of Oregon citizens. This goal requires governments to inventory commercial and industrial lands to plan for economic development opportunities and the provision of an adequate supply of sites to serve a variety of industrial and commercial uses consistent with plan policies. Goal 10 (Housing)—Requires an adequate supply of buildable land for residential use and requires local plans to encourage the availability of adequate numbers of needed housing units at price ranges and rent levels which are commensurate with the salaries of the local population. Goal 11 (Public Facilities and Services)—Requires cities and counties to plan and develop a timely, orderly and efficient arrangement of public facilities and services for a framework for urban and rural development. Requires urban and rural development to be "guided and supported by types and levels of urban and rural public facilities and services appropriate for, but limited to, the needs and requirements of the urban, urbanizable and rural areas to be served." Goal 12 (Transportation)—Requires cities, counties, metropolitan planning organizations, and ODOT to provide and encourage a safe, convenient, and economic transportation system. Goal 13 (Energy Conservation)—Seeks to maximize the conservation of all forms of energy, based on sound economic principles. Goal 14 (Urbanization)—Regulates UGBs, which identify and separate urbanizable land from rural land, and establishes the basis for changing a UGB.
	Transportation Planning Rule (OAR 660-012) (Last amended 2012)	Established in 1991, the purpose of the Transportation Planning Rule is to guide the Department of Land Conservation and Development in its implementation of Statewide Planning Goal 12 (Transportation). It also establishes standards for exceptions to Statewide Planning Goals 3, 4 (Forest Lands), 11 and 14 to locate new highways and other urban scale transportation facilities or improvements on rural lands. Section 0060 is a statewide planning requirement that directs cities and counties to assess whether proposed plan amendments and zone changes will have a significant impact on the transportation system.

Exhibit 3-17 FEIS: *State, Regional, and Local Land Use Plans and Policies*

Regulatory Agency	Title and Date	Applicability
Oregon Department of Transportation	US Highway 97 Corridor Strategy (Madras–California Border) (1997)	This strategy sets forth objectives for the operation, preservation and improvement of transportation facilities within the US Highway 97 Corridor between Madras and the California border.
	Oregon Bicycle and Pedestrian Plan (Adopted 1995, Design Guide updated 2011)	The Oregon Bike and Pedestrian Plan is comprised of two parts: 1) Policy and Action Plan (adopted in 1995); and 2) Design Guide (updated in 2011) which outlines design guidelines for pedestrian and bicycle facilities. The Plan contains policies, but does not constitute a law or regulation.
	Oregon Highway Plan (2006, Last amended 2012)	The modal plan of the Oregon Transportation Plan that establishes performance standards and long range policies and investment strategies for the state highway system. In 2011, Mobility Standards and Access Management Policy Revisions were adopted by the Oregon Transportation Commission. In 2012, the Oregon Transportation Commission also adopted policy revisions on Freight Route Mapping and Tolling/Pricing.
	Bypass Policy (2003)	This policy, an amendment to the Oregon Highway Plan, outlines goals for new bypasses and identifies existing bypasses, including the Bend Parkway from Nels Anderson Place south to Romaine Village Way (mile post 134.76-141.83).
	Oregon Transportation Plan (2006)	Oregon's 20-year multimodal plan for the state's transportation system.
	Traffic Control (OAR 734-020) (1999)	This rule defines and establishes regulations for speed limits on Oregon highways.
	Highway Approaches, Access Control, Spacing Standards and Medians (OAR 734-051) (2004)	This rule regulates changes and uses of approaches to the state highway system, as well as access control, standards, and medians.
	Land Use Coordination (OAR 731-015) (1990)	OAR 731-015-0075 requires agencies proposing Class I NEPA (EIS) projects, such as the US 97 Bend North Corridor project, to determine consistency with relevant land use plans and policies.
Oregon Parks and Recreation Department	Oregon Trails 2005–2014: A Statewide Action Plan (2005)	Oregon's official plan for recreational trail management for the next 10 years, serving as a statewide and regional information and planning tool to assist Oregon recreation providers (local, state, federal and private) with trail opportunities and promoting access to Oregon's trails and waterways.
	2008–2012 Oregon Statewide Comprehensive Outdoor Recreation Plan (2008)	Oregon's basic five year plan for outdoor recreation. It provides information and recommendations to guide federal, state, and local units of government, as well as the private sector, in making policy and planning decisions.
State of Oregon	Oregon Revised Statutes (ORS)	ORS 197.732 (1983; last amended 2007) authorizes exceptions to the statewide planning goals as provided for in Oregon Land Conservation and Development Commission goals and administrative rules.

Exhibit 3-17 FEIS: *State, Regional, and Local Land Use Plans and Policies*

Regulatory Agency	Title and Date	Applicability
Regional		
Bend Park and Recreation District	Bend Metro Park and Recreation District 2012–2017 Strategic Plan (2013)	Provides direction regarding major park and recreation initiatives during a five-year planning period.
	Bend Urban Trails Plan/Map (2013)	The comprehensive plan for planning and developing trails as the Bend community grows. It is a joint plan between the Bend Park and Recreation District and the City of Bend.
	Parks, Recreation, and Green Spaces Comprehensive Plan (updated 2012)	The District's long range policy document that addresses issues identified by the Bend Park and Recreation District Board and the community. Reviewed every five years.
	Neighborhood Parks Plan (2008)	Map showing an inventory of the District's neighborhood parks and identifying proposed park areas.
	Trails Master Plan (2008)	Map showing District's 97-mile planned trail system. Includes a recommended level of service target.
	2015-2019 Capital Improvement Plan (2014)	Provides prioritization of projects for the next five years as well as information on funding sources for each project. Updated annually.
Bend Metropolitan Planning Organization	2007–2030 Metropolitan Transportation Plan (2007)	The Metropolitan Transportation Plan provides a coordinated framework for meeting the region's transportation needs for the next 20-25 years. The plan articulates several goals that are applicable to the US 97 Bend North Corridor project.
County		
Deschutes County	Deschutes County Code, Title 18 County Zoning (1979, last amended 2013)	Title 18, County Zoning, regulates land uses and development standards for the County's zoning districts. The entire County Code is updated annually in January.
	Deschutes County Comprehensive Plan (1979, last updated 2011)	Deschutes County's long range policy document that guides growth and development in areas outside of city UGBs from 2010-2030. This plan is updated approximately every 10 years.
	Deschutes County Transportation System Plan (1998, updated 2012)	Deschutes County's 20-year strategy for planning and implementing a wide range of transportation components including automobile, public transportation, bicycle, and pedestrian travel. The Transportation System Plan identifies that local public road approaches and direct private driveways onto US 97, and the opportunity to enhance the parallel local road network to redistribute local trips, are significant issues. The time horizon for the updated 2012 plan is 2010 through 2030.

***Exhibit 3-17 FEIS:** State, Regional, and Local Land Use Plans and Policies*

Regulatory Agency	Title and Date	Applicability
City		
City of Bend	Bend Area General Plan (1998)	The City's comprehensive plan, which is a long range policy document that guides growth and development in Bend. Reviewed and updated every five years.
	Bend Urban Area Transportation System Plan (2000; last amended 2013)	The Bend Urban Area Transportation System Plan is the City's strategy for planning and implementing a wide range of transportation components including automobile, public transportation, bicycle, and pedestrian travel in Bend (including urban reserve areas). The time horizon for the plan is 1996 to 2016. It recognizes that the section of US 97 north of the Sisters loop ramp to the UGB will continue to experience high traffic demands, and that measures will be necessary to assure the carrying capacity and safe operation of the highway.
	City of Bend Development Code (2006, last amended 2010)	This is the City's comprehensive land use and development code that regulates the use of land within the city limits of Bend.
	Northeast Bend Transportation Study (2008)	This is a city-led effort to coordinate transportation system planning, land use planning, and project development work underway in the northeast part of the City of Bend. This study has not been adopted by the City of Bend and has no legal standing but may be used as a background resource.

Note: This revised exhibit reflects updates to the plans and policies listed as well as clarifications based on comments received on the Draft EIS.

Existing Land Uses

Existing land uses are mapped in Exhibit 3-18. The existing land uses in the City of Bend portion of the API are primarily industrial and commercial. Within the City of Bend, the API includes a portion of the Boyd Acres Neighborhood, but residential areas are primarily located on the east side of the BNSF Railway right of way, beyond the API. In the north, in Deschutes County, land uses are primarily non-commercial agriculture with rural residential uses and some areas of open space. The non-commercial agriculture land use, with or without a dwelling, consists of land zoned by Deschutes County as Multiple Use Agriculture, which is a rural residential zone that allows hobby agriculture uses on land that has been identified as not suitable for full time commercial farming. The Hunnell Neighborhood, which includes the 26 properties along Quail Haven Drive and Rogers Road represented by the Hunnell Hills Homeowners Association, is located in Deschutes County north of Cooley Road between US 97 and US 20. There are no federal or tribal lands within the API.

Within the API, existing right of way for roads and utilities accounts for 32 percent of the existing land use, followed by non-commercial agricultural uses (with and without a dwelling), which accounts for a total of 23 percent of the existing land use, and commercial/industrial uses, which account for just under 20 percent of the existing land use (Exhibit 3-19 FEIS). Vacant parcels represent 13 percent of the existing land use.

Definition

Non-Commercial Agriculture

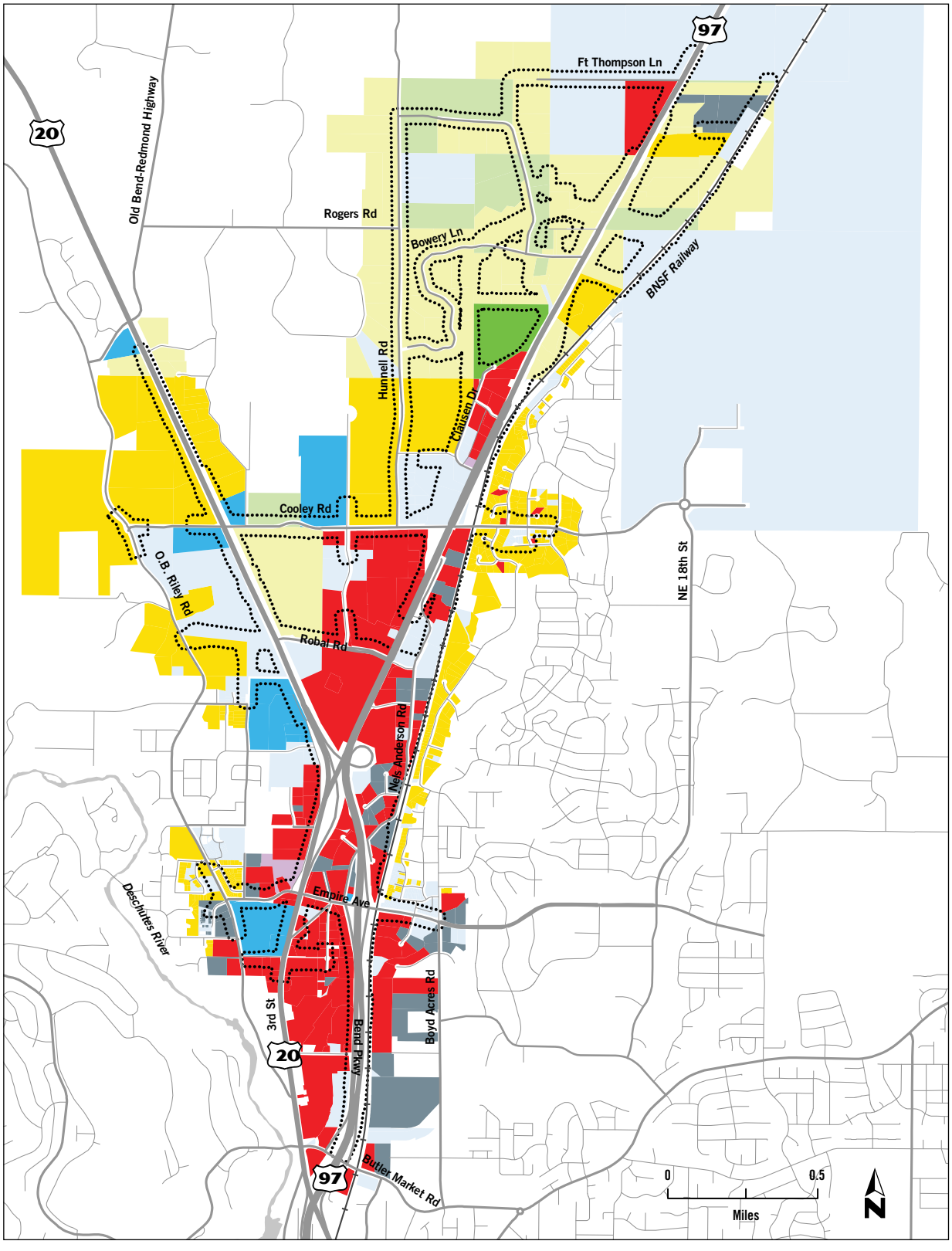
The non-commercial agriculture existing land use consists of land zoned by Deschutes County as Multiple Use Agriculture (MUA10) where the purpose of the zone is to preserve the rural character of the County while permitting development consistent with that character and the capacity of the natural resources of the area, and preserve agricultural lands not suited for full time commercial farming.

Key Point

Neighborhoods

Neighborhoods in the API are described in Section 3.5 Socioeconomic Analysis.

Exhibit 3-18: *Existing Land Uses*



Roadway | Railway | Area of Potential Impact | Water

Land Use

- Non-Commercial Agriculture (with dwelling)
- Non-Commercial Agriculture
- Commercial/Public/Institutional
- Industrial
- Open Space/Cemetery
- Public/Institutional
- Residential
- Commercial
- Vacant

Exhibit 3-19 FEIS: *Acres of Existing Land Uses in the API*

Existing Land Use	Total Area (Acres)	Percent of API
Non-commercial Agriculture (with dwelling)	~~149~~ 150	18%
Non-commercial Agriculture (without dwelling)	39	5%
Commercial/Industrial	~~151~~ 156	18%
Commercial, Public, Institutional (multiple uses on a single parcel)	2	<1%
Existing Right of Way	~~265~~ 272	32%
Industrial	31	4%
Open Space/Cemetery	9	1%
Public/Institutional (includes churches)	~~19~~ 23	2%
Residential	~~54~~ 55	7%
Vacant	~~103~~ 107	13%
Total	~~**821**~~ **844**	**100%**

Source: Deschutes County 2011b, Bing Maps 2011.

Note: Since the publication of the Draft EIS, the API was revised to include areas that will potentially be impacted by the Preferred Alternative, resulting in changes to acres of existing land uses in the API.

Existing land uses are generally consistent with the City of Bend and Deschutes County zoning and comprehensive plan designations. Exhibit 3-20 FEIS lists the City of Bend and Deschutes County zoning designations in the API and provides the total area of each zone in acres. Exhibit 3-21 FEIS shows the locations of these zoning designations relative to the API.

The City of Bend has three Special Planned Districts within or near the API, which describe in more detail than the comprehensive plan and zoning designations the type of development planned for a specific area.

- The first is an Upland Area of Special Interest, located west of Hunnell Road and south of Cooley Road, near the API but not within it. These are scattered areas that represent prominent rock outcrops and rock ridges and provide high points that break the line of sight to give the feeling of being in a rural or open space setting in an urban area.
- The second is the Lava Ridge Refinement Plan area located east of the BNSF Railway right of way at Empire Avenue and Cooley Road. This area is generally bounded by Cooley Road to the north, Empire Avenue to the south, the BNSF Railway right of way to the west, and Bend city limits to the east. The purpose of the Lava Ridge Refinement Plan is to create overlay development

standards for the residential and commercial districts within the refinement plan area.

- The third is the Juniper Ridge Overlay Zone located on the east side of US 97 from the north side of Cooley Road north to just north of Bowery Lane. The planned Juniper Ridge project would include land designated for employment, educational and research opportunities, a town center, and residential neighborhoods.

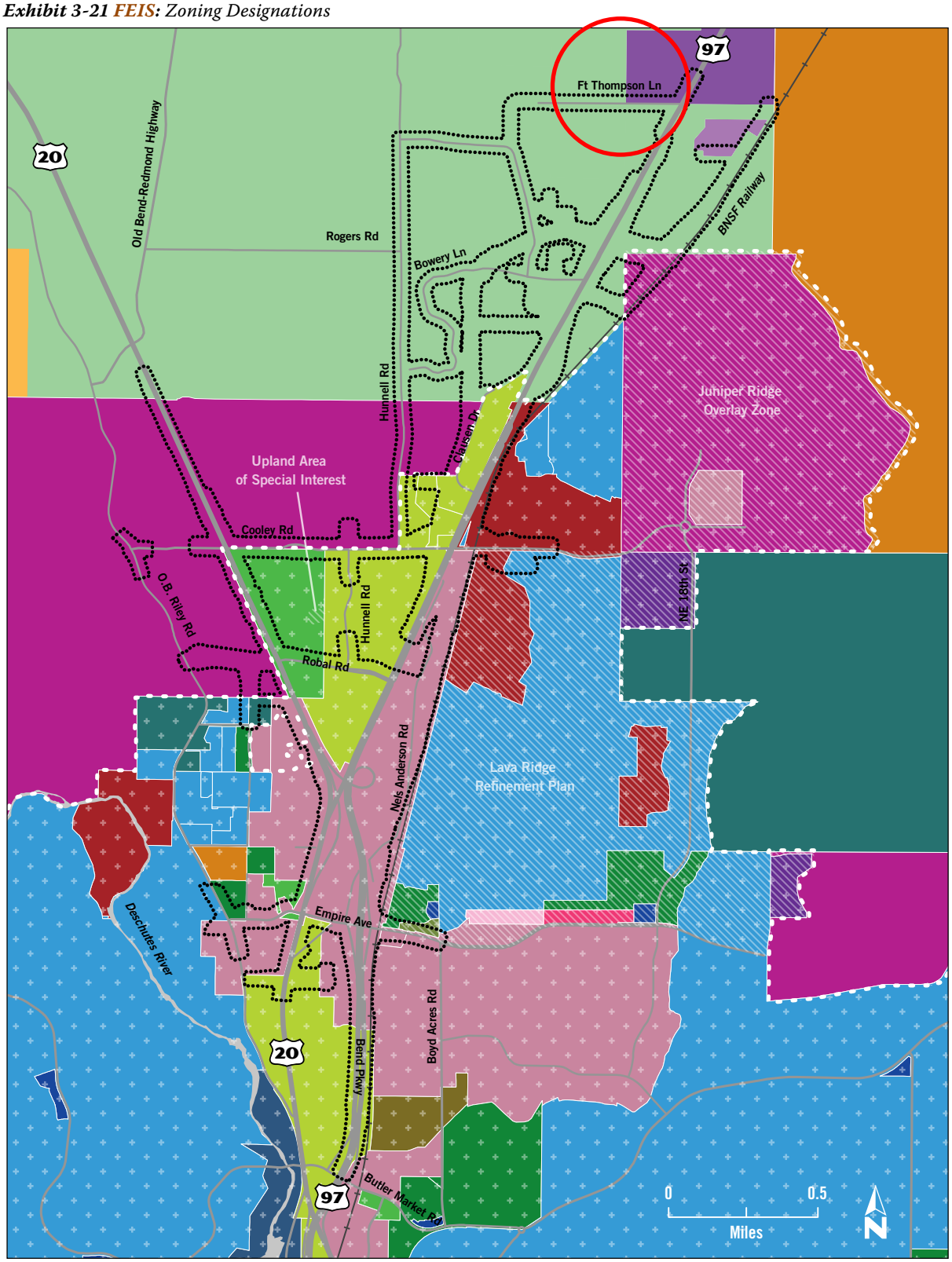
Exhibit 3-20 FEIS: *Acres of Zoning Designations in the API*

Acronym	Zoning Designation	Total Area (Acres)	Percent of API
City of Bend			
CG	Commercial General	~~139~~ 146	17%
IL	Industrial Light	~~221~~ 228	27%
ME	Mixed Employment	~~36~~ 9	~~4%~~ 1%
RH	Residential Urban High Density	2	<1%
RL	Residential Urban Low Density	32	4%
RM	Residential Urban Medium Density	5	1%
RS	Residential Urban Standard Density	~~10~~ 11	1%
SR2 1/2	Residential Suburban Low Density	~~2~~ 3	<1%
Deschutes County			
EFUAL	Exclusive Farm Use – Alfalfa Subzone	~~1~~ <1	<1%
EFUTRB	Exclusive Farm Use – Tumalo/ Redmond/Bend Subzone	~~5~~ 0	~~1%~~ 0%
MUA10	Multiple Use Agriculture	~~258~~ 262	31%
OS&C	Open Space and Conservation	8	1%
RI	Rural Industrial	5	1%
UAR10	Urban Area Reserve	~~97~~ 133	~~12%~~ 16%
TOTAL		**~~821~~ 844**	**100%**

Source: Deschutes County 2011b.

Note: Since the publication of the Draft EIS, the API was revised to include areas that would potentially be impacted by the Preferred Alternative. In addition, one of the parcels in the API as shown in the Draft EIS was rezoned from Exclusive Farm Use – Tumalo/Redmond/Bend Subzone (EFUTRB) to Multiple Use Agriculture (MUA10). These changes are reflected in the updated acreage and percentages in the table.

***Exhibit 3-21 FEIS:** Zoning Designations*



Note: This revised exhibit reflects the rezoning of one parcel (see red circle) on the north side of Fort Thompson Lane from Exclusive Farm Use – Tumalo/Redmond/Bend Subzone (EFUTRB) to Multiple Use Agriculture (MUA10).

In response to comments received on the Draft EIS, the term "hobby agriculture/farming" that was used to describe agricultural activities in the northern end of the API is better characterized as "non-commercial agriculture/farming." In this area of the API, irrigation provided by the Swalley Irrigation District supports the non-commercial agriculture land uses.

Planned Land Use

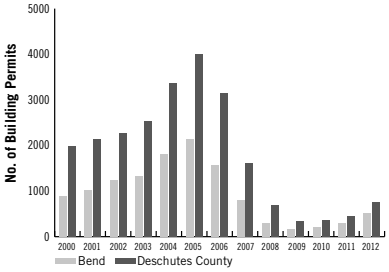
Until recently, Bend has experienced many years of rapid growth. The City's population more than doubled in size in a 13 year period growing from 29,425 in 1995 to 81,640 in 2008. The recent economic downturn, however, has affected Central Oregon more severely than other areas of the state, and development in Bend has slowed tremendously. The number of building permits issued by the City of Bend peaked in 2005 at 2,142 permits. By comparison, only 289 permits were issued in 2008; approximately an 87 percent decrease (Exhibit 3-22 FEIS).

The City of Bend's 2008 update of the City's Buildable Lands Inventory shows that the City of Bend had approximately 3,237 acres of unconstrained land within its UGB as of September 2008. Approximately 1,900 acres of this area are residential lands, primarily located within the Residential Urban Standard Density zone (Exhibit 3-23). The Buildable Lands Inventory also shows that there are approximately 1,247 acres of unconstrained vacant employment lands, the majority of which are located within the Industrial Light zone (City of Bend 2008b).

Development rates and population growth in Bend have slowed since the mid 2000s concurrent to the downturn in the national economy. However, as listed in Chapter 4, there are still a number of current and reasonably foreseeable development actions in the vicinity of the API.

Since the publication of the Draft EIS, the number of building permits issued by the City of Bend reached a low point in 2009 when 160 permits were issued; approximately a 93 percent decrease from the peak of 2,142 permits in 2005 (Exhibit 3-22 FEIS). Though Bend's population decreased to 77,455 in 2012, since 2009 the number of building permits issued has steadily increased; 505 permits were issued in 2012, showing that the region is gradually recovering from the economic downturn.

Exhibit 3-22 FEIS: *Number of Building Permits in Bend and Deschutes County 2000-2012*



Source: US Census Bureau 2013.

Note: This revised exhibit provides updated data on building permits issued.

Definition

Unconstrained Land

Unconstrained land is land with no development constraints (such as lack of public road access) or physical constraints over 50 percent of the parcel (which includes slopes greater than 25 percent, areas of special interest, and floodplains).
Source: City of Bend 2008b

Exhibit 3-23: *City of Bend Buildable Lands Inventory*

Acronym	Zoning Designation	Redevelopable[1] Acres	Unconstrained[2] Vacant Acres	Constrained[3] Vacant Acres
CBD	Central Business District	0	0	0
CC	Commercial Convenience	0	12	0
CG	Commercial General	0	128	5
CL	Commercial Limited	0	96	0
IG	Industrial General	0	13	0
IL	Industrial Light	0	662	0
IP	Industrial Park	0	23	0
ME	Mixed Employment	0	106	0
MR	Mixed Use Riverfront	0	31	4
PF	Public Facilities	0	126	0
PO	Professional Office	0	6	0
PO/RM/RS	Professional Office/Residential Urban Medium Density/Residential Urban Standard Density	0	3	0
RH	Residential Urban High Density	1	24	0
RL	Residential Urban Low Density	78	56	56
RM	Residential Urban Medium Density	141	198	0
RS	Residential Urban Standard Density	697	1,712	116
SM	Surface Mining	0	41	0
TOTAL		917	3,237	181

Source: City of Bend 2008b.

Note: The Buildable Lands Inventory does not identify the location of these vacant lands, so it is not possible to calculate how many of the vacant acres are located within the API.

[1] Redevelopable residential lots can double the number of dwelling units on the lot, are greater than 0.5 acre, have a land value greater than improvement value, and have no Codes, Covenants and Restrictions prohibiting future land division. There are no redevelopable employment lands—lots are either developed or vacant under OAR 660-009.

[2] Unconstrained lots are land with no development constraints (such as lack of public road access) or physical constraints over 50 percent of the parcel (which includes slopes greater than 25 percent, areas of special interest, and floodplains).

[3] Constrained lots are those with development constraints (such as lack of public road access) or with physical constraints over 50 percent of the lot (includes slopes greater than 25 percent, areas of special interest, and floodplains).

Farmlands/Exclusive Farm Use Lands

Non-commercial agriculture uses (with or without residences) cover approximately 188 acres of land in the API, primarily in areas zoned Multiple Use Agriculture and Urban Area Reserve. Approximately 6 acres of land within the API are zoned as Exclusive Farm Use. These six acres are currently vacant and are not in use as commercial agriculture.

Exhibit 3-24 FEIS identifies the soil type, the farmland rating of each soil type identified by the Natural Resources Conservation Service, the acres of each soil type, and the acres of each soil type currently used for agriculture (US Department of Agriculture 2010). The areas rated by the Natural Resources Conservation Service as prime farmland if irrigated and farmland of statewide importance are shown in Exhibit 3-25.

Exhibit 3-24 FEIS: *Soil Type, Natural Resources Conservation Service Farmland Rating, and Acres*

Soil Type	Natural Resources Conservation Service Farmland Rating	Total Area (Acres)	Percent of API	Area Currently Used for Non-commercial Agriculture (Acres)
Clovkamp loamy sand, 0 to 3 percent slopes	Prime farmland if irrigated	4	<1%	0
Deskamp loamy sand, 0 to 3 percent slopes	Prime farmland if irrigated	36	4%	21
Houstake sandy loam, 0 to 3 percent slopes	Prime farmland if irrigated	4	<1%	1
Deschutes Stukel complex, 0 to 15 percent slopes	Farmland of statewide importance	~~27~~ 28	3%	0
Deskamp Gosney complex, 0 to 8 percent slopes	Farmland of statewide importance	~~480~~ 489	58%	~~119~~ 124
Wanoga sandy loam, 0 to 15 percent slopes	Farmland of statewide importance	~~4~~ 5	<1%	0
Wanoga Fremkle Rock outcrop complex, 0 to 15 percent slopes	Farmland of statewide importance	~~39~~ 40	~~5%~~ 6%	0
Gosney Rock outcrop Deskamp complex, 0 to 15 percent slopes	Not prime farmland	~~227~~ 229	28%	47
TOTAL		**~~821~~ 844**	**100%**	**~~188~~ 193**

Source: Deschutes County 2011b, Bing Maps 2011.

Note: Since the publication of the Draft EIS, the API was revised to include areas that would potentially be impacted by the Preferred Alternative, resulting in changes to acres of soil type and rating in the API.

Of the eight soil types found in the API, none are rated by the Natural Resources Conservation Service as prime farmland without conditions, namely irrigation. Three soil types are rated as prime farmland soils if irrigated; these soil types represent just 5 percent of the API, and some of this land is not currently irrigated. Approximately 22 acres of prime farmland if irrigated are currently used for non-commercial agriculture. More than 67 percent of the API (550 acres) contains one of the four soil types rated by the Natural Resources Conservation Service as farmland of statewide importance; 119 acres of farmland of statewide importance are currently used for non-commercial agriculture. It should be noted that much of the soil types rated as farmland of statewide importance are found in areas developed with urban uses.

Since the release of the Draft EIS, the API has been revised to include areas that would potentially be impacted by the Preferred Alternative. Non-commercial agriculture uses (with or without residences) cover approximately 189 acres of land in the API, primarily in areas zoned Multiple Use Agriculture and Urban Area Reserve. As shown in Exhibits 3-20 FEIS and 3-21 FEIS, one parcel in the API was rezoned from Exclusive Farm Use – Tumalo/Redmond/Bend Subzone (EFUTRB) to Multiple Use Agriculture (MUA10) since the publication of the Draft EIS. Less than 1 acre of land within the API is zoned as Exclusive Farm Use; this land is currently vacant and is not in use as commercial agriculture.

Definitions

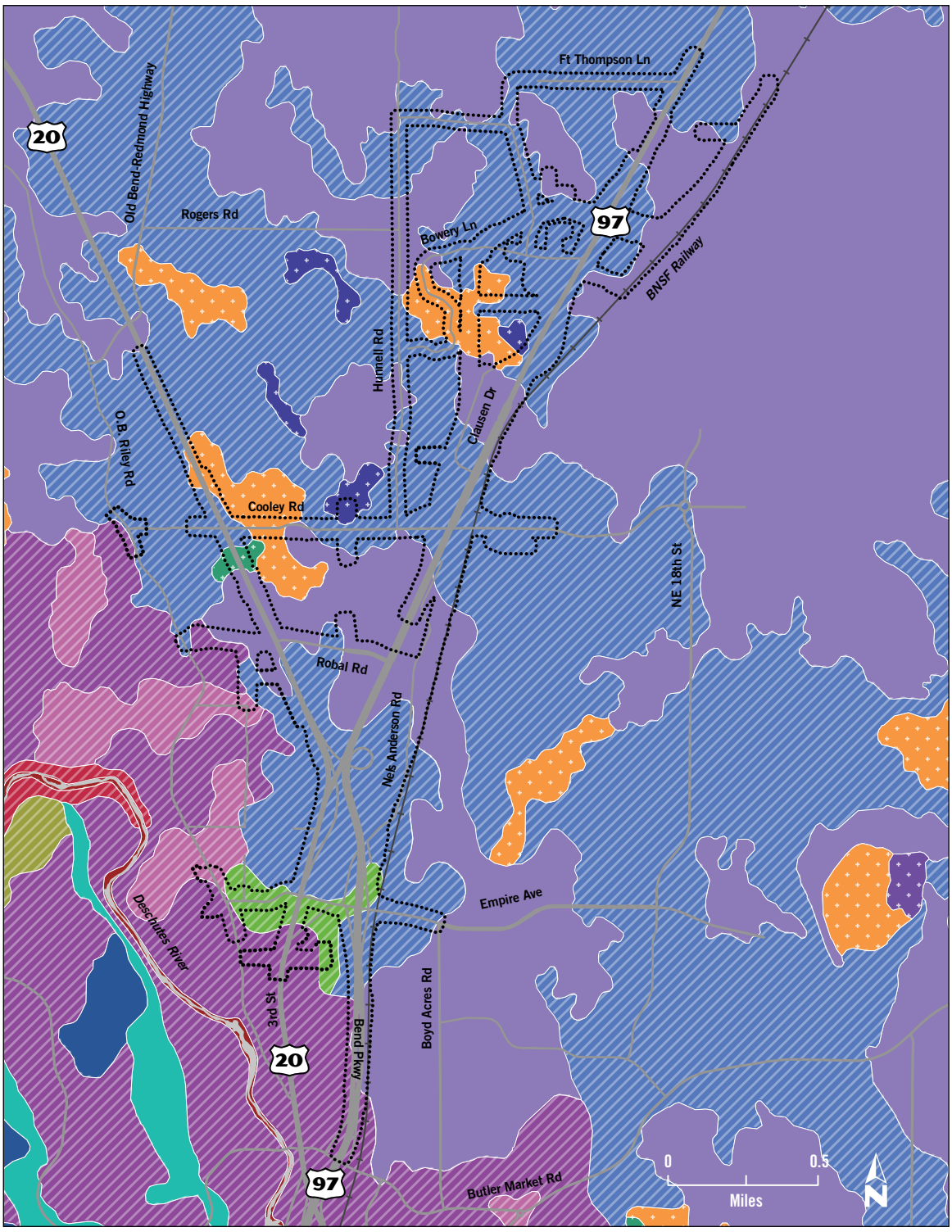
Prime Farmland

Prime farmland is a category of protected and highly productive cropland that is recognized by the US Department of Agriculture's Natural Resources Conservation Service.

Farmland of Statewide Importance

Farmland of Statewide Importance is a category of land recognized by the US Department of Agriculture's Natural Resources Conservation Service for land other than prime farmland which has a good combination of physical and chemical characteristics for the production of crops.

Exhibit 3-25: *Soil Types*



Existing Roadway | Railway | Area of Potential Impact | Farmland of statewide importance | Prime farmland if irrigated

Soil Type

- Clovkamp loamy sand, 0 – 3% slopes
- Clovkamp loamy sand, bedrock substratum, 0 – 3% slopes
- Deschutes-Stukel complex, 0 – 15% slopes
- Deskamp loamy sand, 0 – 3% slopes
- Deskamp-Gosney complex, 0 – 8% slopes
- Gosney-Rock outcrop-Deskamp complex, 0 – 15% slopes
- Henkle-Fryrear-Lava flows complex, 0 – 15% slopes
- Henkle-Lava flows-Fryrear complex, 15 – 50% slopes
- Houstake sandy loam, 0 – 3% slopes
- Redcliff-Lickskillet-Rock outcrop complex, 30 – 50% south slopes
- Wanoga sandy loam, 0 – 15% slopes
- Wanoga sandy loam, 15 – 30% slopes
- Wanoga-Fremkle-Rock outcrop complex, 0 – 15% slopes

In addition, the revision of the API to accommodate the Preferred Alternative changed the acres in certain soil types and ratings (Exhibit 3-24 FEIS). More than 68 percent of the API (571 acres) contains one of the four soil types rated by the Natural Resources Conservation Service as farmland of statewide importance; 124 acres of farmland of statewide importance are currently used for non-commercial agriculture.

3.2.3 Environmental Consequences

This section addresses the potential adverse and beneficial direct, indirect, and temporary impacts to land use from the No Build Alternative and the East DS1 and East DS2 Alternatives. Direct impacts would be long term or permanent impacts that result from implementing the East DS1 Alternative or East DS2 Alternative and that are associated with the operation and maintenance of the facility. Indirect impacts discuss reasonably foreseeable impacts that may occur later in time or farther in distance, while temporary impacts are associated with construction activities.

This section also addresses the potential adverse and beneficial direct, indirect, and temporary impacts to land use from the Preferred Alternative.

No Build Alternative

Federal, State, Regional, and Local Plans – Exhibit 3-26 FEIS provides a summary of the No Build Alternative's consistency with applicable plans and policies.

The No Build Alternative would not require exceptions to the Oregon statewide planning goals. However, the No Build Alternative would be inconsistent with the Transportation Planning Rule, which implements Statewide Planning Goal 12 (Transportation) because, along this section of US 97, it would not be providing a safe, convenient, or economic transportation system.

A portion of the US 97 corridor, from Nels Anderson Place south, is already designated as a bypass under ODOT's *Bypass Policy*. Therefore, the No Build Alternative would be consistent with this policy.

The *Deschutes County Comprehensive Plan* is in the process of being updated. The current and draft *2030 Deschutes County Comprehensive Plan* includes agricultural and urbanization goals. The No Build Alternative would not change the existing use of agricultural lands, would not alter the City of Bend's UGB, and would not change existing or planned land uses as specified in *Deschutes County Code, Title 18 County Zoning*. Therefore, the No Build Alternative would be consistent with the current and draft *2030 Deschutes County Comprehensive Plan* and *Deschutes County Code, Title 18 County Zoning*.

More Information

No Build Alternative

The No Build Alternative is described in Section 2.1.1 Alternatives.

Definition

Bypass

Bypasses are highways designed to maintain or increase mobility for through traffic. Generally, they relocate the highway alignment around a downtown, an urban or metropolitan area, or an existing highway to provide an alternative route for through traffic using that highway

***Exhibit 3-26 FEIS:** Summary of Plan Consistency for the No Build Alternative*

Regulatory Agency	Plan Title	Consistency
State		
Oregon Department of Land Conservation and Development	Oregon Statewide Planning Goals (including the Transportation Planning Rule (OAR 660-012))	Inconsistent
ODOT	US Highway 97 Corridor Strategy (Madras California Border)	Inconsistent
	Oregon Bicycle and Pedestrian Plan	Consistent
	Oregon Highway Plan	Inconsistent
	Bypass Policy	Consistent
	Oregon Transportation Plan	Inconsistent
	Traffic Control (OAR 734-020)	Consistent
	Highway Approaches, Access Control, Spacing Standards and Medians (OAR 734-051)	~~Consistent~~ Inconsistent
	Land Use Coordination (OAR 731-015)	Consistent
Oregon Parks and Recreation Department	Oregon Trails 2005 2014: A Statewide Action Plan	Consistent
	2008-2012 Oregon Statewide Comprehensive Outdoor Recreation Plan	Consistent
State of Oregon	Oregon Revised Statutes (ORS 197.732)	Consistent
Regional		
Bend Park and Recreation District	Bend Metro Park and Recreation District ~~2006-2010~~ 2012-2017 Strategic Plan	Consistent
	Bend Urban Trails Plan/Map	Consistent
	Parks, Recreation, and Green Spaces Comprehensive Plan	Consistent
	Neighborhood Parks Plan	Consistent
	Trails Master Plan	Consistent
	2015-2019 Capital Improvement Plan	Consistent
Bend Metropolitan Planning Organization	2007-2030 Metropolitan Transportation Plan	Inconsistent
County		
Deschutes County	Deschutes County Code, Title 18 County Zoning	Consistent
	Deschutes County Comprehensive Plan	Consistent
	Deschutes County Transportation System Plan	Inconsistent
City		
City of Bend	Bend Area General Plan	Inconsistent
	Bend Urban Area Transportation System Plan	Inconsistent
	City of Bend Development Code	Consistent
	Northeast Bend Transportation Study	Inconsistent

Note: If the No Build Alternative is inconsistent with any aspect of a plan document it is categorized as inconsistent.

The 1998 *Bend Area General Plan* is the City of Bend's comprehensive plan that guides long range growth and development in Bend. Several goals of the *Bend Area General Plan* are related to land use and transportation. The No Build Alternative would not change existing or planned land uses as specified by the *Bend Area General Plan* and the *City of Bend Development Code*, and so it would be consistent with the *City of Bend Development Code* and the land use goals of the *Bend Area General Plan.* The No Build Alternative would not minimize traffic congestion or make transportation improvements that would maximize efficiency or mobility, so it would be inconsistent with the transportation goals specified in the *Bend Area General Plan.*

More Information

Comprehensive Plan Goals

The *Land Use/Planning/Parks and Recreational Facilities Technical Report* contains more detail on the applicable land use and transportation goals included in the current and draft 2030 *Deschutes County Comprehensive Plan* and the *Bend Area General Plan.*

The *2030 Deschutes County Comprehensive Plan* update was completed and adopted in 2011.

In general, the No Build Alternative would be inconsistent with: the *US Highway 97 Corridor Strategy (Madras California Border)*; the *Oregon Highway Plan*; the *Oregon Transportation Plan*; the *Deschutes County Transportation System Plan*; the *2007–2030 Metropolitan Transportation Plan*; the *Bend Area General Plan*; and the *Bend Urban Area Transportation System Plan* because it would not reduce congestion, improve mobility, or improve public safety on US 97 for trucks and automobiles. In addition, the No Build Alternative would also be inconsistent with the *Bend Urban Area Transportation System Plan* because it would not widen US 97, construct a grade-separated interchange at the intersection of Cooley Road and US 97, or conduct an interchange area management plan. In addition, the No Build Alternative would be inconsistent with the *Northeast Bend Transportation Study* because it would not accommodate local trips off US 97.

The No Build Alternative would not minimize traffic congestion or make transportation improvements that maximize efficiency or mobility.

Since the publication of the Draft EIS, the 2030 Deschutes County Comprehensive Plan update was completed and adopted by the Deschutes County Board of County Commissioners in 2011 (Ordinance 2011-003). The No Build Alternative would be consistent with the updated 2030 Deschutes County Comprehensive Plan.

Existing Land Use – The No Build Alternative would not require the acquisition of right of way. Therefore, the No Build Alternative would not result in changes to existing land uses (or to land uses specified by the City of Bend and Deschutes County comprehensive plan and zoning designations), residents or businesses would not be displaced, and access to all existing land uses would remain unchanged. Existing land uses could be adversely impacted by increased congestion and reduced mobility under the No Build Alternative, which could make it more difficult for property owners and tenants to continue the current

use of their properties, particularly for "drive-by" commercial land uses that depend on being easily accessible to customers.

Planned Land Use—The No Build Alternative would not preclude the current and reasonably foreseeable development actions planned in the vicinity of the proposed action, such as:

- commercial and residential development
- park development
- public development
- roadway improvements
- trail improvements
- transit facilities
- urban area reserve lands and
- utility improvements.

The No Build Alternative would not require changes to zoning, would not impact the inventory of buildable lands, would not change planned or allowed land uses, and would neither speed nor impede planned development. However, under the No Build Alternative, congestion would increase and traffic flow would decrease, and planned development may be impacted by these changes in traffic conditions. While the No Build Alternative would not facilitate or prevent particular types of land uses, the impacts from congestion and traffic flow could be greater for "drive-by" commercial uses compared to "destination" commercial uses or residential uses. This is because customers are likely to seek out destination businesses, even if travel times become longer or congestion makes it more difficult to reach them, while drive-by businesses would be more likely to have fewer patrons if customers perceive it to be inconvenient to travel to them.

Farmlands/Exclusive Farm Use Lands—With the No Build Alternative, no right of way would be acquired, so no land currently used for non-commercial agriculture, designated by Deschutes County as Exclusive Farm Use, or identified by the Natural Resources Conservation Service as prime farmland if irrigated or farmland of statewide importance would be converted to a transportation land use.

East DS1 Alternative

Federal, State, Regional, and Local Plans—Exhibit 3-27 FEIS provides a summary of the East DS1 Alternative's consistency with applicable plans and policies.

More Information

Current and Reasonably Foreseeable Actions

Chapter 4, Cumulative Impacts, includes a list of current and reasonably foreseeable development actions planned in the vicinity of the proposed action.

Key Differences

	East DS1	East DS2	Preferred Alternative
Land Acquired and Converted	180 acres	131 acres	82 acres
Prime Farmland Acquired and Converted	5 acres	2 acres	0.07 acre

The East DS1 Alternative would require two exceptions to the Oregon statewide planning goals. See the Review of Goal Exceptions Standards discussion below for more information.

Exhibit 3-27 FEIS: *Summary of Plan Consistency for the East DS1 and East DS2 Alternatives and Preferred Alternative*

Regulatory Agency	Plan Title	Consistency of East DS1 and East DS2 Alternatives	Consistency of Preferred Alternative
State			
Oregon Department of Land Conservation and Development	Oregon Statewide Planning Goals (including the Transportation Planning Rule (OAR 660-012))	~~Consistent subject to approval of goal exceptions.~~ Inconsistent. Would require exceptions to Goals 11 and 14.	Consistent
ODOT	US Highway 97 Corridor Strategy (Madras California Border)	Consistent	Consistent
	Oregon Bicycle and Pedestrian Plan	Consistent	Consistent
	Oregon Highway Plan	Consistent	Consistent
	Bypass Policy	Consistent subject to designations	Consistent subject to designations
	Oregon Transportation Plan	Consistent	Consistent
	Traffic Control (OAR 734-020)	Consistent	Consistent
	Highway Approaches, Access Control, Spacing Standards and Medians (OAR 734-051)	Consistent	Consistent
	Land Use Coordination (OAR 731-015)	~~Consistent subject to approval of goal exceptions.~~ Inconsistent. Would require goal exceptions.	Consistent
Oregon Parks and Recreation Department	Oregon Trails 2005 2014: A Statewide Action Plan	Consistent	Consistent
	2008-2012 Oregon Statewide Comprehensive Outdoor Recreation Plan	Consistent	Consistent
State of Oregon	Oregon Revised Statutes (ORS 197.732)	Consistent	Consistent
Regional			
Bend Park and Recreation District	Bend Metro Park and Recreation District 2012-2017 Strategic Plan	Consistent	Consistent
	Bend Urban Trails Plan/Map	Consistent	Consistent
	Parks, Recreation, and Green Spaces Comprehensive Plan	Consistent	Consistent
	Neighborhood Parks Plan	Consistent	Consistent
	Trails Master Plan	Consistent	Consistent
	2015-2019 Capital Improvement Plan	Consistent	Consistent
Bend Metropolitan Planning Organization	2007-2030 Metropolitan Transportation Plan	~~Consistent subject to approval of amendment~~ Inconsistent. Would require amendment.	Consistent

Exhibit 3-27 FEIS: *Summary of Plan Consistency for the East DS1 and East DS2 Alternatives and Preferred Alternative*

Regulatory Agency	Plan Title	Consistency of East DS1 and East DS2 Alternatives	Consistency of Preferred Alternative
County			
Deschutes County	Deschutes County Code, Title 18 County Zoning	Consistent subject to approval of land use permits	Consistent subject to approval of land use permits
	Deschutes County Comprehensive Plan	~~Consistent subject to approval of amendment.~~ Inconsistent. Would require an amendment to the TSP.	Consistent
	Deschutes County Transportation System Plan (TSP)	~~Consistent subject to approval of amendment. Inconsistent.~~ Inconsistent. Would require an amendment to the TSP.	Consistent
City			
City of Bend	Bend Area General Plan	~~Consistent subject to approval of amendment.~~ Inconsistent. Would require an amendment to the TSP.	Consistent—TSP was amended on March 5, 2014 to include the Preferred Alternative
	Bend Urban Area Transportation System Plan (TSP)	~~Consistent subject to approval of amendment.~~ Inconsistent. Would require an amendment to the TSP.	Consistent—TSP was amended on March 5, 2014 to include the Preferred Alternative
	City of Bend Development Code	Consistent subject to approval of land use permits	Consistent subject to approval of land use permits
	Northeast Bend Transportation Study	Consistent	Consistent

Note: This revised exhibit reflects corrections, updates to the plans and policies listed as well as clarifications based on comments received on the Draft EIS and a summary of plan consistency for the Preferred Alternative.

With the East DS1 Alternative, for the realigned portions of US 97, the existing expressway and freight route designations would need to be transferred from the existing alignment to the new alignment, and the Oregon Transportation Commission would need to apply the bypass designation north to the new northern interchange. With the bypass designation, the realigned portions of US 97 would be subject to the bypass policies and the design and operational standards for bypasses. Upon these designations, the East DS1 Alternative would be consistent with ODOT's *Bypass Policy* as US 97 would be access controlled and would function as an expressway.

The East DS1 Alternative would require the acquisition of right of way within Deschutes County which would result in converting existing and planned land uses, as specified in *Deschutes County Code, Title 18 County Zoning* and in the current and draft *2030 Deschutes County Comprehensive Plan*, to a transportation use. Land zoned by Deschutes County as Multiple Use Agriculture would be the primary zoning designation converted by the acquisitions; however, the East

DS1 Alternative would not change the existing zoning designation of land. Of the 180 acres that would be converted to a transportation use as part of the East DS1 Alternative, 77 acres are currently Multiple Use Agriculture lands. In most cases, only a strip of Multiple Use Agriculture land closest to the roadway would be converted to a transportation use; the remainder of the property could continue to be used for non-commercial agriculture and rural residential purposes. *Deschutes County Code, Title 18 County Zoning* specifies that Class I projects are permitted uses in all of the zones within the API, except for the Exclusive Farm Use zone, subject to the approval of a land use permit under the standards and criteria specified in Chapter 18.116.230. With the East DS1 Alternative no land zoned Exclusive Farm Use would be converted to a transportation use; therefore, the East DS1 Alternative would be consistent with *Deschutes County Code, Title 18 County Zoning* subject to approval of land use permits.

An amendment to the *Deschutes County Transportation System Plan* and *Deschutes County Comprehensive Plan*, would be required for the East DS1 Alternative because the alternative would construct a new northern interchange and new local roadways. Approval of the exceptions to the Oregon statewide planning goals would be required prior to amendment of the *Deschutes County Comprehensive Pla*n. Upon approval of the plan amendments, the East DS1 Alternative would be consistent with the *Deschutes County Transportation System Plan* and the current and draft *2030 Deschutes County Comprehensive Plan.*

By providing improvements to the transportation system that enable short local trips to use local roads (3rd Street), rather than US 97, and by limiting access to state highways the East DS1 Alternative would address congestion and make safety improvements in accordance with the goals of the Bend Metropolitan Planning Organization's *2007-2030 Metropolitan Transportation Plan*. For the East DS1 Alternative to be consistent with the *2007-2030 Metropolitan Transportation Plan* the plan's financially constrained list or illustrative list would need to be amended to include the East DS1 Alternative.

Key Point

ODOT is responsible for obtaining all required permits and plan amendments from local jurisdictions, as listed in Section 2.7 Permits and Approvals Needed.

The East DS1 Alternative would require the acquisition of right of way within the City of Bend, which would convert existing and planned land uses, as specified in *Bend Area General Plan* and *City of Bend Development Code*, to a transportation use. Partial acquisitions of properties could result in tax lots that are smaller than the minimum lot size required in the respective zone; however, uses on those properties would be allowed to remain. The primary City of Bend zoning designation of land that would be converted to a transportation use from the acquisitions is the Industrial Light zone. New local roads

outside of existing right of way would require the approval of land use permits from the City. Upon approval of such permits, the East DS1 Alternative would be consistent with the City of Bend Development Code. The Preferred Alternative, identified in the Final EIS, would need to be adopted and amended into the City of Bend's Bend Urban Area Transportation System Plan and Bend Area General Plan. Upon such an amendment, the East DS1 Alternative would be consistent with the *Bend Urban Area Transportation System Plan* and the *Bend Area General Plan*.

Key Point

There are no alternatives that would eliminate the need for exceptions to the Oregon Statewide Planning Goals and meet the project's purpose and need.

Subsequent to publication of the Draft EIS, the Preferred Alternative was developed. This alternative meets the purpose and need and does not require any goal exceptions.

The East DS1 Alternative would not require an exception to Statewide Planning Goal 3, Agricultural Lands. As noted in Exhibit 3-27 FEIS, the East DS1 Alternative is inconsistent with the Statewide Planning Goals 11 (Public Facilities and Services) and 14 (Urbanization), and thus requires approval of those goal exceptions.

Since the publication of the Draft EIS, the 2030 Deschutes County Comprehensive Plan update was completed and adopted by the Deschutes County Board of County Commissioners in 2011 (Ordinance 2011-003). The East DS1 Alternative is inconsistent with the Deschutes County Comprehensive Plan, the Deschutes County Transportation System Plan, the Bend Area General Plan, and the Bend Urban Area Transportation System Plan and thus requires amendments to the transportation system plans.

East DS1 and East DS2 Alternatives Review of Goal Exception Standards – US 97/3rd Street Interchange and Extension of Robal Road

The East DS1 and East DS2Alternatives would require the construction of a new extension of 3rd Street west of US 97, a new northern interchange, and an extension of Robal Road (as an urban transportation facility) west of US 20 to O.B. Riley Road, which would be outside of the City of Bend's current UGB. Construction of roadways outside of the UGB would require exceptions to Oregon's Statewide Planning Goals 11 (Public Facilities and Services) and 14 (Urbanization). Since the proposed new roadways would not convert land zoned Exclusive Farm Use to right of way, an exception to Statewide Planning Goal 3, Agricultural Lands, would not be required. For the East DS1 and East DS2 Alternatives, two goal exceptions are anticipated; one for the new US 97/3rd Street interchange and one for the extension of Robal Road.

Oregon Statewide Planning Goal 12 (Transportation) and the Transportation Planning Rule specify the state's policy to provide and encourage a safe, convenient, and economic transportation system, and require the adoption of transportation system plans to meet the needs for the movement of people and goods between and through communities. The exception process provides the framework for balancing the objectives of Goal 12 with the objectives of other statewide goals. Through the goal exception process, the East DS1 and East DS2 Alternatives would need to demonstrate that they meet the standards to grant exceptions for transportation improvements (listed in OAR 660-012-0070) as follows:

- **Describe the need, mode, function, and general location for the improvement**—For both the US 97/3rd Street interchange and the extension of Robal Road outside of the UGB this criterion could be met using the information contained in the EIS and supporting technical reports (Appendix K). The need for the proposed action is described in Chapter 1, and the mode, function, and general location of the East DS1 and East DS2 Alternatives is described in Chapter 2.

- **Justify why the applicable statewide goals should not apply** – The purpose and need statement included in Chapter 1 explains why the proposed action is needed. Chapter 2 explains how all of the identified build alternatives (excluding the Transportation System Management/Transportation Demand Management) would have required the same two goal exceptions, for improvements north of Cooley Road and the extension of Robal Road outside of the UGB, as the East DS1 and East DS2 Alternatives. The East DS1 and East DS2Alternatives meet the proposed action's purpose and need and attempt to minimize impacts to land outside of the UGB. Because these alternatives require an urban use and urban public facilities to be located on rural lands, exceptions to the statewide goals are needed.
- **Demonstrate that other locations that do not require a goal exception cannot accommodate the improvement** – As demonstrated in Chapter 2, the East DS1 and East DS2 Alternatives, both of which require the US 97/3rd Street interchange and the extension of Robal Road outside of the UGB, are the only two alternatives that meet the purpose and need for the proposed action. These alternatives were designed to minimize the amount of rural land needed to accommodate the identified transportation need. ODOT investigated other alternatives, but it could not develop alternatives fully within the UGB that could reasonably accommodate the identified transportation need.
- **Factors such as cost, operational feasibility, etc can be used as criteria to screen alternatives that do not require an exception** – Cost and operational feasibility were considered in the purpose and need screening for all alternatives considered, as described in Chapter 2.
- **Compare economic, social, environmental, and energy consequences** – For the US 97/3rd Street interchange the East DS1 and East DS2 Alternatives could result in the loss of non-commercial farmland, that is not zoned for Exclusive Farm Use. For both the US 97/3rd Street interchange and the extension of Robal Road outside of the UGB the East DS1 and East DS2 Alternatives could also result in changes in access to properties, changes in local circulation patterns, and fuel consumption, as well as other impacts identified in Section 3.5 Socioeconomic Analysis, Section 3.17 Energy, and other sections of Chapter 3. The East DS1 Alternative requires greater land acquisitions for improvements and results in greater fuel consumption compared to the East DS2 Alternative.
- **Assess adverse impacts on rural lands and other adjacent uses** – To construct the US 97/3rd Street interchange and extend Robal Road outside of the UGB, which would require goal exceptions, the East DS1 Alternative would result in the acquisition and conversion of 102 acres of land in Deschutes County. The East DS2 Alternative would require the acquisition and conversion of 56 acres of land in Deschutes County. The majority of this land is zoned Multiple Use Agriculture which allows for rural residential use with small scale agricultural practices.
- **Support continued rural use of surrounding lands and minimize accessibility of rural lands from the improvement** – An interchange area management plan would be developed for the US 97/3rd Street interchange with both the East DS1 and East DS2 Alternatives. This plan would require access restrictions that would deter the development of rural lands near the new interchange and would protect the long term function of the interchange. In addition, the new bypass would be access controlled and the US 97/3rd Street interchange would meet access control standards. With the East DS1 Alternative the US 97/3rd Street interchange would be a full diamond interchange that would allow all northbound and southbound movements on to and off of US 97. Compared to the East DS2 Alternative, the East DS1 Alternative could require additional measures to guarantee that the US 97/3rd Street interchange does not open up more access to rural lands. As discussed in Chapter 2, the purpose of the Robal Road extension (proposed with both the East DS1 and East DS2 Alternatives) would be primarily to mitigate for the closure of Xanthippe Lane for emergency service provider access and to relieve congestion at 3rd Street and Empire Avenue. For both the US 97/3rd Street interchange and the extension of Robal Road the East DS1 and East DS2Alternatives would not change the Deschutes County rural zoning designations; future development of land would have to comply with zoning restrictions.
- **The local government approving the exception to adopt findings that the standards in OAR 660-012-0070 have been met** – Deschutes County would be the local government approving the two goal exceptions for improvements outside of the Bend UGB. The County has been involved in the development of the proposed action and coordination with the County would continue through the selection of a preferred alternative and development of findings for the two goal exceptions.

Note: In response to comments on the Draft EIS, ODOT developed the Preferred Alternative, which does not require goal exceptions.

Existing Land Use – The East DS1 Alternative would require acquiring land for new right of way. As shown in Exhibit 3-28 FEIS, a total of 162 acquisitions would be required. Ninety-five acquisitions would involve only a portion of an existing parcel (including 2 easements), while 67 acquisitions would involve an entire parcel. The majority of the land in Deschutes County that would be acquired is located in the Multiple Use Agriculture zone (43 percent). *Deschutes County Code, Title 18 County Zoning* specifies that the purposes of the Multiple Use Agriculture zone include the preservation of the rural

character of the County while permitting development consistent with that character and the capacity of the natural resources of the area, and the preservation of agricultural lands not suited for full time commercial farming. These lands differ from those zoned Exclusive Farm Use, which have been designated as lands to be protected for the continuation of commercial-scale agriculture. The two zones differ in the uses permitted as well as the applicable development standards, such as minimum lot size. Construction of a Class I road project is a permitted use in the Multiple Use Agriculture zone, while in the Exclusive Farm Use zone such construction would require an exception to Statewide Planning Goal 3.

Exhibit 3-28 FEIS: *Acquisitions by Zoning Designation with the East DS1 Alternative*

Zoning Designation	Number of Partial Acquisitions	Number of Full Parcel Acquisitions	Number of Acres to be Acquired	Percent of Acres to be Acquired
City of Bend Zones				
Commercial General	19	3	15	8%
Industrial Light	13	40	56	31%
Mixed Employment	1	1	2	1%
Residential Urban High Density	0	0	0	0%
Residential Urban Low Density	6	8	4	2%
Residential Urban Medium Density	0	0	0	0%
Residential Urban Standard Density	8	3	1	1%
Residential Suburban Low Density	1	0	<1	<1%
City of Bend Subtotal	**48**	**55**	**78**	**43%**
Deschutes County Zones				
Exclusive Farm Use - Alfalfa Subzone	0	0	0	0%
Exclusive Farm Use - Tumalo/Redmond/Bend Subzone[1]	0	0	0	0%
Multiple Use Agriculture	32	10	77	43%
Open Space and Conservation	1	0	0	0%
Rural Industrial	2	0	2	1%
Urban Area Reserve	10	2	23	13%
Deschutes County Subtotal	**45**	**12**	**102**	**57%**
Easements				
BNSF Railway	1	0	0	0%
Swalley Main Canal	1	0	0	0%
Easements Subtotal	**2**	**0**	**0**	**0%**
Total	**95**	**67**	**180**	**100%**

Note: Some partial acquisitions require purchasing only access rights; no acreage would be acquired. Easements are also counted partial acquisitions as shown in this table.

[1]The API no longer includes land zoned Exclusive Farm Use – Tumalo/Redmond/Bend Subzone as a parcel on the north side of Fort Thompson Lane was rezoned since the publication of the Draft EIS.

Exhibit 3-29 FEIS: *Displacements by Zoning Designation with the East DS1 Alternative*

Zoning Designation	Number of Business Displacements	Number of Residential Displacements	Number of Other Displacements
City of Bend			
Commercial General	0	0	2 Billboard
Industrial Light	41	1	2 Billboard, ~~200 Personal Property~~ 250 Personal Property [1]
Mixed Employment	1	0	0
Residential Urban High Density	0	0	0
Residential Urban Low Density	0	8	0
Residential Urban Medium Density	0	0	0
Residential Urban Standard Density	0	0	0
Residential Suburban Low Density	0	0	0
City of Bend Subtotal	**42**	**9**	**4 Billboard, ~~200 Personal Property~~ 250 Personal Property[1]**
Deschutes County			
Exclusive Farm Use - Alfalfa Subzone	0	0	0
Exclusive Farm Use - Tumalo/Redmond/Bend Subzone[2]	0	0	0
Multiple Use Agriculture	1	10	0
Open Space and Conservation	0	0	0
Rural Industrial	0	0	0
Urban Area Reserve	0	0	0
Deschutes County Subtotal	**1**	**10**	**0**
Total	**43**	**19**	**4 Billboard, ~~200 Personal Property~~ 250 Personal Property [1]**

Note: Personal property displacements shown in this table are private rental storage units. Easements from the BNSF Railway and Swalley Main Canal would not result in any displacements.

[1]Public comments on the Draft EIS revealed that the number of private rental storage units that would be displaced is 250.

[2]The API no longer includes land zoned Exclusive Farm Use – Tumalo/Redmond/Bend Subzone as a parcel on the north side of Fort Thompson Lane was rezoned since the publication of the Draft EIS.

The majority of land in the City of Bend that would be acquired for the alternative is located in the City's Industrial Light zone (31 percent). Acquisition in residential zones in the City of Bend would be fairly minimal; in many cases, for those properties in the Residential Urban Standard Density zone with partial acquisitions, only 200 square feet (or less) would be acquired on each property. For parcels in the lower density Residential Urban Low Density zone with larger parcels, most parcels would require acquisition of less than 0.3 acres.

Acquisition of part or all of a parcel could result in displacing existing land uses. Exhibit 3-29 FEIS shows the number of business, residential, and other displacements that would result from the acquisitions. A

total of 43 businesses, 19 residences, 4 billboards, and 200 personal property (rental storage units) displacements would occur as a result of the East DS1 Alternative. ODOT would also acquire an easement from the BNSF Railway for the Cooley Road undercrossing; the size of the easement is undetermined at this time.

Additional information obtained from the public comments on the Draft EIS revealed that there would be 50 additional personal property units displaced by the East DS1 Alternative, totaling 250 personal property units. This updated information is now included in Exhibit 3-29 FEIS.

Planned Land Use – The East DS1 Alternative would not require or propose changes to zoning. The East DS1 Alternative could have an impact on the inventory of buildable lands in the Industrial Light zone, as 56 acres of land in this zone would be acquired for construction. Most of the land zoned Industrial Light that would be acquired is not currently vacant, and therefore not part of the 662 acres reported in the *Buildable Lands Inventory* (City of Bend 2008b); however, if displaced businesses relocated to vacant land zoned Industrial Light, this could reduce the overall inventory of land in this zone. This should not take the city's *Buildable Lands Inventory* out of compliance with Statewide Planning Goal 9 (Economic Development).

The East DS1 Alternative could have a negligible impact on the inventory of buildable residential lands in the City of Bend, as shown previously in Exhibit 3-23, because it would require the acquisition of about 5 acres of residential land, most of which is zoned Residential Urban Low Density, as shown in Exhibit 3-28 FEIS. Most of the land that would be acquired is not vacant and available for development, and thus is not a part of the unconstrained vacant acres reported in the *Buildable Lands Inventory*. The displacements that would result from the East DS1 Alternative, as shown in Exhibit 3-29 FEIS, could cause a slight increase in the demand for residential housing elsewhere in the City of Bend, although there are many vacant homes currently available.

Where partial acquisitions of a parcel would take place, non displaced property owners would continue to be able to use their land for the planned and allowed land uses.

Farmlands/Exclusive Farm Use Lands – The East DS1 Alternative would not require the acquisition of land zoned Exclusive Farm Use, and therefore no exception to Oregon's Statewide Planning Goal 3, Agricultural Lands, would be required for impacts to farmland. Some land that would be acquired, however, has soil types designated by the Natural Resources Conservation Service as prime farmlands if irrigated or farmlands of statewide importance. Exhibit 3-30 FEIS shows that

Key Point

In accordance with the Farmland Protection Policy Act, FHWA and ODOT coordinated with Natural Resources Conservation Service and submitted a farmland conversion impact rating form for the East DS1 and East DS2 Alternatives (Form AD 1006) on January 12, 2011 (See Appendix A).

An updated farmland conversion impact rating form with information on the Preferred Alternative was prepared and submitted to the Natural Resources Conservation Service on April 1, 2014 (Appendix A).

approximately 10 acres of irrigated prime farmland soils and 124 acres of farmlands of statewide importance soils would be acquired for right of way under the East DS1 Alternative. Of the land currently used for non-commercial agriculture approximately 5 acres of prime farmland and approximately 30 acres of land designated as farmland of statewide importance would be within the ground disturbance area and would be converted to a transportation use. In accordance with the Farmland Protection Policy Act, FHWA and ODOT coordinated with the Natural Resources Conservation Service and submitted a farmland conversion impact rating form for the proposed action on January 12, 2011 (Appendix A).

Exhibit 3-30 FEIS: *Natural Resources Conservation Service Farmland Conversion by Alternative*

Alternative	Irrigated Prime Farmland	Farmlands of Statewide Importance	Total Farmland	Percent of Farmland in County	Farmland Conversion Impact Rating
No Build	0	0	0	0.00%	Not Applicable
East DS1	10	124	134	0.01%	58 60[1]
East DS2	2	90	92	0.007%	~~52~~ 53[1]
Preferred Alternative	0.07	59	59	0.005%	43

[1]The farmland conversion rating scores for the East DS1 and East DS2 Alternative were corrected for minor calculation errors on the revised farmland conversion rating form that ODOT completed and submitted to NRCS on April 1, 2014 (Appendix A).

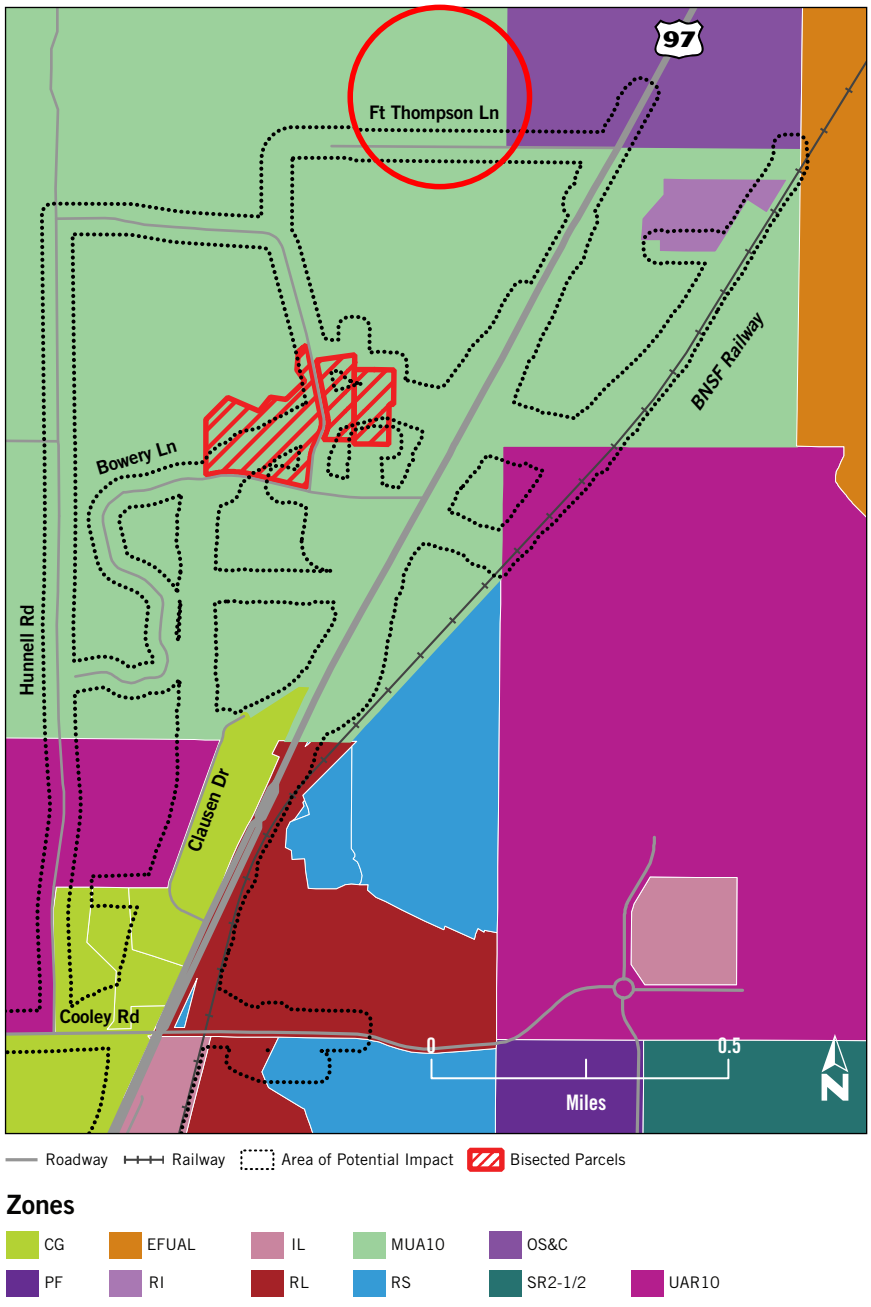
Partial acquisitions under the East DS1 Alternative would not be expected to reduce the feasibility of continuing hobby farming use on the remainder of non-commercial agricultural parcels. It is anticipated that partial acquisitions under the East DS1 Alternative would result in bisecting three parcels currently zoned Multiple Use Agriculture and used for non-commercial agriculture as shown in Exhibit 3-31 FEIS. No parcels zoned Exclusive Farm Use and used for commercial farming would be bisected.

Since the publication of the Draft EIS, ODOT completed and submitted an updated farmland conversation rating form on April 1, 2014 (Appendix A).

In response to comments received on the Draft EIS, the term "hobby agriculture/farming" that was used to describe agricultural activities in the northern end of the API is better characterized as "non-commercial agriculture/farming."

One agricultural parcel bisected by the East DS1 Alternative on the north side of Fort Thompson Lane was rezoned from Exclusive Farm Use Tumalo/Redmond/Bend Subzone (EFUTRB) to Multiple Use Agriculture (MUA10)(Exhibit 3-31 FEIS).

Exhibit 3-31 FEIS: *Agricultural Parcels Bisected by the East DS1 and East DS2 Alternatives*



Note: This revised exhibit reflects the rezoning of one parcel (see red circle) on the north side of Fort Thompson Lane from Exclusive Farm Use – Tumalo/Redmond/Bend Subzone (EFUTRB) to Multiple Use Agriculture (MUA10). As noted in Section 3.2, the Preferred Alternative would not bisect any agricultural parcels.

East DS2 Alternative

Federal, State, Regional, and Local Plans – Exhibit 3-27 FEIS provides a summary of consistency with federal, state, regional, and local plans for the East DS2 Alternative. Because the East DS2 Alternative is the same as the East DS1 Alternative south of Cooley Road the findings of consistency for the East DS1 and East DS2 Alternatives are very similar. Unique features of the East DS2

Alternative and differences between the East DS1 and East DS2 Alternatives with regards to compliance with statewide planning goals and compatibility with local comprehensive plans are noted below.

The East DS2 Alternative would construct a new US 97/3rd Street interchange and extend Robal Road west of US 20 to O.B. Riley Road, both of which would be outside of the current UGB; however, unlike the East DS1 Alternative, the improvements to 3rd Street would not extend beyond the UGB. Construction of roadways outside of the UGB would require exceptions to statewide Goals 11 (public facilities and services) and 14 (urbanization). A total of two goal exceptions are anticipated: one for the new US 97/3rd Street interchange and one for the Robal Road extension.

The applicable standards described for the East DS1 Alternative would also apply for the goal exceptions that would be required with the East DS2 Alternative. The East DS2 Alternative would address the standards in the same way as the East DS1 Alternative except:

- The East DS2 Alternative would require the acquisition and conversion of 56 acres in Deschutes County, which is less than the East DS1 Alternative (102 acres)
- The East DS2 Alternative would result in less fuel consumption than the East DS1 Alternative, as described in Section 3.17 Energy
- The East DS2 Alternative would include a directional interchange at the new northern interchange, which might require fewer measures to guarantee that the new interchange does not open up access to rural lands.

Subject to approval of the statewide goal exceptions, as described above, the East DS2 Alternative would be consistent with the statewide planning goals, including the Transportation Planning Rule.

The realigned portions of US 97 under the East DS2 Alternative, would require the same transfer of bypass, expressway, and freight route designations, and an extension of the bypass designation north to the new northern interchange, as would be required under the East DS1 Alternative. Upon these designations, the East DS2 Alternative would be consistent with the ODOT's *Bypass Policy*.

Similar to the East DS1 Alternative, the East DS2 Alternative would require the acquisition of right of way within Deschutes County, which would convert existing and planned land uses as specified in *Deschutes County Code, Title 18 County Zoning* and in the current and draft *2030 Deschutes County Comprehensive Plan* to a transportation land use. *Deschutes County Code, Title 18 County Zoning* specifies that Class I projects are permitted uses in all of the county zones within the

API, except for the Exclusive Farm Use zone, subject to approval of a land use permit under the standards and criteria specified in Chapter 18.116.230. Like the East DS1 Alternative, no land zoned Exclusive Farm Use would be converted to a new roadway under the East DS2 Alternative, therefore this alternative would be consistent with *Deschutes County Code, Title 18 County Zoning* subject to the approval of the land use permits. An amendment to the *Deschutes County Transportation System Plan* and the current and draft *2030 Deschutes County Comprehensive Plan*, would be required for the East DS2 Alternative because the alternative would construct a new northern interchange and new local roadways. Approval of the exceptions to the Oregon statewide planning goals would be required prior to amendment of the Deschutes County Comprehensive Plan. Upon approval of the plan amendments, the East DS2 Alternative would be consistent with the *Deschutes County Transportation System Plan* and the current and draft *2030 Deschutes County Comprehensive Plan*.

The East DS2 Alternative would be consistent with the *Bend Area General Plan*, the *City of Bend Development Code*, and the *Bend Urban Area Transportation System Plan* in the same manner as the East DS1 Alternative; subject to approval of land use permits for new right of way and an amendment to the *Bend Urban Area Transportation System Plan* and *Bend Area General Plan.*

The East DS2 Alternative would not require an exception to Statewide Planning Goal 3 (Agricultural Lands). As noted in Exhibit 3-27 FEIS, the East DS2 Alternative is inconsistent with Statewide Planning Goals 11 (Public Facilities and Services) and 14 (Urbanization), and thus requires approval of those goal exceptions.

Since the publication of the Draft EIS, the 2030 Deschutes County Comprehensive Plan update was completed and adopted by the Deschutes County Board of County Commissioners in 2011 (Ordinance 2011-003). The East DS2 Alternative is inconsistent with the Deschutes County Comprehensive Plan, the Deschutes County Transportation System Plan, the Bend Area General Plan, and the Bend Urban Area Transportation System Plan and thus requires amendments to the transportation system plans.

Existing Land Use – The East DS2 Alternative would require acquiring land for new right of way. As shown in Exhibit 3-32 FEIS, a total of 142 acquisitions would be required. Seventy nine acquisitions would involve only a portion of an existing parcel (including 2 easements), while 63 acquisitions would involve an entire parcel. The majority of the land that would be acquired is located in the Industrial Light zone (43 percent) in the City of Bend and in the Multiple Use Agriculture zone (23 percent) in Deschutes County. Acquisition in

residential zones in the City of Bend would be fairly minimal; in many cases for those properties in the Residential Urban Standard Density zone with partial acquisitions only 200 square feet (or less) would be acquired on each parcel. For parcels in the lower density Residential Urban Low Density zone with larger parcels, an acquisition of less than 0.3 acres would be required of most parcels.

Exhibit 3-32 FEIS: *Acquisitions by Zoning Designation with the East DS2 Alternative*

Zoning Designation	Number of Partial Acquisitions	Number of Full Parcel Acquisitions	Number of Acres to be Acquired	Percent of Acres to be Acquired
City of Bend				
Commercial General	18	3	12	9%
Industrial Light	13	40	56	43%
Mixed Employment	1	1	2	2%
Residential Urban High Density	0	0	0	0%
Residential Urban Low Density	6	8	4	3%
Residential Urban Medium Density	0	0	0	0%
Residential Urban Standard Density	8	3	1	1%
Residential Suburban Low Density	1	0	<1	<1%
City of Bend Subtotal	**47**	**55**	**75**	**58%**
Deschutes County				
Exclusive Farm Use - Alfalfa Subzone	0	0	0	0%
Exclusive Farm Use - Tumalo/Redmond/Bend Subzone[1]	0	0	0	0%
Multiple Use Agriculture	18	6	31	23%
Open Space and Conservation	0	0	0	0%
Rural Industrial	2	0	2	1%
Urban Area Reserve	10	2	23	18%
Deschutes County Subtotal	**30**	**8**	**56**	**42%**
Easements				
BNSF Railway	1	0	0	0%
Swalley Main Canal	1	0	0	0%
Easements Subtotal	**2**	**0**	**0**	**0%**
TOTAL	**79**	**63**	**131**	**100%**

Note: Some partial acquisitions require purchasing only access rights; no acreage would be acquired. Easements are also counted partial acquisitions as shown in this table.

[1]The API no longer includes land zoned Exclusive Farm Use – Tumalo/Redmond/Bend Subzone as a parcel on the north side of Fort Thompson Lane was rezoned to Multiple Use Agriculture (MUA10) since the publication of the Draft EIS.

Exhibit 3-33 FEIS: *Displacements by Zoning Designation with the East DS2 Alternative*

Zoning Designation	Number of Business Displacements	Number of Residential Displacements	Number of Other Displacements
City of Bend			
Commercial General	8	0	1 Billboard
Industrial Light	41	1	2 Billboard, ~~200 Personal Property~~ 250 Personal Property[1]
Mixed Employment	1	0	0
Residential Urban High Density	0	0	0
Residential Urban Low Density	0	8	0
Residential Urban Medium Density	0	0	0
Residential Urban Standard Density	0	0	0
Residential Suburban Low Density	0	0	0
City of Bend Subtotal	**50**	**9**	**3 Billboard,** ~~200 Personal Property~~ 250 Personal Property[1]
Deschutes County			
Exclusive Farm Use - Alfalfa Subzone	0	0	0
Exclusive Farm Use - Tumalo/Redmond/Bend Subzone[2]	0	0	0
Multiple Use Agriculture	1	4	0
Open Space and Conservation	0	0	0
Rural Industrial	0	0	0
Urban Area Reserve	0	0	0
Deschutes County Subtotal	**1**	**4**	**0**
TOTAL	**51**	**13**	**3 Billboard,** ~~**200 Personal Property**~~ 250 Personal Property[1]

Note: Personal property displacements shown in this table are private rental storage units. Easements from the BNSF Railway and Swalley Main Canal would not result in any displacements.

[1]Public comments on the Draft EIS revealed that the number of private rental storage units that would be displaced is 250.

[2]The API no longer includes land zoned Exclusive Farm Use – Tumalo/Redmond/Bend Subzone as a parcel on the north side of Fort Thompson Lane was rezoned to Multiple Use Agriculture (MUA10) since the publication of the Draft EIS.

Exhibit 3-33 FEIS shows the number of business, residential, and other displacements that would result from the acquisitions for the East DS2 Alternative. A total of 51 businesses, 13 residences, 3 billboards, and 200 personal property (rental storage units) would be displaced as a result of the East DS2 Alternative. ODOT would also acquire an easement from the BNSF Railway for the Cooley Road undercrossing; the size of the easement is undetermined at this time.

Additional information obtained from the public comments on the Draft EIS revealed that there would be 50 additional personal property units displaced by the East DS2 Alternative, totaling 250. This updated information is now included in Exhibit 3-33 FEIS.

Planned Land Use – Similar to the East DS1 Alternative, the East DS2 Alternative could have an impact on the inventory of buildable lands in the Industrial Light zone, as 56 acres of land in this zone would be acquired to build the East DS2 Alternative. Most of the land zoned Industrial Light that would be acquired is not currently vacant, and therefore are not part of the 662 acres reported in the *Buildable Lands Inventory*; however, if displaced businesses relocate to vacant land zoned Industrial Light, this could reduce the overall inventory of buildable land in this zone.

Also like the East DS1 Alternative, the East DS2 Alternative would require acquiring approximately 5 acres of residential land, most of which is zoned Residential Urban Low Density, as shown in Exhibit 3-32 FEIS; however, this would not result in a substantial impact to buildable residential lands in the City of Bend. Other impacts on planned land uses under the East DS2 Alternative would be essentially the same as the East DS1 Alternative.

Farmlands/Exclusive Farm Use Lands – The East DS2 Alternative would not require the acquisition of land zoned Exclusive Farm Use. Therefore, no Exclusive Farm Use land would be converted to a transportation use and no exceptions to the statewide planning goals would be required for impacts to farmlands. Similar to the East DS1 Alternative, some of the land that would be acquired for the East DS2 Alternative has soil types that are designated by the Natural Resources Conservation Service as prime farmlands if irrigated or farmlands of statewide importance. Exhibit 3-30 FEIS shows that approximately 2 acres of irrigated prime farmland soils and 90 acres of farmlands of statewide importance soils would be acquired for right of way under the East DS2 Alternative. Of the land currently used for non-commercial agriculture approximately 2 acres of land designated as prime farmland and approximately 18 acres of land designated as farmland of statewide importance would be within the ground disturbance area and would be converted to a transportation use.

Similar to the East DS1 Alternative, partial acquisitions under the East DS2 Alternative would not be expected to reduce the feasibility of continuing hobby farming use on the remainder of non-commercial agricultural parcels. It is anticipated that partial acquisitions under the East DS2 Alternative would result in bisecting only one parcel currently zoned Multiple Use Agriculture and used for non-commercial agriculture as shown in Exhibit 3-31 FEIS. The East DS2 Alternative would not bisect parcels zoned Exclusive Farm Use and used for commercial farming.

Key Point

The Oregon Statewide Planning Goal regarding transportation uses and improvements on land zoned Exclusive Farm Use (OAR 660 012 0065(5)) does not apply because the East DS1 and East DS2 Alternatives do not impact lands zoned Exclusive Farm Use.

Goal 3 is not applicable to the Preferred Alternative, as this alternative will not impact lands zoned Exclusive Farm Use.

In response to comments received on the Draft EIS, the term "hobby agriculture/farming" that was used to describe agricultural activities in the northern end of the API is better characterized as "non-commercial agriculture/farming."

One agricultural parcel bisected by the East DS2 Alternative on the north side of Fort Thompson Lane was rezoned from Exclusive Farm Use – Tumalo/Redmond/Bend Subzone (EFUTRB) to Multiple Use Agriculture (MUA10)(Exhibit 3-31 FEIS).

Preferred Alternative—East DS2 Modified Alternative

Federal, State, Regional, and Local Plans—Exhibit 3-27 FEIS provides a summary of consistency with federal, state, regional, and local plans for the Preferred Alternative.

The Preferred Alternative does not require exceptions to the Oregon statewide planning goals. There is no new interchange under the Preferred Alternative. Under the Preferred Alternative, 3rd Street will intersect with US 97 at a new signalized intersection located within the City of Bend's UGB, which therefore eliminates the need for exceptions to Statewide Planning Goals 11 and 14 that would have been required for the northern interchange under the East DS1 and East DS2 Alternatives.

In addition, the Preferred Alternative has been designed to minimize improvements that will occur outside of the City of Bend's UGB; improvements that will occur outside of the UGB will be constructed to Deschutes County (rural transportation facility) standards so that an exception to Statewide Planning Goals 11 (Public Facilities and Services) and 14 (Urbanization) is not required.

The Preferred Alternative does not require an exception to Statewide Planning Goal 3 (Agricultural Lands) because this alternative does not convert land zoned as Exclusive Farm Use to right of way. Therefore, as designed, through coordination with Deschutes County and the Oregon State Department of Land Conservation and Development, exceptions to the statewide planning goals are not required for the Preferred Alternative.

The Preferred Alternative is consistent with the Transportation Planning Rule as this alternative incorporates transportation demand management measures and does not require exceptions to the statewide planning goals.

The realigned portions of US 97 under the Preferred Alternative, require the same transfer of bypass, expressway, and freight route designations as would be required under the East DS1 and East DS2 Alternatives. Upon these designations, the Preferred Alternative will be consistent with the Bypass Policy in the Oregon Highway Plan.

Similar to the East DS1 and East DS2 Alternatives, the Preferred Alternative requires the acquisition of right of way within Deschutes County, which converts existing and planned land uses as specified in the Deschutes County Code, Title 18 County Zoning and in the 2030 Deschutes County Comprehensive Plan to a transportation land use. Deschutes County Code, Title 18 County Zoning specifies that Class I projects are permitted uses in all of the county zones within the API, except for the Exclusive Farm Use zone, subject to approval of a land use permit under the standards and criteria specified in Chapter 18.116.230. The land use permit will be obtained during the final design phase. Like the East DS1 and East DS2 Alternatives, no land zoned Exclusive Farm Use is converted to a new roadway under the Preferred Alternative, therefore this alternative is consistent with Deschutes County Code, Title 18 County Zoning subject to the approval of the land use permits that will be obtained during the final design phase. As determined by Deschutes County in June 2013, the Britta Street extension in unincorporated Deschutes County, which is part of the Preferred Alternative, is already included in the Deschutes County Transportation System Plan (see Appendix M). The roundabout at Cooley Road and O.B. Riley Road has been designed in coordination with Deschutes County. On June 14, 2013, ODOT and Deschutes County agreed that this improvement will be added to the Deschutes County Transportation System Plan when the project is funded for construction. Therefore, the Preferred Alternative is consistent with the Deschutes County Transportation System Plan and the Deschutes County Comprehensive Plan.

By providing improvements to the transportation system that enable short local trips to use local roads (3rd Street), rather than US 97, and by limiting access to state highways, the Preferred Alternative addresses congestion and makes safety improvements in accordance with the goals of the Bend Metropolitan Planning Organization's 2007-2030 Metropolitan Transportation Plan. Portions of the Preferred Alternative have identified funding and are included in the financially-constrained list in the 2007-2030 Metropolitan Transportation Plan. On August 15, 2013, the Bend Metropolitan Planning Organization amended the 2007-2030 Metropolitan Transportation Plan to include the remaining portions of the Preferred Alternative in the illustrative list, thereby making the Preferred Alternative consistent with this plan (see Appendix M).

In addition, the City of Bend approved an amendment to include the Preferred Alternative in the Bend Urban Area Transportation System Plan and the Bend Area General Plan on March 5, 2014 (see Appendix M). Therefore, the Preferred Alternative is consistent with the Bend Area General Plan and the Bend Urban Area Transportation System

Plan. Subject to approval of land use permits for new right of way that will be obtained during the final design phase, the Preferred Alternative will be consistent with the City of Bend Development Code. Permits will be obtained during the final design of the Preferred Alternative.

Exhibit 3-32A FEIS: *Estimated Acquisitions by Zoning Designation with the Preferred Alternative*

Zoning Designation	Estimated Number of Partial Acquisitions	Estimated Number of Full Parcel Acquisitions	Estimated Number of Acres to be Acquired	Estimated Percent of Acres to be Acquired
City of Bend				
Commercial General	19	4	13	16%
Industrial Light	12	38	55	68%
Mixed Employment	0	1	1	<1%
Residential Urban High Density	0	0	0	0%
Residential Urban Low Density	0	5	2	2%
Residential Urban Medium Density	0	0	0	0%
Residential Urban Standard Density	1	2	1	<1%
Residential Suburban Low Density	0	0	0	0%
City of Bend Subtotal	**32**	**50**	**72**	**87%**
Deschutes County				
Exclusive Farm Use – Alfalfa Subzone	0	0	0	0%
Multiple Use Agriculture	3	0	0.25	<1%
Open Space and Conservation	0	0	0	0%
Rural Industrial	0	0	0	0%
Urban Area Reserve	16	2	10	13%
Deschutes County Subtotal	**19**	**2**	**10**	**13%**
Easements				
BNSF Railway	1	0	0	0%
Swalley Irrigation District	1	0	0	0%
Easements Subtotal	**2**	**0**	**0**	**0%**
TOTAL	**53**	**52**	**82**	**100%**

Note: Easements are counted as partial acquisitions as shown in this table.

Existing Land Use—The Preferred Alternative requires acquisition of land for new right of way. As shown in Exhibit 3-32A FEIS, a total of approximately 105 acquisitions are required. Based on current design level, ODOT estimates that 53 acquisitions involve only a portion of an existing parcel (including 2 easements), and 52 acquisitions involve an entire parcel. The majority of the land that will be acquired is located in the Industrial Light zone (68 percent) in the City of Bend and in the Urban Area Reserve zone (13 percent) in Deschutes County. Acquisitions that are required in residential zones in the City of Bend are fairly minimal; for parcels in the low density Residential Urban Low Density zone with large parcels, an acquisition of 0.3 acres or less

is required of most parcels. Partial acquisitions of properties could result in tax lots that are smaller than the minimum lot size required in the respective zone; however, uses on those properties would be allowed to remain.

Exhibit 3-33A FEIS: *Estimated Displacements by Zoning Designation with the Preferred Alternative*

Zoning Designation	Estimated Number of Business Displacements	Estimated Number of Residential Displacements	Estimated Number of Other Displacements
City of Bend			
Commercial General	1	0	1 Billboard
Industrial Light	42	1	1 Billboard, 250 Personal Property
Mixed Employment	1	0	0
Residential Urban High Density	0	0	0
Residential Urban Low Density	0	5	0
Residential Urban Medium Density	0	0	0
Residential Urban Standard Density	0	0	0
Residential Suburban Low Density	0	0	0
City of Bend Subtotal	**44**	**6**	**2 Billboards, 250 Personal Property**
Deschutes County			
Exclusive Farm Use – Alfalfa Subzone	0	0	0
Multiple Use Agriculture	0	0	0
Open Space and Conservation	0	0	0
Rural Industrial	0	0	0
Urban Area Reserve	0	0	0
Deschutes County Subtotal	**0**	**0**	**0**
TOTAL	**44**	**6**	**2 Billboards, 250 Personal Property**

Note: Personal property displacements shown in this table are private rental storage units. Easements from the BNSF Railway and Swalley Irrigation District would not result in any displacements.

Exhibit 3-33A FEIS shows the estimated number of business, residential, and other displacements that result from the acquisitions for the Preferred Alternative. Based on the current design level, ODOT estimates that a total of 44 businesses, 6 residences, 2 billboards, and 250 personal property units (rental storage units) will be displaced as a result of the Preferred Alternative. ODOT will also acquire permanent easements from the BNSF Railway for the Cooley Road undercrossing (0.6 acre) and from the Swalley Irrigation District for the new crossing of the Swalley Riley Lateral (0.06 acre).

Access to existing land uses will be altered by the Preferred Alternative, as described in Section 2.1.2. Exhibit 2-3 FEIS shows access closures, and Exhibit 2-8A FEIS shows travel routes for drivers on US 97 to access the commercial area between US 97 and US 20.

Planned Land Use—The Preferred Alternative does not require or propose changes to zoning, nor does it preclude zoning changes initiated by others. The Preferred Alternative could have an impact on the inventory of buildable lands in the Industrial Light zone shown in Exhibit 3-23, as 56 acres of land in this zone will be acquired to build the Preferred Alternative. Most of the land zoned Industrial Light that is acquired is not currently vacant; however, if displaced businesses relocate to vacant land zoned Industrial Light, this could reduce the overall availability of buildable land in this zone.

The Preferred Alternative requires acquisition of approximately 3.5 acres of residential land, most of which is zoned Residential Urban Low Density, as shown in Exhibit 3-32A FEIS; however, this does not result in a substantial impact to buildable residential lands in the City of Bend.

Farmlands/Exclusive Farm Use Lands—The Preferred Alternative does not require the acquisition of land zoned Exclusive Farm Use. Therefore, no Exclusive Farm Use land will be converted to a transportation use and no exceptions to Statewide Planning Goal 3, Agricultural Lands, are required for impacts to farmlands. Similar to the East DS1 and East DS2 Alternatives, some of the land that is acquired for the Preferred Alternative has soil types that are designated by the Natural Resources Conservation Service as prime farmlands if irrigated or farmlands of statewide importance. Exhibit 3-30 FEIS shows that less than 1 acre of irrigated prime farmland soils and 59 acres of farmlands of statewide importance soils are acquired for right of way under the Preferred Alternative. Of the land currently used for non-commercial agriculture less than 1 acre of land designated as prime farmland and approximately 1 acre of land designated as farmland of statewide importance is within the ground disturbance area and is converted to a transportation use.

Similar to the East DS1 and East DS2 Alternatives, partial acquisitions under the Preferred Alternative are not expected to reduce the feasibility of continuing non-commercial farming use on the remainder of non-commercial agricultural parcels. The Preferred Alternative does not bisect any parcels zoned for Multiple Use Agriculture (non-commercial agriculture) and will not impact land zoned Exclusive Farm Use (for commercial farming).

Indirect Impacts

While the No Build Alternative would not convert existing or planned land uses to right of way, indirect impacts to land use could result from increased congestion and reduced mobility in the future which could influence travel patterns to existing businesses and residences. Changes in travel patterns would be more likely to impact existing "drive-by"

businesses than "destination" commercial uses or residential uses because these businesses are dependent on vehicles traveling by their location rather than customers specifically seeking them out.

In addition to the impacts to planned land uses, the East DS1 and East DS2 Alternatives would convert land to right of way, change access to parcels, and displace residences and businesses which could have the following adverse and beneficial indirect impacts.

Based on public comments received on the Draft EIS, it should be noted that changes in travel routes could result in a potential reduction in sales from drive-by customers. The Preferred Alternative will accommodate business directory signs to help motorists reach their destinations.

The Preferred Alternative will have similar indirect impacts as described for the East DS1 and East DS2 Alternatives.

Adverse Indirect Impacts

- With the East DS1 and East DS2 Alternatives there would be a reduction in acreage of Multiple Use Agriculture zoned land available for small scale (hobby) farming on non-commercial agricultural parcels, which could cause a change in the primary rural residential use of the parcel. With the East DS1 and East DS2 Alternatives no commercial agricultural properties, on land zoned Exclusive Farm Use, would be acquired or bisected. Under the East DS1 Alternative three parcels currently used for non-commercial agriculture would be bisected by partial acquisitions for new local roads while only one parcel would be expected to be bisected under the East DS2 Alternative (Exhibit 3-31 FEIS). Along 3rd Street public road approaches would be allowed but private driveways would not be allowed outside the UGB. Therefore, if a non-commercial agricultural parcel is bisected by 3rd Street and it does not have alternate access, it has been included as a property that would be acquired with the build alternative.
- Minor population increases could occur in the locations where displaced residents and businesses relocate as a result of the East DS1 and East DS2 Alternatives. Given the number of residents and businesses potentially relocating, population increases resulting from these alternatives would likely be dispersed throughout the indirect impact area.

In response to comments received on the Draft EIS, the term "hobby agriculture/farming" that was used to describe agricultural activities in the northern end of the API is better characterized as "non-commercial agriculture/farming." The Preferred Alternative requires conversion of less than 1 acre of Multiple Use Agriculture land (Exhibit 3-32A FEIS).

The Preferred Alternative does not acquire or bisect any commercial agriculture properties or non-commercial agricultural land.

The Preferred Alternative has similar population increase impacts as described for the East DS1 and East DS2 Alternatives.

Beneficial Indirect Impacts

- The improved traffic conditions that would result from construction of the East DS1 and East DS2 Alternatives could indirectly encourage planned development in the project vicinity, such as the Juniper Ridge development, to take place more quickly.
- Travel through the region would be enhanced by separating regional and local trips so that local trips use local roads rather than adding to congestion on US 97 that serves as a regional connection. However, because of the constraints of the UGB, comprehensive plan, and zoning designations the East DS1 and East DS2 Alternatives would not influence growth at the regional scale or facilitate land uses that are not planned.

More Information

For more information on the interchange area management plan, see Section 3.1 Transportation.

Both the East DS1 and East DS2 Alternatives have been designed to limit the potential for induced growth, particularly around the new US 97/3rd Street interchange. For either the East DS1 or East DS2 Alternative, ODOT would develop two interchange area management plans; one for the US 97/3rd Street interchange and one for the US 97/Empire Avenue interchange. These interchange area management plans would deter induced growth and protect the long term function of the interchanges. The interchange area management plans would include an access management plan with specific access control measures on US 97 and local roads within the interchange area management plan planning area. (See Exhibit 3-16 in Section 3.1 Transportation Facilities for a map of the proposed interchange area management plan management study areas.) No private road approaches would occur on the local cross road (3rd Street) within 1,320 feet of the ramp terminals.

For the East DS1 and East DS2 Alternatives, ODOT would prepare the interchange area management plans in coordination with the City of Bend and Deschutes County, and the plans would address land management issues for the area within 0.5 mile of the ramp terminal. The City of Bend and Deschutes County would adopt policies and ordinances necessary to implement the interchange area management plans. The interchange area management plans would be adopted by the Oregon Transportation Commission prior to construction. Further, no changes to the existing zoning designations would be included in the proposed action, so future proposed development would have to comply with current zoning restrictions.

The Preferred Alternative has similar population increase impacts as described for the East DS1 and East DS2 Alternatives.

Similar to the East DS1 and East DS2 Alternatives, the Preferred Alternative separates regional and local trips, but does not influence growth at a regional scale.

The Preferred Alternative limits the potential for induced growth by keeping all proposed improvements within the City of Bend's adopted UGB, with the exception of the extension of Britta Street and the roundabout at O.B. Riley Road and Cooley Road; these improvements will be constructed to Deschutes County's rural transportation facility standards.

The Preferred Alternative will not require any interchange area management plans be developed or adopted. Interchange area management plans are required for new interchanges or interchanges with substantial changes. For the Preferred Alternative, no substantial improvements will occur at the US 97/Empire Avenue interchange and no changes to land use along Empire Avenue will occur; thus, an interchange area management plan is not required. Minor interchange improvements associated with the Preferred Alternative include: realigning one existing ramp; restriping the travel and turn lanes on the Empire Avenue overcrossing; and adding ramp metering to the on-ramps. Empire Avenue over US 97 will not be widened so there is no significant reconstruction of the overcrossing. In addition, the Preferred Alternative does not include a new northern interchange.

With the Preferred Alternative, 3rd Street remains within the City of Bend UGB as shown in Exhibit 2-3 FEIS (Maps 6 and 7). The Preferred Alternative does not include a connection to Juniper Ridge and does not change current zoning. The Preferred Alternative does not induce additional growth that is not already planned for in the local comprehensive plans.

Construction Impacts

The No Build Alternative would have no construction impacts. The East DS1 and East DS2 Alternatives would not be expected to result in construction impacts to existing and/or planned land uses.

The Preferred Alternative is not expected to result in construction impacts to existing and/or planned land uses.

3.2.4 Avoidance, Minimization, and/or Mitigation Measures Proposed in the Draft EIS

This section discusses potential measures that have been or could be applied to avoid, minimize, or mitigate for direct impacts to land use. Potential measures are discussed for only the East DS1 and East DS2

Alternatives since there would be no actions to mitigate as result of the No Build Alternative.

Federal, State, Regional and Local Plans

Subject to approval of the goal exceptions, amendments to the *Deschutes County Transportation System Plan* and the *Bend Urban Area Transportation System Plan,* and the approval of land use permits the build alternatives would be consistent with the statewide planning goals, including the Transportation Planning Rule, and all other applicable state, regional, and local plans. No avoidance, minimization, and/or mitigation measures would be necessary.

Since the publication of the Draft EIS, Deschutes County determined that the Preferred Alternative is consistent with the Deschutes County Transportation System Plan and that no amendment is required. Portions of the Preferred Alternative have identified funding and are included in the financially-constrained list in the 2007-2030 Metropolitan Transportation Plan. On August 15, 2013, the Bend Metropolitan Planning Organization amended the 2007-2030 Metropolitan Transportation Plan to include the remaining portions of the Preferred Alternative in the illustrative list, and the City of Bend approved an amendment to the Bend Urban Area Transportation System Plan on March 5, 2014. Upon approval of Deschutes County and City of Bend land use permits during final design, the Preferred Alternative will be consistent with applicable state, regional, and local plans.

The Oregon Department of Land Conservation and Development confirmed that no exception to the statewide planning goals is required for the extension of Britta Street outside of the UGB if it is constructed to rural collector standards (email from Karen Swirsky, Oregon Department of Land Conservation and Development dated April 2, 2013) as is identified in the Preferred Alternative (Appendix M).

Mitigation for Long-Term Impacts to Existing and Planned Land Uses Proposed in the Draft EIS

Avoidance and Minimization Measures – The build alternatives have been designed to incorporate the following measures that would avoid or minimize adverse impacts to land uses:

- The amount of land to be acquired, for the build alternatives, was minimized because the existing US 97, US 20, Clausen Drive, Cooley Road, Robal Road, and Empire Avenue facilities would be used and many of the proposed improvements would be located within existing ODOT right of way

- The number of displacements, for the build alternatives, was minimized because many of the acquisitions would only involve a strip of land along the property frontage
- The directional interchange design for the new northern interchange would minimize the amount of land that would be acquired (East DS2 Alternative only)
- Changes to access to the transportation system for partially acquired parcels, with the build alternatives, was minimized because the new US 97 facility would comply with ODOT access management standards
- The acreage of land converted to a transportation land use, for the East DS1 and East DS2 Alternatives, would be minimized by reconfiguring the unused portions of fully acquired parcels for resale
- Possible induced growth, that could otherwise result from the construction of the new northern interchange for the East DS1 and East DS2 Alternatives, would be minimized with the development and adoption of an interchange area management plan that would include access management measures and land use policies
- Pressure for induced growth along 3rd Street within the UGB would be minimized with the East DS1 and East DS2 Alternatives because access would comply with the City of Bend's access standards. Outside of the UGB, the pressure for induced growth along 3rd Street with the East DS1 and East DS2 Alternatives would be minimized because ODOT would maintain access control; public road approaches would be allowed but private driveways would not be allowed.
- For the East DS1 and East DS2 Alternatives, the number of exceptions to statewide planning goals was minimized by containing proposed improvements within the UGB to the extent possible. The Preferred Alternative was designed to avoid locating urban transportation facilities outside the City of Bend's UGB, which avoids the need for an exception to the Oregon statewide planning goals.
- The East DS1 and East DS2 Alternatives were designed to avoid the acquisition of land zoned Exclusive Farm Use, which avoids the need for an exception to Statewide Planning Goal 3. In addition, impacts to land designated by the Natural Resources Conservation Service as prime farmlands if irrigated or farmland of statewide importance were minimized to the extent practicable by using existing transportation facilities and proposing improvements

within existing public right of way. This design strategy was also used for the Preferred Alternative.

- For the Preferred Alternative, the signalized intersection of 3rd Street and US 97 was designed to minimize property impacts.

Mitigation Measures – The following measures could be taken to the extent practicable to mitigate permanent impacts to land uses:

- Conduct all right of way acquisitions and residential and commercial relocations in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. All impacted property owners would be compensated for property rights acquired at fair market value and relocation assistance would be provided.
- Provide provisions for the replacement of landscaping elements to the extent possible.

More Information

Relocation Assistance

The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 provides protection and assistance for people impacted by the acquisition, rehabilitation, or demolition of real property for federal or federally funded projects. This law was enacted by Congress to ensure that people whose real property is acquired, or who move as a direct result of projects receiving federal funds, are treated fairly and equitably and receive assistance in moving from the property they occupy. Appendix B provides additional information on relocation assistance.

Mitigation for Long-Term Impacts to Farmlands/Exclusive Farm Use Lands

Avoidance and Minimization Measures – The East DS1 and East DS2 Alternatives were designed to avoid the acquisition of Exclusive Farm Use lands, which avoids the need for an exception to Statewide Planning Goal 3. In addition, impacts to land designated by the Natural Resources Conservation Service as prime farmlands if irrigated or farmland of statewide importance were minimized to the extent practicable by using existing transportation facilities and proposing improvements within existing public right of way.

Mitigation Measures—The following measures could be taken to the extent practicable to mitigate adverse impacts to farmlands designated by the Natural Resources Conservation Service:

- Stockpile prime soils for other applications.

3.2.5 Avoidance, Minimization, and/or Mitigation Commitments Incorporated into the Preferred Alternative

ODOT makes the following commitment:

- ODOT will coordinate with the Oregon Transportation Commission to apply the bypass, expressway, and freight route designations to the realigned portions of US 97.

3.3 Right of Way and Utilities

3.3.1 Regulatory Setting

In cooperation with FHWA, the ODOT Right of Way Section implements Public Law 91-646, the Uniform Relocation Assistance and Real Properties Acquisition Policies Act of 1970, as amended (Uniform Act). The Uniform Act ensures the fair and equitable relocation and reestablishment of persons, businesses, farms and nonprofit organizations displaced as a result of federal or federally assisted programs. The objective of the Uniform Act is to ensure that persons displaced as a direct result of federal or federally-assisted projects are treated fairly, consistently and equitably so that such displaced persons will not suffer disproportionate injuries as a result of projects designed for the benefit of the public as a whole. The ODOT Right of Way Section and its Region Right of Way offices through its Relocation Assistance Program assure compliance with the Uniform Act and federal rules and regulations.

More Information

Please see Appendix B for a summary of ODOT's relocation process.

Relocation policies and procedures under the administration of ODOT shall be non-discriminatory in accordance with Title VI of the Civil Rights Act of 1964, which states: "Section 601: No person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance."

More Information

Please see Appendix C for a copy of ODOT's Title VI Civil Rights Act Policy Statement.

3.3.2 Affected Environment

More information: Additional detail on right of way and utilities is provided in the *Right of Way Technical Report* (ODOT 2014k) and *Utility Technical Report* (ODOT 2014p). The *Right of Way Technical Report* and *Utility Technical Report* are listed in Appendix K and available in the document library of the project's website (www.us97solutions.org).

Residential areas are primarily situated around the periphery of the API, including along US 20 north of Cooley Road, along Cooley Road east of US 97, near Robal Road and Britta Street, and near O.B. Riley Road and Empire Avenue. In addition, much of the area in the north end of the API outside of the City of Bend UGB is used for non-commercial agriculture with rural residential dwellings. There are also three mobile home parks located along the east side of US 97 north of Cooley Road. These residential areas are illustrated in the existing land use map (Exhibit 3-18) in Section 3.2 Land Use. In addition to residences, there are 200 personal property rental storage units located east of US 97 on Nels Anderson Road that must be considered in the context of right of way acquisition.

More Information

Please see Section 3.9 Water Quality, Hydrology and Stormwater Runoff for a discussion about public and community wells in the API.

Business areas, including commercial and industrial uses, are mostly found south of Cooley Road within the City of Bend. The Cascade Village Shopping Center is a large regional commercial area bordered by US 20, US 97, and Robal Road. Other businesses are located north of the shopping center between Robal Road and Cooley Road on the west side of US 97; near Clausen Drive and Grandview Drive on the west side of US 97; along Nels Anderson Road on the east side US 97; west of US 20 along Jamison Street; between US 97 and US 20 along Empire Avenue; and north of the API on the east side US 97 near Tumalo Road and Deschutes Market Road. Commercial areas are illustrated in Exhibit 3-18 in Section 3.2 Land Use and in Exhibit 3-45 in Section 3.5 Socioeconomic Analysis.

Farming businesses are primarily found in the north end of the API, outside of the City of Bend UGB, where land is used for agriculture. In addition, there are legally permitted outdoor advertising signs (billboards) along US 97 that would be entitled to relocation benefits specifically provided for outdoor signs affected by right of way acquisition for the proposed action.

There are also a number of utility providers with facilities located within the API, as listed in Exhibit 3-34 FEIS.

Since the publication of the Draft EIS, the project API along US 97 has been modified and generally extends from approximately 1,000 feet north of Bowery Lane to Butler Market Road in Bend (Exhibit 1-1 FEIS).

Since the release of the Draft EIS, public comments revealed that there are an additional 50 personal property units located east of US 97 on Nels Anderson Road, totaling 250 personal property rental storage units that must be considered in the context of right of way acquisition (Exhibit 3-35 FEIS).

Exhibit 3-34 FEIS: *Utility Providers and Facilities*

Utility Providers	Facilities
Cable/Communication	
Bend Broadband	Office and business operation plant (63090 Sherman Road), aerial and underground fiber optic cables
Level (3) Communications	Underground fiber optic cables
Quantum Communications	Aerial fiber optic cable
~~QWEST Communications~~ CenturyLink[1]	Aerial and underground fiber optic cables, remote terminal cabinet, service cabinets, major cross connect cabinets, DSL (digital subscriber line) cabinets
Electric	
Central Electric Cooperative	Aerial distribution power lines, underground power line and pad-mounted transformers, future electrical substation planned (location not yet determined)
Pacific Power	Aerial transmission line, aerial and underground power line, pad-mounted transformers, Juniper Ridge electrical substation (east of BNSF Railway)
Irrigation	
Central Oregon Irrigation District	Pilot Butte Canal, hydro-electric plant (north of API)
North Unit Irrigation District	North Unit Main Canal
Swalley Irrigation District[2]	Swalley Main Canal Pipeline, other canals and laterals, high density polyethylene pipes, hydro-electric plant (north of Fort Thompson Lane)
Natural Gas	
Cascade Natural Gas	Gas mains, gas lines
Sewer	
City of Bend	Pressure sewer lines, sewer lift station (south of Grandview Drive)
Water	
Avion Water Company	Underground reservoir system of deep reserve wells, water mains, water lines
City of Bend	Water mains, water lines
Long Butte Water Company	Unknown

[1] Since publication of the Draft EIS, QWEST Communications was acquired by CenturyLink.

[2] Since publication of the Draft EIS, the Swalley Irrigation District has piped all previously open segments within the API of the Swalley Main Canal (now referred to as the Swalley Main Canal Pipeline). In addition, crossings of laterals have been identified.

Exhibit 3-35 FEIS: *Summary of Estimated Right of Way Impacts under the East DS1 and East DS2 Alternatives, and the Preferred Alternative*

Estimated Right of Way Impacts	East DS1	East DS2	Preferred Alternative
Estimated Parcels Requiring Acquisition	162	142	103
Estimated Total Acquisition Area (acres)	180	131	82
Estimated Residential Displacements	19	13	6
Estimated Business Displacements	43	51	44
Estimated Job Displacements[1]	612	692	579
Estimated Personal Property Displacements (Private Rental Storage Units)	~~200~~ 250[2]	~~200~~ 250[2]	250
Estimated Other Displacements (Billboards)	4	3	2

[1] Job displacements were estimated based on the average number of employees per business area multiplied by the number of displaced businesses per business area. The average number of employees per business was calculated based on data collected in the July 2008 business survey (Parsons Brinckerhoff 2008a)

[2] Public comments on the Draft EIS revealed that the number of private rental storage units that will be impacted by right of way is 250.

3.3.3 Environmental Consequences

Improvements to the US 97 facility would require expansion of the public right of way, which would require ODOT to purchase private property and modify existing utility facilities. Right of way and utility impacts are described for each of the alternatives and are based on information that is available at this time and could change as decisions are made concerning the proposed action.

Right of way and utility impacts could change during final design and construction.

No Build Alternative

No construction would take place and no right of way would be acquired under the No Build Alternative, so there would be no residential, business, personal property, utility, or other displacements under this alternative. No utilities would be relocated under the No Build Alternative.

East DS1 Alternative

The East DS1 Alternative would require acquisition of right of way for new roadway facilities, access management, and stormwater facilities. Right of way would be acquired from residences, businesses, personal property, and other property. These impacts are summarized in Exhibit 3-35 FEIS.

Residential Displacements and Right of Way Impacts—The East DS1 Alternative would require acquisition of right of way, access rights, or an easement from 162 parcels, as shown in Exhibit 3-36. The majority of the parcels highlighted in this exhibit would be only partially acquired and would not require removal of the home or business on that parcel. Acquisitions from residential parcels would result in the displacement of approximately 19 households.

Residential displacements required under the East DS1 Alternative are concentrated along Cooley Road east of US 97 and west of Boyd Acres Road. Homes in this area are single family residences. Of the 19 residences that would be displaced, 12 were purchased for less than $250,000, and 7 were purchased for $250,000 to $500,000. The current housing market in the Bend area offers many potential replacement houses in comparable neighborhoods. Current real estate listings show that there are approximately 250 homes on standard lots and approximately 27 homes on acreage for sale for less than $250,000. There are approximately 179 homes on standard lots and 73 homes on acreage listed for sale between $250,000 and $500,000. These residential displacements, whether owner-occupants or tenants, would be eligible for relocation benefits to assist their moves based on individual property assessments.

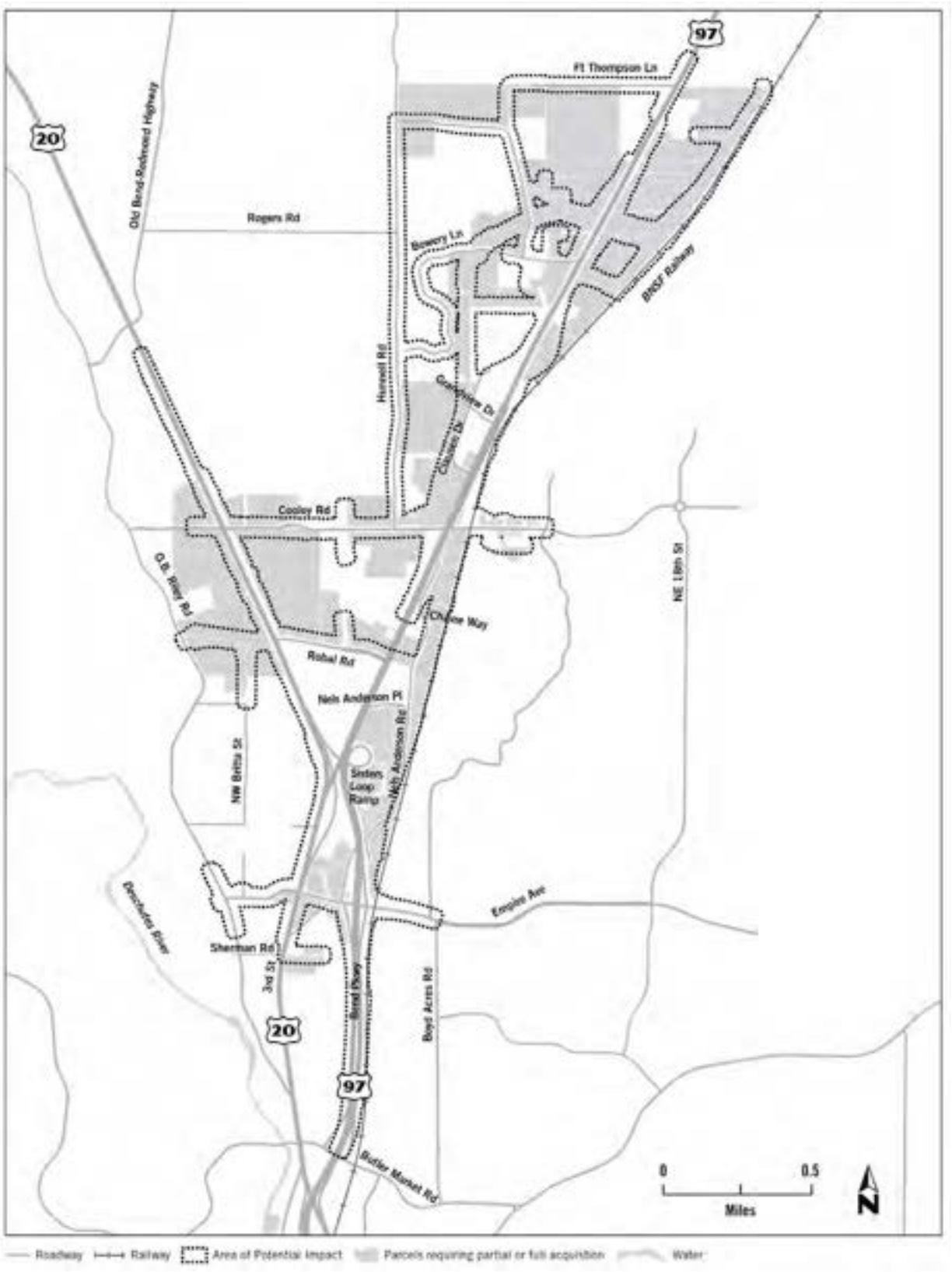
Updated real estate listings show there are at least 180 homes on standard lots and at least 367 homes on acreage for sale for less than $250,000. There are at least 68 homes on standard lots and at least 126 homes on acreage listed for sale between $250,000 and $500,000 (John L. Scott Realty 2013).

Business Displacements and Right of Way Impacts—The commercial and industrial property acquisitions shown in Exhibit 3-35 FEIS would result in the displacement of approximately 43 businesses, primarily concentrated in the Nels Anderson Road business area. There are approximately 612 employees that work for the businesses that would be displaced. In addition, 4 billboards and 200 personal property rental storage units would be displaced under the East DS1 Alternative.

Key Differences

Exhibit 3-35 FEIS provides a comparison of the key right of way impacts for the build alternatives.

Exhibit 3-36. Parcels with Area Acquired under the East DS1 Alternative



Note: Parcels requiring acquisition of only access rights or an easement, but no acreage, are not shown on this exhibit.

Current real estate listings for Bend show approximately 30 vacant and 60 improved commercial or industrial properties for sale; in addition there are approximately 20 vacant and 35 improved properties for sale in Redmond. Additional properties are available for lease. Most businesses that would be displaced under the East DS1 Alternative are not of a specialized nature that would make it difficult to find replacement sites. Other impacts to businesses located on commercial and industrial parcels that would be partially acquired, such as loss of parking and access relocation, would be addressed during appraisal of the property.

The Final EIS corrects the number of personal property rental storage units to 250 units that would be displaced by the East DS1 Alternative.

Updated real estate listings for Bend show there are at least 8 vacant and 9 improved commercial or industrial properties for sale; in addition there are at least 1 vacant and 17 improved properties for sale in Redmond (John L. Scott Realty 2013).

Utility Impacts—Utility relocation would be required for many utility facilities under the East DS1 Alternative, as shown in Exhibit 3-37 FEIS. The cost of some relocation expenses would be reimbursable by ODOT, while other costs would be non-reimbursable (at the utility's expense). The new Cooley Road undercrossing of US 97 and the BNSF Railway is the major design element requiring utility relocation. In addition, relocated utilities currently located in private easements would require relocation within new roadway right of way.

The East DS1 Alternative would require piping approximately 515 feet of the Swalley Rogers and Riley Laterals that connect to the Swalley Main Canal Pipeline. There would be no relocation or piping of the North/Pilot Butte Canal or the North Unit Main Canal. See Exhibit 3-37A FEIS and Section 3.11 Wetlands for additional discussion of irrigation facility impacts.

East DS2 Alternative

The East DS2 Alternative would require acquisition of right of way for new roadway facilities. Fewer than half of the parcels highlighted in Exhibit 3-38 would be only partially acquired and would not require removal of the home or business on that parcel. Right of way acquisition would result in impacts to residences, businesses, personal property, and other property. These impacts are summarized in Exhibit 3-35 FEIS.

Residential Displacements and Right of Way Impacts—The East DS2 Alternative would require acquisition of right of way, access rights, or an easement from 142 parcels, as shown in Exhibit 3-35 FEIS.

Acquisitions from residential parcels would result in the displacement of approximately 13 households.

Similar to the East DS1 Alternative, residential displacements required under the East DS2 Alternative would be concentrated along Cooley Road east of US 97 and west of Boyd Acres Road. Of the 13 residences that would be displaced, 9 were purchased for less than $250,000, and 4 were purchased for $250,000 to $500,000. The availability of comparable replacement housing for residents that would have to relocate under the East DS2 Alternative is the same as under the East DS1 Alternative.

Exhibit 3-37 FEIS: *Utility Relocations under the East DS1 and East DS2 Alternatives and the Preferred Alternative*

Utility Providers	East DS1 Alternative	East DS2 Alternative	Preferred Alternative
Cable/Communication			
Bend Broadband	Aerial and underground fiber optic cables		
Level (3) Communications	None anticipated		
Quantum Communications	Aerial fiber optic cables		
~~QWEST Communications~~ CenturyLink[1]	Aerial and underground fiber optic and copper cables, remote terminal cabinet, service cabinets, major cross connect cabinets, DSL (digital subscriber line) cabinets		
Electric			
Central Electric Cooperative	Aerial distribution power lines, underground power line and pad-mounted transformers		Aerial distribution power lines
Pacific Power	Aerial transmission lines, aerial and underground power lines, pad-mounted transformers		
Irrigation			
Central Oregon Irrigation District	None anticipated		
North Unit Irrigation District	None anticipated		
Swalley Irrigation District[2]	~~Canal pipes~~ Crossing of piped canals and laterals, eight new crossings of open lateral.		Crossing of piped canals and laterals, six new crossings of open laterals
Natural Gas			
Cascade Natural Gas	Gas mains, gas lines		
Sewer			
City of Bend	Pressure sewer lines, gravity sewer lines, sewer lift station		
Water			
Avion Water Company	Water mains, service connections		
City of Bend	Water mains, water lines		
Long Butte Water Company	Unknown		
TOTAL ESTIMATED[3] COST	**~~$4,639,000—$10,558,000~~ $4,825,000 - $10,981,000 Reimbursable (Paid by ODOT, 2016 dollars)** **~~$4,266,000—$5,847,000~~ $4,437,000 – $6,081,000 Non-Reimbursable (Paid by Utility Provider, 2016 dollars)**		**$6,136,000 Reimbursable (Paid by ODOT, 2016 dollars)** **$9,423,000 Non-Reimbursable (Paid by Utility Provider, 2016 dollars)**

[1] Since the publication of the Draft EIS, QWEST Communications was acquired by CenturyLink.

[2] Since the publication of the Draft EIS, the Swalley Irrigation District has piped all previously open segments within the API of the Swalley Main Canal (now referred to as the Swalley Main Canal Pipeline). In addition, crossings of laterals have been identified. Please also see Exhibit 3-37A FEIS for a summary of detailed impacts to Swalley Irrigation District facilities.

[3] These estimates are high-level approximations and are subject to change during final design.

Business Displacements and Right of Way Impacts—The commercial and industrial property acquisitions shown in Exhibit 3-35 FEIS would result in the displacement of approximately 51 businesses, which employ approximately 692 employees. In addition, 3 billboards and 200 personal property rental storage units would be displaced under the East DS2 Alternative.

Business displacements required under the East DS2 Alternative would be concentrated in the Nels Anderson Road and Clausen Drive business areas. The availability of comparable commercial and industrial properties available for businesses to relocate to under the East DS2 Alternative would be the same as under the East DS1 Alternative.

The Final EIS corrects the number of personal property rental storage units to 250 units that would be displaced by the East DS2 Alternative.

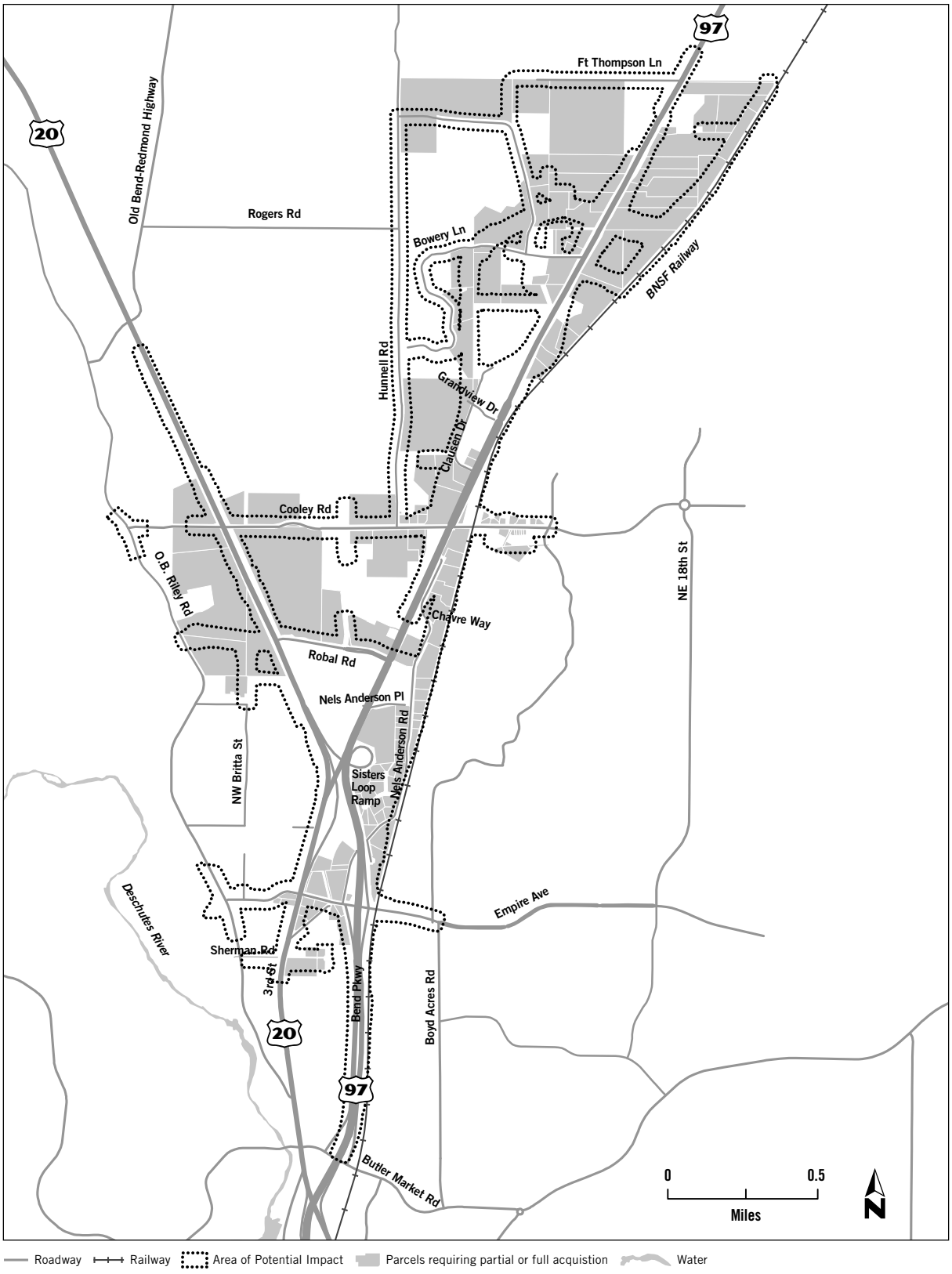
More Information

Additional discussion on business displacements and related economic impacts is included in Section 3.5 Socioeconomic Analysis.

Exhibit 3-37A FEIS: *Impacts to Swalley Irrigation District Facilities under the East DS1 and East DS2 Alternatives and the Preferred Alternative*

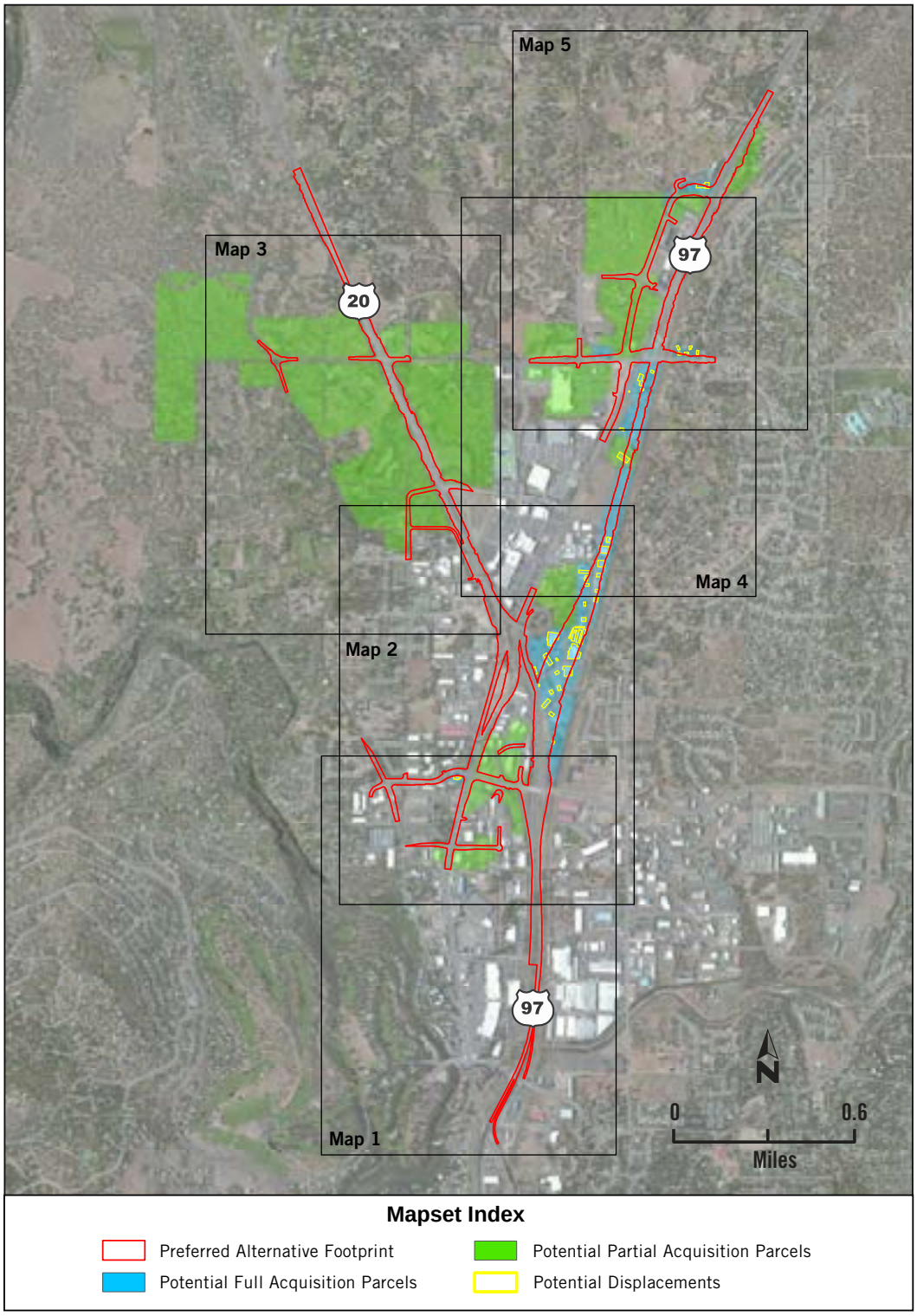
Resource	Location	East DS1 Alternative	East DS2 Alternative	Preferred Alternative
Swalley Riley Lateral	Britta Street	New crossing of open lateral; 70 foot long structure (box culvert or pipe) over the lateral.		
Swalley Rogers Lateral	US 97, US 20	Widening/realignment of US 97 and US 20 on both piped and open sections of the lateral; piping of approximately 310 feet of open lateral; modification of the lateral to accommodate roadway improvements.		
	Cooley Road and Robal Road	Widening/realignment of Cooley Road (110 feet) and Robal Road (25 feet) on both piped and open sections of the lateral		The Preferred Alternative will not widen Cooley Road and Robal Road, there will be no impacts to the Swalley Rogers Lateral
Swalley NC-1 Lateral	Empire Avenue, 3rd Street, Mervin Sampels Road	Widening of road over existing piped crossings; modifications to the Swalley NC-1 Lateral to accommodate roadway improvements.		
Swalley Main Canal Pipeline	US 97 at Empire Avenue, east of north bound off-ramp	Potential change in amount of fill over the pipeline. At this time, no impacts to the pipeline itself are expected.		
Swalley Main Canal Pipeline	US 97, south of Empire Avenue	No impacts anticipated.		
Swalley Main Canal Pipeline	At both Cooley Road and US 97 north of the Deschutes Memorial Gardens and Chapel	Widening of road over existing piped crossing; no impacts to the pipeline itself, but extension or replacement of the existing culvert over the pipe will be needed.		
Swalley Kotzman Lateral	US 97, south of Empire Avenue	No impacts anticipated.		

Exhibit 3-38: *Parcels with Area Acquired under the East DS2 Alternative*



Note: Parcels requiring acquisition of only access rights or an easement, but no acreage, are not shown on this exhibit.

Exhibit 3-38 FEIS: *Anticipated Parcels with Right of Way Acquisition under the Preferred Alternative Mapset Index*



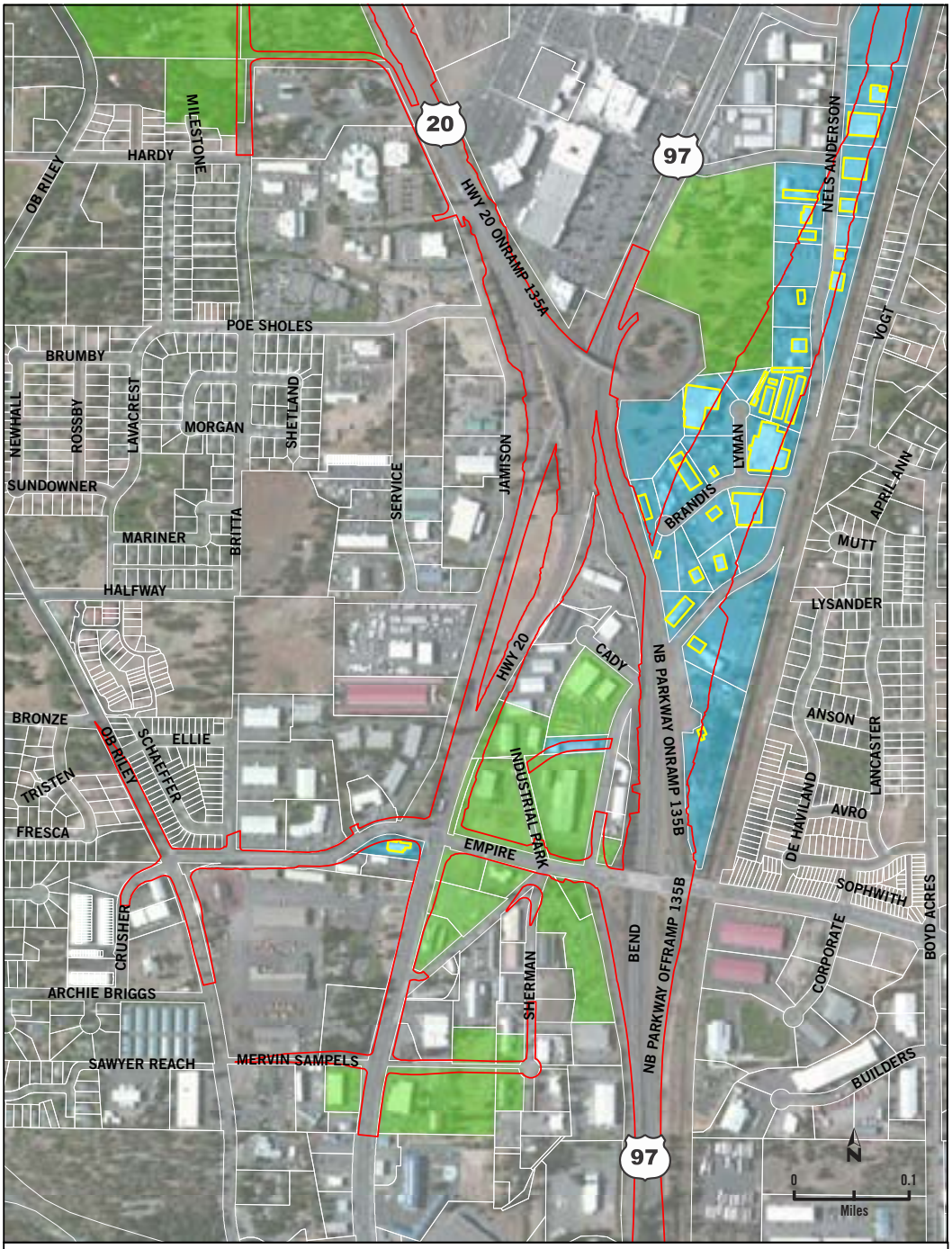
Note: Parcels shown in green are those in which some portion is anticipated to be acquired for right of way. In some cases, a green parcel may be large but only a small portion of the parcel is anticipated to be acquired. Parcels shown in blue are those for which the entire parcel is anticipated to be acquired for right of way. Parcels requiring acquisition of only access rights or an easement, but no acreage, are not shown on this exhibit. Parcels owned by ODOT are not shown as "impacted parcels" where an acquisition will be required; ODOT will deed the necessary right of way to the City of Bend.

Exhibit 3-38A FEIS: *Anticipated Parcels with Right of Way Acquisition under the Preferred Alternative (Map 1)*



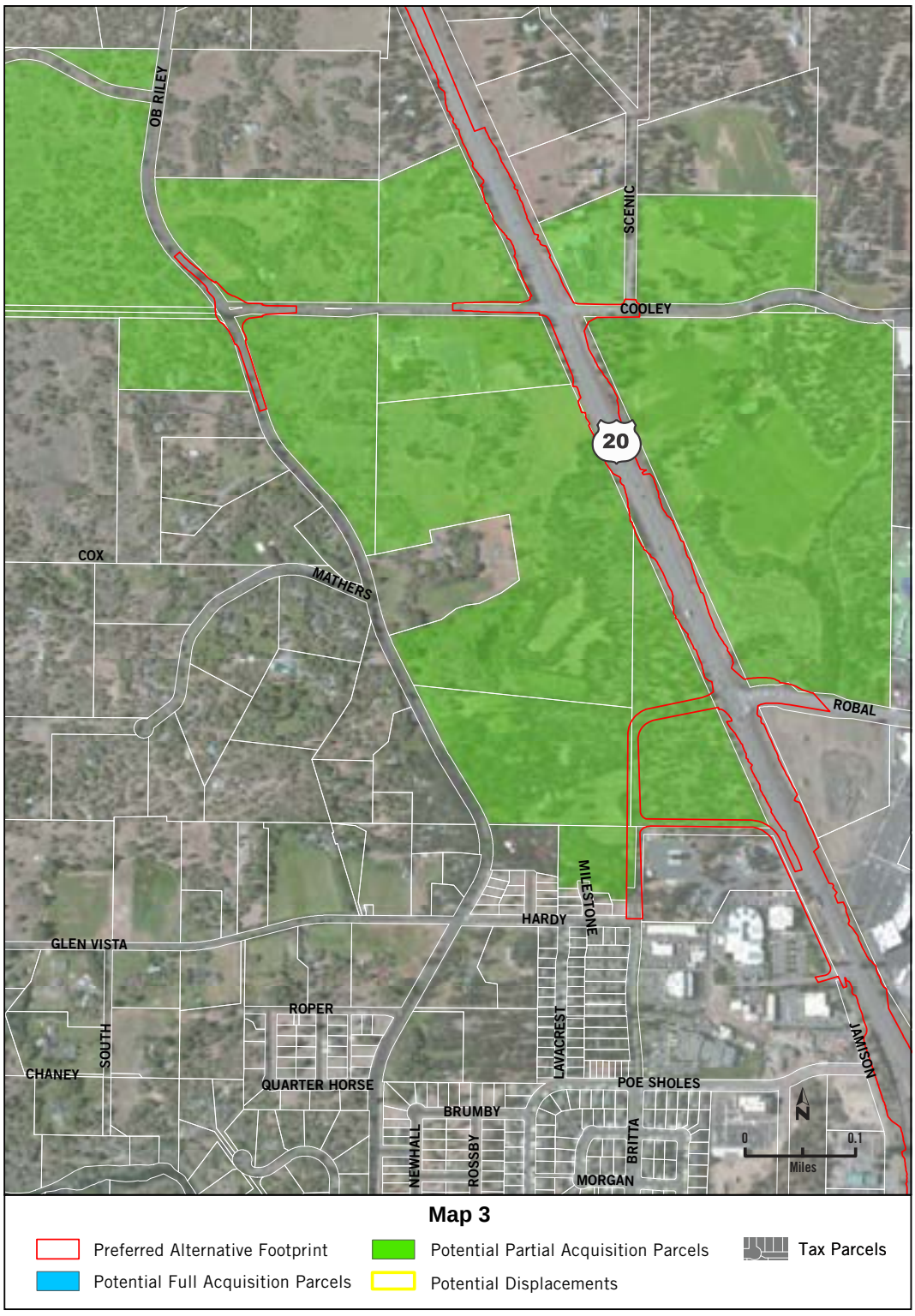
Note: Parcels shown in green are those in which some portion is anticipated to be acquired for right of way. In some cases, a green parcel may be large but only a small portion of the parcel is anticipated to be acquired. Parcels shown in blue are those for which the entire parcel is anticipated to be acquired for right of way. Parcels requiring acquisition of only access rights or an easement, but no acreage, are not shown on this exhibit. Parcels owned by ODOT are not shown as "impacted parcels" where an acquisition will be required; ODOT will deed the necessary right of way to the City of Bend.

Exhibit 3-38B FEIS: *Anticipated Parcels with Right of Way Acquisition under the Preferred Alternative (Map 2)*



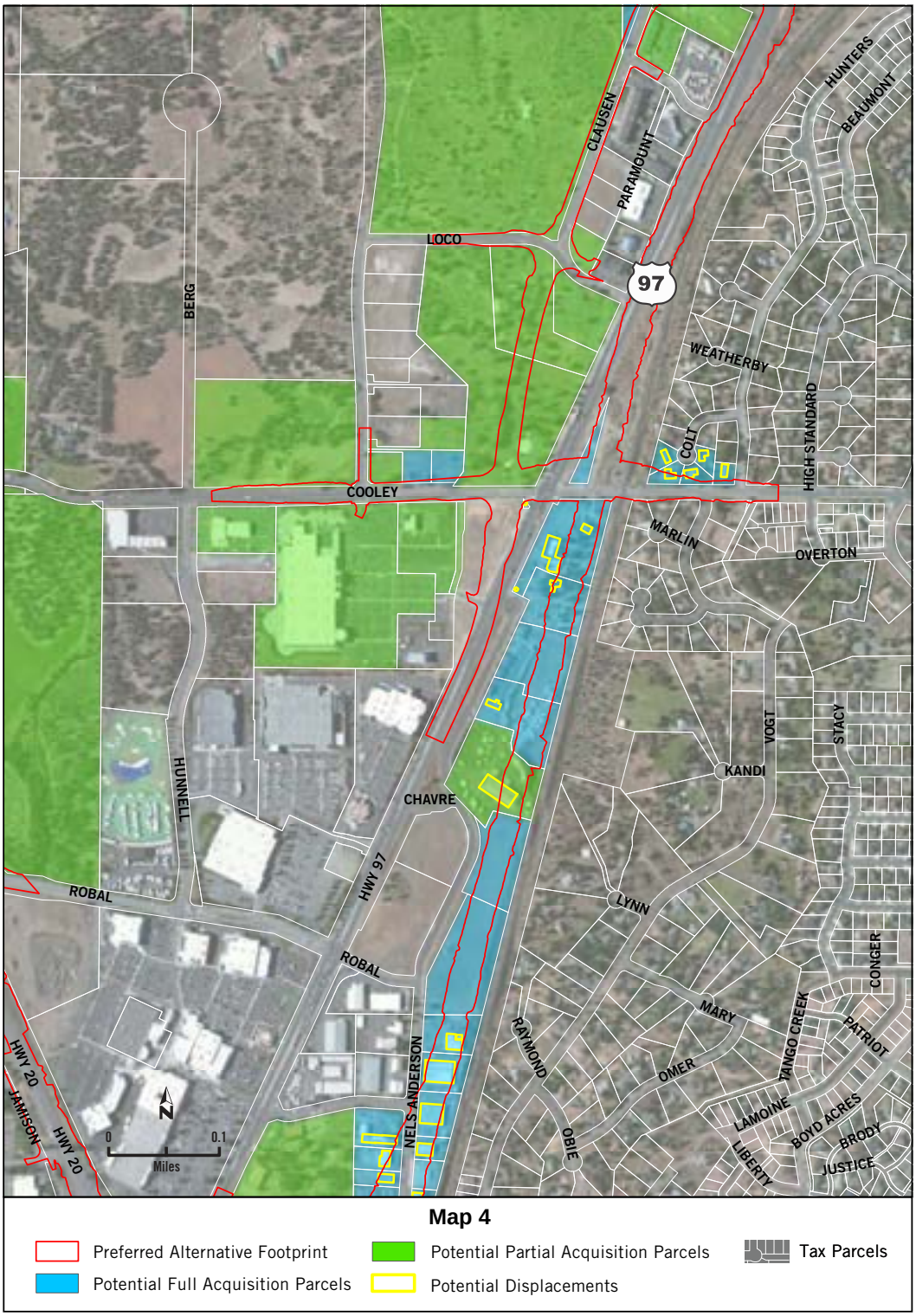
Note: Parcels shown in green are those in which some portion is anticipated to be acquired for right of way. In some cases, a green parcel may be large but only a small portion of the parcel is anticipated to be acquired. Parcels shown in blue are those for which the entire parcel is anticipated to be acquired for right of way. Parcels requiring acquisition of only access rights or an easement, but no acreage, are not shown on this exhibit. Parcels owned by ODOT are not shown as "impacted parcels" where an acquisition will be required; ODOT will deed the necessary right of way to the City of Bend.

Exhibit 3-38C FEIS: *Anticipated Parcels with Right of Way Acquisition under the Preferred Alternative (Map 3)*



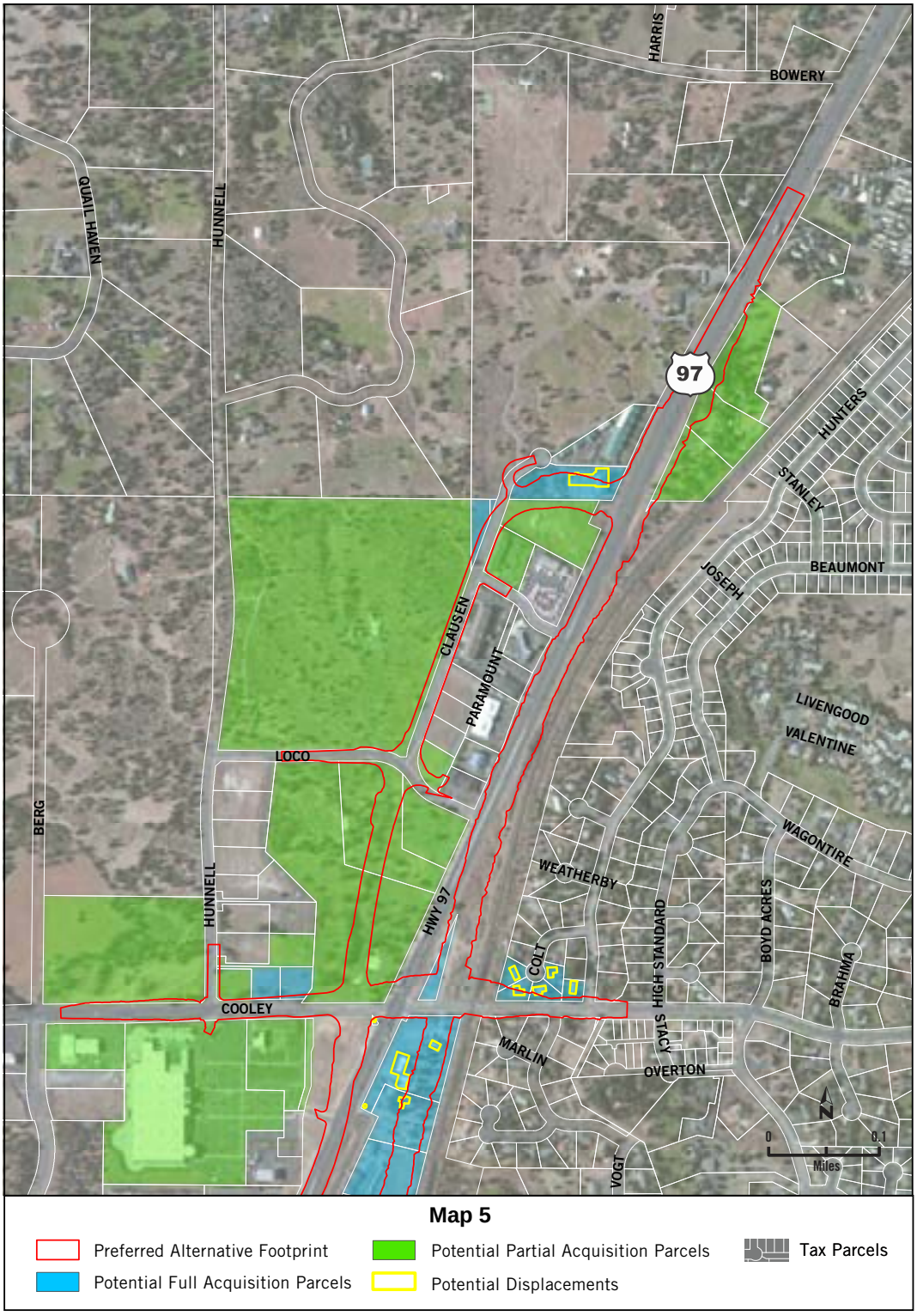
Note: Parcels shown in green are those in which some portion is anticipated to be acquired for right of way. In some cases, a green parcel may be large but only a small portion of the parcel is anticipated to be acquired. Parcels shown in blue are those for which the entire parcel is anticipated to be acquired for right of way. Parcels requiring acquisition of only access rights or an easement, but no acreage, are not shown on this exhibit. Parcels owned by ODOT are not shown as "impacted parcels" where an acquisition will be required; ODOT will deed the necessary right of way to the City of Bend.

Exhibit 3-38D FEIS: *Anticipated Parcels with Right of Way Acquisition under the Preferred Alternative (Map 4)*



Note: Parcels shown in green are those in which some portion is anticipated to be acquired for right of way. In some cases, a green parcel may be large but only a small portion of the parcel is anticipated to be acquired. Parcels shown in blue are those for which the entire parcel is anticipated to be acquired for right of way. Parcels requiring acquisition of only access rights or an easement, but no acreage, are not shown on this exhibit. Parcels owned by ODOT are not shown as "impacted parcels" where an acquisition will be required; ODOT will deed the necessary right of way to the City of Bend.

Exhibit 3-38E FEIS: *Anticipated Parcels with Right of Way Acquisition under the Preferred Alternative (Map 5)*



Note: Parcels shown in green are those in which some portion is anticipated to be acquired for right of way. In some cases, a green parcel may be large but only a small portion of the parcel is anticipated to be acquired. Parcels shown in blue are those for which the entire parcel is anticipated to be acquired for right of way. Parcels requiring acquisition of only access rights or an easement, but no acreage, are not shown on this exhibit. Parcels owned by ODOT are not shown as "impacted parcels" where an acquisition will be required; ODOT will deed the necessary right of way to the City of Bend.

Utility Impacts—Utility relocation and associated costs would be required for the East DS2 Alternative and would be similar to that required under the East DS1 Alternative, as listed in Exhibit 3-37 FEIS. The East DS2 Alternative would require relocation of an additional Avion Water Company water main and two Bend Broadband fiber optic cables in comparison with the East DS1 Alternative.

The East DS2 Alternative would require piping approximately 515 feet of the Swalley Rogers and Riley Laterals that connect to the Swalley Main Canal Pipeline. There would be no relocation or piping of the North/Pilot Butte Canal or the North Unit Main Canal. See Exhibit 3-37A FEIS and Section 3.11 Wetlands for additional discussion of irrigation facility impacts.

More Information

Please see Section 3.11 Wetlands for a discussion about the environmental consequences of irrigation facilities in the API..

Preferred Alternative—East DS2 Modified Alternative

The Preferred Alternative will require acquisition of right of way for new roadway facilities. Nearly half (51) of the parcels highlighted in Exhibit 3-38 FEIS (Maps 1 through 5) will be only partially acquired and will not require removal of the home or business on that parcel. Right of way acquisition will result in impacts to residences, businesses, personal property, and other property. These acquisitions are quantified in Exhibit 3-35 FEIS. The estimated cost of right of way acquisition associated with the Preferred Alternative is $74 million in 2016 dollars.

Residential Displacements and Right of Way Impacts—The Preferred Alternative will require acquisition of right of way, access rights, or an easement from 103 parcels, as shown in Exhibit 3-35 FEIS. Acquisitions from residential parcels will result in the displacement of approximately 6 households.

Similar to the East DS1 and East DS2 Alternatives, residential displacements required under the Preferred Alternative will be concentrated along Cooley Road east of US 97 and west of Boyd Acres Road. Of the 6 residences that will be displaced, all were purchased for less than $250,000. The availability of comparable replacement housing for residents that will have to relocate under the Preferred Alternative is the same as under the East DS1 and East DS2 Alternatives.

Business Displacements and Right of Way Impacts—The commercial and industrial property acquisitions shown in Exhibit 3-35 FEIS will result in the displacement of approximately 44 businesses, which employ approximately 579 employees. In addition, 2 billboards and 250 personal property rental storage units will be displaced under the Preferred Alternative.

Business displacements required under the Preferred Alternative will be concentrated in the Nels Anderson Road and Clausen Drive business areas. The availability of comparable commercial and industrial properties available for businesses to relocate to under the Preferred Alternative will be the same as under the East DS1 and East DS2 Alternatives.

Utility Impacts—Utility relocation and associated costs will be required for the Preferred Alternative and will be slightly less than those required under the East DS1 and East DS2 Alternatives, as listed in Exhibit 3-37 FEIS. The Preferred Alternative will also avoid impacts to the Swalley Main Canal Pipeline.

The Preferred Alternative will require installing one 70-foot long culvert within the open portion of the Swalley Riley Lateral to accommodate the extension of Britta Street. The Preferred Alternative will pipe fewer sections and linear distance of the Swalley Rogers Lateral, for a total of 310 feet of pipe added to the Swalley Rogers Lateral compared to the 445 feet of pipe that would be added to the Swalley Rogers Lateral under the East DS1 and East DS2 Alternatives. Under the Preferred Alternative there will be no relocation or piping of the North/Pilot Butte Canal or the North Unit Main Canal. See Exhibit 3-37A FEIS and Section 3.11 Wetlands for additional discussion of irrigation facility impacts.

Indirect Impacts

Indirect impacts resulting from right of way acquisition could include:

- Minor population increases in other areas of Bend where displaced residents relocate
- Breaking up established clusters of businesses
- A slight increase in demand for housing and commercial properties to accommodate displaced residents and businesses.

Indirect impacts to utilities as a result of construction of the build alternatives could include:

- Additional costs for relocation of aerial transmission lines due to project constraints that do not allow down guying (i.e. steel poles versus wood poles)
- Alternation in the schedule for relocation of utilities and construction within irrigation rights of way due to the overall project staging and schedule
- Sewer adjustments due to grade change at Cooley Road could be required for the sewer line that extends from the Sisters loop ramp to Grandview Drive.

Construction Impacts

Property acquisition and associated residential, business, and personal property relocations would take place prior to construction of improvements under the build alternatives. Utility relocations would occur at the beginning of the construction process. During construction there could also be minor, short interruptions to utility services.

3.3.4 Avoidance, Minimization, and/or Mitigation Measures Proposed in the Draft EIS

Mitigation Measures for Long-Term Impacts from Right of Way Acquisition

Minimization Measures—The build alternatives have been designed to reduce right of way impacts to the extent possible, while also meeting roadway design standards. Specific examples include:

- Avoidance of Deschutes Memorial Gardens and Chapel
- Minimization of displacements in the Juniper Mobile Home Park by terminating the local road on the east side of US 97 at the northern boundary of the mobile home park.

Mitigation Measures—The following measures could be taken to the extent practicable to mitigate long-term adverse impacts resulting from right of way acquisition:

- Relocation assistance would be provided to all persons, businesses, or for personal property required to move as a result of right of way acquisition
- Rights of way would be obtained by the ODOT Right of Way Section under the provisions of Public Law 91-646, the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, 49 CFR Part 24. Title III of this act and its implementing regulations ensure that owners of real property to be acquired for federal and federally assisted projects are treated fairly and consistently. Owners of property needed for a highway project would be offered just compensation for the required right of way.

Definition

Just Compensation

Just compensation includes the estimated value of all the land and improvements within the needed area. If only a part of a property would be acquired, just compensation would also include any measurable loss in value to the remaining property due to the partial acquisition. ODOT procedures, guided by federal regulations, have been designed to protect both owners of properties needed for public projects as well as other taxpayers.

The Relocation Process

When negotiations begin, property owners and tenants would be notified in writing that ODOT intends to acquire the property. No occupant would be required to move from a home, farm, or business location earlier than 90 days following the notice, or 30 days after payment is made for the property, whichever is later.

No family or individual would be required to vacate any dwelling until such displacee has found or been offered comparable replacement housing. All replacement housing offered would be fair housing open to all persons regardless of race, color, religion, sex, or national origin. The project would not be advertised for construction until all eligible displacees have been offered comparable replacement housing.

Businesses, farms, and nonprofit organizations which qualify as displaced persons would be entitled to payment for actual moving of personal property and inventory. In addition they could be eligible to receive a payment for expenses actually incurred in relocating and reestablishing at a replacement site. A business, farm, or non-profit (with the exception of outdoor advertising sign owners) could be eligible to choose a fixed payment in lieu of the payments for actual moving and related expenses and reestablishment expenses.

Appendix B includes additional information on relocation benefits.

Construction Mitigation Measures for Utilities

The following measures could be taken to the extent practicable to avoid, minimize, and mitigate temporary adverse impacts to utilities:

- Early coordination with utility providers for review of preliminary plans to avoid delays to utility relocation work
- Acquisition of new right of way and utility easements prior to construction to minimize delays to utility relocation work.

Mitigation Measures for Long-Term Impacts to Utilities

Avoidance Measures—The build alternatives were designed to minimize acquisition of land and avoid relocation of major utility facilities, including the Bend Broadband operations plant, hydro-electric plants, and electrical substations.

Minimization Measures—The build alternatives have been designed to incorporate the following measures that would minimize adverse impacts to utilities.

- A type, size, and location study would be conducted for bridge and pipe crossings
- Location of drainage swales, stormwater treatment facilities, traffic signals, lighting, and sign bridge foundations would take existing utility facilities into account and minimize conflicts to the extent possible
- Vertical and horizontal roadway alignments of the build alternatives would consider existing utility facilities to minimize impacts to utilities where possible.

Mitigation Measures—The following measures could be taken to the extent practicable to mitigate long-term adverse impacts to utilities.

- Function and capacity would be restored to all utilities experiencing impacts

- Utility providers would be allowed to utilize public right of way for temporary or permanent relocation of facilities. Permanent use of public right of way would require permits from the appropriate administrating agency.
- Rights of way would be obtained by the ODOT Right of Way Section under the provisions of Public Law 91-646, the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, 49 CFR Part 24. Title III of this act and its implementing regulations ensure that owners of real property, including utility providers, to be acquired for federal and federally assisted projects are treated fairly and consistently. Owners of property needed for a highway project would be offered just compensation for the required right of way, and ODOT Right of Way Section would assist utility providers in relocating utility facilities.

Key Point

Utility Relocation

The ODOT Utility Relocation Program policies for reimbursable and non-reimbursable relocations are derived from the Oregon Constitution, ORS, OAR, and the Code of Federal Regulations. OAR 734-055 provides the authority for permitting and the manner in which the utility is allowed in the right of way. Federal regulation 23 CFR 645 provides direction as to when and which costs of relocation are eligible for reimbursement and the relationship between ODOT rules and regulations and FHWA regulations.

3.3.5 Avoidance, Minimization, and/or Mitigation Commitments Incorporated into the Preferred Alternative

ODOT makes the following commitments.

Project Design

- ODOT will perform early coordination with utility providers for review of preliminary plans to avoid delays to utility relocation work
- ODOT will acquire new right of way and utility easements prior to construction to minimize delays to utility relocation work
- ODOT will conduct a type, size, and location study for bridge and pipe crossings
- ODOT will locate drainage swales, stormwater treatment facilities, traffic signals, lighting, and sign bridge foundations and will take existing utility facilities into account and minimize conflicts to the extent possible
- ODOT will consider existing utility facilities when designing the vertical and horizontal roadway alignments to minimize impacts to utilities where possible

- ODOT will continue to coordinate with the Swalley Irrigation District during the project design phase to identify and avoid or minimize construction impacts
- ODOT will design any replacement of Swalley Irrigation Facilities to meet the Swalley Irrigation District's standards or obtain approval by the Swalley Irrigation District manager
- ODOT will protect and maintain access to Swalley Irrigation Facilities.
- ODOT will follow Swalley Irrigation District policies with regard to private laterals
- ODOT will restore the District to full function according to Federal Relocation Policy and Guidelines set forth in 23 CFR 645.

Project Construction

- ODOT will identify utilities experiencing construction conflicts, notify the utility owners of the conflicts, and approve a utility relocation plan for the utility owners to implement
- ODOT will allow utility providers to utilize public right of way for temporary or permanent relocation of facilities
- ODOT will protect and maintain access to Swalley Irrigation Facilities during construction
- ODOT will coordinate with the Swalley Irrigation District during construction and perform construction activities on Swalley Irrigation Facilities outside of irrigation season and winter stock runs, unless other arrangements are made with the Swalley Irrigation District.

3.4 Environmental Justice

3.4.1 Regulatory Setting

All projects involving a federal action (funding, permit, or land) must comply with Title VI of the Civil Rights Act and Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.* Title VI prohibits discrimination on the basis of race, color, or national origin. Executive Order 12898 directs each federal agency, "[t]o the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report on the National Performance Review, each agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, polices, and activities on minority populations and low-income populations…" (Executive Order 12898 Section 1-1).

Transportation projects receiving Federal-aid funding must comply with FHWA Order 6640.23 FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.

3.4.2 Affected Environment

More information: Additional detail on environmental justice is provided in the *Socioeconomic and Environmental Justice Technical Report* (ODOT 2014m). *The Socioeconomic and Environmental Justice Technical Report* is listed in Appendix K and available in the document library of the project's website (www.us97solutions.org).

Population and Households

The City of Bend is Central Oregon's largest city. In July of 2009, the City of Bend and Deschutes County had estimated populations of 82,280 and 170,705, respectively. Between 2000 and 2009 the City of Bend's population increased by nearly 60 percent (Portland State University 2010). Recent population trends show that growth in the City of Bend and Deschutes County has tapered concurrent to the downturn in the national and state economy. The City and County have both experienced slowing population growth from the highs of 7 and 9 percent annual growth, to about 2 percent growth between 2008 and 2009.

As of July 2009, it was estimated that about 14 percent of Deschutes County's population is 65 years old and older (Portland State University 2010). 2000 Census Block Group 991201.3, which is located east of US 97 and south of Cooley Road (Exhibit 3-39), has a lower percentage of elderly persons compared to the City and County. 2000 Census Block Group 991202.1, which is located east of US 97 and north of Cooley Road, has a higher percentage of elderly persons compared to the City and County. The Four Seasons Mobile Home

Definitions

Census Block Group

Census block groups are a collection of census blocks within a census tract, sharing the same first digit of their four-digit identification numbers. A census block group is the smallest geographic unit for which the US Census Bureau tabulates sample data. Block groups average about 1,500 inhabitants.

Elderly

Elderly populations are people aged 65 years and over.

Park, a community for those over 55 years of age, is located within this block group.

From a survey of the three mobile home parks located in the API, it was found that approximately 23 percent of the total residents surveyed are elderly and approximately 28 percent are disabled (ODOT 2011c); higher than the percentages of elderly and disabled persons in the City and County.

Income data from the 2000 census reflects a median individual income in 1999 of about $59,100 for census block groups within the API, compared to $21,600 and $21,800 for Bend and Deschutes County, respectively (US Census Bureau 2000). In 1999, the median household income for census block groups in the API was $88,300, compared to $40,800 for Bend and $41,800 for Deschutes County, respectively (US Census Bureau 2000). This shows that median individual and household income in the API is considerably higher than the City and County for both these measures. The 2008 estimated annual median household income in the City of Bend was $51,600, about $1,400 higher than Oregon's annual average (City-Data 2010). However, as discussed below, there are low-income residents concentrated at the three mobile home parks in the API.

Key Point

In 2008, 75 percent of Bend's housing was single family residential.

Key Point

There are three mobile home parks located in the API: Hilltop, Juniper and Four Seasons (Exhibit 3-39).

For housing, the greater Bend area offers a variety of housing types; however, the rapid increase in Bend's population throughout the last decade "resulted in demand for workforce housing that has outpaced the production of workforce units." This resulted in a lack of affordable housing within the City of Bend (City of Bend 2009b). From 2000 to early 2007 home prices in Bend rose 130 percent (CNNMoney.com 2010); however, by 2009 average home prices dropped 40 percent from $352,250 to $207,000 (Gobend Realty 2010). Mobile home parks are typically a more affordable type of housing. Current real estate listings show that there are approximately 50 mobile homes for sale in the Bend area, which are located in mobile home parks where residents would rent the mobile home space (land) from the park. The Bethlehem Inn, a community sponsored, non-profit emergency shelter for men, women and families is within the API (Exhibit 3-39).

Since publication of the Draft EIS, the US Census Bureau released 2010 decennial census data and American Community Survey (ACS) data. The Final EIS includes 2010 decennial census data and 2007-2011 ACS 5Year Estimates and associated analysis.

In July of 2012, the City of Bend and Deschutes County had estimated populations of 77,455 and 160,140, respectively (Portland State University 2013). The City and County both experienced a slowdown in population growth from 2007 to 2009; with a loss in population in 2010 followed by slight population growth in 2011 and 2012.

By January 2011, the estimated population of Deschutes County that is 65 years old and older had increased to 16 percent (Portland State University 2011). Three of the four 2010 Census Block Groups in the API (001100.1, 001100.2, and 001200.3 shown in Exhibit 3-39 FEIS) have a higher percentage of elderly persons compared to Bend and Deschutes County (US Census Bureau 2010). The Four Seasons Mobile Home Park, a community for those over 55 years of age, is located within one of these block groups (001200.3). See Exhibit 3-47 in Section 3.5 Socioeconomic Analysis for data on elderly residents within census block groups in the API.

Income data from the 2007-2011 American Community Survey 5-Year Estimates shows a median individual income of about $30,982 compared to $30,203 and $27,965 for Bend and Deschutes County, respectively (US Census Bureau 2012). The median household income for census tracts in the API was $60,260, compared to $52,596 for Bend and $52,962 for Deschutes County (US Census Bureau 2012). This shows that median individual and household income in the API is slightly higher than the City and County median. The estimated annual median household income in the City of Bend ($52,596) was about $2,700 higher than Oregon's median household income ($49,850) (US Census Bureau 2012).

As of March 2013, the average home sale price had increased to about $260,000 and the Fourth Quarter 2012 Federal Housing Finance Agency Housing Price Index shows that housing appreciation rates in the Bend Area have returned to 1999 rates (3.8 percent annually) (Federal Housing Finance Agency 2012). Current real estate listings show that there are approximately 60 mobile homes for sale in the Bend area. From a 2008 survey of mobile home parks in the Bend area, only 10 mobile home spaces were vacant at that time (ODOT 2011c).

Chapter 1 Purpose of and Need For Proposed Action
Chapter 2 Alternatives
Chapter 3 Affected Environment, Environmental Consequences and Mitigation
Chapter 4 Cumulative Impacts
Chapter 5 Local Short-term Uses and Long-term Productivity
Chapter 6 Irreversible and Irretrievable Commitment of Resources
Chapter 7 Comments and Coordination

Exhibit 3-39: *2000 US Census Block Groups*

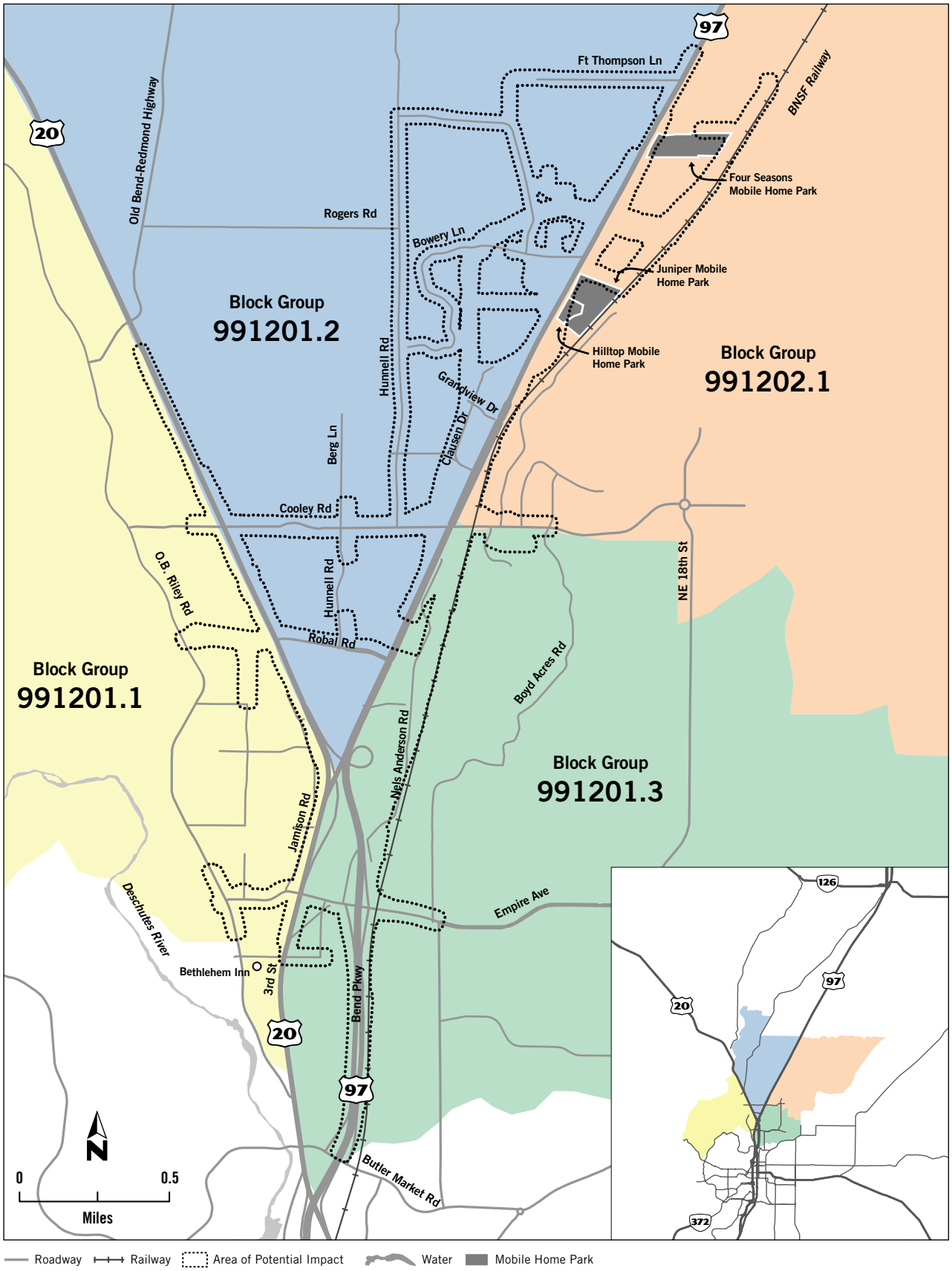
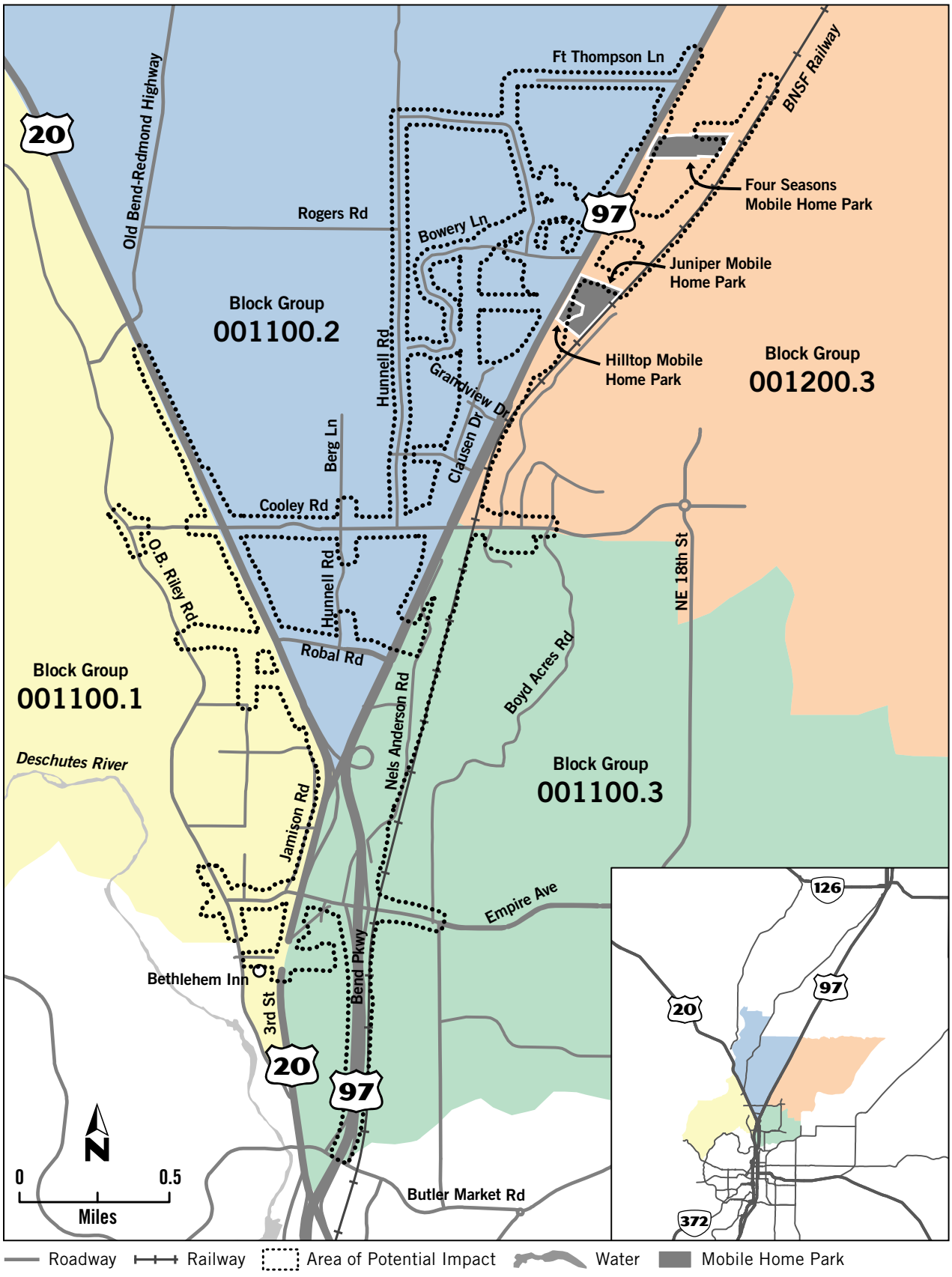


Exhibit 3-39 FEIS: *2010 US Census Block Groups*



Note: This FEIS exhibit shows the 2010 US Census Block Group numbers for census block groups in the API.

Low Income

The 2000 US Census shows that only Block Group 991201.2, which includes the western portion of the API and extends further north and west as shown in Exhibit 3-39, had a higher percentage of residents with incomes below poverty level than the City and County. Because this block group encompasses a large area, there may be low-income residents that live within this block group, but outside of the API. Public involvement activities and conversations with residents of the Hunnell Neighborhood, which is within Block Group 991201.2, has supported that there are few low-income residents in the portion of this block group within the API.

The 2000 US Census data showed that about 9 percent of Deschutes County and Bend households had incomes below poverty level. A survey of all three mobile home parks conducted in 2008 showed that approximately 10 percent of the total households surveyed had incomes below poverty level; a slightly higher proportion of low-income households compared to the City and County (Exhibit 3-40).

Exhibit 3-40: *Low-Income, Minority, and Hispanic and/or Latino Households in Deschutes County, City of Bend, and the Mobile Home Parks (2000 US Census)*

Location	Total Households	Low-Income Households	Minority Households	Hispanic and/or Latino Households
Deschutes County[1]	45,595	9%	3.8%	2.4%
City of Bend[1]	21,062	9%	4.3%	3.1%
Total for Mobile Home Parks[2]	96	10%	9%	25%

[1] City of Bend and Deschutes County data from the 2000 US Census. During the 2000 US Census, income level was based on 1999 income. A household is considered low-income if the total income is less than the poverty threshold. The poverty threshold is based on the number of people in the household; this definition is consistent with the FHWA Order, which defines "low-income" as "a person whose household income is at or below the Department of Health and Human Services (HHS) poverty guidelines. In 1999, the poverty threshold for an individual was $8,240 and each additional individual added $2,820 to the poverty threshold (e.g., the poverty threshold for a four-person family was $16,700). However, a state or locality may adopt a higher threshold for low-income as long as the higher threshold is not selectively implemented and is inclusive of all persons at or below the HHS poverty guidelines. The most current HHS poverty guidelines can be found at HHS's website: http://aspe.hhs.gov/poverty/index.shtml.

[2] Mobile home park data from the *2008 Mobile Home Park Survey* (ODOT 2011c)

Exhibit 3-40 FEIS: *Low-Income, Minority, and Hispanic and/or Latino Households in Deschutes County, City of Bend, and the Mobile Home Parks (2007-2011 American Community Survey)*

Location	Total Households	Low-Income Households	Minority Households	Hispanic and/or Latino Households
Deschutes County[1]	64,090	8%	4%	5%
City of Bend[1]	31,762	7%	4%	5%
Total for Mobile Home Parks[2]	96	10%	9%	25%

[1] City of Bend and Deschutes County data from US Census Bureau 2007-2011 American Community Survey. During the 2011 American Community Survey, income level was based on 2009 income. A household is considered low-income if the total income is less than the poverty threshold. The poverty threshold is based on the number of people in the household; this definition is consistent with the FHWA Order, which defines "low-income" as "a person whose household income is at or below the Department of Health and Human Services (HHS) poverty guidelines. In 2009, the poverty threshold for an individual was $10,830 and each additional individual added $3,740 to the poverty threshold (e.g., the poverty threshold for a four-person family was $22,050). However, a state or locality may adopt a higher threshold for low-income as long as the higher threshold is not selectively implemented and is inclusive of all persons at or below the HHS poverty guidelines. The most current HHS poverty guidelines can be found at HHS's website: http://aspe.hhs.gov/poverty/index.shtml.

[2] Mobile home park data from the 2008 Mobile Home Park Survey (ODOT 2011c)

The 2007-2011 American Community Survey shows that 8 percent of Deschutes County households and 7 percent of Bend households had incomes below the poverty level (Exhibit 3-40 FEIS).

Race and Ethnicity

None of the census block groups in the API have a higher percentage of minorities and Hispanics and/or Latinos compared to the City of Bend or Deschutes County and there are no known linguistically isolated households. The census block data, which is a smaller geographic unit than the census block group, indicates that there are some smaller areas with a slightly higher percentage of minorities and Hispanics and/or Latinos than the City or County average. The 2008 mobile home park survey showed that, of those residents surveyed, the total percentages of minority and Hispanic and/or Latino households living in the mobile home parks is substantially higher than the City or County (Exhibit 3-40).

Based on the 2008 business survey, approximately 18 percent of the businesses employ at least one minority (including Hispanic and/or Latino) person. Within the five API business areas surveyed (Empire Avenue, Jamison Street, Nels Anderson Road, Robal Road/Cooley Road, and Clausen Drive) the percentage of minority employees working for businesses ranges from 3 to 5 percent. The percentage of minority employees varies across the businesses in the API. Approximately 24 percent of the businesses employ at least one low-income person. Within the five business areas surveyed the percentage of low-income employees working for businesses ranges from 0 to 15 percent.

Within the five business areas there are also businesses that indicated they provide services and products for minority and/or low-income persons. Businesses identified these services and products as including multi-lingual materials, employees who translate to Spanish, a senior program, or handicap accessibility.

According to the 2010 US Census data, the two API census tracts both have slightly more linguistically isolated households than in Bend (2 percent) or Deschutes County (1 percent). API census tract 11 has 3 percent linguistically isolated households and API census tract 12 has 5 percent linguistically isolated households.

Outreach to Environmental Justice Populations

Based on the evaluation of race and income data from the US Census Bureau, input from public involvement activities and results of a mobile home park survey (Parsons Brinckerhoff 2008b), the environmental justice population in the API is identified as concentrations of low-income households, minority, and Hispanic and/or Latino

Definitions

Minorities

Minorities are defined as Black (or African American, having origins in any of the black (racial groups of Africa); Hispanic (of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race); Asian American (having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands); or American Indian and Alaskan Native.

Linguistically Isolated Households

A linguistically isolated household is one in which no member 14 years old and over (1) speaks only English or (2) speaks a non-English language and speaks English "very well." In other words, all members 14 years old and over have at least some difficultly with English (US Census Bureau 2000).

More Information

See Section 3.5 Socioeconomics for more information on business areas.

Key Point

Hilltop and Juniper have a higher percentage of Hispanic and/or Latino and low-income residents than Bend or Deschutes County. Four Seasons has a higher percentage of low-income residents than Bend or Deschutes County. These residents are the identified environmental justice population in the API.

residents living at the three mobile home parks: Juniper, Hilltop and Four Seasons.

The Juniper and Hilltop mobile home parks are located east of US 97 between Grandview Drive and Bowery Lane, immediately adjacent to one another. According to the 2000 US Census data, both are densely populated and have higher percentages of Hispanic and/or Latino residents and low-income households than Bend or Deschutes County (Exhibit 3-41). The Four Seasons Mobile Home Park, located east of US 97 between Bowery Lane and Fort Thompson Lane, has a population density that is slightly less than the other mobile home parks. A higher percentage of low-income households live at Four Seasons Mobile Home Park than Bend or Deschutes County (Exhibit 3-41).

The percentage of low-income households in the City of Bend and Deschutes County has been updated according to 2010 US Census data (Exhibit 3-41 FEIS).

Exhibit 3-41: *Percentage of Minority and Low-Income Residents (2000 US Census)*

Mobile Home Park	Percent Minority	Percent Low-Income (Households)	Percent Hispanic and/or Latino
Four Seasons	**10%**[2]	7%	0%
Hilltop	**23%**	**17%**	**54%**
Juniper	6%	**11%**	**44%**
City of Bend[1]	7%	9%	5%
Deschutes County[1]	5%	9%	4%

[1]City of Bend and Deschutes County data from the US Census Bureau's Decennial Census (2000). During the 2000 US Census, income level was based on 1999 income.

[2]Gray shaded percentages indicate minorities or low-income percentages that are higher than that of the City of Bend and Deschutes County.

Source: Parsons Brinckerhoff 2008b

Exhibit 3-41 FEIS: *Percentage of Minority and Low-Income Residents (2007-2011 American Community Survey)*

Mobile Home Park	Percent Minority	Percent Low-Income (Households)	Percent Hispanic and/or Latino
Four Seasons	10%	7%	0%
Hilltop	**23%**[2]	**17%**	**54%**
Juniper	6%	**11%**	**44%**
City of Bend[1]	17%	7%	8%
Deschutes County[1]	14%	8%	7%

[1]City of Bend and Deschutes County data from the US Census Bureau's Decennial Census (2010). During the 2010 US Census, income level was based on 2009 income.

[2]Gray shaded percentages indicate minorities or low-income percentages that are higher than that of the City of Bend and Deschutes County.

Source: Parsons Brinckerhoff 2008b

ODOT conducted specific outreach to populations subject to environmental justice executive orders, including:

On-Site Meeting—On August 25, 2009, ODOT held a meeting at the Juniper Mobile Home Park. Residents from the Juniper and Hilltop mobile home parks were sent notices and the owner of the Four Seasons Mobile Home Park was invited. The purpose of the meeting was to present the alternatives, discuss potential adverse and beneficial impacts of the alternatives to the mobile home parks and identify community concerns about the proposed action. ODOT gave a presentation about the alternatives and answered questions. A Spanish language interpreter translated for Spanish speaking residents. Approximately 40 residents of the mobile home parks attended.

On-Site Meeting—On July 20, 2010, ODOT held another meeting at the Juniper Mobile Home Park to share its recommendation to advance the East DS1 and East DS2 Alternatives for detailed study and comparison. A Spanish language interpreter translated for Spanish speaking residents. Residents of all three mobile home parks attended.



Juniper Mobile Home Park

Spanish Meeting Announcement—English and Spanish meeting announcements were mailed via US Postal Service to all residents in the Juniper and Hilltop mobile home parks for all open houses and the Draft EIS public hearing.

Since the publication of the Draft EIS, ODOT held a project update open house in June 2013. English and Spanish meeting announcements were mailed via US Postal Service to all residents in the Juniper and Hilltop mobile home parks.

Spanish Language Interpreter at Open Houses—ODOT provided a Spanish language interpreter for all open houses, and his contact information was provided on project newsletters and meeting announcements if Spanish-speaking individuals have ad hoc questions about the proposed action.

Other information gathering efforts were pursued to gain a better understanding of the environmental justice populations. A mobile home park survey and a business survey were conducted, which gathered specific information about populations subject to environmental justice executive orders.

The main topics raised by environmental justice populations included:

- Residential displacements, including a desire to remain in or relocate from the mobile home park neighborhoods
- Property acquisitions
- Comparable affordable housing for displaced residents

- Increased travel distance to reach homes and emergency service provider travel routes to neighborhoods
- Access
- Safety
- Visual impacts of elevated structures
- Noise
- Project cost.

Since the publication of the Draft EIS, the API along US 97 has been modified and generally extends from approximately 1,000 feet north of Bowery Lane to Butler Market Road in Bend (Exhibit 3-1 FEIS).

3.4.3 Environmental Consequences

Key Point

The No Build, East DS1, and East DS2 Alternatives would not cause disproportionately high and adverse effects on any minority or low-income populations in accordance with the provisions of Executive Order 12898 and FHWA Order 6640.23. No further EJ analysis is required.

The Preferred Alternative does not cause disproportionately high and adverse effects on any minority or low-income populations in accordance with the provisions of Executive Order 12898 and FHWA Order 6640.23. No further EJ analysis is required.

No Build Alternative

There would be no property acquisitions or residential and/or business displacements associated with the No Build Alternative. Vehicular safety concerns, such as turning movements between the high-speed US 97 and the mobile home park private driveways, would not be addressed; furthermore, with the projected increase in traffic volumes, the accident rate could even worsen. These vehicular safety concerns would include turning movements, particularly left turns, into and out of the mobile home parks onto US 97.

The No Build Alternative would not cause disproportionately high and adverse effects on minorities and Hispanics and/or Latinos or low-income populations as per Executive Order 12898.

Since the publication of the Draft EIS, additional analysis was conducted in preparation of the Final EIS. Emergency service provider response times to all locations evaluated in the API would be longer under the No Build Alternative in 2036 than under existing conditions in 2011 as shown in Exhibit 3-54B FEIS in Section 3.5 Socioeconomic Analysis.

No new elevated structures would be constructed with the No Build Alternative, therefore avoiding the potential negative impact of solid, linear manmade structures on existing views from the mobile home parks.

Eighteen (18) mobile homes currently experience noise levels of 65 dBA or above. However, none of these 18 mobile homes would experience more than an increase of 2 dBA with the No Build Alternative. By 2036, 21 mobile homes would experience noise levels of 65dBA or above (ODOT 2014j, Exhibit 18). Furthermore, none of the

other 80 mobile homes at the three mobile home parks with existing noise levels below 65 dBA would experience an increase of more than 2 dBA or have a noise level of 65 dBA or greater with the No Build Alternative. For more information on the noise analysis, please see Section 3.16 Noise.

East DS1 Alternative

With the East DS1 Alternative all mobile home park residents, including low-income and minority and/or Hispanic and/or Latino residents identified as the environmental justice population within the API, would travel on local streets to many locations in the API as shown on Exhibit 3-42. The distance to reach some destinations would be slightly longer than the existing route that uses US 97. For example, to reach northbound US 97, mobile home residents would travel 0.7 miles on local roads before entering the highway via the northern interchange, which is 0.7 miles longer than the routes these residents travel under the No Build Alternative. Similarly residents would travel 0.9 miles on local roads (3rd Street) to reach Cooley Road. However, the new routes would avoid entering or exiting high speed traffic on US 97 to reach destinations, which would provide safer travel. This impact would be similar for all residents in the API who live north of Cooley Road.

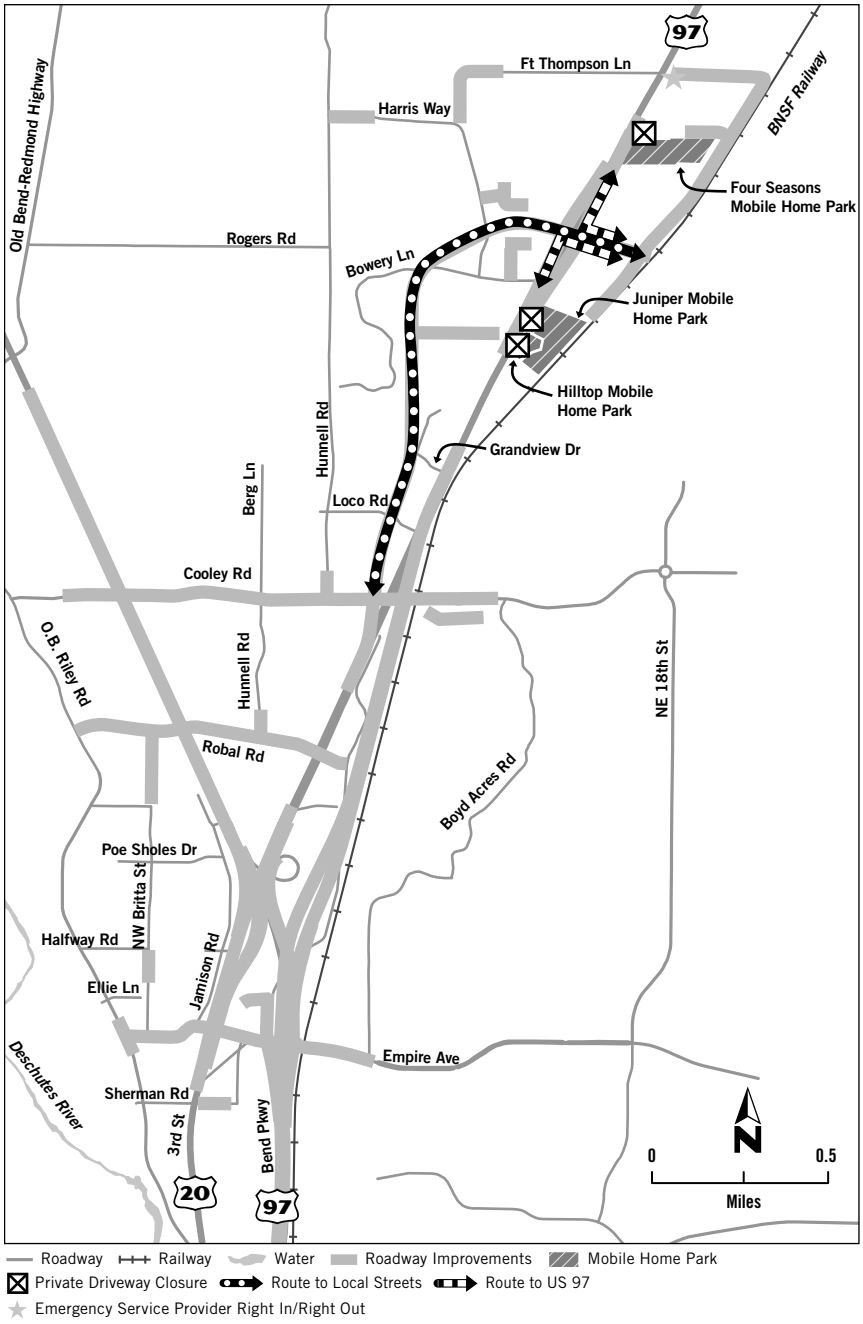
With the East DS1 Alternative a full diamond interchange would provide access from the mobile home parks to destinations in the greater Bend area (Exhibit 3-42). Mobile home park residents would travel on a new local street adjacent to the railroad tracks and then on to 3rd Street where there would be on and off-ramps for both the northbound and southbound directions of US 97. This new interchange would also provide safer access to US 97; vehicles making right or left turns on to or off of US 97 would no longer need to wait for gaps in traffic, potentially crossing two lanes of high speed traffic traveling in the opposite direction, and turn into a travel lane where traffic would be traveling at high speeds. Right turns off the highway would no longer need to decelerate in a travel lane and use the shoulder to exit.

Key Point

With the East DS1 Alternative, mobile home park residents, who are the environmental justice population within the API, would access southbound or northbound US 97 through a full diamond interchange. All persons, regardless of race or income, would experience enhanced safety from restricted turning movements.

Solid, vertical noise barriers that would separate each of the three mobile home parks and US 97 would prevent views across US 97, but these barriers would provide noise mitigation for all residents within the mobile home parks. Regional mobile source air toxics emissions are expected to substantially decrease from the existing conditions, and no exceedances of the National Ambient Air Quality Standards are expected under the East DS1 Alternative. Environmental justice populations and others would benefit similarly from these decreases.

Exhibit 3-42: *East DS1 Alternative: Routes to US 97 and the Local Street Network for Environmental Justice Populations*



With the East DS1 Alternative, none of the 24 mobile home spaces, where populations subject to the environmental justice executive order reside, would be acquired. The Bethlehem Inn would not be displaced. Therefore, residential displacements from the East DS1 Alternative would not result in disproportionate impacts to minority, Hispanic and/or Latino, and low-income individuals.

Minority, Hispanic and/or Latino, and low-income individuals could be affected by business displacements resulting from the East DS1 Alternative. The only business area that would experience substantial changes in access and from acquisitions with the East DS1 Alternative

would be the Nels Anderson Road business area. With the East DS1 Alternative about 70 percent of the businesses within this business area would be displaced. A 2011 survey of the environmental justice population within the API found that only one resident of the mobile home parks works at a business in the Nels Anderson Road business area (ODOT 2011c).

Approximately 25 percent of the Nels Anderson Road businesses employ at least one minority and Hispanic and/or Latino individual and 8 percent employ at least one low-income individual. These employees are dispersed across employers within the Nels Anderson Road business area. Some of the acquisitions in this area would likely be businesses that employ minority, Hispanic and/or Latino, or low-income persons. However, no businesses with a majority of minority, Hispanic and/or Latino, or low-income persons would be displaced, except for one single-employee business. Moreover, displaced businesses would either continue operations in another location and retain their employees, or there are other businesses that could provide employment opportunities for employees of displaced businesses.

The East DS1 Alternative would not cause disproportionately high and adverse effects on minorities and Hispanics and/or Latinos or low-income populations as per Executive Order 12898.

The Final EIS provides additional clarification on impacts that would result from the East DS1 Alternative. The northern full diamond interchange, with its elevated overcrossing, would be somewhat visible from the mobile home parks, and its solid, linear appearance would slightly decrease visual quality.

Twenty-one mobile homes were predicted to experience noise impacts with the East DS1 Alternative. Eighteen of the twenty-one mobile homes have existing noise levels of 65 dBA or above. However none of these 18 mobile home sites would experience more than an increase of 2 dBA with the East DS1 Alternative. Furthermore, none of the other 80 mobile homes at the three mobile home parks with existing noise levels below 65 dBA would experience an increase of more than 2 dBA or have a noise level of 65 dBA or greater with the East DS1 Alternative.

The ODOT Noise Manual was revised in 2011, which changed the noise mitigation analysis. As a result, the noise barriers that would be constructed to mitigate noise impacts from US 97 under the East DS1 Alternative were reevaluated. Noise abatement was found to be feasible and reasonable at one location for the East DS1 Alternative, located at O. B. Riley Road and Empire Avenue. No feasible and reasonable noise barriers were identified in the vicinity of the mobile home parks. For more information on the noise analysis, please see Section 3.16 Noise.

Key Point

With the East DS2 Alternative, the route to southbound or northbound US 97 would be longer in distance and include out of direction travel. It would also require travel on unimproved Bowery Lane and Hunnell Road. However, this rerouting of traffic would similarly affect the environmental justice population and others in the API north of Cooley Road. All persons, regardless of race or income, would experience enhanced safety from restricted turning movements.

East DS2 Alternative

With the East DS2 Alternative, the Bethlehem Inn would not be displaced, and there would be no displacements within the mobile home parks where populations subject to the environmental justice executive order reside. Therefore, residential displacements from the East DS2 Alternative would not result in disproportionate impacts to minority, Hispanic and/or Latino, and low-income individuals. The impacts to minority, Hispanic and/or Latino, and low-income individuals from business displacements would also be the same as the East DS1 Alternative.

As shown in Exhibit 3-43, all local trips to and from the mobile home parks would travel over a new bridge crossing US 97, then could use local streets such as Bowery Lane, Hunnell Road, Harris Way, Rogers Road, and Old Bend-Redmond Highway to travel to connect to major travel routes.

The main difference between the East DS1 Alternative and the East DS2 Alternative would be access to US 97. For all residents in the API, including mobile home park residents, the route to access southbound US 97 would require more travel on local streets and would make travel routes longer as Empire Avenue would be the only point to access southbound US 97 in the API. To access northbound US 97, mobile home park residents would need to travel across US 97 via a new bridge and south on Bowery Lane and Hunnell Road, turn north on to 3rd Street and then access US 97 at the new northern interchange (see Exhibit 3-43). This route would be about 3 miles longer in distance than the No Build Alternative, and would include out-of-direction travel. It would also require travel on unimproved Bowery Lane and Hunnell Road. During peak hour, there would be between 60 and 90 vehicles per hour on Bowery Lane, depending on the direction of travel.

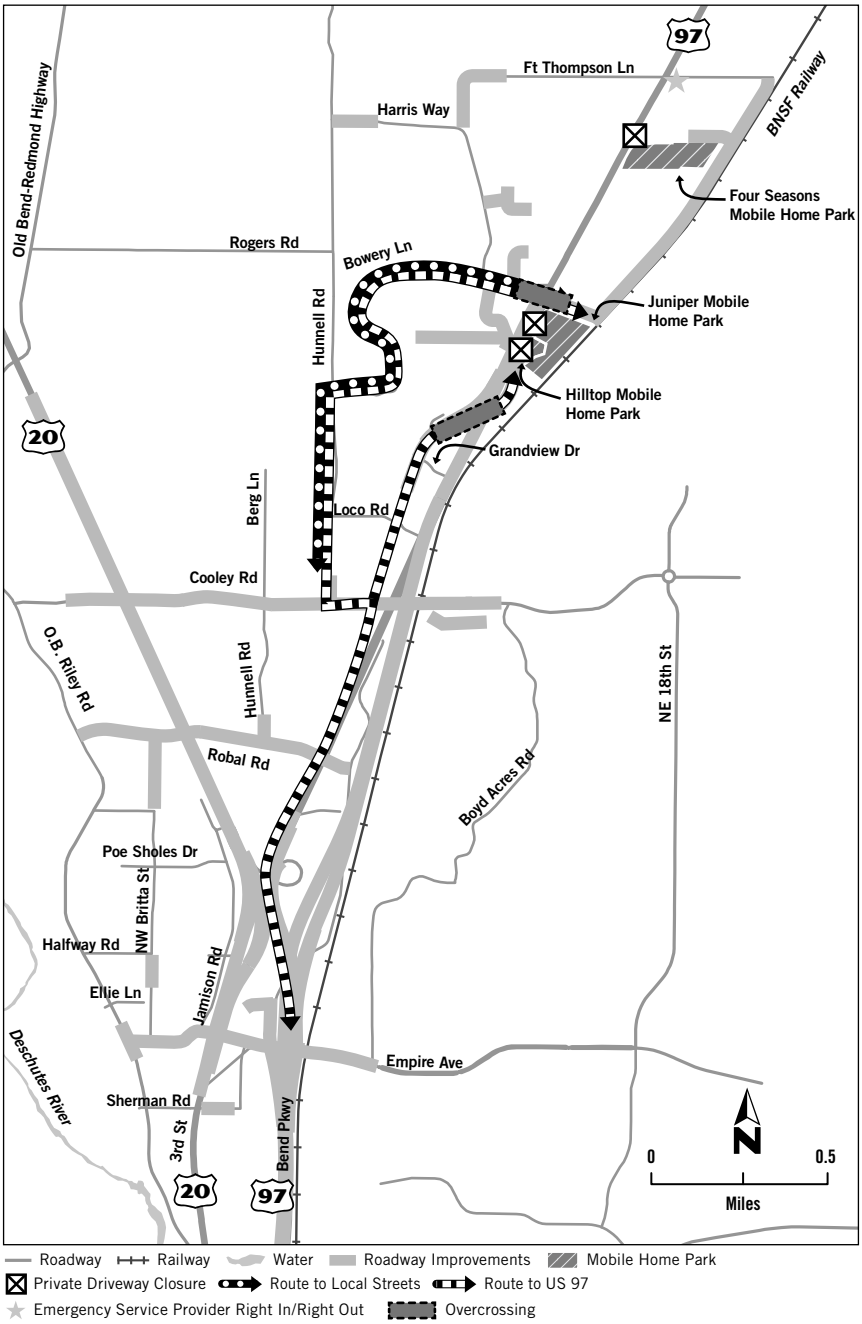
Closing the private driveways on US 97 would provide enhanced safety for trips to and from the mobile home parks as well as through-traffic on US 97. The associated traffic route changes would similarly affect environmental justice residents and others in the API north of Cooley Road who travel southbound or northbound US 97. All persons, regardless of race or income, would experience enhanced safety from closed private driveways on US 97.

The visual, noise and air quality impacts would be similar as those described for the East DS1 Alternative. However, under the East DS2 Alternative, a linear, solid overcrossing at Bowery Lane would be visible above the noise barrier. As a result, there would be slightly more light and glare visible to residents at the Hilltop and Juniper mobile home

parks, and others living close to the overcrossing, compared to the East DS1 Alternative.

The East DS2 Alternative would not cause disproportionately high and adverse effects on minorities and Hispanics and/or Latinos or low-income populations as per Executive Order 12898.

Exhibit 3-43: *East DS2 Alternative: Routes to US 97 and the Local Street Network for Environmental Justice Populations*



The Final EIS provides additional clarification on impacts that would result from the East DS2 Alternative. Under the East DS2 Alternative, the linear, solid overcrossing at Bowery Lane would be visible close to the Juniper and Hilltop mobile home parks; however, the updated noise analysis conducted after the Draft EIS determined that a noise barrier would not be constructed at this location. Thus, there would be slightly more light and glare visible to residents at these mobile home parks, and others living close to the overcrossing, compared to the East DS1 Alternative.

Preferred Alternative—East DS2 Modified Alternative

With the Preferred Alternative, the Bethlehem Inn will not be displaced, and there will be no displacements within the mobile home parks where populations subject to the environmental justice executive order reside. The impacts to minority, Hispanic and/or Latino, and lowincome individuals from business displacements are the same as the East DS1 and East DS2 Alternatives.

Key Point

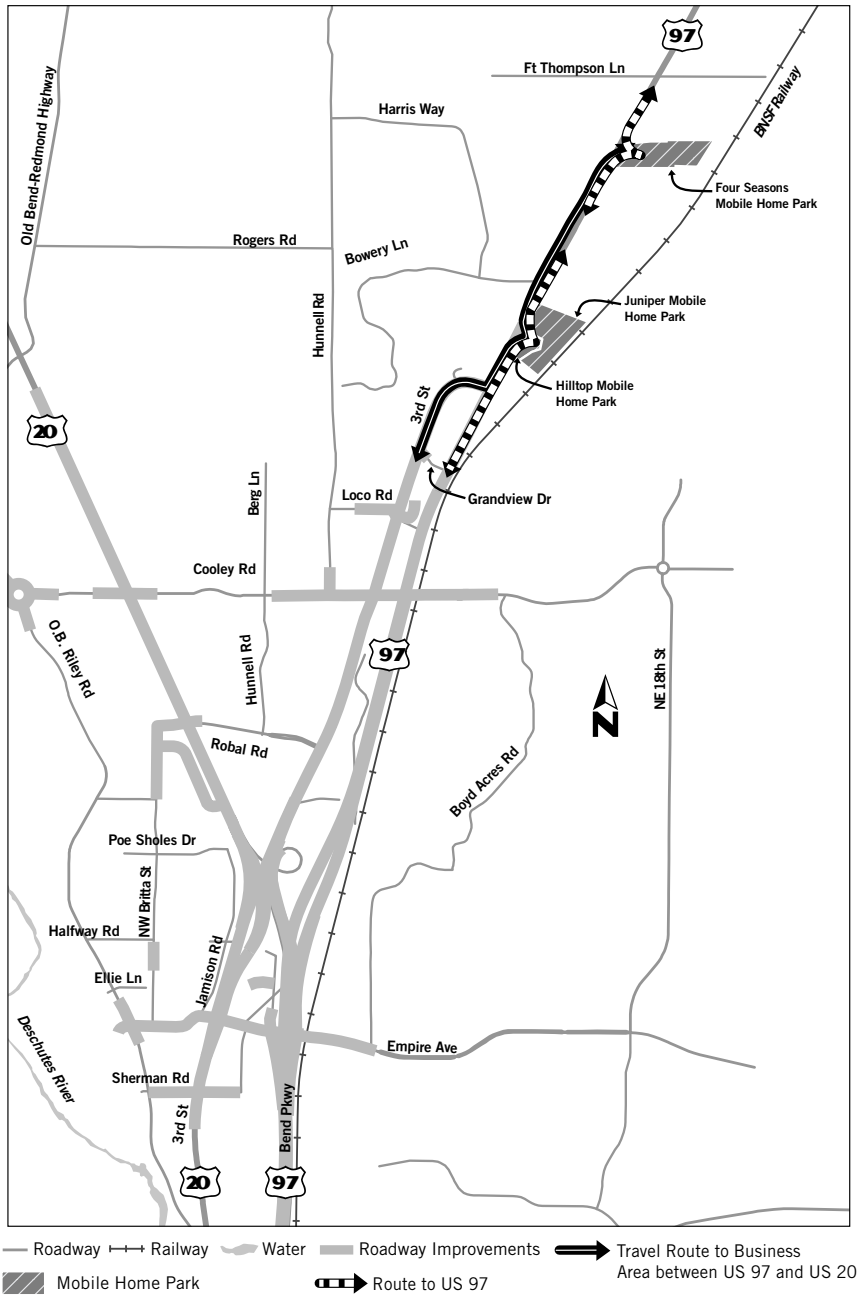
The Preferred Alternative will not eliminate the current driveway accesses from the mobile home parks to US 97. The travel route from the mobile homes parks to southbound or northbound US 97 will remain as it currently exists.

For residents of the mobile home parks, the main difference between the East DS1 and East DS2 Alternatives and the Preferred Alternative is access to US 97 and other areas in the API. The Preferred Alternative does not close the three (3) mobile home park accesses that were identified for closure in the East DS1 and East DS2 Alternatives, maintaining the existing access for the mobile home park residents to northbound and southbound US 97 (Exhibit 3-43 FEIS). All mobile home park residents, including minority, Hispanic and/or Latino, and low-income individuals residing in the mobile home parks will continue to access US 97 directly with the ability to make right and left turns into and out of the mobile home park driveways. At the new signalized intersection of US 97 and 3rd Street, individuals residing in the mobile home parks will travel on 3rd Street to locations within the API or the greater Bend area. In addition, as shown on Exhibit 2-3 FEIS (Map 7), with the Preferred Alternative a multi-use path for bicyclists and pedestrians will be located along the east side of US 97 and crosswalks will be constructed at the signalized intersection, which will provide for a safer crossing of US 97 and access to destinations along 3rd Street.

With the Preferred Alternative, emergency service provider response times to five of six locations evaluated in the API will be shorter than under the 2036 No Build Alternative as shown in Exhibit 3-54 FEIS (in Section 3.5 Socioeconomic Analysis). The response time to US 20 at Robal Road would increase by 10 seconds under the Preferred Alternative. The Preferred Alternative performs the best in terms of emergency service provider response times when compared to the East DS1 and East DS2 Alternatives.

Since there will be no changes to existing roadways in the immediate vicinity of the mobile home parks the visual, noise and air quality impacts from the Preferred Alternative are expected to be minimal for residents in the mobile home parks.

Exhibit 3-43 FEIS: *Preferred Alternative: Routes to US 97 and the Local Street Network for Environmental Justice Populations*



Note: The Preferred Alternative does not close any of the three (3) accesses that were identified for closure under the East DS1 and East DS2 Alternatives as shown in Exhibits 3-42 and 3-43.

The API for the Preferred Alternative is smaller than the API for the East DS1 and East DS2 Alternatives studied in the Draft EIS; the Preferred Alternative's API contains 59 mobile homes at the Juniper and Hilltop mobile home parks. Ten (10) mobile homes have existing noise levels at or above 65 dBA. Eight (8) additional mobile homes have noise levels that will increase above 65 dBA and will be noise impacted with the Preferred Alternative. None of the 10 mobile homes with existing noise levels at or above 65 dBA will experience an increase in noise of more than 5 dBA with the Preferred Alternative. Furthermore, none of the other 41 mobile homes at the two mobile home parks in the area with existing noise levels below 65 dBA will experience an increase of more than 3 dBA or have a noise level of 65 dBA or greater with the Preferred Alternative. Noise abatement was not found to be feasible or reasonable in the vicinity of the mobile home parks and no noise barrier is being considered in the vicinity of the mobile home parks at this time. For more information on the noise analysis, please see Section 3.16 Noise.

For environmental justice populations who may use services at the Bethlehem Inn, the Preferred Alternative provides a signalized intersection with crosswalks at Mervin Sampels Road and 3rd Street, which provides for a safer travel route to and from the facility.

Indirect Impacts

The indirect impacts of the No Build Alternative would be substantially increased traffic congestion, reduced traffic flow, and increased safety issues over time on US 97. All residents and motorists would experience similar indirect impacts such as increased travel time and increased safety problems associated with the numerous public and private approaches and interrupted traffic flow on US 97. With the No Build Alternative, the indirect impacts would be similar across all populations, including minority, Hispanic and/or Latino, or low-income populations. The No Build Alternative would not cause disproportionately high and adverse indirect effects on populations subject to environmental justice executive orders.

With the East DS1 and East DS2 Alternatives, all residents, motorists, and employees would experience similar indirect impacts related to reduced congestion, improved mobility and supporting planned economic development opportunities. Since all people would experience similar indirect impacts, the East DS1 and East DS2 Alternatives would not cause disproportionately high and adverse indirect effects to populations subject to environmental justice executive orders.

The Preferred Alternative has indirect impacts similar to those described for the East DS1 and East DS2 Alternatives. In addition, with the Preferred Alternative residents of the mobile home parks, including populations subject to environmental justice executive orders, will not experience indirect impacts from light and glare, noise and exhaust emissions from the construction of new roads.

Construction Impacts

With the No Build Alternative the US 97 infrastructure improvements would not be constructed and, therefore, no related temporary adverse and beneficial impacts would occur as a result of the proposed action.

With the East DS1 and East DS2 Alternatives all residents, motorists, and employees would experience similar types of temporary adverse and beneficial impacts. Persons that have limited English proficiency could be inadvertently more affected if they are unable to understand public notifications about construction-related activities. Temporary street crossings in construction zones could become obstacles for disabled and elderly individuals. Residents of the mobile home park neighborhoods, where populations subject to environmental justice executive orders reside, would experience the types of temporary construction impacts similar to the greater population.

With the Preferred Alternative residents of the mobile home parks will likely be affected by construction to a lesser extent than with the East DS1 and East DS2 Alternatives since there will be no construction of new access roads to the mobile home parks, and no elevated structures constructed in the vicinity of the mobile home parks.

Environmental Justice Finding

Based on the above discussion and analysis, the Preferred Alternative will not, cause disproportionately high and adverse effects on any minority or low-income populations in accordance with the provisions of Executive Order 12898 and FHWA Order 6640.23. No further EJ analysis is required.

3.4.4 Avoidance, Minimization, and/or Mitigation Measures Proposed in the Draft EIS

In addition to the avoidance, minimization, and mitigation measures listed below, all considerations under Title VI of the Civil Rights Act of 1964 and related statutes have been included in the proposed action. ODOT's commitment to uphold the mandates of Title VI is evidenced by its Title VI Policy Statement, signed by the Director, which can be found in Appendix C of this document.

Construction Mitigation and Commitments

The following measures could be taken to the extent practicable to avoid, minimize, and mitigate temporary adverse impacts to environmental justice populations:

- Distribute periodic press releases, newsletters or written notices in English and Spanish to residents in and near the API to advise them of temporary changes in pedestrian or bicycle routes
- Prepare and distribute written notices in English and Spanish regarding construction activities and changes or closures to roads and pedestrian and bicycle facilities
- Implement dust, noise and vibration mitigation during work hours
- Plan construction activities to allow reasonable access to residential and commercial areas, and community and social services.

Mitigation for Long-Term Impacts

Avoidance Measures—The East DS1 and East DS2 Alternatives have been developed to avoid residential displacements at the mobile home parks where populations subject to environmental justice executive orders reside.

The Preferred Alternative was also developed to avoid similar residential displacements.

Minimization Measures—The East DS1 and East DS2 Alternatives were designed to minimize the amount of private property acquired which reduces the number of residences and businesses displaced. Accessibility to the business areas and neighborhoods was also maintained through local street connections that were included as part of the East DS1 and East DS2 Alternatives.

The Preferred Alternative was designed to minimize the amount of private property acquired and reduce the number of residences and businesses displaced.

Mitigation Measures—In case specific residential displacements impact a minority, Hispanic and/or Latino, or low-income individual, the following measures could be taken to the extent practicable to mitigate potential long-term adverse impacts to populations subject to environmental justice executive orders:

- The available housing in greater Bend is expected to provide suitable relocation for housing for displaced residents. If sufficient comparable replacement housing is not available, provide housing of last resort.

- Implement provisions as required under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, for all businesses, and residents that are displaced and real property acquisitions. All affected property owners would be compensated at fair market value and relocation assistance would be provided for those who would be relocated in accordance with the Uniform Relocation Act.
- Maintain accessibility to the business areas and neighborhoods through local street connections.

3.4.5 Avoidance, Minimization, and/or Mitigation Commitments Incorporated into the Preferred Alternative

No additional avoidance, minimization and/or mitigation commitments are incorporated into the Preferred Alternative.

3.5 Socioeconomic Analysis

3.5.1 Regulatory Setting

The National Environmental Policy Act of 1969 as amended, established that the federal government use all practicable means to ensure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings (42 USC 4331[b][2]). The FHWA in its implementation of the National Environmental Policy Act (23 USC 109[h]) directs that final decisions regarding projects are to be made in the best overall public interest. This requires taking into account adverse environmental impacts, such as destruction or disruption of human-made resources, community cohesion, and the availability of public facilities and services.

The framework provided by Executive Order 12898 on Environmental Justice and the US Department of Transportation Order (5610.2) addresses only minority populations and low-income populations. However, concentrations of the elderly, children, disabled, and other populations protected by Title VI of the Civil Rights Act of 1964 and related nondiscrimination statutes will also be discussed. Executive Order 13045 addresses the Protection of Children from Environmental Health Risks and Safety.

The EIS addresses all impacts (to the human and natural environments), and describes any mitigating protections or benefits that would be provided by federal or state law, or as part of the action. In particular, the Age Discrimination Act of 1975, as amended (42 USC 6101 et seq.), prohibits discrimination on the basis of age in programs receiving federal financial assistance, and Section 504 of the Rehabilitation Act of 1973 (29 USC 794 and 49 CFR Part 27.7) protects handicapped persons.





Juniper and Hilltop Mobile Home Parks

3.5.2 Affected Environment

More information: Additional detail on the socioeconomic analysis is provided in the *Socioeconomic and Environmental Justice Technical Report* (ODOT 2014m). *The Socioeconomic and Environmental Justice Technical Report* is listed in Appendix K and available in the document library of the project's website (www.us97solutions.org).

Since the Draft EIS was published, 2010 decennial census data and American Community Survey data was released by the US Census Bureau. The Final EIS has been updated with more recent demographic data from the US Census Bureau and other sources as described below.

Study Area Description

For the socioeconomic analysis, the study area for direct impacts is the project's API. Potential indirect impacts from the project could occur in the greater Bend area.

Since the publication of the Draft EIS, the API along US 97 has been modified and generally extends from approximately 1,000 feet north of Bowery Lane to Butler Market Road in Bend (Exhibit 3-1 FEIS).

Community Features

Exhibit 3-44 shows the neighborhoods and community facilities that comprise the main community features.

Neighborhoods

There are four distinct neighborhoods that intersect the API: Boyd Acres Neighborhood, Hunnell Neighborhood, and two neighborhoods comprised of mobile home parks (the Juniper/Hilltop Neighborhood and the Four Seasons Neighborhood).

The Boyd Acres Neighborhood Association is formally recognized by the City of Bend. There are an estimated 2,482 residential properties in this neighborhood, some of which have more than one residence. Most of the Boyd Acres Neighborhood's residential population lives east of US 97 and the BNSF Railway (Bend Neighborhood Associations 2004). This neighborhood also includes the established business areas along Nels Anderson Road, Robal Road, Cooley Road, and Empire Avenue. This neighborhood is fairly well connected to US 97 and US 20 via major east-west roads including Cooley Road, Robal Road, Empire Avenue, and Butler Market Road.

The Hunnell Neighborhood is predominantly rural with 5 to 10acre residential parcels located outside of the City of Bend urban growth boundary. There is no formally designated neighborhood association for the Hunnell Neighborhood; however, the Hunnell Hills Homeowners Association represents 26 properties. The Hunnell Neighborhood is connected to US 20 and US 97 via Old Bend-Redmond Highway, Bowery Lane, Rogers Road, Hunnell Road, and several unimproved, dirt and gravel roads.



The Hunnell Neighborhood

The Hunnell Neighborhood includes the residences in the Bowery Lane (Rock O' the Range) area. In addition, the Hunnell United Neighbors group is an active group in the area. The residents in the Bowery Lane area of the Hunnell Neighborhood have private codes, conditions and restrictions regarding the use and maintenance of their properties. The Hunnell Neighborhood is not served by urban-level utilities.

There are three mobile home parks within the API: Hilltop Mobile Home Park; Juniper Mobile Home Park; and Four Seasons Mobile Home Park. The Hilltop and Juniper mobile home parks are owned by the same owner. Residents often do not identify with the boundaries of the individual parks but rather they function as one neighborhood. The Four Seasons Mobile Home Park is a community for those over 55 years of age. Each mobile home park has a private driveway to US 97.

More Information

Mobile Home Park	Residences
Four Seasons	43
Hilltop	6
Juniper	47

Definition

Community Cohesion

Community cohesion is the ability of people to communicate and interact with each other in ways that lead to a sense of community, as reflected in the neighborhood's ability to function and be recognized as a singular unit. There are several indicators of community cohesion including: long average residency tenures; households of two or more people; community activity and communication; and religious homogeneity.

Community Character and Cohesion

The community can be characterized as urban in the southern portion, within the City of Bend's UGB, and predominantly rural residential within Deschutes County in the northern portion.

Using the following indicators, there appears to be a moderate degree of community cohesion.

Longevity of Residency Tenures—Residents that have lived within the same home and neighborhood is an indication of community cohesion. Given the recent population influx and new home construction in the Bend area there may be a lack of community cohesion regarding this indicator.

Bend saw a population increase of nearly 60 percent (over 30,000 individuals) between 2000 and 2009 (Portland State University 2010). As of the 2000 US Census, 89 percent of the housing units within the API census block groups were owner occupied; of the owner occupied units, 37 percent were moved into between 1995 and 1998 (US Census Bureau 2000). The substantial influx of residents to Bend between 2000 and 2009, and the relatively short-term tenure of many residents prior to 2000, indicates that many Bend area residents are fairly new to the community. The Hunnell Neighborhood has longer residency tenures than most other neighborhoods in the Bend area. Many of the homes in the Hunnell Neighborhood were constructed about 30 years ago, and many of the original homeowners still reside at the same home, which suggests a high level of community cohesion for this indicator (City of Bend 2008d).

Between 2009 and 2012 the population of Bend decreased (from 82,280 individuals in 2009 to 77,455 in 2012) (Portland State University Population Research Center 2013). The 2010 US Census data still indicates that many Bend area residents are fairly new to the community. As of the 2010 US Census, 83 percent of the 7,063 housing units within the API census block groups were owner occupied; of the owner occupied units, 43 percent were moved into later than 2005. Less than one percent of the owner occupied housing units were occupied by the owner who moved into the unit in 1969 or earlier (US Census Bureau 2010).

Household Size— Generally, a higher percentage of households with two or more people correlates to higher community cohesion. The average household size in 2000 was 2.8 people and 84 percent of households had two or more persons, which suggests a high degree of community cohesion for this indicator.

Within the census block groups in the API the 2010 US Census data shows the average household size was 2.6 people and 85 percent of

households had two or more persons, which continues to suggest a high degree of community cohesion for this indicator.

Community Activity and Communication—Currently, US 97 is a barrier that separates neighborhoods west of US 97 from neighborhoods east of US 97. The mobile home park neighborhoods are isolated from other neighborhoods as they are bordered by US 97 on the west and the BNSF Railway on the east. There appears to be substantial community activity and communication within the separate neighborhoods but it is unclear if there is much community activity and communication between neighborhoods. Therefore, community activity and communication may contribute to a moderate level of community cohesion.



Bicycle lanes on US 97 north of Cooley Road



Sidewalks on US 97 at Robal Road

In the Hunnell Neighborhood community activity and communication is evident by the activities of the Hunnell United Neighbors group, a neighborhood website, and the residents' coordinated public input to this project. The Boyd Acres Neighborhood has an official neighborhood association with the City of Bend and has some existing infrastructure to promote community activity and communication within the neighborhood such as sidewalks and schools (Exhibit 3-44). The Juniper/Hilltop Neighborhood includes a picnic area and playground, which residents of both mobile home parks use, and a community bulletin board for announcements. During surveys of the Four Seasons Mobile Home Park Neighborhood, community activity and communication was observed through neighbor interactions.

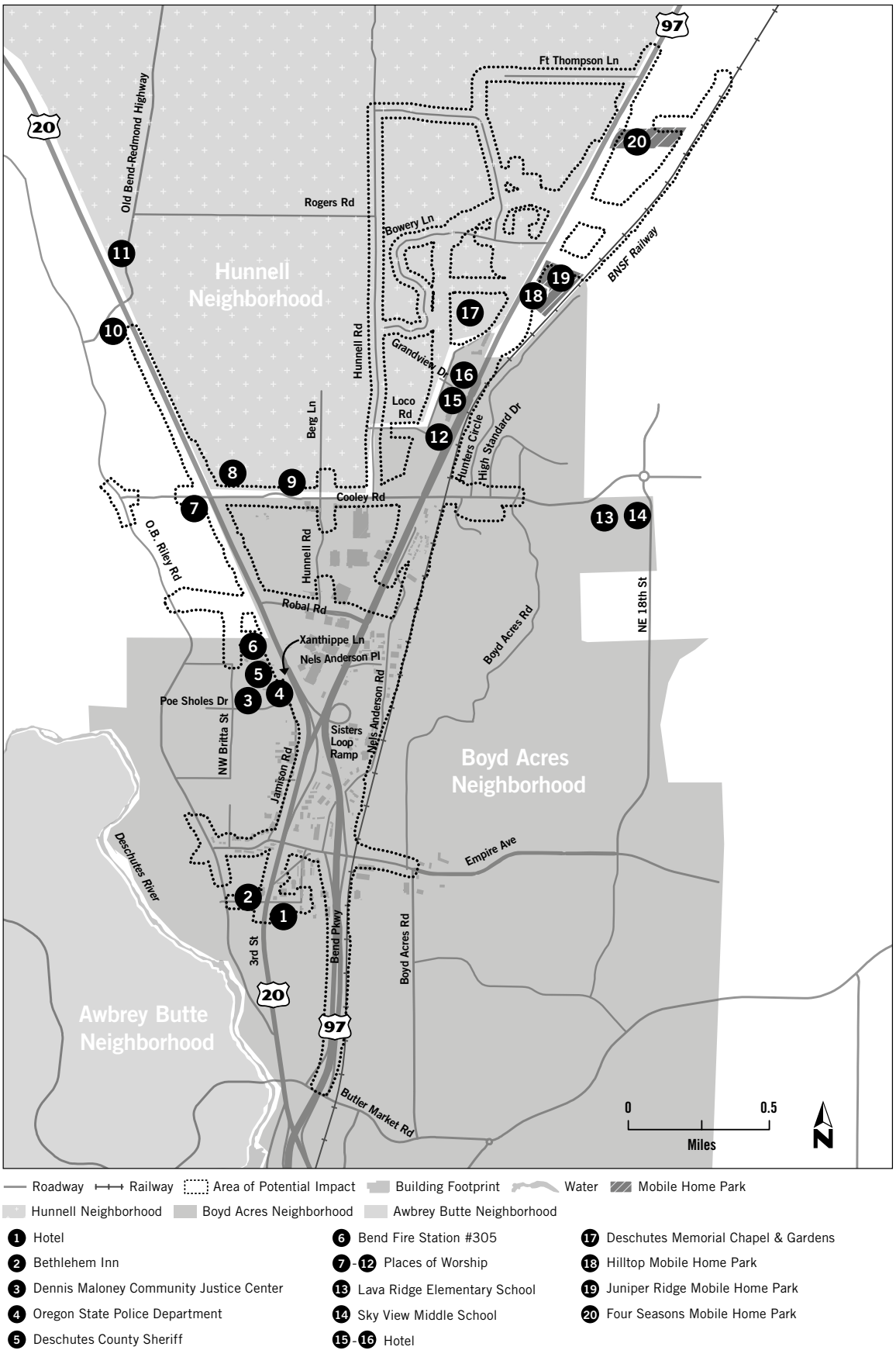
Religious Homogeneity—Lastly, religious homogeneity is another measure of community cohesion. The six places of worship within or adjacent to the API are all Christian churches (Exhibit 3-44) which indicates some degree of religious homogeneity and a high degree of community cohesion.

Community Facilities and Services

Within the API, there are no publicly owned parks, public schools, or private schools. There are six places of worship and the Deschutes Memorial Gardens and Chapel, which includes a funeral home, cemetery, and mortuary. There are no community centers; however, the Bethlehem Inn, a community sponsored, non-profit emergency shelter for men, women and families, is located in the southern portion (Exhibit 3-44).

The City of Bend's fixed-route bus service provider, Bend Area Transit operates Route 4, which connects the north end of Bend to downtown along 3rd Street/US 20.

Exhibit 3-44: *Neighborhoods and Community Facilities*



Bicycle lanes exist on US 97 and US 20 and intermittently on local roads. For pedestrians, sidewalks are also intermittent; sidewalks exist on 3rd Street/US 20, along the north side of Cooley Road between US 97 and Berg Lane, partially along the east side of Hunnell Road, and along the west side of US 97 to Grandview Drive.

An interconnected and complete system of bicycle and pedestrian facilities does not exist within the API. Bend Area Transit is now called Cascade East Transit.

Emergency Service Providers

There is one fire station, the Oregon State Police office, the Deschutes County Sheriff's office, and a juvenile justice center located on Jamison Street in an area called the public safety complex. Currently, public safety vehicles access US 20 via Xanthippe Lane. Fire engines and ambulance operators avoid driving through residential neighborhoods to access emergencies; therefore, their main routes are US 20, US 97, and major arterials, such as Cooley Road, Robal Road, and Empire Avenue.



Bend Fire Station #305

Exhibit 3-54 FEIS shows the existing emergency service response time to locations within the API.

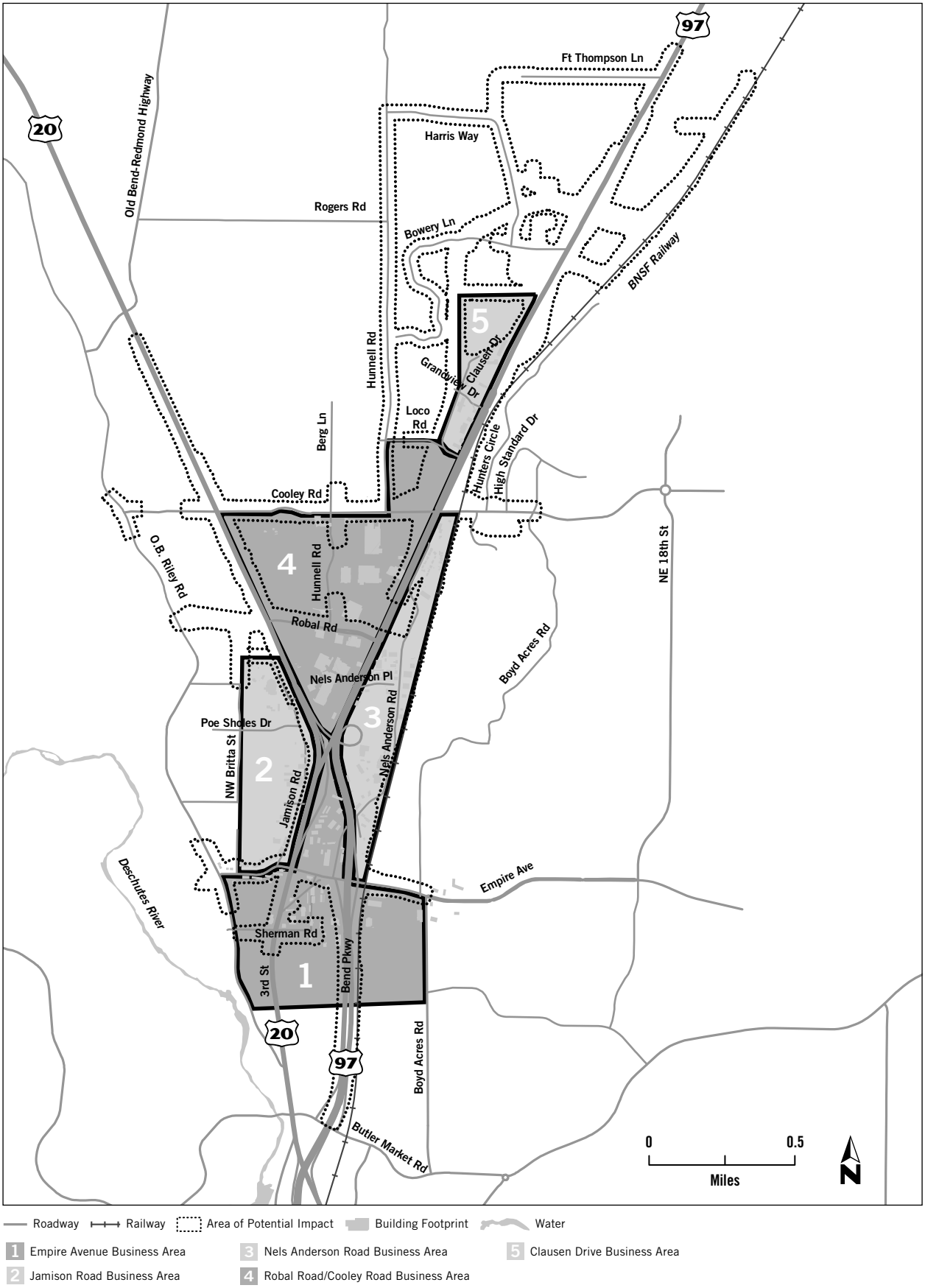
Established Businesses Areas

There are five established business areas as shown in Exhibit 3-45: Empire Avenue, Jamison Street, Nels Anderson Road, Robal Road/ Cooley Road, and Clausen Drive. There are an estimated 285 businesses in these five business areas representing uses such as retail, industrial, offices, hotels, restaurants, and public or institutional organizations. Almost 90 percent of the properties in the business areas are commercial uses (Parsons Brinckerhoff 2008a).

Robal Road/Cooley Road Business Area—Establishments within this business area include the Cascade Village Shopping Center, Target, Lowes, Home Depot, and other retail stores. The average business in this area employs 23 individuals. Robal Road intersects with US 97 to provide an east-west connection to commercial areas between US 97 and US 20. Traveling south on US 97 there are two public road approaches (Cooley Road and Robal Road) and three private driveways connecting to the shopping area. Two of the private driveways are restricted to rightin/right-out, the southernmost private driveway only restricts left-out turns but leftin turns are permitted. Traveling north or south on US 20, this business area can be reached via Cooley Road and Robal Road. The majority of the businesses in this area share parking with other businesses; about 20 percent rely on parking lots that are exclusively for their patrons and employees.

Clausen Drive Business Area –Establishments within this business area include a cemetery, hotels, a strip mall with numerous smaller

Exhibit 3-45: *Business Areas*



businesses, and vacant commercial property. The average business in this area employs 10 individuals. Businesses in this area are connected to the local street network via Clausen Drive. In this business area there are two public road approaches to US 97; an unnamed road north of the Deschutes Memorial Gardens and Chapel and Grandview Drive to the south. The majority of the businesses in this area share parking with other businesses; approximately 33 percent rely on parking lots that are exclusively for their patrons and employees.

In Bend, real estate data from early 2010 showed that there was about a 17 percent vacancy rate for office space, 14 percent vacancy for industrial space, 13 percent vacancy for retail. These rates are expected to increase slightly by 2011 (Bend Oregon Real Estate 2010).

Early 2011 Bend real estate data showed about a 21 percent vacancy rate for office space, a 17 percent vacancy for industrial space, and an 8 percent vacancy for retail (Cascade Business News).

Demographic and Economic Trends

Bend is Central Oregon's largest city. In July of 2009, the City of Bend and Deschutes County had estimated populations of 82,280 and 170,705, respectively. Bend's population increased by nearly 60 percent between 2000 and 2009 (Portland State University 2010). Over the past ten years Deschutes County and the City of Bend have experienced substantial population growth compared to the state as a whole. However, recent population trends show that between 2007 and 2009 growth in Bend and Deschutes County has tapered concurrent with the downturn in the national and state economies.

In 2010 there was a loss of population for Bend and Deschutes County; however, in 2011 and 2012 there was a slight increase in growth. In July of 2012, the City of Bend and Deschutes County had estimated populations of 77,455 and 160,140, respectively (Portland State University Population Research Center 2013).

Population Subgroups

Elderly and Disabled— As of July 2009, it was estimated that about 14 percent of Deschutes County's population was 65 years old and older (Portland State University 2010); an increase from the 13 percent reported in the 2000 US Census. Block Group 991201.3 (Exhibit 3-46 and Exhibit 3-47) has a lower percentage of elderly persons compared to the City of Bend and Deschutes County. 2000 US Census Block Group 991202.1, which includes the 55-plus community of the Four Seasons Mobile Home Park, has a higher percentage of elderly persons compared to the City and County.

The percentage of disabled persons within the API is comparable to the percentages of disabled persons in the City of Bend and Deschutes County.

Definitions

Elderly

Elderly populations are people aged 65 years and over.

Disabled

Generally, the US Census defines a person with a disability as having a long lasting condition, such as severe vision or hearing impairments, or a condition that substantially limits basic physical activities. It may also include people with conditions that make other activities such as learning, getting around inside the home, working at a job, or going places outside the home difficult.

Exhibit 3-46:* 2000 US *Census Block Groups

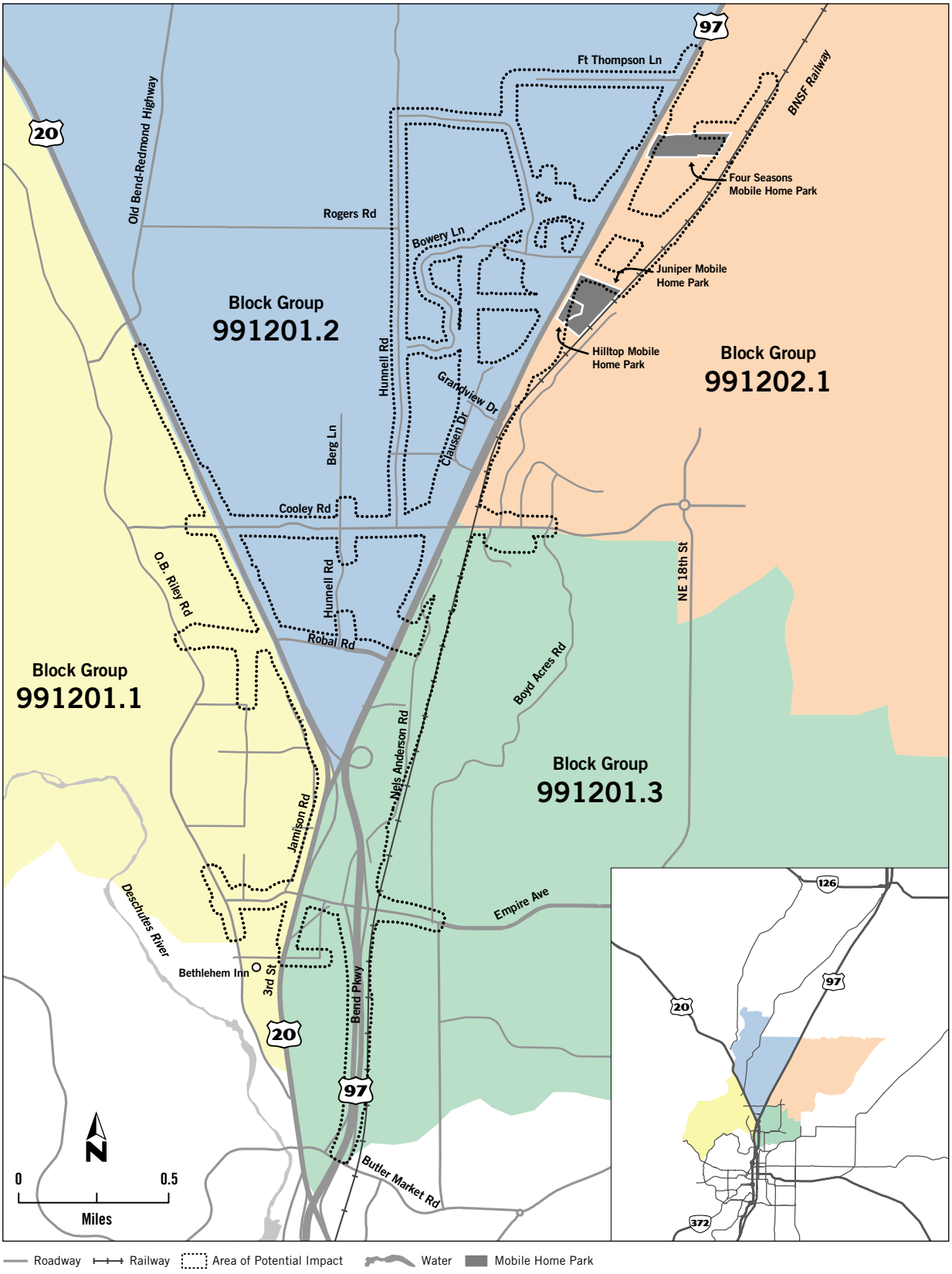
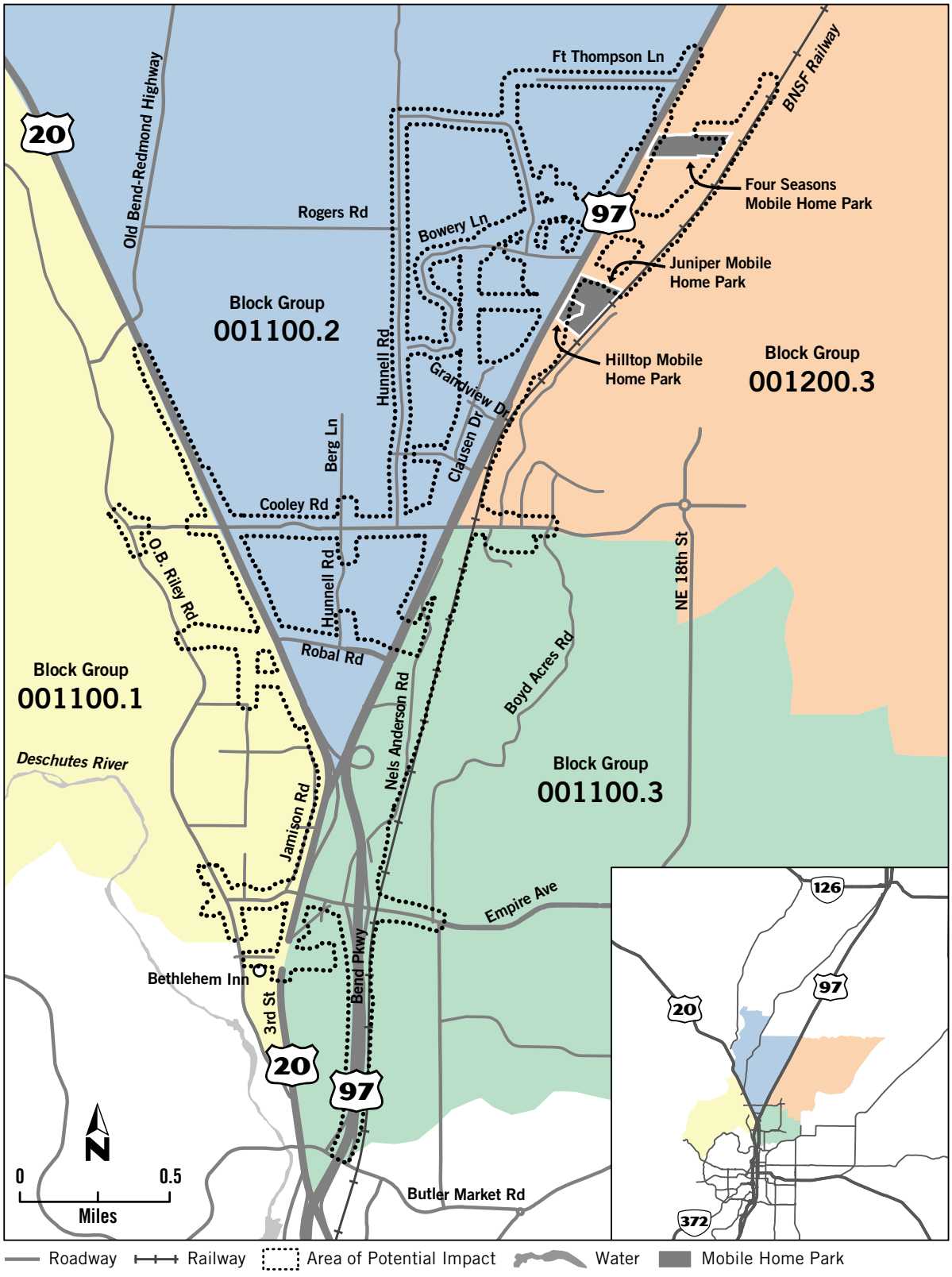


Exhibit 3-46 FEIS: *2010 US Census Block Groups*



Note: This exhibit has been revised to show the 2010 US Census Block Group numbering for block groups in the API.

Exhibit 3-47: *Elderly and Disabled Residents within Census Tracts and Block Groups (2000)*

Population	Area		Census Block Group			
	Deschutes County	City of Bend	991201.1	991201.2	991201.3	991202.1
Total Population	115,367	52,029	1,563	1,958	2,489	1,740
Elderly	13%	12%	14%	12%	8%	19%
			Census Tract			
			991201			991202
Disabled	17%	15%	12%			18%

Source: US Census Bureau 2000

Exhibit 3-47 FEIS: *Elderly and Disabled Residents and Children within Census Tracts and Block Groups (2010)*

Population	Area		Census Block Group			
	Deschutes County	City of Bend	001100.1	001100.2	001100.3	001200.3
Total Population	157,733	76,639	2,994	1,846	5,414	2,134
Elderly	16%	13%	26%	33%	14%	33%
Children (17 years of age and younger)	23%	24%	20%	21%	28%	20%
			Census Tract			
			11			12
Disabled	17%	15%	NSV			NSV

Source: US Census Bureau 2010

Note: This table has been revised to reflect the 2010 US census block groups, tracts and data. In 2000, the decennial census, which is a 100 percent sample of the population, used a "long-form" questionnaire that included numerous questions covering a wide array of social and economic characteristics. In 2010, the decennial census questionnaire was much shorter, and many of the questions about social and economics characteristics were not asked. Rather, these questions are now asked through the yearly American Community Survey, which is an estimate based on a much smaller sample size than the decennial census. Therefore, while both the 2010 decennial census and the 2007-2011 American Community Survey datasets reported in this document have varying amounts of statistical error associated with them, at smaller geographies in particular (e.g. census tract, census block group and census block) the margins of error associated with American Community Survey data can be high. "NSV" (not statistically valid) is used in this report where the margins of error were known to be too high such that the data was not statistically valid.

As of January 2011, it was estimated that about 16 percent of Deschutes County's population was 65 years old and older (Portland State University 2011). Three of the four 2010 census block groups in the API (001100.1, 001100.2, and 001200.3) show a higher percentage of elderly persons compared to Bend and Deschutes County (Exhibit 3-46 FEIS and Exhibit 3-47 FEIS). The Four Seasons Mobile Home Park, a 55-plus community, is located within US Census Block Group 001200.3 and may contribute to the higher percentages of elderly population.

Beginning in 2010, questions about disability status were asked in the American Community Survey, rather than the decennial census. At smaller geographies in particular (e.g. census tract, census block group and census block) the margins of error associated with American Community Survey data can be high enough to be Not Statistically Valid. Disability data for the API's census block groups fall into this category of being Not Statistically Valid, and are, thus, not reported as noted in Exhibit 3-47 FEIS.

Children (18 years of age and younger)—As summarized in Exhibit 3-47 FEIS, the 2007-2011 American Community Survey shows the percentage of children living within the API (20 to 28 percent) is similar to the percentage of children living in Deschutes County (23 percent) and the City of Bend (24 percent).

Race and Ethnicity—A detailed discussion of the racial and ethnic composition is presented Section 3.4 Environmental Justice.

Transit-Dependent Households—Transit-dependent households represented a minor portion of the total households. According to the 2000 US Census, about 0.6 percent of the households within census block groups were without a vehicle available; compared to about 4.2 and 5.8 percent of Deschutes County and Bend, respectively.

Definition

Transit Dependent Household

An occupied housing unit that does not have a vehicle available.

According to the 2010 US Census, which collected this data at the census tract level, transit-dependent households still represent a minor portion of the total occupied housing units. About 0.6 percent of the occupied housing units within census tracts in the API were without a vehicle available; compared to about 2.5 and 3.1 percent of Deschutes County and Bend, respectively.

More Information

For more information on low income households see Section 3.4 Environmental Justice

Household Income

Income data from the 2000 US Census reflects a median individual income in 1999 of about $59,100 for census block groups within the API, compared to $21,600 and $21,800 for Bend and Deschutes County, respectively (US Census Bureau 2000). In 1999, the median household income for census block groups in the API was $88,300, compared to $40,800 for Bend and $41,800 for Deschutes County, respectively (US Census Bureau 2000). This shows that median individual and household income in the API is considerably higher than the City and County for both these measures. The 2008 estimated annual median household income in the City of Bend was $51,600, about $1,400 higher than Oregon's annual average (City-Data 2010).

According to the US 2000 Census, about 9 percent of Bend and Deschutes County households had income levels below poverty. Households with income levels below poverty within all but one of the census block groups were substantially less than the City and County.

Income data from the 2007-2011 American Community Survey 5-Year Estimates shows a median individual income of $30,982 for 2010 US Census tracts within the API, compared to $30,203 and $27,965 for Bend and Deschutes County, respectively (US Census Bureau 2012). In 2010, the median household income for census tracts in the API was $60,260, compared to $52,596 for Bend and $52,962 for Deschutes County (US Census Bureau 2012). This shows that the median individual and household income in the API is slightly

higher than the City and County median. The 2010 estimated annual median household income in the City of Bend was $52,596, about $2,700 higher than Oregon's annual average ($49,850) (US Census Bureau 2012).

The 2007-2011 American Community Survey shows about 11 percent of Bend and Deschutes County family households had income levels below poverty. In 2009, the poverty threshold for an individual was $10,830 and each additional individual added $3,740 to the poverty threshold (e.g., the poverty threshold for a four-person family was $22,050). Within the two census tracts in the API one has a lower percent (7 percent) of households below the poverty level and one has a slightly higher percent (14 percent) of households below the poverty level compared to the City of Bend and Deschutes County.

Housing

Bend offers a variety of housing options (Exhibit 3-48). Single family housing units comprised 75 percent of the City's housing stock in 2008. Mobile home parks, which are reported within the manufactured dwelling park units housing type in Exhibit 3-48, comprise 4 percent of the existing housing. In the Bend real estate market approximately 7 percent of the single family home market and 11 percent of apartments are vacant (City of Bend 2009b). ~~Current~~ 2011 real estate listings show that there are approximately 50 mobile homes for sale in the Bend area.

Exhibit 3-48: *~~Current~~ Mix of Housing in Bend (2008)*

Housing Type	Totals	Percentage
Single Family Units	24,484	75%
Manufactured Dwelling Park Units	1,221	4%
Duplex Units	562	2%
Tri- and Quad-plex Units	2,904	9%
5+ Multi-Family Units	3,559	11%
Total Units	**32,730**	**100%**

Source: City of Bend 2009b.

In 2013, real estate listings showed that there were approximately 60 mobile homes for sale in the Bend area.

Property Values and Tax Base

In 2006, Bend reached its highest estimated average home sales price, about $352,250. In 2009, the average home sales price was about $207,000; a drop of about 40 percent (Gobend Realty 2010). For Deschutes County the estimated median house or condominium value in 2008 was $331,600, compared to $140,700 in 2000 (City-Data 2010). The 2009 approximate real market property value for residential property within the API ranges significantly, from about $0.50 per

square foot to approximately $28.00 per square foot (Deschutes County 2010c).

In March 2013, the average home sales price was about $260,000, an increase of 25 percent from 2009 (Gobend Realty 2013). For the greater Deschutes County area the estimated median home price in 2011 was $190,000, a decrease of approximately 43 percent from 2008 (City-Data 2012).

The City of Bend collects taxes from two sources: property taxes and transient room taxes (hotel taxes). The current permanent property tax rate for the City of Bend is $2.80 per $1,000 of assessed value; one of the lowest in Oregon. Property taxes make up approximately 22 percent of the City's total revenue sources (City of Bend 2009d). The transient room tax is nine percent of the nightly rate for hotels, motels, and bed and breakfasts (City of Bend 2007). During fiscal year 2008–09, the City collected $2.9 million in transient room taxes (City of Bend 2009d). There are three hotels in the API that collect this tax.

In 2011-2012 the City of Bend collected $3.6 million in transient room taxes (City of Bend 2012).

The City of Bend also generates income from public utility franchise fees, which is tied to development and investment income. Public utility franchise fees made up approximately nine percent of the City's 2008-09 General Fund. The City collected $1.6 million from their investment income during fiscal year 2008-09 (City of Bend 2009b).

Deschutes County collects property taxes from businesses, residences, and other uses (Deschutes County 2009b). Deschutes County's general fund had a balance of just over $7 million as of June 2009 (Deschutes County 2009b). The 2009–10 billing rate for Deschutes County was $1.28 per $1,000 of assessed value. In total, Deschutes County was estimated to collect over $272 million in taxes from businesses and residents for the year ending June 30, 2009 (Deschutes County 2009d).

For the year ending June 30, 2012, Deschutes County was estimated to collect over $268 million in taxes from businesses and residents (Deschutes County 2012a).

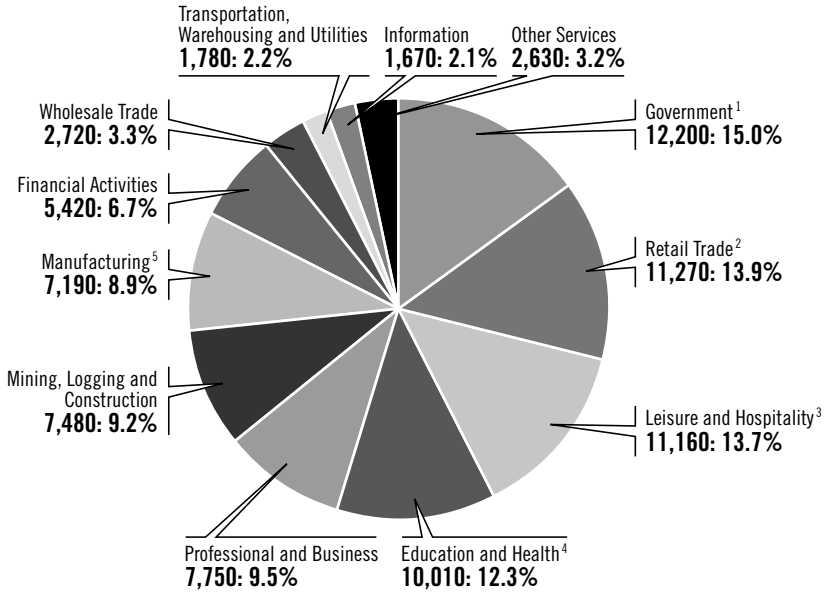
Employment and Industry

The two leading industries in Deschutes County are retail trade and leisure and hospitality, which each employed nearly 10,000 individuals in 2009. This reflects the Bend area's strong tourism industry and Deschutes County's continued population growth (Oregon Employment Department 2010). Employment by the government and in the education and health services fields has also been dominant in Deschutes County and, together with the retail trade and leisure and hospitality industries, represents nearly 60 percent of all

employment in the County in 2009. In 2009 the top five (by number of employees) regional private employers were St. Charles Medical Center, Les Schwab Tire Centers, Sunriver Resort, TMobile, and Mt. Bachelor; none of these employers are located in the API (Economic Development for Central Oregon 2009). Exhibit 3-49 illustrates employment by industry for the tri-county region that includes Deschutes County.

In 2011, over 18,000 individuals were employed in the retail trade and leisure and hospitality industries (Economic Development for Central Oregon 2012). Employment by the government and in the education and health services fields continues, to a lesser degree, to be dominant in Deschutes County and, together with the retail trade and leisure and hospitality industries, represents nearly 47 percent of all employment in the County in 2011. In 2012 the top five regional employers were the same as in 2009. Exhibit 3-49 FEIS illustrates employment by industry for the tri-county region that includes Deschutes County.

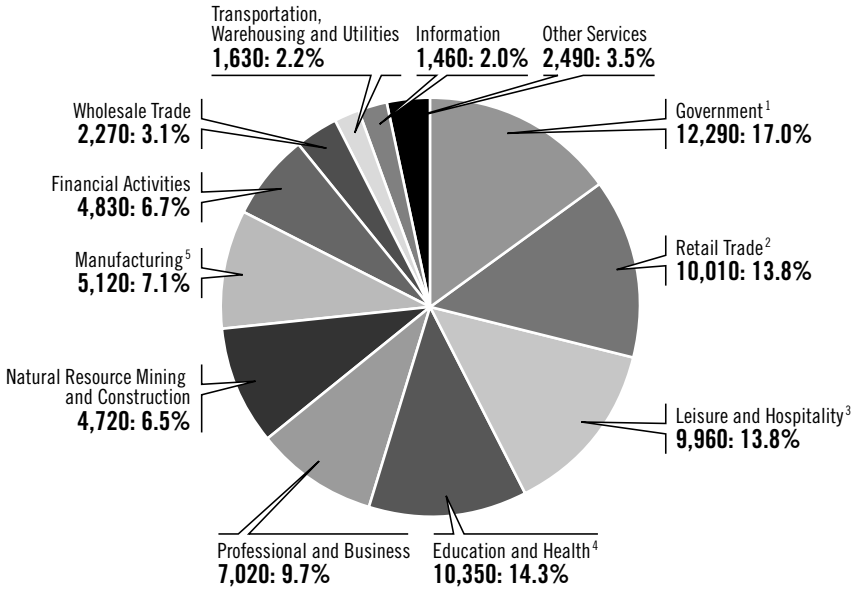
Exhibit 3-49: *Tri-County (Crook, Deschutes, and Jefferson Counties) Industry Employment, 2009*



[1] Government includes federal, state and local governments. 2 Retail trade includes food and beverage stores and general merchandise stores industries. 3 Leisure and hospitality include accommodation and food services industries. 4 Educational and health care services include health care and social assistance and health care industries. 5 Manufacturing includes durable and nondurable goods and wood product manufacturing industries.

Source: Oregon Employment Department 2010 (based on 2009 data).

Exhibit 3-49 FEIS: *Tri-County (Crook, Deschutes, and Jefferson Counties) Industry Employment, 2011*



[1] Government includes federal, state and local governments. 2 Retail trade includes food and beverage stores and general merchandise stores industries. 3 Leisure and hospitality include accommodation and food services industries. 4 Educational and health care services include health care and social assistance and health care industries. 5 Manufacturing includes durable and nondurable goods and wood product manufacturing industries.

Source: Oregon Employment Department 2012 (based on 2011 data).

Until 2007, the average unemployment rate in the City of Bend and Deschutes County was lower than the average unemployment rate in Oregon. However, beginning in 2007 the City and County experienced substantially higher unemployment than the rest of the state. Despite recent economic downturns, current regional employment projections show that growth will continue in the region. According to industry employment projections for the tri-county area (Crook, Deschutes, and Jefferson Counties), total nonfarm (payroll) employment is projected to increase by 14 percent by year 2018 (Oregon Employment Department 2010).

At the end of 2012, the City unemployment rate (10.3 percent) and County unemployment rate (11 percent) continued to be higher than the rest of the state (8.6 percent). By 2020 the Oregon Employment Department projects that total payroll employment for the tri-county area will increase by 15 percent (Oregon Employment Department 2012).

Key Differences

	East DS1	East DS2	Preferred Alternative
Estimated Residences displaced	19	13	6
Estimated Businesses displaced	43	51	42
Estimated Other displacements (Billboards)	4	3	2
Hunnell Road traffic volumes (Clausen Drive to Rogers Road)	Less than the No Build Alternative	Similar to the No Build Alternative (northbound);	Less than the No Build Alternative
Bowery Lane traffic volumes (Hunnell Road to 3rd Street)	Greater than the No Build Alternative	Less than the No Build Alternative (southbound)	N/A[1]

[1] Since Bowery Lane will not be impacted by the Preferred Alternative, this location was not analyzed in the Final EIS.

3.5.3 Environmental Consequences

No Build Alternative

The No Build Alternative would maintain the current US 97 facility as it presently exists. There would be no property acquisitions or residential and/or business displacements associated with this alternative. Vehicular safety concerns would not be addressed and, with the projected increase in traffic volumes, the crash rate could worsen. Existing and future congestion and traffic flow would not be addressed and would likely result in increased traffic on US 97. Increased future congestion on US 97 may impede travel routes to and from destination businesses, deter new development, and make it difficult to attract new businesses and retain existing businesses. In addition, the pedestrian and bicycle facilities would not be improved or expanded. Congestion along the US 97/3rd Street corridor under the No Build Alternative would affect local and regional freight trips resulting in delays up to 15 minutes during peak weekday periods.

Based on comments on the Draft EIS, businesses located in the commercial triangle bound by US 20, US 97 and Cooley Road prefer direct access to US 97 under the projected congested conditions. The No Build Alternative would retain direct access to 3rd Street/US 97.

Exhibit 3-54 FEIS shows emergency service response times to locations within the API under the No Build Alternative.

East DS1 Alternative

The East DS1 Alternative would include realignment of US 97 east of the existing alignment, from just north of Cooley Road to Empire Avenue, and would be fully access controlled and designated as US 97. The East DS1 Alternative would also restrict access and turning movements along US 97 from Empire Avenue to the new northern interchange. Through-traffic on US 97 would avoid signals and most local traffic would use 3rd Street, which would reduce congestion and increase free-flow movement on US 97. The long-term adverse and beneficial socioeconomic impacts of the East DS1 Alternative are summarized in Exhibit 3-50.

Exhibit 3-50: *East DS1 Alternative Long-Term Socioeconomic Adverse and Beneficial Impacts*

Adverse Impacts
■ Estimated 19 residences displaced
■ Estimated 43 businesses displaced
■ Traffic volumes on Bowery Lane could increase compared to the No Build Alternative
Beneficial Impacts
■ Increased vehicle safety
■ Local street extensions would increase neighborhood connectivity
■ Increased pedestrian and bicycle safety
■ Traffic volumes on Hunnell Road, between Clausen Drive and Rogers Road, could decrease compared to the No Build Alternative
■ Improved regional and statewide movement of goods and people

Community Character and Cohesion—The East DS1 Alternative would not change the community character; the southern portion would remain an urban area serving the greater Bend area, and the northern portion would remain predominantly rural residential.

Community cohesion would be adversely altered by property acquisitions and residential displacements with the East DS1 Alternative. Full and partial acquisitions within established residential neighborhoods would have localized impacts to community cohesion through residential displacements. These displacements could impact residents with a long tenure in these neighborhoods and could ~~slightly~~ alter community activity and communication within the neighborhoods. As shown in Exhibit 3-51, a total of 19 residential properties would be acquired. This is a small percentage (0.7 percent) of the total residential parcels (2,747 total residential parcels). These displacements would be within the Boyd Acres Neighborhood along Cooley Road east of the BNSF Railway and within the Hunnell Neighborhood adjacent to 3rd Street.

Exhibit 3-51: *East DS1 Alternative Estimated Residential Displacements*

Neighborhood	Estimated Number of Residential Displacements	Estimated Total Number of Parcels in Neighborhood	Percent of Total
Boyd Acres Neighborhood	9	2,482	<1%
Hunnell Neighborhood	4	169	2%
Juniper/Hilltop Neighborhood	0	53	0%
Four Seasons Neighborhood	0	43	0%
Residences unassociated with neighborhoods	6	—	—
Total Residential Displacements	**19**	**2,747**	**<1%**

Key Point

For a more detailed discussion of visual quality, invasive species, air quality, and noise impacts, please see these sub-sections of Chapter 3:

Section 3.8 Visual Resources

Section 3.14 Invasive Species

Section 3.15 Air Quality

Section 3.16 Noise

The East DS1 Alternative would improve connectivity for vehicles, pedestrians, and bicyclists particularly associated with the local street network, which would benefit community activity (including travel to and from area businesses) and communication, and community cohesion.

New county roads or private driveways have been designed to meet the appropriate standards within this urban area. These improvements would enhance community cohesion by providing more opportunities for people to be outdoors, interact with other community members, and reduce their reliance on motor vehicles. Pedestrians and bicyclists would also benefit from improved safety as many of these facilities would be separated from vehicle traffic.

These improvements could also increase traffic on roads above current conditions (Exhibit 3-52 FEIS). The extension of 3rd Street through the Hunnell Neighborhood, and local street improvements such as the extension of Harris Way and Fort Thompson Lane, could have air, noise and visual impacts that could alter the rural lifestyle associated with this neighborhood. However, traffic volumes on Hunnell Road during the evening peak period would be less with the East DS1 Alternative than the No Build Alternative. This would occur because congestion on US 97 would be reduced, and therefore, there would be less cut-through traffic on Hunnell Road. The East DS1 Alternative would bring more traffic to 3rd Street (in the vicinity of Bowery Lane) than experienced on Bowery Lane with the existing conditions and the No Build Alternative because of traffic entering and exiting US 97 and continuing on 3rd Street.

The realignment of US 97 closer to the Boyd Acres Neighborhood could also have associated air, noise and visual impacts that would alter the existing quality of life of this neighborhood. Increased air, noise and visual impacts, from new and expanded local roads, elevated structures, and the realignment of US 97 closer to residential neighborhoods could have an adverse impact to the quality of life for residents; however, these impacts would only be experienced adjacent to the new roads.

Key Point

Most Neighborhoods and businesses would benefit from improvements proposed with the build alternatives through more transportation connectivity and enhanced safety on US 97 compared to the existing conditions and the No Build Alternative.

New roads and existing local roads that are substandard for the anticipated traffic volumes and are included in the East DS1 Alternative improvements would be designed to City or County standards, including sidewalks, planter strips, and/or bicycle lanes.

The East DS1 Alternative would generally improve connectivity and safety for vehicles, pedestrians, and bicyclists particularly associated with the local street network (including travel to and from area businesses). However, in the vicinity of 3rd Street north of Cooley

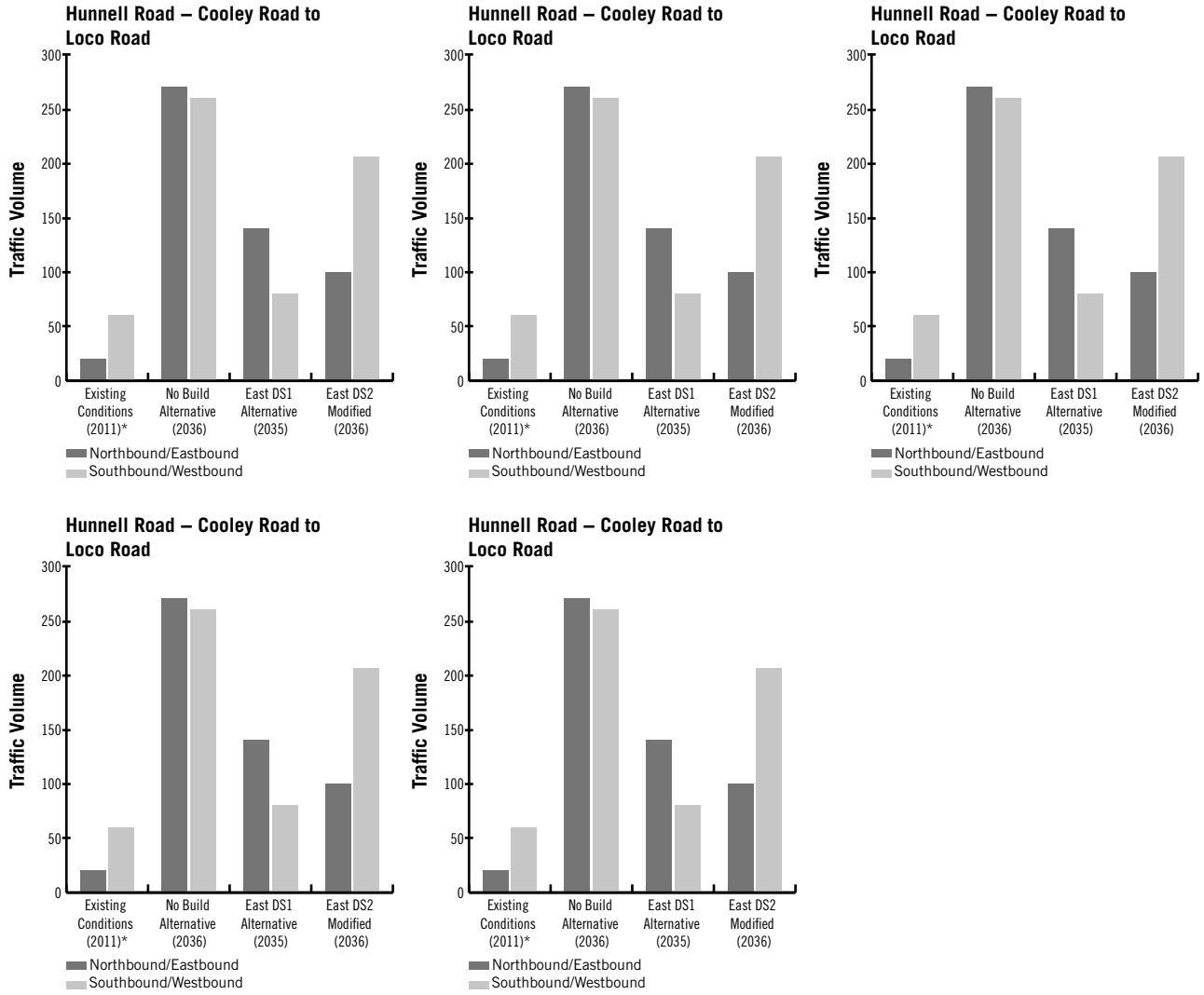
Road, the Hunnell Neighborhood would be bisected by 3rd Street, decreasing community cohesion in this localized area.

New county roads or private driveways have been designed to meet the appropriate county standards, and these improvements could enhance community cohesion by constructing pedestrian connections through the neighborhood for circulation.

In the future traffic volumes on Hunnell Road (between Clausen Drive and Rogers Road) during the evening peak period would be less with the East DS1 Alternative than the No Build Alternative (Exhibit 3-52 FEIS).

Light and glare from vehicles and minor increases in noise could adversely impact the quality of life for residents closest to the new infrastructure. Noise barriers were analyzed for the East DS1 Alternative, and none of the analyzed barriers near the Boyd Acres neighborhood were found to be feasible and reasonable. Construction of noise barriers would not be constructed with the East DS1 Alternative. With all build alternatives the National Ambient Air Quality Standards would not be exceeded. There could be localized areas where ambient concentrations of mobile source air toxic could be higher than under the No Build Alternative. However, overall future mobile source air toxic emissions are expected to be substantially lower than today due to implementation of the US Environmental Protection Agency's vehicle and fuel regulations.

Exhibit 3-52: *Approximate Evening (PM) Peak Period Traffic Volumes on US 97, 3rd Street, and Nearby Local Streets*



Note: The data represented in the charts shown in Exhibit 3-52 have been updated and are now shown in Exhibit 3-52 FEIS.

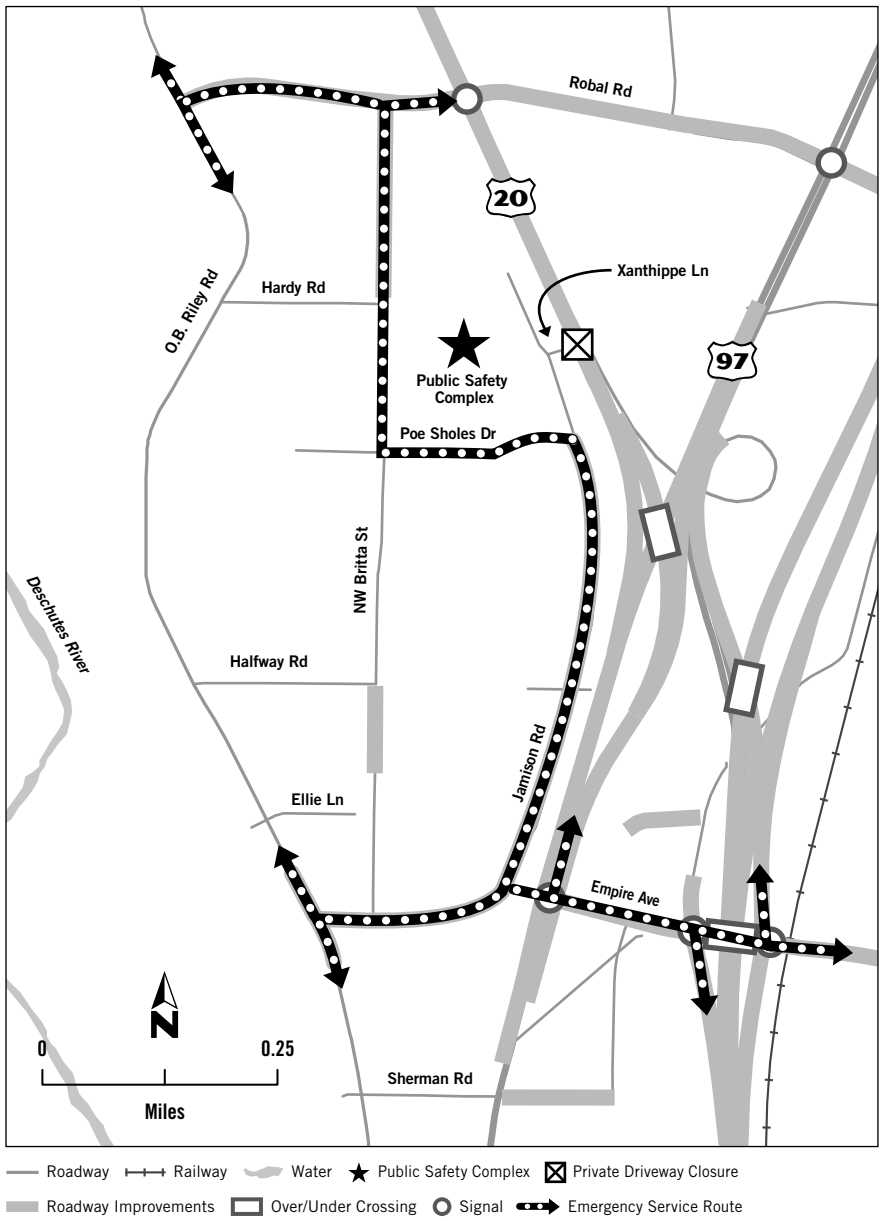
Exhibit 3-52 FEIS: *Approximate Evening (PM) Peak Period Traffic Volumes on US 97, 3rd Street, and Nearby Local Streets*

Highway/ Street	Existing Conditions (2011) Traffic Volume		No Build Alternative (2036) Traffic Volume		East DS1 Alternative (2036) Traffic Volume		East DS2 Alternative (2036) Traffic Volume		Preferred Alternative (2036) Traffic Volume	
	Northbound/ Eastbound	Southbound /Westbound	Northbound/ Eastbound	Southbound/ Westbound	Northbound/ Eastbound	Southbound/ Westbound	Northbound/ Eastbound	Southbound /Westbound	Northbound /Eastbound	Southbound / Westbound
US 97 – Between Empire Avenue and the North Interchange or Intersection with 3rd Street	2,480	1,180	3,535	1,460	1,870	1,440	1,750	1,370	1,820	1,850
Hunnell Road – between Cooley Road and Loco Road[1]	20	60	270	920	140	80	260	180	100	595
Bowery Lane – Between Hunnell Road and 3rd Street	4	4	7	7	50	20	60	90	N/A	N/A
Empire Avenue – Between US 97 and 3rd Street/ US 20	980	400	1,730	815	1,370	1,420	1,380	1,420	1,080	1,090

Note: The Draft EIS included an incorrect comparison in Exhibit 3-52 in the "3rd Street – Between Grandview Drive and Bowery Lane" bar graph. That bar graph depicted the US 97 traffic volumes for the existing conditions and No Build Alternative and depicted the 3rd Street traffic volumes for the East DS1 and East DS2 Alternatives, which were not comparable because two different roadway segments were compared within the same bar graph. Comment regarding this comparison was received on the Draft EIS. In response to that comment this Exhibit 3-52 FEIS was developed and therefore, no longer includes the data for "3rd Street – Between Grandview Drive and Bowery Lane". Exhibit 3-52 FEIS also provides the actual estimated traffic volumes on each facility so that more precise comparisons can be made amongst alternatives.

[1] A different section of Hunnell Road was used in the Final EIS so that a comparison could be made among all alternatives. The section of Hunnell Road included in the Draft EIS would not be affected by the Preferred Alternative and the Cooley Road to Loco Road section is in close proximity to the Clausen Drive to Rogers Road section

Exhibit 3-53: *East DS1 and East DS2 Alternatives Emergency Service Provider Routing from the Public Safety Complex*



Note: Please see Exhibit 2-29 FEIS or 2-30 FEIS for the location of the emergency provider only turnaround.

Exhibit 3-53 FEIS: *Preferred Alternative Emergency Service Provider Routing from the Public Safety Complex*



Note: This exhibit has been added to the Final EIS to show the emergency service provider routing from the Public Safety Complex that will occur with the Preferred Alternative. The Preferred Alternative will preserve the right out public approach from Xanthippe Lane onto southbound US 20 for emergency service vehicles only. This will preserve the existing travel routes to locations south of the Public Safety Complex. The Preferred Alternative will require travel route changes for emergency service providers located within the Public Safety Complex to areas in the northeast portion of the API as shown on this exhibit.

Community Facilities—No community facilities would be displaced with the East DS1 Alternative. Travel routes to community facilities would likely change as many trips would need to exit US 97 and travel on the local street network to reach their final destination. The Deschutes Memorial Gardens and Chapel would no longer have a private driveway on US 97; visitors to this facility would travel via the extended 3rd Street. Local street improvements that could be constructed, including sidewalks and designated bicycle lanes, and the reduced traffic congestion (which could reduce conflicts between vehicles, pedestrians and bicyclists) associated with the East DS1 Alternative infrastructure improvements, would provide a safer travel environment for pedestrians and bicyclists.

Assuming transit routes continue to operate on US 20 in their current manner, this alternative would not alter travel routes to the two bus stations.

The East DS1 Alternative would require travel route changes for emergency service providers located within the public safety complex (Exhibit 3-53). Jamison Street would no longer connect to US 20 via Xanthippe Lane. Instead, emergency service providers would travel to US 20 via the extended Britta Street that would connect to the extended Robal Road. Jamison Street would still connect to Empire Avenue, which connects to 3rd Street/US 20 and US 97. A turnaround on US 97 near Fort Thompson Lane would allow emergency service providers to change directions as shown in Exhibit 2-29 FEIS in Chapter 2.

Response times for emergency service providers would increase under both the No Build Alternative (2036) and East DS1 Alternative (2036) compared to existing conditions (2011) due to increased traffic volumes and congestion in the future. However, as shown in Exhibit 3-54 FEIS, travel times would decrease under the East DS1 Alternative (2036) compared to the No Build Alternative (2036) for routes from the Public Safety Complex to:

- 3rd Street at Empire Avenue
- 3rd Street at US 97
- Northbound US 97
- Southbound US 97.

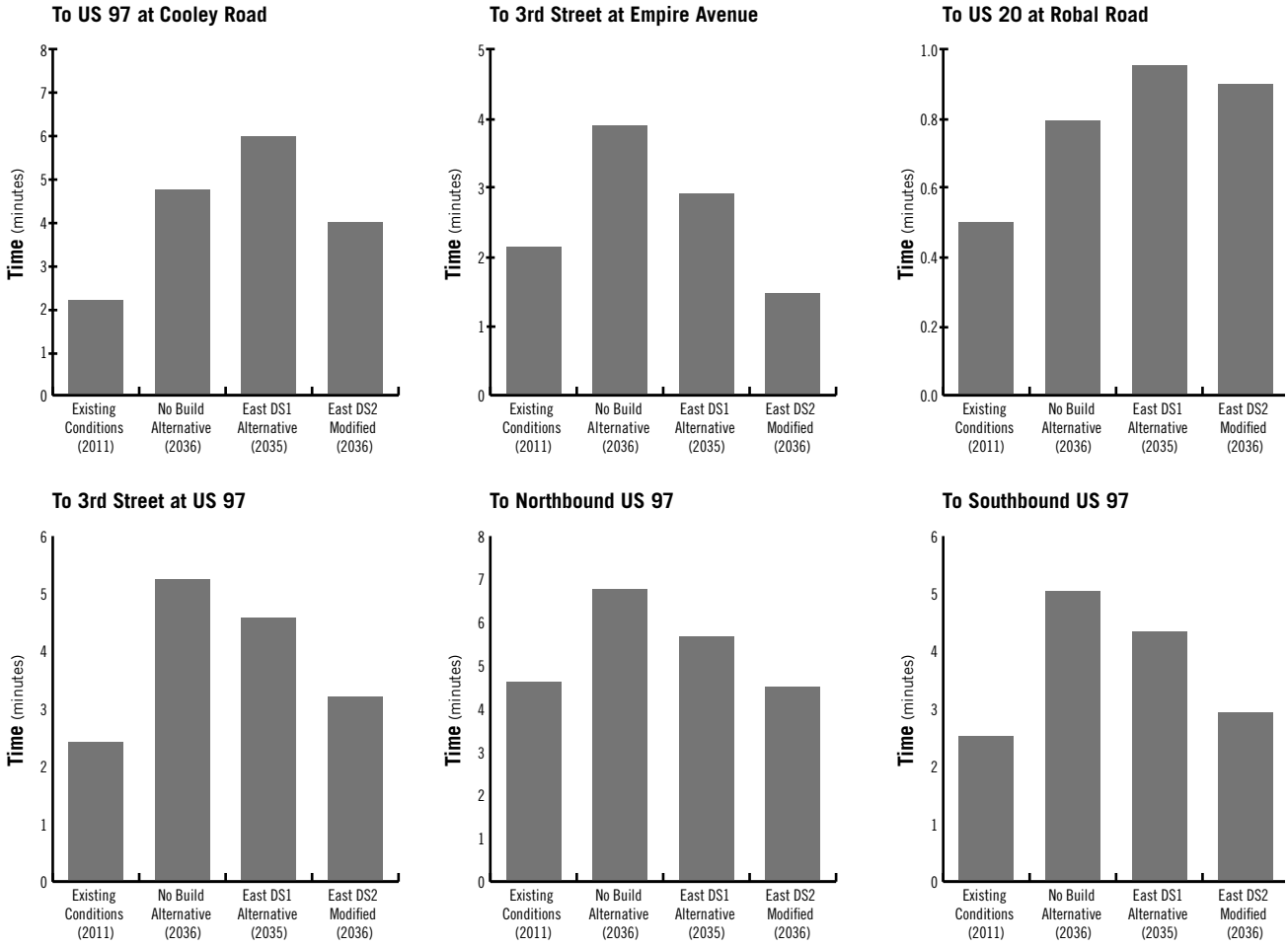
Due to additional congestion, travel times for several routes would increase under the East DS1 Alternative (2036) compared to No Build Alternative (2036), including those routes from the Public Safety Complex to:

- US 97 at Cooley Road
- US 20 at Robal Road.

Emergency service providers in this area strive for a three minute response time for fire and emergency services. Slower emergency response times under the East DS1 Alternative would be from out-of-direction travel and additional vehicles on 3rd Street and Empire Avenue (Exhibit 3-54 FEIS).

Exhibit 3-54 FEIS, shows emergency service response times to locations within the API under the East DS1 Alternative.

Exhibit 3-54: *Emergency Service Provider Estimated Response Times from the Public Safety Complex Emergency Service Provider Estimated Response Times from the Public Safety Complex*



Note: These times are an average of the free-flow times, the Bend travel demand model link travel times, and the peak hour congested conditions from the model simulations. The free-flow times assume a speed 5 mph over the posted speed and do not take signal delay or congestion into account (a simple speed times distance calculation), so these would be naturally low. The model travel times take link congestion into account but do not take intersection delay into account. The model simulations are of congested conditions and they assume that the emergency vehicle would be no different than any other vehicle stuck in traffic, which would overestimate the response time. In reality, emergency vehicles do travel a bit faster than the stream of traffic and vehicles do yield to allow them to pass, but emergency vehicles

Note: The data represented in the charts shown in Exhibit 3-54 have been updated and are now shown in Exhibit 3-54 FEIS.

Exhibit 3-54 FEIS: *Emergency Service Provider Estimated Response Times from the Public Safety Complex*

Public Safety Complex to:	Existing Conditions (2011)[1]	No Build Alternative (2036)[1]	East DS1 Alternative (2036)[1]	East DS2 Alternative (2036)	Preferred Alternative (2036)
US 97 at Cooley Road	2 minutes 20 seconds	4 minutes 40 seconds	6 minutes 0 seconds	6 minutes 30 seconds	4 minutes 10 seconds
3rd Street at Empire Avenue	1 minutes 40 seconds	4 minutes 0 seconds	3 minutes 0 seconds	4 minutes 15 seconds	1 minutes 55 seconds
US 20 at Robal Road	0 minutes 30 seconds	0 minutes 40 seconds	0 minutes 55 seconds	1 minutes 0 seconds	0 minutes 50 seconds
3rd Street at US 97	2 minutes 55 seconds	5 minutes 10 seconds	4 minutes 35 seconds	3 minutes 35 seconds	3 minutes 20 seconds
Northbound US 97	4 minutes 40 seconds	6 minutes 50 seconds	5 minutes 40 seconds	5 minutes 25 seconds	4 minutes 50 seconds
Southbound US 97	2 minutes 35 seconds	5 minutes 0 seconds	4 minutes 20 seconds	5 minutes 35 seconds	3 minutes 0 seconds

[1]Note: These times are an average of the free-flow times, the Bend Metropolitan Planning Organization's travel demand model link travel times, and the peak hour congested conditions from the model simulations to provide a more representative estimation of the emergency response times. The free-flow times assume a speed 5 mph over the posted speed and do not take signal delay or congestion into account (a simple speed times distance calculation), so these would be naturally low. The model travel times take link congestion into account but do not take intersection delay into account. The model simulations are of congested conditions and they assume that the emergency vehicle would be no different than any other vehicle stuck in traffic, which would overestimate the response time. In reality, emergency vehicles do travel a bit faster than the stream of traffic and vehicles do yield to allow them to pass, but emergency vehicles would still be affected by congested conditions as they have to weave in and out of spaces and slow down substantially at intersections. If more than one logical path was available then the one with the shortest travel time was used.
Note: Emergency service providers in this area strive for a three minute response time for fire and emergency services. This exhibit has been added to the Final EIS in response to public comment received on the Draft EIS.

Exhibit 3-55 FEIS: *East DS1 Alternative Estimated Business and Personal Property Displacements*

Business Area	Number of Business Displacements	Estimated Total Number of Businesses[1]	Percent of Total	Estimated Number of Displaced Employees
Empire Avenue	3	100	3%	69
Jamison Street	0	54	0%	0
Nels Anderson Road	38	55	69%	520
Robal Road/Cooley Road	1	53	2%	23
Clausen Drive	0	22	0%	0
Businesses unassociated with business areas	1	n/a	—	—
Total	43	**284**	**15%**	**612**
Personal Property Displacements[2]	~~200~~ 250		—	
Other Displacements (Billboards)	4			
Total Displacements	~~247~~ **297**		—	

[1] Total number of businesses is based on US 97 Bend North Corridor Project's *Final Business Survey Summary* (Parsons Brinckerhoff 2008a).

[2] This is a storage unit rental facility where there are approximately ~~200~~ 250 units available for storage. Each unit would require a relocation of personal property only.

Businesses—The most noticeable impact to businesses would be the displacement of 38 of the 55 businesses in the Nels Anderson Road business area (Exhibit 3-55 FEIS); this would comprise about 69 percent of the businesses within this business area. It is unlikely that all of these businesses would relocate to areas within or adjacent to the API or relocate as a group. Some business owners could choose to not reestablish their business at all. Of the business owners that do choose to relocate, many would likely do so in the greater Bend area and a few could relocate elsewhere in the region.

As shown in Exhibit 3-55 FEIS, there would be three business displacements from the Empire Avenue business area (3 percent), one business displacement from the Robal Road/Cooley Road business area (2 percent), and one business displaced that is not associated with a business area. There would be no business displacements from the Jamison Street and Clausen Drive business areas. The Empire Avenue, Robal Road/Cooley Road, Jamison Street, and Clausen Drive business areas would remain substantially intact. Four billboards would also be displaced.

Although some businesses could be required to relocate existing private driveways to the local street network, street improvements and signal installations would facilitate traffic flow and reduce congestion to and from businesses. Reduced congestion on the local street network, compared to the No Build Alternative, could facilitate efficient traffic movement which could attract customers to these business areas.

Southbound travelers that do not exit at the northern interchange would not be able to exit US 97 until they are outside the API. Northbound travelers that do not exit at the Empire Avenue interchange would next be able to exit US 97 at the new northern interchange. Travelers that pass by these interchanges would have longer travel routes to a business that is currently accessible via US 97. By keeping local trips on local roads commercial properties in the vicinity of local roads could experience enhanced visibility to local residents; however, these businesses would also be likely to experience reduced visibility to those using US 97 to travel through Bend to another destination. Overall, the East DS1 Alternative could reduce the number of driveby clientele to businesses; however, many of these businesses indicated that they cater to clients that seek out their establishment (Parsons Brinckerhoff 2008a).

The larger retailers within the commercial triangle bound by US 20, US 97 and Cooley Road could experience a greater loss of driveby customers. However, this business area provides important services to the residents of the greater Bend area who would likely continue to frequent the establishments within this business area regardless of the change in travel routes. Based on this information, it can be reasonably stated that customers would continue to seek many of these businesses in the future via a different travel route. Therefore, the separation of local and regional traffic on 3rd Street and US 97, respectively, would have minimal to moderate changes in patronage of businesses.

General and Particular Social Groups—All travelers (local and non-local) would benefit from the reduced congestion, and improved safety and traffic flow on US 97 from the East DS1 Alternative. Safety problems associated with numerous public road approaches, private driveways, and interrupted traffic flow on US 97 from signals at Cooley Road and Robal Road would be minimized. All population groups would benefit from the new sidewalks and bike lanes; increased mobility and connectivity within neighborhoods; safer access to and from US 97 and the local street network; and, particularly when compared to the No Build Alternative, reduced congestion on US 97 and the local street network.

The East DS1 Alternative has been analyzed under Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks and determined that it would not cause an environmental risk to health or safety that might have a disproportionate impact on children.

Local, Regional, and State Economy—The businesses, residences, and personal property acquisitions for the East DS1 Alternative would be acquired in conformance with the Uniform Relocation Assistance

and Real Property Acquisition Policies Act and applicable state and local policies. After construction of the new US 97 facility, there could be opportunities for ODOT to sell any surplus property to private ownership; it is unknown at this time how much surplus property, if any, would return to private ownership.

Within Bend's city limits, the possible transfer of jurisdiction over 3rd Street (former US 97) from ODOT to the City of Bend would transfer the responsibility of road maintenance. The City of Bend would likely require an increase to their maintenance budget to accommodate this transfer.

The East DS1 Alternative would require approximately 67 full parcel and 95 partial acquisitions (Exhibit 3-56). The economic impact of fully acquiring parcels would be the permanent conversion from private to public ownership. Parcels in public ownership are exempt from paying property taxes on the assessed value of the parcel. Most parcels subject to partial acquisition would retain existing buildings on the remainder parcel, continue current uses, and continue to pay property taxes. In some cases, partial acquisitions would only require ODOT to acquire access rights or an easement. The amount of property taxes paid could change for the properties subject to partial acquisition if they would be-reassessed by the Deschutes County's Assessor's Office. Because these reassessments would be on a case-by-case basis and would occur sometime after completion of the right of way acquisition, an estimate cannot be made at this time regarding what changes in property tax would occur due to partial acquisitions.

Exhibit 3-56: *East DS1 Alternative Estimation of Acquisitions*

Property Elements	Acquisition
Parcels subject to acquisition (full or partial)	162
Parcels subject to full acquisition	67
Property tax paid by fully acquired parcels (2009 tax year)	$267,000
Area of fully acquired tax-paying parcels	100.5 acres

Source: Deschutes County 2010c

After construction, those parcels that were either fully or partially acquired and were not part of the permanent roadway right of way could be sold by ODOT as surplus property, which would return them to private ownership. Parcels returned to private ownership would pay property taxes and could provide opportunities as replacement properties for displaced businesses, allowing owners to remain in the community. Some remnant parcels, however, might not be sold and redeveloped following construction because of potential access constraints caused by the access management under the East DS1 Alternative.

Key Point

The build alternatives would increase the efficiency of local and regional freight and goods movement, which would create opportunities to enhance local and regional economies.

The East DS1 Alternative would improve traffic flow for regional freight and travelers who are not destined for northern Bend, as travel speeds would increase and less delay would occur on US 97. These conditions would improve the regional and statewide movement of goods and people and could reduce costs associated with these movements.

There may be some impact on the local economy because of the potential loss of businesses that do not choose to relocate in the area; however, that loss may be somewhat modified by increased mobility on local streets which could improve the flow of customers and goods to and from the remaining businesses. Decisions on the jurisdictional transfers of roadways would be made during the project's final design.

East DS2 Alternative

Similar to the East DS1 Alternative, the East DS2 Alternative would include realignment of US 97 east of the existing alignment, from just north of Cooley Road to Empire Avenue, and would be fully access controlled and designated as US 97. The East DS2 Alternative would also restrict access and turning movements along US 97 from Empire Avenue to the new northern interchange. North of the new northern interchange left turn movements would still be allowed. Many of the beneficial and adverse impacts of these changes would be similar to the East DS1 Alternative. The long-term adverse and beneficial socioeconomic impacts of the East DS2 Alternative are summarized in Exhibit 3-57.

New roads and existing local roads that are substandard for the anticipated traffic volumes and are included in the East DS2 Alternative improvements would be designed to City or County standards, including sidewalks, planter strips, and/or bicycle lanes.

Community Character and Cohesion—The East DS2 Alternative would not change the community character; the southern portion would remain an urban area serving the greater Bend area and the northern portion would remain predominantly rural residential.

Similar to the East DS1 Alternative, property acquisitions and residential displacements with the East DS2 Alternative would affect community cohesion. Full and partial acquisitions within established residential neighborhoods would have localized impacts to community cohesion similar to those experienced under the East DS1 Alternative. The East DS2 Alternative would result in a total of 13 residential displacements (Exhibit 3-57 and Exhibit 3-58). Since the East DS2 Alternative would not construct a new local street through the Hunnell Neighborhood, residential relocations associated with that element of the East DS1 Alternative would not occur.

Exhibit 3-57: *East DS2 Alternative Long-Term Socioeconomic Adverse and Beneficial Impacts*

Adverse Impacts
■ Estimated 13 residences displaced
■ Estimated 51 businesses displaced
■ Traffic volumes on Bowery Lane could increase compared to the No Build Alternative.
Beneficial Impacts
■ Increased vehicle safety
■ Local street extensions would increase neighborhood connectivity
■ Increased pedestrian and bicycle safety
■ Improved regional and statewide movement of goods and people.

Exhibit 3-58: *East DS2 Alternative Estimated Residential Displacements*

Neighborhood	Estimated Number of Residential Displacements	Estimated Total Number of Parcels	Percent of Total
Boyd Acres Neighborhood	9	2,482	<1%
Hunnell Neighborhood	0	169	0%
Juniper/Hilltop Neighborhood	0	53	0%
Four Seasons Neighborhood	0	43	0%
Residences unassociated with neighborhoods	4	—	—
Total Residences Displaced	13	2,747	<1%

Improved connectivity and safety for vehicles, pedestrians and bicyclists, particularly associated with the local street network, would benefit community cohesion through improvements to community activity, including travel to and from area businesses and communication. The neighborhood street improvements would contribute to transportation connectivity and provide residents with several options to reach 3rd Street, US 20, and US 97.

As previously shown in Exhibit 3-52 FEIS, with the East DS2 Alternative traffic volumes on Hunnell Road and Bowery Lane would be greater than the East DS1 Alternative. This is because, with the East DS2 Alternative, 3rd Street would end at the new northern interchange, which would be located south of Bowery Lane. Therefore, with the East DS2 Alternative, to access locations on or north of Bowery Lane vehicles would need to use unimproved Hunnell Road and Bowery Lane. In addition, as with the East DS1 Alternative, the East DS2 Alternative would realign US 97 closer to the Boyd Acres Neighborhood. Vehicular air, noise and visual impacts could impact the quality of life for residents. However, these impacts would only be experienced adjacent to the new infrastructure.

Community cohesion would decrease in the vicinity of Bowery Lane between Hunnell Road and 3rd Street because of the increased traffic using Bowery Lane as shown in Exhibit 3-52 FEIS.

Light and glare from vehicles and minor increases in noise could impact the quality of life for residents closest to the new infrastructure. Noise barriers were analyzed for the East DS2 Alternative, and none of the analyzed barriers near the Boyd Acres neighborhood were found to be feasible and reasonable. No noise barriers would be constructed near the Boyd Acres neighborhood under the East DS2 Alternative. With all build alternatives the National Ambient Air Quality Standards would not be exceeded. There could be localized areas where ambient concentrations of mobile source air toxic could be higher than under the No Build Alternative. However, overall future mobile source air toxic emissions are expected to be substantially lower than today due to implementation of the US Environmental Protection Agency's vehicle and fuel regulations.

Community Facilities—Impacts to most community facilities, including schools, places of worship, transit, and bicycle and pedestrian facilities would be the same as the East DS1 Alternative. The Deschutes Memorial Gardens and Chapel would no longer have a private driveway on US 97; a connection to the local street network would be provided via a new street extended south from Bowery Lane, which may be improved to Deschutes County standards.

Response times for emergency service providers would increase under both the No Build Alternative (2036) and East DS2 Alternative (2036) compared to existing conditions (2011) due to increased traffic volumes and congestion in the future. However, as shown in Exhibit 3-54 FEIS travel times would decrease under the East DS2 Alternative (2036) compared to the No Build Alternative (2036) for routes from the Public Safety Complex to:

- 3rd Street at US 97
- Northbound US 97.

Due to additional congestion, travel times for several routes would increase under the East DS2 Alternative (2036) compared to the No Build Alternative (2036), including those routes from the Public Safety Complex to:

- US 97 at Cooley Road
- 3rd Street at Empire Avenue
- US 20 at Robal Road
- Southbound US 97.

Emergency service providers in this area strive for a three minute response time for fire and emergency services. Slower emergency response times under the East DS2 Alternative would be from out-of-direction travel and additional vehicles on 3rd Street and Empire Avenue (see Exhibit 3-54 FEIS).

Exhibit 3-54 FEIS, shows emergency service response times to locations within the API under the East DS2 Alternative.

Businesses—More businesses would be acquired with East DS2 Alternative (51) than with East DS1 Alternative (43) (Exhibit 3-59 FEIS). The Jamison Street, Nels Anderson Road, Robal Road/Cooley Road and Empire Avenue business areas would have the same number of acquisitions as with East DS1 Alternative. One business would also be displaced that is not associated with a business area and three billboards would be displaced.

Exhibit 3-59 FEIS: *East DS2 Alternative Estimated Business and Personal Property Displacements*

Business Area	Estimated Number of Business Displacements	Estimated Total Number of Businesses[1]	Percent of Total	Estimated Number of Displaced Employees
Empire Avenue	3	100	3%	69
Jamison Street	0	54	0%	0
Nels Anderson Road	38	55	69%	520
Robal Road/Cooley Road	1	53	2%	23
Clausen Drive	8	22	36%	80
Businesses unassociated with business areas	1	n/a	—	—
Total	**51**	**284**	**18%**	**692**
Personal Property Displacements[2]	~~200~~ 250		—	
Other Displacements (Billboards)	3			
Total Displacements	~~254~~ 304		—	

[1] Total number of businesses is based on US 97 Bend North Corridor Project's Final Business Survey Summary (Parsons Brinckerhoff 2008a).

[2] This is a storage unit rental facility where there are approximately ~~200~~ 250 units available for storage. Each unit would require a relocation of personal property only.

The notable difference in business acquisitions would occur at the Clausen Drive business area where eight businesses would be acquired under the East DS2 Alternative compared to none with the East DS1 Alternative. This represents about 36 percent of the businesses within the Clausen Drive business area. Businesses within the Clausen Drive

area include hotels, a strip mall with a number of small businesses, and vacant commercial property. Similar to the East DS1 Alternative, it is unlikely that all of these businesses would relocate to areas within or adjacent to the API, or relocate as a group. Some business owners could choose to not reestablish their business at all. Of the business owners that do choose to relocate, many would likely do so in the greater Bend area and a few could relocate elsewhere in the region.

Aside from acquisitions and displacements, businesses and the local economy under the East DS2 Alternative would experience similar impacts as discussed under the East DS1 Alternative.

General and Particular Social Groups—Impacts to travelers and social groups would include longer routes on local streets to access US 97. For some, this would include travel on unimproved roads such as segments of Bowery Lane and Hunnell Road. Access to southbound US 97 would occur at Empire Avenue; access to northbound US 97 would occur at Empire Avenue or via 3rd Street north of Cooley Road.

The East DS2 Alternative has been analyzed under Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks and determined that it would not cause an environmental risk to health or safety that might have a disproportionate impact on children.

Local, Regional, and State Economy—As with the East DS1 Alternative, the possible transfer of jurisdiction over 3rd Street (former US 97) from ODOT to the City of Bend would transfer the responsibility of road maintenance. The City of Bend would likely require an increase to their maintenance budget to accommodate this transfer.

Decisions on the jurisdictional transfers of roadways would be made during the project's final design.

The East DS2 Alternative would require acquisition of 63 full parcels and 79 partial acquisitions (Exhibit 3-60). The economic impact of fully acquiring these parcels would be to permanently convert them from private to public ownership. Parcels in public ownership are exempt from paying property taxes on the assessed value of the parcel. Most parcels subject to partial acquisition would retain existing buildings on the remainder parcel, current uses, and continue to pay property taxes. In some cases, partial acquisitions would only require ODOT to acquire access rights or an easement. The amount of property taxes paid could change for the properties subject to partial acquisition if they would be reassessed by the Deschutes County's Assessor's Office. Because these reassessments would be on a case-by-case basis and would occur sometime after completion of the right of way acquisition,

an estimate cannot be made at this time regarding what changes in property tax would occur due to partial acquisitions.

After construction, those parcels that were either fully or partially acquired and were not part of the permanent roadway right of way could be sold by ODOT as surplus property, which would return them to private ownership. Parcels returned to private ownership would pay property taxes and could provide opportunities as replacement properties for displaced businesses, allowing owners to remain in the community. Some remnant parcels, however, might not be sold and redeveloped following construction because of potential access constraints caused by the access management under the East DS2 Alternative.

Exhibit 3-60: *East DS2 Alternative Estimation of Acquisitions*

Property Elements	Acquisition
Parcels subject to acquisition (full or partial)	142
Parcels subject to full acquisition	63
Property tax paid by fully acquired parcels (2009 tax year)	$287,000
Area of fully acquired tax-paying parcels	73.5 acres

Source: Deschutes County 2010c

The East DS2 Alternative would improve traffic flow for regional freight and travelers who are not destined for northern Bend, which would improve the regional and statewide movement of goods and people and may reduce costs associated with these movements.

There may be some impact on the local economy because of the potential loss of businesses that do not choose to relocate in the area, However, that loss may be somewhat modified by increased mobility on local streets which could improve the flow of customers and goods to and from the remaining businesses.

Preferred Alternative—East DS2 Modified Alternative

Similar to the East DS1 and East DS2 Alternatives, the Preferred Alternative will include realignment of US 97 east of the existing alignment, from just north of Cooley Road to Empire Avenue, and will be fully access controlled and designated as US 97. The Preferred Alternative will not include a new northern interchange but instead will include a signalized intersection at US 97 and 3rd Street just north of Grandview Drive and south of the Deschutes Memorial Garden and Chapel. This new intersection will be located entirely within the City of Bend's UGB. With this signalized intersection, the Preferred Alternative will minimize impacts to neighborhoods east of US 97, and will substantially minimize impacts to rural residential properties north of Cooley Road.

Improvements to City of Bend and Deschutes County roads that are included in the Preferred Alternative as shown in Exhibit 2-3 FEIS, have been coordinated with those agencies and will be designed to meet the appropriate standards; including sidewalks, planter strips, and/or bicycle lanes. Properties north of the new signalized intersection of US 97 and 3rd Street will maintain their existing access on to US 97 with the exception of the three parcels closest to the new signalized intersection, which will have their access modified. The long-term adverse and beneficial socioeconomic impacts of the Preferred Alternative are summarized in Exhibit 3-57 FEIS.

Exhibit 3-57 FEIS: *Preferred Alternative Long-Term Socioeconomic Adverse and Beneficial Impacts*

Adverse Impacts
■ Estimated 6 residences displaced
■ Estimated 44 businesses displaced
■ Traffic volumes on Hunnell Road would decrease compared to the No Build Alternative.
Beneficial Impacts
■ Increased vehicle safety
■ Local street extensions would increase neighborhood connectivity
■ Increased pedestrian and bicycle safety
■ Improved regional and statewide movement of goods and people.

Community Character and Cohesion—The Preferred Alternative will not change the community character; the southern portion will remain an urban area serving the greater Bend area and the northern portion will remain predominantly rural residential.

The Preferred Alternative will result in a total of six residential displacements. Similar to the East DS1 and East DS2 Alternatives, full and partial property acquisitions and residential displacements within established residential neighborhoods will have localized impacts to community cohesion. While the types of localized impacts to community cohesion from residential displacements will be similar to those experienced under the East DS1 and East DS2 Alternatives, the Preferred Alternative will only result in six residential displacements and the magnitude of the impact to community cohesion will be less as shown in Exhibit 3-58 FEIS. Since the Preferred Alternative will not construct a new local street through the Hunnell Neighborhood, residential relocations associated with that element of the East DS1 Alternative will not occur.

Exhibit 3-58 FEIS: *Preferred Alternative Estimated Residential Displacements*

Neighborhood	Estimated Number of Residential Displacements	Estimated Total Number of Parcels	Percent of Total
Boyd Acres Neighborhood	6	2,482	<1%
Hunnell Neighborhood	0	169	0%
Juniper/Hilltop Neighborhood	0	53	0%
Four Seasons Neighborhood	0	43	0%
Residences unassociated with neighborhoods	0	—	—
Total Residences Displaced	6	2,747	<1%

Improved connectivity for vehicles, pedestrians and bicyclists, particularly associated with the local street network, will benefit community cohesion through improvements to community activity and communication. The neighborhood street improvements will contribute to transportation connectivity and provide residents with several options to reach 3rd Street, US 20, and US 97. Pedestrian and bicycle facilities provided by the Preferred Alternative are shown in Exhibit 2-3 FEIS and detailed in Section 2.1.2. Description of the Preferred Alternative.

Exhibit 3-52 FEIS shows that the Preferred Alternative will cause traffic volumes on Hunnell Road to increase over the existing conditions. However, these increases will be in the area between Loco Road and Cooley Road, not further north in the Hunnell Neighborhood.

In addition, as with the East DS1 and East DS2 Alternatives, the Preferred Alternative will realign US 97 closer to the Boyd Acres Neighborhood. Light and glare from vehicles and minor increases in noise could impact the quality of life for residents closest to the new infrastructure. Noise barriers were analyzed for the Preferred Alternative, and none of the analyzed barriers near the Boyd Acres neighborhood were found to be feasible and reasonable. No noise barriers near the Boyd Acres neighborhood would be constructed with the Preferred Alternative. Additionally, the National Ambient Air Quality Standards will not be exceeded as a result of the Preferred Alternative. There could be localized areas where ambient concentrations of mobile source air toxic could be higher than under the No Build Alternative. However, overall future mobile source air toxic emissions are expected to be substantially lower than today due to implementation of the US Environmental Protection Agency's vehicle and fuel regulations.

Community Facilities—Impacts to most community facilities, including schools, places of worship, transit, and bicycle and pedestrian facilities will be similar to the East DS1 and East DS2 Alternatives. A difference is that with the Preferred Alternative the

Deschutes Memorial Gardens and Chapel will retain its driveway on US 97; additional access could be provided via a driveway off of 3rd Street west of the northern intersection with US 97. The bicycle and pedestrian facilities for the Preferred Alternative are shown in Exhibit 2-3 FEIS in Chapter 2.

The Preferred Alternative will preserve the right out public approach from Xanthippe Lane onto southbound US 20 for emergency service vehicles only. This will preserve the existing travel routes to locations south of the Public Safety Complex. The Preferred Alternative will require travel route changes for emergency service providers located within the Public Safety Complex to areas in the northeast portion of the API (Exhibit 3-53 FEIS). For example, to access the mobile home parks along US 97 emergency service providers will travel south on Jamison Street to Empire Avenue, east a short distance on Empire Avenue to the US 97 northbound on-ramp, and then access the mobile home parks by the existing access off of US 97.

For the forecasted travel times, in most cases the response times for emergency service providers will increase under both the No Build Alternative (2036) and the Preferred Alternative (2036) compared to existing conditions (2011) due to future increases in traffic volumes and congestion (Exhibit 3-54 FEIS). However, in general, preserving the southbound access from the Public Safety Complex onto US 20 as part of the Preferred Alternative (2036) will reduce response times compared to the No Build Alternative (2036). Travel times will decrease under the Preferred Alternative (2036) compared to the No Build Alternative (2036) for routes from the Public Safety Complex to:

- US 97 at Cooley Road
- 3rd Street at Empire Avenue
- 3rd Street at US 97
- Northbound US 97
- Southbound US 97.

Due to additional congestion, travel times to US 20 at Robal Road will have a minor increase of 10 seconds under the Preferred Alternative (2036) compared to the No Build Alternative (2036).

Businesses—The number of businesses acquired for the Preferred Alternative (42) is similar to the East DS1 Alternative (43) and less than the East DS2 Alternative (51) (Exhibit 3-59A FEIS). The Jamison Street, Nels Anderson Road, Robal Road/Cooley Road and Empire Avenue business areas will have the same number of acquisitions as with the East DS1 and East DS2 Alternatives. One business will also be

displaced that is not associated with a business area and two billboards will be displaced.

Exhibit 3-59A FEIS: *Preferred Alternative Estimated Business and Personal Property Displacements*

Business Area	Estimated Number of Business Displacements	Estimated Total Number of Businesses[1]	Percent of Total	Estimated Number of Displaced Employees
Empire Avenue	2	100	2%	46
Jamison Street	0	54	0%	0
Nels Anderson Road	41	55	75%	533
Robal Road/Cooley Road	0	53	0%	0
Clausen Drive	0	22	0%	0
Businesses unassociated with business areas	1	n/a	—	—
Total	44	284	15%	579
Personal Property Displacements2	250			—
Other Displacements (Billboards)	2			--
Total Displacements	297			—

[1] Total number of businesses is based on US 97 Bend North Corridor Project's Final Business Survey Summary (Parsons Brinckerhoff 2008a).

[2] This is a storage unit rental facility where there are approximately 250 units available for storage. Each unit would require a relocation of personal property only.

Similar to the East DS1 and East DS2 Alternatives, it is unlikely that all of the displaced businesses will relocate to areas within or adjacent to the API, or relocate as a group. Some business owners could choose to not reestablish their business at all. Of the business owners that do choose to relocate, many will likely do so in the greater Bend area and a few could relocate elsewhere in the region.

Businesses and the local economy under the Preferred Alternative will experience similar impacts as discussed under the East DS1 and East DS2 Alternatives.

Access to the commercial triangle bound by US 20, US 97 and Cooley Road is illustrated in Exhibit 2-8A FEIS in Chapter 2. Access to this area from southbound US 97 will occur at the new signalized intersection of US 97 and 3rd Street south of Deschutes Memorial Gardens. The next opportunity for southbound US 97 travelers to access this commercial area will be at Butler Market Road. Travelers will exit at Butler Market Road and travel north on 3rd Street to Robal Road or Cooley Road. The Preferred Alternative could accommodate generic motorist service signing, such as Gas-Food-Lodging signs that could direct motorists to business areas. These signs could be installed on US 97 to direct travelers to the commercial triangle bound by US 20, US 97, and Cooley Road. The sign placement will be determined during final design once funding becomes available for construction,

and businesses can work with Oregon Travel Experience to get business-specific signs installed.

General and Particular Social Groups—All travelers (local and non-local) will benefit from the reduced congestion, improved safety and traffic flow on US 97 from the Preferred Alternative, particularly when compared to the No Build Alternative. Impacts to travelers and residents in the API will be less with the Preferred Alternative than the East DS1 and East DS2 Alternatives, especially the lack of out-of-direction travel that will be required with the Preferred Alternative. Within the API, connections between US 97 and the local street network will occur at Empire Avenue and at the new signalized intersection at 3rd Street north of Cooley Road.

The Preferred Alternative was analyzed under Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks, and determined that it will not cause an environmental risk to health or safety that might have a disproportionate impact on children.

Local, Regional, and State Economy—As with the East DS1 and East DS2 Alternatives, the possible transfer of jurisdiction over 3rd Street (former US 97) from ODOT to the City of Bend will transfer the responsibility of road maintenance. The City of Bend will likely require an increase to their maintenance budget to accommodate this transfer. Decisions on the jurisdictional transfers of roadways will be made during the project's final design.

The Preferred Alternative will require acquisition of 52 full parcels and 52 partial acquisitions as shown in Exhibit 3-60 FEIS. The economic impact of fully acquiring these parcels will be to permanently convert them from private to public ownership. Parcels in public ownership are exempt from paying property taxes on the assessed value of the parcel. Most parcels subject to partial acquisition will retain existing buildings on the remainder parcel, continue current uses, and continue to pay property taxes. In some cases, partial acquisitions will only require ODOT to acquire access rights or an easement. The amount of property taxes paid could change for the properties subject to partial acquisition if they are reassessed by the Deschutes County's Assessor's Office. Because these reassessments will be on a case-by-case basis and will occur sometime after completion of the right of way acquisition, an estimate cannot be made at this time regarding what changes in property tax will occur due to partial acquisitions.

Exhibit 3-60 FEIS: *Preferred Alternative Estimation of Acquisitions*

Property Elements	Acquisition
Parcels subject to acquisition (full or partial)	104
Parcels subject to full acquisition	52
Property tax paid by fully acquired parcels (2012 tax year)	$203,469
Area of fully acquired tax-paying parcels	82 acres

Source: Deschutes County 2012a

After construction, those parcels that were either fully or partially acquired and were not part of the permanent roadway right of way could be sold by ODOT as surplus property, which will return them to private ownership. Parcels returned to private ownership will pay property taxes and could provide opportunities as replacement properties for displaced businesses, allowing owners to remain in the community. Some remnant parcels, however, might not be sold and redeveloped following construction because of potential access constraints caused by the access management under the Preferred Alternative.

There may be some impact on the local economy because of the potential loss of businesses that do not choose to relocate in the area, However, that loss may be somewhat modified by increased mobility on local streets which could improve the flow of customers and goods to and from the remaining businesses.

The Preferred Alternative will improve traffic flow for regional freight and travelers who are not destined for northern Bend, which will improve the regional and statewide movement of goods and people and may reduce costs associated with these movements.

Indirect Impacts

No Build Alternative—The indirect impacts of the No Build Alternative would be substantially increased traffic congestion from increases in the traffic volumes, reduced traffic flow, and worsened safety issues on US 97. While no physical infrastructure improvements would be associated with the No Build Alternative, congested roadways and long queues at intersections could increasingly restrict motorists' ability to move for employment, commercial, and social opportunities. Increasing travel time and increasing schedule unpredictability due to traffic congestion would be experienced by all residents and motorists.

Traffic congestion would increase under the No Build Alternative. Although travel patterns are not forecasted to change significantly over the No Build Alternative, traffic volumes would increase in all neighborhoods and business areas. Increased traffic would lead to more vehicle and road noise, light and glare, exhaust, and dust (on unimproved roads), closer to residents and business areas.

Congestion leads to numerous quality of life consequences (NCHRP 2002). With the No Build Alternative, the lack of infrastructure improvements would likely result in congestion and delay. This would affect peoples' quality of life, safety, and environment; crash rates, fuel consumption and air pollution all increase under congested driving conditions (NCHRP 2002). Increasing traffic and congestion would also make traveling to destinations more difficult and increase travel times.

Bicycle and pedestrian mobility would be limited to existing facilities, which would remain intermittent and disconnected. Transit travel times would increase and reliability would decrease as buses would be slowed by traffic congestion. Emergency service response times would increase under the No Build Alternative compared to existing response times due to increasing traffic and congestion over time.

The existing safety problems on US 97 would not be addressed with the No Build Alternative. These safety problems, coupled with increased response times for emergency service providers, would likely further diminish quality of life by increasing residents' concerns about unsafe traffic conditions and general safety.

Increased congestion and delay on US 97 would likely have some adverse impact on regional and state commerce by increasing the time it takes to move goods regionally or across the state. Furthermore, trucks idling in traffic congestion would likely increase fuel and labor costs for businesses. These added costs could reduce the competitiveness, productivity, and future development opportunities for businesses locally, across the state, and beyond.

East DS1 Alternative—Over the long-term, the indirect impacts associated with the East DS1 Alternative would reduce congestion, which would reduce regional and state-wide transportation costs for businesses, improve the ability to plan freight movement, and improve the ability of residents to move. Improvements to the transportation infrastructure would also support future planned economic development opportunities.

The improvements proposed under the East DS1 Alternative would be located in an urbanized area in the south and a rural area in the north. The East DS1 Alternative would either introduce new roadways to locations in the northern area (north of Cooley Road) where they do not currently exist or it would expand existing facilities which could increase vehicular traffic and associated impacts. Over time, increasing traffic on these roads could increase visual distractions from vehicle movement, light and glare, and noise and exhaust emissions. These indirect impacts could alter the character of neighborhoods.

There could be minor population changes within areas where displaced businesses and residents would choose to relocate, either within or outside of the API. Given that residents and businesses potentially relocating would likely not all relocate to the same neighborhood or business area, any population increases resulting from this alternative would likely be dispersed throughout the greater Bend area. Therefore, indirect impacts such as changed demographics within receiving areas would be negligible.

East DS2 Alternative—The indirect impacts of the East DS2 Alternative would be the same as those described for the East DS1 Alternative.

Preferred Alternative—East DS2 Modified Alternative

The indirect impacts of the Preferred Alternative will be similar to those described for the East DS1 and East DS2 Alternatives, with the exception of potential indirect impacts to community character and cohesion. The new or expanded roadway facilities with the Preferred Alternative will be contained within the City of Bend's UGB, an urbanized area. Therefore, with the Preferred Alternative the indirect impacts on the character of the Hunnell Neighborhood, the Juniper/Hilltop Neighborhood, and the Four Seasons Neighborhood are expected to be substantially less than with the East DS1 and East DS2 Alternatives.

Construction Impacts

With the No Build Alternative proposed US 97 infrastructure improvements would not be constructed and, therefore, no project related temporary adverse or beneficial impacts would occur.

With the build alternatives the types of construction-related impacts would include temporary road closures, detours, delay and congestion; modified travel routes and approaches; dust from grading; visual encroachment from brightly colored equipment, signs, light and glare, scaffolding, temporary structures and debris piles; and air and noise pollution from construction equipment. Other temporary impacts could include utility shut-offs and noise from construction equipment and demolition of structures. No residents would become isolated during the construction of either of the build alternatives. Connectivity to the roadway system would remain, although travel routes to and from US 97 and US 20 could be modified. Motorists would likely experience minor disruptions, detours, and additional congestion on nearby local streets; particularly during peak hours. Construction of local roads and road improvements could temporarily alter access to public transit and pedestrian and bicycle facilities. In general, all social groups would experience similar types of temporary adverse and beneficial impacts.

Community facilities would remain open and available during construction, although travel routes to and from these facilities could be modified temporarily. Emergency response times could be delayed by detours and congestion during construction; however, emergency vehicles would continue to be given priority during construction.

Key Point

It is estimated that every $1 million of construction expenditure (in 2012 dollars) by ODOT Region 4 would result in 6.5 direct, 2.0 indirect and 2.0 induced jobs, for a total of 10.5 full time equivalent jobs.

Some businesses could suffer little or no adverse economic impacts during construction, while others could experience a decline in sales if customers choose to avoid businesses located near construction areas. Transportation costs could increase if freight times increase during construction although this would likely be negligible to local, regional, and statewide economies. Access to businesses that would not be displaced could be modified during construction but some type of access would remain. Visibility of businesses could decrease.

Project related temporary benefits would include short-term jobs supported by transportation construction spending, which stem from a number of elements in the economy. First, work could be directly created from construction (direct job impacts). Second, ripple effects could be created throughout the economy from the construction companies' purchases of supplies, materials, and services (indirect job impacts). Finally, the spending by construction workers, as well as employees of firms indirectly involved, could serve to further increase the demand for consumer/household goods and services (induced job impacts).

Construction costs for the East DS1 and East DS2 Alternatives were estimated to be approximately $93–$102 million (2010 year dollars). It was estimated that every $1 million of construction expenditure by ODOT Region 4 would result in 5.7 direct, 1.5 indirect and 1.7 induced jobs, for a total of 8.9 full-time equivalent jobs. Thus, the estimated $93–102 million project cost could be associated with about 830–910 full-time equivalent jobs. These short-term job impacts could be expected to dissipate following the end of the construction period.

The Final EIS describes that while the types of project related temporary impacts would be similar with the build alternatives, the specific locations of the construction-related impacts would be different. In particular, with the Preferred Alternative the location of the construction-related impacts will be primarily contained within the City of Bend's UGB. The exceptions are the Britta Street extension and the roundabout at O.B. Riley Road and Cooley Road; both of these improvements are outside the City of Bend UGB. Furthermore, with the Preferred Alternative 3rd Street will remain open during most of the construction of the new alignment of US 97.

In 2012 ODOT updated their Short-Run Job Impacts from Transportation Construction Expenditures in Oregon Regions

guidance (ODOT 2012c). This guidance requires using construction costs in 2012 year dollars, and provides specific inflation factors to adjust construction costs in other years such as a 1.08 inflation factor for 2010 year dollars. Therefore, the construction costs, not including right of way acquisition, for the East DS1 and East DS2 Alternatives in 2012 year dollars are estimated to be approximately $100$110 million. Based on this updated guidance, it is estimated that every $1 million of construction expenditure (in 2012 dollars) by ODOT Region 4 would result in 6.5 direct, 2.0 indirect and 2.0 induced jobs, for a total of 10.5 full-time equivalent jobs. Thus, the estimated $100–$110 million project construction cost could be associated with about 1,050-1,155 full-time equivalent jobs. These short-term job impacts could be expected to dissipate following the end of the construction period.

Applying the guidance's deflation factor of 0.84 to convert the construction cost of the Preferred Alternative ($100 million in 2016 dollars), construction costs in 2012 dollars are estimated to be approximately $84 million which includes utilities relocation costs but not right of way acquisition. The Preferred Alternative would be associated with about 880 full-time equivalent jobs during construction. These short-term job impacts could be expected to dissipate at the end of the construction period.

3.5.4 Avoidance, Minimization, and/or Mitigation Measures Proposed in the Draft EIS

This section discusses potential measures that could be applied to the build alternatives to avoid, minimize, or mitigate for impacts to socioeconomic elements, including community character and cohesion, community facilities, business, general and particular social groups, and the local, regional and state economy.

More Information

Please refer to Section 3.8 Visual Resources, Section 3.14 Invasive Species, Section 3.15 Air Quality, and Section 3.16 Noise, for avoidance, minimization, and/or mitigation measures pertaining to those resources.

Construction Mitigation

The following measures could be taken to the extent practicable to avoid, minimize, and mitigate temporary adverse impacts to the economic and social conditions:

- For major utility shut-offs, provide advance notice and encourage utilities to schedule during low use times
- Distribute periodic press releases, newsletters or notices to residents to advise them of changes in pedestrian or bicycle routes during construction
- Plan construction activities to allow reasonable access to private residential and commercial properties, and community and social services
- Time temporary road closures to minimize negative impacts to area residents

- Provide notices of planned construction activities, planned temporary road closures and detours, and changes in other access routes. The schedule for these activities could be mailed periodically to all public facilities and social services operating within and near the API and to the school districts for potential impacts to school bus routes and stops.

Since publication of the Draft EIS, the last bullet from the mitigation list above has been modified to better conform to ODOT's practices.

- Provide notices of planned construction activities, planned temporary road closures and detours, and changes in other access routes. ODOT would provide notifications of the construction schedule and activities.

Mitigation for Long-Term Impacts

Avoidance Measures—The build alternatives have been designed to avoid the following long-term adverse impacts:

- Residential displacements from the mobile home parks
- Alterations to the alignment of the BNSF Railway
- Displacement of community facilities and public service facilities.

Minimization Measures—The following measures were considered in developing the alternatives to minimize long-term adverse impacts to the extent practicable:

- Minimize the amount of private property acquired, which reduces the number of residences and businesses displaced
- Minimize dividing neighborhoods or business areas by aligning the new US 97 highway adjacent to the BNSF Railway and along the existing route for US 97
- Minimize impacts to emergency services by providing an emergency service turnaround at Fort Thompson Lane
- Maintain existing accessibility to as many of the business areas and neighborhoods by including local street connections in the proposed action.

Since publication of the Draft EIS, the last bullet from the mitigation list above has been modified to better conform to ODOT's practices.

- Maintain access to businesses and residences that are not displaced by including local street connections in the proposed action.

Mitigation Measures—The following measures could be taken to the extent practicable to mitigate long-term adverse impacts to the economic and social conditions:

- The available housing in greater Bend is expected to provide suitable relocation housing for displaced residents. If sufficient replacement housing is not available, provide housing of last resort.
- Implement provisions as required under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, for all businesses; and residents that are displaced and real property acquisitions. All affected property owners would be compensated at fair market value and relocation assistance would be provided for those who would be relocated in accordance with the Uniform Relocation Act.

3.5.5 Avoidance, Minimization, and/or Mitigation Commitments Incorporated into the Preferred Alternative

ODOT makes the following commitments.

- ODOT will preserve southbound access from the Public Safety Complex onto US 20
- Maintain access to businesses and residences that are not displaced by including local street connections in the proposed action.

3.6 Parks and Recreational Facilities

3.6.1 Regulatory Setting

Section 4(f)

Section 4(f) of the Department of Transportation Act of 1966, codified in federal law at 49 USC 303, declares that "it is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites."

Section 4(f) specifies that the Secretary [of Transportation] may approve a transportation program or project requiring the use of publicly owned land of a public park, recreation area, or wildlife or waterfowl refuge of national, state, or local significance, or land of an historic site of national, state, or local significance (as determined by the federal, state, or local officials having jurisdiction over the park, area, refuge, or site) only if:

- there is no prudent and feasible alternative to using that land; and
- the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use; or
- the use would not affect the features, activities, or attributes which qualify the property for Section 4(f) consideration and the Federal Highway Administration has made a determination that the Section 4(f) use is *de minimis*.

Section 4(f) further requires consultation with the US Department of the Interior and, as appropriate, the involved offices of the US Departments of Agriculture and Housing and Urban Development in developing transportation projects and programs that use lands protected by Section 4(f). If historic sites are involved, then coordination with the State Historic Preservation Officer or Tribal Historic Preservation Officer is also needed.

Section 6(f)

The Land and Water Conservation Fund Act State Assistance Program was established by the Land and Water Conservation Fund Act of 1965 (Section 6, Land and Water Conservation Fund Act of 1965, as amended; Public Law 88-578; 16 USC 4601-4 et seq.) to stimulate a nationwide action program to assist in preserving, developing, and assuring to all citizens of the US of present and future generations such quality and quantity of outdoor recreation resources as may be available and are 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.

Property acquired or developed with Land and Water Conservation Fund assistance shall be retained and used for public outdoor recreation. Any property so acquired and/or developed shall not be wholly or partly converted to other than public outdoor recreation uses without the approval of the National Park Service pursuant to Section 6(f)(3) of the Land and Water Conservation Fund Act and the *Land and Water Conservation Fund State Assistance Program Federal Financial Assistance Manual* (2008). The conversion provisions of Section 6(f)(3), 36 CFR Part 59 and the manual apply to each area or facility for which Land and Water Conservation Fund assistance is obtained, regardless of the extent of participation of the program in the assisted area or facility and consistent with the contractual agreement between the National Park Service and the state.

3.6.2 Affected Environment

More information: Additional detail on parks and recreational facilities is provided in the *Land Use/Planning/Parks and Recreational Facilities Technical Report* (ODOT 2014h) and *Bicycle/Pedestrian Technical Report* (ODOT 2014c). The *Land Use/Planning/Parks and Recreational Facilities Technical Report* and *Bicycle/Pedestrian Technical Report* are listed in Appendix K and available in the document library of the project's website (www.us97solutions.org).

Since the publication of the Draft EIS, the API along US 97 has been modified and generally extends from approximately 1,000 feet north of Bowery Lane to Butler Market Road in Bend (Exhibit 3-1 FEIS). In addition, ODOT coordinated extensively with the City of Bend and Bend Parks and Recreation District regarding the existing and planned trail facilities in the project API. As a result, the discussion of trail facilities in this section has been substantially revised for the Final EIS.

~~Six existing and planned trail facilities are partially or wholly located within the API (Exhibit 3-61). There are no parks or wildlife or waterfowl refuges located within the API.~~

~~The Trails Master Plan, included in Bend Park and Recreation District's Parks, Recreation, and Green Spaces Comprehensive Plan, identifies an existing "connector trail" (a sidewalk, shown as #1 on Exhibit 3-61) at the southern end of the API along Butler Market Road from the Deschutes River west of US 97 to 4th Street east of US 97. The Trails Master Plan also identifies the following planned "primary trails:"~~

- ~~Rails with Trails Corridor (#2 on Exhibit 3-61) along the BNSF Railway in the eastern portion of the API (also shown on the Bend Urban Area Bicycle and Pedestrian System Plan, included in the Bend Urban Area Transportation Plan)~~

- ~~North Parkway Trail (#3 on Exhibit 3-61), which provides a connection from Butler Market Road north to Empire Avenue west of US 97, including an existing paved trail segment (called the Bend River Promenade) between Butler Market Road and Bend River Mall Drive~~
- ~~North Unit Canal Trail (#4 on Exhibit 3-61), which begins at Butler Market Road east of US 97 and connects north to the North Unit Canal, and then parallels the canal to the east.~~

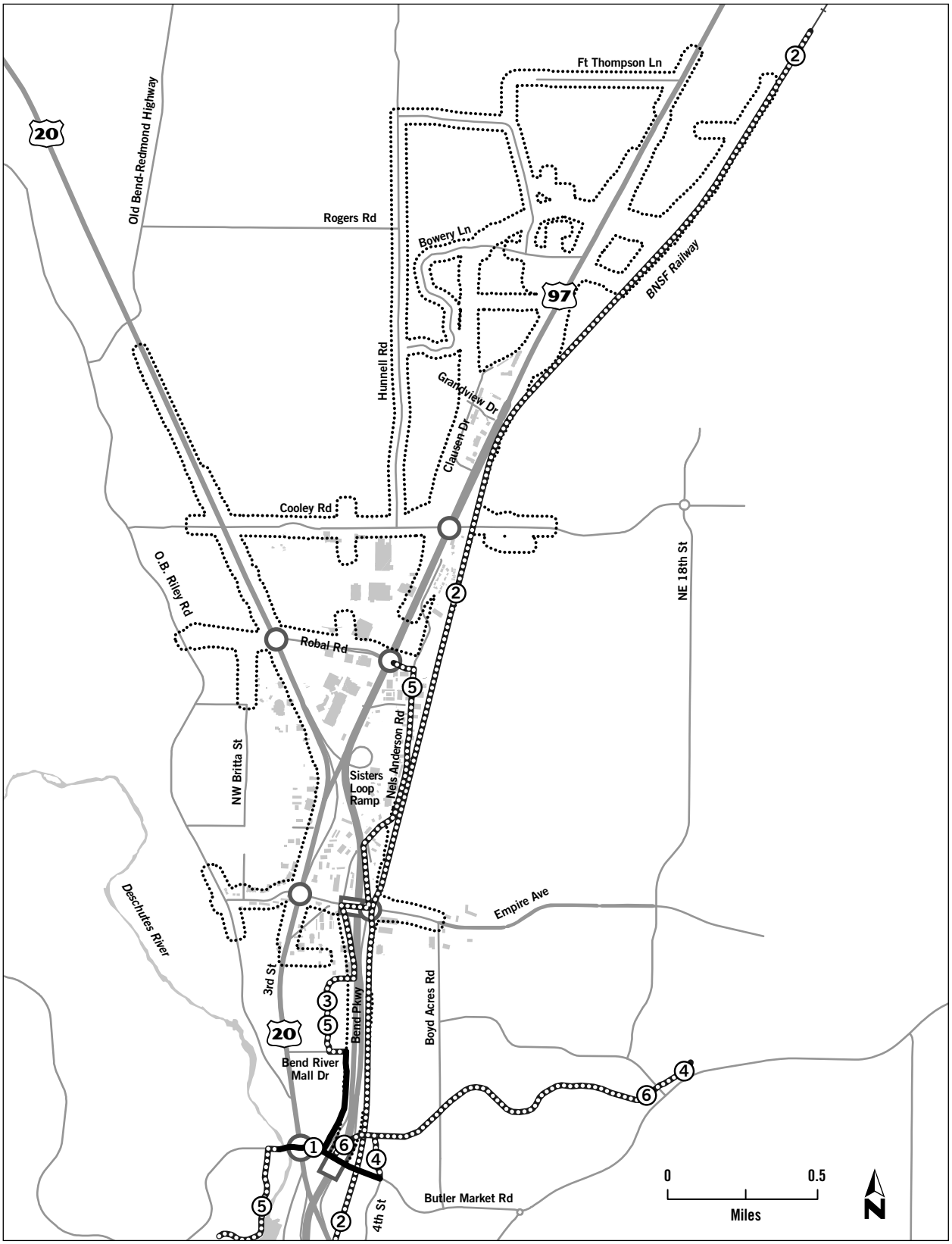
~~The Bend Area General Plan Bicycle and Pedestrian System Plan Map identifies two future multi-use trails within the API: one would be a north-south hard surface trail (#5 on Exhibit 3-61) connecting the Deschutes River to Robal Road; the other trail would be an east-west alternative surface trail (#6 on Exhibit 3-61) following the North Unit Main Canal from where it meets the Deschutes River east to connect with the existing trails located near 18th Avenue and Butler Market Road.~~

Deschutes County does not have a parks department or a parks master plan. The 2030 Deschutes County Transportation System Plan identifies existing and planned trails and notes that Deschutes County would support grant applications by third parties to build and maintain trails. None of the existing and planned trails identified in the 2030 Deschutes County Transportation System Plan are located in the API.

Bend Park and Recreation District's 2008 Neighborhood Parks Plan and 2012 update of the Parks, Receration, and Green Space Comprehensive Plan identify existing and planned park areas and neighborhood park development priority areas. While there are planned parks outside of the API, there are no existing or planned parks or wildlife or waterfowl refuges located within the API.

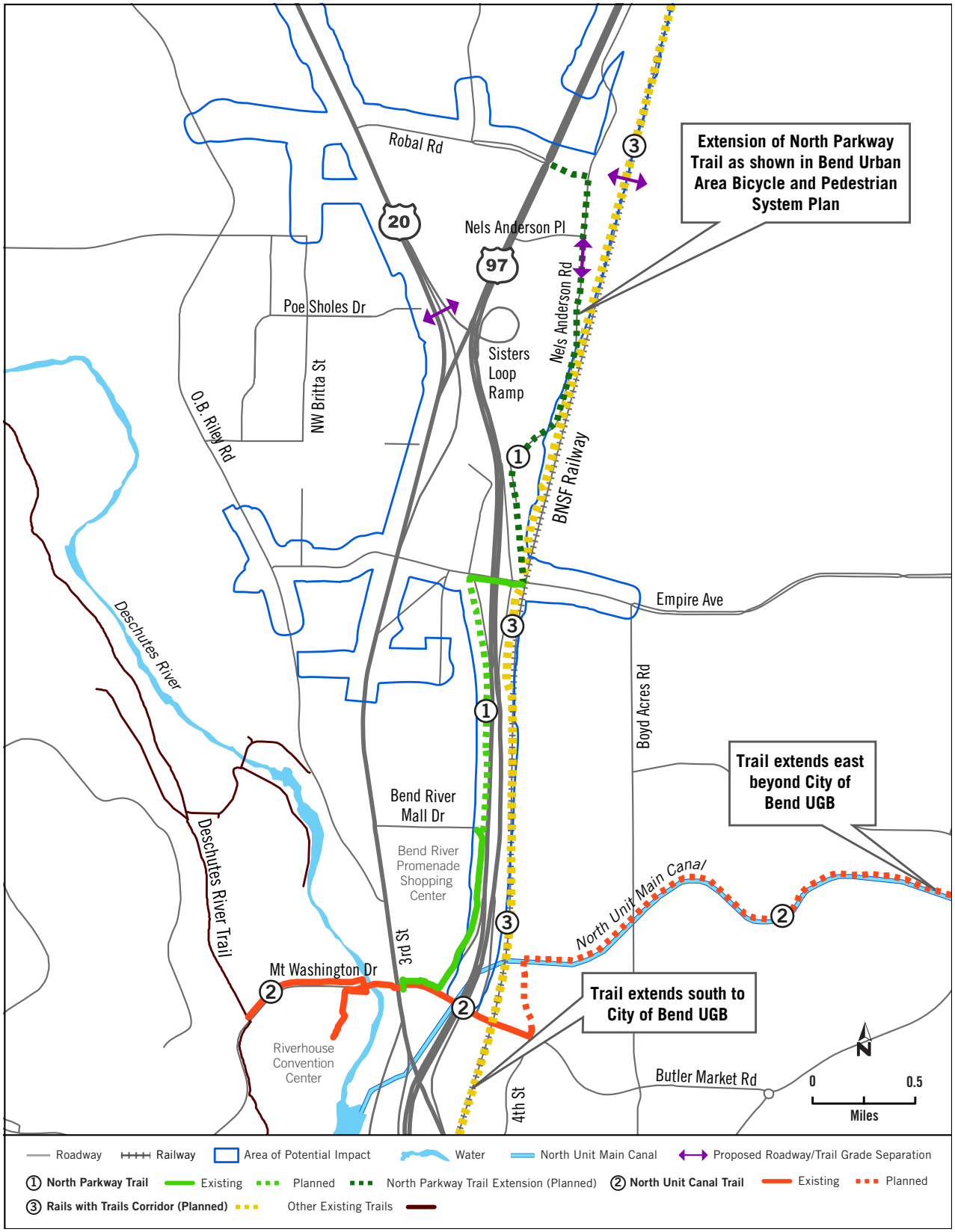
The 2010 Bend Park and Recreation District Trails Atlas identifies three trail facilities located partially or wholly within the API as shown on Exhibit 3-61A FEIS and Exhibit 3-61B FEIS and described below. The Bend Urban Area Plan Bicycle and Pedestrian System Plan, a component of the Bend Urban Area Transportation System Plan (as amended in 2014), also identifies these same trail facilities. The alignment, status, ownership, and funding of planned and existing trails was verified with the Bend Park and Recreation District and the City of Bend in June 2014.

Exhibit 3-61: *Existing and Planned Trail Facilities*



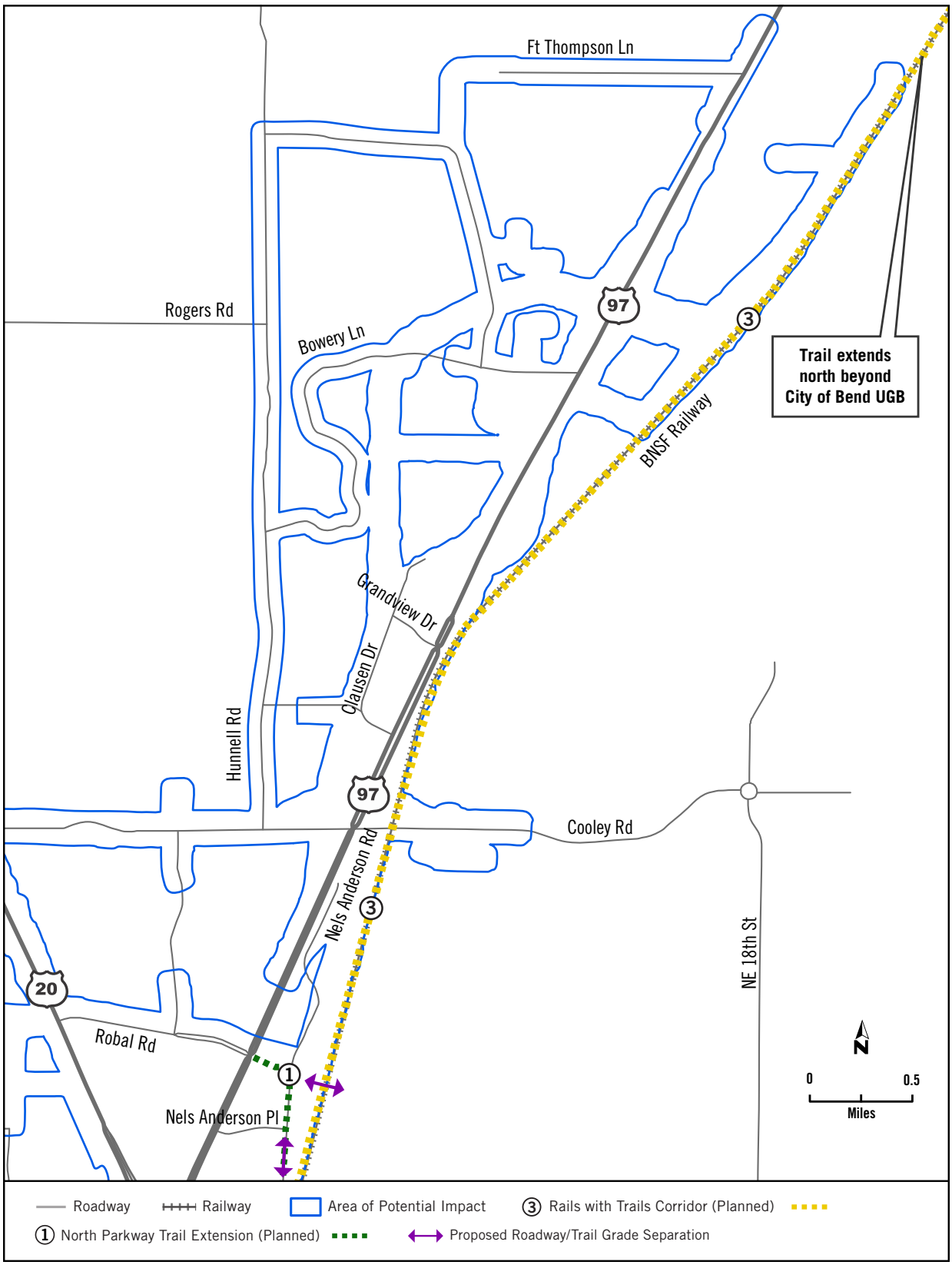
Note: The information in this exhibit has been updated for the Final EIS. Please see Exhibit 3-61A FEIS and Exhibit 3-61B FEIS.

Exhibit 3-61A FEIS: *Existing and Planned Trail Facilities in the API South of Robal Road*



Note: This revised exhibit provides updated trail alignments shown in the 2010 Bend Park and Recreation District Trails Atlas and the Bend Urban Area Plan Bicycle and Pedestrian System Plan.

Exhibit 3-61B FEIS: *Existing and Planned Trail Facilities in the API North of Robal Road*



Note: This revised exhibit provides updated trail alignments shown in the 2010 Bend Park and Recreation District Trails Atlas and the Bend Urban Area Plan Bicycle and Pedestrian System Plan.

The North Parkway Trail (#1 on Exhibit 3-61A FEIS and Exhibit 3-61B FEIS), is a primary trail that would provide a connection on the west side of US 97 from Butler Market Road north to Empire Avenue. The southern end of the trail connects to the North Unit Canal Trail, and the north end would connect to the planned Rails with Trails Corridor. Portions of the trail exist while others are planned as described below.

The North Parkway Trail begins on an existing sidewalk on Butler Market Road connecting from 3rd Street to the eastern side of the Bend River Promenade shopping center, where an existing paved trail segment in ODOT right of way and a public easement on private property continues north to Bend River Mall Drive adjacent to the US 97 southbound off-ramp for the Butler Market Road interchange. The trail is planned to continue in ODOT right of way on the west side of US 97 north to Empire Avenue adjacent to the southbound US 97 on-ramp from the Empire Avenue interchange. Along Empire Avenue, there is an existing trail segment that uses the sidewalk located in the public right of way east to the BNSF Railway, where it would connect to the Rails with Trails Corridor (#3 on Exhibits 3-61A FEIS and 3-61B FEIS).

The City of Bend's Bend Urban Area Plan Bicycle and Pedestrian System Plan (as amended in 2014) shows a planned trail segment extending the North Parkway Trail to the north on the east side of US 97 by way of the US 97 northbound on-ramp at Empire Avenue to Nels Anderson Road to Robal Road where it would extend west to the intersection with US 97. There is a proposed grade separation for this trail segment near the intersection of Nels Anderson Road and Nels Anderson Place, as shown in Exhibit 3-61A FEIS. As noted in the Transportation System Plan the grade separation represents a general conceptual location that would require further detailed analysis to determine the specific location and type of facility.

The existing segments of the North Parkway Trail total approximately one-half mile in length. Upon completion, the North Parkway Trail would be approximately 1 mile in length as mapped by the Bend Park and Recreation District. It would be approximately 2 miles in length as mapped in the Bend Urban Area Plan Bicycle and Pedestrian System Plan. The Bend Park and Recreation District's 2015-2019 Five Year Capital Improvement Plan does not specifically identify any funding for completion of the North Parkway Trail, although it does identify $150,000 in funding for miscellaneous trail system improvements that can be applied anywhere in the district as needs or opportunities arise. The City of Bend does not have any other identified funding for this trail.

The build alternatives would have no impact on the existing portions of the North Parkway Trail, and the planned portions are mere

expressions of interest with no identified funding and no land ownership by the City of Bend and/or Bend Park and Recreation District. Therefore no further analysis of this trail under Section 4(f) is required.

The North Unit Canal Trail (shown as #2 on Exhibit 3-61A FEIS) crosses the southern end of the API. Portions of this trail exist, while others are still planned. The trail begins west of the API with an existing connector trail segment on sidewalks and bicycle lanes in the public right of way on Mt. Washington Drive, connecting to the existing sidewalks and bicycle lanes in public right of way along Butler Market Road, crossing through the API, to NE 4th Street east of US 97. There is an existing connector trail extension south located in a public easement on private property that connects into the Riverhouse Convention Center. A planned connector trail segment would extend north across private property from the intersection of NE 4th Street and Butler Market Road to the North Unit Main Canal, at which point the trail is planned to parallel the canal on private property beyond the City of Bend urban growth boundary as a primary trail. There are two segments of this primary trail east of the API that already exist. The existing trail segments total approximately 2 miles in length, and the total trail length upon completion would be approximately 4 miles.

Bend Park and Recreation District would likely take the lead on developing and maintaining the planned portions of the North Unit Canal trail. The Bend Park and Recreation District's 2015-2019 Five Year Capital Improvement Plan does not specifically identify any funding for completion of the planned trail segments, although it does identify $150,000 in funding for miscellaneous trail system improvements that can be applied anywhere in the district as needs or opportunities arise. The City of Bend does not have any other identified funding for this trail.

The build alternatives would have no impact on the existing portions of the North Unit Canal Trail, and the planned portions are mere expressions of interest with no identified funding and no land ownership by the City of Bend and/or Bend Park and Recreation District. Therefore no further analysis of this trail under Section 4(f) is required.

The Rails with Trails Corridor (#3 on Exhibit 3-61A FEIS and Exhibit 3-61B FEIS) is a planned primary trail along the BNSF Railway in the eastern portion of the API. This planned trail facility would extend from north of the City of Bend urban growth boundary near Fort Thompson Lane through the length of the API to the southern limits of the urban growth boundary. The trail would be located within the active BNSF Railway right of way on the east side of US 97.

Approximately 10 trains per day travel through this area. To-date, no property or easements have been acquired from the BNSF Railway by the Bend Park and Recreation District or the City of Bend for construction of the trail. The trail would be nearly 11 miles in length upon completion.

The Bend Urban Area Transportation System Plan acknowledges that there could be problematic sections of the Rails with Trails Corridor due to specific railroad operational requirements and that grade-separated crossings could present difficulties for joint trail and rail operations. The plan calls for further discussion and planning with the BNSF Railway to investigate the feasibility of this conceptual trail corridor.

Bend Park and Recreation District would likely take the lead on developing and maintaining this planned trail facility. The Bend Park and Recreation District's 2015-2019 Five Year Capital Improvement Plan does not specifically identify any funding for development of this planned trail, although it does identify $150,000 in funding for miscellaneous trail system improvements that can be applied anywhere in the district as needs or opportunities arise. The City of Bend does not have any other identified funding for this trail.

The Rails with Trails Corridor is a mere expression of interest with no identified funding and no land ownership by the City of Bend and/or Bend Park and Recreation District. Very little coordination with the BNSF Railway has occurred regarding the potential viability of this trail. Therefore no further analysis of this trail under Section 4(f) is required.

The City of Bend's Bend Urban Area Plan Bicycle and Pedestrian System Plan also shows two additional proposed major roadway and trail grade separations in the API – one east of Robal Road over the BNSF Railway and one across US 20 near Poe Sholes Drive, as shown in Exhibit 3-61A FEIS. As noted in the Transportation System Plan the grade separations represent general conceptual locations that would require further detailed analysis to determine the specific location and type of facilities.

Section 6(f)

There are no properties in the API that were acquired or developed with Land and Water Conservation Fund funds, and therefore, there are no properties that are subject to Section 6(f) (National Park Service 2010). ~~The Bend River Promenade is eligible for evaluation under Section 4(f). The "connector trail" and all other planned "primary trails" are exempt from Section 4(f) because they do or would occupy a transportation facility right of way or are or would be part of the~~

~~local transportation system and function primarily for transportation (CFR 774.13 Section 23). In addition, there are six historic properties that are listed or potentially eligible for listing on the National Register of Historic Places and therefore are subject to Section 4(f). Historic resources are described in Section 3.7 Historic Resources.~~

3.6.3 Environmental Consequences

No Build Alternative

With the No Build Alternative, there would be no change to existing or planned trails.

East DS1 Alternative

~~The East DS1 Alternative would not alter existing trails or prohibit construction of the planned trails. The portion of the planned north-south hard surface trail between Empire Avenue and Robal Road would need to be realigned as its conceptual alignment is shown along the existing US 97 facility and Nels Anderson Road. This planned trail could be realigned to the proposed 3rd Street to provide the same connection between Empire Avenue and Robal Road. No changes to other planned trails or the existing trails would occur.~~

The East DS1 Alternative would not convert any existing park or recreational facilities to right of way. It would not alter existing trails, but would require refinement of the conceptual alignments of two of the planned trail segments as described below. Although not required for a Section 4(f) evaluation, potential options for rerouting these conceptual trail alignments have been identified in consultation with the officials with jurisdiction, City of Bend and Bend Parks and Recreation, and are included the discussion below and associated exhibits.

The North Parkway Trail (#1 on Exhibits 3-61A FEIS and 3-61B FEIS), as identified by the Bend Park and Recreation District, would not be impacted by the East DS1 Alternative. As shown in Exhibit 3-61C FEIS, the existing sidewalks on Butler Market Road and Empire Avenue will remain in place, as would the trail segment located on the east side of the Bend River Promenade shopping center. Further the alternative would not require any changes to the planned trail alignment near the southbound US 97 on-ramp from Empire Avenue (Exhibit 3-61C FEIS).

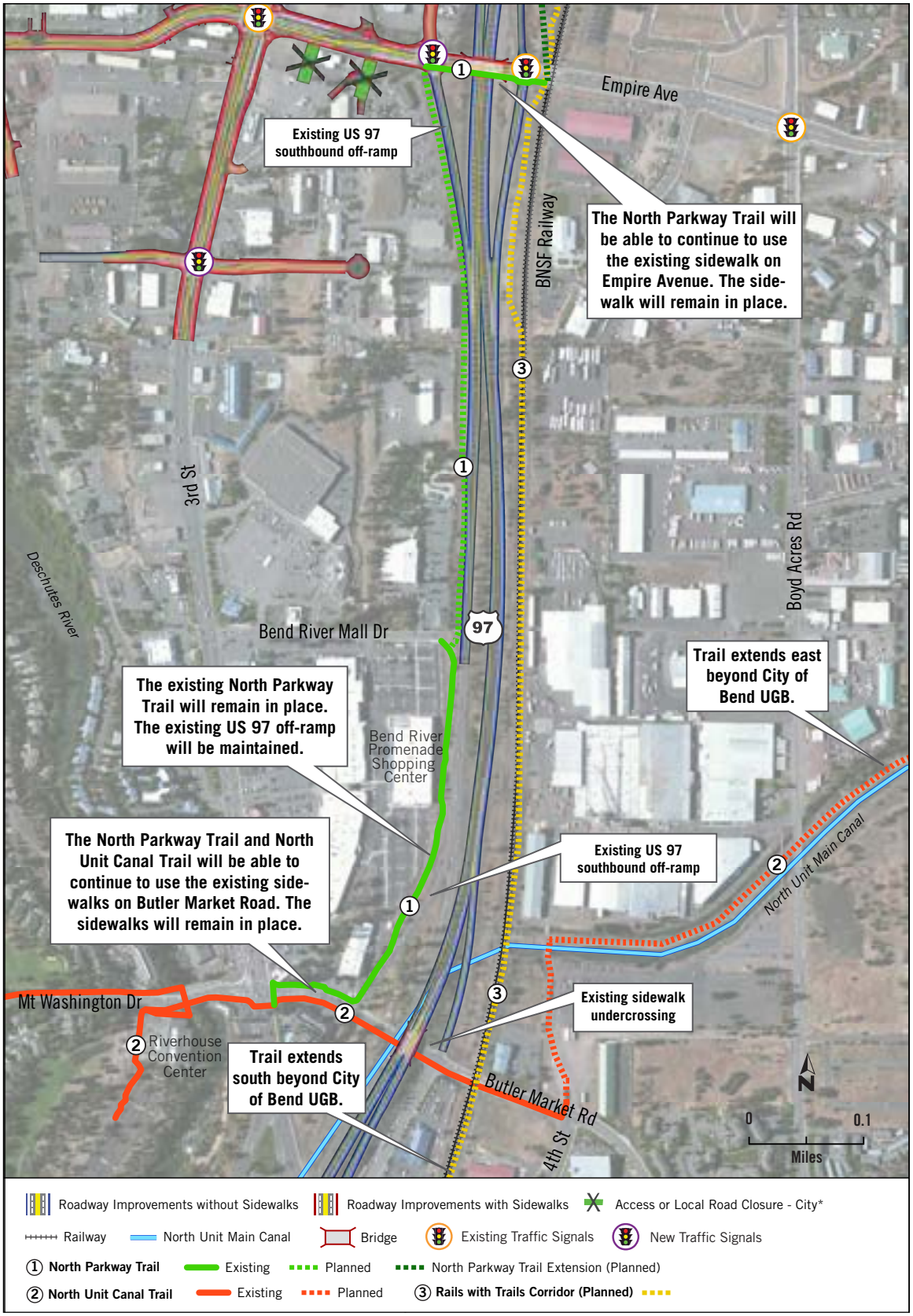
Key Point

Section 4(f) Evaluation

A Draft Section 4(f) Evaluation has been prepared for the project and is included in this document.

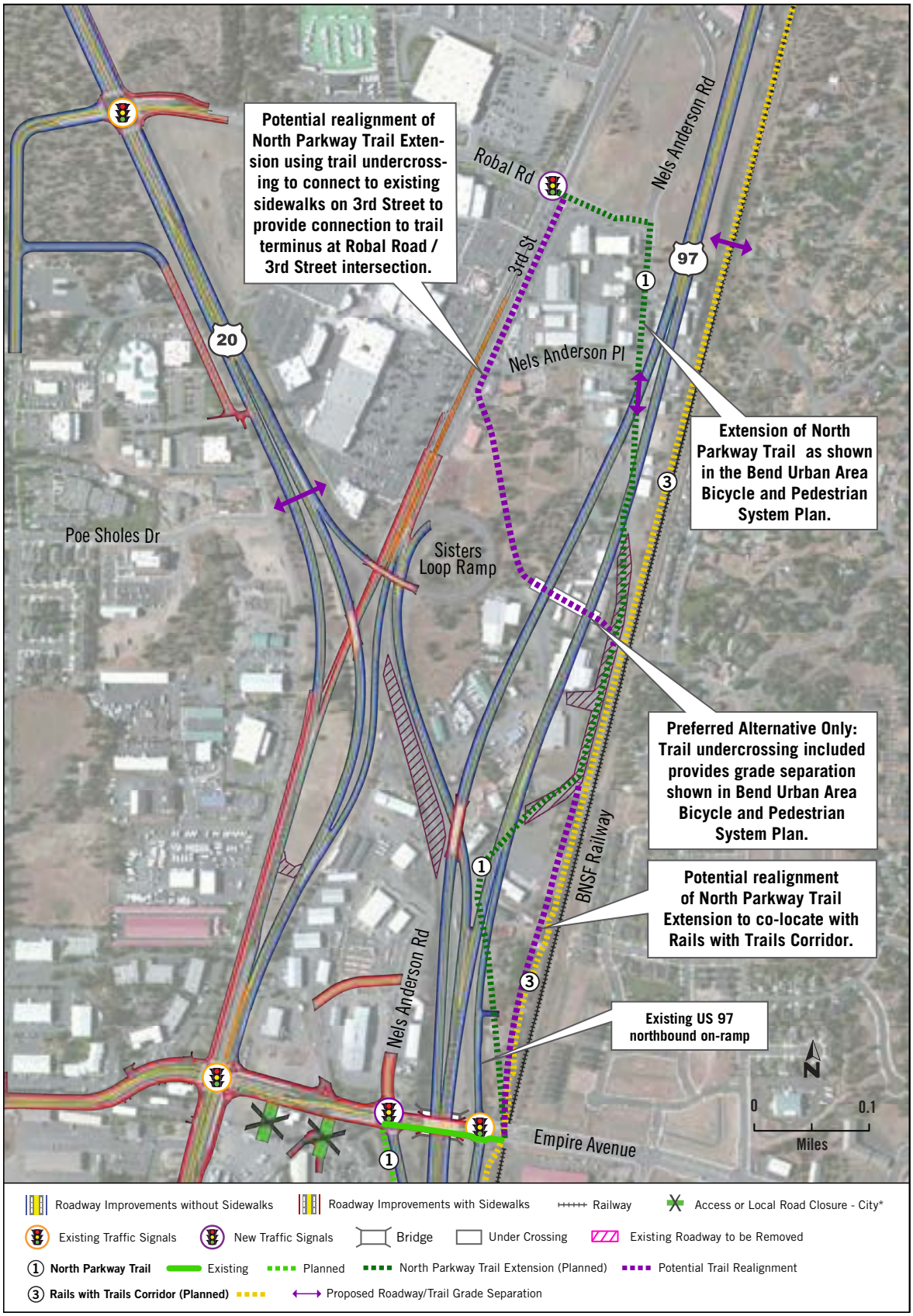
The Final Section 4(f) Evaluation has been prepared and is included in the Final EIS document.

Exhibit 3-61C FEIS: *Impacts to Trails South of Empire Avenue with the East DS1 and East DS2 Alternatives and the Preferred Alternative*



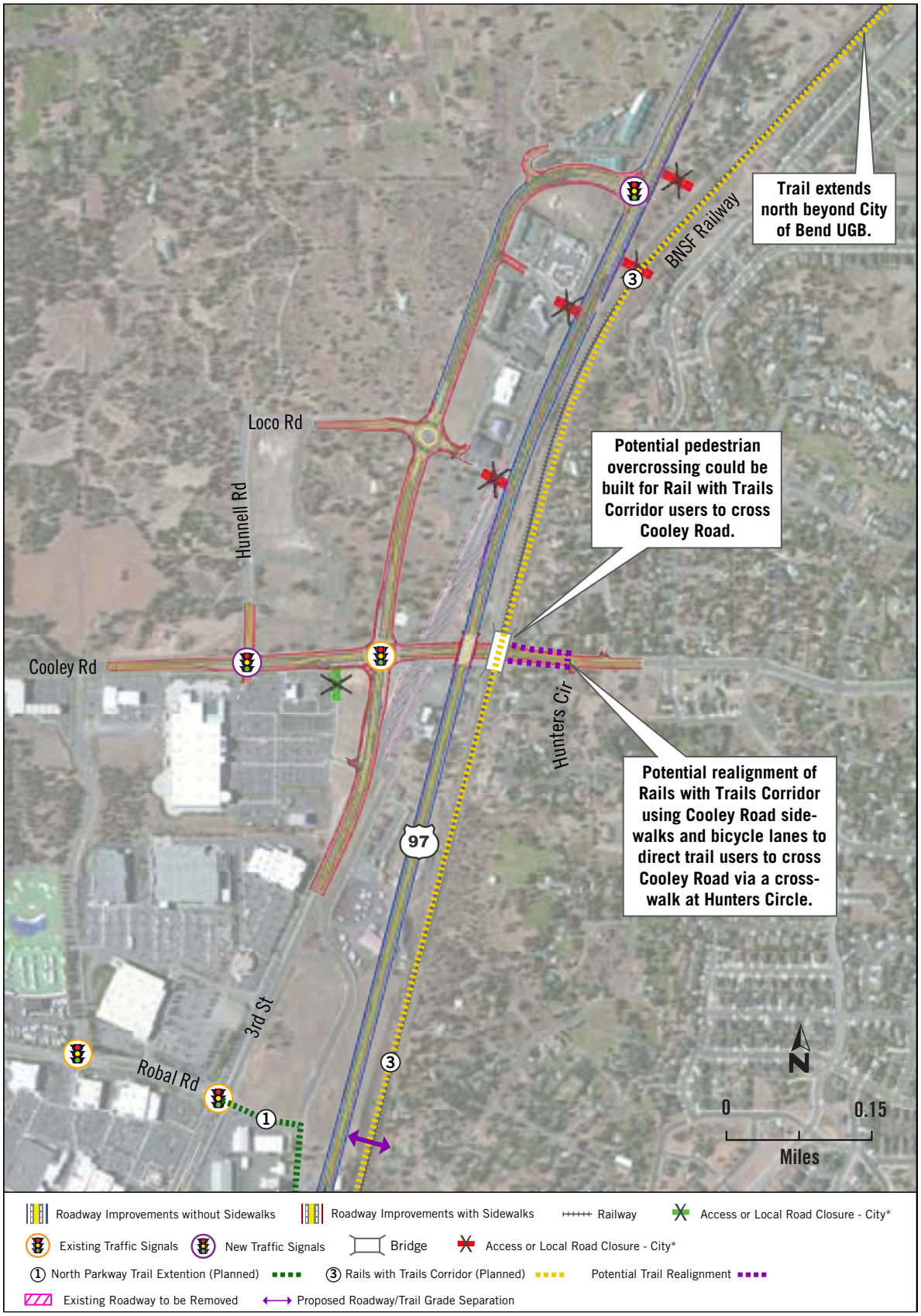
Note: This new exhibit provides greater detail on the impacts to planned and existing trail segments. These same impacts will occur with the Preferred Alternative and would have occurred with the East DS1 and East DS2 Alternatives. The proposed design of roadway improvements shown in this exhibit reflects the Preferred Alternative.

Exhibit 3-61D FEIS: *Impacts to Trails Between Empire Avenue and Robal Road with the East DS1 and East DS2 Alternatives and the Preferred Alternative.*



Note: This new exhibit provides greater detail on the impacts to planned and existing trail segments. These same impacts will occur with the Preferred Alternative and would have occurred with the East DS1 and East DS2 Alternatives. The proposed design of roadway improvements and the trail undercrossing near the Sisters loop ramp shown in this exhibit reflect the Preferred Alternative.

Exhibit 3-61E FEIS: *Impacts to Trails North of Robal Road with the East DS1 and East DS2 Alternatives and the Preferred Alternative*



Note: This new exhibit provides greater detail on the impacts to planned and existing trail segments. These same impacts will occur with the Preferred Alternative and would have occurred with the East DS1 and East DS2 Alternatives. The proposed design of roadway improvements shown in this exhibit reflects the Preferred Alternative.

The extension of the North Parkway Trail from Empire Avenue to Robal Road, as identified in the Bend Urban Area Bicycle and Pedestrian System Plan, would need to be realigned, as shown in Exhibit 3-61D FEIS. The conceptual alignment of this trail is located along the existing northbound US 97 on-ramp from Empire Avenue and continues to Nels Anderson Road to Robal Road. Under the East DS1 Alternative, this segment of Nels Anderson Road would be removed and the new US 97 facility will be located through this area. Instead of following Nels Anderson Road north to Robal Road, the trail could potentially be realigned to be co-located with the Rails with Trails Corridor from Empire Avenue north, to then be routed west under the new US 97 facility to connect to the sidewalks on 3rd Street near the Sisters loop ramp, to then provide the same connection north to Robal Road. This conceptual trail alignment would still obtain the function of a north-south connection between Empire Avenue and Robal Road. ODOT would work with the City of Bend to provide the trail connection between Empire Avenue and Robal Road through this area, which would include a grade separated crossing under US 97.

The North Unit Canal Trail (#2 on Exhibit 3-61A FEIS) would not be impacted by the East DS1 Alternative. There would be no change to the existing sidewalk along Mt. Washington Drive and Butler Market Road where the existing portion of trail is located, as shown in Exhibit 3-61C FEIS. The East DS1 Alternative would not impact the proposed trail segments from Butler Market Road north to the North Unit Main Canal and paralleling the North Unit Main Canal to the east.

The alignment of the Rails with Trails Corridor (#3 on Exhibits 3-61A FEIS and 3-61B FEIS) is only conceptual at this time. The 2010 Bend Park and Recreation District Trails Atlas and the Bend Urban Area Bicycle and Pedestrian System Plan do not specify exactly where the trail would be located within the BNSF Railway right of way. The only change within the BNSF Railway right of way under the East DS1 Alternative would be construction of an undercrossing for Cooley Road to go under the railroad. The Rails with Trails Corridor alignment would need to be refined to retain its planned connectivity across Cooley Road, as shown in Exhibit 3-61E FEIS. At such a time that the trail is constructed in the future, Bend Parks and Recreation District and/or the City of Bend could construct a pedestrian crossing over Cooley Road or potentially route trail users to a crosswalk across Cooley Road at the intersection with Hunters Circle. As shown in Exhibits 3-61C FEIS and 3-61D FEIS, the East DS1 Alternative would have no impacts to the Rails with Trails Corridor elsewhere in the API.

Although the East DS1 Alternative would not include the roadway/trail grade separations shown in the City of Bend's Bend Urban Area Plan Bicycle and Pedestrian System Plan, it would provide grade separation of Cooley Road under the realigned portion of US 97 and the BNSF

Railway, and it would not preclude construction of grade separations at the identified conceptual locations in the future.

East DS2 Alternative

The impacts of the East DS2 Alternative to parks, recreational facilities, and trails would be the same as the East DS1 Alternative.

Preferred Alternative—East DS2 Modified Alternative

The impacts of the Preferred Alternative to parks, recreational facilities, and will be the same as described under the East DS1 and East DS2 Alternatives except as described below.

Realignment of the extension of the North Parkway Trail will be the same as described under the East DS1 Alternative, and as shown in Exhibit 3-61D FEIS. In order to facilitate this potential realignment, ODOT coordinated with the City of Bend to include construction of a trail crossing under US 97 near the Sisters loop ramp in the design of the Preferred Alternative, as shown in Exhibit 3-61D FEIS. At such a time that the North Parkway Trail extension is constructed in the future, this trail undercrossing will accommodate the movement of bicyclists and pedestrians. This roadway/trail grade separation provides the function of the proposed roadway/trail grade separation shown in the conceptual location near the intersection of Nels Anderson Place and Nels Anderson Road in the Bend Urban Area Bicycle and Pedestrian System Plan. ODOT will continue to work with the City of Bend to provide the trail connection between Empire Avenue and Robal Road.

For the realignment of the Rails with Trails Corridor across Cooley Road as shown on Exhibit 3-61E FEIS, the only difference from the East DS1 and East DS2 Alternatives is that Cooley Road will be 3 lanes wide instead of 5 lanes wide at Hunters Circle. This narrower cross-section would require a shorter crosswalk across Cooley Road.

The Preferred Alternative includes construction of three multi-use paths for pedestrians and bicyclists in the following locations:

- On the west side of US 20/3rd Street from Empire Avenue to the north to connect with Cascade Village Shopping Center (Exhibit 2-3 FEIS Maps 2 and 3)
- On the east side of US 20 from Robal Road to Cooley Road (Exhibit 2-3 FEIS Maps 4 and 5)
- On the east side of US 97 from approximately 500 feet south of the US 97/3rd Street signalized intersection to the Hilltop and Juniper mobile home parks (Exhibit 2-3 FEIS Map 7).

Sidewalks and bicycle lanes included in the Preferred Alternative are described in Section 3.1.3 and shown on Exhibit 2-3 FEIS.

Indirect Impacts

While the No Build Alternative would not alter planned or existing trails, indirect impacts as a result of future increased congestion and reduced mobility could influence pedestrian and bicycle travel patterns to trail facilities. These impacts are anticipated to be minimal.

The East DS1 and East DS2 Alternatives would reduce congestion and improve mobility and safety. Over time this would benefit pedestrian and bicycle mobility and safety along the existing and planned trails.

The indirect impacts resulting from the Preferred Alternative on parks and recreational facilities will be the same as the East DS1 and East DS2 Alternatives.

Construction Impacts

Potential impacts to users of existing trail facilities from construction of the East DS1 and East DS2 Alternatives would include equipment noise, vehicle and work light illumination, and air and dust emissions. These impacts could affect the experience of those using the trails and could deter pedestrians and bicyclists from using the existing trails during construction. It is not expected that construction impacts would preclude the use of existing trail facilities, access to trails, or continuity of trails, or temporarily occupy existing trail facilities during construction. Construction related impacts would decrease in intensity as the distance between construction and a particular trail increases. These impacts would be temporary and would likely vary as construction proceeds. Once construction is complete these impacts would end and no long-term impacts to trails related to construction would occur.

Construction impacts resulting from the Preferred Alternative on parks and recreational facilities will be the same as the East DS1 and East DS2 Alternatives.

Resources Evaluated Relative to the Requirements of Section 4(f)

~~The project alternatives were evaluated to determine if any use of Section 4(f) parks or recreational facilities, wildlife or waterfowl refuges would occur. This evaluation has determined that the following are Section 4(f) properties: the Bend River Promenade and the six historic properties. None of the Section 4(f) recreation properties would be used by the project alternatives; however, the build alternatives would require a use of the historic Nels Andersen House and cause a *de minimis* impact of the Oregon Trunk Railway and Swalley Canal. See the Draft Section 4(f) Evaluation and Section 3.7 Historic Resources for more information.~~

The project alternatives were evaluated to determine if any use of Section 4(f) parks or recreational facilities, wildlife or waterfowl

Definitions

Section 4(f) Property

Section 4(f) property refers to land that is subject to Section 4(f) of the Department of Transportation Act of 1966. This includes: publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of an historic site of national, state, or local significance that is included in or is eligible for inclusion in the National Register of Historic Places..

refuges would occur. The East DS1 Alternative, East DS2 Alternative, and Preferred Alternative will have no impact on the existing portions of the trails within the API, and the planned portions of trails are mere expressions of interest with no identified funding and no land ownership by the City of Bend and/or Bend Park and Recreation District. Therefore no further Section 4(f) analysis is required.

Resources Evaluated Relative to the Requirements of Section 6(f)

There are no properties in the API that were acquired or developed with Land and Water Conservation Fund funds; therefore, no properties are subject to Section 6(f) (National Park Service 2010).

3.6.4 Avoidance, Minimization, and/or Mitigation Measures Proposed in the Draft EIS

Construction Mitigation and Commitments

Avoidance Measures—The following measure could be taken to the extent practicable to avoid and minimize temporary adverse impacts to trails:

- Ensure that access and connectivity to all existing trail facilities is maintained during construction.

Mitigation for Long-Term Impacts

Minimization Measures—The East DS1 and East DS2 Alternatives have been designed to incorporate the following measure that would minimize adverse impacts to trails:

- The East DS1 and East DS2 Alternatives would make use of the existing US 97 facility, US 20, Clausen Drive, Cooley Road, Robal Road, and Empire Avenue. In addition, many of the proposed improvements would be located within the existing ODOT right of way, thereby minimizing the amount of land, including trails, needed for right of way acquisition.

Mitigation Measures—Because there would be no long-term impacts to the existing or planned trails, mitigation measures would not be required.

3.6.5 Avoidance, Minimization, and/or Mitigation Commitments Incorporated into the Preferred Alternative

ODOT makes the following commitments:

- Construction of a trail crossing under US 97 as shown in Exhibit 2-3 FEIS (Map 3) and Exhibit 3-61D FEIS to accommodate bicyclists and pedestrians on the planned extension of the North Parkway Trail between Empire Avenue and Robal Road.

3.7 Historic Resources

3.7.1 Regulatory Setting

The National Historic Preservation Act of 1966, as amended, sets forth national policy and procedures regarding historic properties, defined as districts, sites, buildings, structures, and objects included in, or eligible for, the National Register of Historic Places. Section 106 of National Historic Preservation Act requires federal agencies to take into account the effects of their undertakings on such properties and to allow the Advisory Council on Historic Preservation the opportunity to comment on those undertakings, following regulations issued by the Advisory Council on Historic Preservation (36 CFR 800).

Archaeological resources are also protected under ORS 390.235 which requires a permit for excavation and/or exploration of archaeological resources on public lands and OAR 736-051-0080 and -0090 for protection of archaeological resources on public and private lands. In addition to the archaeological protections, ORS 97.740 was established to protect Indian graves and sacred objects.

Section 4(f) of the Department of Transportation Act of 1966, codified in federal law at 49 USC 303, declares that "it is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites."

Section 4(f) specifies that the Secretary of Transportation may approve a transportation program or project requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of an historic site of national, state, or local significance (as determined by the federal, state, or local officials having jurisdiction over the park, area, refuge, or site) only if:

- there is no prudent and feasible alternative to using that land; and
- the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use; or
- the Administration determines that the use of the property, including any mitigation measures and all possible planning to minimize harm reduces the impact on the Section 4(f) property to a *de minimis* impact as defined in 23 CFR 774.117.

Section 4(f) further requires consultation with the Department of the Interior and, as appropriate, the involved offices of the Departments of Agriculture and Housing and Urban Development in developing transportation projects and programs that use lands protected by Section 4(f). If National Register of Historic Places

Definition

National Register Criteria for Evaluation

Criteria A-D are applied to evaluate a property's eligibility for listing in the National Register of Historic Places. Historic districts, sites, buildings, structures, and objects that possess integrity must meet at least one of the qualifying criteria to be determined eligible for listing in the National Register of Historic Places:

- Criterion A: It is associated with events that have made a significant contribution to the broad patterns of our history
- Criterion B: It is associated with the lives of persons significant in our past
- Criterion C: It embodies a distinctive characteristic of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction
- Criterion D: It has yielded, or may be likely to yield, information important in prehistory or history.

listed or eligible sites are involved, then coordination with the State Historic Preservation Officer or Tribal Historic Preservation Officer is also needed.

3.7.2 Affected Environment

More information: Additional detail on cultural resources is provided in the *Historic Resources Technical Report* (ODOT 2014g) and the *Archaeological Resources Technical Report* (ODOT 2014b). The *Historic Resources Technical Report* and the *Archaeological Resources Technical Report* are listed in Appendix K. The *Historic Resources Technical Report* is available in the document library of the project's website (www.us97solutions.org).

Historic and Archaeological Resource Identification Methods

Historic and archaeological resources were identified within an area of potential effect (APE). Historic resource impacts can occur within the APE, whereas impacts to archaeological resources are typically limited to areas where ground disturbing activities would occur. For the purposes of evaluating historic and archaeological resources, the combined study area is referenced as the APE, which is consistent with Section 106 of the National Historic Preservation Act.

Methods to identify significant historic and archaeological resources included a literature search of documents available at the Oregon State Historic Preservation Office as well as a search through documents held by the research team. The literature search informed the historic context for the APE, identified historic sites and provided insight for identification of other historic and/or archaeological sites. Further, a reconnaissance-level pedestrian survey was performed for historic resources in March 2010 and, for archaeological resources, in October 2009. Follow-up archaeological testing was performed from August to September 2010 to determine the significance of archaeological resources present within the APE.

All historic and archaeological surveys, testing, and evaluation conducted in 2009 and 2010 were based on the APE established in 2009. As design refinements were made subsequent to 2009, the APE changed accordingly. Some properties previously within the APE would no longer be directly affected by the proposed action, and other properties that were previously outside the APE would now be potentially affected. Thus, some of the properties within the current APE have changed since the surveys and follow-up testing occurred. New properties that were not previously in the APE established in 2009 have not been surveyed at the time of the Draft EIS publication. However, new surveys would be conducted as part of the Final EIS and the results of those surveys will be disclosed in the Final EIS. Any properties that cannot be accessed for surveys due to land owner's refusal to grant permission will be surveyed prior to construction when ODOT purchases right of way and takes ownership.

Since the publication of the Draft EIS, the APE changed again to reflect the refined design of the Preferred Alternative. In April 2013 an additional pedestrian survey for both historic and archaeological resources, was performed for the new areas within the APE. As a result of the historic pedestrian survey three additional built resources, constructed in or before 1965, were identified within the APE that required additional analysis to determine whether or not they were eligible for listing in the National Register of Historic Places. During the April 2013 pedestrian survey for archaeological resources, four additional resources were identified as needing further testing to determine eligibility for listing in the National Register of Historic Places and the boundary of a previously identified site was expanded. Testing for archaeological resources that were identified in April 2013 was also conducted.

Historic Resources

The arid landscape of the greater Bend area deterred many early settlers from the region until the mid to late twentieth century. In 1901, the Carey Act was adopted in Oregon. In accepting the Carey Act of 1894, the state allowed settlers to acquire 160 acres of what was formerly publicly-owned arid land if they agreed to irrigate 20 acres.

The adoption of the Carey Act in Oregon was felt immediately within the APE, as three canals were constructed within its boundaries during this significant period of irrigation expansion in the early twentieth century: the Swalley Main Canal, the North Unit Main Canal, and the North/Pilot Butte Canal. These three canals are eligible resources not only for their historical importance within the Bend and Central Oregon community, but also for their visual presence. Many of the residential developments platted in or near the APE within the last 40 years have taken into account their relationship with nearby canals, using them as landscape features that determine bridge placement, road placement, and the siting of houses on subdivided parcels.

The Final EIS corrects information regarding the Section 106 eligibility of the canals. Within the APE the open, unpiped, portions of the Swalley Main Canal and the associated Swalley Riley Lateral and Swalley Rogers Lateral, the North Unit Main Canal, and the North/Pilot Butte Canal are still historically eligible resources because they retain integrity of location, design, materials, workmanship, feeling and association. Due to the loss of historic integrity, the piped portions of the Swalley Main Canal, and the associated Swalley Riley Lateral and Swalley Rogers Lateral, within the APE no longer contribute to the significance of the resource.

The expansive growth of Bend over the last three to four decades resulted in the construction of modern industrial and commercial

Key Point

Historic Milestones

- Pre-1860s: Native American occupation and settlement
- 1860s: Beginning of Euroamerican settlement in Central Oregon
- 1901: Carey Act adopted in Oregon
- 1911: Oregon Trunk Railway completed
- Early 1900s: Irrigation system expansion
- Mid-1900s: Substantial growth in Bend and Central Oregon begins

Definition

Historical Significance

The significance of a property refers to its ability to meet one of the four National Register of Historical Places criteria for evaluation. Integrity is the ability of the property to convey this significance through location, design, setting, materials, workmanship, feeling, and association. Historic properties are significant because they meet these criteria and have integrity.

buildings along US 97 and US 20, as well as in between the two highways near Robal Road and Cooley Road. Residential buildings range from mid-century vernacular houses situated on large parcels formerly associated with ranching activities, to housing developments platted in the 1960s, 1970s, and 1980s that contain much smaller lots and modern buildings, but attempt to incorporate natural features into the landscape of the development. Three mobile home parks are situated in the northern portion of the APE, which were established from the late 1960s onward and do not date within the 45-year timeframe set for evaluating historic buildings and structures for this project.

Forty historic resources were identified within the APE that were constructed in or before 1965, including bridges, homes, canals, and a railway. Of the 40 resources, 5 meet eligibility criteria for listing in the National Register of Historic Places (Johnson 2011) and 1 is already listed; these 6 resources are shown in Exhibit 3-62A FEIS. The six historic resources are considered historically significant because they retain sufficient integrity and historical or architectural/engineering significance; Section 4(f) applies to all six of these historic resources. A brief description of each eligible resource is provided:

- **Oregon Trunk Railway—**The Oregon Trunk Railway, now a part of a BNSF Railway line that runs from Keddie, California to Wishram, Washington, is historically significant because it contributed to the economic development of Bend and Central Oregon during the twentieth century. The railway was completed on October 5, 1911 and expanded shipping capabilities for stock ranchers while creating new opportunities for large-scale producers of wood products, such as the Shevlin-Hixon Lumber Company and the Brooks-Scanlon Lumber Company, which established large and productive mills in Bend which attracted thousands of new residents (Tucker 2002). The railway is also notable for its association with the rivalry between railroad tycoons James J. Hill and Edward H. Harriman, who, in competition with one another, laid track through the Deschutes River Canyon to access Central Oregon from the Columbia River Gorge in 1909.
- **North Unit Main Canal—**The North Unit Main Canal, first conceived in 1904, was dedicated in May 1946. The 65-mile canal takes its name from an early north-south division of the Deschutes River Basin. The South Unit, located along the upper Deschutes River within Deschutes County, was the first to be developed, while the North Unit, located south of the Crooked River Canyon in Jefferson County, was developed second (ODOT 1998a). One reason the canal is a significant historic resource is

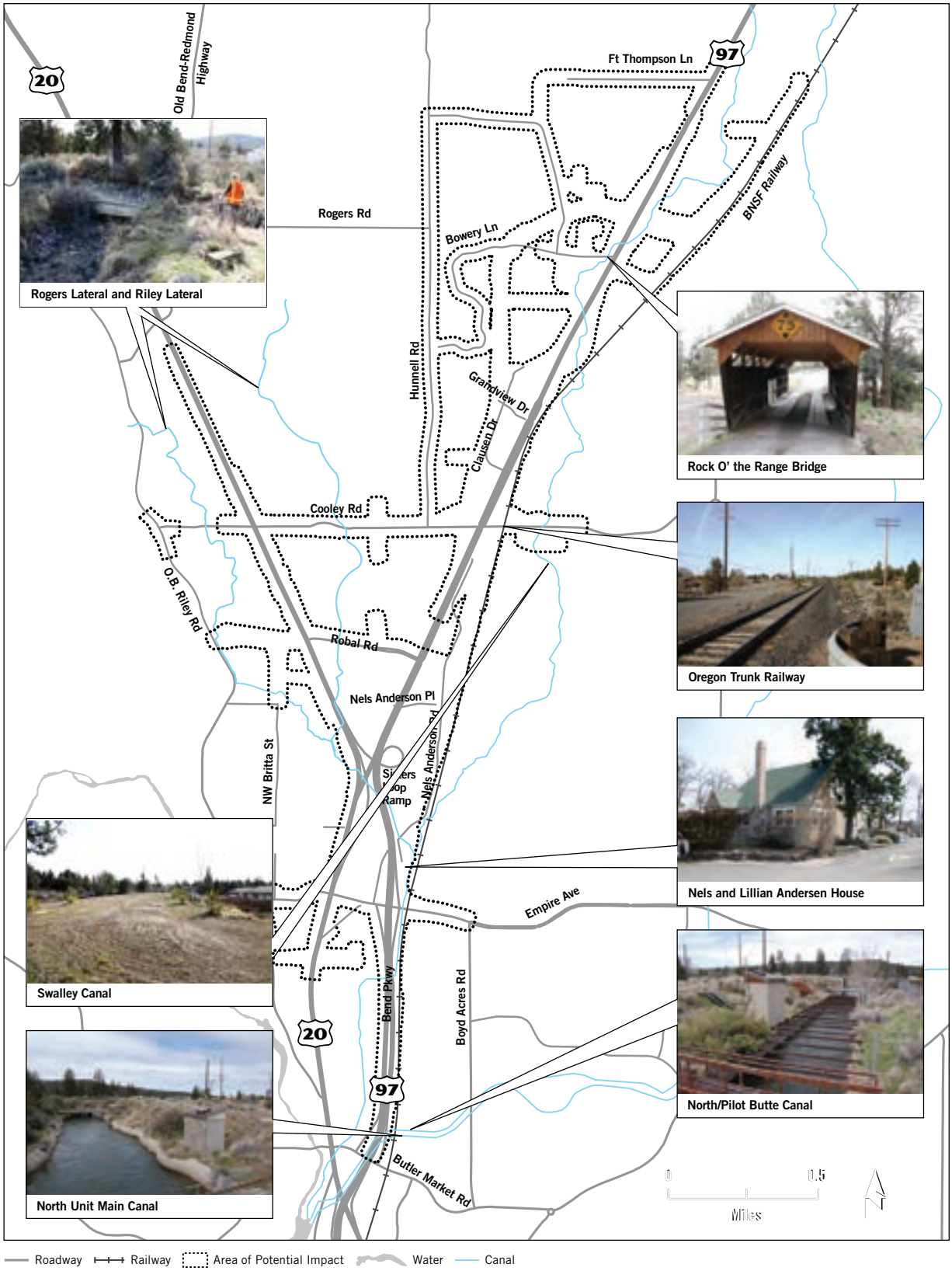
because construction of the canal marked the establishment of the earliest known irrigation system in Jefferson County. Another reason why it is historically significant is because of how and by whom the canal was constructed. Although plans for the canal had been contemplated since the turn of the twentieth century, by the 1920s the North Unit Main Canal project still laid dormant due to contested bonds. In 1938, a 600-man crew from the Civilian Conservation Corps, one of the largest known to have worked in the American West, initiated construction of the canal. The 600-man crew, while able to make incredible progress on the construction of the canal, was delayed when available laborers became scarce during World War II. The project was completed by the labor of Mennonites and other conscientious objectors who did not participate in fighting during the war.

- **North/Pilot Butte Canal—**The North/Pilot Butte Canal was built in conjunction with the North Canal Dam between 1910 and 1912. The North Canal, which is 1.4 miles long, collects water diverted from the North Canal Dam and carries it to the Pilot Butte Canal to irrigate the Redmond area. One reason the North/Pilot Butte Canal is historically significant is because it is associated with the North Canal Dam diversion project, which constructed the earliest and largest irrigation dam on the Deschutes River in Bend. Another reason it is historically significant is the canal's association with the founding of Redmond and the development of rural communities and agriculture throughout the immediate region (ODOT 1998a and 1998b).
- **Swalley Main Canal—** The Swalley Main Canal was constructed in approximately 1910 and is widely considered to be one of the earliest known private irrigation projects completed in Central Oregon after the passage of the Carey Act of 1894 (Smith 1991). George W. and C. B. Swalley, early Bend ranchers and brothers, first submitted permits to divert water from the Deschutes River on their land in 1892. By 1899 the Deschutes Reclamation and Irrigation Company had been formed, and construction of the canal began soon afterward. It would take approximately ten years to finish the construction of the canal; water would not flow through the canal until the North Canal Dam was completed in 1912. By 1920, the canal was irrigating 3,000 acres and had sold 5,000 acres of water rights. In the early- to mid-twentieth century two main laterals, the Swalley Rogers Lateral and Swalley Riley Lateral, were constructed to the west of the Swalley Main Canal in the APE. Only the open, unpiped portions of the Swalley Main Canal and the associated Swalley Rogers Lateral and Swalley Riley Lateral are historically significant because they expanded

irrigation and helped to encourage development into the area and because these open, unpiped portions still retain integrity of location, design, materials, workmanship, feeling and association. The Swalley Main Canal is also significant for its association with Nels Andersen, a prominent dairy farmer in the area who was instrumental in making the Swalley Main Canal profitable in the 1920s. In 1994, the company decided to incorporate as the Swalley Irrigation District and efforts are currently underway to pipe the canal underground, but its historic alignment will be preserved. Due to this loss of historic integrity, the piped portions of the Swalley Main Canal, Swalley Riley Lateral, and Swalley Rogers Lateral within the APE no longer contribute to the significance of the overall resource, which extends beyond the current APE and had been previously determined eligible for listing in the National Register of Historic Places. In 2011, the State Historic Preservation Officer concurred with the determination that only the open, unpiped portions of the Swalley Main Canal and the Swalley Riley and Swalley Rogers Laterals are eligible for listing in the National Register of Historic Places.

- **Nels and Lillian Andersen House—**The Nels and Lillian Andersen House was constructed in 1929 in the Tudor style using locally produced building materials. Nels Andersen immigrated to the United States from Denmark in 1906. By 1915, he had made his way to modern-day Deschutes County and was deeded 160 acres of land in or near the APE (Kennedy 2008). Nels used these first 160 acres to establish the Lilly Dairy. Nels also served as President of the Deschutes Reclamation Company in 1921 and later on its board. In simultaneously taking on these two tasks, Nels became a well-respected member of the Bend-area community. The house is significant for its association with Nels Andersen and for being one of few remaining examples of English Tudor residential architecture in the area.
- **Rock O' the Range Bridge—**William Bowers, a landowner with extensive holdings near the present-day intersection of Bowery Lane and US 97, decided in the 1960s to create a subdivision of semi-rural parcels on a portion of his land. The subdivision lacked direct access to US 97, and was otherwise accessed by two-track and county roads. To complete the connection, a bridge crossing was required over the Swalley Main Canal, which was an open waterway at that time. The Rock O' the Range Bridge was listed in the National Register of Historic Places in 1979 as part of a thematic nomination for covered bridges in Oregon, although it is described as unconventional because of its late build date and method of construction, which does not use a standard truss design.

Exhibit 3-62A FEIS: Historic Resources Eligible for or Currently Listed in the National Register of Historic Places



Note: This revised exhibit includes corrections to the naming of the Swalley Rogers Lateral and the Swalley Riley Lateral; these laterals are being shown on this map because they are an associated feature of the Swalley Main Canal. This revised exhibit also includes a corrected photograph of the Swalley Main Canal Pipeline, which is piped through the project area, and a correction to the spelling of the Rock O' the Range Bridge.

Definitions

High Probability Area

High probability areas are areas where the landform, soil conditions, and in some cases, the presence of surface artifacts are considered to be likely locations to find intact subsurface archaeological deposits.

Artifact

An artifact is any object made or modified by a human. In archaeology, an artifact is an object recovered by some archaeological endeavor, which may have a cultural interest. Examples include stone tools such as projectile points, pottery vessels, metal objects such as guns, and items of personal adornment such as buttons, jewelry and clothing. Other examples include bone that show signs of human modification, fire cracked rocks from a hearth, or plant material used for food.

During the additional surveys conducted in April 2013 to account for the APE modifications from identifying the Preferred Alternative, three resources constructed in or before 1965 were identified within the APE that required additional evaluation. Additional evaluation determined that none of these resources meet eligibility criteria for listing in the National Register of Historic Places.

In 2010, the Swalley Irrigation District completed a project that piped five miles of the Swalley Main Canal and segments of the Swalley Rogers Lateral and the Swalley Riley Lateral, portions of which are in the APE. Within the APE the open, unpiped, portions of the three canals are still historically eligible resources because they retain integrity of location, design, materials, workmanship, feeling and association. Due to the loss of historic integrity, the piped portions of the Swalley Main Canal, Swalley Riley Lateral, and Swalley Rogers Lateral within the APE no longer contribute to the significance of the resource.

Archaeological Resources

During the course of literature search, pedestrian surveys, and additional site tests, eight archaeological resource sites and four high probability areas were identified in areas where ground disturbing activities would occur. During site testing conducted in August 2010, the four high probability areas were investigated and did not yield significant archaeological artifacts. The eight archaeological resource sites primarily contain historic-period artifacts and comprise trash dumps, historic rock alignments, and amethyst glass fragments. The preliminary determination for these eight sites is that they are not eligible for listing in the National Register of Historic Places. The State Historic Preservation Office (SHPO) will review these preliminary determinations; documentation of SHPO concurrence will be included in the Final EIS. Some areas within the APE have not yet been surveyed due to land owners not granting permission for surveys and design changes to the alternatives that have occurred since the surveys were conducted. Upon gaining right of entry ODOT would survey all remaining areas prior to construction.

Within the APE, which has been revised since the Draft EIS to reflect the design of the Preferred Alternative, a total of ten archaeological resources were identified. One additional resource was identified and recommended as eligible to the National Register of Historic Places. Though the property this one resource is located on will be landlocked by the Preferred Alternative the site will be avoided by direct project impacts.

Since the publication of the Draft EIS SHPO has reviewed the ten archaeological determinations for the sites that are not eligible and the

one site recommended as eligible but will be avoided by the Preferred Alternative. SHPO provided their concurrence for these eleven sites on September 27, 2013. This Section 106 documentation is included in Appendix D of this Final EIS.

Portions of eight additional parcels, with a total area of approximately 1.5 acres within the APE, will have ground disturbance from the construction of the Preferred Alternative but have not yet been surveyed for archaeological resources because land owners have not granted permission for these surveys. The likelihood of archaeological material present on these portions of the eight unsurveyed parcels within the APE is low to medium. These parcels will be surveyed prior to construction after ODOT purchases right of way and takes ownership. If archaeological resources are present they will complete Section 106 evaluation through ODOT coordination with FHWA and SHPO.

3.7.3 Environmental Consequences

Key Point

The proposed action would have:

- **Adverse effect** on the Nels and Lillian Andersen House
- **No adverse effect** on the Oregon Trunk Railway, Swalley Main Canal, North Unit Main Canal, North/Pilot Butte Canal, and Rock O' the Range Bridge.

No Build Alternative

The No Build Alternative would have no effect on historic or archaeological resources because the proposed action would not be constructed.

East DS1 Alternative

Historic Resources—In compliance with Section 106 of the National Historic Preservation Act of 1966, FHWA and ODOT have coordinated with the Oregon State Historic Preservation Office regarding the proposed action's effects to historic resources (May 23, 2011, June 17, 2011, and June 29, 2011). Findings indicate one of the six significant historic resources, the Nels and Lillian Andersen House, would be adversely affected by the East DS1 Alternative, while the remaining five resources would have no adverse effect.

- **Nels and Lillian Andersen House**—one highway ramp would be constructed across the northwest corner of this property. As shown in Exhibit 3-62B FEIS, while these improvements would not traverse the area occupied by the house itself, other structures and vegetation on the property would be removed. Further, the remaining portion of the parcel containing the house would become landlocked without access to any roadways, which would likely require relocation or removal of the house for safety and liability reasons, resulting in an adverse effect.
- **Oregon Trunk Railway (now the BNSF Railway)**—an underpass would be constructed for Cooley Road at its existing at-grade crossing with the railway line. A new permanent easement (approximately 170 feet by 160 feet in size) from the BNSF Railway

would be obtained for the Cooley Road underpass, as depicted in Exhibit 3-62C FEIS. As shown on Exhibit 3-62C FEIS the railroad would remain intact along its existing alignment (over Cooley Road) and continue operations; thus, no adverse effect would result from obtaining the permanent easement.

- **Swalley** Main **Canal**— portions of the canal and its laterals are already or would be piped as a part of the proposed action, which would result in a no adverse effect

  The Final EIS updates the environmental consequences analysis for the East DS1 Alternative. The East DS1 Alternative would result in piping five small, open segments of the Swalley Rogers Lateral due to the widening and realignment of US 97 and US 20 in the area near the Sisters Loop Ramp, as shown in Exhibit 3-62D FEIS. These five segments are all located on existing ODOT right of way for US 97 or US 20; therefore, no new easements from the Swalley Irrigation District would be needed.

  The East DS1 Alternative would also lengthen the existing piped crossings of the Swalley Rogers Lateral at Robal Road and Cooley Road, as shown in Exhibit 3-70 FEIS in Section 3.11 of the Final EIS. At Robal Road and Cooley Road the roadway widening over the Swalley Rogers Lateral would require extending the existing culvert and piping of the Swalley Rogers Lateral and a new permanent easement.

  The East DS1 Alternative would also have one new crossing of a currently open portion of the Swalley Riley Lateral from the extension of Britta Street. At Britta Street the new crossing of the Swalley Riley Lateral and the new permanent easement (52 feet by 50 feet in size) that would be obtained from the Swalley Irrigation District, is shown in Exhibit 3-62E FEIS.

  These would be the only direct impacts to the National Register of Historic Places-eligible portions of the Swalley Main Canal and its associated laterals. Since this impact would not affect the character of unmodified segments outside of the APE, on June 17, 2011 SHPO concurred that no adverse effect would result. On June 11, 2014 SHPO amended their Section 106 finding of no adverse effect to the Swalley Main Canal and its associated laterals to account for the additional impacts to the Swalley Rogers Lateral that were identified after June 17, 2011.

- **North Unit Main Canal**—improvements to US 97 would be made where the canal is piped. All open portions of the canal would be avoided by the proposed action; thus, no adverse effect would occur (Exhibit 3-62F FEIS).

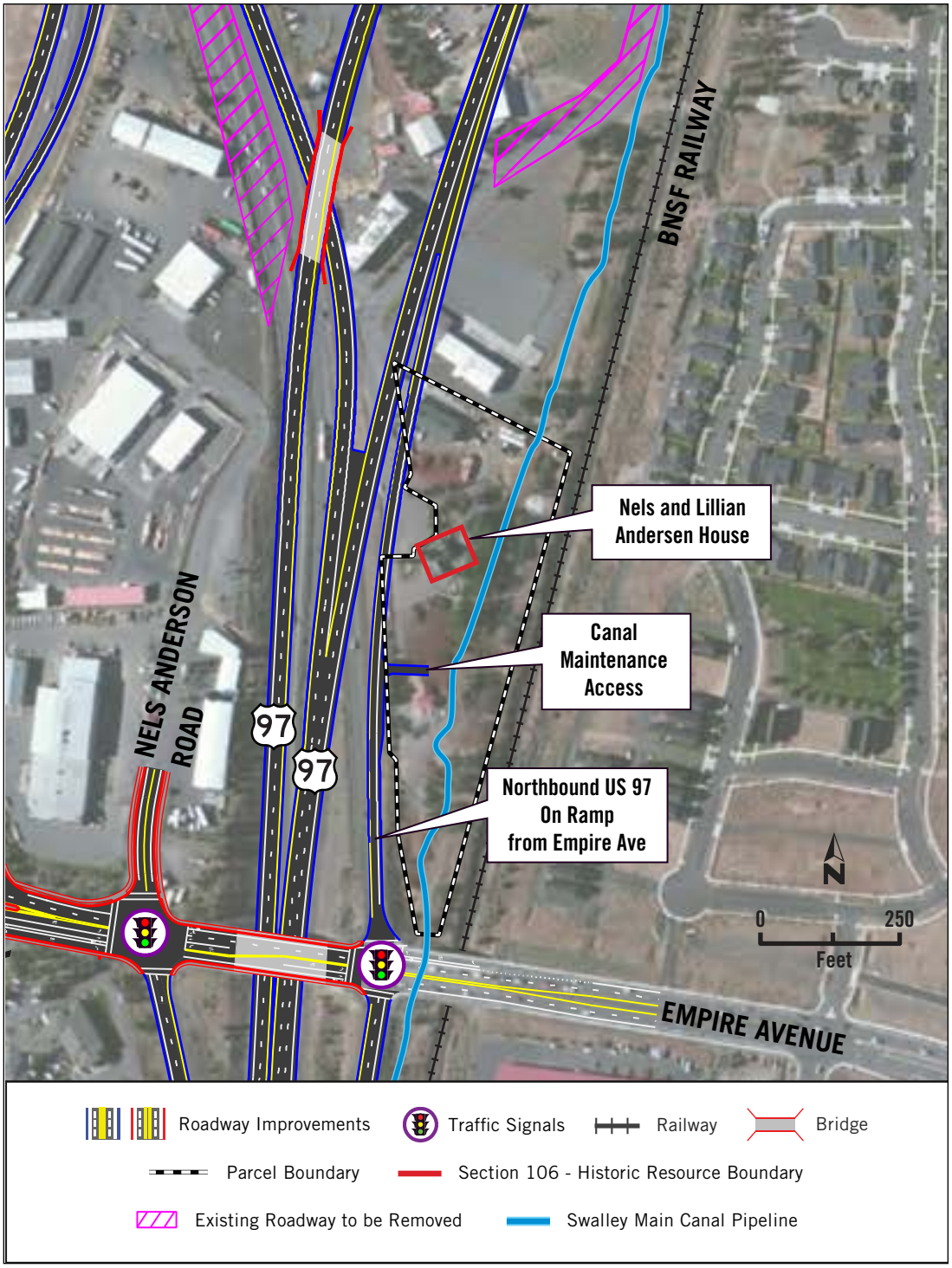
- **North/Pilot Butte Canal**—improvements to US 97 would be made where the canal is piped. All open portions of the canal would be avoided by the proposed action; thus, no adverse effect would occur (Exhibit 3-62F FEIS).
- **Rock O' the Range Bridge**—would be avoided. The bridge would not be moved or altered, and the ownership would not change. Although the bridge would no longer provide a connection between US 97 and Bowery Lane, no adverse effect would occur. The bridge could still be accessed by pedestrians and bicyclists and would not be physically affected by the proposed action.

On May 23, 2011 SHPO concurred with the findings that the Nels and Lillian Andersen House would be adversely affected by the East DS1 Alternative. On May 23, 2011 and June 17, 2011 SHPO concurred that the remaining five resources just discussed would have no adverse effect. On June 11, 2014 SHPO amended their Section 106 finding of no adverse effect to the Swalley Main Canal and its associated laterals to account for the additional impacts to the Swalley Rogers Lateral that were identified after June 17, 2011.

Archaeological Resources— Preliminary evaluations indicate no archaeological resources have been identified in the APE that are eligible for listing on the National Register of Historic Places; therefore, the East DS1 Alternative would not be anticipated to impact any eligible archaeological resources.

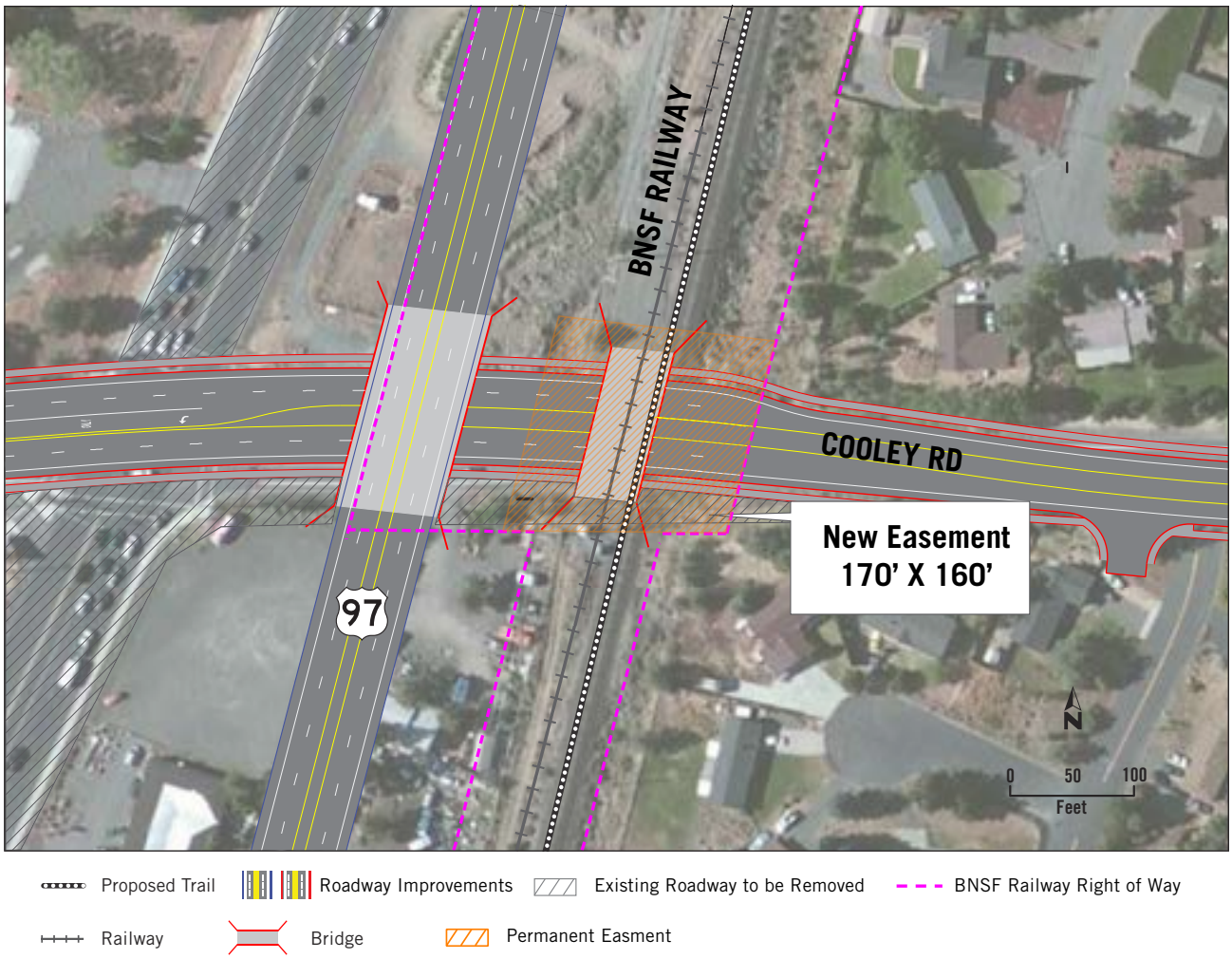
One archaeological resource was identified and is recommended as eligible to the National Register of Historic Places. Although the property that this one resource is located on would be landlocked by the East DS1 Alternative, the site would be avoided by direct impacts.

Exhibit 3-62B FEIS: *Nels and Lillian Andersen House with the East DS1 and East DS2 Alternatives and the Preferred Alternative*



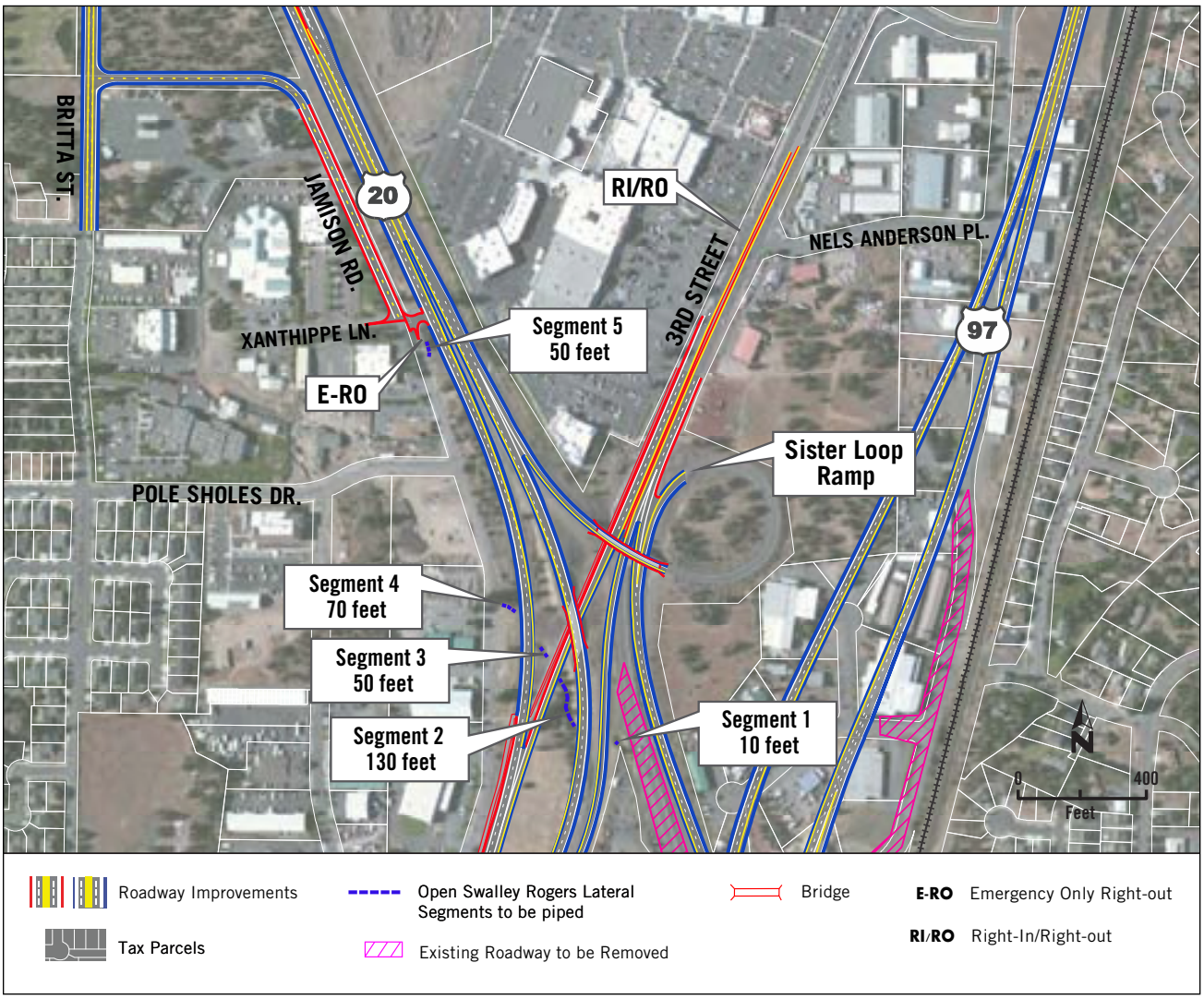
Note: This new exhibit provides greater detail on the adverse effect to, and use of, the Nels and Lillian Andersen House that is a result of landlocking the parcel. This same adverse effect will occur with the Preferred Alternative and would have occurred with the East DS1 and East DS2 Alternatives. The proposed design of US 97 shown in this exhibit reflects the Preferred Alternative.

Exhibit 3-62C FEIS: *Cooley Road Underpass at the Oregon Trunk Railway with the East DS1 and East DS2 Alternatives and the Preferred Alternative*



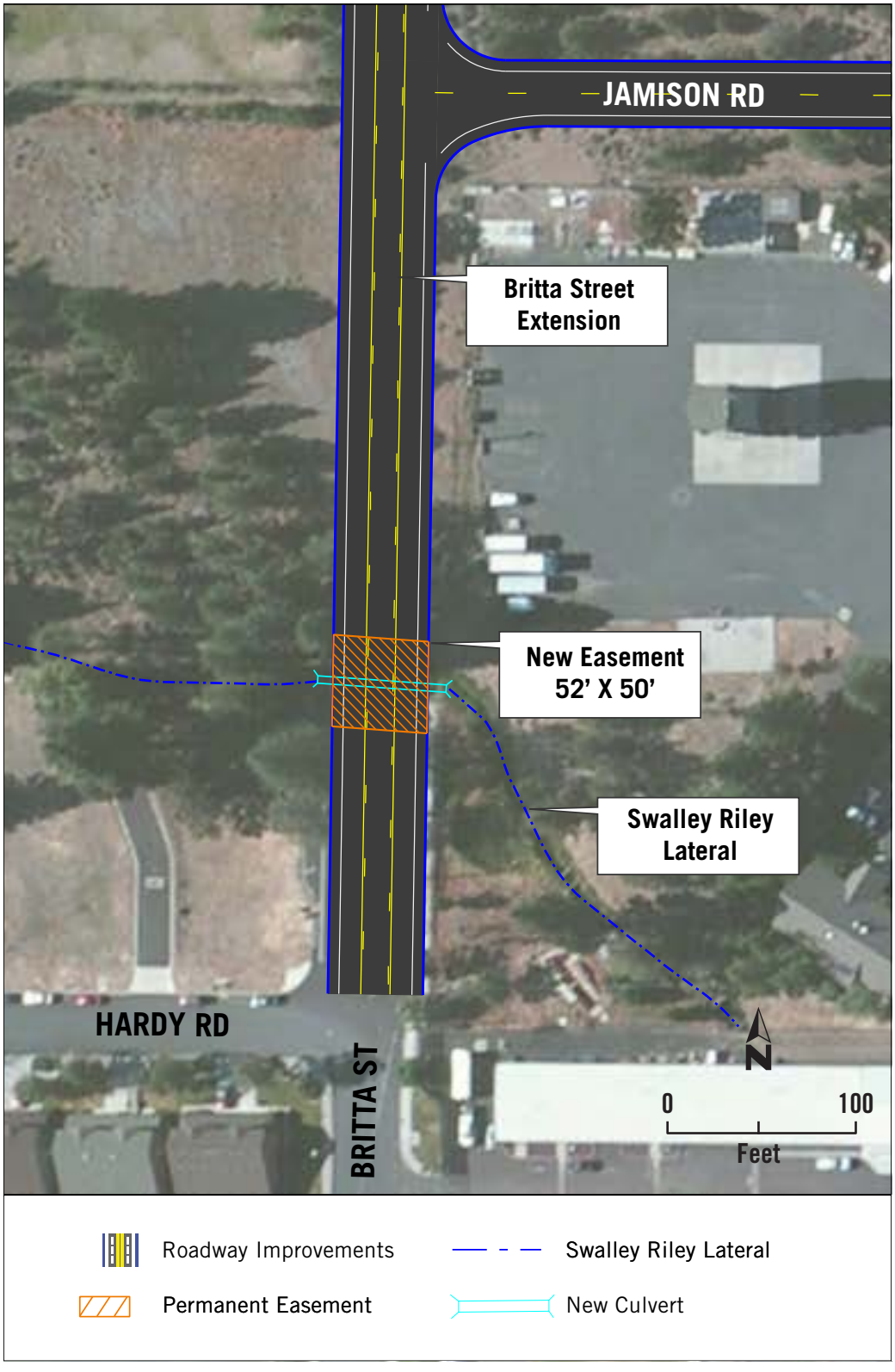
Note: This new exhibit provides greater detail on the effect to, and use of, the Oregon Trunk Railway. The same Cooley Road undercrossing and permanent easement will occur with the Preferred Alternative and would have occurred with the East DS1 and East DS2 Alternatives. The proposed design of Cooley Road shown in this exhibit reflects the Preferred Alternative.

Exhibit 3-62D FEIS: *New Piping of the Swalley Rogers Lateral in the Area Near the Sisters Loop Ramp with the East DS1 and East DS2 Alternatives and the Preferred Alternative*



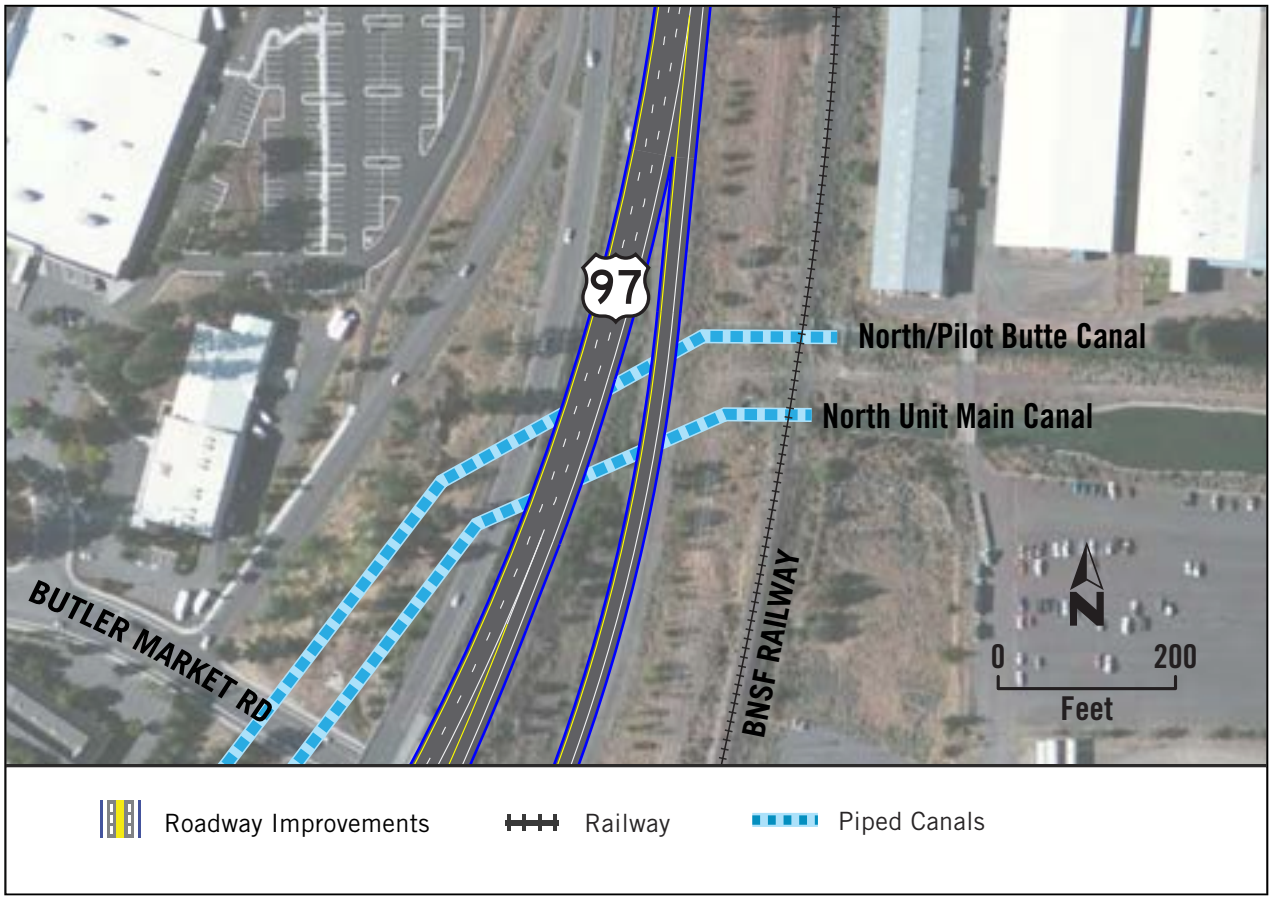
Note: This new exhibit provides greater detail on the effect to, and use of, the Swalley Rogers Lateral. These same segments of piping of the Swalley Rogers Lateral will occur with the Preferred Alternative and would have occurred with the East DS1 and East DS2 Alternatives.

Exhibit 3-62E FEIS: *New Crossing of the Swalley Riley Lateral with the East DS1 and East DS2 Alternatives and the Preferred Alternative*



Note: This new exhibit provides greater detail on the effect to, and the use of, the Swalley Riley Lateral of the Swalley Main Canal. The same crossing of Britta Street and installing a culvert of the Swalley Riley Lateral will occur with the Preferred Alternative and would have occurred with the East DS1 and East DS2 Alternatives. The proposed design of Britta Street shown in this exhibit reflects the Preferred Alternative.

Exhibit 3-62F FEIS: *North Unit Main Canal and the North/Pilot Butte Canal Crossings by the East DS1 and East DS2 Alternatives and the Preferred Alternative*



Note: This new exhibit provides greater detail on how effects to, and use of, the North/Pilot Butte Canal and the North Unit Main Canal, which are already piped in this location, would be avoided with the East DS1, East DS2 and the Preferred Alternative. The proposed design of US 97 shown in this exhibit reflects the Preferred Alternative.

East DS2 Alternative

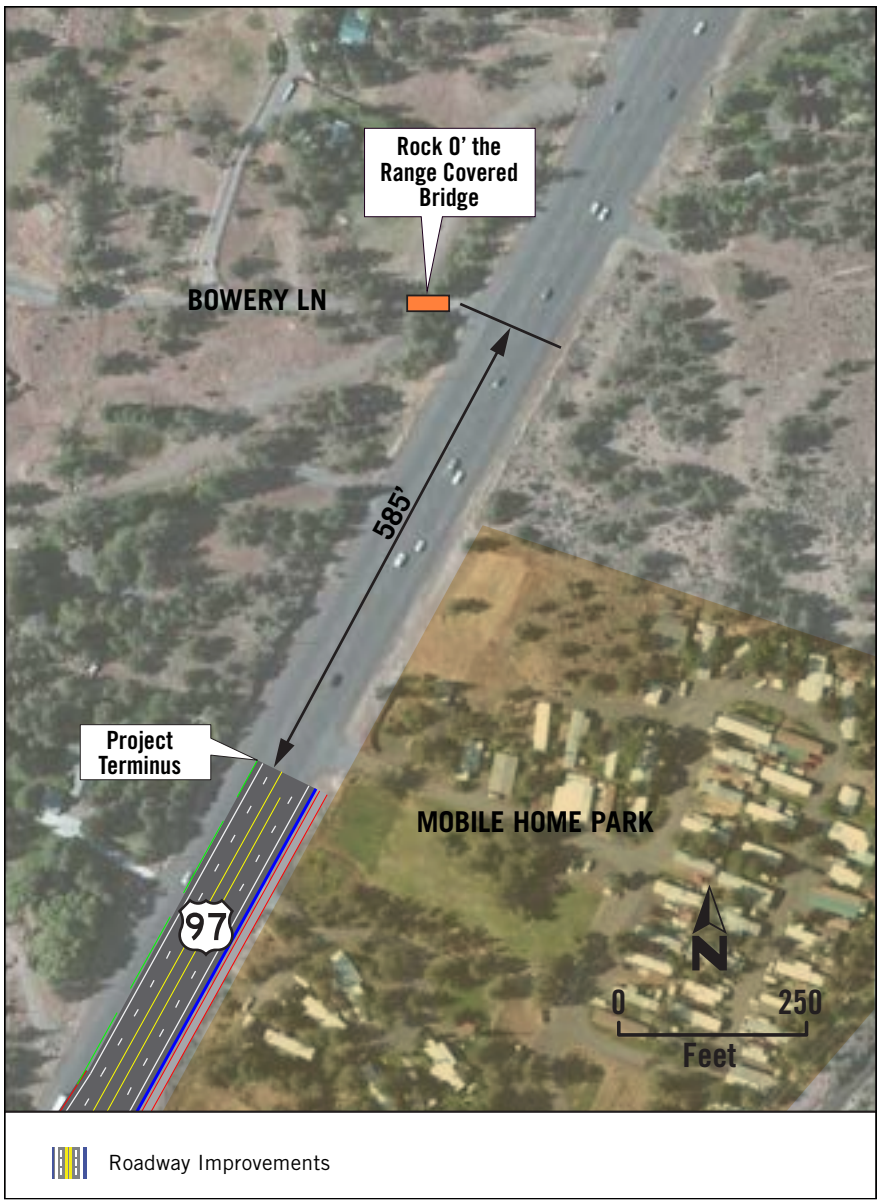
The East DS2 Alternative would have the same effects as the East DS1 Alternative to historic and archaeological resources.

Preferred Alternative—East DS2 Modified Alternative

The Preferred Alternative will have the same effects as the East DS1 and East DS2 Alternatives to historic resources with the exception of the Swalley Main Canal Pipeline and its associated laterals; the Nels and Lillian Andersen House will be adversely affected by the Preferred Alternative while the remaining five resources would have no adverse effect.

With the Preferred Alternative there will be no change to the existing crossing of the Swalley Rogers Lateral at Robal Road and Cooley Road; the existing piped crossings of the Swalley Rogers Lateral at these two locations will not be lengthened, as they would have with the East DS1 and East DS2 Alternatives. Therefore, the direct impacts to the Swalley Main Canal Pipeline and its associated laterals will be the piping of the

Exhibit 3-62G FEIS: *Rock O' the Range Bridge and the Preferred Alternative*



Note: This new exhibit provides greater detail on how the Rock O' the Range Bridge is avoided with the Preferred Alternative. The proposed design of US 97 shown in this exhibit reflects the Preferred Alternative.

five, small currently open segments of the Swalley Rogers Lateral in the area near the Sisters Loop Ramp (Exhibit 3-62D FEIS) and the new crossing of the currently open, unpiped Swalley Riley Lateral by the extended Britta Street (Exhibit 3-62E FEIS).

Exhibit 3-62G FEIS shows the Preferred Alternative in relation to the Rock O' the Range Bridge, which shows that the nearest project improvement will be approximately 585 feet to the south.

The Preferred Alternative will have the same effects to archaeological resources as the East DS1 and East DS2 Alternatives.

SHPO concurred with the Section 106 project-level finding of effect for the Preferred Alternative for archaeological resources on September 27, 2013 (and for historic resources on September 24, 2013). This concurrence is included in Appendix D.

Since the publication of the Draft EIS, FHWA invited the Advisory Council on Historic Preservation (ACHP) to participate in the resolution of the adverse effect to the Nels and Lillian Andersen House resulting from the Preferred Alternative. On March 25, 2014 ACHP declined to participate in the resolution of adverse effect. FHWA, SHPO and ODOT executed a Memorandum of Agreement (MOA) on June 9, 2014, which resolves the adverse effect to the Nels and Lillian Andersen House. FHWA filed the MOA with ACHP on June 10, 2014. On June 17, 2014 ACHP acknowledged their receipt of the MOA and noted that this completed the Section 106 requirements for the project. The MOA and other Section 106 documentation is included in Appendix D.

Indirect Impacts

The No Build Alternative would result in no indirect impacts to historic resources.

The East DS1 Alternative and East DS2 Alternative would likely have an indirect impact on the noise and visual setting of the following historic resources that would remain: the Oregon Trunk Railway, the North/Pilot Butte Canal, the North Main Unit Canal, the Rock O' the Range Bridge, and the Swalley Main Canal and its associated laterals. The Nels and Lillian Andersen House would not be indirectly impacted, as it would be removed and/or-demolished.

The Preferred Alternative will have the same indirect impacts on the noise and visual setting of the above listed historic resources that will remain.

As the Section 106 Memorandum of Agreement to Resolve the Adverse Effect specifies, if there is an interested buyer for the Nels and Lillian Andersen House, ODOT will prepare the House so that it can be relocated from its current site.

There would be no anticipated indirect impacts to archaeological resources that are eligible for listing on the National Register of Historic Places within the APE because no eligible archaeological resources have been identified in the APE.

There is one archaeological resource that is recommended as eligible for listing in the National Register of Historic Places. This resource is located on a parcel that will be landlocked by ODOT to construct the

Definition

***Section 4(f) de minimis* Impact**

1) For historic sites,a Section 4(f) *de minimis* impact means that the FHWA has determined that the impact is one that would not adversely affect the features, attributes, or activities qualifying the property for protection under Section 4(f), (23 CFR 774.17), and in accordance with 36 CFR part 800 that no historic property is affected by the project or that the project would have "no adverse effect" on the historic property in question..
2) For parks, recreation areas, and wildlife and waterfowl refuges, a Section 4(f) *de minimis* impact is one that would not adversely affect the features, attributes, or activities qualifying the property for protection under Section 4(f). (23 CFR 774.17)

Preferred Alternative; no indirect impacts are anticipated since the archaeological resource is outside of the project construction footprint.

Construction Impacts

Historic resources near construction areas could be temporarily affected by dust, noise and vibrations from the movement of heavy construction equipment. Inadvertent discoveries of archaeological resources could occur during construction and the associated ground disturbing activities.

Resources Evaluated Relative to the Requirements of Section 4(f)

Six historic resources have been evaluated relative to Section 4(f). The proposed action would require the use of the Nels and Lillian Andersen House, so an individual Section 4(f) evaluation has been prepared and included with the Draft EIS. The Section 106 findings of effect and preliminary Section 4(f) determinations of use under the East DS1 and East DS2 Alternatives are noted in Exhibit 3-63.

FHWA made two Section 4(f) *de minimis* findings, one for the Oregon Trunk Railway signed on November 7, 2013 and the other for the Swalley Main Canal Pipeline and associated Swalley Riley Lateral signed on November 12, 2013. These *de minimis* findings are included in Appendix L of the Final EIS. The final Section 106 findings of effect and Section 4(f) determinations of use for the East DS1 and East DS2 Alternatives and the Preferred Alternative are noted in Exhibit 3-63 FEIS.

A final individual Section 4(f) evaluation has been prepared and is included with the Final EIS. The Section 4(f) evaluation determined that there is no feasible and prudent alternative to the use of land from the Nels and Lillian Andersen House and the Preferred Alternative includes all possible planning to minimize harm to the Nels and Lillian Andersen House.

Exhibit 3-63 FEIS: *Section 106 Findings and Section 4(f) Use Determinations for Historic Resources under the East DS1 and East DS2 Alternatives and the Preferred Alternative*

	East DS1 and East DS2 Alternatives		Preferred Alternative	
Historic Resource	**Section 106 Finding**	**Section 4(f) Use (Preliminary)**	**Section 106 Finding**	**Section 4(f) Use**
Nels and Lillian Andersen House	Adverse Effect	Use	Adverse Effect	Use
North/Pilot Butte Canal	No Adverse Effect	~~*de minimis* Impact~~ Avoid (No Use)[2]	No Adverse Effect	Avoid (No Use)[2]
North Unit Main Canal	No Adverse Effect	~~*de minimis* Impact~~ Avoid (No Use)[2]	No Adverse Effect	Avoid (No Use)[2]
Oregon Trunk Railway	No Adverse Effect	*de minimis*	No Adverse Effect	*de minimis*
Rock O' the Range Bridge	No Adverse Effect	Avoid (No Use)	No Adverse Effect	Avoid (No Use)
Swalley Main Canal[1]	No Adverse Effect	*de minimis*	No Adverse Effect	*de minimis*

[1] Only the open, unpiped portions of the Swalley Main Canal and its associated laterals, the Swalley Riley Lateral and the Swalley Rogers Lateral are considered historic resources. Piped portions are not considered historic, due to a lack of integrity in terms of Section 106 evaluation.

[2] In the Draft EIS the analysis of Section 4(f) impacts to the North/Pilot Butte Canal and the North Unit Main Canal was estimated to be a Section 4(f) de minimis use. However, as shown in Exhibit 3-62F FEIS, the East DS1 Alternative, East DS2 Alternative and the Preferred Alternative avoids impacts to these resources and, therefore, there is no Section 4(f) use.

Note: Since the publication of the Draft EIS the Section 4(f) de minimis determinations for the Oregon Trunk Railway and the Swalley Main Canal were made by FHWA. These determinations are included in Appendix L

3.7.4 Avoidance, Minimization, and/or Mitigation Measures Proposed in the Draft EIS

Construction Mitigation and Commitments

A memorandum of agreement that includes mitigation measures would be developed and implemented to resolve adverse effects to the Nels and Lillian Andersen House prior to removal and/or demolition of the house. Signatories to the memorandum of agreement would likely include FHWA, ODOT, the Oregon State Historic Preservation Officer, and other consulting parties.

An inadvertent discovery plan would be developed and implemented during construction. This plan would specify a protocol for halting construction work if unidentified archaeological resources or human remains are encountered. Various government agencies and tribes would be notified so that the significance of the discovery could be evaluated and the appropriate course of action could be implemented.

Mitigation for Long-term Impacts

No long-term mitigation measures would be necessary as adverse impacts to historic resources would be resolved prior to construction. Furthermore, no adverse impacts to archaeological resources would be anticipated to result from the proposed action; thus, no mitigation would be required.

3.7.5 Avoidance, Minimization, and/or Mitigation Commitments Incorporated into the Preferred Alternative

ODOT makes the following commitments:

- ODOT will complete one of three options, up to a maximum cost of $30,000, to resolve adverse effects to the Nels Andersen House:
  - Option 1: Removal and Relocation of the Andersen House (when ODOT possesses the Andersen House and a qualified party is selected to relocate the Andersen House)
  - Option 2: Provide content and funding for Des Chutes County Historical Museum's architectural walking tour mobile application and demolition of the Andersen House (when ODOT possesses the Andersen House and a qualified party is not identified to relocate the Andersen House)
  - Option 3: Provide content and funding for Des Chutes County Historical Museum's architectural walking tour mobile application (when ODOT does not possess the Andersen House but removes vehicular access from the parcel upon which the Andersen House is located)
- ODOT will develop and implement an inadvertent discovery plan prior to construction. This plan will specify a protocol for halting construction work if unidentified archaeological resources or human remains are encountered. This protocol will specify that SHPO, the Confederated Tribes of Warm Springs, the Burns Paiute Tribe and the Klamath Tribe will be notified so that the significance of the discovery could be evaluated and the appropriate course of action could be implemented.
- ODOT will survey the portions of the eight parcels within the APE that have not yet been surveyed for archaeological resources after the right of way is purchased and ODOT takes ownership.

3.8 Visual Resources

3.8.1 Regulatory Setting

The National Environmental Policy Act establishes that the federal government use all practicable means to ensure all Americans safe, healthful, productive, aesthetically and culturally pleasing surroundings (42 USC 4331[b][2]). To further emphasize this point, the FHWA in its implementation of the National Environmental Policy Act (23 USC 109[h]) directs that final decisions regarding projects are to be made in the best overall public interest taking into account adverse environmental impacts including, among others, the destruction or disruption of aesthetic values.

Definitions

Visual Quality Measures

Vividness

Vividness in the context of visual impact analysis is the memorability of the visual impression received from contrasting landscape elements as they combine to form a striking and distinctive visual pattern and looks at: landform, vegetation, water, and man-made development.

Intactness

Intactness in the context of visual impact analysis looks at the integrity of visual order and how much the view is free from encroaching features.

Unity

Unity in the context of visual impact analysis looks at the degree to which the visual resources of the landscape form a coherent, harmonious visual pattern and the compositional harmony or compatibility between landscape elements.

3.8.2 Affected Environment

More information: Additional detail on visual resources is provided in the *Visual Quality Technical Report* (ODOT 2014q). The *Visual Quality Technical Report* is listed in Appendix K and available in the document library of the project's website (www.us97solutions.org).

The API is not within any specially designated scenic area and is not part of a scenic byway (USDOT 2010; Travel Oregon 2010).

The API is divided visually into two unique landscape units, which are areas of distinct landscape character (FHWA 1981). For each landscape unit the visual quality was evaluated by scoring views from and toward US 97 on three components: vividness, intactness, and unity. The three components were rated on a scale of 1 to 7, with 7 being the highest rating and 1 being the lowest rating. The visual quality of each landscape unit is the average of these ratings.

The southern landscape unit is defined as the API from Butler Market Road to Cooley Road (Exhibit 3-64). This landscape unit is characterized as urban with commercial and light industrial development adjacent to the highway corridor, BNSF Railway tracks, and local street network. This landscape unit is mostly flat with only slight variation in topography. The water features in this landscape unit consist of stormwater ditches, canals, and a few manmade ponds. Light and glare are prevalent at night, coming from headlights, taillights, traffic signals, street lighting, and illuminated signs. Views from the road consist of the roadway and associated structures, signs, lighting and utilities, vehicles, substantial light and glare, roadside

development, and some vegetation. Views from this landscape unit also capture the adjacent vegetated hills to the west and, in the background, the jagged, highly vivid ridgeline of the Cascade Mountains (View 5). Awbrey Butte is visible to the southwest.

Within and adjacent to the southern landscape unit eight views were selected to represent the various existing views and visual character (Exhibit 3-64). The existing visual quality score for this landscape unit, as an overall average, is moderately low (3). One area, immediately east of the railroad tracks and south of Cooley Road, has been designated by the City of Bend as the Lava Ridge Refinement Plan area. The purpose of the Lava Ridge Refinement Plan is to create overlay development standards, including design treatments such as setbacks and tree planting, for the residential and commercial development.

The northern landscape unit is defined as the API from Cooley Road to Fort Thompson Lane. This landscape unit is characterized as transitional, with decreasing commercial development and increasing residential or vacant parcels and vegetation adjacent to US 97 (View 9). This landscape unit is mostly flat; however, there are variations in topography beyond the US 97 right of way. This landscape unit north of Cooley Road includes the Hilltop, Juniper, and Four Seasons mobile home parks and the low-density, rural Hunnell Neighborhood. Natural resources are more visually predominant in the rural Hunnell Neighborhood, with intact stands of juniper trees, native grasses, visually distinct lava pressure ridges, and natural-component fencing that blends with the landscape. Water features include irrigation ponds and ditches. Light and glare are highly evident along US 97; beyond US 97 and developed commercial areas, light and glare is much less evident. Views from the landscape unit to the west capture the adjacent vegetated hills and bluffs, and, in the background, views of the jagged ridgeline of the highly vivid Cascade Mountains.

Within and adjacent to the northern landscape unit eight views were selected to represent the various existing views and visual character (Exhibit 3-64). The existing visual quality score for the northern landscape unit, as an overall average, is moderate (4).



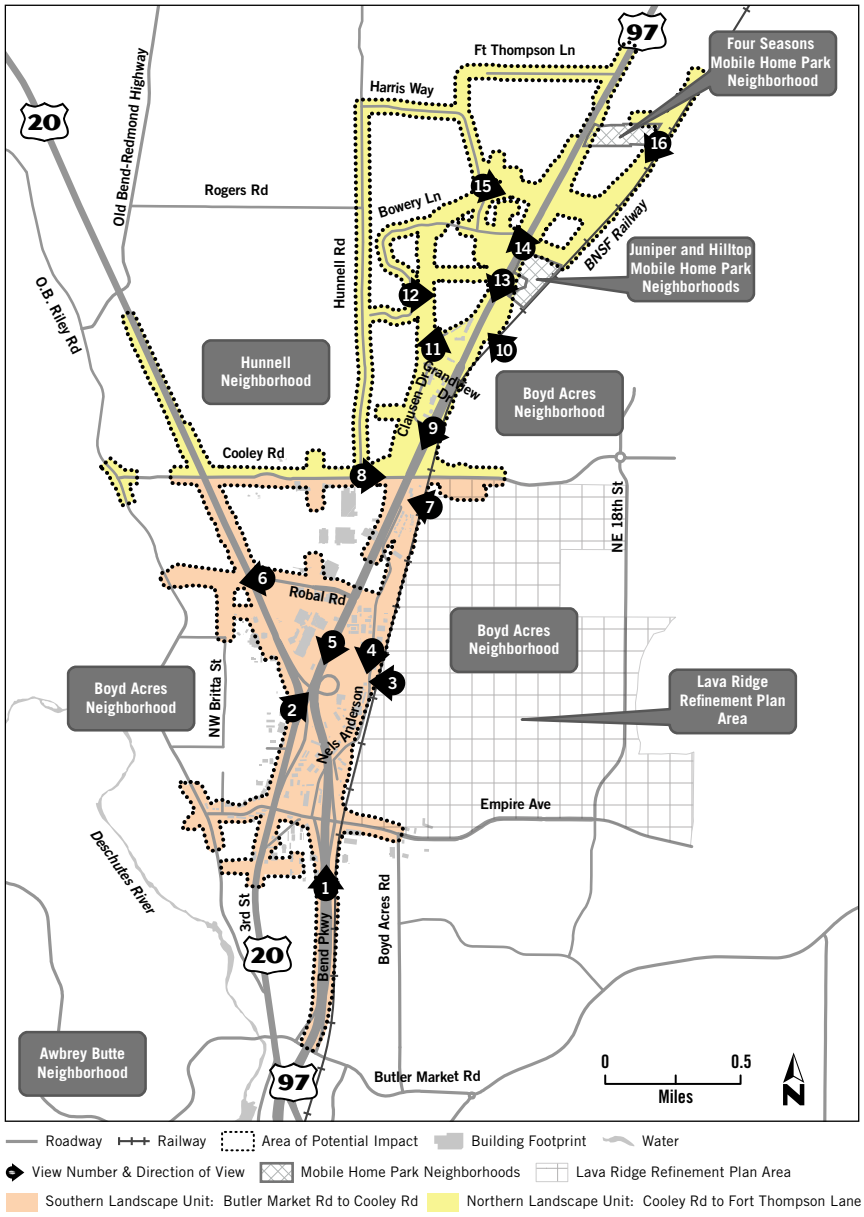
View 5: Looking south along US 97. Urban commercial and light industrial development is visible on both sides of the highway. An existing overcrossing and the Awbrey Butte ridgeline is visible in the distance.

Under the East DSI Alternative, East DS2 Alternative, and Preferred Alternative, US 97 would be widened, resulting in some vegetation removal but the overall visual character of a multi-lane highway corridor would remain.



View 9: Looking south along US 97 from Clausen Drive. The Cooley Road signalized intersection is visible ahead of the viewer.

Exhibit 3-64: *Location and Direction of Representative Views*



3.8.3 Environmental Consequences

No Build Alternative

With the No Build Alternative, the visual quality scores for both landscape units would be the same as the existing visual quality scores. There would be no change to visual resources or visual character because the proposed action would not be constructed. As traffic volumes increase, there would be increasing light and glare encroachment and visually distracting congestion, but this would not

be expected to change the visual quality scores for the landscape unit overall or for individual views.

East DS1 Alternative

Southern Landscape Unit: Butler Market Road to Cooley Road—Between Butler Market Road and Cooley Road, as an overall average, the visual quality score would remain the same as existing conditions: moderately low (3).

There would be incremental removal of limited existing visual resources such as trees, terrain changes from new roads, additional encroachment by light and glare, and new or widened paved, linear surfaces (View 1). Conversely, the use of consistent design standards and aesthetic treatments would increase unity and intactness of views of US 97 and local roads. Improved traffic flow and decreased congestion would be a visual benefit. With less congestion, there would be less visually distracting light and glare, especially from brake lights. Realigning US 97 to the east, adjacent to the railroad tracks, would create a new road corridor, which would result in new views along US 97. These views would be of an intact and unified multi-lane highway (View 4).

The urban visual character of most views in this landscape unit would not change noticeably because there is already a substantial amount of built development and transportation infrastructure, including existing elevated structures. Views across the landscape and toward more visually distinct features (View 8) like Awbrey Butte and the Cascade Mountains would remain.

Northern Landscape Unit: Cooley Road to Fort Thompson Lane—Between Cooley Road and Fort Thompson Lane, as an overall average, the visual quality score of the landscape unit would decrease from moderate (4) to moderately low (3).

The decrease in visual quality for the landscape unit overall would be primarily due to the new northern interchange and new roads that would be constructed through largely intact vegetated and visually unified areas. The Cooley Road and 3rd Street intersection would be below grade approximately 10 feet, thereby minimizing the visual impact against the landscape (View 9). Below grade retaining walls would be constructed along 3rd Street and Cooley Road. The northern interchange would elevate 3rd Street, a local street with one eastbound and one westbound travel lane, over US 97; the interchange ramps for the northbound and southbound movements on to and off of US 97 would also be elevated to connect with 3rd Street (Exhibit 3-65 FEIS). Although these structures would be elevated, with the exception of residences closer to the interchange, most views toward the interchange would be largely shielded by existing, mature juniper



View 1: Looking north along US 97 between Butler Market Road and Empire Avenue. US 97 would be widened, resulting in some vegetation removal but the overall visual character of a multi-lane highway corridor would remain.



View 4: Looking south along Nels Anderson Road, which would become the US 97 alignment with East DS1 Alternative.



View 8: Looking east along Cooley Road toward US 97. Cooley Road would be widened and a new signal installed. Cooley Road would cross under US 97 in the middleground of this view.



View 10: Looking west from Boyd Acres Neighborhood toward the railroad tracks and US 97 alignment. Under East DS1 Alternative, the highway and roads would be at- or below-grade, and would not be visible to a vast majority of residents in the Boyd Acres Neighborhood.



View 13: Looking south along US 97 from a point between Grandview Drive and Bowery Lane. The highway would be widened under the East DS1 Alternative, East DS2 Alternative, and Preferred Alternative, resulting in vegetation removal and a wider, linear paved footprint. The overall visual character of a multi-lane highway corridor would remain.



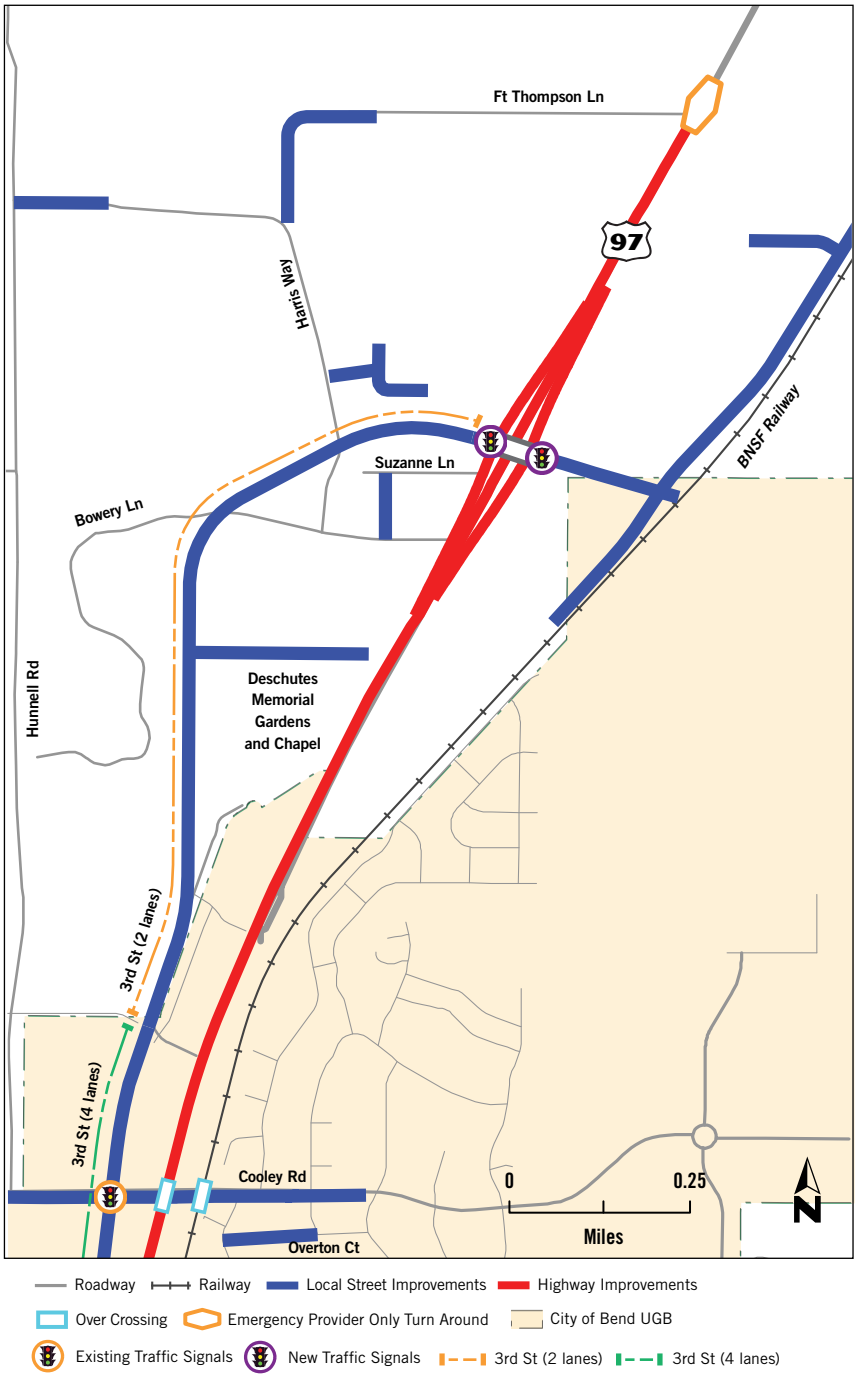
View 12: Looking west from Bowery Lane toward the proposed 3rd Street alignment. Vegetation would be removed and there would be encroachment from light and glare to residents close to 3rd Street. The proposed road would create a horizontal bisecting feature across the view.

trees or by existing two-story houses (View 10). Still, the presence of new elevated structures would be a change to views toward and along US 97. The new paved road corridors would require the removal of vegetation and would bring traffic, light and glare into new areas. Although the roads would be relatively narrow compared to the nearby US 97, the introduction of roads that bisect previously vegetated, residential areas would decrease the visual quality and change the rural residential character to a road facility.

The views along US 97 would retain a similar visual character (View 13). The new 3rd Street alignment would decrease the visual quality from residences in the Hunnell Neighborhood, east of Hunnell Road (View 12 and View 15), due to vegetation removal, encroachment from light and glare from vehicle headlights and taillights, and new signals at the new northern interchange. The visual quality for residences west of Hunnell Road would largely be unaffected. There would also be a slight decrease in visual quality for residents of the Juniper, Hilltop, and Four Seasons mobile home park neighborhoods (View 14 and View 16). The new paved access road would visually encroach closer to the neighborhood and would create a wider open visual corridor that could make the railroad tracks even more visible.

Since the publication of the Draft EIS, impacts to the Hunnell Neighborhood residences east of Hunnell Road have been further identified and defined. Public comments on the Draft EIS identified that the new 3rd Street alignment would also decrease the visual quality for residences in the Hunnell Neighborhood by bisecting intact views. This would substantially change the visual quality for residences east of Hunnell Road.

Exhibit 3-65 FEIS: *East DS1 Alternative Northern Interchange*



Note: This exhibit has been updated to show a larger view of the East DS1 Alternative, which can be compared to the Preferred Alternative. Interchange ramps for the northbound and southbound movements onto and off US 97 would be elevated to connect with 3rd Street.

East DS2 Alternative

Southern Landscape Unit: Butler Market Road to Cooley Road—Between Butler Market Road and Cooley Road, the adverse and beneficial visual quality impacts of the East DS2 Alternative would be the same as the East DS1 Alternative.



View 15



View 16: Looking south from southeastern corner of Four Seasons Mobile Home Park Neighborhood. Vegetation removal would decrease the vividness of this view, and a new paved access road would encroach closer to the neighborhood and could open up wider views of the railroad tracks.



View 14: Looking northwest from the Juniper/Hilltop Mobile Home Parks. Under the East DS2 Alternative, the Bowery Lane overcrossing would bisect the view and there would be additional encroachment from light and glare.

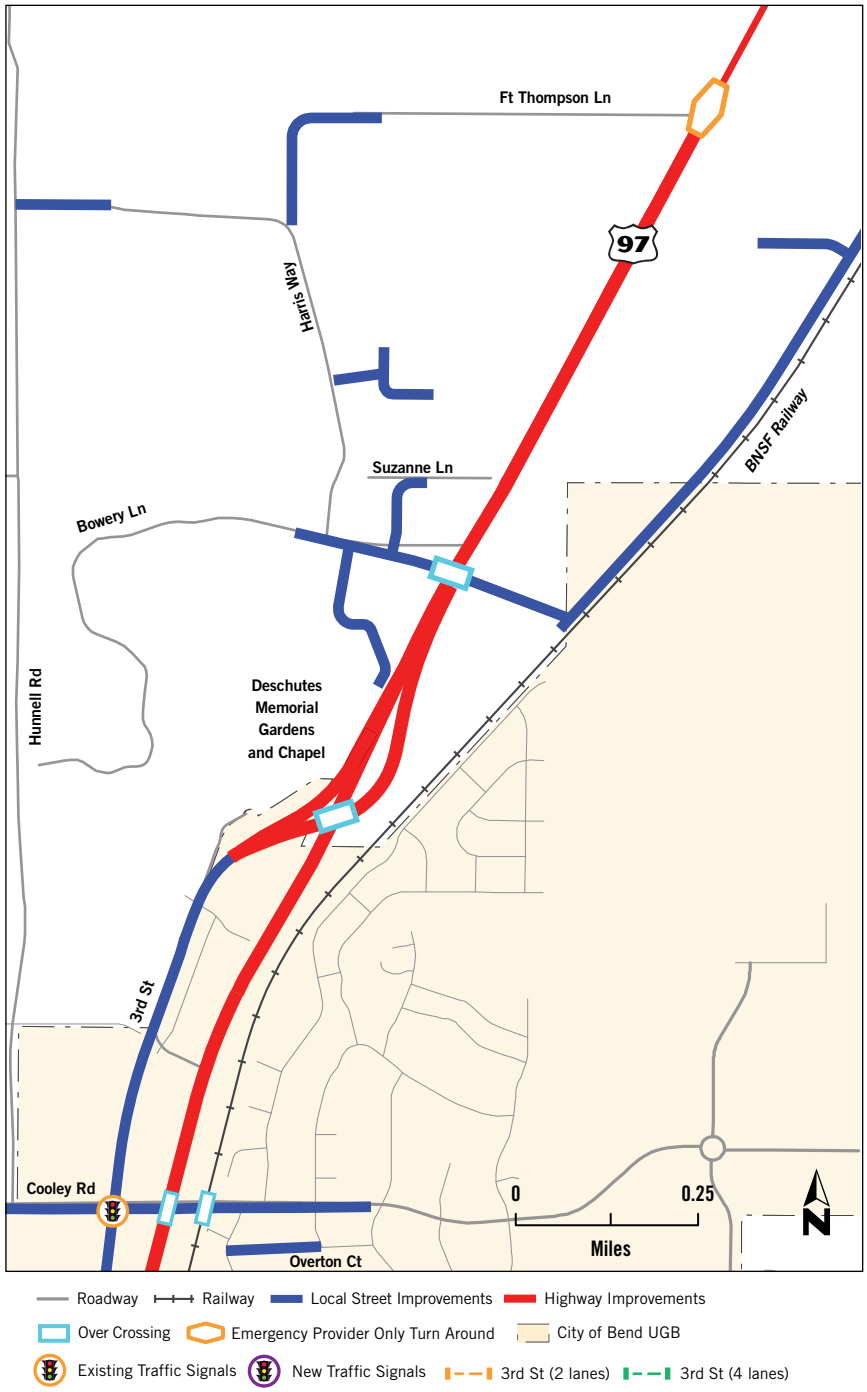
Northern Landscape Unit: Cooley Road to Fort Thompson Lane—As with the East DS1 Alternative, between Cooley Road and Fort Thompson Lane, the East DS2 Alternative would decrease the overall average visual quality score from moderate (4) to moderately low (3).

The decrease in visual quality for the landscape unit overall would be primarily associated with two new elevated structures, expanded local streets, and new short access roads. Vegetation removal would also contribute to the decrease in visual quality by reducing the color and textural variation, thereby decreasing vividness, and by removing trees that shield viewers from light and glare (View 16). The visual quality of views along US 97 in the vicinity of the new interchange would decrease slightly due to landform changes, vegetation removal and the visual bisecting and screening effect of the bridge. The interchange includes one elevated ramp for northbound 3rd Street that would partially obstruct some views from the road and would cast new shadows onto the roadway (Exhibit 3-66 FEIS). Another structure would be the elevated Bowery Lane overcrossing, which would alter the visual character by preventing views toward vegetation and adding a vertical, solid, linear form to the view. Cooley Road and 3rd Street would be below grade approximately 10 feet, as described under the East DS1 Alternative.

The visual quality from residences on the western edge of the Boyd Acres Neighborhood and the Juniper/Hilltop Mobile Home Park neighborhood would decrease from the removal of some vegetation which would make the highway visible to residents, particularly in the vicinity of the elevated structures. In addition, there would be elevated fill material and structure elements (e.g. retaining walls, bridge supports) that would bisect views, and some encroachment from light and glare associated with headlights on the overcrossing (View 14).

With the East DS2 Alternative, visual impacts associated with local road improvements would extend slightly further west into the Hunnell Neighborhood than under East DS1 Alternative. There would be a slight decrease in visual quality due to increased light and glare on Bowery Lane (View 12) from vehicles traveling to and from neighborhoods east of US 97. Portions of some roads within the Hunnell Neighborhood (including Hunnell Road, Harris Way, Bowery Lane and Fort Thompson Lane) would be widened, thereby slightly increasing their visually bisecting effect. A consistent design and aesthetic treatment would be applied to local roads improved in this neighborhood providing visual unity of the local transportation network.

Exhibit 3-66 FEIS: *East DS2 Alternative Northern Interchange*



Note: This exhibit has been updated to show a larger view of the East DS2 Alternative, which can be compared to the Preferred Alternative.

Preferred Alternative—East DS2 Modified Alternative

Southern Landscape Unit: Butler Market Road to Cooley Road—Between Butler Market Road and Cooley Road, the Preferred Alternative is similar to the East DS1 Alternative. The Preferred Alternative will have the same adverse and beneficial visual quality impacts as the East DS1 Alternative, and the visual quality scores will remain the same as existing conditions: moderately low (3).

Northern Landscape Unit: Cooley Road to Fort Thompson Lane—Between Cooley Road and Fort Thompson Lane, the visual quality for the landscape unit overall will remain mostly the same as under the existing conditions, moderate (4), as there will be very few improvements north of Cooley Road, and there will be no new manmade elevated structures such as overcrossings (Exhibit 3-66A FEIS).

There will be no impacts to visual quality and visual character for views north of the Juniper and Hilltop mobile home parks (Views 14, 15 and 16) because there will be no improvements resulting from the Preferred Alternative within these views. The impacts to visual quality and visual character will be the same or nearly the same as the East DS1 Alternative for Views 9 and 13. View 10 will experience some change with the addition of a traffic signal at the new intersection of 3rd Street and US 97, but most residential viewers will be shielded from light and glare by existing vegetation or two-story houses. Under the Preferred Alternative, there will be the addition of a traffic signal at the new intersection of 3rd Street and US 97 and some associated light and glare in View 13; however, the general view and visual quality will be the same as described under the East DS1 Alternative.

The visual character of views along Clausen Drive, which will become 3rd Street, will change (View 11). In the foreground of the view, vegetation will be removed, the terrain graded, and the road widened. In the middle ground of this view, because 3rd Street will curve to the east, most of the vegetation will remain. The visual quality of this view will decrease slightly with the Preferred Alternative.

Residents in the Hunnell Neighborhood will experience minimal impacts to visual character and visual quality with the Preferred Alternative as no visual resources will be removed north of Deschutes Memorial Gardens and Chapel. There will be no fill material or roads bisecting the rural portion of the neighborhood outside the City of Bend UGB, and no elevated structures potentially spilling ambient light, so the intactness and unity of views, such as View 12, will be unchanged. There will be some vegetation removal and grading along the new 3rd Street alignment; however, only a very few residents in the immediate vicinity of 3rd Street will experience any visual change, and



View 14



View 15



View 16: Under the Preferred Alternative, there will be no impacts to visual quality and visual character for views 14, 15, and 16 because there are no improvements in these views under the Preferred Alternative.

the visual quality overall will be unchanged as the vividness, intactness and unity of views will remain largely the same as the existing conditions.

Exhibit 3-66A FEIS: *Preferred Alternative Northern Signalized Intersection*



Viewers along Cooley Road and O.B. Riley Road will see a new roundabout at the intersection where these roads meet. Other than the roundabout, there will be no other improvements to the intersection, so the overall view from the roundabout will remain very similar to the existing conditions. Since roundabouts are relatively common in Bend, this new manmade feature will be a relatively familiar and unobtrusive sight on a local road. There will be some slight grading and vegetation and tree removal to accommodate the roundabout at this location, but similar vegetation and trees will remain just beyond those that will be removed.



View 11: Looking north along Clausen Drive, which will become 3rd Street. Vegetation removal and increased light and glare from moving vehicles will be predominant in the foreground. With the Preferred Alternative, the middle ground of this view will remain largely unchanged because 3rd Street will veer to the east in this photo.

Indirect Impacts

With the No Build Alternative there would be no improvements made to reduce congestion and improve traffic flow. Increased traffic congestion over time would increase the light and glare coming from the highway, and would likely increase light and glare on local roads as motorists use local streets to avoid congestion on US 97. Moreover, there would be increased visual distraction from traffic congestion on US 97 and local roads.

The indirect impacts would be expected to be the same for the East DS1 and East DS2 Alternatives. Growth and development, including the development of land for public right of way, could potentially result the in reduction or elimination of visual resources such as trees, water features, landform variation (hills, pressure ridges), or a splitting of visually unified areas. Another indirect impact could be increased encroachment upon views by visually distracting vehicle movement and light and glare.

The Preferred Alternative will have the same indirect impacts as the East DS1 and East DS2 Alternatives.

Construction Impacts

With the No Build Alternative, there would be no construction and, therefore, no construction impacts.

Construction impacts from the East DS1 Alternative would be greater than the East DS2 Alternative due to the extension of 3rd Street being located closer to rural residential areas under the East DS1 Alternative. Construction impacts would be associated with the presence of equipment and workers, material stockpiles, debris, signage, staging areas, and demolition activities. Grading and the removal of vegetation for staging areas would create a temporary visual impact, provided that staging areas are rehabilitated after construction finishes. Dust would encroach upon views as would light and glare emanating from construction activities. The movement of large, typically bright yellow construction vehicles would add potentially visually distracting elements to views, particularly in more intact and vegetated areas. Congestion associated with work areas could also intrude upon views.

The Preferred Alternative will have fewer construction impacts than the East DS1 and East DS2 Alternatives because the area of ground disturbance will be less, and there will be no construction activities associated with elevated structures north of Cooley Road (e.g., heavy earthwork for fill slopes, scaffolding, or use of cranes and temporary support structures). The East DS1 and East DS2 Alternatives would have had a substantial amount of construction near the northern interchange. With the Preferred Alternative, construction north of Cooley Road will be focused on the new signalized intersection at 3rd

Street and US 97, and will be substantially less visually intrusive than the construction of the elevated interchange proposed in the East DS1 and East DS2 Alternatives for north of Cooley Road.

3.8.4 Avoidance, Minimization, and/or Mitigation Measures Proposed in the Draft EIS

Construction Mitigation and Commitments

Some temporary impacts to visual quality would be a result of safety measures (e.g., brightly colored signs, safety lights) and could not be mitigated. The following measures could be taken to the extent practicable to avoid, minimize, and mitigate for temporary adverse impacts to visual quality:

- Where feasible, set up construction staging areas in locations that are out of sight from a majority of viewers
- Shield construction lighting and/or focus lighting on work areas to minimize ambient spillover of into adjacent areas
- To the extent reasonable and safe, limit traffic stops, lane shifts or detours associated with construction to offpeak travel hours so that fewer viewers would be affected and congestion would be minimized
- Restore staging areas to pre-project conditions after the construction would be completed. This would require a survey of proposed staging areas prior to construction to document the existing visual character of the site, existing surface material and vegetation.

Mitigation for Long-Term Impacts

Avoidance Measures—The build alternatives have been designed to incorporate the following measures that would avoid adverse impacts:

- Avoid bisecting visually intact rural residential lands west of Hunnell Road
- Avoid vegetation removal and terrain grading west of Hunnell Road
- Design Cooley Road to be an undercrossing of US 97 to avoid elevated structures and minimize the visibility of US 97.

Minimization Measures—The following minimization measures, where feasible and practical, are recommended for both build alternatives.

- Use retaining walls to minimize the amount of fill material needed
- Contour cuts and fills to visually blend with the surrounding landscape

- Repeat natural forms and lines when creating new road corridors, particularly the 3rd Street extension north of Cooley Road
- If street lights would be installed, utilize technology that minimizes ambient spillover light into adjacent areas
- Remove trees in a manner that leaves a feathered edge, rather than a straight edge
- Retain as many rock features and lava pressure ridges as possible to reflect the landform of the surrounding landscape
- Apply a consistent color and aesthetic treatment like texturizing and scoring to structures such as retaining walls, medians, and bridge abutments to facilitate a common visual theme with other highway structures and colors in Central Oregon. Bridge design would be consistent with ODOT's *Bridge Design and Drafting Manual* (ODOT 2010a) and the Structural Component Aesthetic Treatment Plan for the US 97 Bend North Corridor Project (ODOT 2013b)
- To the extent practical and safe, apply a consistent landscape treatment throughout the API to promote visual continuity. Where planting is required, typical vegetation would consist of native plant species (grass, sagebrush, and trees) that would not require irrigation and would be low maintenance
- Retain as much vegetation as possible, particularly mature trees between residences and US 97 or new local roads. This would help shield viewers from light and glare associated with new roads, and would shield views toward elevated structures.

Mitigation Measures—There would be no mitigation measures required for impacts to visual resources.

3.8.5 Avoidance, Minimization, and/or Mitigation Commitments Incorporated into the Preferred Alternative

ODOT makes the following commitments:

- ODOT will apply color and aesthetic treatment like texturizing and scoring to structures such as retaining walls, medians, and bridge abutments to facilitate a common visual theme with other highway structures and colors in Central Oregon
- ODOT will follow the Structural Component Aesthetic Treatment Plan for the US 97 Bend North Corridor Project (ODOT 2013b) to the extent practical

- ODOT will contour cuts and fills to visually blend with the surrounding landscape where feasible
- ODOT will utilize street light technology that minimizes ambient spillover light into adjacent areas
- ODOT will remove as few mature trees as possible, and will retain as many rock features and lava pressure ridges as possible to reflect the vegetation and landform of the surrounding landscape
- ODOT will design bridges to be consistent with ODOT's Bridge Design and Drafting Manual (ODOT 2010a) or equivalent.

3.9 Water Quality

3.9.1 Regulatory Setting

The Federal Water Pollution Control Act commonly referred to as the Clean Water Act is the primary law covering water quality. The intent of the Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and nonpoint pollution sources, providing assistance to publicly owned treatment works for the improvement of wastewater treatment, and maintaining the integrity of wetlands. If an ODOT project requires a Clean Water Act Section 404 permit from the US Army Corps of Engineers, then ODOT must also receive a Clean Water Act Section 401 water quality certification from the Oregon Department of Environmental Quality.

In addition to a Clean Water Act Section 401 water quality certification, projects exposing one acre of more of dirt need to comply with Clean Water Act Section 402. Clean Water Act Sections 401 and 402 establishes the National Pollutant Discharge Elimination System permit for the discharge of any pollutant into waters of the US. ODOT construction projects that disturb more than 1 acre are regulated under the National Pollutant Discharge Elimination System 1200-CA permit and are required to develop and implement an erosion control plan prior to ground-breaking.

Discharges to groundwater through underground injection control systems are regulated as Class V injection wells under the Federal Safe Drinking Water Act. If a project needs to construct an underground injection control, then a permit from the Oregon Department of Environmental Quality is required. These permits typically have conditions for treatment prior to discharge and monitoring of the quality of stormwater. The Safe Drinking Water Act also governs the protection of sole-source aquifers, critical aquifer protection areas, and wellhead protection areas. The Oregon Groundwater Act includes guidance on wellhead protection in Oregon. The Oregon Groundwater Act led to the Oregon Wellhead Protection Program, which is a voluntary program that local governments can enter into. The Oregon water quality laws and regulations are found in ORS Chapter 468B and ORS Chapter 340 Division 041, which cover surface water and groundwater.

ODOT has a set of goals and objectives for projects that, when achieved, will contribute to the protection and improvement of the waters of the state. These goals and objectives are described in Highway Division Project Delivery Leadership Team Operational Notice PD-05: Water Quality Mitigation (ODOT 2006a) and in Technical Bulletin GE09-02(B): Stormwater Management Program (ODOT 2009b).

Definitions

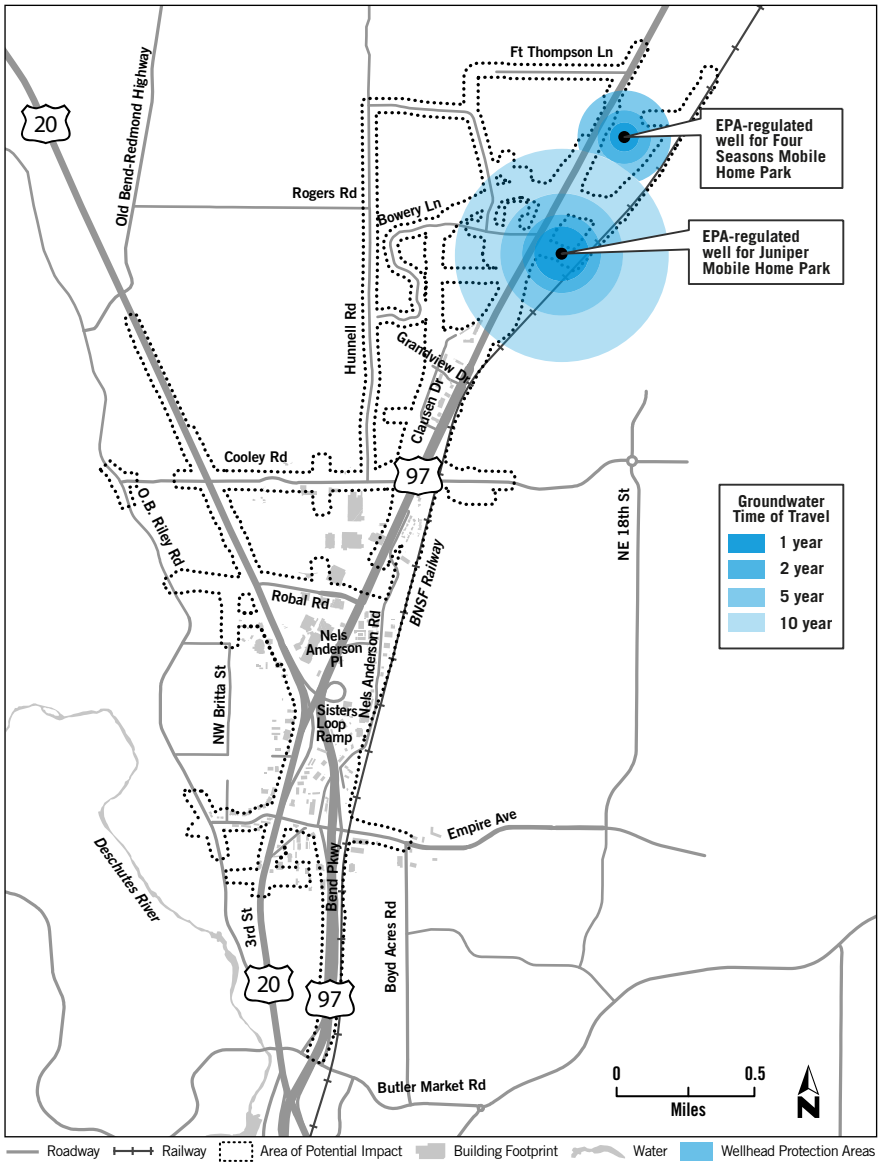
Salmonid

A salmonid is a salmon and trout species that are born in freshwater streams, live in the ocean during maturity, and return to the streams of their birth to spawn and die.

Total Maximum Daily Load

A total maximum daily load, or TMDL, is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards.

Exhibit 3-67: *Wellhead Protection Areas*



A Clean Water Act Section 404 permit and Clean Water Act Section 401 water quality certification will not be required for the Preferred Alternative.

Since the release of the Draft EIS, ODOT has applied for a system underground injection control permit from Oregon Department of Environmental Quality. Underground injection controls serving the proposed action will be covered by the permit and subject to its conditions.

Since the release of the Draft EIS, ODOT released the *Hydraulics Manual—Water Quality* (2011) to replace the *Highway Division Project Delivery Leadership Team Operational Notice PD-05* and the *Technical Bulletin GE09-02(b)*. The water quality goals and objectives are described in Chapter 14 of this manual.

3.9.2 Affected Environment

More information: Additional detail on water resources is provided in the Water Resources Technical Report (ODOT 2014r). The *Water Resources Technical Report* is listed in Appendix K and available in the document library of the project's website (www.us97solutions.org).

Water Quality

The API is within the Upper Deschutes Watershed, which is a part of the Deschutes River Basin. The Deschutes River, which is located outside of the API to the west, is a major tributary to the Columbia River and provides irrigation to many areas like the City of Bend. The deep aquifer in the vicinity of the API is primarily fed from precipitation falling in the upper elevation areas of the Newberry Volcano, which is located about 10 miles south of Bend. Precipitation and seepage from irrigation canals supports the shallow groundwater in the API.

Water withdrawals from the Deschutes River for the irrigation canals have caused the Deschutes River flow to be much lower in the summer than is natural. The shallow water depth during these low flows results in an increase in the temperature of the water, which makes the water unhealthy for fish and aquatic insects. The Deschutes River in Bend exceeds the state's temperature standard during the salmonid rearing period in the summer. The Upper Deschutes Watershed also does not meet the Oregon Department of Environmental Quality's water standards (303(d) list) for temperature, pH, sedimentation, dissolved oxygen, turbidity, or chlorophyll. There are no Total Maximum Daily Load limits established for the Upper Deschutes Watershed.

Hydrology

The API contains portions of three canals. The Swalley Main Canal is managed by the Swalley Irrigation District, and the North/Pilot Butte Canal and the North Main Canal are managed by the Central Oregon Irrigation District.

Hydrology is tied to low rainfall precipitation and seasonal snowmelt that moves through the ground to groundwater resources. Closer to the Deschutes River, precipitation and snowmelt would flow directly in to the river. The API is not close enough to the Deschutes River to allow stormwater runoff to reach the river. The productive groundwater level ranges from 110 feet to 840 feet below the ground surface (Oregon Water Resources Department 2008). Groundwater is used for domestic and municipal uses, including drinking water. Within the ODOT right of way there are 18 drywells, 1 linear drywell (2,435 feet in length), and 3 drainwells. Well logs indicate that wells typically reach down into the volcanic and sedimentary rocks to depths of between 500 and 700 feet. Although groundwater is typically deep, shallow groundwater from perched zones may be encountered.

More Information

For more information about coordination that has occurred between ODOT and local, state and federal agencies concerning public wells and well-head protection areas see section 7.2 Consultation and Coordination with Other Public Agencies.

The locations of the well protection areas identified by the Bend Metropolitan Planning Organization within the API (Bend Metropolitan Planning Organization 2007) are shown on Exhibit 3-67. They are located south of Rogers Road on the east side of US 97 near Fort Thompson Lane.

The Oregon Department of Human Services, Public Health Division, Drinking Water Program, has identified two public community wells that are regulated by the US Environmental Protection Agency located at the Four Seasons Mobile Home Park and the Juniper Mobile Home Park. Both wells are associated with well protection areas within the API for this project. The well protection areas consist of 1-year, 2-year, 5-year and 15-year groundwater time of travel zones. State of Oregon and Deschutes County drinking water program guidance indicate that drainage swales within 500 feet or overlaying the 2-year water travel zone of any public community well requires additional coordination with the agencies. Coordination would occur if the wellhead protection area is impacted throughout the NEPA process with the Oregon Department of Human Services, Drinking Water Program.

There is one public well that is state regulated at the Hilltop Mobile Home Park; however, there are no well protection areas identified for this type of well. Coordination between ODOT and Deschutes County has been conducted and will continue throughout the project.

Additional information on the Swalley Irrigation Facility was provided during and following the public comment period associated with the Draft EIS. The API contains portions of three canals. The Swalley Main Canal Pipeline is managed by the Swalley Irrigation District, the North Unit Main Canal is managed by the North Unit Irrigation District, and the North/Pilot Butte Canal is managed by the Central Oregon Irrigation District. Several laterals from the Swalley Main Canal Pipeline are in the API including the Swalley Rogers Lateral, Swalley Kotzman Lateral, Swalley NC-1 Lateral, and Swalley Riley Lateral.

Key Differences

	East DS1	East DS2	Preferred Alternative
Impervious Area Formally Treated	52 acres	53 acres	56 acres
Portion of Contributing Area Treated	56%	63%	59%
Impervious Area Incidentally Treated	41 acres	31 acres	39 acres

Soils

A list of soils is included in Section 3.18 Geology. About 85 percent of the API consists of the Deskamp-Gosney complex, 0 to 8 percent slopes and the Gosney-Rock outcrop-Deskamp complex, 0 to 15 percent slopes. These soils are sandy, somewhat excessively drained with the potential for wind and water erosion. None of these soils are classified by the National Resource Conservation Service as hydric soils. The Deskamp-Gosney complex, 0 to 8 percent slopes is in the "B" hydrologic soil group while the Gosney-Rock outcrop-Deskamp complex, 0 to 15 percent slopes is in the "C" hydrologic soil group. These soils provide some natural treatment of diffuse stormwater runoff before the runoff reaches water bodies or drinking water sources.

Stormwater Runoff

Stormwater can carry roadway pollutants like dissolved metals from the road to adjacent areas, where they can eventually reach surface water bodies or drinking water sources. The City of Bend does not have a city-wide piped storm drain system (URS 2008). There are only about 13 miles of city stormwater pipes and 20 outfalls to the Deschutes River to convey stormwater runoff. All of these piped areas are south of the API and located in the central part of Bend. Bend has primarily relied upon dry wells and drilled holes to convey stormwater to groundwater.

Definition

Impervious Surfaces

Impervious surfaces are mainly constructed surfaces such as rooftops, sidewalks, roads, and parking lots, covered by impenetrable materials such as asphalt or concrete. These materials seal surfaces, repel water, and prevent precipitation from infiltrating soils. Soils compacted by urban development can also be highly impervious.

There are approximately 44 acres of existing impervious surfaces within the API that are within ODOT right of way. There are also additional impervious surfaces related to Deschutes County roads, City of Bend streets, and public and private development; however, these surfaces are not contributing impervious areas requiring stormwater treatment by the proposed action (ODOT 2009b).

Stormwater runoff for approximately half of the 44 acres of existing impervious surfaces is sheet flow to adjacent roadside ditches where the stormwater is incidentally treated by flowing through vegetation and soils. This stormwater does not reach surface water bodies. The remainder is curbed with catch basins that discharge to drywells and drainwells. Pollutants that reach these wells could degrade groundwater resources that provide domestic use water to residents. There is no formal treatment of stormwater runoff in the API. Exhibit 3-68 FEIS shows the estimated amounts of roadway pollutants that are transferred annually by stormwater runoff.

Exhibit 3-68 FEIS: *Roadway Pollutant Loads Per Year*

Alternative	Net New Impervious Area (acres)	Impervious Area Treated (acres)	Percent Formally Treated (%)	Percent Incidental Treatment (%)	Roadway Pollutant Loads With Treatment Per Year				
					Total Suspended Solids (kg/yr)	Total Copper (kg/yr)	Dissolved Copper (kg/yr)	Total Zinc (kg/yr)	Dissolved Zinc (kg/yr)
Existing (2007) and No Build (2035) Alternative	N/A	44	0	50	4,935	0.85	0.19	6.73	1.47
East DS1 Alternative	49	~~93~~ 99	56	44	~~5,432~~ 5,813	~~1.22~~ 1.30	~~0.34~~ 0.36	~~9.75~~ 10.43	~~2.58~~ 2.75
East DS2 Alternative	40	~~84~~ 90	63	37	~~4,723~~ 5,095	~~1.09~~ 1.17	~~0.30~~ 0.32	~~8.68~~ 9.37	~~2.31~~ 2.49
Preferred Alternative	39	95	59	41	5,462	1.26	0.34	9.90	2.62

Note: This table was revised to include the net new impervious area and the total area to be treated following the 2011 ODOT stormwater water quality treatment guidance for all build alternatives.

The *ODOT Hydraulics Manual—Water Quality* (ODOT 2011) provided new guidance to calculate the contributing area for stormwater treatment. The analysis for the Preferred Alternative uses the 2011 guidance for calculating the contributing area; the analysis for the East DS1 and East DS2 Alternatives was updated to include contributing areas that would be treated using the 2011 guidance. Existing non-ODOT-controlled impervious surfaces were quantified for the East DS1, East DS2, and Preferred Alternatives as impervious areas that could contribute to impacts and will require stormwater treatment.

3.9.3 Environmental Consequences

No Build Alternative

Under the No Build Alternative, groundwater resources would not benefit from the removal of existing drywells and drainwells and the installation of stormwater treatment facilities that would occur under the East DS1 and East DS2 Alternatives. No additional impervious surfaces would be added to the Upper Deschutes Watershed. Stormwater and the roadway pollutants it carries would continue to be discharged to the soil through ditches and to the underlying geologic formations through drywells and drainwells, potentially reaching drinking water. Stormwater that sheet flows into ditches would continue to have incidental treatment by flowing through vegetation and/or the soils. The amount of roadway pollutants transferred by stormwater runoff would be the same as shown for the existing conditions (Exhibit 3-68 FEIS).

East DS1 Alternative

Under the East DS1 Alternative, impervious surfaces would increase by 49 acres, bringing the total amount of impervious surfaces within ODOT, City of Bend, and Deschutes County rights of way to be treated to 93 acres (Exhibit 3-68 FEIS). As a result of the increase in impervious surfaces, the proposed action would be required to follow the water quality guidance for stormwater in *Technical Services GeoEnvironmental Bulletin GE09-02(B): Stormwater Management Program* (ODOT 2009b) and flow control guidance from the Chapter 12 in the *ODOT Hydraulics Manual – Storage Hydraulics Manual* (ODOT 2005b). The existing drywells and drainwells would be decommissioned. This decommissioning would benefit groundwater resources by removing a direct route for contaminants, such as metals and petroleum-oil lubricants, to reach groundwater and drinking water. Construction within the wellhead protection areas at Four Seasons and Juniper mobile home parks would include a frontage road east of US 97 that extends from the Juniper Mobile Home Park to the Four Seasons Mobile Home Park, the ramps of the

Definitions

Drywell

A drywell is an underground structure that disposes of stormwater runoff by dissipating it into the ground where it merges with the local groundwater. A drywell is typically constructed of a metal or concrete cylinder with perforated sides and bottom.

Drainwell

A drainwell is similar to a drywell but a drainwell consists of a pit filled with gravel, riprap, rubble, or other stony debris.

Wellhead Protection Area

The area surrounding a drinking water well or well field is protected to prevent contamination of the wells.

northern interchange, and the extension of 3rd Street from Cooley Road to the northern interchange. There are four proposed drainage swales that would provide enhanced stormwater treatment within the 15-year wellhead protection areas; however, none would be located within 500 feet of the public community wellhead protection areas or overlay the 2-year water travel zone. Planned road improvements would occur within the 2year water travel zone and within 500 feet of the well protection zones. However, these improvements would not significantly change the existing patterns of stormwater flow and infiltration into the soil and vegetation, and therefore would be compatible with guidance on the wellhead protection zones. No drainage swales and minimal roadway improvements would occur near the public well located at Hilltop Mobile Home Park. The Oregon Department of Human Services, Drinking Water Program confirmed that the three public wells within the API would not be impacted by the East DS1 Alternative, and stated that a Source Water Assessment Report is not required for any of these well systems (Pattee 2011).

Private wells and septic systems that would be acquired or otherwise unable to continue use as a result of the proposed action would be viewed as a damage/cost-to-cure scenario in the acquisition process. Decommissioning of wells and/or septic systems on fully acquired parcels would be conducted prior to project construction.

Definition

Cost-to-cure

The additional cost that the project would pay to the property owner to have the private wells and septic systems rebuilt, if necessary, and returned to equal-to-pre-construction conditions.

Six stormwater ponds and three stormwater swales totaling about 2.3 acres of surface area would be constructed. The stormwater ponds and stormwater swales would provide the required stormwater detention for water quality and would be sized to retain the water quality storm event (50 percent of the 2-year, 24-hour storm event (0.8 inches)) and retain the 50-year (2.8 inches) and 100-year (3.0 inches) storm events.

All stormwater would infiltrate after both formal and incidental treatment. For the purposes of estimating the annual pollutant loads for this alternative, the following stormwater treatment efficiencies were used:

- Total suspended solids: formal 70 percent, incidental 50 percent
- Total metals: formal 50 percent, incidental 40 percent
- Dissolved metals: formal 30 percent, incidental 20 percent.

It is anticipated that there would be two new crossings of the Swalley Main Canal Pipeline and potential minor relocations of the pipeline. ~~These crossings would pipe the canal in a culvert under the roadway.~~ The crossings of laterals and minor relocations would be designed such that the function and flow of the irrigation canals would be maintained to existing conditions.

The East DS1 Alternative would be required to follow the water quality guidance for stormwater in Chapter 14 of the *ODOT Hydraulics Manual – Water Quality* (ODOT 2011b), which was released after the Draft EIS was published. The total amount of impervious surface that would be treated increased to 99 acres using this new guidance. Additionally, the retention facility design guidelines described in the Stormwater Report and in Chapter 12 of the *ODOT Hydraulics Manual* would be followed. The stormwater facilities would be designed to infiltrate all of the project's runoff with no discharges to surface waters; therefore, flow control requirements would not apply to this project. In addition, the Swalley Irrigation District has piped the remaining open segments of the Swalley Main Canal Pipeline within the API. Open portions of laterals that intersect the East DS1 Alternative would be piped in culverts under the roadway.

East DS2 Alternative

Under the East DS2 Alternative, impervious surfaces would increase by 40 acres, bringing the total amount of impervious surfaces within ODOT, City of Bend, and Deschutes County right of way to be treated to 84 acres (Exhibit 3-68 FEIS). As a result of the increase in impervious surfaces, the proposed action would be required to follow the water quality guidance for stormwater in *Technical Services GeoEnvironmental Bulletin GE09-02(B): Stormwater Management Program* (ODOT 2009b) and flow control guidance from the *Hydraulics Manual* (ODOT 2005b). The existing drywells and drainwells would be decommissioned benefitting groundwater resources. This decommissioning would benefit groundwater resources by removing a direct route for contaminants, such as metals and petroleum-oil lubricants, to reach groundwater and drinking water.

Construction within the wellhead protection areas would include the Bowery Lane overcrossing near Four Seasons Mobile Home Park and a frontage road east of US 97 extending from the Juniper Mobile Home Park to the Four Seasons Mobile Home Park. Impacts would be the same as those described for the East DS1 Alternative. No drainage swales and only minimal roadway improvements would occur near the public well located at the Hilltop Mobile Home Park. The Oregon Department of Human Services, Drinking Water Program confirmed that the three public wells within the API would not be impacted by the East DS2 Alternative, and stated that a Source Water Assessment Report is not required for any of these well systems (Pattee 2011).

Private wells and septic systems that would be acquired or otherwise unable to continue use as a result of the proposed action would be viewed as a damage/cost-to-cure scenario in the acquisition process.

Decommissioning of wells and/or septic systems on fully acquired parcels would be conducted prior to project construction.

Six stormwater ponds and four stormwater swales totaling 2.4 acres of surface area would be constructed. The stormwater ponds and stormwater swales would provide the required stormwater detention for water quality and would be sized to retain the water quality storm event (50 percent of the 2-year, 24-hour storm event (0.75 inches)) and retain the 50-year (2.8 inches) and 100-year (3.0 inches) storm events.

All stormwater would infiltrate after both formal and incidental treatment. For the purposes of estimating the annual pollutant loads, the same stormwater treatment efficiencies used for the East DS1 Alternative were used for the East DS2 Alternative.

Similar to the East DS1 Alternative, it is anticipated that there would be two new crossings and potential minor relocations of the Swalley Main Canal Pipeline under the East DS2 Alternative.

The East DS2 Alternative would be required to follow the water quality guidance for stormwater in Chapter 14 of the *ODOT Hydraulics Manual – Water Quality* (ODOT 2011b), which was released after the Draft EIS was published. The total amount of impervious surface that would be treated increased to 90 acres using this new guidance. Additionally, the retention facility design guidelines described in the Stormwater Report and in Chapter 12 of the *ODOT Hydraulics Manual* would be followed. The stormwater facilities would be designed to infiltrate all of the project's runoff with no discharges to surface waters; therefore, flow control requirements would not apply to this project. In addition, the Swalley Irrigation District has piped the remaining open segments of the Swalley Main Canal Pipeline within the API. Open portions of laterals that intersect the East DS2 Alternative would be piped in culverts under the roadway.

Preferred Alternative—East DS2 Modified Alternative

Under the Preferred Alternative, impervious surfaces will increase by 39 acres, bringing the total amount of impervious surfaces within ODOT, City of Bend, and Deschutes County rights of way to be treated to 95 acres (Exhibit 3-68 FEIS). As a result of the increase in impervious surfaces, the Preferred Alternative will be required to follow the water quality guidance for stormwater in Chapter 14 of the *ODOT Hydraulics Manual – Water Quality* (ODOT 2011b). Additionally, the retention facility design guidelines described in the Stormwater Report and in Chapter 12 of the ODOT Hydraulics Manual will be followed. The stormwater facilities will be designed to infiltrate all of the runoff with no discharges to surface waters; therefore, flow control requirements will not apply to this project. The existing drywells and drainwells will be decommissioned

benefitting groundwater resources. This decommissioning will benefit groundwater resources by removing a direct route for contaminants, such as metals and petroleum-oil lubricants, to reach groundwater and drinking water.

There will be no construction within the wellhead protection areas near the Juniper Mobile Home Park and the Four Seasons Mobile Home Park. Impacts to water quality resulting from the Preferred Alternative will be slightly less than those described for the East DS1 and slightly more than those described for the East DS2 Alternatives. No drainage swales or roadway improvements will occur near the public well located at the Hilltop Mobile Home Park. The Oregon Department of Human Services, Drinking Water Program confirmed that the three public wells within the API will not be impacted by the Preferred Alternative, and stated that a Source Water Assessment Report will not be required for any of these well systems (Pattee 2011).

Private wells and septic systems that will be acquired or otherwise unable to continue use as a result of the Preferred Alternative will be viewed as a damage/cost-to-cure scenario in the acquisition process. Decommissioning of wells and/or septic systems on fully acquired parcels will be conducted prior to project construction.

Fifteen stormwater ponds and six stormwater swales totaling 2.7 acres of surface area will be constructed within the right of way obtained for this project. The stormwater ponds and stormwater swales will provide the required stormwater detention for water quality and will be sized to retain the water quality storm event (50 percent of the 2-year, 24-hour storm event (0.75 inches)) and retain the 50-year (2.8 inches) and 100-year (3.0 inches) storm events.

All stormwater will infiltrate after both formal and incidental treatment. For the purposes of estimating the annual pollutant loads, the same stormwater treatment efficiencies used for the East DS1 and East DS2 Alternatives were used for the Preferred Alternative.

Modifications to the Swalley Irrigation District facilities under the Preferred Alternative are presented in detail in Section 3.11.3. No stormwater runoff or other construction-related pollutants will discharge to any of the canals or laterals.

Indirect Impacts

No indirect impacts to water quality are anticipated from the proposed action. There would be no construction near the Deschutes River and all stormwater runoff would discharge to the underlying geologic formation and would not reach the Deschutes River. Groundwater is too deep and annual precipitation is too low to alter base flow of the Deschutes River. Indirect impacts due to water quantity are not

anticipated for the East DS1 and East DS2 Alternatives because water quantity flow control design standards would be applied and all new impervious surface would be formally or informally treated.

The indirect impacts from the Preferred Alternative will be the same as those from the East DS1 and East DS2 Alternatives.

Construction Impacts

For the No Build Alternative, construction would not occur and there would be no construction impacts to water quality and water resources. For the East DS1 and East DS2 Alternatives, temporary construction impacts would be similar. Construction would last approximately two to three years. Clearing and grading of between 115 and 140 acres would expose soils. Soils could also be exposed at staging areas. Erosion from exposed soils (either disturbed soil areas or soil stockpiles) could increase the amount of sediment and suspended solids potentially flowing off site during a rain event. However, there are no steep slopes or highly erodible soils in the API. During construction, increased stormwater runoff due to an increase of impervious surface from widening existing roads and constructing new roads could combine with erosion from grading, machine operation, and vegetation removal to cause off-site deposition of sediment. Stormwater runoff could also carry other contaminants, such as fuel or oil from construction machinery, particularly at staging areas. Chemical and petroleum spills could percolate through the soil and contaminate groundwater. Pouring concrete near open water would create the potential for spills. Concrete spilled into open waters can change local pH levels.

Construction impacts related to canal crossings would have the potential to introduce sediment into the irrigation canals, which would increase turbidity. The canals would be protected during construction by performing the work when the canal is dry and fully installing erosion control measures before the water reenters the canal channel.

Geotechnical investigations performed during the final design phase for the Preferred Alternative will involve installing geotechnical boreholes and collecting soil and bedrock samples. These boreholes, if not properly abandoned, could provide a conduit to allow pollutants to contaminate groundwater resources. The boreholes will be properly abandoned following Oregon Water Resource Department rules and regulations. Groundwater wells, dry wells, and drain wells encountered during construction will also need to be properly abandoned in order to protect groundwater resources.

Private domestic groundwater wells present in the API, but not on parcels subject for acquisition or not in conflict with proposed construction, could be damaged by nearby (within 150 feet)

construction activities such as drilling of foundation shafts or other subsurface vibration-inducing activities. Construction activities could alter the bedrock, which could result in changes to water volume production as well as changes to water color, taste, turbidity, or odor.

3.9.4 Avoidance, Minimization, and/or Mitigation Measures Proposed in the Draft EIS

Construction Mitigation and Commitments

The following measures could be taken to the extent practicable to avoid and minimize temporary adverse impacts to water resources:

- Preparation and implementation of an erosion and sediment control plan
- Preparation and implementation of a spill prevention control and countermeasures plan
- Implementation of water quality best management practices.

All projects in the construction phase would require water quality best management practices. These best management practices are described in the Standard Specifications for Construction, Section 00280. Specific best management practices for erosion prevention could include:

- Plastic Sheeting—Place plastic sheeting on disturbed, temporary slopes or stockpiles where immediate protection is required and mulching or other methods of soil stabilization are not feasible. Temporary slopes include vertical excavations for retaining walls and other temporary soil excavations and embankments related to structural work.
- Chemical Soil Binder—Hydraulically apply a liquid stabilization emulsion
- Chemical Dust Control—Apply appropriate dust control for wind or equipment-caused erosion
- Temporary Mulching—Evenly apply dry mulch and tackifier material to form a cohesive surface cover that is resistant to displacement by wind and water. In areas not accessible to heavy equipment, mulch by hand or by other approved methods.

Specific best management practices for runoff control could include:

- Check Dams—Construct check dams
- Diversion Dikes and Swales—Construct diversion dikes and swales above the cut slope to divert runoff from undisturbed areas away from disturbed slope areas. Convey runoff to an undisturbed area and discharge in a non-erosive manner.

- Temporary Drainage Curbs—Construct temporary drainage curbs
- Temporary Slope Drains—Construct watertight slope drains and extend as the embankment height increases. Construct temporary slope berms at the top of embankment slopes to direct water into the drains until permanent drainage structures are completed.
- Flow Spreader—A flow spreader is a device that receives channeled runoff and uniformly disperses the runoff along the length of the spreader. The flow spreader could be constructed of clean aggregate in a berm or trench or lumber or similar materials. Place the flow spreader to discharge water into a stabilized area at non-erosive velocities.

Specific best management practices for sediment control could include:

- Construction Entrances—Install construction entrances at every point of access onto paved surfaces. When construction entrances are in use and mud and dirt tracking is still evident, take additional steps to eliminate tracking by hosing off tires before vehicles leave the site, or by modifying construction techniques or work operation. Perform tire washing on gravel pads. Use silt-trapping structures to collect and drain wash water before water leaves the construction site.
- Sediment Fence—Construct supported (mesh and metal posts) and unsupported (no mesh) sediment fences
- Inlet Protection—Construct inlet protection that directs flows through the control and into the inlet
- Sediment Barriers—Install sediment barriers

Temporary Scour Basin—Construct temporary scour basins at the outfall ends of temporary slope drains

Temporary Sediment Trap—The trap may be formed by constructing a berm or by partial or complete excavation. Direct the discharge flow to a stabilized conveyance outlet or level spreader.

The following additional measures identified during the public comment on the Draft EIS could be taken to the extent practicable to avoid and minimize additional temporary adverse impacts to water resources:

- Protection of the unpiped sections of the canals by performing the work when the canal is dry and fully installing erosion control measures before the water re-enters the canal channel
- Protection of the piped canals during construction by identifying their piped locations prior to construction and eliminating unnecessary equipment loading directly above the canals

- Coordination of work in or near the canals in the API with the Swalley and Central Oregon Irrigation Districts
- Preparation and implementation of a pollution prevention plan
- Preparation and implementation of a groundwater protection plan.

The groundwater protection plan could include:

- Identification and confirmation of groundwater resources within the API through field surveys and contacts with landowners before construction
- Sampling wells within 150 feet of subsurface construction activities before construction to obtain water quality and water volume yield data for each sampling point
- If it is determined that subsurface construction activities have diminished a water supply, arrange for a temporary water supply through a local supplier and make the necessary repairs to the affected water well, or install another comparable well
- Implementation of the best management practices of the pollution prevention plan and spill prevention control and countermeasures plan with regard to fueling of construction equipment, fuel storage and secondary containment with impermeable lining, and having spill containment equipment and supplies maintained on site.

Mitigation for Long-Term Impacts

Avoidance Measures—The East DS1 and East DS2 Alternatives have been designed to avoid placing structures within canals, which would avoid impacts to surface water resources. In addition, the East DS1 and East DS2 Alternatives have been designed to minimize the extent that the irrigation canals would need to be realigned or covered.

The remaining open segments of the canals have been piped within the API. The Preferred Alternative has been designed to avoid breeching piped canals, which will avoid impacts to surface water resources. In addition, the Preferred Alternative has been designed to minimize the extent that the irrigation canals will need to be crossed. The Preferred Alternative has been designed to avoid the same impacts to the East DS1 and East DS2 Alternatives identified above.

Minimization and Mitigation Measures—The East DS1 and East DS2 Alternatives would provide the required stormwater detention for water quality through the construction of stormwater retention ponds and swales. The ponds would be sized to retain the water quality storm (50 percent of the 2-year, 24-hour storm event) and retain the 50-year and 100-year storm events. Incidental treatment of stormwater, from sheet flow to ditches, would further minimize the

impacts to water quality by providing filtration through vegetation or infiltration into the soils. ODOT would continue to coordinate with Deschutes County on the public and community wells.

Under the Preferred Alternative, there will be no construction within the wellhead protection areas near the Juniper Mobile Home Park and the Four Seasons Mobile Home Park; therefore, no impacts to groundwater resources will be associated with these protected wells. As a result of the Preferred Alternative, no drainage swales or roadway improvements will occur near the public well located at the Hilltop Mobile Home Park. The Oregon Department of Human Services, Drinking Water Program confirmed that the three public wells within the API will not be impacted by the Preferred Alternative. As a result, ODOT will not need to coordinate with Deschutes County on the public and community wells.

The Preferred Alternative will provide approximately the same amount of stormwater detention (2.7 acres) as identified for the East DS1 (2.3 acres) and East DS2 (2.4 acres) Alternatives. The Preferred Alternative expects to provide for a higher number of smaller sized ponds and swales than were envisioned for the East DS1 and East DS2 alternatives. Once constructed, the ponds and swales for the Preferred Alternative will provide formal stormwater treatment through settling, vegetation filtration, and the filtration of stormwater through the soil. These stormwater treatment approaches will minimize the amount of pollutants, including dissolved metals from potentially entering groundwater resources. ODOT will continue to coordinate with the Swalley Irrigation District related to the location of stormwater ponds and canal and lateral crossings in relation to their irrigation facilities.

3.9.5 Avoidance, Minimization, and/or Mitigation Commitments Incorporated into the Preferred Alternative

ODOT makes the following commitments:

Project Design

- ODOT will continue coordination during the project design phase with the Swalley Irrigation District related to the location of stormwater ponds and canal and lateral crossings in relation to their irrigation facilities
- ODOT will prepare a groundwater protection plan that will:
  - Identify and confirm the location of groundwater resources within the API through field surveys and contacts with landowners before construction

  - Identify the procedures to sample wells within 150 feet of planned subsurface construction activities before construction to obtain water quality and water volume yield data for each sampling point.

- ODOT will prepare an erosion and sediment control plan, a pollution prevention plan and a spill prevention control and countermeasures plan.

Project Construction

- ODOT will require the contractor to implement temporary and permanent erosion control best management practices as needed during all phases of construction to prevent unnecessary soil disturbance and limit vegetation removal to protect water resources
- ODOT will require the contractor to implement pollution prevention and spill prevention control and countermeasures best management practices with regard to fueling of construction equipment, fuel storage and secondary containment with impermeable lining, and having spill containment equipment and supplies maintained on site to protect groundwater resources
- ODOT will arrange for a temporary water supply through a local supplier and make the necessary repairs to any well that has a diminished water supply due to subsurface construction activities, or install another comparable well
- ODOT will coordinate the timing of the installation of new crossings of the Swalley Irrigation District facilities with the district.

3.10 Natural Systems and Communities

3.10.1 Regulatory Setting

This section of the document provides an overview of the natural systems and communities. The Oregon Department of Fish and Wildlife has developed a statewide Conservation Strategy that charts a course for the long-term conservation of the state's fish and wildlife. It takes a non-regulatory, proactive approach to conservation. This section highlights natural communities of concern such as strategy habitats and conservation opportunity areas as described in the *Oregon Conservation Strategy (2006)*. Information about individual plant and animal species is not included in this section.

The Conservation Strategy identified barriers to fish and wildlife movement as a top conservation priority. The Oregon Department of Fish and Wildlife has mapped wildlife linkages along the state highway system, which are areas of habitat used by wildlife for seasonal or daily movement or migration; they connect core habitats that support necessary life history functions. ODOT has also mapped wildlife collision hot spots, which are locations with high concentrations of deer and elk carcass reports.

In addition to a description of natural communities, this section includes information on fish passage, wildlife linkages, wildlife collision hot spots, and habitat loss and fragmentation.

Although both terrestrial and aquatic communities are included in this section, the regulatory framework of designated critical habitat (as designated under the Federal Endangered Species Act) is presented in Section 3.12 Threatened and Endangered Species. The regulatory aspects of wetlands and aquatic habitats are discussed in Section 3.11 Wetlands and Other Waters.



Western juniper woodlands with sagebrush shrubland at the north end of the API.



Western juniper woodlands with shrub-steppe at the north end of the API.

3.10.2 Affected Environment

More information: Additional detail on natural systems and communities is provided in the *Natural Systems and Communities Technical Report* (ODOT 2014i). The *Natural Systems and Communities Technical Report* is listed in Appendix K and available in the document library of the project's website (www.us97solutions.org).

The API is within the western corner of the Blue Mountains Ecoregion, which covers a portion of Central Oregon and the majority of northeastern Oregon. The API is in the western corner of this large ecoregion where the climate is typified by short, dry summers and long, cold winters. Within the Blue Mountain Ecoregion 26 conservation opportunity areas have been identified, none of which are within the API. The nearest conservation opportunity area is located approximately 10 miles east of Bend in the Badlands (Oregon Department of Fish and Wildlife 2006). The following is a summary of

the strategy habitat and wildlife linkages of the Blue Mountains Ecoregion that occur within the API.

The strategy habitat of the Blue Mountains Ecoregion that occurs within the API is the sagebrush shrublands/shrub-steppe, a component of which is western juniper woodlands habitat (Exhibit 3-69 FEIS). This strategy habitat is primarily found north of Cooley Road where the structure includes open-grown western junipers mixed with pine trees and relatively sparse sagebrush mixed with other low shrubs. The area north of Cooley Road also contains a few pockets of landscaped yards, commercial development, and graveled, weedy roadside areas. The area south of Cooley Road is considered "urban landscape" and includes industrial, commercial, and residential development with planted grass and landscaped trees. Urban landscape is not considered a strategy habitat (Oregon Department of Fish and Wildlife 2006). Coordination with the Oregon Department of Fish and Wildlife would occur if impacts to strategy habitats are identified.

Wildlife Linkages

Along 40 miles of US 97 from Redmond, north of Bend, to La Pine south of Bend and along 30 miles of US 20 from Sisters, northwest of Bend, to the Badlands southeast of Bend, a 500-foot habitat buffer is defined as a wildlife linkage for small mammals, specifically the western grey squirrel (Oregon Department of Fish and Wildlife 2009). No other mammal, reptile, or amphibian linkages are mapped within the API (Oregon Department of Fish and Wildlife 2009). Linkage features that have the potential to facilitate the movement of the western grey squirrel and other small mammals include the open portions of the Swalley Riley Lateral, which traverses O.B. Riley Road east to west in the west-central portion of the API. The Oregon Department of Fish and Wildlife has placed a low value rating on the linkage provided by the Swalley Riley Lateral. Other features that typically facilitate wildlife movement are not present in the API. Due to the lack of natural waterways, no riparian habitat is present, and there are no known key underpasses or bridges that would facilitate wildlife movement. There are no mapped wildlife collision hot spots within the API (Oregon Department of Fish and Wildlife 2009 and ODOT 2009c).

Definitions

Strategy Habitats

Strategy habitats are native vegetation assemblages identified by the Oregon Department of Fish and Wildlife as needing conservation and restoration.

Sagebrush Shrublands/ Shrub-Steppe

Sagebrush shrublands are dominated by shrubs and may include various sagebrush species, bitterbrush, rabbitbrush, and western juniper. Shrub-steppe habitats are open grass-dominated communities and are usually found on loamy, wind-deposited (loess) soils.

Western Juniper Woodlands

Western juniper woodlands consist of scattered, often large, juniper trees within shrub-steppe. Late successional juniper woodlands are characterized by larger diameter trees.

Wildlife Linkage

A wildlife linkage provides a connection for wildlife to travel between habitats.

3.10.3 Environmental Consequences

Long-term, direct impacts to natural systems and communities are defined as the removal of vegetation communities or habitat, such as by clearing and grading, to construct roadways or stormwater facilities.

No Build Alternative

The No Build Alternative would maintain the existing natural systems and communities conditions. Existing conditions include on-going maintenance along roadways, which would result in adverse and

beneficial impacts to roadside vegetation and habitat, depending on the species. Beneficial impacts to habitat would include on-going control of invasive plants, which could threaten the biodiversity of native habitats, within road rights of way. However, if used, herbicide application to control weeds could have adverse impacts on the environment depending on method of application and timing. A potential adverse impact to habitat due to on-going maintenance would be the removal or alteration of woody vegetation that provides a buffer between roadway activity and adjacent habitats.

East DS1 Alternative

The East DS1 Alternative would remove approximately 66 acres (along approximately 10 miles) of western juniper woodlands habitat and sagebrush shrublands/shrub-steppe strategy habitat, comprised of 22 areas of smaller slivers, due to the construction of new roadways, new stormwater facilities, and improvements to existing roads. In addition, the East DS1 Alternative would result in the fragmentation of western juniper woodlands habitat and sagebrush shrublands/shrub-steppe strategy habitat at five locations; these locations would be generally due to the 3rd Street extension and other new roadway connections in the north.

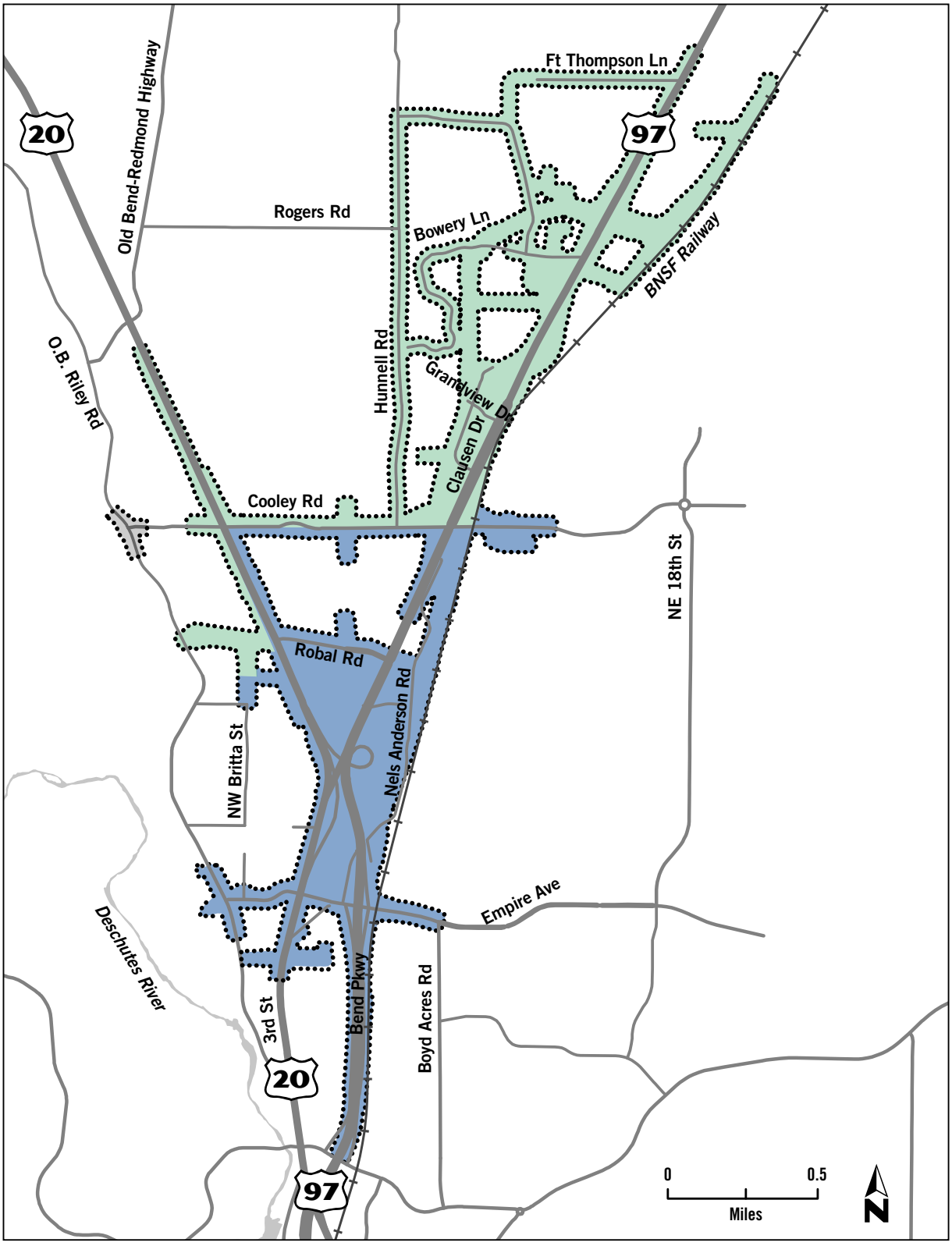
In the northern end of the API, the East DS1 Alternative would result in the loss of 950 linear feet of a habitat linkage feature (the Swalley Main Canal) for the western grey squirrel, and other small mammals, due to new roadway construction. These portions of the canal would be piped and covered and would no longer serve as a linkage between habitats east and west of US 97. The Oregon Department of Fish and Wildlife has placed a low value rating on the linkage provided by the Swalley Main Canal.

Key Differences

	East DS1	East DS2	Preferred Alternative
Strategy Habitat Removed	66 acres	62 acres	16 acres
Habitat Linkage Feature Removed	~~950 feet~~ 70 feet[1]	~~2,300 feet~~ 70 feet[1]	70 feet

[1] The Swalley Irrigation District piped all previously open segments of the Swalley Main Canal within the API, so previously identified habitat linkage features are no longer present within the API. However, habitat linkage features from the Swalley Riley Lateral have since been identified and their removal impacts from the Britta Street extension have been quantified.

Exhibit 3-69 FEIS: *Strategy Habitat Types*



Note: This exhibit has been updated to show the revised API and add color to better distinguish between habitat types. The legend has been updated to reflect revised terminology used in the Final EIS.

The East DS1 Alternative would include on-going maintenance along roadways that would benefit habitat because there would be continued control of invasive plants within road rights of way. However, if used, herbicide application to control weeds could have adverse impacts on the environment depending on method of application and timing.

Since the release of the Draft EIS, the Swalley Irrigation District has piped all previously open segments of the Swalley Main Canal within the API (now referred to as the Swalley Main Canal Pipeline). Therefore, the 950 linear foot habitat linkage feature previously referenced no longer exists within the API, and would not be affected as a result of the East DS1 Alternative.

As the design was refined for the Final EIS, additional impacts to the Swalley Riley and Rogers Laterals were identified. The East DS1 Alternative would result in the loss of a 70 linear foot habitat linkage feature (the Swalley Riley Lateral) for the western grey squirrel and other wildlife species due to new roadway construction. The currently unpiped canal would be conveyed through a four-foot diameter culvert under the proposed extension of Britta Street. Depending on water levels in the canal, many small to medium-sized animals are expected to be able to use the culvert as passage. If water levels are too high in the canal, wildlife species are expected to avoid the area or cross on the proposed road surface. This portion of the canal is within 250 feet of where the waterway is piped for several hundred feet under US 20 and US 97. Piping a small segment of the canal (70 linear feet) for the East DS1 Alternative would be expected to have little to no effect on wildlife movement. The ODFW has placed a low value rating on the linkage provided by the Swalley Riley Lateral.

The East DS1 Alternative would result in the piping of 445 feet of the Swalley Rogers Lateral, but the piping would be extensions of already piped segments of the lateral in urban landscape that do not provide habitat linkage features. Therefore, the East DS1 Alternative would only remove habitat linkage features from the piping of the open Swalley Riley Lateral. Impacts to the Swalley Irrigation Facilities are summarized in Exhibit 3-37A FEIS in Section 3.3 Right of Way and Utilities.

East DS2 Alternative

The East DS2 Alternative would remove approximately 62 acres (along approximately 11 miles) of western juniper woodlands habitat and sagebrush shrublands/shrub-steppe strategy habitat, comprised of 23 areas of smaller slivers, due to the construction of new roadways, new stormwater facilities, and improvements to existing roads. In addition, the East DS2 Alternative would result in the fragmentation of western juniper woodlands habitat and sagebrush shrublands/shrub-steppe

strategy habitat at three locations; these locations would be generally due to new roadway connections in the north.

The East DS2 Alternative would result in the loss of 2,300 linear feet of a habitat linkage feature (the Swalley Main Canal) for the western grey squirrel and other small mammals due to new roadway construction. These portions of the canal would be piped and covered and would no longer serve as a linkage between habitats east and west of US 97. The Oregon Department of Fish and Wildlife has placed a low value rating on the linkage provided by the Swalley Main Canal.

The East DS2 Alternative would also include on-going maintenance along roadways that would benefit habitat because there would be continued control of invasive plants within road rights of way. However, if used, herbicide application to control weeds could have adverse impacts on the environment depending on method of application and timing.

Since the release of the Draft EIS, the Swalley Irrigation District has piped all previously open segments of the Swalley Main Canal within the API (now referred to as the Swalley Main Canal Pipeline). Therefore, the 2,300 linear foot habitat linkage feature previously discussed no longer exists within the API, and would not be affected as a result of the East DS2 Alternative.

As the design was refined for the Final EIS, additional impacts to the Swalley Riley and Swalley Rogers Laterals were identified. Impacts to the 70 linear foot habitat linkage feature provided by the Swalley Riley Lateral as a result of the Britta Street extension would be the same as those described for the DS1 Alternative. Impacts to the 445 feet of Swalley Rogers Lateral segments in urban landscape, which do not provide habitat linkage features, would be the same as those described for the East DS1 Alternative. The East DS2 Alternative would only remove habitat linkage features from the piping of the open Swalley Riley Lateral. Impacts to the Swalley Irrigation Facilities are summarized in Exhibit 3-37A FEIS in Section 3.3 Right of Way and Utilities.

Preferred Alternative—East DS2 Modified Alternative

The Preferred Alternative will remove approximately 16 acres (along approximately 4 miles) of western juniper woodlands habitat and sagebrush shrublands/shrub-steppe strategy habitat, comprised of 13 areas of smaller slivers, due to the construction of new roadways, new stormwater facilities, and improvements to existing roads. This includes fragmentation of western juniper woodlands habitat and sagebrush shrublands/shrub-steppe strategy habitat from the culvert installation for the Swalley Riley Lateral due to the construction of the Britta Street extension.

Impacts to the 70 linear foot habitat linkage feature provided by the Swalley Riley Lateral as a result of the Britta Street extension will be the same as those described for the East DS1 and East DS2 Alternatives. Though the Preferred Alternative will pipe 310 feet of the Swalley Rogers Lateral, the habitat linkage impact will be the same as described for the East DS1 and East DS2 Alternatives because the segments are in urban landscape and do not provide habitat linkage features. Impacts to the Swalley Irrigation Facilities are summarized in Exhibit 3-37A FEIS in Section 3.3 Right of Way and Utilities.

On-going maintenance along roadways will benefit habitat because there will be continued control of invasive plants within road rights of way. However, if used, herbicide application to control weeds can have adverse impacts on the environment depending on method of application and timing.

Indirect Impacts

The No Build Alternative would not result in indirect impacts to natural systems and communities.

Indirect impacts from the East DS1 and East DS2 Alternatives would be limited to areas where the direct impacts of habitat fragmentation would occur within the API and to a minor extent beyond the API. The East DS1 Alternative could indirectly affect natural systems and communities by potentially increasing wildlife collisions with vehicles, spreading invasive species, and increasing the presence of nest predators and scavengers as a result of fragmentation of strategy habitat. These indirect impacts could occur at five locations north of Cooley Road where new roads, such as 3rd Street and a new road between Fort Thompson Lane and Harris Way, would be constructed. The East DS2 Alternative would result in indirect impacts to natural systems and communities through similar mechanisms as those described for the East DS1 Alternative. These indirect impacts could occur in three locations where roadway improvements would be constructed near Bowery Lane and 3rd Street.

The Preferred Alternative will result in indirect impacts to natural systems and communities through similar mechanisms as those described for the East DS1 and East DS2 Alternatives. These indirect impacts could occur in only one location (Britta Street) where strategy habitat will be fragmented.

Construction Impacts

Construction impacts to strategy habitats resulting from the East DS1 and East DS2 Alternatives could include increased noise, dust, and human activity. These impacts would be temporary and localized and would not be expected to adversely impact natural systems and communities.

Construction impacts from the Preferred Alternative will be the same as those described for the East DS1 and East DS2 Alternatives.

3.10.4 Avoidance, Minimization, and/or Mitigation Measures Proposed in the Draft EIS

Construction Mitigation and Commitments

ODOT's *Standard Specifications for Highway Construction* (ODOT 2008c) and *Special Provisions* (ODOT 2009a) would be used to minimize impacts to the surrounding environment. Examples of measures that could be taken to the extent practicable to avoid, minimize, and mitigate for temporary adverse impacts to natural systems and communities include:

- Do not compact soil with heavy equipment in areas where soil would not otherwise be disturbed for other construction activities
- Minimize vegetation removal and schedule removal outside of the breeding season (March 15 through August 31) if feasible
- Seed or cover disturbed areas to prevent the establishment of non-native/invasive plants. Include native species in permanent ground cover seeding.

Mitigation for Long-Term Impacts

Avoidance and Minimization Measures – The East DS1 and East DS2 Alternatives were designed to avoid large tracts of western juniper woodlands habitat north of Fort Thompson Lane and along US 97. To ensure that impacts to habitat continue to be minimized, coordination with the Oregon Department of Fish and Wildlife would occur throughout the construction of the project.

Avoidance and minimization measures of the Preferred Alternative for natural systems and communities were the same as described for the East DS1 and East DS2 Alternatives. Additionally, the Preferred Alternative was designed to avoid impacts to natural lands outside the UGB, unlike the East DS1 and East DS2 Alternatives.

Mitigation Measures – Mitigation is not required for habitat loss to non-threatened or endangered species since impacts from the East DS1 and East DS2 Alternatives would not be adverse. Additionally, it is ODOT's policy to disturb the minimum area needed in order to construct a project.

No mitigation for wildlife linkage impacts is recommended because of the relatively low value rating placed on the linkage by the Oregon Department of Fish and Wildlife.

Mitigation is not required for habitat loss to non-threatened or endangered species since impacts from the Preferred Alternative will not be adverse.

3.10.5 Avoidance, Minimization, and/or Mitigation Commitments Incorporated into the Preferred Alternative

ODOT makes the following commitments:

Project Design

- ODOT will design vegetation restoration plans to prevent the establishment of non-native/invasive plants to the greatest extent feasible by specifying native plants and seed mixes.

Project Construction

- ODOT will coordinate with the Oregon Department of Fish and Wildlife to minimize impacts to habitat
- ODOT will implement temporary and permanent best management practices as needed during all phases of construction to prevent unnecessary soil compaction and limit vegetation removal where feasible, and in coordination with the Oregon Department of Fish and Wildlife.

3.11 Wetlands and Other Waters

3.11.1 Regulatory Setting

Wetlands and other waters are protected under a number of laws and regulations. These resources may be protected by local comprehensive plans. At the federal level, the Federal Water Pollution Control Act commonly referred to as the Clean Water Act (33 USC 1344) is the primary law regulating wetlands and waters. The Clean Water Act regulates the discharge of dredged or fill material into waters of the US, including wetlands. Waters of the US include navigable waters, interstate waters, territorial seas and other waters that may be used in interstate or foreign commerce.

The Section 404 regulatory program is administered by the US Army Corps of Engineers with oversight by the US Environmental Protection Agency. The US Army Corps of Engineers has the authority under Section 404 of the Clean Water Act to deny a request to discharge dredged or fill material if a practicable alternative exists that is less damaging to the aquatic environment or if the nation's waters would be significantly degraded.

Section 10 of the Rivers and Harbors Act (33 USC 403), covers construction, excavation, or deposition of materials in, over, or under such waters, or any work which would affect the course, location, condition or capacity of those waters. Actions requiring Section 10 permits include structures (e.g., piers, wharfs, breakwaters, bulkheads, jetties, weirs, transmission lines) and work such as dredging or disposal of dredged material, or excavation, filling or other modifications to the navigable waters of the US. The Coast Guard also has responsibility for permitting the erection or modification of bridges over navigable waters of the US.

At the state level, wetlands and waters are regulated primarily by the Oregon Department of State Lands under the Removal-Fill Law (ORS 196.800-196.990). The jurisdictional limits of the Oregon Department of State Lands are to the ordinary high water line or the edge of the wetland/upland boundary, whichever is higher, on nontidal streams. Wetlands are jurisdictional to the wetland/upland boundary. The extent of the US Army Corps of Engineers and Oregon Department of State Lands' jurisdiction on certain features may be different.

In addition to the Clean Water Act, 23 CFR 777.3 also regulates the activities of federal agencies with regard to wetlands. This executive order essentially states that a federal agency, such as FHWA, cannot undertake or provide assistance for new construction located in wetlands unless that agency finds: 1) that there is no practicable alternative to the construction, and 2) the proposed action includes all practicable measures to minimize harm.

The Oregon Department of Environmental Quality issues water quality certifications in compliance with Section 401 of the Clean Water Act when a US Army Corps of Engineers permit is issued under Section 404, or when a project involves federal lands (e.g., US Forest Service or Bureau of Land Management).

3.11.2 Affected Environment

More information: Additional detail on wetlands and other waters is provided in the *Wetlands and Water Resources Technical Report* (ODOT 2014c). The *Wetlands and Water Resources Technical Report* is listed in Appendix K and available in the document library of the project's website (www.us97solutions.org).

Wetlands

There are no natural wetlands in the API (ESA Adolfson 2008). The wetlands present are human-created, non-jurisdictional (state or federal) features. These non-jurisdictional wetlands are found along the edge of small, isolated, excavated ponds or are supported by seepage from excavated ponds or by direct irrigation. The irrigation water supporting the wetlands originates from the Deschutes River and is diverted from the river slightly to the south, within the city limits of Bend. The non-jurisdictional wetlands may provide limited functions such as songbird, amphibian, reptile, and small mammal habitat. However, because they do not flow into other waters, these wetlands do not provide hydrologic functions, water quality functions, organic matter export, or fish habitat, and they are not unusual or rare. The preamble to the 1986 regulations defining waters of the United States describes several types of water bodies that the US Army Corps of Engineers generally does not consider waters of the US including artificially irrigated areas that would revert to upland if the irrigation ceased and artificial ponds created in dry land. Consequently, the Portland District of the US Army Corps of Engineers does not assert jurisdiction over excavated ponds, wetlands formed at the periphery of excavated ponds, wetlands supported by seepage of ponds, or wetlands formed as a result of direct irrigation.

Water Resources

Water resources include ponds, small irrigation ditches, and canals. There are approximately 73 excavated ponds used for irrigation, stock watering, or aesthetic purposes. All of the ponds are less than one acre (and all except one are less than 0.5 acre); many are lined with heavy plastic. The National Wetland Inventory classifies these ponds as palustrine, unconsolidated shore, seasonally flooded, excavated or palustrine, unconsolidated bottom, semipermanently flooded, excavated (ESA Adolfson 2008). Because these ponds are artificially created, less than one acre in size, and isolated, they do not fall under either state or federal jurisdiction (ESA Adolfson 2008).

There are no natural waterways in the API (ESA Adolfson 2008). However, the three canals are present, including the Swalley Main Canal, the North/Pilot Butte Canal, and the North Unit Main Canal (Exhibit 3-70). ~~Although these are human created canals, they flow into the Deschutes River and are defined by federal law as jurisdictional and regulated tributaries (ODOT 2010h).~~ Although they are not included on National Wetlands Inventory maps, unpiped portions of laterals are consistent with the Cowardin classification (1979) of riverine, intermittent, unconsolidated bottom. Fish screens prevent fish from inhabiting the canals. The irrigation water that supports these water features is diverted from the Deschutes River slightly to the south, within the city limits of Bend. Federal jurisdiction of the canals and their laterals is discussed below.

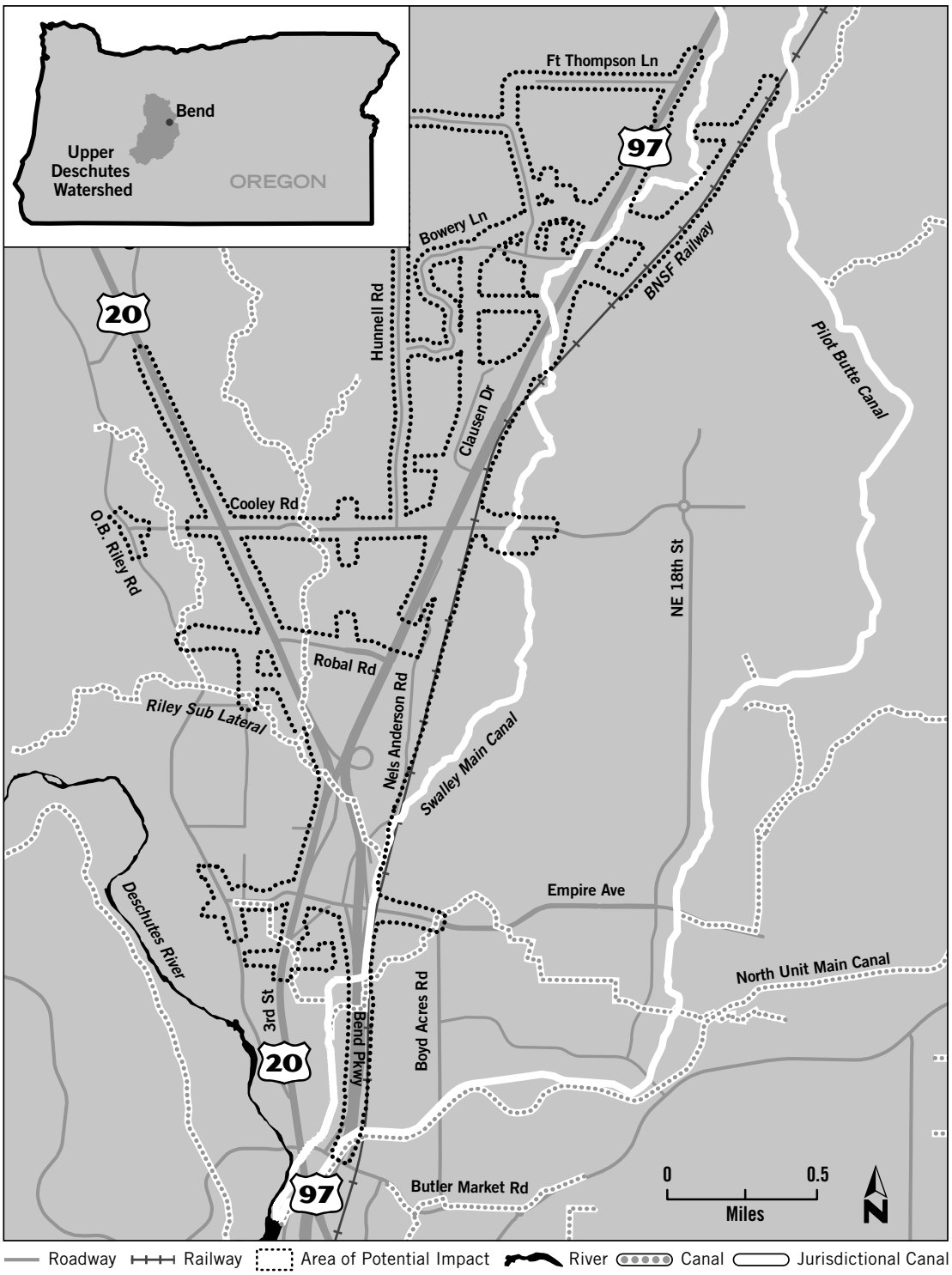
The API contains portions of three canals (Exhibit 3-70 FEIS). The Swalley Main Canal Pipeline is managed by the Swalley Irrigation District and is piped in the API. The North Unit Main Canal is managed by the North Unit Irrigation District and is piped in the API. The North/Pilot Butte Canal is managed by the Central Oregon Irrigation District and is piped in the API.

Four laterals from the Swalley Main Canal Pipeline are in the API including the Swalley Rogers Lateral, Swalley Riley Lateral, Swalley NC-1 Lateral, and Swalley Kotzman Lateral. Some portions of the Swalley Rogers Lateral and Swalley NC-1 Lateral are predominantly piped in the API, but some open segments remain. The Swalley Riley Lateral is open in the API, while the Swalley Kotzman Lateral is piped.

Exhibit 3-70 FEIS provides a depiction of the status of jurisdictional determinations for the canals and laterals in the API. The US Army Corps of Engineers determined in 2004, and again on May 13, 2010, that the North/Pilot Butte Canal may be a tributary to a water of the US through preliminary jurisdictional determination. The US Army Corps of Engineers also determined that the Swalley Main Canal may be a tributary to a water of the US, and a preliminary jurisdictional determination was issued by the Corps on May 13, 2010. However, it is important to note that laterals and ditches that flow off of these canals are not jurisdictional waters as they do not function as tributaries, and therefore, are not jurisdictional or regulated tributaries. Since the Preferred Alternative will have no impact on the Swalley Main Canal Pipeline, ODOT will not be pursuing an approved jurisdictional determination from the US Army Corps of Engineers. ODOT has not requested a preliminary jurisdictional determination for the North Unit Main Canal from the US Army Corps of Engineers because the Preferred Alternative will have no impact on the North Unit Main Canal.

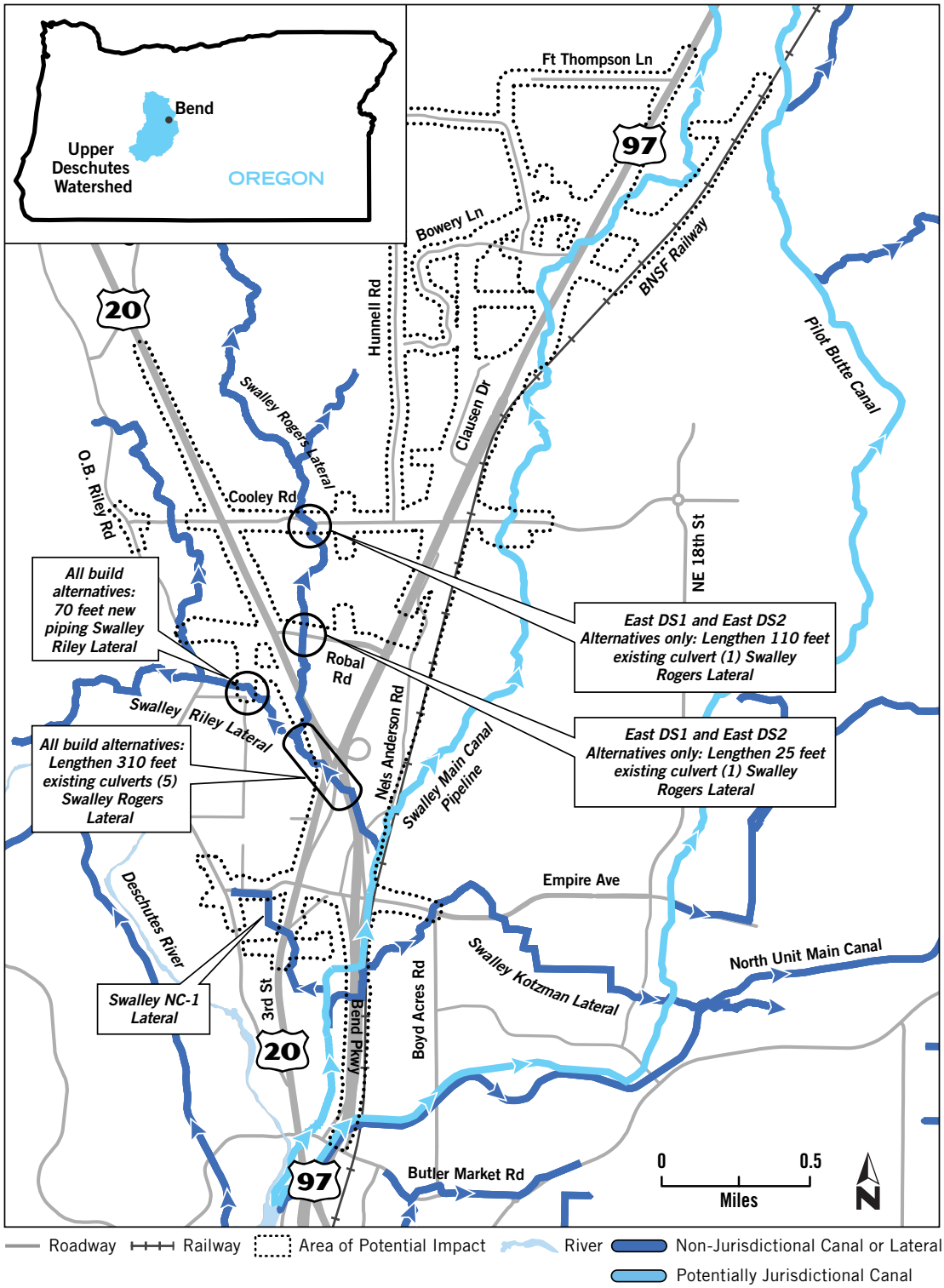
Chapter 1 Purpose of and Need For Proposed Action
Chapter 2 Alternatives
Chapter 3 Affected Environment, Environmental Consequences and Mitigation
Chapter 4 Cumulative Impacts
Chapter 5 Local Short-term Uses and Long-term Productivity
Chapter 6 Irreversible and Irretrievable Commitment of Resources
Chapter 7 Comments and Coordination

Exhibit 3-70: *Wetlands and Water Resources*



Note: Please see Exhibit 3-70 FEIS for updated information on the canals and laterals in the API.

Exhibit 3-70 FEIS: Impacts to Wetlands and Water Features with the East DS1, East DS2 and the Preferred Alternatives



Note: This exhibit was revised to correctly identify the Swalley Main Canal Pipeline and to identify all of the laterals discussed in this section of the Final EIS. The locations of new or modified piped crossings are also identified. The arrows on this exhibit depict the flow of water that is pulled from the Deschutes River.

3.11.3 Environmental Consequences

No Build Alternative

The No Build Alternative would retain all canals in their current condition. No adverse impacts to regulated waters would result from the No Build Alternative.

East DS1 Alternative

The East DS1 Alternative would require piping approximately 950 feet of the main branch of the Swalley Main Canal in the northern end, as well as additional piping of lateral lines connecting to the Swalley Main Canal. The Swalley Main Canal would retain the length and capacity that currently exists. The minor relocations and piping would not change the function, length, or capacity of the canals (Gagnon 2010). There would be no impacts the North/Pilot Butte Canal or the North Unit Main Canal.

Since the release of the Draft EIS, the Swalley Irrigation District has piped the open segments of the Swalley Main Canal within the API (now referred to as the Swalley Main Canal Pipeline). Therefore, the piping of 950 feet of the Swalley Main Canal previously discussed would no longer be required. However, 515 feet of eight new crossings of open lateral lines, were identified that would have been piped.

Additional crossings of the Swalley Irrigation District facilities that were not identified in the Draft EIS would be required for the East DS1 Alternative, as shown in Exhibit 3-37A FEIS in Section 3.3 Right of Way and Utilities. The Swalley Main Canal Pipeline would not be modified itself, but Cooley Road and US 97 would be widened over the existing Swalley Main Canal Pipeline. Existing culverts over the pipeline would also be extended or replaced. There would be a potential for the amount of fill over the Swalley Main Canal Pipeline at US 97 and Empire Avenue to change as well.

The Swalley NC-1 Lateral would be modified at Empire Avenue, 3rd Street, and Mervin Sampels Road to accommodate roadway improvements, including the widening of road over existing piped crossings. No impacts would be anticipated to the Swalley Kotzman Lateral as a result of the East DS1 Alternative.

The East DS1 Alternative would result in piping 70 feet of an existing open segment of the Swalley Riley Lateral due to new roadway construction. The canal would be conveyed through a 70 foot long structure (box culvert or pipe) as part of the extension of Britta Street. This portion of the canal is within 250 feet of where the waterway is piped for several hundred feet under US 20 and US 97.

The East DS1 Alternative would result in the widening or realignment of US 97 and US 20 over both piped and open segments of the Swalley

Key Differences

	East DS1	East DS2	Preferred Alternative
New Piping of Lateral Lines Connecting to Swalley Main Canal Pipeline	~~950 feet~~ 515 feet	~~2,300 feet~~ 515 feet	380 feet

This table has been updated to acknowledge the changes due to the piping of the Swalley Main Canal subsequent to the release of the Draft EIS as well as to reflect the impacts to Swalley Laterals that were identified as the Preferred Alternative was developed for the Final EIS.

Rogers Lateral to accommodate roadway improvements. The East DS1 Alterative would result in the piping of seven segments totaling 445 feet of open Swalley Rogers Lateral. The seven segments that would be piped for the East DS1 Alternative would be extensions of already piped segments in urban landscape.

The piping would not change the function, length, or capacity of the canals or laterals (Gagnon 2010). There would be no relocation or piping of the North/Pilot Butte Canal or the North Unit Main Canal.

East DS2 Alternative

Approximately 2,300 feet of the main branch of the Swalley Main Canal would be piped in the northern end under the East DS2 Alternative, as well as additional piping of lateral lines connecting to the Swalley Main Canal. Similar to the East DS1 Alternative, the Swalley Main Canal would retain the length and capacity that currently exists, and the minor relocations and piping would not change the function, length, or capacity of the canals (Gagnon 2010). Under the East DS2 Alternative there would be no impacts to the North/Pilot Butte Canal or the North Unit Main Canal.

The East DS2 Alternative would have the same impacts to Swalley Irrigation District facilities as described under the East DS1 Alternative, including those impacts that were not identified in the Draft EIS, but are disclosed in this Final EIS. The piping would not change the function, length, or capacity of the canals (Gagnon 2010). There would be no relocation or piping of the North/Pilot Butte Canal or the North Unit Main Canal. Swalley Irrigation Facility impacts are summarized in Exhibit 3-37A FEIS in Section 3.3 Right of Way and Utilities.

Preferred Alternative—East DS2 Modified Alternative

The Preferred Alternative will have the same impacts to Swalley Irrigation District facilities as described under the East DS1 and East DS2 Alternatives above except it will result in piping five segments of the Swalley Rogers Lateral instead of seven segments. The Preferred Alternative will not impact the Swalley Rogers Lateral at Cooley Road or Robal Road; and therefore, will result in piping 310 feet of the Swalley Rogers Lateral, which is 135 fewer feet than under the East DS1 and East DS2 Alternatives. These impacts were not previously identified in the Draft EIS. The locations of the piping of the Swalley Riley Lateral and the extensions of existing culverts on the Swalley Rogers Lateral are shown on Exhibit 3-70 FEIS. The piping will not change the function, length, or capacity of the canals (Gagnon 2010). Under the Preferred Alternative there will be no relocation or piping of the North/Pilot Butte Canal or the North Unit Main Canal. Swalley Irrigation Facility impacts are summarized in Exhibit 3-37A in Section

3.3 Right of Way and Utilities. Impacts to non-commercial agriculture will be minimized because all Swalley Irrigation Facilities delivery functions will be maintained during construction and following construction completion.

Indirect Impacts

As described above, the No Build Alternative would retain the regulated waters in their current condition. Thus, no additional indirect permanent impacts to regulated waters would result from the No Build Alternative.

No adverse indirect impacts would be associated with the East DS1 and East DS2 Alternatives. Piping small sections of the Swalley Riley Lateral and other lateral lines would minimally help prevent the loss of surface water from evaporation and seepage into the groundwater.

The Preferred Alternative will have the same indirect impacts as the East DS1 and East DS2 Alternatives. It is District policy to remove or transfer any district water rights on property ODOT will acquire, so the water rights can be retained within the District. If it becomes necessary for ODOT to purchase water rights through property acquisitions, the resulting decrease in properties with water rights could affect the rate structure for the remaining patrons. However, water rights would then be returned to the District and could be made available by the District for redistribution.

Construction Impacts

Under the No Build Alternative, there would be no construction, and therefore no constructionrelated, impacts. No temporary construction impacts to wetlands and other waters are expected to result from the East DS1 Alternative or East DS2 Alternative because construction of the Swalley crossings would occur during the nonirrigation season.

Construction impacts for the Preferred Alternative will be similar to but slightly less than those described for the East DS1 and East DS2 Alternatives because the Preferred Alternative will result in piping 135 feet less of the Swalley Rogers Lateral than would occur under the East DS1 and East DS2 Alternatives. Construction of the Swalley Riley Lateral crossing will occur during the non-irrigation season.

3.11.4 Avoidance, Minimization, and/or Mitigation Measures Proposed in the Draft EIS

Construction Mitigation and Commitments

Due to the large scale of the project, construction would take place year round. However, piping the Swalley Riley and Rogers Laterals would occur during the nonirrigation season (October through early April) and outside of winter stock runs. Once the laterals are piped, the water would be effectively protected from fuel spills and other potential

contamination or degradation. If construction takes place near open laterals, best management practices would take place to avoid adverse impacts to irrigation water.

Best management practices include:

- Locate staging and storage areas away from unpiped and piped canals and laterals
- Follow all applicable Oregon Department of Environmental Quality National Pollutant Discharge Elimination System 1200CA requirements
- Refuel or service machinery at least 150 feet away from the canals and laterals
- Clean equipment and check for leaks at least 150 feet away from the canals and laterals
- On design plans, delineate open portion of laterals as "no work zone prior to piping"
- Require all contractors to implement a pollution control plan and an erosion and sediment control plan.

Mitigation for Long-term Impacts

Because there are no jurisdictional wetlands and impacts to the canals would include only minor relocations and/or piping of lateral lines, no mitigation would be required for long-term impacts from the proposed action.

3.11.5 Avoidance, Minimization, and/or Mitigation Commitments Incorporated into the Preferred Alternative

ODOT makes the following commitments:

Project Design

- If construction takes place near open laterals, best management practices would take place to avoid adverse impacts to irrigation water.

Project Construction

- ODOT will require the contractor to implement temporary and permanent erosion control best management practices (ODOT 2005a) as needed during all phases of construction including both vegetative control and engineered controls
- ODOT will require all contractors to implement a pollution control plan and an erosion and sediment control plan which will include provisions for:

- Locating staging and storage areas away from unpiped and piped canals and laterals
- Refueling or servicing machinery at least 150 feet away from the canals and laterals
- Cleaning equipment and check for leaks at least 150 feet away from the canals and laterals.

3.12 Threatened and Endangered Species

3.12.1 Regulatory Setting

Federal

The primary federal law protecting threatened and endangered species is the federal Endangered Species Act: 16 USC Section 1531-1544, et seq. and FHWA and ODOT's responsibilities under the act are regulated at 50 CFR Part 402. The Endangered Species Act and subsequent amendments provide for the conservation of threatened and endangered species and the ecosystems upon which they depend. Under Section 7 of the Endangered Species Act, federal agencies, such as the FHWA, are required to consult with the US Fish and Wildlife Service and/or the National Marine Fisheries Service to ensure that FHWA is not undertaking, funding, permitting or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. Critical habitat is defined as geographic locations critical to the existence of a threatened or endangered species.

Exhibit 3-71 FEIS: ~~*Listed Species Potentially in Deschutes County*~~ *Federal and State Listed Species that May Occur in Deschutes County*

Species Common and Scientific Name	Status		Jurisdiction
	Federal	State	
Fish			
Bull trout, Columbia River Basin *(Salvelinus confluentus)*	Threatened	—	USFWS[1]
Wildlife			
Northern spotted owl *(Strix occidentalis caurina)*	Threatened	Threatened	USFWS[1]
Bald eagle *(Haliaeetus leucocephalus)*	—	Threatened	ODFW[2]
Plants			
Howell's thelypody *(Thelypodium howellii ssp. Howellii)*	—	Threatened	ODA[3]
Peck's milkvetch *(Astragalus peckii)*	—	Threatened	ODA[3]
Pumice grape fern *(Botrychium pumicola)*	—	Endangered	ODA[3]

[1] United States Fish and Wildlife Service

[2] Oregon Department of Fish and Wildlife

[3] Oregon Department of Agriculture

Note: the jurisdiction responsible for managing the species and their habitat was added to this exhibit for the Final EIS.

Compliance with the Endangered Species Act can be demonstrated through "No Effect" documentation, which is generally provided by the applicant (ODOT). For actions which are "Not Likely to Adversely Affect" species or their habitat, informal consultation is conducted and results in a concurrence letter from the US Fish and Wildlife

Service and/or the National Marine Fisheries Service. For actions which are "Likely to Adversely Affect" species or their habitat, formal consultation is conducted. The outcome of formal consultation is a biological opinion which may include an incidental take permit. Section 3 of the Endangered Species Act defines take as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or any attempt at such conduct."

State

Consultation with the Oregon Department of Fish and Wildlife and/or the Oregon Department of Agriculture is required when species are state listed as threatened or endangered. State-listed fish and wildlife species are regulated by the Oregon Department of Fish and Wildlife in ORS 496.171 to 496.192. State-listed plants are regulated by the Oregon Department of Agriculture in ORS 564.100 to 564.135. Wildlife "take" is defined under state law as to kill or obtain possession or control of. Plant "take" is defined under state law as to collect, cut, damage, destroy, dig, kill, pick, remove or otherwise disturb.

3.12.2 Affected Environment

More information: Additional detail on threatened and endangered species is provided in the *Natural Systems and Communities Technical Report* (ODOT 2014i). The *Natural Systems and Communities Technical Report* is listed in Appendix K and available in the document library of the project's website (www.us97solutions.org).

Definition

Federal or State Threatened and Endangered Species

Both the federal government and Oregon State maintain threatened and endangered species lists, which identify plant, wildlife, and fish species that face significant threats to their continued survival. Threatened species are those that are likely to become endangered within the foreseeable future.

A review of threatened and endangered species listed by the US Fish and Wildlife Service and the National Marine Fisheries Service was conducted for the project. Federal and state threatened and endangered listed species documented as potentially occurring in Deschutes County are listed in Exhibit 3-71 FEIS. No species proposed for listing are documented for Deschutes County (US Fish and Wildlife Service 2013).

There are no state or federal listed fish or wildlife species, or potential suitable habitat in the API (ESA Adolfson 2008). Marginal habitat for Peck's milkvetch was identified in the far northeastern portion (ESA Adolfson 2008). No individuals of Peck's milkvetch were observed during field surveys which were conducted during the appropriate bloom period for listed plants (May to August).

3.12.3 Environmental Consequences

No Build Alternative

The No Build Alternative would maintain the existing conditions for threatened and endangered species; and therefore, no impacts to federal or state threatened or endangered species or their habitat would occur.

East DS1 Alternative

No direct impacts to federal or state threatened and endangered fish or wildlife species would result from the East DS1 Alternative because no threatened and endangered fish or wildlife species or their habitat is located in the API or in the immediate vicinity. Approximately one acre of marginal habitat for a state threatened plant, Peck's milkvetch, would be removed for the construction of a new road along the BNSF Railway. In compliance with Section 7 of the Federal Endangered Species Act, ODOT prepared a No Effect Memorandum, which was submitted to FHWA, to document that the proposed action would have no effect on federal threatened and endangered species (Appendix G).

East DS2 Alternative

The impacts of the East DS2 Alternative to threatened and endangered species would be the same as the East DS1 Alternative.

Preferred Alternative—East DS2 Modified Alternative

No direct impacts to threatened and endangered fish or wildlife species will result from the Preferred Alternative because no threatened and endangered fish or wildlife species or their habitat is located in the API or in the immediate vicinity. The Preferred Alternative will avoid the marginal habitat for Peck's milkvetch within the northern-most portion of the API.

Key Point

In compliance with Section 7 of the federal Endangered Species Act, a No Effect Memorandum was prepared to document that the proposed action would have no effect on federal threatened and endangered species (October 19, 2010) (Appendix G). On June 16, 2014 ODOT updated the No Effect Memorandum (Appendix G).

Indirect Impacts

No indirect impacts to federal or state threatened and endangered fish and wildlife species would result from either the East DS1 Alternative or the East DS2 Alternative because no threatened and endangered fish and wildlife species or habitat occur in the API or immediate vicinity. No indirect impacts to Peck's milkvetch, a state listed plant, are anticipated from either the East DS1 Alternative or the East DS2 Alternative.

No indirect impacts to federal or state threatened and endangered fish and wildlife species will result from the Preferred Alternative because no threatened and endangered fish and wildlife species or habitat occur in the API or immediate vicinity. No indirect impacts to Peck's milkvetch are anticipated from the Preferred Alternative.

Construction Impacts

No construction impacts to threatened and endangered species would result from the build alternatives due to the absence of listed species and suitable habitat within the API.

3.12.4 Avoidance, Minimization, and/or Mitigation Measures Proposed in the Draft EIS

Because there would be no impact from the project to federal or state threatened and endangered species, no measures would be needed to avoid, minimize, and/or mitigate for construction or long-term impacts.

3.12.5 Avoidance, Minimization, and/or Mitigation Commitments Incorporated into the Preferred Alternative

There are no mitigation commitments related to federal or state threatened and endangered species for the Preferred Alternative.

3.13 Non-threatened or Endangered Species

3.13.1 Regulatory Setting

Fish and Wildlife

This subsection discusses potential impacts and permit requirements associated with fish and wildlife that are not listed under the state or federal endangered species acts.

Federal laws and regulations beyond the Endangered Species Act that pertain to fish and wildlife include, but are not limited to, the following:

Migratory Bird Treaty Act—makes it unlawful to take, import, export, possess, sell, purchase, or barter any migratory bird, with the exception of the taking of game birds during established hunting seasons. The law also applies to feathers, eggs, nests, and products made from migratory birds. This law is of particular concern when birds nest on bridges, buildings, signs, illumination, and ferry dock structures.

Bald and Golden Eagle Protection Act—makes it unlawful to take, import, export, sell, purchase, or barter any bald or golden eagle, their parts, products, nests, or eggs. "Take" includes pursuing, shooting, poisoning, wounding, killing, capturing, trapping, collecting, molesting, or disturbing the eagles.

Magnuson-Stevens Act—The Fishery Conservation and Management Act of 1976, was amended in 1996 and became known as the Magnuson-Stevens Act. This Act emphasizes the sustainability of the nation's fisheries and created a new habitat conservation approach. This habitat is called Essential Fish Habitat.

State laws and regulations beyond the Endangered Species Act that pertain to fish and wildlife include, but are not limited to, the following:

Oregon Revised Statutes Chapter 496 of the Oregon Wildlife Code (Fish Passage)—The owner or operator of an artificial obstruction located in waters in which native migratory fish are currently or were historically present must address fish passage requirements prior to certain trigger events (installation, major replacement, a fundamental change in permit status [e.g., new water right, renewed hydroelectric license], or abandonment of the artificial obstruction). Laws regarding fish passage may be found in ORS 509.580 through 910 and in OAR 635, Division 412.

Plants

This subsection discusses all the other special-status plant species, including Oregon Department of Agriculture species and species of special concern, and candidate species. Oregon Department of Agriculture has responsibility for the conservation of non-threatened

and endangered plant species through the *Native Plant Conservation Program*. "Special-status" species are identified because they are rare and/or subject to population and habitat declines. Special status plants are afforded no regulatory protection, except sensitive species on federal lands. Please see Section 3.12 Threatened and Endangered Species, for detailed information regarding listed and proposed species

Exhibit 3-72: *Strategy Species Associated with Western Juniper Woodlands Habitat and Sagebrush Shrubland/Shrub-Steppe Strategy Habitat*

Species Common and Scientific Name	Habitat Requirements	Distribution in Oregon	Habitat in API?
Birds			
Brewer's sparrow (*Spizella breweri*)	Sagebrush shrubland	Breeding range throughout eastern Oregon	Yes
Ferruginous hawk (*Buteo regalis*)	Open country; large tracks of western juniper savanna	Breeding range throughout eastern Oregon	No
Greater sage grouse (*Centrocercus urophasianus phaios*)	Found only in areas dominated by big sagebrush	Southeastern Oregon	No
Loggerhead shrike (*Lanius ludovicianus*)	Open woodland, scrub	Year-round and breeding habitat in eastern Oregon	Yes
Sage sparrow (*Amphispiza belli*)	Sagebrush	Breeding range throughout eastern Oregon	Yes
Mammals			
Pygmy rabbit (*Brachylagus idahoensis*)	Dense sagebrush stands; and soft, deep soils for burrowing	Southeastern Oregon	No
Reptiles			
Sagebrush lizard (*Sceloporus graciosus*)	Sagebrush shrublands; open western juniper or pine woodlands	Most counties in Eastern Oregon (includes Deschutes County)	Yes

3.13.2 Affected Environment

More information: Additional detail on non-threatened or endangered species is provided in the *Natural Systems and Communities Technical Report* (ODOT 2014i). The *Natural Systems and Communities Technical Report* is listed in Appendix K and available in the document library of the project's website (www.us97solutions.org).

Definition

Strategy Species

Strategy species includes species associated with western juniper woodlands habitat and sagebrush shrublands/shrub-steppe strategy habitat. Strategy species are of special concern due to their sensitivity to habitat loss and degradation (Oregon Department of Fish and Wildlife 2006).

Fish and Wildlife

Because there is no freshwater aquatic habitat, there are also no non-threatened or endangered fish species within the API. Non-threatened or endangered wildlife species includes strategy species and species associated with the urban landscape. Strategy species associated with western juniper woodlands habitat and sagebrush shrublands/shrub-steppe strategy habitats are presented in Exhibit 3-72. The western juniper woodlands habitat and sagebrush shrublands/shrub-steppe strategy habitat and the urban landscape are shown in Exhibit 3-69 FEIS in Section 3.10 Natural Systems and Communities.

Common wildlife species associated with the urban landscape include native and non-native birds and mammal species such as the American robin, American crow, black-tailed deer, house mouse, opossum,

raccoon, and squirrel. These species also occur in more natural settings, but they exhibit a high degree of tolerance to human activity and are able to successfully reproduce in the urban/suburban landscape.

Plants

Field surveys for the following special status plants were conducted: Mt. Shasta arnica (*Arnica viscosa*), Newberry's gentian (*Gentiana newberryi var. newberryi*), Peck's penstemon (*Penstemon peckii*), and Tall agoseris (*Agoseris elata*). No special status plants were observed in the API during field surveys.

3.13.3 Environmental Consequences

No Build Alternative

The No Build Alternative would maintain the existing conditions for non-threatened or endangered species. Existing conditions include on-going maintenance along roadways, which is anticipated to result in adverse and beneficial impacts to roadside vegetation and habitat, depending on the species. Beneficial impacts to habitat include on-going control of invasive plants within road rights of way, which could threaten the biodiversity of native habitats. However, if used, herbicide application to control weeds could have adverse impacts on the environment depending on method of application and timing. A potential adverse impact to habitat due to on-going maintenance would be the removal or alteration of woody vegetation that provides a buffer from roadway activity to adjacent habitats.

East DS1 Alternative

A direct impact to non-threatened or endangered species would include the removal of vegetation communities (i.e. habitat) because of the dependence of wildlife species on suitable habitat for daily life functions.

The East DS1 Alternative would result in the loss of approximately 66 acres of habitat for non-threatened or endangered, strategy species associated with western juniper woodlands habitat and sagebrush shrublands/shrub-steppe strategy habitat. The loss of habitat would be due to the construction of new roadways, new stormwater facilities, and improvements to existing roads. Approximately 34 acres of urban habitat would be lost or altered due to roadway improvements. These areas would include landscaped commercial areas, rights of way vegetated with grasses and native trees, graveled weedy areas, and buildings. As a result of this habitat loss, non-threatened or endangered wildlife species, including common wildlife species associated with the urban landscape, would have less suitable habitat for daily life functions such as foraging and sleeping.

More Information

A more comprehensive list of birds that may be found in residential areas of Central Oregon can be found at: http://www.ecbcbirds.org/

Key Differences

	East DS1	East DS2	Preferred Alternative
Strategy Habitat Removed	66 acres	62 acres	16 acres



Typical residential landscaping South of Cooley Road in the urban environment with planted grass and trees.

The East DS1 Alternative would have no adverse impacts on special status plant species. The East DS1 Alternative would include on-going maintenance along roadways that would benefit habitat because there would be continued control of invasive plants within road rights of way.

East DS2 Alternative

The East DS2 Alternative would have similar impacts as the East DS1 Alternative, except the loss of habitat for non-threatened and endangered strategy species would be slightly less at 62 acres. Approximately 34 acres of urban habitat would be lost or altered due to roadway improvements with the East DS2 Alternative.

Preferred Alternative—East DS2 Modified Alternative

The Preferred Alternative will have similar impacts as the East DS1 and East DS2 Alternatives, except the loss of habitat for non-threatened and endangered strategy species is approximately 16 acres. Approximately 24 acres of urban habitat will be lost or altered due to roadway improvements with the Preferred Alternative.

Indirect Impacts

Roads could facilitate the spread of non-native plants in both a linear orientation along the roadway and in a lateral orientation from the roadway (Forman et al. 2003), which in turn could degrade adjacent native habitats.

Indirect impacts to non-threatened or endangered species associated with western juniper woodlands habitat and sagebrush shrublands/shrub-steppe strategy habitat would be due to habitat modification and degradation along new roadways. The spread of annual non-native plants like cheatgrass and medusahead rye would be a threat to the health of sagebrush shrublands/shrub-steppe habitat (Oregon Department of Fish and Wildlife 2006). Because the lateral distance of adverse habitat impacts from the roadway is not well known and varies by site (Forman et al. 2003), indirect impacts to non-threatened or endangered species are described in terms of linear distance of new roadway (this includes both sides of the road where relevant).

Within the western juniper woodlands habitat and sagebrush shrublands/shrub-steppe strategy habitat, the East DS1 Alternative would result in approximately 6.3 miles of new roadway and the East DS2 Alternative would result in the construction of approximately 5.6 miles of new roadway, which would have the potential indirect impact of spreading non-native plant species to these habitats. New roadways and increased human presence have the potential to result in increased deer/vehicle collisions.

The Preferred Alternative will result in the construction of approximately 1.4 miles of new roadway within the western juniper

Definition

Linear and Lateral Orientation

Linear orientation refers to the distance along a roadway which non-native plants may spread.

Lateral orientation refers to how far non-native plants may spread to the side of a roadway (perpendicular to the orientation of the roadway).

Key Point

The indirect impacts of the East DS1 Alternative or the East DS2 Alternative and the Preferred Alternative would be limited to areas where habitat would be fragmented by the proposed action and few, if any, indirect impacts to non-threatened or endangered species beyond the API would occur.

woodlands habitat and sagebrush shrublands/shrub-steppe strategy habitat, which will have the potential indirect impact of spreading non-native plant species to these habitats.

Construction Impacts

Construction impacts, from the East DS1 Alternative or the East DS2 Alternative, to non-threatened or endangered strategy species associated with western juniper woodlands habitat and sagebrush shrublands/shrub-steppe strategy habitat would include temporary displacement due to increased noise, dust, and human activity.

Construction impacts from the Preferred Alternative will be the same as those described for the East DS1 and East DS2 Alternatives.

3.13.4 Avoidance, Minimization, and/or Mitigation Measures Proposed in the Draft EIS

Construction Mitigation and Commitments

The construction mitigation measures for non-threatened or endangered species are the same as those listed in Section 3.10 Natural Systems and Communities.

Mitigation for Long-Term Impacts

Avoidance Measures—The avoidance measures for non-threatened or endangered species are the same as those listed in Section 3.10 Natural Systems and Communities.

Minimization Measures—The minimization measures for non-threatened or endangered species are the same as those listed in Section 3.10 Natural Systems and Communities and Section 3.14 Invasive Species.

Mitigation Measures—The mitigation measures for non-threatened or endangered species are the same as those listed in Section 3.10 Natural Systems and Communities.

3.13.5 Avoidance, Minimization, and/or Mitigation Commitments Incorporated into the Preferred Alternative

ODOT makes the same commitments as identified in Section 3.10 Natural Systems and Communities and Section 3.14 Invasive Species.

3.14 Invasive Species

3.14.1 Regulatory Setting

Executive Order 13112 requires federal agencies to combat the introduction or spread of invasive species in the US. The order defines invasive species as "any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem whose introduction does or is likely to cause economic or environmental harm or harm to human health." FHWA guidance issued August 10, 1999 directs the use of the state's noxious weed list to define the invasive plants that must be considered as part of the National Environmental Policy Act analysis for a proposed action. However, invasive species include wildlife as well as plants.



A weedy, graveled area mixed with a few sagebrush shrubs along Clausen Drive

3.14.2 Affected Environment

More information: Additional detail on invasive species is provided in the *Natural Systems and Communities Technical Report* (ODOT 2014i). *The Natural Systems Communities Technical Report* is listed in Appendix K and available in the document library on the project's website (www.us97solutoins.org).

The following invasive plant species occur within the API: Dalmatian toadflax (*Linaria genistifolia ssp dalmatica*), medusahead rye (*Taeniatherum caput-medusae*), spotted knapweed (*Centaurea stoebe;* formerly *Centaurea maculosa*), and common mullein (*Verbascum thapsus*).

Exhibit 3-73 maps the invasive plant species surveyed. Dalmatian toadflax was mostly observed along roadways and in disturbed areas near development. The occurrence of this invasive plant is considered "occasional." Four large populations of spotted knapweed were found, and a few smaller populations were observed along Cooley Road and along other roadways south of Cooley Road. Spotted knapweed is considered "common." A few small patches of medusahead rye were observed in three areas near roads. Common mullein is widespread and dispersed throughout much of the API, particularly along roads and streets between US 97 and US 20, north of Cooley Road.

This species was not mapped due to its widespread distribution. The Oregon Department of Agriculture and Deschutes County invasive species status, and the frequency of occurrence, for these species are shown in Exhibit 3-74.

Exhibit 3-73: *Invasive Plants*

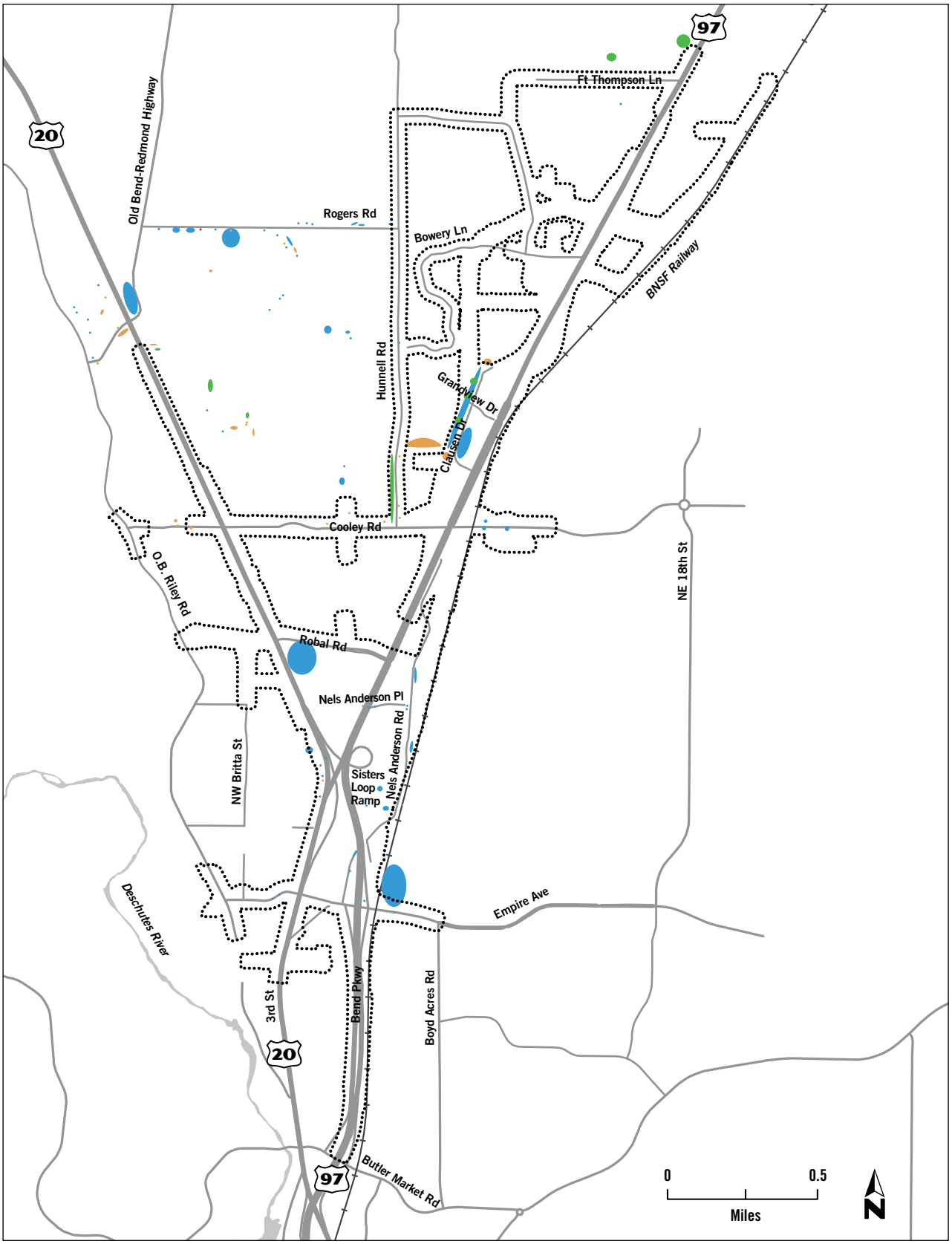


Exhibit 3-74: *Status and Frequency of Occurrence of Invasive Plant Species*

Common Name	Scientific Name	Oregon Department of Agriculture Rating[1]	Deschutes County Rating[2]	Occurrence in API
Common mullein	*Verbascum thapsus*	Not Applicable	C	Common
Dalmatian toadflax	*Linaria genistifolia ssp. dalmatica*	B	B	Occasional
Medusahead rye	*Taeniatherum caput-medusae*	B	A	Occasional
Spotted knapweed	*Centaurea stoebe* (formerly *Centaurea maculosa*)	B, T	B	Common

[1] Ratings based on Oregon Department of Agriculture classification system.

B = Common, well established weeds. Eradication at county level unlikely. Containment is possible in some cases and encouraged. Intensive control recommended on small isolated infestations.

T = Priority targeted weeds; all of which already exist on A or B lists.

[2] Ratings based on Deschutes County Weed Policy and Classification System

A = Priority noxious weed for intensive control and monitoring. Recommended action: subject to intensive control when and where found.

B = Weed of economic importance; locally abundant. Recommended action: moderate control or monitoring.

C = Potential to cause harm to agricultural production and transportation systems. Recommended action: control and monitoring.

3.14.3 Environmental Consequences

No Build Alternative

The No Build Alternative would maintain the existing conditions for invasive plants. Existing conditions include on-going maintenance along roadways, which is anticipated to result in beneficial impacts because there would be on-going control of invasive plants within road rights of way.

Definition

Invasive Species Population Sizes

Small populations of invasive species are defined as less than 100 individuals. Large populations of invasive species are defined as more than 100 individuals.

"Occasional" occurrence of an invasive plant species is defined as small populations widely spaced throughout the site. "Common" occurrence of an invasive plant species is defined as frequently observed.

East DS1 Alternative

With the East DS1 Alternative, increased vehicle traffic and activities would be anticipated along new and widened roadways where four populations of medusahead rye, a priority invasive species for intensive control, are mapped along Cooley Road and Clausen Drive. Vehicles could introduce new invasive species to these areas, such as through the transportation of seeds on tires, or similarly spread seeds from the existing populations of invasive species to other areas.

The area where a large spotted knapweed population is located, in the southeast corner of the US 20/Robal Road intersection, and the locations of invasive species along the east side of US 20 would not be disturbed. With the East DS1 Alternative, on-going maintenance along roadways would result in beneficial impacts because there would be continued control of invasive plants within road rights of way.

East DS2 Alternative

The adverse and beneficial impacts of the East DS2 Alternative on invasive species would be the same as the East DS1 Alternative.

Preferred Alternative—East DS2 Modified Alternative

The adverse and beneficial impacts of the Preferred Alternative on invasive species will be similar to those described for the East DS1 and

East DS2 Alternatives but to a lesser extent due to the reduced project footprint of the Preferred Alternative.

Indirect Impacts

Indirect invasive plant impacts are discussed in terms of the construction of new roadways, which are known to facilitate the spread of non-native species (Forman et al. 2003). Seeds would be spread along roadways by vehicle tires and wind and can spread laterally into the adjacent landscape when they become established in the right of way (Forman et al. 2003).

In the western juniper woodlands habitat and sagebrush shrublands/shrub-steppe strategy habitat, the East DS1 Alternative would result in the construction of approximately 6.3 miles of new roadways while the East DS2 Alternative would result in the construction of approximately 5.6 miles of new road, which would have the potential to facilitate the spread of non-native plants including invasive species throughout the API. In addition, the East DS1 and East DS2 Alternatives would result in the construction of new roadways in the urban landscape, which could also facilitate the spread of non-native invasive species. The indirect impacts of the East DS1 and East DS2 Alternatives would be mostly limited to areas where habitat would be fragmented by the proposed action; few indirect impacts to invasive plants beyond the API would occur.

Indirect impacts from invasive plants as a result of the Preferred Alternative will be the same as those described for the East DS1 and East DS2 Alternatives except for indirect impacts within the western juniper woodlands habitat and sagebrush shrublands/shrub-steppe strategy habitat, where the Preferred Alternative will result in the construction of approximately 1.4 miles of new roadways. The Preferred Alternative has the potential to facilitate the spread of non-native plants including invasive species throughout the API and vicinity but to a lesser extent than the East DS1 and the East DS2 Alternatives due to fewer miles of new roadway construction under the Preferred Alternative.

Construction Impacts

Ground disturbance facilitates seedling recruitment and non-native/invasive plants are often the first to colonize disturbed areas (Forman et al. 2003). Ground disturbance during construction of either of the build alternatives has the potential to increase the spread of invasive plants. Approximately 140 acres of ground (including the urban landscape plus western juniper woodlands habitat and sagebrush shrublands/shrub-steppe strategy habitat) would be disturbed during construction for the East DS1 Alternative and approximately 132 acres for the East DS2 Alternative.

Approximately 115 acres of ground will be disturbed as a result of the Preferred Alternative.

3.14.4 Avoidance, Minimization, and/or Mitigation Measures Proposed in the Draft EIS

Construction Mitigation and Commitments

The construction mitigation measures for invasive species are the same as those listed in Section 3.10 Natural Systems and Communities.

Mitigation for Long-Term Impacts

Minimization Measures—The following measures would be incorporated to reduce the spread of invasive plants:

- Remove the four small populations of medusahead rye that would be disturbed during construction and coordinate with the Deschutes County Weed Board regarding the control and removal of this priority weed
- Stabilize/reduce populations of spotted knapweed and Dalmatian toadflax.

Mitigation Measures—The following measure could be taken to reduce the spread of invasive plants:

- Where possible, reestablish native species to mitigate for the potential establishment and spread of invasive species.

3.14.5 Avoidance, Minimization, and/or Mitigation Commitments Incorporated into the Preferred Alternative

ODOT makes the following commitments:

Project Design

- ODOT will design vegetation restoration plans to prevent the establishment of non-native/invasive plants to the greatest extent feasible by specifying native plants and seed mixes
- ODOT will identify and verify locations of known populations of invasive species on plan sheets and call out treatment method including removal or spraying prior to construction activities.

Project Construction

- ODOT will implement temporary and permanent best management practices as needed during all phases of construction to prevent the spread of invasive plants
- ODOT will remove any populations of invasive plants within the construction area prior to ground-disturbing activities.

3.15 Air Quality

3.15.1 Regulatory Setting

Criteria Pollutants

The Clean Air Act as amended in 1990 is the federal law that governs air quality. This law sets standards for the quantity of pollutants that can be in the air. These standards are called National Ambient Air Quality Standards. Standards have been established for six criteria pollutants that have been linked to potential health concerns; the criteria pollutants are: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM), lead (Pb), and sulfur dioxide (SO_2). A region is a nonattainment area when designated by the US Environmental Protection Agency when one or more monitoring stations in the region fail to attain the relevant standard. Areas that were previously designated as nonattainment areas but have met the standard are called maintenance areas.

Under the 1990 Clean Air Act Amendments, the US Department of Transportation cannot fund, authorize, or approve federal actions to support programs or projects that are not first found to conform to the State Implementation Plan. Conformity with the Clean Air Act takes place at the regional level and at the project level. Any build alternative must conform at both levels to be approved.

Regional Conformity—Regional level conformity in Oregon is concerned with how well the region meets the standards set for carbon monoxide, ozone, and particulate matter. Oregon is not designated nonattainment for the other criteria pollutants. At the regional level, metropolitan planning organizations develop regional transportation plans that include all of the transportation projects planned for that region over at least the next 20 years. Based on the projects included in the fiscally constrained regional transportation plan, a US Environmental Protection Agency air quality model is used to determine whether or not the implementation of those projects meets the emission budgets or other tests showing that attainment requirements of the Clean Air Act are met. If all requirements for regional conformity are met, the FHWA and the Federal Transit Administration jointly make a conformity determination that the regional transportation plan conforms to the state implementation plan for achieving the goals of the Clean Air Act. Metropolitan planning organizations are also required to develop a transportation improvement program, which includes projects that will be funded and implemented in the near term. Both regional transportation plans and transportation improvement plans are required to meet regional conformity requirements.

Definitions

Criteria Pollutants

Criteria pollutants regulated by the National Ambient Air Quality Standards include:

- Carbon monoxide (CO)
- Lead (Pb)
- Nitrogen dioxide (NO_2)
- Ozone (O_3)
- Particulate matter less than 10 micrometers in size (PM_{10})
- Particulate matter less than 2.5 micrometers in size ($PM_{2.5}$)
- Sulfur dioxide (SO_2)

In Attainment

An area that is in attainment is considered to have air quality as good as or better than the National Ambient Air Quality Standards for the criteria pollutants designated in the Clean Air Act.

Project-level Conformity—In addition to meeting regional-scale conformity requirements, individual federal projects must meet certain project-level conformity requirements. Federal projects are required to be in a conforming regional transportation plan and transportation improvement plan, and the design concept and scope of the project need to be consistent with those analyzed in the regional transportation plan and transportation improvement plan. Conformity at the project-level for projects located in nonattainment or maintenance areas for carbon monoxide and/or particulate matter also requires consideration of "hot spot" analysis, which is an analysis of localized pollutant concentrations, when an area is classified as nonattainment or maintenance for carbon monoxide and/or particulate matter. In general, pollutant concentrations due to construction associated with the proposed action either need to be below the National Ambient Air Quality Standards, or lower than the concentrations associated with not building the project (the No Build Alternative).

Mobile Source Air Toxics—In addition to the criteria air pollutants for which there are National Ambient Air Quality Standards, the US Environmental Protection Agency also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners), and stationary sources (e.g., factories or refineries).

Mobile source air toxics are a subset of the 188 air toxics defined by the Clean Air Act. The mobile source air toxics are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

The US Environmental Protection Agency is the lead federal agency for administering the Clean Air Act and has certain responsibilities regarding the health effects of mobile source air toxics. Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments of 1990, whereby Congress mandated that the US Environmental Protection Agency regulate 188 air toxics, also known as hazardous air pollutants. The US Environmental Protection Agency has assessed this expansive list in their latest rule on the *Control of Hazardous Air Pollutants from Mobile Sources* (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (http://www.epa.gov/

ncea/iris/index.html). In addition, the US Environmental Protection Agency identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their *1999 National Air Toxics Assessment* (http://www.epa.gov/ttn/atw/nata1999/). These are acrolein, benzene, 1- and 3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel particulate matter), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future US Environmental Protection Agency rules. Appendix F includes more detail on the FHWA's Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA (September 2009).

The 2007 US Environmental Protection Agency rule mentioned above requires controls that will dramatically decrease mobile source air toxics emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using the US Environmental Protection Agency's MOBILE 6.2 model, even if vehicle activity (vehicle-miles traveled) increases by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority mobile source air toxics is projected from 1999 to 2050.

Since the publication of the Draft EIS, FHWA updated their Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA (December 2012). In addition, FHWA's air quality analysis was updated using the US Environmental Protection Agency MOVES2010b model, which indicates that if vehicle activity (vehicle-miles traveled) increases by 102 percent as assumed from 2010 to 2050, then a combined reduction of 83 percent in the total annual emission rate for the priority mobile source air toxics is projected for that same period.

Definition

Vehicle-Miles Traveled

Vehicle-miles traveled represents the number of vehicles using a roadway and the number of miles traveled by those vehicles.

Local VMT represents trips that are entirely within the Transportation API (as shown on Exhibit 3-1 FEIS).

Regional VMT represents trips that have one end of a trip within the Transportation API with the other end being outside of the Transportation API.

3.15.2 Affected Environment

More information: Additional detail on the air quality analysis is provided in the *Air Quality Technical Report* (ODOT 2011a). The *Air Quality Technical Report* is listed in Appendix K and is available in the document library of the project's website (www.us97solutions.org).

Standards for Criteria Pollutants

Exhibit 3-75 FEIS provides a summary of the State of Oregon standards and National Ambient Air Quality Standards for the criteria pollutants.

***Exhibit 3-75 FEIS:** Summary of National Ambient Air Quality Standards and Oregon Air Quality Standards*

Pollutant	Averaging Time	State Standard	Federal Standard	Health and Atmospheric Effects	Typical Sources
Ozone (O_3)	8 hours	0.075 ppm	0.075 ppm	High concentrations irritate lungs. Long-term exposure may cause lung tissue damage. Long-term exposure damages plant materials and reduces crop productivity. Precursor organic compounds include a number of known toxic air contaminants.	Low-altitude ozone is almost entirely formed from reactive organic gases (ROG) and nitrogen oxides in the presence of sunlight and heat. Major sources include motor vehicles and other mobile sources, solvent evaporation, and industrial and other combustion processes. Biologically-produced ROG may also contribute.
Carbon Monoxide (CO)	1 hour 8 hours	35 ppm 9 ppm	35 ppm 9 ppm	Asphyxiant. Carbon monoxide interferes with the transfer of oxygen to the blood and deprives sensitive tissues of oxygen.	Combustion sources, especially gasoline-powered engines and motor vehicles. Carbon monoxide is the traditional signature pollutant for on-road mobile sources at the local and neighborhood scale.
Respirable Particulate Matter (PM_{10})	24 hours Annual	150 µg/m³ 50 µg/m³	150 µg/m³ –	Irritates eyes and respiratory tract. Decreases lung capacity. Associated with increased cancer and mortality. Contributes to haze and reduced visibility. Includes some toxic air contaminants. Many aerosol and solid compounds are part of respirable particulate matter.	Dust- and fume-producing industrial and agricultural operations; combustion smoke; atmospheric chemical reactions; construction and other dust-producing activities; unpaved road dust and re-entrained paved road dust; natural sources (wind-blown dust, ocean spray).
Fine Particulate Matter ($PM_{2.5}$)[a]	24 hours Annual	–	35 µg/m³ ~~15 µg/m³~~ 12 µg/m³[b]	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and produces surface soiling. Most diesel exhaust particulate matter – considered a toxic air contaminant – is in the fine particulate matter size range. Many aerosol and solid compounds are part of fine particulate matter.	Combustion including motor vehicles, other mobile sources, and industrial activities; residential and agricultural burning; also formed through atmospheric chemical (including photochemical) reactions involving other pollutants including nitrogen oxides, sulfur oxides, ammonia and ROG.
Nitrogen Dioxide (NO_2)	Annual 1 Hour	0.053 ppm	0.053 ppm 0.10 ppm	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown. Contributes to acid rain.	Motor vehicles and other mobile sources; refineries; industrial operations.
Sulfur Dioxide (SO_2)	3 hours 1 hour	0.50 ppm 75 ppb	N/A	Irritates respiratory tract; injures lung tissue. Can yellow plant leaves. Destructive to marble, iron, steel. Contributes to acid rain. Limits visibility.	Fuel combustion (especially coal and high-sulfur oil), chemical plants, sulfur recovery plants, metal processing.
Lead (Pb)[a]	Rolling 3-month average	0.15 µg/m³	0.15 µg/m³	Disturbs gastrointestinal system. Causes anemia, kidney disease, and neuromuscular and neurological dysfunction. Also considered a toxic air contaminant.	Primary: lead-based industrial process like batter production and smelters. Previously: lead paint, leaded gasoline. Moderate to high levels of aerially deposited lead from gasoline may still be present in soils along major roads, and can be a problem if large amounts of soil are disturbed.

Notes: ppm = parts per million; µg/m³ = micrograms per cubic meter.

[a] Diesel exhaust particulate matter is part of respirable particulate matter and, in larger proportion, fine particulate matter. The US Environmental Protection Agency has identified various organic compounds that are precursors to ozone and fine particulate matter as toxic air contaminants. There is no threshold level of exposure for adverse health effect determined for toxic air contaminants, and control measures may apply at ambient concentrations below any criteria levels specified for these pollutants or the general categories of pollutants to which they belong.

[b] Since the publication of the Draft EIS, the $PM_{2.5}$ Annual Average NAAQS was reduced to 12 µg/m³ in 2012.

General Climatic Conditions

Bend has a predominately dry climate. The weather is characterized by sunny days, cool nights, and low humidity. The Cascade Mountains block prevailing winds from carrying moist Pacific Ocean air into Central Oregon, creating a semiarid desert climate with an annual average of 300 days of sunshine. Average annual rainfall in the City of Bend is about 11.7 inches. Summer high temperatures range from 73 to 81°F and winter lows are in the range of 22 to 28°F. Average annual temperature is about 46°F (National Oceanic and Atmospheric Administration 2010).

Attainment Status

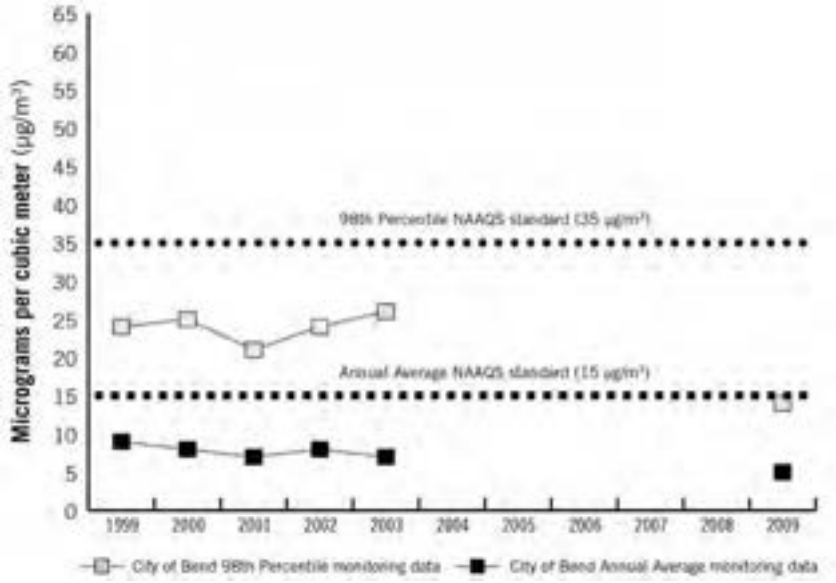
The project's API is classified as an attainment area for all criteria pollutants.

Monitoring Data and Air Quality Trends—The Oregon Department of Environmental Quality operates a network of monitors in Oregon including Bend.

- **Ozone:** The 8-hour standard for ozone is 0.075 parts per million (ppm) and is measured as the three year average of the fourth highest value. Although only 2009 monitoring data is available for the City of Bend, the fourth highest average occurred on July 22, 2009 with a value of 0.060 ppm.
- **Particulate matter less than 2.5 micrometers in size ($PM_{2.5}$):** Exhibit 3-76 shows the $PM_{2.5}$ trend in the City of Bend. Monitoring occurred from 1999 to 2003, and again in 2009; monitoring data is not available between 2004 and 2008.
- **Particulate matter less than 10 micrometers in size (PM_{10}):** Particulate matter (PM_{10}) monitoring in the City of Bend ended in 2007, but the monitoring that occurred from 2001 to 2007 showed that the maximum 24-hour average of 68 micrograms per cubic meter (µg/m^3) and the annual average of 17.3 µg/m^3 in 2007 were below the state standard and National Ambient Air Quality Standards.
- **Carbon monoxide:** Carbon monoxide monitoring in the City of Bend was conducted from 2000 until 2005. In 2005, monitoring results showed that the maximum 1-hour average was 6.7 ppm and the 8-hour average was 3.0 ppm, both below the state standard and National Ambient Air Quality Standards.

Exhibit 3-76 FEIS was updated in the Final EIS to demonstrate the $PM_{2.5}$ trend in the City of Bend. The daily and 24-hour annual average $PM_{2.5}$ concentrations monitored were below the National Ambient Air Quality Standards. Furthermore, the highest 8-hour ozone concentration monitored in Bend between 2009 and 2012 was 0.065 ppm (Oregon Department of Environmental Quality 2013). Ozone levels were below the state standard and National Ambient Air Quality Standards.

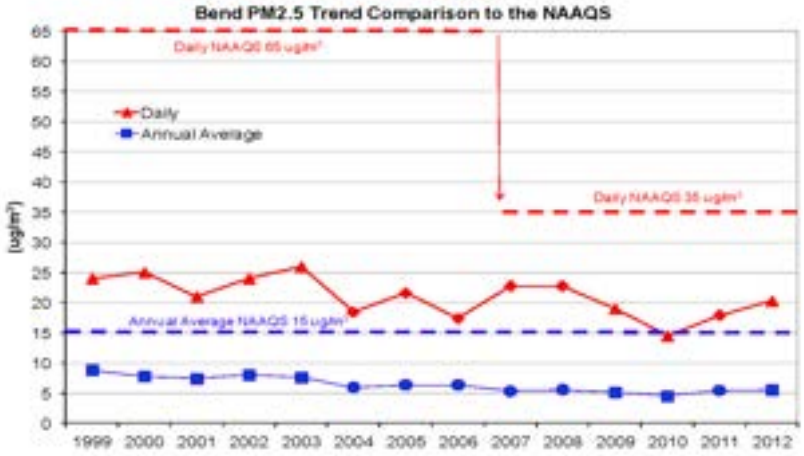
Exhibit 3-76: *City of Bend Fine Particulate Matter ($PM_{2.5}$) Trend Compared to the National Ambient Air Quality Standards (1999–2009)*



Source: Oregon Department of Environmental Quality 2010.

Note: Monitoring data is not available between 2004 and 2008.

Exhibit 3-76 FEIS: *City of Bend Fine Particulate Matter ($PM_{2.5}$) Trend Compared to the National Ambient Air Quality Standards (1999–2012)*



Source: 2012 Oregon Air Quality Data Summaries (Oregon Department of Environmental Quality 2013).

Notes: Exhibit 3-76 FEIS shows the $PM_{2.5}$ 98th percentile and annual average trends. The 98th Percentile is used for comparison to the daily standard. Oregon's Air Quality Surveillance Network collects data for $PM_{2.5}$. In the years that this data is collected using the EPA Federal Reference Methods, the data is represented by triangles and squares; in years that data is collected using a different methodology, the data is represented by diamonds and circles. The data collected by the two different methodologies is comparable, but data that is collected without using the EPA Federal Reference Methods is informational only and cannot be used for attainment designation. In 2006 the $PM_{2.5}$ Daily NAAQS average was reduced from 65 ug/m^3 to 35 ug/m^3. In 2012, the $PM_{2.5}$ Annual Average NAAQS was reduced to 12 µg/m^3. Since the publication of the Draft EIS, Oregon DEQ updated the Oregon Air Quality Data Summaries.

3.15.3 Environmental Consequences

No Build Alternative

The API is located in an area which has not been designated by the US Environmental Protection Agency as a nonattainment or maintenance area for any criteria pollutants. Therefore, conformity requirements do not apply. Pollutant concentrations would not exceed the National Ambient Air Quality Standards.

Key Point

Air quality conformity requirements do not apply to the proposed action as the API is not located in a US Environmental Protection Agency-designated nonattainment or maintenance area.

Regional Conformity—Regional conformity does not apply to this project because the API is not within a nonattainment or maintenance area.

The No Build Alternative is not predicted to affect regional vehicle-miles traveled, and the No Build Alternative is predicted to have no measurable impact on regional pollutant levels.

Since the publication of the Draft EIS, the data for the No Build Alternative have been updated to reflect the current traffic and growth projections for the region. The No Build Alternative is predicted to have no measureable impact on regional pollutant levels.

Project-level Conformity—Hot spot analysis is only required when a project is in a carbon monoxide or particulate matter nonattainment or maintenance area. The API is not located in a carbon monoxide or particulate matter nonattainment or maintenance area, therefore a hot spot analysis is not required. Further, since the No Build Alternative is not predicted to affect regional vehicle-miles traveled, background pollutant concentrations are not expected to increase, and the No Build Alternative is not expected to create localized pollutant concentrations that would exceed the National Ambient Air Quality Standards.

Mobile Source Air Toxics—Scientific uncertainties remain in our understanding of the relationship between adverse health effects and near-road exposure, including the exposures of greatest concern, the importance of chronic versus acute exposures, the role of fuel type (e.g., diesel or gasoline) and composition (e.g., percent aromatics), relevant traffic patterns, the role of co-stressors including noise and socioeconomic status, and the role of differential susceptibility within the "exposed populations."[2]

Chapter 3 of the US Environmental Protection Agency *Control of Hazardous Air Pollutants from Mobile Sources Regulatory Impact Analysis* for the 2007 mobile source air toxics rules states that there are a number of additional significant uncertainties associated with the air quality, exposure and risk modeling. The modeling also has certain key

[2] Volume 73 Federal Register Page 8441 (February 26, 2007) Control of Hazardous Air Pollutants from Mobile Sources.

limitations such as the results are most accurate for large geographic areas, exposure modeling does not fully reflect variation among individuals, and non-inhalation exposure pathways and indoor sources are not taken into account.

Technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects prevent meaningful or reliable estimates of mobile source air toxic emissions of the proposed action. However, even though reliable methods do not exist to accurately estimate the health effects of mobile source air toxics at the project level, it is possible to qualitatively assess the levels of future mobile source air toxic emissions. The qualitative assessment presented has been prepared in accordance with FHWA's Interim Guidance derived in part from a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Air Source Toxic Emissions Among Transportation Project Alternatives.*

FHWA's *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA* groups projects into the following categories:

- Exempt projects and projects with no meaningful potential mobile source air toxics effects
- Projects with low potential mobile source air toxics effects
- Projects with higher potential mobile source air toxics effects.

Definition

Intersegment

An intersegment is a segment of an intersection.

FHWA's *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA* provides examples of "projects with low potential mobile air source toxics effects." These projects include minor widening projects and new interchanges, such as those that replace a signalized intersection on a surface street or where design year traffic projections are less than 140,000 to 150,000 annual average daily traffic.

The East DS1 and East DS2 Alternatives would realign a portion of US 97 east of the existing highway. For the project, the highest projected design year annual average daily traffic is: 114,813 for the No Build Alternative; 112,074 for the East DS1 Alternative; and 109,485 for the East DS2 Alternative (ODOT 2010f). Therefore, the project meets the criteria for a "project with low potential mobile air source toxics effects" and has been evaluated as such.

The Draft EIS includes a basic analysis of the likely mobile source air toxic emissions impacts of the proposed action. However, available technical tools do not enable accurate prediction of project-specific health impacts of the emission changes associated with the project alternatives. FHWA's 2009 *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA,* which includes information on compliance

with 40 CFR 1502.22 regarding incomplete or unavailable information, is included in Appendix F.

For the No Build Alternative, the amount of mobile source air toxics emitted would be proportional to the vehicle-miles traveled assuming that other variables such as fleet mix are the same. Local daily vehicle-miles traveled in the API are shown in Exhibit 3-77.

Exhibit 3-77: *Local Daily Vehicle-Miles Traveled*

Alternative	Vehicle-Miles Traveled Project Opening Year 2015	Vehicle-Miles Traveled Project Design Year 2035
No Build Alternative	442,048	624,041
East DS1 Alternative	489,762	670,449
East DS2 Alternative	466,753	634,144

Source: ODOT 2010o.

With the 2035 No Build Alternative, emissions would likely be lower than present levels as a result of the US Environmental Protection Agency's national control programs that are projected to reduce annual mobile source air toxic emissions by 72 percent between 1999 and 2050. Local conditions could differ from these national projections in terms of fleet mix and turnover, vehicle-miles traveled growth rate, and local control measures. However, the magnitude of the US Environmental Protection Agency's projected reductions is so great (even after accounting for vehicle-miles traveled growth) that mobile source air toxic emissions would likely be lower in the future than they are today.

Since the publication of the Draft EIS, data for the No Build Alternative has been updated to 2036, which included reducing the traffic volumes that were input into the traffic analysis to reflect more current traffic conditions for the region. The data reflect the current traffic and growth projections for the region. Also, to account for the Preferred Alternative, which minimizes impacts to neighborhoods north of Cooley Road and east of US 97, the overall Transportation API for existing conditions is smaller than the original Transportation API defined in the Draft EIS. The updated network does not include the Tumalo Road/Deschutes Junction interchange roadway or four miles of US 97 north of milepost 132.19. As a result, the highest projected design year annual average daily traffic for the No Build Alternative would be 103,524.

Exhibit 3-77 FEIS: *Local Daily Vehicle-Miles Traveled*

Alternative	Vehicle-Miles Traveled Project Opening Year 2016	Vehicle-Miles Traveled Project Design Year 2036
No Build Alternative[1]	287,734	411,284
Preferred Alternative	294,731	436,457

Source: ODOT 2010f and 2014o.

Note: Data reflect the smaller Transportation API of the Preferred Alternative.

[1] No Build Alternative traffic volumes and roadway network have been updated to 2016 Year of Opening and 2036 Design Year.

In addition, FHWA updated the Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA (December 2012) and the US Environmental Protection Agency's national control programs are now projected to reduce annual mobile source air toxic emissions by 83 percent between 2010 and 2050.

East DS1 Alternative and East DS2 Alternative

Regional Conformity—The API is located in an area which has not been designated by the US Environmental Protection Agency as a nonattainment or maintenance area for any criteria pollutants. Therefore, conformity requirements do not apply. Pollutant concentrations would not exceed the National Ambient Air Quality Standards. Further, since the East DS1 and East DS2 Alternatives are not predicted to affect regional vehicle-miles traveled, they are predicted to have no measurable impact on regional pollutant levels.

Project-level Conformity—Hot spot analysis is only required when a project is in a carbon monoxide or particulate matter nonattainment or maintenance area. The API is not located in a carbon monoxide or particulate matter nonattainment or maintenance area, therefore a hot spot analysis is not required. Further, since the East DS1 and East DS2 Alternatives are not predicted to affect regional vehicle-miles traveled, background pollutant concentrations are not expected to increase and the East DS1 and East DS2 Alternatives are not expected to create localized pollutant concentrations that would exceed the National Ambient Air Quality Standards.

Mobile Source Air Toxics—Please also see the discussion of scientific uncertainties regarding mobile source air toxics earlier in Section 3.15.3 Environmental Consequences. For the East DS1 and East DS2 Alternatives the amount of mobile source air toxics emitted would be proportional to the vehicle-miles traveled assuming that other variables such as fleet mix are the same for each of the alternatives. With the East DS1 and East DS2 Alternatives there are not expected to be any regional changes in vehicle-miles traveled when compared to the No Build Alternative. However, local vehicle-miles traveled in the API is still expected to increase under both the East DS1 and East DS2

Alternatives (see Exhibit 3-77) because the additional capacity on US 97 would increase the efficiency of the roadway and attract rerouted trips from elsewhere in the transportation network.

Because the estimated vehicle-miles traveled of the East DS1 and East DS2 Alternatives would be nearly the same (varying by less than six percent), it is expected that there would be no appreciable difference in overall mobile source air toxic emissions. For the East DS1 and East DS2 Alternatives, in the design years, emissions would be virtually certain to be lower than present levels as a result of the US Environmental Protection Agency's national control programs that are projected to reduce annual mobile source air toxic emissions by 72 percent from 1999 to 2050.

The realignment of US 97, from just north of Cooley Road to approximately Empire Avenue, that is part of the East DS1 and East DS2 Alternatives would move traffic closer to some businesses and residences in the Boyd Acres Neighborhood. In addition, both the East DS1 and East DS2 Alternatives would include the construction of a new segment of 3rd Street in the area of Bowery Lane that would move traffic closer to some residences in the Hunnell Neighborhood. Therefore, under the East DS1 and East DS2 Alternatives there could be localized areas where ambient concentrations of mobile source air toxics could be higher than under the No Build Alternative. However, the magnitude and the duration of these potential changes compared to the No Build Alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting projectspecific mobile source air toxic health effects. Further, overall future mobile source air toxic emissions are expected to be substantially lower than today due to implementation of the US Environmental Protection Agency's vehicle and fuel regulations.

The US Environmental Protection Agency comments on the Draft EIS requested further detail about sensitive receptors in the area of potential impact which are provided here. The new northern interchange would be located between or south of the three mobile home parks in the API with the East DS1 or DS2 Alternatives. New access roads would be constructed along the east side of the mobile home parks under both the East DS1 and East DS2 Alternatives. These roadway improvements would move traffic closer to the east and west sides of the mobile home parks. In the south portion of the project, near Butler Market Road, where the existing North Unit Canal Trail is located, roadway improvements with the East DS1 and East DS2 Alternatives are limited to re-striping. There are no other sensitive receptor locations in the API such as schools, hospitals, medical facilities, senior centers, daycare facilities or parks.

The US Environmental Protection Agency's national control programs are now projected to reduce annual mobile source air toxic emissions by 83 percent between 2010 and 2050.

The analysis of air quality that was conducted for the Draft EIS was accurate at that time, and impacts to air quality for the years 2016 and 2036 compared to the years 2015 and 2035, respectively, are expected to be negligible. Therefore, the analysis of air quality was not updated for the East DS1 and East DS2 Alternatives in the Final EIS.

Preferred Alternative—East DS2 Modified Alternative

Regional Conformity—For the same reasons stated for the East DS1 and East DS2 Alternatives, regional conformity requirements do not apply to the Preferred Alternative. Pollutant concentrations will not exceed the National Ambient Air Quality Standards for the Preferred Alternative. Further, since the Preferred Alternative is not predicted to affect regional vehicle-miles traveled, the Preferred Alternative is predicted to have no measurable impact on regional pollutant levels.

Project-level Conformity—For the same reasons stated for the East DS1 and East DS2 Alternatives, a hot spot analysis is not required for the Preferred Alternative. Further, since the Preferred Alternative is not predicted to affect regional vehicle-miles traveled, background pollutant concentrations are not expected to increase and the Preferred Alternative is not expected to create localized pollutant concentrations that would exceed the National Ambient Air Quality Standards.

Mobile Source Air Toxics—For the Preferred Alternative, the impacts to mobile source air toxics will be the same as described for the East DS1 and East DS2 Alternatives. The Preferred Alternative will construct a new segment of 3rd Street; however, the segment will terminate south of the Deschutes Memorial Gardens and Chapel. The estimated vehicle-miles traveled of the Preferred Alternative will be approximately one-third less than the East DS1 and East DS2 Alternatives; it is expected that there will be no appreciable difference in overall mobile source air toxic emissions.

Since the publication of the Draft EIS, the data for the Preferred Alternative have been updated to reflect the current and projected traffic conditions for the region. The highest projected design year annual average daily traffic for the Preferred Alternative will be 99,182 (ODOT 2014o). The Preferred Alternative will minimize impacts to neighborhoods north of Cooley Road and east of US 97.

Indirect Impacts

The travel demand model used for the air quality direct impacts analysis for the No Build, East DS1, and East DS2 Alternatives reflects

future land use, employment and growth and therefore addresses indirect impacts.

The travel demand model addresses indirect impacts resulting from the Preferred Alternative.

Construction Impacts

During construction associated with the East DS1 and East DS2 Alternatives, short-term degradation of air quality could occur due to the release of particulate emissions (airborne dust) generated by excavation, grading, hauling and various other activities. Emissions from construction equipment would include carbon monoxide, nitrogen oxides, volatile organic compounds, directly-emitted particulate matter (PM_{10} and $PM_{2.5}$), and toxic air contaminants such as diesel exhaust particulate matter. Ozone is a regional pollutant that is derived from nitrogen oxides and volatile organic compounds in the presence of sunlight and heat.

Site preparation and roadway construction would involve clearing, cut-and-fill activities, grading, removing or improving existing roadways, and paving roadway surfaces. Construction related impacts on air quality would be greatest during the site preparation phase because most engine emissions are associated with the excavation, handling, and transport of soils to and from the site. If not properly controlled, these activities could temporarily generate particulate matter (PM_{10} and $PM_{2.5}$) and small amounts of carbon monoxide, sulfur dioxide, nitrogen oxides, and volatile organic compounds.

Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site could deposit mud on local streets, which could be an additional source of airborne dust after it dries. Particulate matter (PM_{10}) emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. Particulate matter (PM_{10}) emissions would depend on soil moisture, the silt content of the soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site.

In addition to dust related particulate matter (PM_{10}) emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate carbon monoxide, sulfur dioxide, nitrogen oxides, and volatile organic compounds and some soot particulate (PM_{10} and $PM_{2.5}$) in exhaust emissions. If construction activities were to increase traffic congestion in the area, carbon monoxide and other emissions from traffic would increase slightly while those vehicles

are delayed. These emissions would be temporary and limited to the immediate area surrounding the construction site.

Construction of concrete structures could have associated dust-emitting sources, such as concrete mixing operations. Asphalt mix plants could have particulate, hazardous air pollutant, and combustion source emissions. Stationary sources such as concrete and asphalt mix plants are generally required to obtain permits from the Oregon Department of Environmental Quality.

Most of the construction impacts to air quality would be short-term in duration and, therefore, would not result in adverse or long-term impacts.

The construction impacts associated with the Preferred Alternative will be the same type as those described for the DS1 and DS2 Alternatives; however, the overall construction impacts to air quality will be less with the Preferred Alternative because of its smaller footprint.

3.15.4 Avoidance, Minimization, and/or Mitigation Measures Proposed in the Draft EIS

Construction Mitigation and Commitments

Measures could be taken to the extent practicable to avoid, minimize and mitigate temporary adverse impacts to air quality.

Construction contractors are required to comply with Division 208 of OAR 340 which addresses visible emissions and nuisance requirements. Subsection 210 of OAR 340-208 places limits on fugitive dust that causes a nuisance or violates other regulations. Violations of the regulations can result in enforcement action and fines. The regulation provides a list of reasonable precautions be taken to avoid, minimize and mitigate temporary adverse impacts to dust emissions:

- Use of water or chemicals, where possible, for the control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads or the clearing of land
- Application of asphalt, oil, water, or other suitable chemicals on unpaved roads, materials stockpiles, and other surfaces which can create airborne dusts

- Full or partial enclosure of materials stockpiles in cases where application of oil, water, or chemicals are not sufficient to prevent particulate matter from becoming airborne
- Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials
- Adequate containment during sandblasting or other similar operations
- When in motion, always covering open-bodied trucks transporting materials likely to become airborne
- The prompt removal from paved streets of dirt or other material that does or could become airborne.

In addition, contractors are required to comply with ODOT standard specifications. Section 290 of the specifications has requirements for environmental protection, which include air pollution control measures. These control measures include vehicle and equipment idling limitations and are designed to minimize vehicle trackout and fugitive dust. These measures would be documented in the pollution control plan that the contractor is required to submit prior to the pre-construction conference. To reduce the impact of construction delays on traffic flow and resultant emissions, road or lane closures should be restricted to non-peak traffic periods when possible.

Mitigation for Long-term Impacts

Regional mobile source air toxics emissions are expected to substantially decrease from existing conditions, and no exceedances of the National Ambient Air Quality Standards are expected under the proposed action. Because no substantial adverse air quality effects are expected, no mitigation measures would be necessary.

3.15.5 Avoidance, Minimization, and/or Mitigation Commitments Incorporated into the Preferred Alternative

ODOT makes the following commitments:

- ODOT will require the contractor to establish truck staging areas for diesel-powered vehicles located where truck emissions have a minimum impact on sensitive populations, such as residences, schools, hospitals and nursing homes
- ODOT will require the contractor to prevent airborne dust and fugitive dust emissions from construction activities including rock, concrete, and asphalt crushing operations
- ODOT will require the contractor to not use oil, waste, waste water or other illegal materials as dust suppressants.

Definitions

Decibel (dB) and A-Weighted Decibel (dBA)

Decibel is a unit for relative sound intensity. For highway traffic noise, an adjustment, or weighting, of the high and low-pitched sounds is made to approximate the way that an average person hears sounds. The adjusted sounds are called "A-weighted levels" (dBA). For comparative purposes, human breathing is approximately 10 dBA, a calm room ranges 40-50 dBA, normal talking ranges 40-60 dBA, typical television setting is about 60 dBA at 10 feet, and a passing car is 60-80 dBA at 50 feet.

L_{eq}

L_{eq} represents the equivalent steady-state sound level that, in a stated period of time, contains the same acoustic energy as the time-varying sound level during the same period.

3.16 Noise

3.16.1 Regulatory Setting

The National Environmental Policy Act of 1969 provides a regulatory framework that promotes the general welfare and fosters a healthy environment for noise considerations. Procedures for Abatement of Highway Traffic Noise and Construction Noise (23 CFR 772), and the current ODOT *Noise Manual* provide the basis for analyzing and abating highway traffic noise impacts in Oregon.

23 CFR 772

For highway transportation projects with FHWA involvement, the Federal-Aid Highway Act of 1970 and the associated implementing regulations (23 CFR 772) govern the analysis and abatement of traffic noise impacts. The regulations require that potential noise impacts in areas of frequent human use be identified during the planning and design of a highway project. In July 2010, the FHWA revised 23 CFR 772 (FHWA 2010). Projects to be finalized on or before July 13, 2011 (e.g. Record of Decision or finding of no significant impacts) are "grandfathered" in using the previous version of 23 CFR 772. Projects that will be finalized after July 13, 2011 are to use the July 2010 rule. Since the Final EIS for this project is anticipated to be finished after July 13, 2011 it is subject to the July 2010 rule. Therefore, the analysis conducted complies with the latest version of 23 CFR 772.

The noise regulations govern noise prediction requirements, noise analyses, noise abatement criteria, and requirements for informing local officials. The noise abatement criteria are thresholds used to determine when a noise impact would occur. The noise abatement criteria differ depending on the type of land use under analysis. For example, the noise abatement criteria for residences (67 AWeighted decibels or dBA) are lower than the noise abatement criteria for commercial areas (72 dBA). Exhibit 3-78 lists the noise abatement criteria for use in the FHWA noise analysis.

Exhibit 3-79 lists the noise levels of common activities to compare the actual and predicted highway noise-levels discussed in this section with common activities that may be familiar.

Exhibit 3-78: *FHWA Noise Abatement Criteria*

Activity Category	Activity L_{eq}(h) dBA[1 & 2]	Criteria L10(h) dBA[1 & 2]	Evaluation Location	Activity Description
A	57	60	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[3]	67	70	Exterior	Residential
C[3]	67	70	Exterior	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails and trails crossings.
D	52	55	Interior	Auditoriums, campgrounds, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E[3]	72	75	Exterior	Hotels, motels, offices, restaurants/bars, and other develop lands, properties or activities not included in A-D or F.
F	–	–	–	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	–	–	–	Undeveloped lands that are not permitted.

Source: FHWA 2010

[1] Either L_{eq}(h) or L10(h) (but not both) may be used on a project. L10(h) is not used by ODOT.

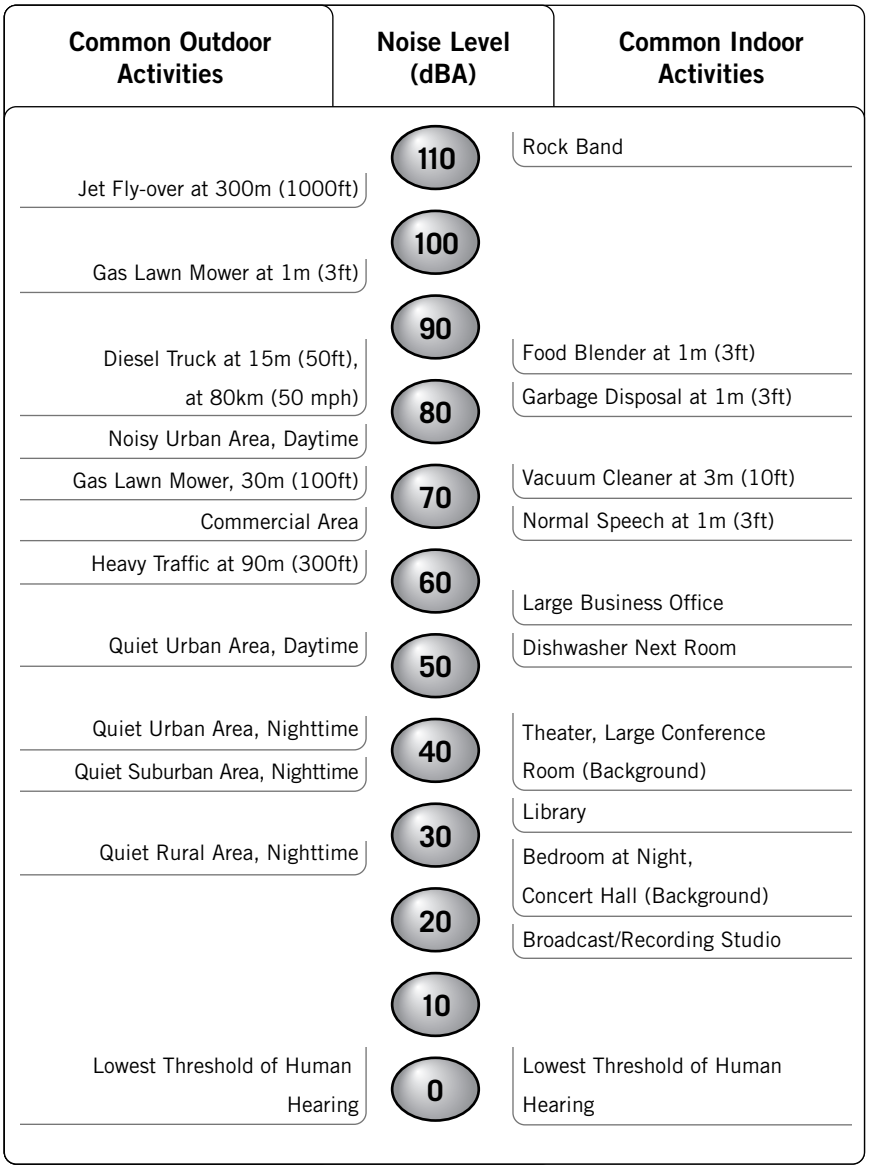
[2] The L_{eq}(h) and L10(h) Activity Criteria values are for impact determination only, and are not design standards for noise abatement measures.

[3] Includes undeveloped lands permitted for this activity category.

ODOT Noise Policy

ODOT implements FHWA noise regulations in the State of Oregon in accordance with the current ODOT *Noise Manual*. According to this manual, a noise impact occurs when the future noise level for one or more build alternatives result in a substantial increase in the noise level (defined as a 10 dBA or more increase over the existing noise levels) or when the future noise level for one or more build alternatives approaches or exceeds the noise abatement criteria. ODOT noise policy defines approaching the noise abatement criteria as 2 dBA less than the noise abatement criteria. Exhibit 3-78 summarizes the criteria used for highway projects in Oregon. The ODOT *Noise Manual* is being revised to comply with the June 2010 update to 23 CFR 772. The updated manual must be approved by July 13, 2011. This report complies with the anticipated revisions to the manual, and assesses noise impacts based on the noise abatement criteria in Exhibit 3-80 FEIS.

Exhibit 3-79: *Common Noise Levels*



The revisions to the ODOT Noise Manual were approved on July 13, 2011. In the Final EIS the analysis of the Preferred Alternative complies with the updated ODOT Noise Manual and 23 CFR 772. With the 2011 revision to the ODOT Noise Manual, the procedures were modified to define the noise abatement approach criteria (NAAC), which is then used in the noise analysis. The ODOT noise abatement approach criteria does not change the ODOT impact level defined as 2 dBA less than FHWA noise abatement criteria (NAC). In addition, the 2011 update to the ODOT Noise Manual no longer requires consideration of traffic management measures when evaluating noise abatement.

Exhibit 3-80 FEIS: *ODOT Noise Abatement Approach Criteria*

Activity Category	Activity $L_{eq}(h)$ dBA[1]	Evaluation Location	Activity Description
A	55	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[2]	65	Exterior	Residential
C[2]	65	Exterior	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails and trails crossings.
D	50	Interior	Auditoriums, campgrounds, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E[2]	70	Exterior	Hotels, motels, offices, restaurants/bars, and other develop lands, properties or activities not included in A D or F.
F	–	–	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	–	–	Undeveloped lands that are not permitted.

Source: ODOT 2011a (based on updated 23 CFR 772 FHWA rule; July, 2010)

[1] The $L_{eq}(h)$ are for impact determination only, and are not design standards for noise abatement measures.

[2] Includes undeveloped lands permitted for this activity category.

Note: ODOT's revised Noise Manual, which was published at the same time as the Draft EIS, revises the impact terminology from noise abatement criteria to noise abatement approach criteria.

Oregon Department of Environmental Quality Noise Policy

The Oregon Department of Environmental Quality Chapter 340 Division 35 sets allowable noise levels for individual vehicles and for industrial and commercial uses. Maximum allowable noise levels for inuse vehicles in Oregon are determined by vehicle type, operating conditions, and model year.

Local Noise Policy

The City of Bend and Deschutes County have noise ordinances for nuisance noise and limits on construction noise times or sound levels. The City of Bend Code 5.385 Noise, describes unreasonably loud or raucous noise, applicable to this project, in subsections 2(c), 2(h), 2(k), and 2(n). Subsection 2(k) prohibits construction noise between 10:00 pm and 7:00 am, except as provided in subsection 4. Variances (or special approvals) to these noise ordinances could be required if construction were to occur during nighttime hours. The city manager may issue a permit for the activities described in subsection 2(k) to take place at any hour during the duration of the activity.

The Deschutes County Code Chapter 8.08 Noise Control, describes unreasonably loud or raucous noise, applicable to this project, in subsections 8.08.040(L), (N), and (P). Subsections (L) and (N) prohibit construction noise between 10:00 pm and 7:00 am, except as provided in DCC8.08.080. Variances (or special approvals) to these noise ordinances could be required if construction were to occur during nighttime hours. The County may grant variances, for an expressly limited duration and covering a defined geographical area, after holding a public hearing and satisfaction of the variance burden of proof under the current County zoning ordinances. For activities in Deschutes County Code 8.08.040(L), the County may issue a permit allowing scheduled construction activities to take place between such hours and for such periods as they deem proper. Activities using equipment described in Deschutes County Code 8.08.040(P) are permissible so long as it does not disturb the sleep, peace, quiet, comfort or response of persons more than 30 feet away.

Project Noise Abatement Requirements

If the project would have noise impacts, then potential abatement measures must be considered. Noise abatement measures that are determined to be reasonable and feasible at the time of final design are incorporated into the project plans and specifications. The Draft EIS discussed noise abatement measures that would be considered in final design of the project.

The ODOT *Noise Manual* sets forth the criteria for determining when an abatement measure is reasonable and feasible. Abatement must meet ODOT's reasonable and feasible criteria to be considered. Feasibility of noise abatement is primarily an engineering concern. A minimum 5 dBA reduction in the future noise level must be achieved for an abatement measure to be considered feasible. Other feasibility considerations include topography, access requirements, other noise sources, and safety considerations. The reasonableness determination is three fold. First, noise abatement must be cost effective for it to be reasonable. ODOT's reasonable cost criterion is $25,000/benefitted residence. Second, noise abatement must reduce noise levels to ODOT's "design goal" which requires that abatement result in a reduction of 7 dBA or more at some of the receivers benefitting from the noise abatement. Finally, the third requirement is that the proposed noise abatement gain approval from benefitted property owners. ODOT requires that a "simple majority" (51 percent or greater) of benefitted property owners approve of the proposed noise abatement. Other factors used in determining whether a proposed noise abatement measure is reasonable include: absolute noise levels, the change in existing noise levels, and environmental impacts of abatement.

The Draft EIS provided information on the potential locations of noise abatement measures that currently meet the reasonable and feasible

Updated Definitions

Abatement

Abatement is a reduction in degree or intensity. Abatement for project noise impacts must meet feasible and reasonable criteria.

Feasible

Feasible refers to whether the barrier can provide a substantial (at least 5 dBA) reduction in noise levels for at least one of the noise impacted properties and other constructability issues.

Reasonable

A noise barrier is reasonable if it fulfills the following three criteria:

3) Cost Effective: The cost of the noise barrier does not exceed $25,000 per benefitted residence.
4) Meets ODOT's "Design Goal": The noise barrier reduces noise by 7 dBA or more for at least one of the noise impacted properties.
5) Property Owner's Approval: Construction of the noise barrier is approved by 51 percent or more of the benefited property owners and residents.

Benefitted Property

The recipient of an abatement measure that receives a noise reduction of at least 5 dBA, regardless of whether or not it is impacted.

Receptor

Term used to describe single individual property or single land use.

Receiver

Modeling term for a location that could represent one or more receptors and one or more land uses.

criteria. The Draft EIS also provided information on which areas are forecast to be noise impacted, but would not meet the reasonable and feasible criteria and therefore, would not be considered for noise abatement. The final decision on provision for noise abatement would not be made until final design, when the exact number of noise impacts would be known so that the final assessment of reasonable and feasible criteria could be measured. ODOT strongly considers the desires of residents when considering providing abatement. In some cases, residents and property owners could choose not to have reasonable and feasible abatement built. In these cases, those areas would not be able to access federal-aid funding in the future for noise abatement.

More Information

Specific land uses at each sensitive receptor are included in Appendix I and detailed land use information for the project can be found in Section 3.2 Land Use.

3.16.2 Affected Environment

More information: Additional detail on the noise analysis is provided in the *Noise Technical Report* (ODOT 2014j). The Noise Technical Report is listed in Appendix K and available in the document library of the project's website (www.us97solutions.org).

The area studied for the noise analysis includes areas outside of the project's API boundary. This is because the noise impacts for highway projects would extend well beyond the project's proposed construction limits (approximately 400 to 800 feet). Therefore the noise study includes all other areas outside of the API where there could be direct impacts, including all noise sensitive land uses. The area within which potential indirect impacts from the proposed action could occur is the same as the direct impact area.

Land uses in the area studied include non-commercial agricultural (NAC B with dwelling and NAC F without dwelling), commercial (NAC E), residential (NAC B), open space/cemetery (NAC C), public/institutional (NAC C), and undeveloped (NAC G). Two hundred forty modeled sites were included in the area studied for the noise analysis (Exhibit 3-81 and Exhibit 3-82) representing 389 residences, 5 churches, a cemetery, 5 public areas (two outdoor eating areas at the ODOT Region 4 offices, Oregon State Police offices, Bend Fire Department, Deschutes County Juvenile Community Justice Center), and 131 commercial businesses.

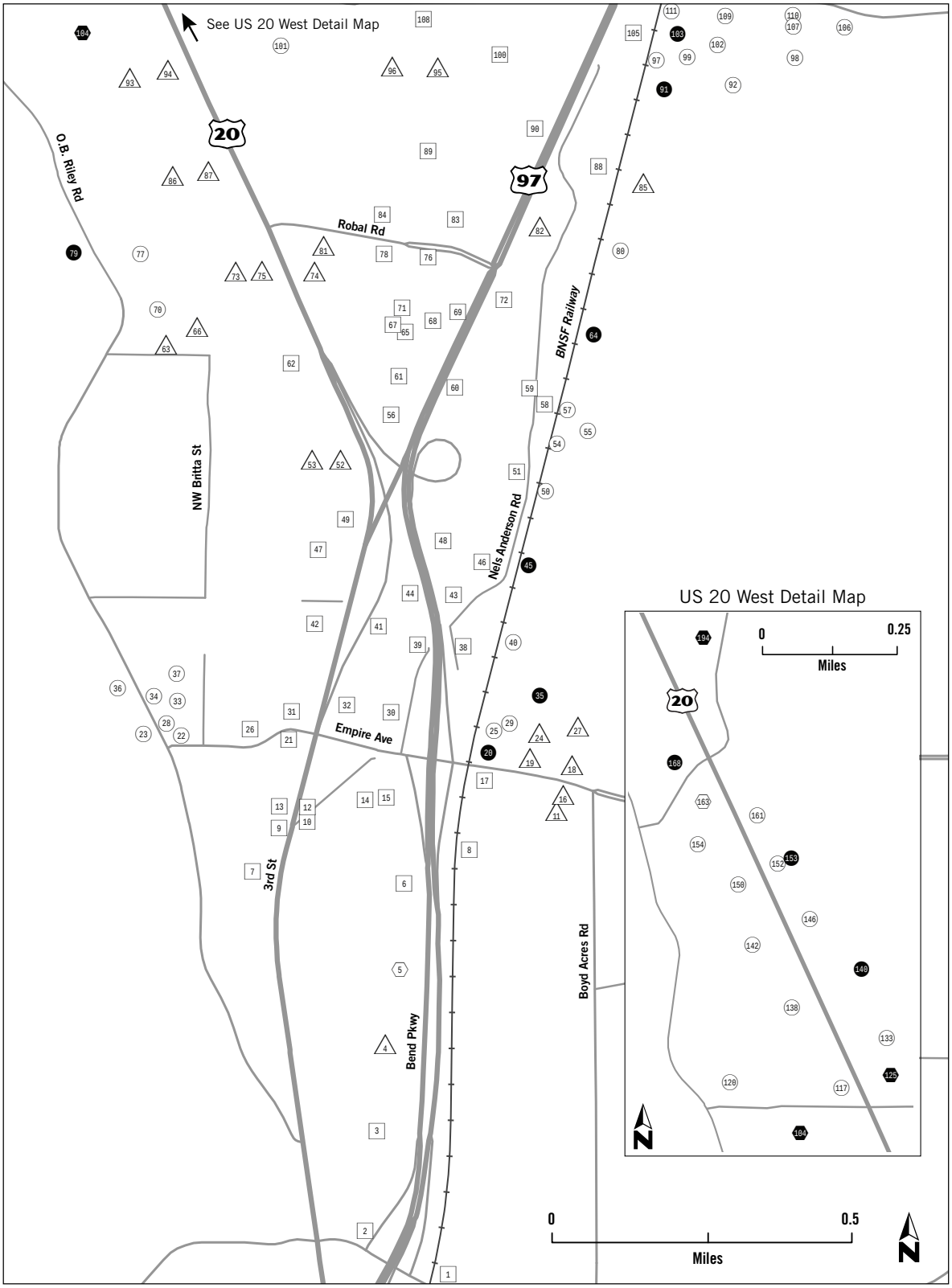
Key Point

Sensitive receptors studied:

- 389 residences
- 5 churches (Calvary Pride, Cascade Praise, Community of Christ, Crossroads Church, Summit Community Church)
- 1 park (unnamed)
- 1 cemetery (Deschutes Memorial Gardens and Chapel)
- 5 public areas (two outdoor eating areas at the ODOT Region 4 offices, Oregon State Police offices, Bend Fire Department, Deschutes County Juvenile Community Justice Center)
- 131 commercial businesses.

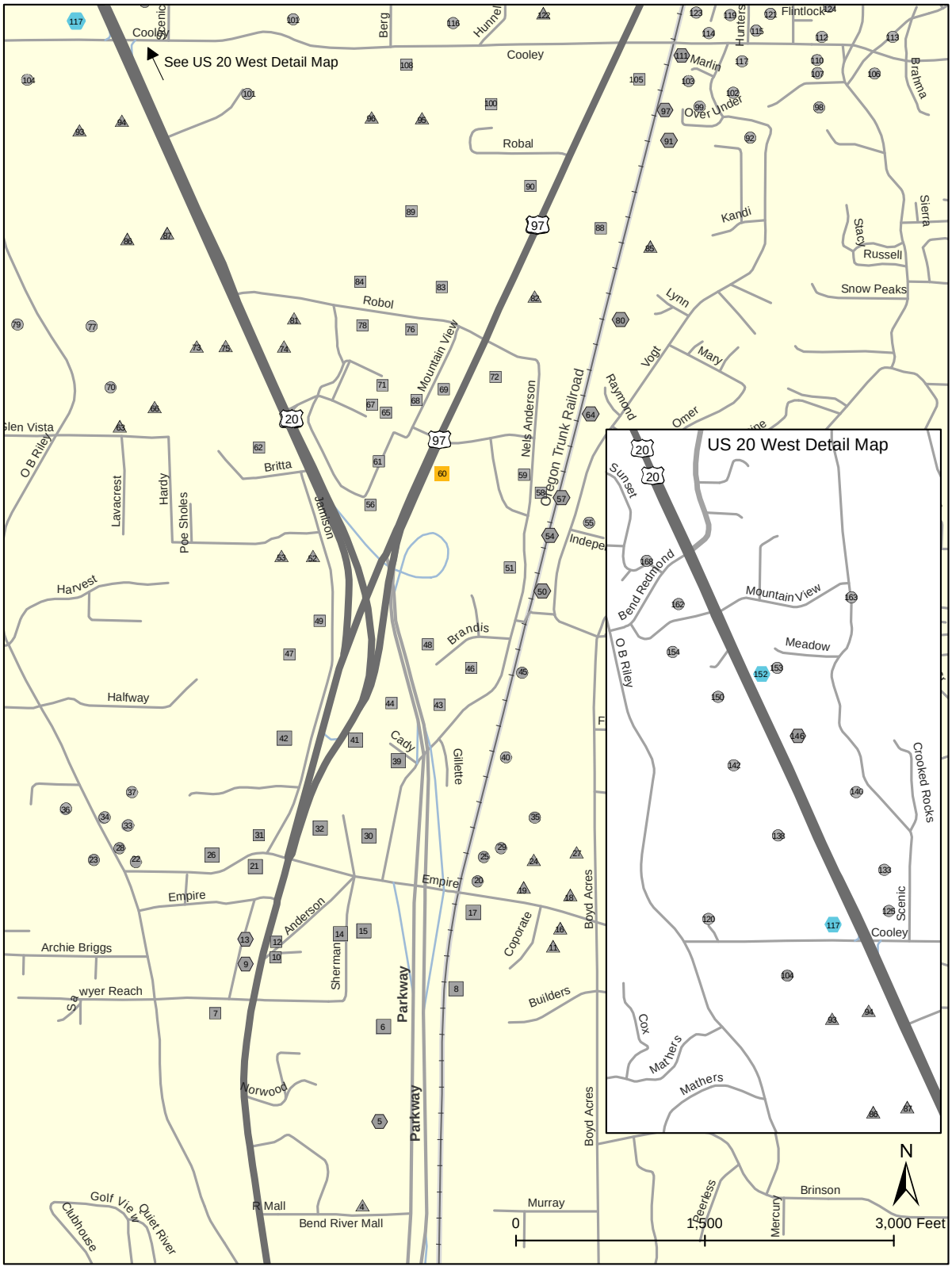
The analysis of existing conditions for noise levels was revised to reflect the 2011 revision to the ODOT Noise Manual which eliminates the railroad noise from consideration of traffic noise impacts and mitigation measures. In addition, since the publication of the Draft EIS the existing noise analysis was updated to account for the updated existing traffic conditions (from 2007 to 2011). The noise level modeled sites using the 2011 existing traffic conditions are shown in Exhibit 3-81 FEIS and Exhibit 3-82 FEIS.

Exhibit 3-81: ~~*Noise Sensitive Sites South*~~ *2007 Existing Conditions – Modeled Sites South of Cooley Road*



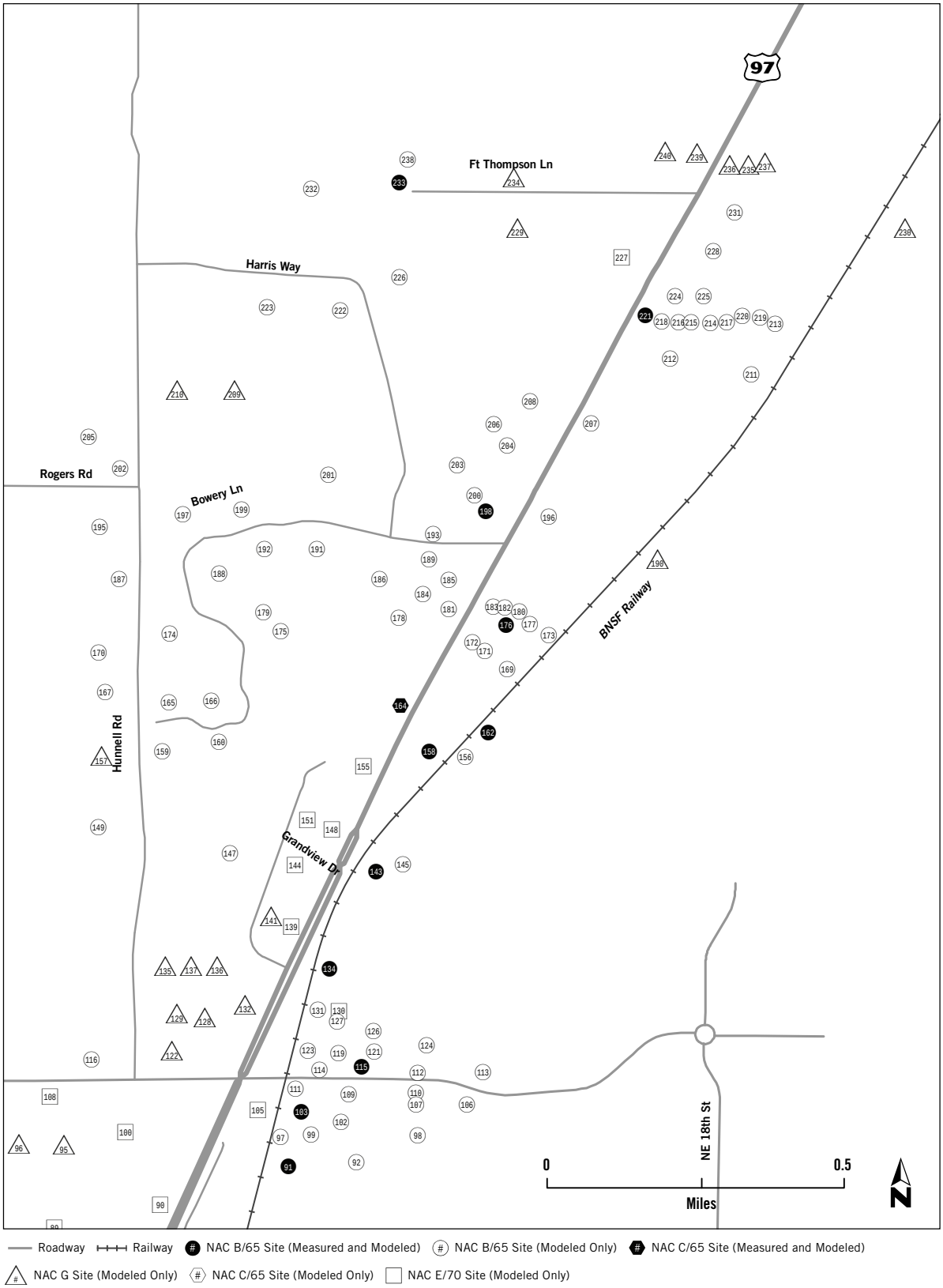
Note: Site numbers shown correlate to site numbers and associated noise levels listed in Appendix I, Exhibit I-2.

Exhibit 3-81 FEIS: *2011 Existing Conditions – Modeled Sites South of Cooley Road*



Notes: A noise impact occurs when noise levels approach or exceed the NAAC threshold for the corresponding land use activity category. Please see Exhibit 3-80 (ODOT NAAC) for descriptions of land use activity categories and noise levels that require noise abatement analysis. Site numbers shown correlate to site numbers and associated noise levels listed in Appendix I, Exhibit I-2 FEIS. The noise impacts shown on Exhibit 3-81 FEIS and Exhibit 3-82 FEIS reflect updated traffic analysis conducted for the existing conditions (2011) peak hour traffic noise levels.

Exhibit 3-82: ~~*Noise Sensitive Sites North*~~ *2007 Existing Conditions – Modeled Sites North of Cooley Road*



Note: Site numbers shown correlate to site numbers and associated noise levels listed in Appendix I, Exhibit I-2.

Exhibit 3-82 FEIS: *2011 Existing Conditions – Modeled Sites North of Cooley Road*



Notes: A noise impact occurs when noise levels approach or exceed the NAAC threshold for the corresponding land use activity category. Please see Exhibit 3-80 (ODOT NAAC) for descriptions of land use activity categories and noise levels that require noise abatement analysis. Site numbers shown correlate to site numbers and associated noise levels listed in Appendix I, Exhibit I-2 FEIS. The noise impacts shown on Exhibit 3-81 FEIS and Exhibit 3-82 FEIS reflect updated traffic analysis conducted for the existing conditions (2011) peak hour traffic noise levels.

Existing Noise Levels

Existing noise levels at the 240 modeled sites were assessed by using a combination of noise measurements and computer assisted modeling. Noise modeling was conducted using the latest version of the FHWA's Traffic Noise Model (TNM 2.5). Noise measurements were taken during October 2008 and May 2010 at 24 sites. Monitored noise levels ranged from 44 dBA L_{eq} to 71 dBA L_{eq}. Appendix I, Exhibit I-1 indicates monitored noise levels at each of the sites where noise measurements were conducted. The results from the noise measurements found that railroad noise is dominant in some areas. For areas where railroad noise is dominant the worst case noise hour from field measurements of the railroad were used to estimate noise levels at sites with different distances from the railroad than the monitoring sites. This is possible because it has been established that noise dissipates with distance from linear sources such as railroads at the rate of 3 dBA per doubling of distance.

Computer assisted modeling was used at all the receiver sites to predict roadway traffic noise levels. Noise monitoring was also used to ensure that the noise model predicts noise levels that are consistent with those measured. The modeled noise levels and monitored noise levels were found to be in agreement and therefore the noise model is accurate for predicting noise levels in the area studied. Noise levels at each of the 240 representative sites are listed in Appendix I, Exhibit I-2. The peak noise hour was identified by conducting a comparison of peak vehicular hour traffic to peak truck hour traffic to see which is noisier and the peak vehicular hour was found to be the noisier of the two. These traffic levels were used to predict traffic noise levels at sites within the area studied using TNM 2.5. A comparison was then conducted between the modeled peak noise hour for roadway traffic with the loudest railroad noise hour which was identified during the monitoring effort. The louder of these conditions was used as the existing worst case noise hour. Existing noise levels range from 48 to 74 dBA L_{eq} for the peak noise hour.

Undeveloped lands (e.g. activity category NAC G in Exhibit 3-78 and Exhibit 3-80 FEIS) also have been analyzed to provide local agencies with information on noise levels resulting from the proposed action.

The BNSF Railway operates freight trains along the railroad that is adjacent to US 97. The BNSF Railway does not operate trains on a fixed schedule; however, trains are operated 10 times a day with 6 day trips and 4 night time trips. There are no more than two trains per hour. The BNSF Railway anticipates that trains will operate more frequently in the future with 15 trips a day, 8 of which would occur during daylight hours and 7 at night. Based on this future schedule and relationship to the existing schedule and noise levels from rail, areas

within approximately 300 feet of active railroad tracks would not be considered for roadway traffic noise abatement because the abatement measure could not also feasibly reduce noise from the railroad.

Under the existing conditions in 2007, 17 of the 240 sites modeled (Exhibit 3-83) approach or exceed the noise abatement criteria due to traffic noise on roadways representing:

- 29 residences
- 1 public area
- 1 cemetery
- 4 businesses.

Exhibit 3-83: *Summary of Sites at or Above the Noise Abatement Criteria under the Existing Conditions*

Analyzed Condition	FHWA/ ODOT Noise Abatement Criteria Activity Category[1]	Approach or Exceed Noise Abatement Criteria from Roadway Traffic Noise		Approach or Exceed Noise Abatement Criteria from Railroad Noise		Total Number that Approach or Exceed Noise Abatement Criteria	
		Sites	Number of Uses	Sites	Number of Uses	Sites	Number of Uses
Existing Conditions (2007)	B	12	29	24	131	36	160
	C	2	2	0	0	2	2
	E	3	4	0	0	3	4

Note: Sites is an abbreviation for the noise measurement/modeled sites. Number of uses is the number activities present at each of the sites that approach or exceed the noise abatement criteria (NAC). [1] See Exhibit 3-78 and Exhibit 3-80 for a detailed description of what the NAC activity categories correspond to.

BNSF Railway noise does not approach or exceed the noise abatement criteria for activity categories C or E; however, 24 activity category B (residential) sites approach or exceed the noise abatement criteria due to noise on the BNSF Railway representing:

- 131 residences.

Therefore a total of 41 sites (Exhibit 3-83) approach or exceed the noise abatement criteria representing

- 160 residences
- 1 public area
- 1 cemetery
- 4 businesses.

Railroad noise was typically found to be dominant in areas within 600 - 800 feet of active railroad tracks, depending on their location and distance relative to existing high traffic roadways. For undeveloped lands in the area studied existing noise levels ranged from 50 dBA L_{eq} to 69 dBA L_{eq}. Noise levels at each of the sites studied are listed in Appendix I, Exhibit I-2. Locations of all these sites are shown in Exhibit 3-81 and Exhibit 3-82.

Since publication of the Draft EIS, ODOT provided revised guidance to eliminate railroad noise from the consideration of traffic noise impacts and mitigation. The noise analysis for the Preferred Alternative focused on existing peak hour traffic noise levels from the 2011 existing traffic conditions and mitigation of those traffic noise levels when warranted. In 2011 existing traffic noise levels ranged from 43 to 72 dBA L_{eq} for the peak noise hour. The locations of all of the modeled sites are shown in Exhibit 3-81 FEIS and Exhibit 3-82 FEIS. Additional graphics are provided in the Final Noise Technical Report that further identify the receptor locations and noise levels for the 2011 existing conditions.

Under the 2011 existing conditions, 13 of the 240 sites modeled are exposed to traffic noise levels in excess of the ODOT NAAC limits (Exhibit 3-84 FEIS). These 13 sites represent 26 residences, one cemetery (Deschutes Memorial Gardens and Chapel), and two businesses.

Exhibit 3-84: *Comparison of Sites that Approach or Exceed the Noise Abatement Criteria*

Analyzed Condition	FHWA/ODOT Noise Abatement Criteria Activity Category[1]	Total Number that Approach or Exceed Noise Abatement Criteria	
		Sites	Number of Uses
Existing Conditions (2007)	B	36	160
	C	2	2
	E	3	4
No Build Alternative (2035)	B	19	53
	C	5	5
	E	6	9
East DS1 Alternative (2035)	B	17	59
	C	4	4
	E	2	5
East DS2 Alternative (2035)	B	20	63
	C	4	4
	E	2	5

Note: The data for the existing conditions in 2007 are included above for comparative reference. Sites is an abbreviation for the noise measurement/modeled sites.

[1] See Exhibit 3-78 and Exhibit 3-80 for a detailed description of the noise abatement criteria activity categories correspond to.

Exhibit 3-84 FEIS: *Comparison of Sites that Exceed the ODOT Noise Abatement Approach Criteria*

Analyzed Condition	ODOT NAAC Activity Category[1]	Substantial Increase in Noise or Exceeds Noise Abatement Approach Criteria	
		Modeled	Number of Uses
Existing Conditions (2011)	B	11	26
	C	1	1
	E	1	2
No Build Alternative (2036)	B	18	46
	C	2	2
	E	2	3
Preferred Alternative (2036)	B	21 (no feasible/ reasonable mitigation)	67 (no feasible/ reasonable mitigation)
	C	4	4
	E	1	4

[1] See Exhibit 3-80 FEIS for a detailed description of the NAAC activity categories.

Note: This table has been revised to show the updated 2011 existing traffic conditions, 2036 No Build Alternative, and Preferred Alternative. The totals presented for all scenarios were revised to eliminate railroad noise and only consider impacts and mitigation from traffic noise.

3.16.3 Environmental Consequences

No Build Alternative

Traffic noise levels under the No Build Alternative (2036) would also increase over time due to increased traffic volumes on the existing roadway network. Future traffic noise levels for the No Build Alternative at the 240 receptor locations are predicted to range from 45 to 74 dBA L_{eq} (Appendix I, Exhibit I-2 FEIS). Where roadway traffic noise would be dominant, noise levels would increase by 1 to 6 dBA L_{eq} over the existing noise levels.

Exhibit 3-84 FEIS summarizes the number of sites that would approach or exceed the noise abatement criteria under the No Build Alternative (2036). Under the No Build Alternative (2036) 22 sites would approach or exceed the noise abatement criteria from roadway noise representing:

- 46 residences
- 1 public area
- 1 cemetery
- 3 businesses.

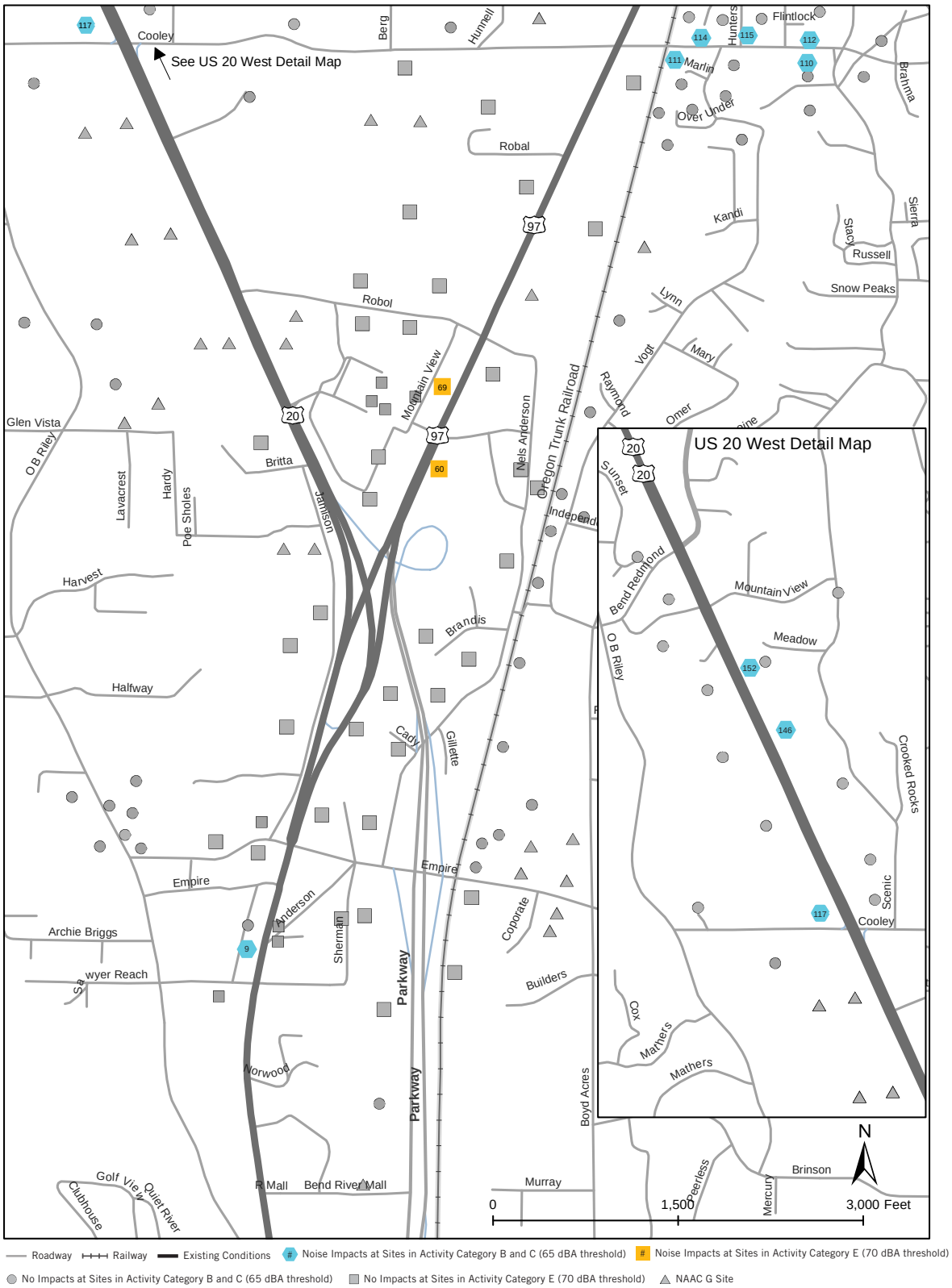
Noise levels for undeveloped lands in the area studied range from 45 dBA L_{eq} to 70 dBA L_{eq}. Noise levels at each of the sites studied are listed in Appendix I, Exhibit I-2 FEIS. Locations of all these sites including those sites that approach or exceed the NAAC are shown in Exhibit 3-85 FEIS and Exhibit 3-86 FEIS.

Definition

Design Year

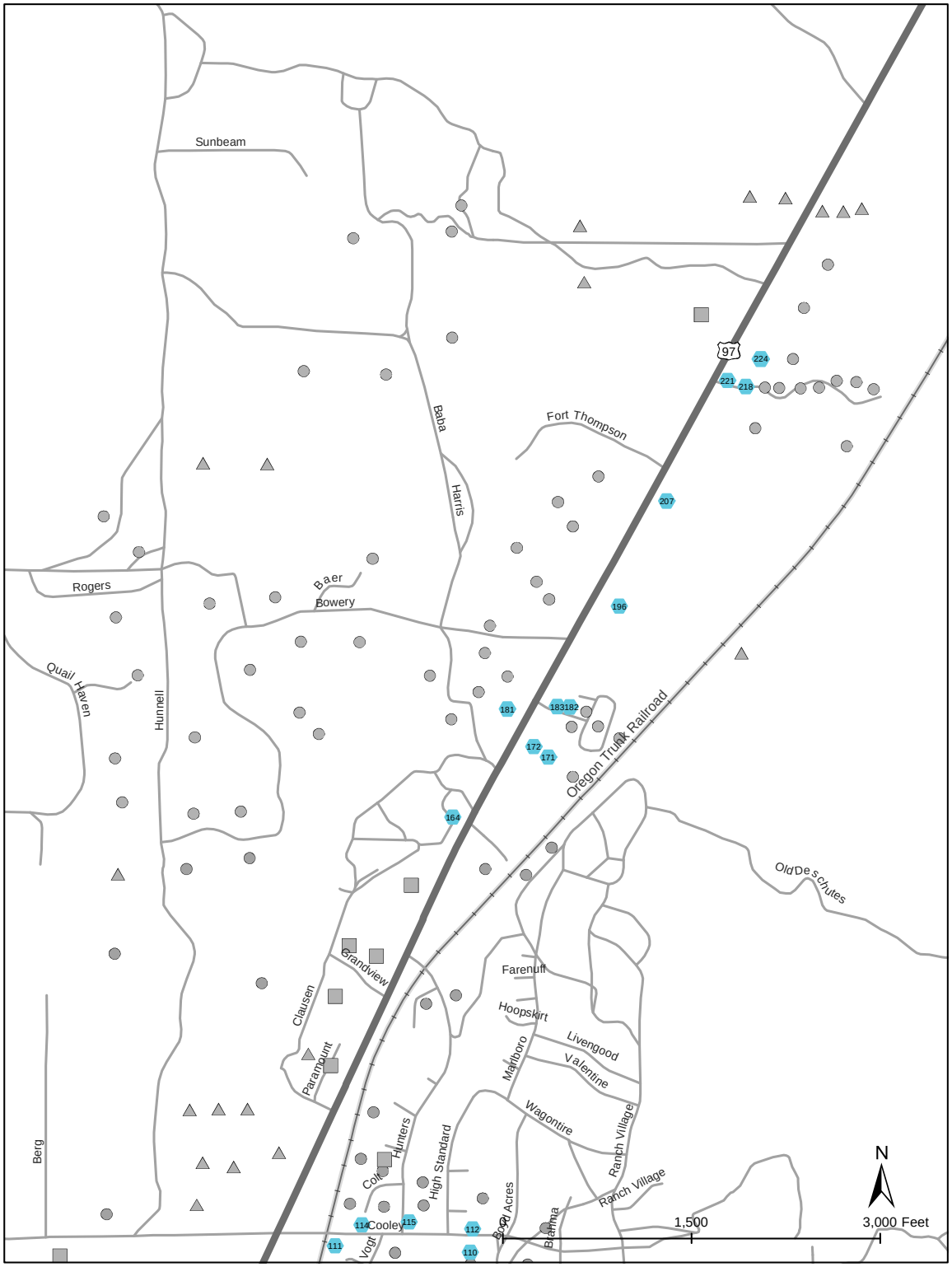
The design year is the year for which the project was designed to meet anticipated needs. The No Build Alternative and the Preferred Alternative have been updated to a 2036 Design Year in the Final EIS. The noise analysis that was conducted for the East DS1 and East DS2 Alternatives in the Draft EIS was accurate at that time, and the noise levels for the 2036 design year compared to the 2035 design year reported in the Draft EIS is expected to be negligible.

Exhibit 3-85 FEIS: *No Build Alternative – Modeled Sites South of Cooley Road that Approach or Exceed the Noise Abatement Approach Criteria*



Notes: A noise impact occurs when noise levels approach or exceed the NAAC threshold for the corresponding land use activity category. Please see Exhibit 3-80 (ODOT NAAC) for descriptions of land use activity categories and noise levels that require noise abatement analysis. Exhibit 3-85 FEIS includes data for the existing conditions updated to the year 2011. Modeled sites reflect updated traffic analysis and consideration of peak hour traffic noise levels (2036) without railroad noise. Site numbers shown correlate to site numbers and associated noise levels listed in Appendix I, Exhibit I-2 FEIS.

Exhibit 3-86 FEIS: *No Build Alternative – Modeled Sites North of Cooley Road that Approach or Exceed the Noise Abatement Approach Criteria*



Notes: A noise impact occurs when noise levels approach or exceed the NAAC threshold for the corresponding land use activity category. Please see Exhibit 3-80 (ODOT NAAC) for descriptions of land use activity categories and noise levels that require noise abatement analysis. Exhibit 3-86 FEIS includes data for the existing conditions updated to the year 2011. Modeled sites reflect updated traffic analysis and consideration of peak hour traffic noise levels (2036) without railroad noise. Site numbers shown correlate to site numbers and associated noise levels listed in Appendix I, Exhibit I-2 FEIS.

Key Differences

	East DS1 (2036)	East DS2 (2036)	Preferred Alternative (2036)
Residences Impacted by Noise (roadway noise only)	59	63	67

Note: The number of residences impacted by noise with the Preferred Alternative reflects updated traffic analysis and consideration of peak hour traffic noise levels (2036) without railroad noise.

East DS1 Alternative

Traffic noise levels for the East DS1 Alternative would rise in the future due to increased traffic volumes on the roadway network and increased proximity to this build alternative. Future noise levels at the 240 receptor locations for the East DS1 Alternative are predicted to range from 46 to 74 dBA L_{eq} (Appendix I, Exhibit I-2). East DS1 Alternative would move traffic on US 97 closer to some noise sensitive sites and further away from other noise sensitive sites. As a result noise levels would increase in some areas and decrease in other areas. Increases in roadway traffic noise are predicted to be between 1 and 9 dBA L_{eq}. Decreases in roadway traffic noise in areas closest to roadways where traffic noise would be dominant, are predicted to be between 1 and 7 dBA L_{eq}.

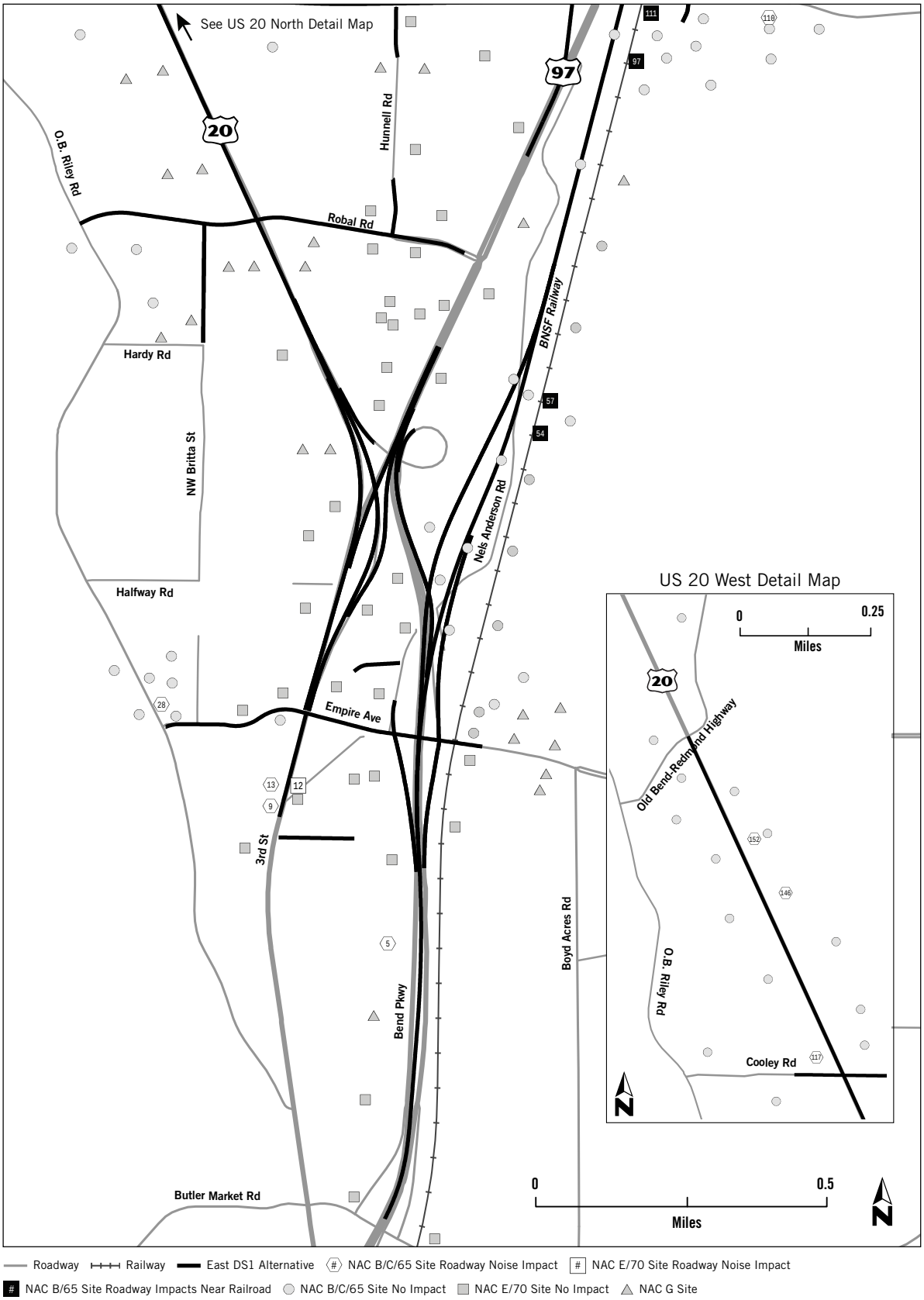
At residences near the ramps of the new northern interchange, roadway noise would continue to be dominant but the noise level would decrease by approximately 1 to 7 dBA L_{eq}. This decrease is due to the ramps in these locations acting as traffic noise barriers for some residences. In other areas near the interchange but not receiving shielding from traffic noise from the ramp configuration US 97 and/or 3rd Street would be closer to noise sensitive sites. This exposure in addition to an increase in traffic volumes in the future are predicted to result in a 1 to 7 dBA L_{eq} increase in traffic noise in these areas. No substantial increases (increases of 10 dBA or more) are predicted to occur under the East DS1 Alternative.

Under the East DS1 Alternative (2035), 23 of the sites (Exhibit 3-84) would approach or exceed the noise abatement criteria, representing:

- 59 residences
- 2 public areas
- 1 active outdoor sports area at a business
- 1 cemetery
- 5 businesses (one with an outdoor use – the Sonic Restaurant).

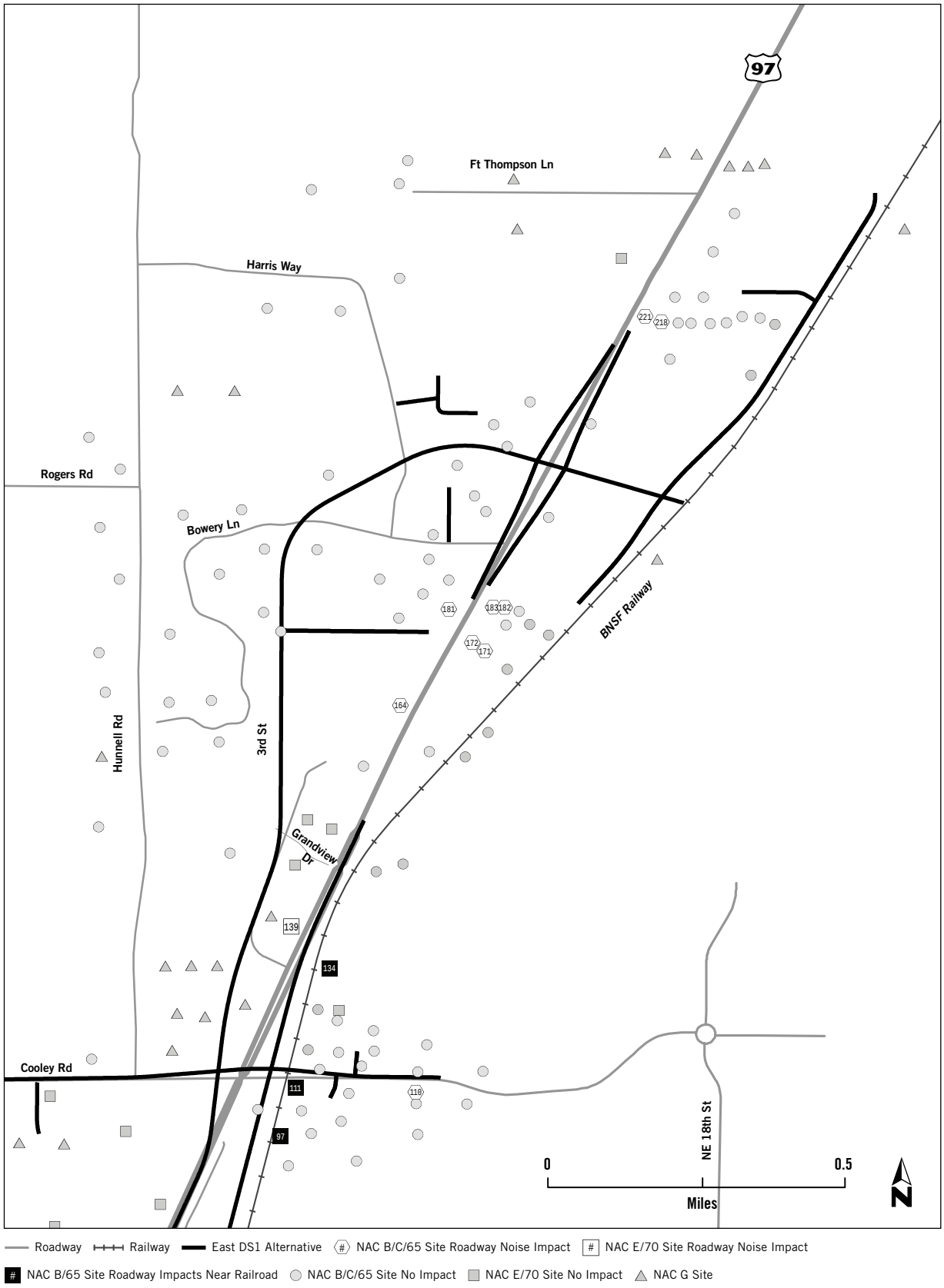
Noise levels for undeveloped lands in the area studied range from 48 dBA L_{eq} to 70 dBA L_{eq}. Noise levels at each of the sites studied are listed in Appendix I, Exhibit I-2. Locations of all these sites are shown in Exhibit 3-87 and Exhibit 3-88.

Exhibit 3-87: *East DS1 Alternative – Modeled Sites South of Cooley Road that Approach or Exceed the Noise Abatement Criteria*



Note: Site numbers shown correlate to site numbers and associated noise levels listed in Appendix I, Exhibit I-2.

Exhibit 3-88: *East DS1 Alternative – Modeled Sites North of Cooley Road that Approach or Exceed the Noise Abatement Criteria*



Note: Site numbers shown correlate to site numbers and associated noise levels listed in Appendix I, Exhibit I-2.

East DS2 Alternative

Similar to East DS1 Alternative, future noise levels at the 240 receptor locations are predicted to range from 46 to 74 dBA L_{eq} (Appendix I, Exhibit I-2). Roadway traffic noise would also increase in some areas (between 1 and 9 dBA L_{eq}) and decrease in other areas (between 1 and 7 dBA L_{eq}).

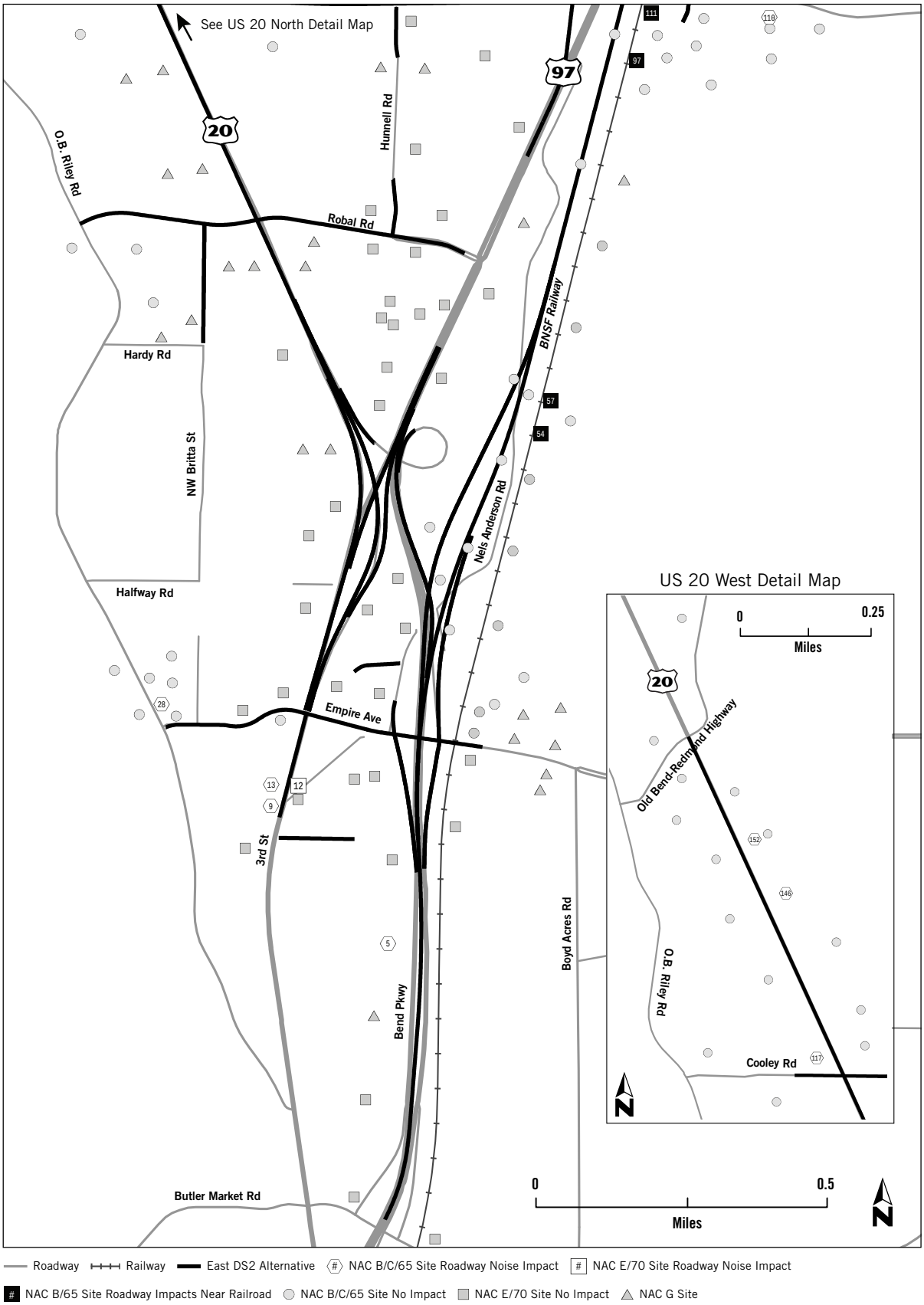
At residences near the realignment of Bowery Lane and along US 97 near the new northern interchange and associated ramps, roadway noise would continue to be dominant, the noise levels would decrease by approximately 1 to 7 dBA L_{eq} when compared to the existing conditions. This decrease is due to the ramps in these locations acting as traffic noise barriers for some residences. In some other areas, noise levels would increases 1 to 3 dBA L_{eq} due to increased traffic volumes on the US 97 facility. No substantial increases (increases of 10 dBA or more) are predicted to occur under the East DS2 Alternative.

Under the East DS2 Alternative (2035), 26 of the sites would approach or exceed the noise abatement criteria due to roadway noise, representing:

- 63 residences
- 2 public use areas
- 1 cemetery
- 1 active outdoor sport area at a business (Sun Mountain Fun Center)
- 5 businesses (one with an outdoor use – the Sonic Restaurant).

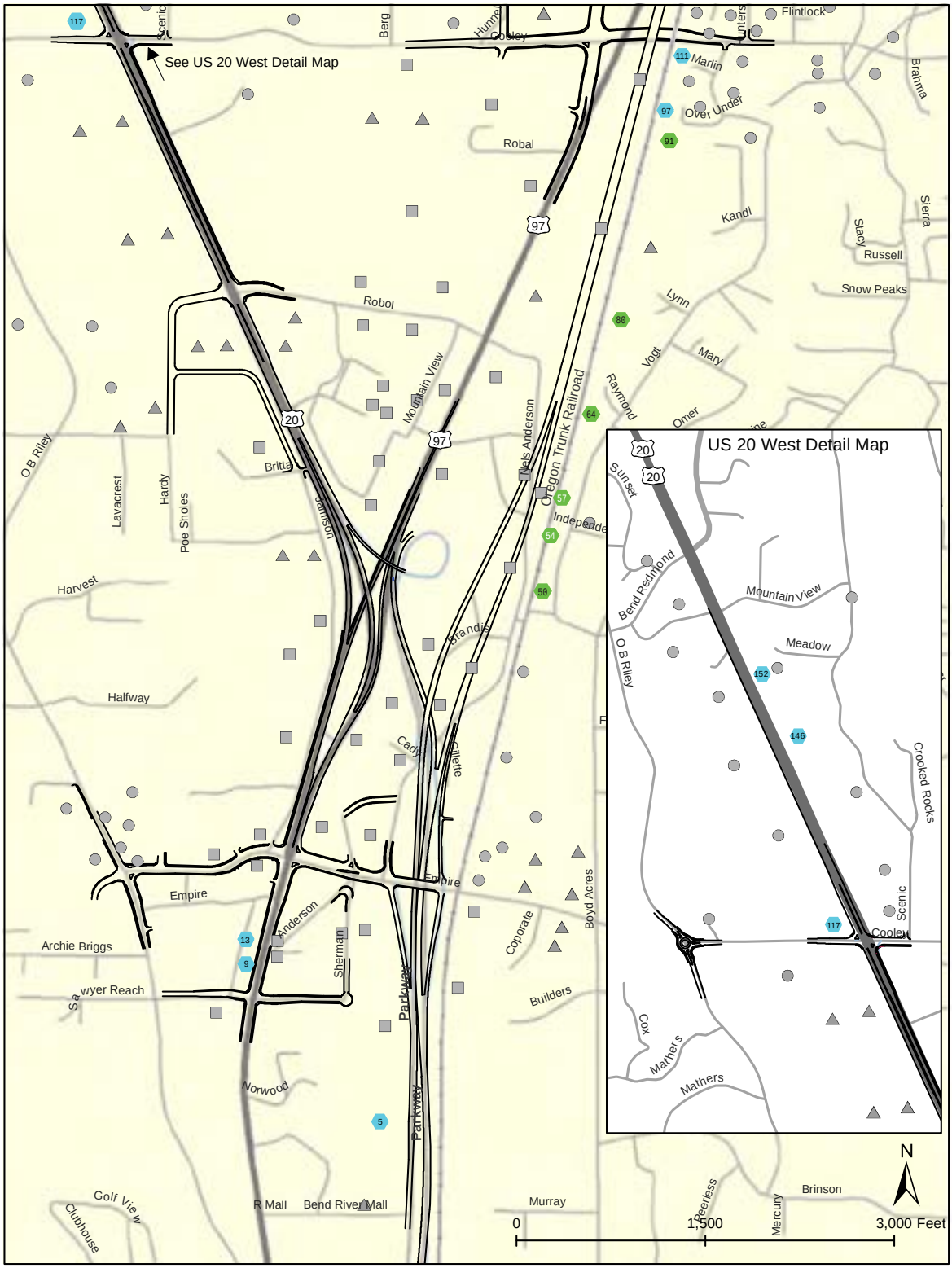
Noise levels for undeveloped lands in the area studied range from 47 dBA L_{eq} to 70 dBA L_{eq}. Noise levels at each of the sites studied are listed in Appendix I, Exhibit I-2. Locations of all these sites are shown in Exhibit 3-89 and Exhibit 3-90.

Exhibit 3-89: *East DS2 Alternative – Modeled Sites South of Cooley Road that Approach or Exceed the Noise Abatement Criteria*



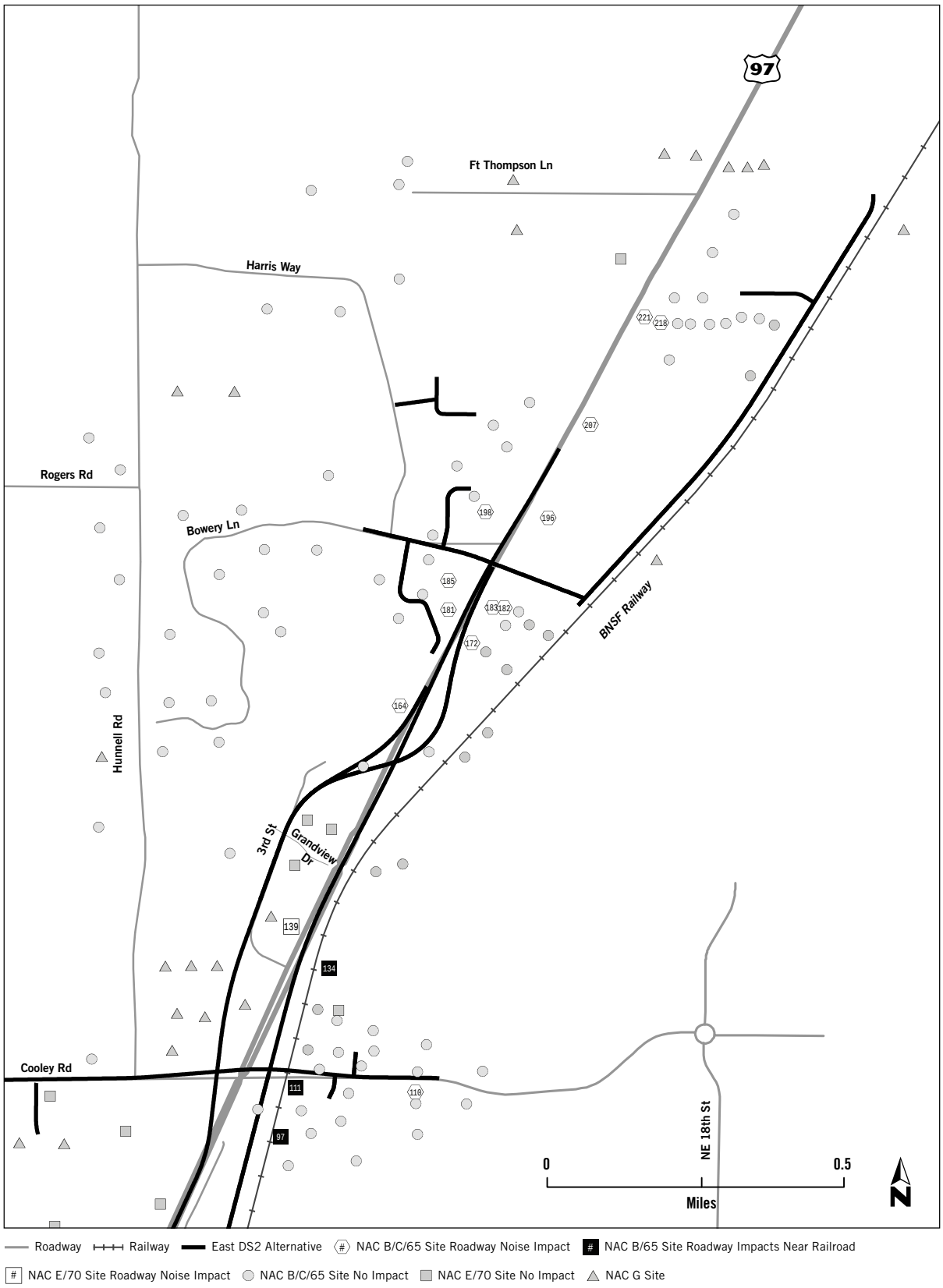
Note: Site numbers shown correlate to site numbers and associated noise levels listed in Appendix I, Exhibit I-2.

Exhibit 3-89 FEIS: *Preferred Alternative – Modeled Sites South of Cooley Road that Approach or Exceed the Noise Abatement Approach Criteria*



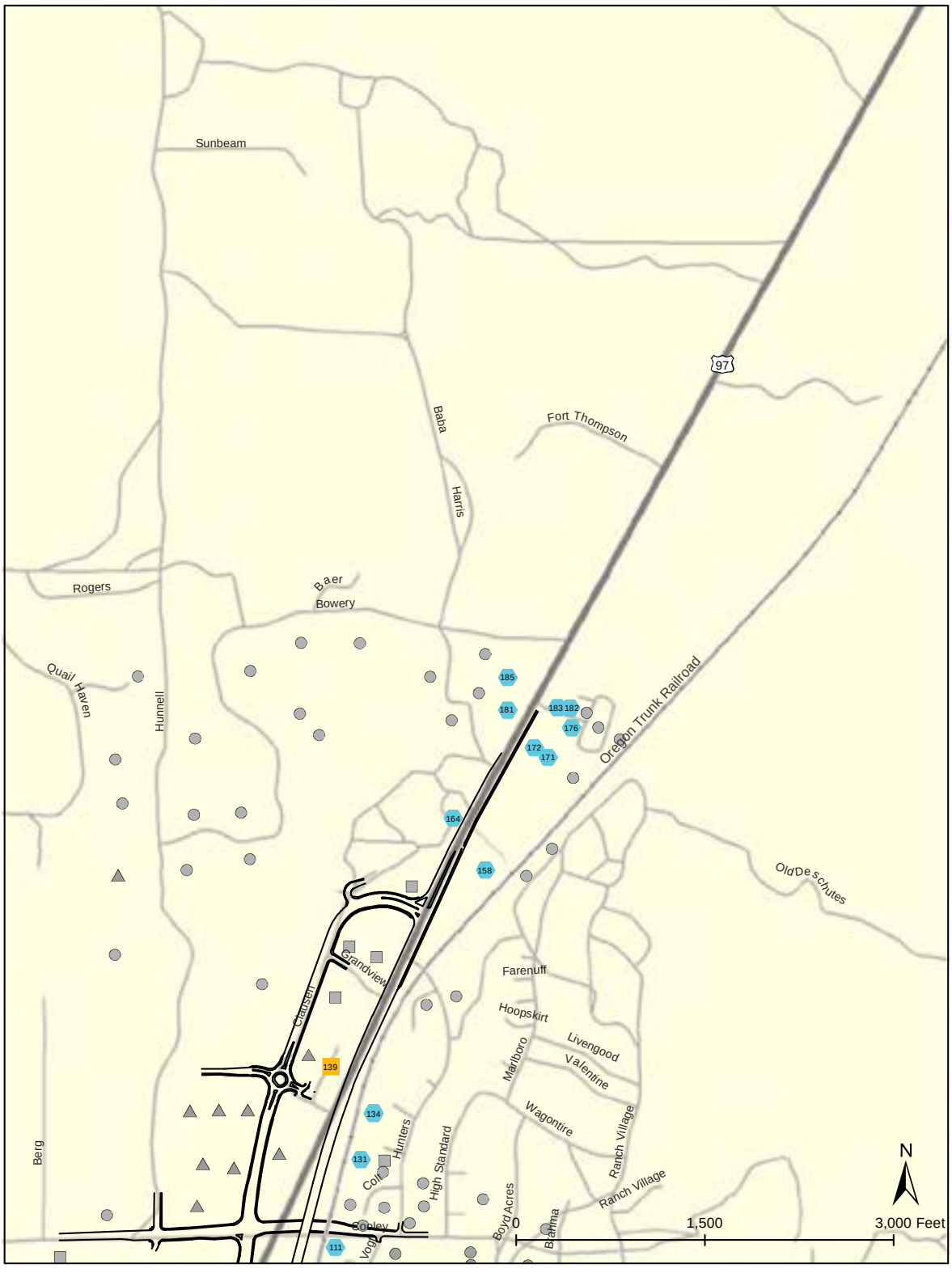
Notes: A noise impact occurs when noise levels approach or exceed the NAAC threshold for the corresponding land use activity category. Please see Exhibit 3-80 (ODOT NAAC) for descriptions of land use activity categories and noise levels that require noise abatement analysis. Site numbers shown correlate to site numbers and associated noise levels listed in Appendix I, Exhibit I-2 FEIS. Modeled sites reflect updated traffic analysis and consideration of peak hour traffic noise levels (2036) without railroad noise.

Exhibit 3-90: *East DS2 Alternative – Modeled Sites North of Cooley Road that Approach or Exceed the Noise Abatement Criteria*



Note: Site numbers shown correlate to site numbers and associated noise levels listed in Appendix I, Exhibit I-2.

Exhibit 3-90 FEIS: *Preferred Alternative – Modeled Sites North of Cooley Road that Approach or Exceed the Noise Abatement Approach Criteria*



Note: A noise impact occurs when noise levels approach or exceed the NAAC threshold for the corresponding land use activity category. Please see Exhibit 3-80 (ODOT NAAC) for descriptions of land use activity categories and noise levels that require noise abatement analysis. Site numbers shown correlate to site numbers and associated noise levels listed in Appendix I, Exhibit I-2 FEIS. Modeled sites reflect updated traffic analysis and consideration of peak hour traffic noise levels (2036) without railroad noise.

Key Information

The noise impact analysis for the Preferred Alternative has been updated to reflect the new traffic analysis performed for this alternative as well as to conform to the 2011 updates to the ODOT Noise Manual. The analysis of the Preferred Alternative also includes an evaluation of substantial noise impacts, which are determined by comparing the future design year to existing conditions.

Preferred Alternative—East DS2 Modified Alternative

The total number of modeled sites for the Preferred Alternative is 197, compared to 240 total sites modeled for the East DS1 and East DS2 Alternatives. This reduction in modeled sites is because the improvements on US 97 associated with the Preferred Alternative will terminate approximately one-half mile south of the northern terminus of the improvements that were proposed with the East DS1 and East DS2 Alternatives. In addition, the Preferred Alternative will not include the roadway improvements east of US 97 along the BNSF Railway north of Bowery Lane that the East DS1 and East DS2 Alternatives would include.

With the Preferred Alternative the future noise levels at the 197 receptor locations are predicted to range from 46 to 74 dBA L_{eq} (Appendix I, Exhibit I-2 FEIS). Roadway traffic noise will also increase in some areas (between 1 and 14 dBA L_{eq}) and decrease in other areas (between 1 and 4 dBA L_{eq}).

With the Preferred Alternative (2036), 26 of the 197 modeled sites, representing 67 residences, the Sun Mountain Fun Center, one cemetery (Deschutes Memorial Gardens and Chapel), two outdoor eating areas at the ODOT Region 4 offices, and outdoor areas at four businesses will experience traffic noise levels that exceed the NAAC limits. See Exhibit 3-84 FEIS for a summary of sites that exceed the NAAC under the Preferred Alternative. Six of the 197 modeled sites representing 31 residences are predicted to experience a substantial increase (10 dBA or more) in traffic noise levels over existing traffic noise levels. Two sites representing 13 residences will be exposed to traffic noise levels in excess of the NAAC limits and will experience a substantial increase in traffic noise levels.

With the Preferred Alternative, the BNSF Railway crossing of Cooley Road will be grade-separated, which avoids the need for all trains to sound their horn as is done under the current conditions.

Locations of all the modeled and impacted sites are shown in Exhibit 3-89 FEIS and Exhibit 3-90 FEIS.

Indirect Impacts

An impact is considered to be indirect when it occurs later in time or further removed in distance as a result of the direct impacts. Indirect impacts may include changes in land use patterns, population density or growth rate, and related impacts on other natural systems.

The noise analysis for the proposed action is based on the transportation demand forecasting model that generates the projected traffic volumes and includes the impacts of unmet demand on the transportation system from future population, housing and land use

changes and growth. Unmet demand refers to traffic levels that have not yet been fulfilled. By including unmet demand, the indirect noise impacts of increased transportation capacity are included in the direct impact analysis. Therefore the transportation analysis includes forecasting for all planned projects that would increase roadway traffic to US 97 and other local roads. Examples of projects or additional growth that are part of the traffic analysis and that would add to the indirect noise impacts include commercial developments, residential developments, and other conversions of undeveloped lands to a more urbanized environment; these are in addition to improvements that have been already planned. Therefore, the transportation analysis used to assess the direct noise impacts takes into account indirect impacts as well.

Construction Impacts

Construction activities associated with the East DS1 and East DS2 Alternatives would have short-term noise impacts on receptors in the immediate vicinity of construction activities. Impacts would include noise from the operation of construction equipment and noise from construction and delivery vehicles traveling to and from the construction site. The level of impact would depend on the noise characteristics of the equipment, activities involved, construction schedule, and distance of equipment from sensitive receptors.

Although of a temporary nature, construction noise could be annoying to the public, particularly during typically quieter periods. At a typical noise receptor, the noise levels would be highest during the early phases of construction, when excavation and heavy daily truck traffic would occur. Average noise levels for typical construction equipment, measured at 50 feet from the construction site, would range from 81 dBA for generators and pumps to 89 dBA for asphalt spreaders to 101 dBA for pile drivers. The average dBA L_{eq} noise level for a one hour period at a distance of 50 feet from activities associated with typical highway construction is approximately 85 dBA L_{eq}. Actual noise levels would vary due to specific equipment, phase of construction, the influence of the person using the equipment, and distance to receptor.

Construction noise impacts resulting from the Preferred Alternative will be slightly less than those described for the East DS1 and East DS2 Alternatives with the most noticeable decreases north of Cooley Road due to a reduced design footprint.

3.16.4 Avoidance, Minimization, and/or Abatement Measures Proposed in the Draft EIS

Avoidance and Minimization Measures

The East DS1 and the East DS2 Alternatives have been designed to minimize impacts to a variety of sensitive resources such as noise sensitive land uses in the area studied. While shifts in the build alternatives' alignments could provide some benefit to noise sensitive land uses, these shifts could cause impacts to other sensitive resources such as land use and increased displacements. Therefore, the proposed action has been designed to avoid and minimize impacts to noise sensitive land uses to the greatest extent possible.

With the Preferred Alternative all of the improvements will be contained within the adopted urban growth boundary, except for the extension of Britta Street to intersect with US 20 and Robal Road and the roundabout at Cooley Road and O.B. Riley Road. This will further avoid and minimize impacts to noise sensitive land uses.

Construction Abatement and Commitments

Construction of either the East DS1 or East DS2 Alternative would be conducted within the constraints indicated in City of Bend and Deschutes County noise ordinances. The following measures could be taken to the extent practicable to avoid, minimize and mitigate temporary adverse noise impacts during construction:

- The contractor would be required to comply with all state and local sound control and noise level rules, regulations and ordinances that would apply to any work performed pursuant to the contract. If necessary, the contractor would obtain variances to the noise ordinances.
- The contractor would be required to provide a detailed construction noise control plan, which would list all of the proposed construction equipment and types of construction activity
- All equipment would be required to comply with pertinent equipment noise standards of the US Environmental Protection Agency
- All equipment used would be required to have sound control devices no less effective than those provided on the original equipment; no equipment would have unmuffled exhaust
- All equipment would be required to comply with the pertinent equipment noise standards found in the FHWA Roadway Construction Noise Model

- No construction would be performed within 1,000 feet of an occupied dwelling unit on Sundays, legal holidays and, on other days, between the hours of 10:00 pm and 7:00 am without the approval of ODOT's project manager
- No pile driving, hoe ramming, or blasting operations would be performed within 3,000 feet of any occupied dwelling unit on Sundays, legal holidays and between the hours of 8:00 pm and 8:00 am on other days, without the approval of ODOT's project manager
- The noise from rock crushing or screening operations performed within 3,000 feet of any occupied dwelling would be mitigated by strategic placement of material stockpiles between the operation and the affected dwelling or by other means approved by ODOT's project manager.

Should specific noise complaints occur during the construction of the project, one or more of the following noise abatement measures could be required at the contractor's expense, as directed by ODOT's project manager:

- Locate stationary construction equipment as far from the nearby noise sensitive properties as possible
- Shut off idling equipment
- Use alternative methods or equipment which produce less noise
- Reschedule construction operations to avoid periods of noise annoyance identified in the complaint
- Notify nearby residences whenever extremely noisy work would occur
- Install temporary or portable acoustic barriers around stationary construction noise sources
- Operate electric-powered equipment using line voltage power instead of onsite generators
- Use manually adjustable and/or the new broadband backup alarms set to the low noise setting on all construction vehicles used during nighttime hours.

Abatement for Long-Term Impacts

Where predicted traffic noise levels would approach or exceed applicable noise abatement criteria, or result in a substantial increase, mitigation measures are warranted for consideration. Noise abatement must be considered for areas where frequent human use occurs and where a lower noise level would provide benefits (USDOT 1982).

The ODOT *Noise Manual* sets forth the criteria for determining when an abatement measure is reasonable and feasible. Abatement must meet ODOT's reasonable and feasible criteria to be considered. Feasibility of noise abatement is primarily an engineering concern. A minimum 5 dBA reduction in the future noise level must be achieved for an abatement measure to be considered feasible. Other feasibility considerations include topography, access requirements, other noise sources, and safety considerations. The reasonableness determination is three fold. First, noise abatement must be cost effective for it to be reasonable. ODOT's reasonable cost criterion is $25,000/benefitted residence. Second, noise abatement must reduce noise levels to ODOT's "design goal" which requires that abatement result in a reduction of 7 dBA or more at some of the receivers benefitting from the noise abatement. Finally, the third requirement is that the proposed noise abatement gain approval from benefitted property owners. ODOT requires that a "simple majority" (51 percent or greater) of benefitted property owners approve of the proposed noise abatement. Other factors used in determining whether a proposed noise abatement measure is reasonable include: absolute noise levels, the change in existing noise levels, and environmental impacts of abatement.

Several different traffic noise abatement measures are evaluated when noise impacts would occur. For example, noise generated from the long-term operation of the proposed action could be reduced by implementing traffic management measures, acquiring land as buffer zones, realigning the roadway, soundproofing public use or nonprofit institutional structures, and constructing noise barriers. Noise barriers include noise walls, berms, and buildings that are not sensitive to noise. These measures were evaluated for their potential to reduce predicted noise impacts from the proposed action.

With both the East DS1 and East DS2 Alternatives noise levels within the area studied would be expected to approach or exceed the noise abatement criteria at several sites as shown in Exhibit 3-87, Exhibit 3-88, Exhibit 3-89, and Exhibit 3-90.

Traffic Management Measures

Traffic management measures including modification of speed limits, traffic control devices, and restricting or prohibiting truck traffic would be infeasible because reduced speeds would conflict with mobility in the corridor and restricting or prohibiting truck traffic would conflict with the classification of US 97 as a statewide freight route.

Land Acquisition for Noise Buffers or Barriers

Acquiring land for noise buffer purposes at impacted sites would require ODOT to purchase additional right of way and relocate

residences, which would be unreasonably expensive for the purpose of noise mitigation.

Realigning the Roadway

Realigning the roadway would not be reasonable for noise mitigation because the proposed horizontal and vertical alignments of the build alternatives have been established to meet highway design standards and minimize impacts on a wide variety of resources.

Noise Barriers

Noise barriers include soundwalls (noise barrier walls) and berms. Berms would not be reasonable for the proposed action because construction of berms would require ODOT to purchase additional right of way, which would be prohibitively expensive for noise mitigation.

Nineteen noise barriers for the East DS1 Alternative and 23 noise barriers for the East DS2 Alternative were evaluated for their effectiveness at abating traffic noise. For each of the alternatives three noise barriers were found to be feasible and reasonable. One noise barrier, at Site 28, would be the same under either East DS1 or East DS2 Alternatives because it is located in an area where the two alternatives share the same configuration. The remaining two feasible and reasonable noise barriers for each of the East DS1 Alternative or East DS2 Alternative would differ in size. The following sections describe the feasible and reasonable noise barriers in detail.

Noise Barrier Common to East DS1 and East DS2 Alternatives

Noise Barrier at Site 28 northwest of the Empire Avenue and O.B. Riley Road intersection

A noise barrier was found to be feasible and reasonable at abating traffic noise at Site 28 northwest of the intersection between Empire Avenue and O.B. Riley Road. Site 28 represents seven single family residences that would be impacted by roadway traffic noise under the East DS1 and East DS2 Alternatives. To be feasible a noise barrier would need to be constructed along O.B. Riley Road north of Empire Avenue and continuing east along Empire Avenue. A noise barrier approximately 499 feet in length and 10 feet tall (4,987 square feet) would achieve reduction in traffic noise of approximately 9 dBA, exceeding ODOT's feasibility requirement of reducing noise by 5 dBA or more and exceeding ODOT's "design goal" of reducing noise by 7 dBA or more at the impacted receptors. A barrier of this size would cost approximately $99,740 and would be cost effective. The barrier would also result in benefits to three nearby non-impacted residences at Site 22 reducing traffic noise by 5 dBA. Therefore a noise barrier is feasible and reasonable and recommended for further study during the design phase of the proposed action. The location of the noise barrier

and the benefited receptors are shown on Exhibit 3-91. The results of the barrier analysis are listed in Appendix I, Exhibits I-3 and I-11.

Noise Barriers Unique to the East DS1 Alternative

The following is a discussion of noise barriers that are exclusive to the East DS1 Alternative. These noise barriers would only be effective under this alternative.

Noise Barrier at Sites 171, 172, 182, and 183 under the East DS1 Alternative located in the Hilltop and Juniper mobile home parks

Sites 171, 172, 182 and 183 represent 13 mobile home residences at the Hilltop Mobile Home Park and the Juniper Ridge Mobile Home Park. These locations are predicted to be impacted by traffic noise ranging from 65 dBA L_{eq} to 71 dBA L_{eq} under the East DS1 Alternative. For a noise barrier to be effective, or feasible, it must block the "line of sight" between the noise source and the receiver. In this case, roadway noise would be due to traffic along US 97 and the northern interchange and associated ramps just north of the Juniper and Hilltop mobile home parks. Therefore a noise barrier would need to be constructed along the western property line running parallel to US 97 to block the noise. It was determined that a noise barrier 1,370 feet in length, ranging in height from 14 to 18 feet tall feasibly would reduce noise (5 dBA reduction or more) at these sites. A noise barrier of this size would exceed ODOT's feasibility requirement of reducing noise by 5 dBA or more and achieve ODOT's "design goal" of reducing noise by 7 dBA or more at the majority of the impacted receptors. The noise barrier would be approximately 23,004 square feet and cost approximately $460,080. The barrier would benefit more than just the affected sites with sites 169, 176, 177, and 180 experiencing reductions in noise levels of 5 dBA. The total number of residences represented by all the benefited sites would be 44, which would be eligible for noise abatement covering costs up to $1,100,000. Therefore a noise barrier would be feasible and reasonable and recommended for further study during the design phase of the proposed action. The location of the noise barrier and the benefited receptors are shown on Exhibit 3-92. The results of the barrier analysis are listed in Appendix I, Exhibits I-4 and I-24.

Noise Barrier at Sites 218 and 221 under the East DS1 Alternative located in the Four Seasons Mobile Home Park

Sites 218 and 221 represent eight mobile home residences at the Four Seasons Mobile Home Park. These locations are predicted to be impacted by traffic noise ranging from 67 dBA L_{eq} to 74 dBA L_{eq} under the East DS1 Alternative. For a noise barrier to be effective, or feasible, it must block the "line of sight" between the noise source and the receiver. In this case, roadway noise would be due to traffic

along US 97 and the northern interchange and associated ramps just south of the sites. Because of this, to block the noise a noise barrier would need to be constructed along the western property line running parallel to US 97 and the northbound off-ramp of the interchange. A noise barrier was modeled and found to reduce noise by 5 dBA or more at each of the affected receptors and would therefore be feasible. A noise barrier 900 feet in length and 18 feet tall (16,205 square feet) would exceed ODOT's feasibility requirement of reducing noise by 5 dBA or more and exceed ODOT's "design goal" of reducing noise by 7 dBA or more at the impacted receptors. The noise barrier studied would cost approximately $324,100 and would benefit more than just the affected sites with sites 215 and 216 experiencing reductions in noise levels of 5 dBA. The total number of residences represented by all the benefited sites would be 17, which would be eligible for noise abatement covering costs up to $400,000. Therefore a noise barrier is feasible and reasonable and recommended for further study during the design phase of the proposed action. The location of the noise barrier and the benefited receptors are shown on Exhibit 3-93. The results of the barrier analysis are listed in Appendix I, Exhibits I-4 and I-30.

Noise Barriers for the East DS2 Alternative Only

The following is a discussion of noise barriers that are exclusive to the East DS2 Alternative. These noise barriers would only be effective under this alternative.

Noise Barrier Unique to Sites 172, 182 and 183 under the East DS2 Alternative located in the Hilltop and Juniper Mobile Home Parks

Sites 172, 182 and 183 represent 10 mobile home residences at the Juniper Ridge Mobile Home Park. These locations are predicted to be impacted by traffic noise ranging from 66 dBA L_{eq} to 70 dBA L_{eq} under the East DS2 Alternative. For a noise barrier to be effective, or feasible, it must block the "line of sight" between the noise source and the receiver. In this case roadway noise would be due to traffic along US 97 and the interchange north of the mobile home parks. Therefore, a noise barrier would need to be constructed along the western property line running parallel to US 97. A noise barrier 710 feet in length and 20 feet tall (approximately 14,203 square feet) would exceed ODOT's feasibility requirement of reducing noise by 5 dBA or more and achieve ODOT's "design goal" of reducing noise by 7 dBA or more at the majority of the impacted receptors. The barrier studied would cost approximately $284,060 and would benefit more than just the affected sites with Sites 176, 177, 180 experiencing reductions in noise levels of 5 dBA. The total number of residences represented by all the benefited sites is 39, which would be eligible for noise abatement covering costs up to $975,000. Therefore a noise barrier is feasible and reasonable and recommended

for further study during the design phase of the proposed action. The location of the noise barrier and the benefited receptors are shown on Exhibit 3-94. The results of the barrier analysis are listed in Appendix I, Exhibits I-5 and I-25.

Noise Barrier at Sites 218 and 221 under the East DS2 Alternative located in the Four Seasons Mobile Home Park

Sites 218 and 221 represent eight mobile home residences at the Four Seasons Mobile Home Park. These locations are predicted to be impacted by traffic noise ranging from 67 dBA L_{eq} to 74 dBA L_{eq} under the East DS2 Alternative. For a noise barrier to be effective, or feasible, it must block the "line of sight" between the noise source and the receiver. In this case roadway noise would be due to traffic along US 97 and the northern interchange. Because of this a noise barrier would need to be constructed along the western property line running parallel to US 97 and the ramps from the interchange to block the noise. A noise barrier 1,125 feet in length and 16 feet tall (approximately 18,002 square feet) would exceed ODOT's feasibility requirement of reducing noise by 5 dBA or more and exceed ODOT's "design goal" of reducing noise by 7 dBA or more at the impacted receptors. The barrier studied would cost approximately $360,040 and would benefit more than just the affected sites with Site 216 experiencing a reduction in noise level of 5 dBA. The total number of residences represented by all the benefited sites would be 13, which would be eligible for noise abatement covering costs up to $325,000. Therefore a noise barrier is feasible and reasonable and recommended for further study during the design phase of the proposed action. The location of the noise barrier and the benefited receptors are shown on Exhibit 3-95. The results of the barrier analysis are listed in Appendix I, Exhibits I-5 and I-31.

Key Differences

	East DS1 Alternative	East DS2 Alternative
Number of Feasible/ Reasonable Barriers	3	3
Number of Barriers Not Feasible/ Reasonable	16	20
Estimated Project Cost of Feasible/ Reasonable Noise Abatement	$883,920	$743,840
Impacted Residences	59	63
Mitigated Residences	28	25
Residences Not Mitigated	31	38
Number of Residences Benefitted*	71	62

* Some benefitted residences are not impacted by roadway noise.

Noise Barriers that are not Feasible and/or Reasonable for the East DS1 and East DS2 Alternatives

Noise barriers would not be feasible or reasonable for the remaining sites because of one or more of the following reasons:

- Would not provide a minimum 5 dBA noise reduction
- Would be too costly (e.g. in excess of $25,000 per benefitted residence)
- Would not achieve ODOT's "design goal"
- Would result in safety or aesthetic concerns.

For the East DS1 Alternative noise barriers at 16 of the impacted sites representing 32 residences, one cemetery, two public use areas, one outdoor active sports area, and one commercial use were found to be

either not feasible or not reasonable. Generally the impacted residential areas that could not be mitigated are located in one of three areas:

- Along 3rd Street south of Empire Avenue
- Along the BNSF Railway
- Along US 20 north of Cooley Road.

The cemetery (Deschutes Memorial Gardens and Chapel) is located along the west side of US 97 north of Grandview Drive. The two public use areas (ODOT picnic tables) are located south of Empire Avenue on the west side of 3rd Street. One commercial site, the Sonic Restaurant, is also located south of Empire but on the east side of 3rd Street. The outdoor active sports area, the Sun Mountain Fun Center, is located south of Empire Avenue on the west side of the Bend Parkway (US 97).

For the East DS2 Alternative noise barriers at 20 of the impacted sites representing 40 residences, one cemetery, two public use areas, one outdoor active sports area, and one commercial use were found to be either not feasible or not reasonable. Generally the impacted residential areas that could not be mitigated are located in one of three areas:

- Along 3rd Street south of Empire Avenue
- Along the BNSF Railway
- Along US 20 north of Cooley Road.

The cemetery (Deschutes Memorial Gardens and Chapel) is located along the west side of US97 north of Grandview Drive. The two public use areas (ODOT picnic tables) are located south of Empire Avenue on the west side of 3rd Street. One commercial site, the Sonic Restaurant, is also located south of Empire but on the east side of 3rd Street. The outdoor active sports area, the Sun Mountain Fun Center, is located south of Empire Avenue on the west side of the Bend Parkway (US 97).

The results of the barrier analysis at all of the affected sites are listed in Appendix I, Exhibits I-3, I-4, and I-5. The locations of feasible and reasonable noise barriers under the East DS1 Alternative are shown in Exhibit 3-91, Exhibit 3-92 and Exhibit 3-93. The locations of feasible and reasonable noise barriers under the East DS2 Alternative are shown in Exhibit 3-91, Exhibit 3-94 and Exhibit 3-95. A detailed noise analysis including specific abatement recommendations and design will be included in the Final EIS once the Preferred Alternative is identified.

ODOT has determined that reasonable and feasible noise barriers typically cost approximately $20 per square foot to construct. The total cost to build reasonable and feasible noise barriers under East DS1 Alternative would be approximately $883,920. The total cost to build

reasonable and feasible noise barriers under East DS2 Alternative would be approximately $743,840.

3.16.5 Preferred Alternative Abatement for Long-Term Impacts

Where predicted traffic noise levels would exceed applicable NAAC, or result in a substantial noise increase, mitigation measures are warranted for consideration. Noise abatement must be considered for areas where frequent human use occurs and where a lower noise level would provide benefits (USDOT 1982).

As described in Section 3.16.2 Affected Environment, railroad noise is dominant during periods of high train traffic at sites located within approximately 600 to 800 feet of the BNSF Railway railroad tracks. ODOT is required to consider mitigation in the form of noise barriers at all sites that experience traffic noise levels that exceed the ODOT NAAC. ODOT analyzed all traffic noise levels equally, regardless of the proximity to railway noise.

Noise Barriers Evaluation for the Preferred Alternative

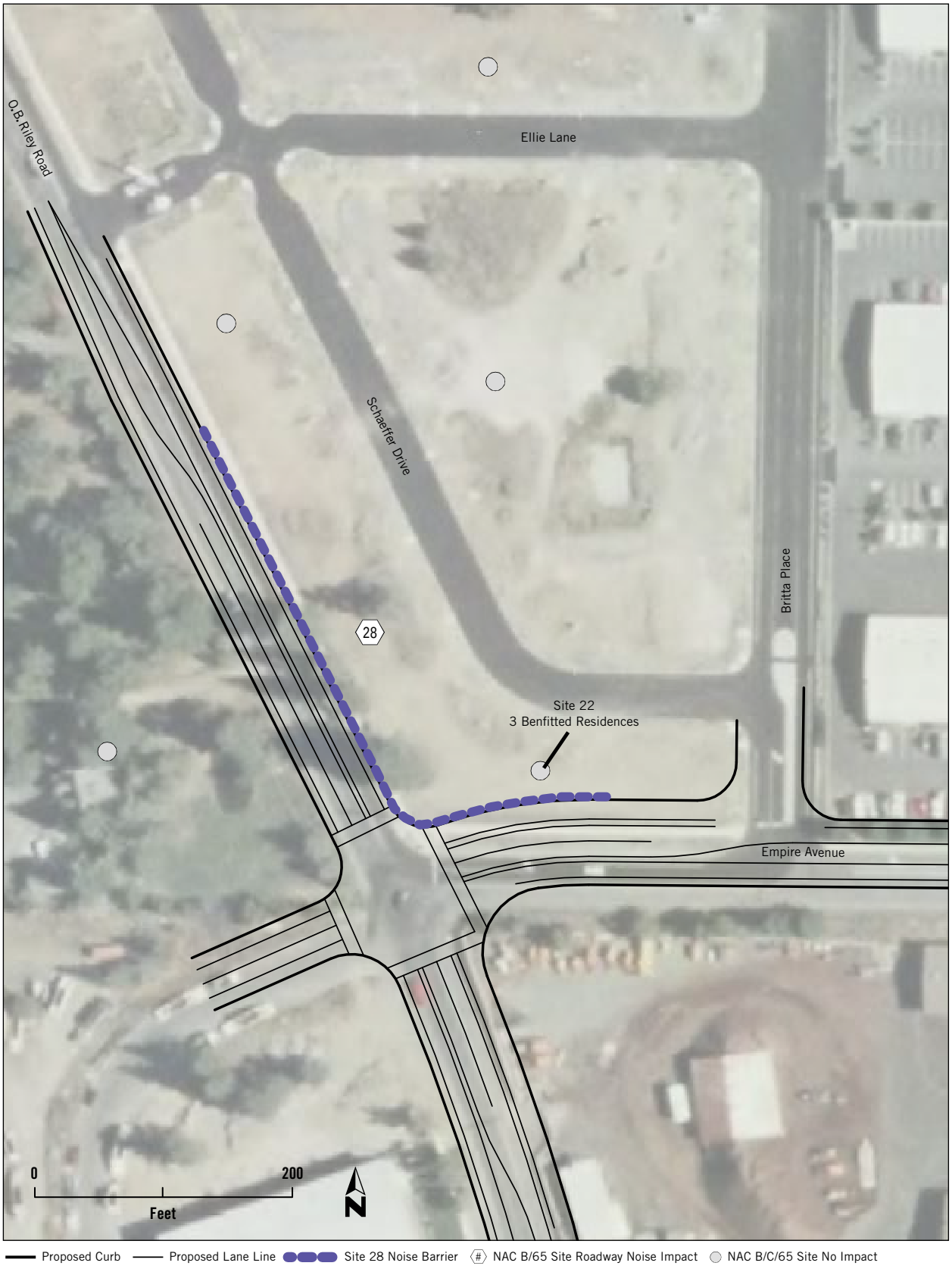
For the Preferred Alternative, 26 sites representing 67 residences, the Sun Mountain Fun Center, one cemetery (Deschutes Memorial Gardens and Chapel), two outdoor eating areas at the ODOT Region 4 offices, and outdoor areas at four businesses will experience traffic noise impacts if no noise abatement is provided. Noise barriers were evaluated for each of the sites impacted by traffic noise from the Preferred Alternative (Exhibit 3-89 FEIS and Exhibit 3-90 FEIS). Noise barriers were not evaluated for commercial properties without frequent outdoor human use areas.

Fourteen noise barriers for the Preferred Alternative were evaluated for their effectiveness at abating traffic noise. Three of the 14 evaluated noise barriers did not meet ODOT feasibility criteria to effectively abate traffic noise. The remaining 11 noise barriers were evaluated to effectively abate traffic noise and satisfy ODOT feasibility requirements; however, these barriers were too costly and did not satisfy ODOT's reasonableness requirement of $25,000 per benefitted residence.

One of the 11 noise barriers evaluated to meet ODOT's feasibility criteria was estimated to cost $29,804 per benefited residence which is within ODOT's Optional Reasonableness Criteria of $35,000 per benefited residence. This noise barrier was evaluated to reduced traffic noise levels at the Hilltop and Juniper Mobile Home Parks located east of US 97(Exhibit 3-94 FEIS). ODOT will consider abatement at this location during final design of the Preferred Alternative. Additional details regarding this noise barrier evaluation for Sites 171, 172, 182,

and 183 can be found in Section 8.2.1 of the Noise Technical Report (ODOT 2014j). This noise barrier would reduce noise impacts at 12 residences. If this barrier is constructed 55 homes will experience traffic noise levels above ODOT NAAC with the Preferred Alternative that will not be mitigated (Exhibit 3-89 FEIS and Exhibit 3-90 FEIS). If the barrier is not constructed 67 home will experience traffic noise levels above the ODOT NAAC.

Exhibit 3-91: *Location of Proposed Noise Barrier for Site 28 (East DS1 and East DS2 Alternatives)*



Note: Site numbers shown correlate to site numbers and associated noise levels listed in Appendix I, Exhibit I-2. Aerial is from the US Department of Agriculture Imagery Program, 2004. Development near Site 22 occurred after the aerial photo was taken.

Exhibit 3-92: *Location of Proposed Noise Barrier for Sites 171, 172, 182 and 183 (East DS1 Alternative)*



Note: Site numbers shown correlate to site numbers and associated noise levels listed in Appendix I, Exhibit I-2.

Exhibit 3-93: *Location of Proposed Noise Barrier for Sites 218 and 221 (East DS1 Alternative)*



Note: Site numbers shown correlate to site numbers and associated noise levels listed in Appendix I, Exhibit I-2.

Exhibit 3-94: *Location of Proposed Noise Barrier for Sites 172, 182 and 183 (East DS2 Alternative)*



Note: (1) Site numbers shown correlate to site numbers and associated noise levels listed in Appendix I, Exhibit I-2.

Exhibit 3-94 FEIS: *Location of Proposed Noise Barrier for Sites 171, 172, 182, and 183 (Preferred Alternative)*



Note: This exhibit was added to depict noise abatement considered for the Preferred Alternative. Site numbers shown correlate to site numbers and associated noise levels listed in Appendix I, Exhibit I-2 FEIS.

Exhibit 3-95: *Location of Proposed Noise Barrier for Sites 218 and 221 (East DS2 Alternative)*



Note: (1) Site numbers shown correlate to site numbers and associated noise levels listed in Appendix I, Exhibit I-2.

Noise Barriers Evaluation Summary

In the Draft EIS, the East DS1 and East DS2 Alternatives included three noise barriers found to be feasible and reasonable. The three noise barriers that met ODOT feasibility and reasonableness criteria shielded traffic noise:

- East of US 97 at the Hilltop and Juniper Mobile Home Parks,
- East of US 97 at the Four Seasons Mobile Home Park, and
- Near the single-family homes located at the northeast corner of Empire Avenue and O.B. Riley Road.

Under the Preferred Alternative, noise impacts east of US 97 at the Hilltop and Juniper mobile home parks are similar to the East DS1 and East DS2 Alternatives. The noise barrier evaluation concluded that this barrier meets ODOT's Optional Reasonableness Criteria of $35,000 per benefited residence; and, ODOT will consider abatement at this location during the final design phase of the project and in compliance with the ODOT Noise Manual.

With the smaller size Transportation API associated with the Preferred Alternative, the Four Seasons Mobile Home Park is now outside the project limits for the Preferred Alternative; thus, a noise barrier was not evaluated at this location.

The projected noise levels near the single-family residences located at Empire Avenue and O.B. Riley Road in the Preferred Alternative are 64 dBA, which is 1 dBA below the ODOT NAAC. Therefore, a noise barrier was not considered at this location in the noise analysis for the Preferred Alternative. Design refinements were incorporated into the Preferred Alternative that resulted in slightly lower noise levels at this location compared to the East DS1 and East DS2 Alternatives, which resulted in noise levels of 65 dBA that met the ODOT NAAC and required noise abatement evaluation.

The location of sites impacted by the Preferred Alternative and the location of improvements associated with the Preferred Alternative are shown in Exhibit 3-89 FEIS and Exhibit 3-90 FEIS.

Information for Local Governments

Undeveloped properties are located throughout the project corridor. The results of the noise analysis, including expected noise levels at undeveloped properties, for the proposed action has been made available to the City of Bend and Deschutes County to assist in their planning efforts.

ODOT met with local officials from the City of Bend (July 11, 2014 and July 16, 2014) and Deschutes County (July 8, 2014) Planning Departments to discuss the noise analysis for the Preferred Alternative,

including results of the noise analysis, sites where noise impacts will occur, and the rationale supporting decisions to not provide noise mitigation. Local officials were given the opportunity to ask questions so existing and predicted noise levels could be understood and incorporated into planning efforts associated with undeveloped lands that are adjacent to the transportation facilities analyzed for the project. Local officials also confirmed and provided updates to current land uses, which were integrated into the Final EIS.

Much of the area in the City of Bend's UGB is developed; however, there are several relatively small undeveloped areas within the vicinity (approximately 500 to 600 feet) of the East DS1 and East DS2 Alternatives.

- There is a small undeveloped area south of the Sun Mountain Fun Center, north of Bend River Mall Road and west of the US 97 where traffic noise levels would be approximately 66 dBA L_{eq} under both build alternatives
- There are several undeveloped properties north and south of Empire Avenue between the US 97 and Boyd Acres Road where traffic noise levels would range from 55 dBA L_{eq} to 62 dBA L_{eq} under both build alternatives
- An undeveloped area south of Poe Sholes Drive and west of the US 20/US 97 interchange would have traffic noise levels ranging from 60 dBA L_{eq} to 65 dBA L_{eq} under both build alternatives
- Another undeveloped area north of Hardy Road and west of Britta Street (including the local connecting road that would be built under either build alternative) are predicted to have traffic noise levels ranging from 55 dBA L_{eq} to 58 dBA L_{eq} under both build alternatives
- West of the Cascade Village Shopping Center, east of US 20 and south of Robal Road is another undeveloped area where traffic noise levels would range from 61 dBA L_{eq} to 66 dBA L_{eq} under both build alternatives
- South of Cooley Road and on the east and west sides of Hunnell Road is are undeveloped areas that would have traffic noise levels ranging from 56 dBA L_{eq} to 57 dBA L_{eq} under both build alternatives
- A cluster of undeveloped properties north of Cooley Road, east of Hunnell Road, and adjacent to US 97 would have traffic noise levels ranging from 58 dBA L_{eq} to 66 dBA L_{eq} under both build alternatives
- Approximately 1,400 feet east of US 97 at Bowery Lane is an undeveloped area that is predicted to have a noise level of 48

dBA L_{eq} for the East DS1 Alternative and 52 dBA L_{eq} for the East DS2 Alternative.

The traffic noise levels depend on proximity to the East DS1 and East DS2 Alternatives, traffic volumes, and existing shielding that may be present.

There are several undeveloped areas outside of the Bend UGB that are within Deschutes County jurisdiction and within the vicinity (approximately 500 to 600 feet) of the East DS1 and East DS2 Alternatives. Undeveloped areas of Deschutes County are found in four general locations in the vicinity of the project.

- One area is located adjacent to the west side of US 20 south of Cooley Road where noise levels are predicted to range from 57 dBA L_{eq} to 66 dBA L_{eq} under both build alternatives
- A second undeveloped area is located 1,000 to 2,500 feet west of US 97 in the Hunnell Neighborhood area along Hunnell Road and Fort Thompson Lane where noise levels are predicted to range from 48 dBA L_{eq} to 51 dBA L_{eq} under both build alternatives
- The third undeveloped area is located north of Fort Thompson Lane adjacent to US 97 on the east and west sides of the highway where noise levels are predicted to range from 62 dBA L_{eq} to 70 dBA L_{eq} under both build alternatives
- A fourth undeveloped area approximately 1,700 feet west of where US 97 and Fort Thompson Lane intersect is predicted to have traffic noise levels of 48 dBA L_{eq} under the East DS1 Alternative and 49 dBA L_{eq} under the East DS2 Alternative.

The traffic noise levels depend on proximity to the East DS1 and East DS2 Alternatives and existing shielding that may be present.

Based on the results of the noise modeling analysis conducted for the Preferred Alternative, including the future traffic volumes and speeds, areas within 25 feet of US 97 and US 20 and associated on and off-ramps may experience noise levels that exceed the ODOT NAAC of 65 dBA for residential land uses and other outdoor land uses such as playfields and parks. Areas within 50 feet of many of the other more heavily travelled roads including Empire Avenue, O.B. Riley Road, Nels Anderson Road, and Cooley Road may also experience noise levels that exceed the ODOT NAAC of 65 dBA with the Preferred Alternative.

The traffic noise levels depend on proximity to the Preferred Alternative, traffic volumes, and existing shielding that may be present.

3.16.6 Avoidance, Minimization, and/or Mitigation Commitments Incorporated into the Preferred Alternative

ODOT makes the following commitments:

- During final design of the Preferred Alternative, ODOT will update the feasible and reasonable analysis for a potential noise barrier(s) which would be placed east of US 97 to reduce predicted traffic noise impacts at the Hilltop and Juniper mobile home parks as shown in Exhibit 3-94 FEIS. This noise barrier is referred to as "Noise Barrier for Sites 171, 172, 182, and 183" in the Final EIS and Noise Technical Report (ODOT 2014j).

3.17 Energy

3.17.1 Energy Regulations, Guidelines and Policies

Various regulations and guidelines require ODOT to consider to evaluate energy efficiency and to incorporate energy saving procedures into transportation facilities and programs.

National Environmental Policy Act of 1969

The National Environmental Policy Act of 1969 was established to minimize or eliminate damage to the environment caused by actions funded or taken by the federal government. The National Environmental Policy Act establishes policy, sets goals, and provides means for carrying out the policy. In order to comply with the National Environmental Policy Act, an energy analysis is appropriate for some proposed transportation projects.

FHWA Technical Advisory T6640.8

FHWA Technical Advisory T6640.8, dated February 24, 1982, states that environmental impact statements "should discuss in general terms the energy requirements and conservation potential of various alternatives under consideration."

Transportation Planning Rule (OAR 660-12-035)

Section 35 of the Transportation Planning Rule (OAR 660-12-035) states that the following standards shall be used to evaluate and select transportation system alternatives: "The transportation system shall minimize adverse economic, social, environmental and energy consequences."

Statewide Planning Goals: Goal 13, Energy Conservation (OAR 660-015-0000(13))—To conserve energy, land and uses developed on the land shall be managed and controlled so as to maximize the conservation of all forms of energy, based upon sound economic principles.

The following is a list of guidelines for planning and implementation.

Planning

- Priority consideration in land use planning should be given to methods of analysis and implementation measures that will assure achievement of maximum efficiency in energy utilization
- The allocation of land and uses permitted on the land should seek to minimize the depletion of non-renewable sources of energy
- Land use planning should, to the maximum extent possible, seek to recycle and re-use vacant land and those uses which are not energy efficient

- Land use planning should, to the maximum extent possible, combine increasing density gradients along high capacity transportation corridors to achieve greater energy efficiency
- Plans directed toward energy conservation within the planning area should consider as a major determinant the existing and potential capacity of the renewable energy sources to yield useful energy output. Renewable energy sources include water, sunshine, wind, geothermal heat and municipal, forest and farm waste. Whenever possible, land conservation and development actions provided for under such plans should utilize renewable energy sources.

Implementation

Land use plans should be based on utilization of the following techniques and implementation devices which can have a material impact on energy efficiency:

- Lot size, dimension, and siting controls
- Building height, bulk and surface area
- Density of uses, particularly those which relate to housing densities
- Availability of light, wind and air
- Compatibility of and competition between competing land use activities
- Systems and incentives for the collection, re-use and recycling of metallic and nonmetallic waste.

Oregon Transportation Plan

The *Oregon Transportation Plan* gives direction to the coordination of transportation modes and states the desired characteristics of a transportation system. This plan includes guidelines which operate in conjunction with the Transportation Planning Rule.

Goal 4 of the *Oregon Transportation Plan*, Sustainability, sets a policy framework that applies to all types of travel and transportation investments. The policies provide guidance on environmental quality, energy supply and creating communities that support the integration of land use and transportation including the key fundamentals of building street networks, connecting modes, and utilizing land in efficient ways that reduce travel. Policy 4.1 includes "environmental responsibility," as a characteristic for a transportation system. Policy 4.1 of the *Oregon Transportation Plan* states: "To provide a transportation system that is environmentally responsible and encourages conservation of natural resources."

3.17.2 Affected Environment

More information: Additional detail on the energy analysis is provided in the *Energy Technical Report* (ODOT 2014d). The *Energy Technical Report* is listed in Appendix K and available in the document library of the project's website (www.us97solutions.org).

In 2008, the State of Oregon consumed 1,104.7 trillion British thermal units (Btu). The transportation sector consumed 331.6 trillion Btu (30 percent of the State's total energy consumption), with gasoline and ethanol representing 196 trillion Btu consumed (18 percent) (US Energy Information Administration 2008).

Exhibit 3-96 illustrates daily and annual vehicle-miles traveled, the energy consumed (in Btu), and the fuel consumption (in gallons), by automobiles and trucks in the API during 2007.

Updated analysis for energy consumed by automobiles and trucks in the API during 2011 is shown in Exhibit 3-96 FEIS.

Exhibit 3-96: *Estimated Energy Consumption, Existing Year 2007*

Vehicle Type	Daily			Annual[1]		
	Vehicle-miles Traveled	Energy Consumed[2] (Millions of Btu/day)	Fuel Consumed (gal/day)	Vehicle-miles Traveled	Energy Consumed 2 (Millions of Btu/year)	Fuel Consumed (gal/year)
Autos	352,730	1,513	12,104	128,746,450	552,245	4,417,960
Trucks	44,378	717	5,165	16,198,335	261,705	1,885,225
Total	397,108	2,230	17,269	144,944,785	813,950	6,303,185

Btu = British thermal unit

Source: *US 97 Bend North Corridor Solutions Traffic Analysis Report* (ODOT 2014o).
[1] Annual energy consumptions are estimates only and do not accurately account for variations in seasonal energy use
[2] Energy Consumed, Auto: Btu/gallon of gasoline = 125,000, Trucks: Btu/gallon of diesel = 139,000

Exhibit 3-96 FEIS: *Estimated Energy Consumption, Existing Year 2011*

Vehicle Type	Daily			Annual[1]		
	Vehicle-miles Traveled[3]	Energy Consumed[2] (Millions of Btu/day)	Fuel Consumed (gal/day)	Vehicle-miles Traveled	Energy Consumed2 (Millions of Btu/year)	Fuel Consumed (gal/year)
Autos	228,264	981	7,844	83,316,356	357,891	2,863,131
Trucks	26,580	453	3,256	9,701,828	165,202	1,188,506
Total	254,844	1,434	11,100	93,018,184	523,093	4,051,637

Btu = British thermal unit

Source: *US 97 Bend North Corridor Solutions Traffic Analysis Report* (ODOT 2014o).
[1] Annual energy consumptions are estimates only and do not accurately account for variations in seasonal energy use
[2] Energy Consumed, Auto: Btu/gallon of gasoline = 125,000, Trucks: Btu/gallon of diesel = 139,000
[3] Data for the existing conditions have been updated to the year 2011 and data also reflect a smaller Transportation API of the Preferred Alternative.

3.17.3 Environmental Consequences

No Build Alternative

Exhibit 3-97 presents the average daily vehicle-miles traveled which is used to determine fuel consumption, which can then be translated to energy consumption. The analysis uses the daily average speed from each transportation link within the roadway network, which would not be expected to change significantly from the existing conditions (2007) to the No Build Alternative (2035). Peak hour speeds resulting from the No Build Alternative are expected to change significantly from the existing conditions; however, the peak hour speeds represent only one twenty-fourth of the average daily speed. Therefore, the change in fuel and energy consumption is determined by vehicle-miles traveled.

By 2015 (year of opening) daily vehicle-miles traveled would increase by 11 percent and by 2035 (design year) daily vehicle-miles traveled would increase 57 percent. This equates to an increase of 10 percent in fuel use and energy consumption in 2015, and a 37 percent increase in fuel use and energy consumption in 2035 over existing conditions (Exhibit 3-97).

Exhibit 3-97: *No Build Alternative Daily Energy Consumption*

Measures of Effectiveness	2007 Existing Conditions	2015 No Build Alternative	2035 No Build Alternative
Travel Distance (daily vehicle-miles traveled)	397,108	442,048	624,041
Fuel Consumed (gallons)	17,269	19,036	23,612
Energy Consumed (million Btu)	2,230	2,462	3,053

Since the publication of the Draft EIS, the data for the existing conditions have been updated to the year 2011 and the data for the No Build design year have been updated to 2036. The data reflect the current traffic and growth projections for the region. Also, to account for the Preferred Alternative, which minimizes impacts to neighborhoods north of Cooley Road and east of US 97, the overall Transportation API for existing conditions is smaller than the original Transportation API defined in the Draft EIS. The updated network does not include the Tumalo Road/Deschutes Junction interchange roadway or four miles of US 97 north of milepost 132.19.

Definitions

Peak Hour Speeds

Reductions in peak hour speeds affect fuel economy for that hour of vehicles using the roadway network which results in higher energy usage.

Year of Opening (2015)

The year of opening is the year in which construction of the build alternatives would be completed.

Design Year (2035)

The design year is the year for which the project was designed to meet anticipated needs.

For the Final EIS, the existing traffic conditions have been updated to year 2011 and the No Build Alternative has been updated to 2036. The Preferred Alternative has been updated to a 2016 Year of Opening and 2036 Design Year. Comparative 2036 Design Year data for the East DS1 and East DS2 Alternatives is provided in the Final EIS.

Exhibit 3-97 FEIS. No Build Alternative Daily Energy Consumption

Measures of Effectiveness	2011 Existing Conditions[1]	2016 No Build Alternative[1]	2016 No Build Alternative % increase from existing	2036 No Build Alternative[1]	2036 No Build Alternative % increase from existing
Travel Distance (daily vehicle-miles traveled)	254,844	287,734	13%	411,284	43%
Fuel Consumed (gallons)	11,100	12,266	11%	15,663	28%
Energy Consumed (million Btu)	1,434	1,597	11%	2,022	27%

Btu = British thermal unit

[1] Data for the No Build Alternative existing year, year of opening and design year have been updated to 2011, 2016 and 2036, respectfully; data also reflect a smaller Transportation API of the Preferred Alternative.

As shown in Exhibit 3-97 FEIS, by 2016 (year of opening) daily vehicle-miles traveled would increase by 13 percent and by 2036 (design year) daily vehicle-miles traveled would increase 43 percent. This equates to an increase of 11 percent in fuel use and energy consumption in 2016, and a 28 percent increase in fuel use and energy consumption in 2036 over existing conditions.

East DS1 Alternative

The East DS1 Alternative proposes grade separation and signal removal at intersections, and elimination of several public and private approaches along US 97. By 2015, the East DS1 Alternative would result in a daily vehicle-miles traveled of 489,762, which represents an 11 percent increase over the 2015 No Build Alternative. By 2035 the daily vehicle-miles traveled with the East DS1 Alternative would be 670,449, which would be a 7 percent increase over the 2035 No Build Alternative (Exhibit 3-98).

The increase in vehicle-miles traveled would create a concomitant increase in fuel consumption. In 2015, fuel consumption with the East DS1 Alternative would equal 21,189 gallons per day, which would be an 11 percent increase over the 2015 No Build Alternative. By 2035, fuel consumption with the East DS1 Alternative would increase to 25,487 gallons per day, which would be an 8 percent increase over the 2035 No Build Alternative. The increase in daily vehicle-miles traveled and fuel consumption for the East DS1 Alternative would be attributed to the larger roadway network.

Again, it should be noted that this analysis relies on the average daily speed and vehicle-miles traveled for each transportation link, and there would be no difference in average daily speed between the East DS1 Alternative and the No Build Alternative. If the analysis used peak hour or peak period traffic data, the same roadway network, and updated traffic forecast volumes, it is likely that the analysis would demonstrate that the East DS1 Alternative would consume less fuel than the No

Build Alternative because of the greater difference in average speeds during the peak hour.

The East DS1 Alternative would contribute to an insignificant amount of Oregon's gasoline and ethanol consumption (based on use in 2008). The consumption rate of Btu within the corridor would be insignificant when compared to the entire state's energy use. The East DS1 Alternative would consume about 1,201,945 million Btu in 2035. Although there is no data for Oregon's predicted statewide energy consumption for the year 2035, this represents about 0.1 percent of Oregon's 2008 energy use. It is likely that this energy consumption would represent a smaller fraction of Oregon's statewide energy use in 2035.

Exhibit 3-98: *East DS1 Alternative Energy Consumption Compared to the No Build Alternative*

Conditions	Daily			Annual[1]		
	Vehicle-miles Traveled	Energy Consumed[2] (Million Btu/day)	Fuel Consumed (gal/day)	Vehicle-miles Traveled	Energy Consumed (Million Btu/year)	Fuel Consumed (gal/year)
Existing Year 2007	397,108	2,230	17,269	144,944,785	813,950	6,303,185
2015 Year of Opening						
No Build Alternative	442,048	2,462	19,036	161,347,520	898,630	6,948,140
East DS1 Alternative	489,762	2,738	21,189	178,763,130	999,370	7,733,985
2035 Design Year						
No Build Alternative	624,041	3,053	23,612	227,774,695	1,114,345	8,618,380
East DS1 Alternative	670,449	3,293	25,487	244,713,885	1,201,945	9,302,755

Btu = British thermal unit

[1] Annual energy consumptions are estimates only and do not accurately account for variations in seasonal energy use

[2] Energy Consumed, Auto: Btu/gallon of gasoline = 125,000, Trucks: Btu/gallon of diesel = 139,000

The analysis of energy consumption that was conducted for the Draft EIS was accurate at that time, and the energy consumption levels for the years 2016 and 2036 compared to the years 2015 and 2035, respectively, are expected to be negligible. Therefore, the analysis of energy consumption was not updated for the East DS1 Alternative in the Final EIS.

East DS2 Alternative

Similar to the East DS1 Alternative, the East DS2 Alternative proposes grade separation and signal removal at intersections, and eliminating several public and private approaches along US 97. By 2015, the East DS2 Alternative would result in approximately 466,753 daily vehicle-miles traveled, which would be a 6 percent increase from

the 2015 No Build Alternative. By 2035, the East DS2 Alternative's daily vehicle-miles traveled would increase to 634,144, which would be almost a 2 percent increase over the No Build Alternative (Exhibit 3-99).

The increase in vehicle-miles traveled would create a concomitant increase in fuel consumption. In 2015, daily fuel consumption with the East DS2 Alternative would average 20,033 gallons, which would be a 5-percent increase over the No Build Alternative. By 2035, the East DS2 Alternative's daily fuel consumption would average 24,220 gallons, which would be a 3 percent increase over the No Build Alternative. The increase in daily vehicle-miles traveled and fuel consumption for the East DS2 Alternative would be attributed to the larger roadway network.

Exhibit 3-99: *East DS2 Alternative Energy Consumption Compared to the No Build Alternative*

Conditions	Daily			Annual[1]		
	Vehicle-miles Traveled	Energy Consumed [2] (Million Btu/day)	Fuel Consumed (gal/day)	Vehicle-miles Traveled	Energy Consumed (Million Btu/year)	Fuel Consumed (gal/year)
Existing Year 2007	397,108	2,230	17,269	144,944,785	813,950	6,303,185
2015 Year of Opening						
No Build Alternative	442,048	2,462	19,036	161,347,520	898,630	6,948,140
East DS2 Alternative	466,753	2,589	20,033	170,364,845	944,985	7,312,045
2035 Design Year						
No Build Alternative	624,041	3,053	23,612	227,774,695	1,114,345	8,618,380
East DS2 Alternative	634,144	3,128	24,220	231,462,560	1,141,720	8,840,300

Btu = British thermal unit

[1] Annual energy consumptions are estimates only and do not accurately account for variations in seasonal energy use

[2] Energy Consumed, Auto: Btu/gallon of gasoline = 125,000, Trucks: Btu/gallon of diesel = 139,000

The East DS2 Alternative would contribute to an insignificant amount of Oregon's gasoline and ethanol consumption (based on use in 2008). The consumption rate of Btu within the corridor would be insignificant when compared to the entire state's energy use. The East DS2 Alternative would consume about 1,141,720 million Btu in 2035. Although there is not data for Oregon's predicted statewide energy consumption for the year 2035, this represents about 0.1 percent of Oregon's 2008 energy use. It is likely that this energy consumption would represent a smaller fraction of Oregon's statewide energy use in 2035.

The analysis of energy consumption that was conducted for the Draft EIS was accurate at that time, and the energy consumption levels for the years 2016 and 2036 compared to the years 2015 and 2036, respectively, are expected to be negligible. Therefore, the analysis of energy consumption was not updated for the East DS2 Alternative in the Final EIS.

Preferred Alterntive—East DS2 Modified Alternative

Similar to the East DS1 and East DS2 Alternatives, the Preferred Alternative will include signal removal at the intersections of US 97 and Cooley Road and at US 97 and Robal Road. The Preferred Alternative will also eliminate several public and private approaches along US 97. Unlike the DS1 and DS2 Alternatives, the Preferred Alternative will not include a grade-separated northern interchange; the Preferred Alternative will, however, construct one new at-grade signalized intersection at US 97 and 3rd Street. By 2016, the Preferred Alternative will result in approximately 294,731 daily vehicle-miles traveled, which would be a 2 percent increase from the 2016 No Build Alternative. By 2036, the Preferred Alternative's daily vehicle-miles traveled would increase to 436,457, which would be a 6 percent increase over the 2036 No Build Alternative (Exhibit 3-99 FEIS).

The increase in average vehicle-miles traveled would create a concomitant increase in fuel consumption. In 2016, daily fuel consumption with the Preferred Alternative would average 12,549 gallons, which would be a 2 percent increase over the No Build Alternative. By 2036, the Preferred Alternative's daily fuel consumption would average 16,442 gallons, which would be a 5 percent increase over the No Build Alternative. The increase in daily vehicle-miles traveled and fuel consumption for the Preferred Alternative would be attributed to the larger roadway network.

The Preferred Alternative will contribute to an insignificant amount of Oregon's gasoline and ethanol consumption (based on use in 2008). The consumption rate of Btu within the corridor will be insignificant when compared to the entire state's energy use. The Preferred Alternative will consume about 773,435 million Btu in 2036. Although there is not data for Oregon's predicted statewide energy consumption for the year 2036, this represents about 0.1 percent of Oregon's 2008 energy use. It is likely that this energy consumption will represent a smaller fraction of Oregon's statewide energy use in 2036.

Exhibit 3-99 FEIS: *Preferred Alternative Energy Consumption Compared to the No Build Alternative*

Conditions	Daily			Annual[1]		
	Vehicle-miles Traveled	Energy Consumed[2] (Million Btu/day)	Fuel Consumed (gal/day)	Vehicle-miles Traveled	Energy Consumed[2] (Million Btu/year)	Fuel Consumed (gal/year)
Existing Year 2011	254,844	1,434	11,100	93,018,060	523,410	4,051,500
2016 Year of Opening						
No Build Alternative	287,734	1,597	12,266	105,022,910	582,905	4,477,090
Preferred Alternative	294,731	1,618	12,549	107,576,815	590,570	4,580,385
Preferred Alternative % change from Existing	16%	13%	13%	16%	13%	13%
Preferred Alternative % change from No Build Alternative	2%	1%	2%	2%	1%	2%
2036 Design Year						
No Build Alternative	411,284	2,022	15,663	150,118,660	738,030	5,716,995
Preferred Alternative	436,457	2,119	16,442	159,306,717	773,435	6,001,330
Preferred Alternative % Change from Existing	71%	48%	48%	71%	48%	48%
Preferred Alternative % Change from No Build Alternative	6%	5%	5%	6%	5%	5%

Btu = British thermal unit

[1] Annual energy consumptions are estimates only and do not accurately account for variations in seasonal energy use

[2] Energy Consumed, Auto: Btu/gallon of gasoline = 125,000, Trucks: Btu/gallon of diesel = 139,000, Electrical lighting and signalization: energy needs will be determined during final design; based on past experience, ODOT expects these needs to comprise a very small percentage (<0.01 percent) of the energy consumed in the corridor by vehicle travel.

[3] No Build Alternative traffic volumes and roadway network have been updated to 2016 Year of Opening and 2036 Design Year.

Indirect Impacts

Indirect energy consumption would include activities such as manufacturing and maintaining construction equipment, and the energy consumed by workers commuting to the project site. Because direct one-time energy consumption for roadway projects would be much greater than indirect energy consumption, indirect impacts from the East DS1 and East DS2 Alternatives would be relatively minor. Indirect energy consumption would also include energy used during the long-term operation of the facility for lighting, ramp-metering or variable message signs, which would be minor.

The Preferred Alternative will result in similar indirect impacts as the East DS1 and East DS2 Alternatives.

Construction Impacts

Under the No Build Alternative, the proposed action would not be implemented; therefore, there would be no temporary energy consumption as a result.

The consumption of energy during construction could be considered a temporary impact, as it would occur during a limited duration, and construction-related energy consumption would be correlated with the construction cost of the alternative and the miles of facility type. Given the various construction elements, a weighted average of three facility types was used to calculate energy consumption during construction of the East DS1 Alternative. These facilities are "Rural Conventional Highway," "Urban Conventional Highway," and "Urban Freeway." The East DS1 Alternative estimated construction cost, not including right of way acquisition costs, is $102 million in 2010 dollars. For this analysis, construction dollars were deflated to 1977 dollars using the California Highway Construction Price Index for selected highway construction items in order to use the conversion factors provided in the index, which are listed in 1997 dollars. This would result in about 932,170 million Btu consumed during construction of the East DS1 Alternative. This represents about 7.5 million gallons of fuel. Construction is estimated to last two to three years.

Similar to the East DS1 Alternative, a weighted average of three facility types was used as the energy consumption factor to account for Btu consumed in the construction of the East DS2 Alternative, and construction dollars were deflated to 1977 dollars using the California Highway Construction Price Index for selected highway construction items in order to use the conversion factors provided in the index, which are listed in 1997 dollars. The estimated construction cost of the East DS2 Alternative, not including the right of way acquisition costs, is $100 million in 2010 dollars. The East DS2 Alternative would result in approximately 953,114 million Btu consumed during the construction of the East DS2 Alternative. This represents about 7.6 million gallons of fuel. Construction is estimated to last two to three years.

Similar to the East DS1 and the East DS2 Alternatives, a weighted average of three facility types was used as the energy consumption factor to account for Btu consumed in the construction of the Preferred Alternative. Construction dollars were deflated to 1977 dollars using the California Highway Construction Price Index for selected highway construction items in order to use the conversion factors provided in the index, which are listed in 1997 dollars. The estimated construction cost of the Preferred Alternative, not including the right

of way acquisition costs, is $100 million in 2016 dollars. The Preferred Alternative will result in approximately 880,245 million Btu consumed during the construction of the Preferred Alternative. This represents about 7 million gallons of fuel. Construction is estimated to last two to three years.

3.17.4 Avoidance, Minimization, and/or Mitigation Measures Proposed in the Draft EIS

Construction Mitigation and Commitments

The following measures could be taken to the extent practicable to avoid, minimize and mitigate temporary adverse impacts to energy consumption:

- Limit idling of construction equipment
- Locate staging areas as close to work sites as feasible
- Implement traffic management plans that minimize delay and vehicle idling.

Mitigation for Long-term Impacts

Since the proposed action would not have an adverse impact to long-term energy consumption, no mitigation would be necessary.

3.17.5 Avoidance, Minimization, and/or Mitigation Commitments Incorporated into the Preferred Alternative

ODOT makes the following commitments:

- ODOT will require the contractor to limit idling of construction equipment to the greatest extent possible/feasible or as directed by the ODOT construction project manager
- ODOT will require the contractor to locate staging areas as close to work sites as feasible or as directed by the ODOT construction project manager
- ODOT will require the contractor to implement traffic management plans that minimize delay and vehicle idling to the extent possible or as directed by the ODOT construction project manager.

3.18 Geology

3.18.1 Affected Environment

More Information: Additional detail on geology is provided in the *Geology Technical Report* (**ODOT 2014e**). The *Geology Technical Report* is listed in Appendix K and available in the document library of the project's website (www.us97.solutions.org).

The API is located approximately 20 miles east of the Cascade Mountains and 15 miles west of Powell Butte, in the western fourth of the High Lava Plains Physiographic Provence. The High Lava Plains Physiographic Provence is characterized by Pliocene to Holocene aged volcanic rocks, with dry lava plains vegetated by juniper trees and sagebrush (Greeley 1971). The geology of the API is mapped as Basalt of the Newberry Volcano, a Pleistocene aged sequence of lava flows that flowed from vents on the north flank of the Newberry Volcano north across a broad plain that extends to Redmond (Sherrod et al. 2004). Bedrock within the API is typically very shallow; generally located within 60 inches of the ground surface.

The overall topography is relatively flat, sloping gently downward toward the north. The elevation ranges from approximately 3,550 feet at the south end of the API to approximately 3,370 feet at the north end. Small mounds and ridges are present that create irregular local relief of 5 to 20 feet. These features are typical of volcanic terrain and were formed when pressurized molten lava pushed the overlying crust upward and are commonly known as tumuli and pressure ridges. There are no known unique or distinct geologic features in the API.

There are eight soils types in the API (US Department of Agriculture 2010), as shown previously in Section 3.2 Land Use. The Deskamp-Gosney complex, 0 to 8 percent slopes and the Gosney-Rock outcrop-Deskamp complex, 0 to 15 percent slopes comprise approximately 85 percent of the API. These sandy soils are derived from volcanic ash with weathered components of coarse sands and gravels from local basalt flows. Exhibit 3-25 also indicates which soil types are considered to be prime farmland if irrigated or farmlands of statewide importance, although some of the areas designated as prime farmland if irrigated are not currently irrigated. Soils in the API are likely to be more susceptible to erosion by wind, rather than water, due to the relatively flat topography and dry climate.

Groundwater ranges from 110 feet to 840 feet below the ground surface (Oregon Water Resources Department 2008) and is mainly used for domestic and municipal uses, including drinking water.

The API is located within a seismically-active area. For the proposed action, seismic hazards include ground shaking, fault surface rupture, and liquefaction. Ground shaking would be anticipated to be low due to the regional geologic setting. It is possible that the Sisters

More Information

For a detailed discussion on prime farmland and farmlands of statewide importance see Section 3.2 Land Use.

More Information

Groundwater

Additional description of groundwater is included in Section 3.9 Water Quality, Hydrology and Stormwater Runoff.

fault zone, which passes through the API, and the Metolius fault zone, which is 10 miles from the API, could rupture in the future and damage the constructed project. Soils in the API are not expected to be susceptible to liquefaction due to the deep groundwater table and the shallow bedrock.

Hazards due to lahars or related processes are considered unlikely in the API as the API is not located in the direct drainage of the Cascade Mountains. The history of eruptions and recent activity indicate that the Newberry Volcano, located approximately 10 miles south of Bend, will likely erupt again. The annual probability of a lava flow from the Newberry Volcano reaching the API is considered to be roughly 1 in 100,000. The annual probability of a large magnitude explosive eruption of the Newberry Volcano is considered to be no greater than 1 in 100,000 (Sherrod et al. 1997). The nearest known lava tube system, Horse Lava Tube System, is located approximately four miles southeast of the API (Greeley 1971).

There are no known, reported, or suspected areas of active or historic landslides (including fast moving landslides and debris flows) in the API (Brabb, et al. 1999).

Definitions

Liquefaction

Liquefaction describes the behavior of loose saturated sands, which go from a solid state to the consistency of a heavy liquid, or reach a liquefied state.

Lahar

A lahar is a landslide or mudflow of volcanic material from an eruption.

Lava Tube

A lava tube is a hallow space below the surface of a solidified lava flow, formed by the withdrawal of molten lava after the formation of the surficial crust.

3.18.2 Environmental Consequences

No Build Alternative

Under the No Build Alternative no improvements would be constructed, and so no soil would be disturbed.

East DS1 Alternative

Approximately 152 acres of land would be disturbed under the East DS1 Alternative, of which 50 acres would be new impervious area.

Although no known lava tubes are present in the API, project excavations could encounter an unmapped lava tube and may result in the tube being infilled or destructed. Embankments constructed could be susceptible to localized slope failures if not properly constructed. There are no other known long-term geologic hazards that would influence the design of structures and foundations for the proposed action.

The area of ground disturbance was corrected for the Final EIS. The East DS1 Alternative would cause approximately 140 acres of ground disturbance.

East DS2 Alternative

Approximately 132 acres of land would be disturbed under the East DS2 Alternative, of which 40 acres would be new impervious area.

Other impacts under the East DS2 Alternative would occur in the same manner as under the East DS1 Alternative.

Key Differences

	East DS1	East DS2	Preferred Alternative
Ground Disturbance	~~152~~ 140 acres[1]	132 acres	115 acres

[1] The area of disturbance that would be caused by the East DS1 Alternative has been corrected.

Preferred Alternative—East DS2 Modified Alternative

Approximately 115 acres of land will be disturbed under the Preferred Alternative, of which 39 acres would be new impervious area.

Other impacts under the Preferred Alternative will occur in the same manner as under the East DS1 and East DS2 Alternatives.

Indirect Impacts

There would be no indirect impacts for the No Build Alternative. Indirect impacts for the East DS1 and East DS2 Alternatives include geotechnical risks such as grading fill slopes too steeply during project construction or establishing highmaintenance exposed slopes, which could lead to long-term erosion problems. Additionally, a large precipitation event could lead to embankment soil saturation and initiate slope failures on slopes that would normally be stable.

The Preferred Alternative will have similar indirect impacts as the East DS1 and East DS2 Alternatives.

More Information

Farmland

Section 3.2 Land Use provides additional information on potential direct impacts to farmland.

Construction Impacts

Ground-clearing activities for construction of the East DS1 and East DS2 Alternatives would expose soils to erosive forces, both water and wind. Erosion from construction activities could cause increased sediment transport to other locations and into storm drains. Soils exposed to windblown erosion could create nuisance dust, which may reduce visibility, create respiratory hazards, and temporarily inhibit the aesthetics of the surrounding area.

Excavations during construction would likely encounter bedrock, including the Cooley Road underpass of US 97 and the BNSF Railway. Overhanging rocks and rock fragments could present rockfall hazards. Regulations for excavation support are specified by Oregon Occupational Safety and Health Administration, and compliance would be required by the construction contract.

3.18.3 Avoidance, Minimization, and/or Mitigation Measures Proposed in the Draft EIS

Construction Mitigation and Commitments

The following measures could be taken to the extent practicable to avoid and minimize temporary adverse impacts to geologic resources during construction of the proposed action:

- Implement temporary and permanent erosion control best management practices (ODOT 2005a) as needed during all phases of construction including both vegetative control and engineered controls
- Implement rock cut design and mitigation as outlined in Chapter 12 of the *Geotechnical Design Manual* (ODOT 2012a).

Mitigation for Long-term Impacts

Minimization Measures – The build alternatives have been designed to incorporate the following measures that would avoid or minimize adverse impacts to geologic resources:

- Compliance with the ODOT's *Erosion Control Manual, Erosion Control Field Manual, Geotechnical Design Manual, and Standard Specifications for Highway Construction* would avoid and minimize impacts to geologic resources
- Use of current seismic design standards and applicable building material would minimize seismic hazards
- Embankments would be placed on rock or firm subgrade soils to avoid long-term settlement.

3.18.4 Avoidance, Minimization, and/or Mitigation Commitments Incorporated into the Preferred Alternative

ODOT makes the following commitments:

Project Design

- ODOT will design embankments such that they are placed on rock or firm subgrade soils to avoid long-term settlement.

Project Construction

- ODOT will require the contractor to implement temporary and permanent erosion control best management practices (ODOT 2005a) as needed during all phases of construction including both vegetative control and engineered controls.

3.19 Hazardous Materials

3.19.1 Regulatory Setting

Hazardous materials and hazardous wastes are regulated by many state and federal laws. These include not only specific statutes governing hazardous waste, but also a variety of laws regulating spill cleanup, air and water quality, human health, and land use.

The primary federal laws regulating hazardous wastes/materials are the Resource Conservation and Recovery Act of 1976 (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). RCRA provides for "cradle to grave" regulation of wastes as well as regulating underground storage tanks, which are a common source of contamination. The purpose of CERCLA, often referred to as Superfund, is to clean up contaminated sites so that public health and welfare are not compromised. Other relevant federal laws and regulations include:

- Community Environmental Response Facilitation Act of 1992
- Clean Water Act of 1972
- Clean Air Act of 1970
- Safe Drinking Water Act of 1974
- Hazardous Waste Operations and Emergency Response Standard of 1996 (29 CFR 1910.120)
- Toxic Substances Control Act of 1976
- Federal Insecticide, Fungicide, and Rodenticide Act of 1996.

Key Point

Metals can become soluble and migrate to groundwater depending on the soil and infiltration conditions. However, metal contamination is more commonly found in shallow, subsurface soils.

Waste management, hazardous waste, cleanup and underground storage tanks in Oregon are regulated under the authority of RCRA and CERCLA, ORS 459, ORS 459a, ORS 465m, and ORS 466, respectively. Other Oregon laws that affect hazardous materials, waste, and hazardous waste are specific to water quality, transportation, emergency planning, community right to know, and worker health and safety requirements.

Health and safety for both workers and the public are key issues when dealing with hazardous materials and hazardous waste. Proper management of hazardous materials and disposal of hazardous waste are vital if it is disturbed during project construction.

3.19.2 Affected Environment

More information: Additional detail on hazardous materials is provided in the *Hazardous Materials Corridor Study* (ODOT 2008d) and the *Hazardous Materials Technical Report* (ODOT 2014f). The *Hazardous Materials Corridor Study* and the *Hazardous Materials Technical Report* are listed in Appendix K and available in the document library of the project's website (www.us97solutions.org).

There are nine sites that are potential sources of contamination including but not limited to heating oil tanks, above ground and below ground storage tanks, septic systems, potential polychlorinated biphenyl (PCB)-containing equipment, and fluorescent or mercury vapor light bulbs. These are shown on Exhibit 3-100 FEIS.

Definition

Remediation

Remediation is the act of containing or cleaning up a hazardous materials site.

Individual sites include:

- Site 1 is an automotive repair shop located at the northwest corner of the intersection of Nels Anderson Road and Sherman Road just south of Empire Avenue. Onsite contamination is confirmed from contaminants that include metals and heavy oil (ODOT 2008a and 2008b).
- Site 2 is located at the southeast corner of the intersection of US 20 and Empire Avenue. This site was a fenced vacant property at the time of site reconnaissance with several areas of surface disturbance. The soil disturbance may be indicative of underground storage tank removal. The site is also located in proximity to heavily traveled roadways where service stations are often found. Potential petroleum hydrocarbon contamination may exist at Site 2. Conditions at the time of site reconnaissance indicated that this lot may have been a service station.

  Since the reconnaissance, the northern portion of the property has been partially developed as a demonstration site for a landscaping company while the southern portion remains mostly vacant with a trailer on site.



Site 4 is a fenced-in vacant property where potential soil contamination may exist from a former service station.

- Site 3 is a former gas station located at the southwest corner of the intersection of US 97 and Cooley Road where potential petroleum-contaminated soil may exist from undocumented spills and underground storage tanks located on site. Site reconnaissance and a review of recent aerial photography identified areas of cleared vegetation where former structures may have been located.
- Site 4 is a fenced vacant property located at the northwest corner of the intersection of US 97 and Cooley Road. Potential petroleum-contaminated soil may exist from a former service station located on site with two underground gasoline storage tanks and one underground diesel storage tank.

- Site 5 is a vehicle storage and maintenance facility located adjacent and to the east of US 97 approximately 500 feet south of Fort Thompson Lane. Potential soil contamination may exist from vehicle storage and maintenance. Various automobiles and storage containers were observed on site. Possible contaminants include: diesel and gasoline fuel, metals, and solvents.

Multiple property sites include:

- Sites 6, 7, and 8 are manufacturing and vehicle maintenance areas southwest, northwest, and northeast of the US 97 and Empire Avenue interchange, respectively. Possible contaminants include: metals, diesel and gasoline fuel, degreasers, and solvents. Large exterior areas and all interior areas of the properties included in Site 6 were not visible from public viewing areas during site reconnaissance.
- Site 9 includes properties adjacent to the BNSF Railway right of way between Grandview Drive and Fort Thompson Lane. Potential soil contamination includes: possible spills of solvents, combustible solids, acids, oil and grease, and heavy metals from hazardous materials transported by railway cars along the BNSF Railway and hazardous materials such as creosote-treated timbers on the railway ballast. During the site reconnaissance approximately thirty 55-gallon storage drums were observed at one property. Many properties located adjacent to the BNSF Railway had generally poor site conditions. Many of the properties that comprise Site 9 were not visible from public viewing areas during site reconnaissance.



Site 5 is a vehicle storage and maintenance facility where potential soil contamination may exist.

Key Point

Gasoline components including benzene, toluene, ethyl benzene, and xylenes are volatile organic compounds are highly soluble and mobile in groundwater.

Limitations Regarding Hazardous Materials

The Draft EIS identified reported and observed potential hazardous material conditions that could affect construction of the proposed action. The hazardous materials assessment does not provide a definitive determination of the actual presence or absence of contamination, and would not meet "innocent landowner" provisions under CERCLA, which establish a defense for the purchase of real property. The information contained in the Draft EIS is based on a limited review of site data. The presence of asbestos-containing material, lead-based paint, and radon gas were not assessed and the hazardous material assessments prepared for the proposed action does not guarantee, imply, or assert that all potential contaminated sources have been located. There is a possibility of unlisted contaminant occurrences. Conditions in the API could change and should be reevaluated during final design and whenever new information becomes available.

The Final EIS is subject to the same limitations regarding hazardous materials as those described above for the Draft EIS.

3.19.3 Environmental Consequences

No Build Alternative

With the No Build Alternative no construction would occur, so no existing hazardous materials sites would be disturbed; and therefore, there would be no direct hazardous materials impacts. There also would be no beneficial impacts as no existing contaminated hazardous materials sites would be remediated under the No Build Alternative.

East DS1 Alternative

Portions of the East DS1 Alternative would be located within areas of the API where historic and current land use has included the use, generation, storage, and release or disposal of petroleum products and other hazardous materials. Potential impacts in these areas would be related to the disturbance of hazardous materials contained in storage containers, such as 55-gallon drums, demolition of existing structures, and construction in areas of potential soil and/or ground water contamination.

Four individual sites (Sites 1, 2, 3, and 5) and one multi-property site (Site 6) that contain known or potential hazardous materials would be adjacent to the East DS1 Alternative; however, hazardous materials at these sites could pose a low potential impact because no off site contamination has been reported migrating from Site 1, and no contamination has been reported at adjacent Sites 2, 3, 5, and 6. Site conditions at all four individual sites and the one multi-property site did not indicate the presence of large areas of contamination. Groundwater throughout the API is typically between 500 and 700 feet so potential groundwater migration of contaminants would be unlikely.

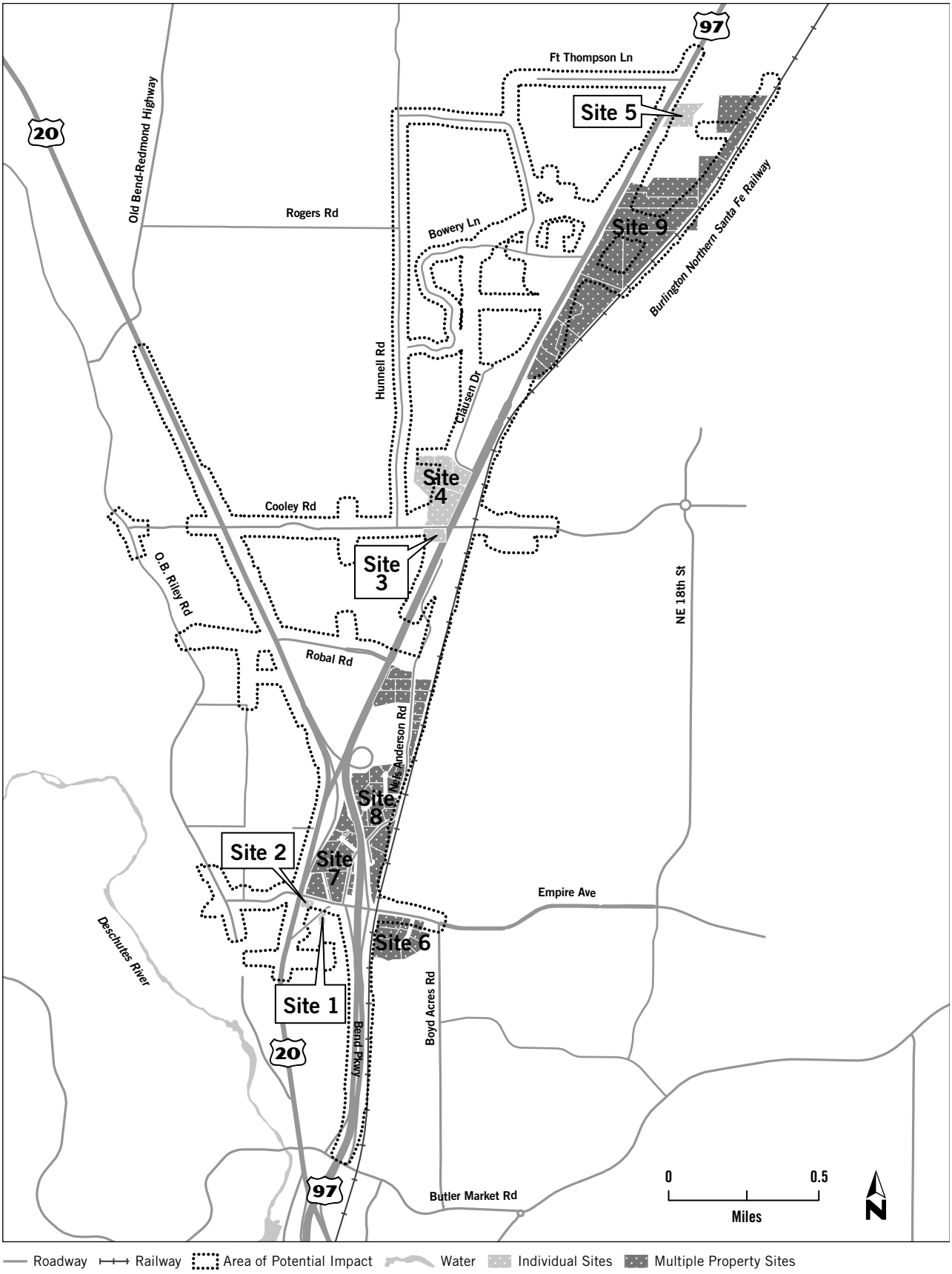
Definition

Remediation

Remediation is the act of containing or cleaning up a hazardous materials site.

One individual site (Site 4) and three multi-property sites (Sites 7, 8, and 9) could have a higher potential impact due to potential onsite contamination, current site conditions, and planned acquisition. Acquisition and/or construction or demolition at these sites could disturb and potentially release contaminated soil and hazardous material into the environment and expose workers to hazardous materials. However, known or potentially contaminated hazardous materials sites would be partially or fully remediated with East DS1 Alternative. This would be a long-term, beneficial impact to the environment and human health.

Exhibit 3-100 FEIS: *Hazardous Materials Sites*



Note: A detailed description of each numbered site on the map is provided in the Section 3.19.1. These descriptions include potential contaminants that may be present at each site.

For the East DS1 Alternative, no hazardous materials sites were identified to pose a significant unavoidable adverse impact to human health or the environment that cannot be reasonably mitigated. However, once a Preferred Alternative is identified further investigation through a Level 1 Initial Site Assessment is recommended for the sites identified in Exhibit 3-100 FEIS and any additional sites where property easements or acquisitions are planned to substantiate this finding. The purpose of a Level 1 Initial Site Assessment is to identify specific potential sources of hazardous substances and/or petroleum products that would intersect, and potentially be disturbed by, the proposed action. The results of a Level 1 Initial Site Assessment would be used to determine whether environmental sampling could be required prior to construction and/or right of way acquisition. If results of the site-specific Level 1 Initial Site Assessments indicate that further investigation would be necessary, a Level 2 Preliminary Site Investigation should be conducted to confirm the presence of environmental concerns at the property. The Level 2 Preliminary Site Investigation would include a walkthrough site reconnaissance of the properties, sampling activities, and laboratory analysis.

East DS2 Alternative

The direct impacts of the East DS2 Alternative would be the same as those for the East DS1 Alternative.

Preferred Alternative—East DS2 Modified Alternative

The direct impacts of the Preferred Alternative will be similar to the direct impacts of the East DS1 and East DS2 Alternatives, with the exception that impacts to Site 5 will likely be avoided. Site 5 is located on US 97 approximately three-quarters of a mile beyond of the northern extent of project impacts associated with the Preferred Alternative. It is unlikely that Site 5 will pose a risk to the Preferred Alternative due to the distance between Site 5 and the northern most improvements and because there is no record of an environmental release occurring at Site 5. All other potential contaminant sources described for the East DS1 and East DS2 Alternatives will pose similar risks as for the Preferred Alternative.

For the Preferred Alternative, no hazardous materials sites were identified that pose a significant unavoidable adverse impact to human health or the environment that cannot be reasonably mitigated.

Similar to the East DS1 and East DS2 Alternatives, the Preferred Alternative will have the long-term benefit to the environment and human health from partially or fully remediating any known or potentially contaminated hazardous materials sites.

Key Point

Known or potentially contaminated hazardous materials sites acquired by ODOT for the proposed action would be partially or fully remediated. Therefore, with either build alternative, there would be a long-term, beneficial impact to the environment and human health.

Level 1 Site Assessments will be conducted for properties that will be acquired as well as Level 2 Preliminary Site Investigations if warranted by the findings of the Level 1 Site Assessments.

Indirect Impacts

The No Build Alternative would provide no improvements to traffic safety on US 97, which could have the indirect impact of hazardous materials spills in the API from a higher risk of motor vehicle accidents as compared with the East DS1, East DS2, or Preferred Alternatives. ~~Indirect impacts would not occur with the No Build Alternative.~~

Indirect impacts of the East DS1 Alternative and East DS2 Alternative would be the same, and mostly would be associated with stormwater runoff as discussed in Section 3.9 Water Quality.

The improved traffic conditions that would result from construction of the East DS1 and East DS2 Alternatives could indirectly encourage planned development in the vicinity to take place more quickly, including new service stations or other facilities that could potentially release hazardous substances into the environment.

The East DS1 and East DS2 Alternatives would improve traffic operations, which would help reduce the risk of motor vehicle accidents including those involving the large-quantity release of petroleum and hazardous materials. This in turn would result in beneficial impacts through decreasing the amount of harmful materials that might enter soil and water resources.

Indirect impacts resulting from the Preferred Alternative will be the same as described for the East DS1 and East DS2 Alternatives.

Construction Impacts

During construction, grading activities in areas with known or potential soil contamination could cause exposure to or mobilize contaminants. Dewatering in areas of contaminated soil and groundwater could contaminate water discharge areas.

Unknown contamination resulting from undocumented storage tanks, asbestos-containing materials and lead-based paint could also be encountered during excavation, earthwork, grading, and utility work. High intensity discharge mercury vapor lamps are located along industrial areas and roadways throughout the API. If the lamps are not handled and disposed of properly, the potential exists for mercury contamination in soils and groundwater, as well as worker exposure to mercury.

3.19.4 Avoidance, Minimization, and/or Mitigation Measures Proposed in the Draft EIS

Construction Mitigation and Commitments

The following measures could be taken to the extent practicable to avoid and minimize temporary adverse construction impacts to hazardous materials:

- Conduct Level 1 Initial Site Assessments of all properties where a full or partial acquisition is planned to adequately assess the potential for existing environmental contaminants on each property
- Arrange with utility providers to remove and relocate utilities that contain hazardous materials such as transformers containing PCBs, as necessary
- Conduct pre-demolition asbestos and lead surveys for all structures to be demolished; if necessary, proceed with removal and disposal in accordance with regulations
- Evaluate structures to be demolished for the presence of hazardous materials. Conduct Level 2 Preliminary Site Investigations, as necessary, to evaluate soil and groundwater conditions in the vicinity of potential sources of hazardous materials. Remove and dispose of hazardous materials, and remediate contaminated soil and groundwater in accordance with applicable regulations.
- Evaluate soil conditions in the vicinity of construction as grading activities occur. In the event that hazardous materials are encountered, remove and assess soil and groundwater conditions.
- Remediate hazardous materials sites, as necessary, in accordance with applicable regulations
- Develop a construction health and safety plan contaminant management plan, contingency plan, and solid waste management plan prior to project construction
- Since the publication of the Draft EIS, the plans needed prior to construction have been modified. A Hazardous Substance Health and Safety Plan and a Contaminant Management Plan will replace the plans listed in the text above. These plans have been included as an ODOT commitment for the Preferred Alternative.
- Prepare an emergency response plan in the event of an accidental release of hazardous materials or soil contamination problem during construction. Assessment and cleanup of a release should be conducted in accordance with the emergency response plan.

Preliminary cost estimates for site assessments and preliminary site investigations are based on conceptual engineering of the project and best professional judgment (Exhibit 3-301).

Exhibit 3-101: *Preliminary Cost Estimates for Site Assessments and Investigations*

Site	Level 1 Initial Site Assessment	Level 2 Preliminary Site Investigation
Commercial/State Properties (each)	$3,500	$15,000
Residential Properties (each)	$1,500	$7,500

Mitigation for Long-term Impacts

Minimization Measures—The East DS1 and East DS2 Alternatives have been designed to incorporate the following measure that would avoid or minimize adverse impacts due to hazardous materials:

- Stormwater management facilities were designed and would be maintained to standards to treat stormwater runoff from the project.

Section 3.9 Water Quality includes minimization measures that address the hazardous materials implications of stormwater management facilities.

Mitigation Measures—The following measures could be taken to the extent practicable to mitigate long-term impacts due to hazardous materials:

- Follow standard highway procedures for transporting hazardous materials for operation of US 97
- Remediate hazardous materials sites, as necessary, in accordance with applicable regulations
- Follow emergency response plan to assess and cleanup accidental release of hazardous materials.

3.19.5 Avoidance, Minimization, and/or Mitigation Commitments Incorporated into the Preferred Alternative

ODOT makes the following commitments:

- ODOT will conduct asbestos and lead-based paint surveys on structures to be demolished
- ODOT will conduct Level 1 Site Assessments and Level 2 Preliminary Site Investigations (if recommended by the Level I Site Assessments) for properties to be acquired

- ODOT will coordinate with utility providers to remove and relocate utilities that contain hazardous materials, such as transformers containing PCBs, as necessary
- ODOT will confirm the presence/absence of contamination where contamination is reasonably suspected by collecting soil and groundwater (if encountered) samples for laboratory analysis prior to construction. If contamination is confirmed in areas that will be disturbed or excavated during construction, special provisions will be prepared to address regulatory compliance for worker safety and the handling and disposal of contaminated media. If unexpected contamination is encountered during construction, work will stop until a qualified hazardous materials subcontractor can be mobilized to address the contaminated media.
- ODOT will require the contractor to prepare a Hazardous Substance Health and Safety Plan and a Contaminant Management Plan prior to construction if there is a likelihood of encountering contaminated media.

Chapter 4
Cumulative Impacts

4.1 Cumulative Impacts

Chapter 4 Content

4.1 Cumulative Impacts
4.2 Climate Change

Cumulative impacts are those that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of the proposed action. A cumulative impact assessment looks at the collective impacts posed by individual land use plans and projects. Cumulative impacts can result from individually minor, but collectively substantial impacts taking place over a period of time.

Cumulative impacts to resources in the project area may result from residential, commercial, industrial, and highway development, as well as from agricultural development and the conversion to more intensive types of agricultural cultivation. These land use activities can degrade habitat and species diversity through consequences such as displacement and fragmentation of habitats and populations, alteration of hydrology, contamination, erosion, sedimentation, disruption of migration corridors, introduction of invasive species, changes in water quality, and introduction or promotion of predators. They can also contribute to potential community impacts, such as changes in community character, traffic patterns, housing availability, and employment.

4.1.1 Regulatory Setting

Cumulative impact is defined in 40 CFR, Section 1508.7 of the Council on Environmental Quality Regulations as:

> *The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.*

4.1.2 Resources Analyzed for Cumulative Impacts

More Information

Resources with minimal contributions to cumulative impacts are described in Section 4.1.6 Cumulative Impacts.

The information gathered and analysis conducted in the technical reports for each resource was used as a starting point for making a determination as to which resources are expected to be substantially affected by direct and indirect impacts of the proposed action and, therefore, may have more than minimal cumulative impacts and should be analyzed indepth for cumulative impacts. These resources include:

- Land use
- Environmental Justice and Socioeconomics
- Visual resources.

Brief descriptions of resources with minimal contributions to cumulative impacts are provided in Section 4.1.6 Resources with Minimal Contributions to Cumulative Impacts.

Analysis for cumulative impacts follows an 8-step process:

1. Identify the resources to consider
2. Define the study area for each resource
3. Describe the current health and historical context for each resource
4. Identify the direct and indirect impacts that might contribute to a cumulative impact
5. Identify other current and reasonably foreseeable actions
6. Identify and assess potential cumulative impacts
7. Document the results
8. Assess the need for mitigation.

The geographic boundary of the study area for potential cumulative impacts to these resources considers the geographic extent of direct and indirect project impacts as well as the natural boundaries of these resources. The cumulative impacts study area encompasses a larger area than the API to account for projects within a more regional context that could contribute to cumulative impacts to land use, environmental justice and socioeconomics, and visual resources. The cumulative impacts study area comprises approximately 11,000 acres (Exhibit 4-1).

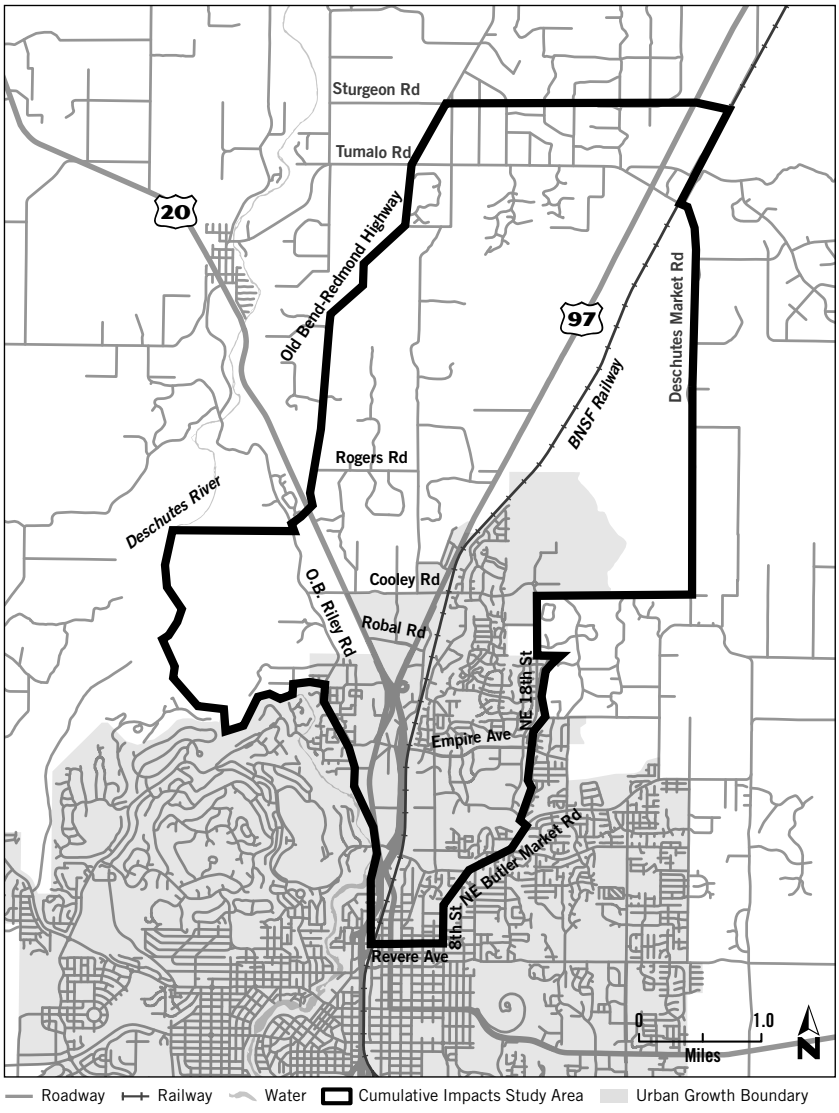
The cumulative impact study area extends north of Tumalo Road to capture the commercial development around the Deschutes Market Road/Tumalo Junction interchange; east to 18th Street and to Deschutes Market Road to capture the planned Juniper Ridge development; south to Revere Avenue to capture new development south of the API; and west to follow O.B. Riley Road and the Old Bend–Redmond Highway and to include the Urban Area Reserve lands west of the API.

4.1.3 Cumulative Impacts: Land Use

Current Status/Viability and Historical Context

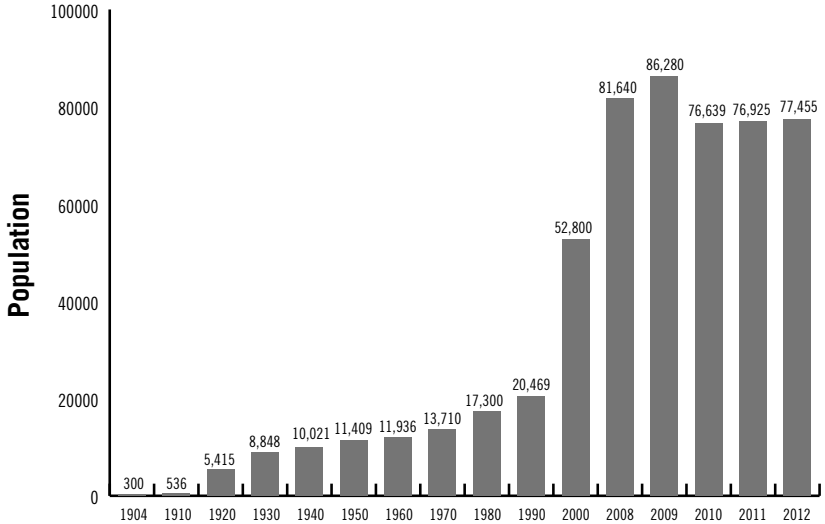
The Bend area was occupied by Native Americans for thousands of years before this area was first visited by European and Canadian explorers in 1834, and the "Farewell Bend" Ranch was established in 1877. Later, in 1904, Bend became incorporated with a population of just 300 people. Beginning in the later part of the twentieth century, Bend has historically experienced rapid spurts of population growth and corresponding development as illustrated in Exhibit 4-2 FEIS.

Exhibit 4-1: *Cumulative Impacts Study Area*



Source: City of Bend 2010.

Exhibit 4-2 FEIS: *Population in Bend 1904-2012*



Source: City of Bend 2010 and Portland State University Population Research Center 2013.
Note: This exhibit has been revised to provide updated population data through 2012.

With this growth and development has come a continual expansion of built facilities and structures outward toward undeveloped lands across the landscape. New road corridors have been built and parcels of land subdivided. Neighborhoods and shopping centers drawing regional retailers have been constructed. The recent economic downturn, however, has affected Central Oregon more severely than other areas of the state, and development in Bend slowed tremendously but is now starting to increase again.

More Information

Please refer to Section 3.2 Land Use for a more detailed discussion on direct and indirect impacts to land use.

Bend's UGB was first established in 1981 when the population was 17,425. Since then, the UGB has expanded by approximately 600 acres. In 2004, the City of Bend began an effort to further expand the UGB to accommodate the growing need for development as the population has more than quadrupled in size since the UGB was first established.

In 2009, the Bend City Council and the Deschutes County Board of County Commissioners adopted a new UGB; however in 2010, the Oregon Department of Land Conservation and Development remanded the UGB expansion to the City and County for further work to comply with state law.

The UGB expansion process is ongoing and is estimated to be complete in 2017. The currently adopted UGB was used in the cumulative impacts analysis.

Direct and Indirect Impacts

The primary direct impact of the East DS1 and East DS2 Alternatives that could contribute to cumulative impacts to land use is the acquisition of additional right of way, which would convert existing land uses to a transportation use. Under the East DS1 Alternative, 180 acres would be acquired and converted to a transportation use; under the East DS2 Alternative, 131 acres would be acquired and converted to a transportation use.

The Preferred Alternative will contribute to cumulative impacts to land use through the acquisition and conversion of approximately 82 acres of land for additional right of way.

The primary indirect impact from the East DS1 and East DS2 Alternatives that could contribute to cumulative impacts to land use is a reduction in the acreage available for rural use, including rural residential uses and small-scale non-commercial farming. Under the East DS1 and East DS2 Alternatives most of the acquisitions would be partial acquisitions of land adjacent to roadway, which would allow the remaining land to continue its current use.

The Preferred Alternative minimizes indirect impacts to rural lands, and thus its contribution to cumulative impacts, because the improvements are contained within the adopted City of Bend UGB

except for the extension of Britta Street and the new roundabout that will be constructed at the intersection of O.B. Riley Road and Cooley Road.

Current and Reasonably Foreseeable Actions

While development in Bend and Deschutes County soared in the early and mid-2000s, this growth slowed tremendously toward the end of the decade with the onset of the economic recession. Nonetheless, there are still a number of other current and reasonably foreseeable actions that are factored into the cumulative impacts analysis, including:

- Commercial development
- Communication facilities
- Park and trail improvements
- Residential development
- Roadway improvements
- Transit improvements
- Utility improvements.

Exhibit 4-4 FEIS shows the other current and reasonably foreseeable actions within the cumulative impacts study area.

Land uses are most likely to be impacted by other current and reasonably foreseeable actions that would convert existing land uses to a new land use. Of particular note among the foreseeable actions is the 1,500 acre planned Juniper Ridge project east of the API, which would include employment, educational, and research opportunities, a town center, and residential neighborhoods. Potential major commercial development in the proximity of the proposed action includes Phase II of the Cascade Village Shopping Center (#4 on Exhibit 4-4 FEIS) and a Walmart (#6 on Exhibit 4-4 FEIS) store north of Cooley Road. There is no evidence that these developments will happen and no applications are currently on file with the City of Bend or Deschutes County, but the respective businesses own property in the area, and the shopping center has a conceptual plan for the second phase of its development. Also of note is the large area of Urban Area Reserve land west of US 97. A portion of Juniper Ridge (approximately 500 acres, # 3 on Exhibit 4-4 FEIS) is also located within the Urban Area Reserve zone.

As shown in Exhibit 4-4 FEIS, the entire area of Juniper Ridge (1,500 acres) was considered as a reasonably foreseeable action in the cumulative impacts analysis, although only 500 acres of Juniper Ridge is within the adopted UGB.

Definition

Urban Area Reserve Lands

Lands zoned Urban Area Reserve are identified for future urban growth

Key Point

Other Current and Reasonably Foreseeable Actions

Additional information on the other current and reasonably foreseeable actions shown in Exhibit 4-4 FEIS can be found in the appendices of the Land Use/Planning/Parks and Recreational Technical Report, the Socioeconomic and Environmental Justice Technical Report, and the Visual Quality Technical Report.

In comments received on the Draft EIS, it was noted that the Cascade Village Shopping Center has received entitlements to construct Phase II of the Cascade Village Shopping Center. In addition, developers have met with the Deschutes County Planning Commission to discuss development of a new mobile home park (#8 on Exhibit 4-4 FEIS) on the east side of US 97 just south of the existing mobile home parks. This development would convert several agricultural properties (with dwellings), totaling approximately 10 acres to a residential neighborhood.

Key Point

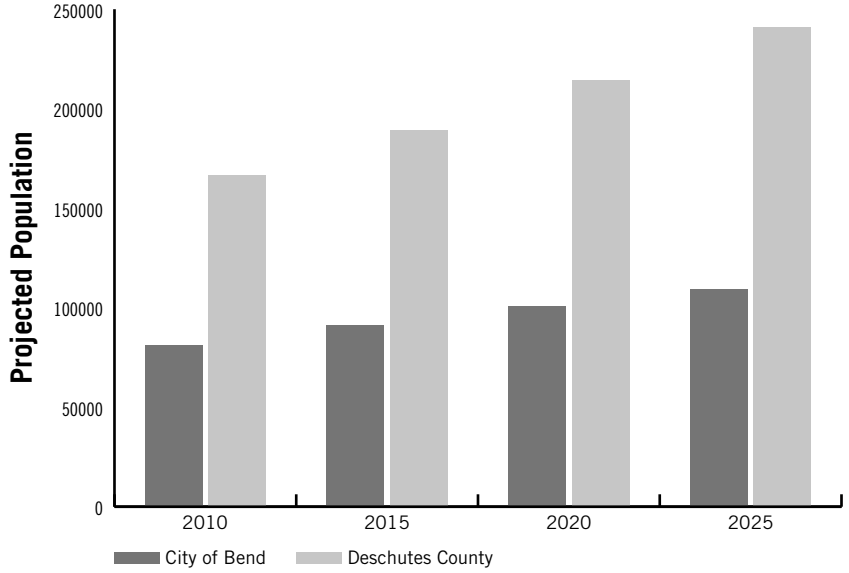
Preferred Alternative

The Preferred Alternative has been designed with the intent of minimizing direct and indirect impacts to resources, which also minimizes the Preferred Alternative's contribution to cumulative impacts.

Cumulative Impacts

The City of Bend and Deschutes County are both projected to experience population growth over the next 15 years. The 2005-2025 Deschutes County coordinated population projection, shown in Exhibit 4-3, is the latest estimate available for projected population growth.

Exhibit 4-3: *Projected Population Growth in Bend and Deschutes County 2010–2025*



Source: Bend Metropolitan Planning Organization 2007, City of Bend 2009b, Deschutes County 2010a.

Note: The Bend Metropolitan Planning Organization's *2007-2030 Metropolitan Transportation Plan*, City of Bend's *Bend Area General Plan*, and Deschutes County's *2030 Draft Deschutes County Comprehensive Plan* utilize the 2005-2025 Deschutes County coordinated population projection, completed in 2004. The traffic analysis for the East DS1 and East DS2 Alternatives also incorporates these projections as the analysis is based on the Bend Metropolitan Planning Organization's travel demand model. The traffic analysis for the Preferred Alternative also incorporates these projections and is based on the Bend Metropolitan Planning Organization's travel demand model.

These estimates are an indication of the growth that the City and County expect to experience in the next 15 years. The City, County, and Bend Metropolitan Planning Organization's land use and transportation plans account for this projected growth. Based on these projections it is likely that there will be a need for additional development of many of the current and reasonably foreseeable projects identified in Exhibit 4-4 FEIS. Specifically, it is reasonable to

anticipate that the Urban Area Reserve lands, including a portion of Juniper Ridge, would be converted from a rural land use to commercial, industrial, residential, and park uses to serve the growing population. It is unknown at this time how the UGB expansion will evolve. If expanded, the UGB could be expected to add Urban Area Reserve lands for development further into the future.

At the time of the publication of the Final EIS, the 2005-2025 Deschutes County coordinated population projection is still the most current population estimate available.

The City of Bend's UGB expansion is an ongoing planning effort independent of this project. The Final EIS is published before completion of the UGB expansion, which is estimated to be complete in 2017.

No Build Alternative—The No Build Alternative would not require right of way acquisition and would not convert existing land uses to transportation uses. Therefore, the No Build Alternative is not expected to contribute to overall changes in land uses within the cumulative impacts study area.

East DS1 and East DS2 Alternatives—The incremental impact of the East DS1 and East DS2 Alternatives in combination with other past, present and reasonably foreseeable projects to land uses would include:

- Acquisition and conversion of 131–180 acres of land, the majority of which is zoned Industrial Light, Multiple Use Agriculture, or Urban Area Reserve.

In the context of the 1,460 acres zoned Urban Area Reserve in the north end of Bend, west of US 97, and the 1,500 acre Juniper Ridge development that are planned to be converted from rural to urban land uses, the land that would be converted by the East DS1 or East DS2 Alternative is relatively small. The conversion of Multiple Use Agriculture land would contribute to the overall loss of rural residential land uses.

The East DS1 and East DS2 Alternatives would convert of 31-77 acres of Multiple Use Agriculture lands, including land used for non-commercial farming.

Preferred Alternative—East DS2 Modified Alternative

The incremental impact of the Preferred Alternative in combination with other past, present and reasonably foreseeable projects to land uses includes:

- Acquisition and conversion of approximately 82 acres of land, the majority of which is zoned Industrial Light.

In the context of the 1,460 acres zoned Urban Area Reserve in the north end of Bend, west of US 97, and the 1,500 acre Juniper Ridge

Key Point

Land Use Mitigation Measures

- Other Current and Reasonably Foreseeable Actions
- Additional information on the other current and reasonably foreseeable actions shown in Exhibit 4-4 FEIS can be found in the appendices of the Land Use/Planning/Parks and Recreational Technical Report, the Socioeconomic and Environmental Justice Technical Report, and the Visual Quality Technical Report.

development that are planned to be converted from rural to urban land uses, the land that will be converted by the Preferred Alternative is relatively small. Less than 1 acre of Multiple Use Agriculture land will be acquired and converted under the Preferred Alternative, which minimizes any cumulative impacts to rural residential and non-commercial farming land uses.

Need for Mitigation

As described in Section 3.2 Land Use, the design of the proposed action, including access management, and the mitigation measures that would be undertaken would minimize the direct and indirect impacts on land use, and therefore also the cumulative impacts. Subject to the approval of amending the *Bend Urban Area Transportation System Plan* and the *Deschutes County Transportation Plan* to include the proposed action as part of the planned roadway network, and amending the *2007-2030 Metropolitan Transportation Plan* to include the project in the financially constrained list, the proposed action would be consistent with the *Bend Area General Plan*, the 2030 *Deschutes County Comprehensive Plan*, and 2007-2030 *Metropolitan Transportation Plan*. Therefore, with the exception of the improvements proposed at the north end of the API where exceptions to the statewide goals are needed, the proposed action would not induce growth because this planned growth is already accounted for in the state and local land use and transportation plans.

For the Preferred Alternative, no exceptions to the Oregon statewide planning goals are required. Portions of the Preferred Alternative have identified funding and are included in the financially-constrained list in the *2007-2030 Metropolitan Transportation Plan*. On August 15, 2013 the Bend Metropolitan Planning Organization amended the illustrative list in the *2007-2030 Metropolitan Transportation Plan* to include the remaining portions of the Preferred Alternative. As determined by Deschutes County in June 2013, the elements of the Preferred Alternative located in unincorporated Deschutes County are already consistent with the *Deschutes County Transportation System Plan*, so an amendment to this plan is not required for the Preferred Alternative. The City of Bend amended the *Bend Urban Area Transportation System Plan* to include the Preferred Alternative on March 5, 2014. Upon approval of Deschutes County and City of Bend land use permits during final design, the Preferred Alternative will be consistent with applicable state, regional, and local plans.

The proposed action, as well as other current and reasonably foreseeable actions, would be required to follow environmental regulations and comply with City and County comprehensive plans, zoning codes, transportation plans, public infrastructure plans, development ordinances, Oregon's statewide planning goals, and the

Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970. In addition, under the proposed action interchange area management plans for the ~~US 97/Empire Avenue interchange and~~ new US 97 interchange in the north end of the API would be adopted by the Oregon Transportation Commission. The interchange area management plans would consist of an interchange function statement, land use assumptions, and a circulation and access management plan. The interchange area management plans could be implemented through comprehensive plan language, an interchange area management plan overlay district, and transportation system plan amendments that would limit and manage access on state and local roadways around the interchanges. These measures, in combination with existing zoning and comprehensive plan designations, would deter induced growth around the interchanges. All of these land use actions would minimize the proposed action's contribution to cumulative impacts to land use such as additional development of rural lands. Land use actions supporting the interchange area management plans would be submitted and require approval by the City of Bend or Deschutes County, as appropriate, prior to the publication of the Final EIS.

Since the publication of the Draft EIS, ODOT determined that no changes to land use along Empire Avenue would occur, so an interchange area management plan would not be required for the US 97/Empire Avenue interchange.

The Preferred Alternative will not require any interchange area management plans as it does not include a new northern interchange and no changes to land use along Empire Avenue will occur.

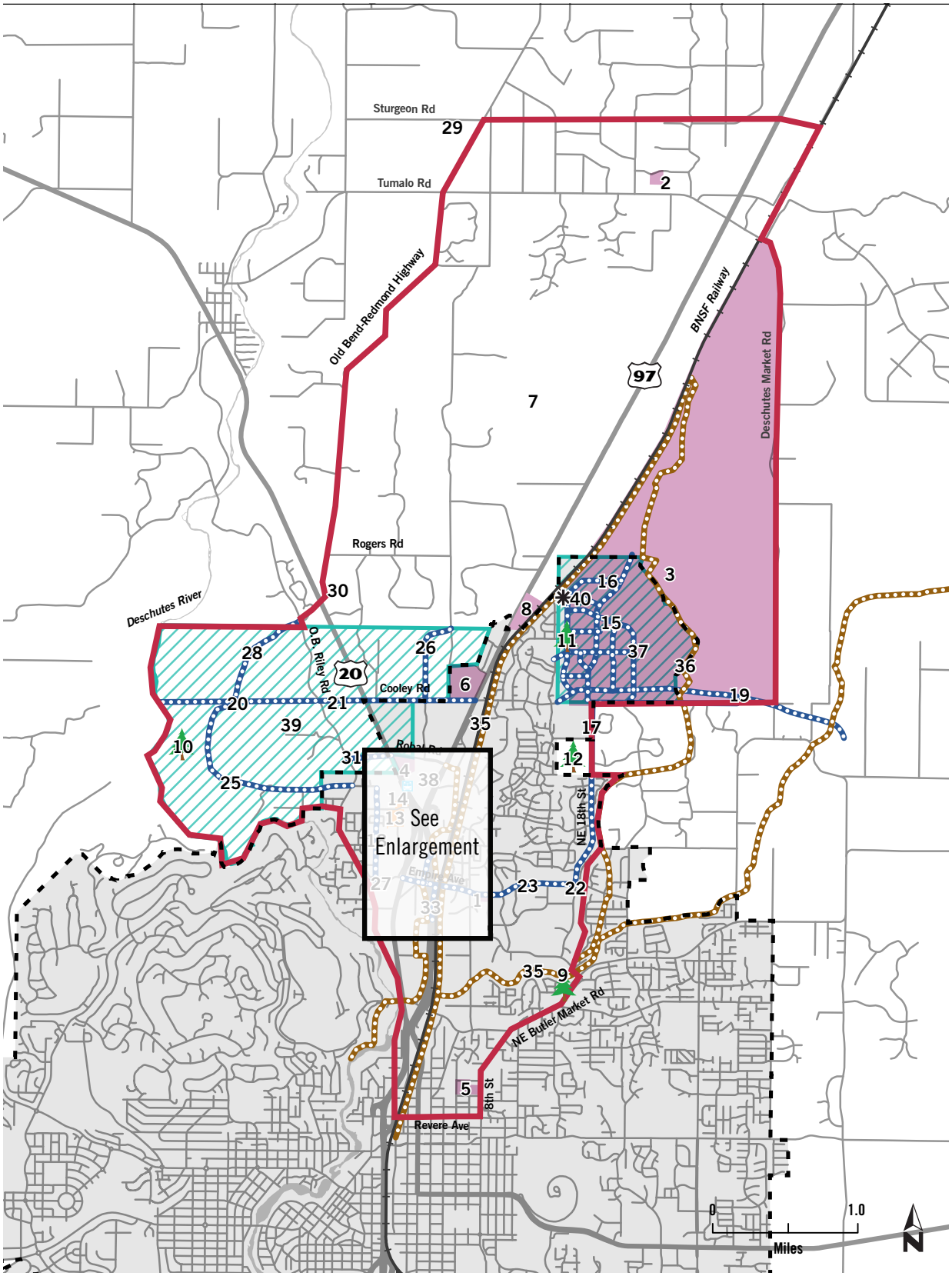
The Preferred Alternative limits the potential for induced growth in the northern end of Bend that is not already planned for in local comprehensive plans. The potential for induced growth is reduced by locating most of the transportation improvements within the City of Bend's UGB. The Britta Street extension and roundabout at O.B. Riley Road and Cooley Road will be constructed to Deschutes County's rural transportation facility standards. The Preferred Alternative will not require or propose changes to zoning, nor will it preclude zoning changes initiated by others.

4.1.4 Cumulative Impacts: Environmental Justice and Socioeconomics

Current Status/Viability and Historical Context

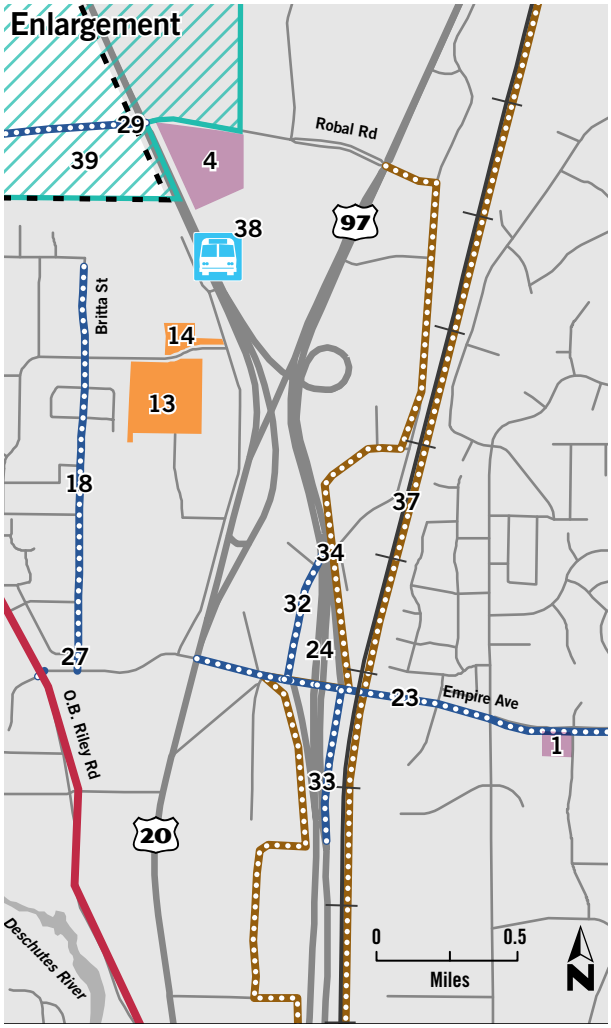
Bend was inhabited only by Native Americans until 1834 when the first European and Canadian explorers visited the area. Extensive

Exhibit 4-4 FEIS: *Other Current and Reasonably Foreseeable Actions in the Cumulative Impacts Study Area*



Note: This exhibit has been revised to reflect additional current and reasonably foreseeable actions identified since publication of the Draft EIS: the potential mobile home park development (#8), the new name for Butler Market Park (#9) (now Canal Row Park), Hunnell Neighborhood new home construction (#7), and Old Bend Highway turn lanes (#29), US 20/Old Bend Highway grade separation (#30).

Exhibit 4-4 FEIS: *Other Current and Reasonably Foreseeable Actions in the Cumulative Impacts Study Area (continued)*



Legend

- Roadway
- Railway
- Water
- Cumulative Impacts Study Area
- Urban Growth Boundary
- Commercial/Residential Development
- Park Development
- Public Development
- Roadway Improvements
- Trail Improvements
- Transit Facilities
- Urban Area Reserve Land
- Utility Improvement
- # Project

Map Number	Project Name
Commercial, Industrial, and Residential Development	
1	Airgas
2	First Addition to Whispering Pines Estates
3	Juniper Ridge
4	Phase II Cascade Village
5	Vail Meadows Planned Unit Development
6	Walmart Store
7	Hunnell Neighborhood New Home Construction
8	Mobile Home Park
Park Development	
9	Canal Row Park
10	Community Regional Park
11	Juniper Ridge Park
12	Rock Ridge Park
Public Development	
13	Deschutes County Oregon State Police/911 Building
14	Deschutes County Mental Health Facility
Roadway Improvements	
15	18th Street Extension
16	18th Street to Juniper Ridge Connections
17	18th Street Widening
18	Britta Street Extension
19	Cooley Road Extension East
20	Cooley Road Extension West
21	Cooley Road Widening
22	Empire Avenue/18th Street Roundabout
23	Empire Avenue Widening
24	Empire Avenue/US 97 Signal
25	Glen Vista Road Extension
26	Hunnell Road to Cooley Road Connection
27	O.B. Riley Road/Empire Avenue Signal
28	Old Bend Redmond Highway Extension
29	Old Bend Highway Turn Lanes
30	US 20/Old Bend Highway Grade Seperation
31	Robal Road Widening/Extension
32	US 97 Ramp Additon
33	US 97 Ramp Widening
Trail Improvements	
34	North Parkway Trail
35	North Unit Canal Trail
36	Pilot Butte Canal Trail
37	Rails with Trails Corridor
Transit Facilities	
38	Park and Ride Facility
Urban Area Reserve Lands	
39	Urban Area Reserve Lands
Utility Improvements	
40	Pacificorp Power Station and Power Lines

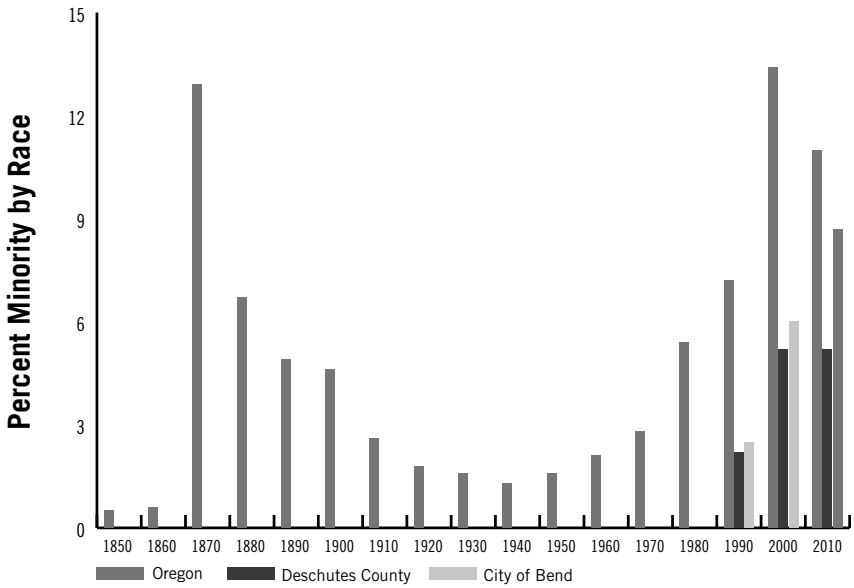
Note: This exhibit has been revised to reflect additional current and reasonably foreseeable actions identified since publication of the Draft EIS: the potential mobile home park development (#8), the new name for Butler Market Park (#9) (now Canal Row Park), Hunnell Neighborhood new home construction (#7), Old Bend Highway turn lanes (#29), and US 20/Old Bend Highway grade separation (#30).

timber resources and railroads helped draw more Euroamericans to the area throughout the second half of the nineteenth century. With the development of canals for irrigation, the City saw growth in agriculture and continued inmigration, leading to increased development and urbanization. As described in the prior section, the City of Bend's population has grown tremendously since the City's incorporation in 1904, with dramatic increase beginning at the end of the twentieth century (Exhibit 4-2 FEIS).

As the population in Bend, Deschutes County, and Oregon has grown, it has also become more diverse. The proportion of minorities in the state increased greatly in the 1800s and has steadily grown since 1940, as shown in Exhibit 4-5 FEIS; likewise, the proportion of minorities in Bend and Deschutes County grew from 1990 to 2000. The percent of minorities in the City more than doubled between 1990 (2.5 percent) and 2000 (6.1 percent).

By 2010 the percent of minorities in the City of Bend more than tripled from 2.5 percent in 1990 to 8.4 percent in 2010, as shown in Exhibit 4-5 FEIS.

Exhibit 4-5 FEIS: *Percentage of Minorities by Race in Oregon, Deschutes County, and City of Bend 1850–2010*

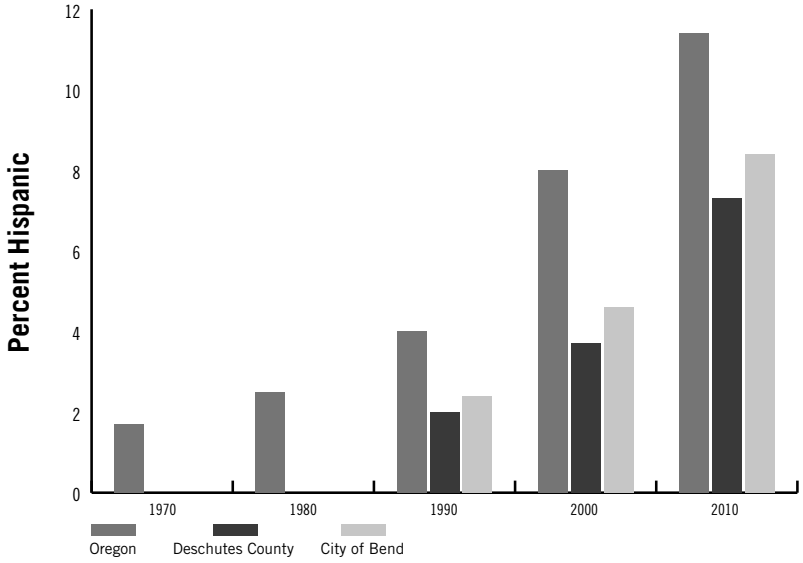


Source: US Census 1990, 2000, 2002, 2010.
Notes: City-level and County-level US Census data on minorities not available prior to 1990. This exhibit has been revised to include data through 2010.

Similarly, the percentage of state, county, and city residents that are Hispanic has increased in recent decades as the population has grown. In 1990 Hispanics represented 2.4 percent of the City of Bend's population and 2.0 percent of the Deschutes County population; by 2000 these percentages nearly doubled to 4.6 percent and 3.7 percent, respectively, as shown Exhibit 4-6 FEIS.

By 2010 the Hispanic population increased to 8.4 percent in City of Bend and 7.3 percent in Deschutes County, as shown Exhibit 4-6 FEIS.

Exhibit 4-6 FEIS: *Hispanic Percentage of Population in Oregon, Deschutes County, and City of Bend 1970–2010*



Source: US Census 1990, 2000, 2002, 2010.

Notes: City-level and County-level US Census data on minorities not available prior to 1990.

This exhibit has been revised to provide data through 2010.

Direct and Indirect Impacts

When the City was incorporated in 1905, Bend's economy depended on sawmills and it continued to operate as a mill town through much of the twentieth century until this industry was hit hard by the timber bust in the 1980s. In the 1970s Bend's economy began to diversify with manufacturing, trade, medical services, and tourism accounting for more and more jobs. Bend's tourism and resort industry took a leap forward with the establishment of the Mount Bachelor ski area (City of Bend 2009b, Deschutes County 2010b).

Because there would be no improvements under the No Build Alternative, there would be no direct impacts that would contribute to cumulative impacts to socioeconomic conditions. However, the following indirect impacts from the No Build Alternative could contribute to cumulative impacts: worsened congestion, travel time delays, increased response times for emergency services, potential for increased cut-through traffic in neighborhoods, and reduced safety and mobility for drivers, pedestrians, and bicyclists.

The primary direct impacts from the proposed action that could contribute to cumulative impacts to socioeconomic conditions include business and residential displacements/relocations. The primary indirect impacts from the proposed action that could contribute to

More Information

Please refer to Sections 3.4 Environmental Justice and 3.5 Socioeconomic Analysis for a more detailed discussion on direct and indirect impacts to environmental justice and socioeconomic conditions.

cumulative impacts to socioeconomic conditions include: improved vehicle and transit travel time; increased emergency service responses times; reduced accident rates; improved bicycle and pedestrian mobility; and reduced traffic in neighborhoods.

No disproportional impacts to environmental justice populations would occur under the proposed action, as demonstrated in Section 3.4 Environmental Justice.

Further analysis following publication of the Draft EIS shows that there could be some additional traffic in neighborhoods in the north end of the API under the East DS1 Alternative.

Current and Reasonably Foreseeable Actions

Other current and reasonably foreseeable actions (Exhibit 4-4 FEIS) that would most likely impact socioeconomic conditions and environmental justice populations include those projects which would add or remove community facilities (parks, trails, sidewalks, transit service); roadway projects that would change emergency service response times; residential development that would provide additional housing; commercial development that provides employment opportunities and contributes to the local economy; projects that would result in residential or business displacements; improvements that would alter community cohesion; and actions that would impact economic development opportunities.

Cumulative Impacts

As the City of Bend and Deschutes County grow, additional housing, employment opportunities, community facilities, and services would be needed to accommodate new residents. All social groups, including environmental justice populations, would be anticipated to experience the same cumulative adverse and beneficial impacts resulting from the proposed action in combination with other current and reasonably foreseeable actions.

More Information

Other current and reasonably foreseeable actions in the cumulative impacts study area are shown in Exhibit 4-4 FEIS.

No Build Alternative—The incremental impact of the No Build Alternative in combination with other past, present and reasonably foreseeable projects to environmental justice populations and socioeconomic conditions would include:

- Higher traffic volumes and increased traffic demand on local roads, resulting in increasing cut-through traffic over time in neighborhoods and disrupting community cohesion
- Reduced safety and mobility from additional traffic, resulting in an adverse impact to residents' quality of life
- Enhanced community facilities from other actions, such as additional sidewalk, bicycle, and trail improvements; new park

facilities; and improvements to the Public Safety Complex. Pedestrian and bicycle mobility would be enhanced by these improvements. However, worsened traffic congestion from additional development would generate vehicle trips on US 97, making it more difficult and more time consuming for citizens to travel to these community facilities by automobile.

- Roadway improvements proposed under other current and reasonably foreseeable actions could improve emergency service providers' ability to reach their destinations to some degree. However, US 97 is a major facility which must be navigated to reach many locations and the absence of improvements to this facility would lead to worsened traffic congestion and would adversely impact emergency service providers' ability to quickly reach their destinations.
- Additional employment opportunities would be generated both temporarily during construction of other projects and permanently where new commercial facilities are built. However, the additional commercial development could worsen traffic congestion on US 97, which in combination with the indirect impacts of the No Build Alternative, could lead to increased travel time for employees and customers to reach businesses by automobile, potentially affecting customers' willingness to travel to a particular business.

  Based on public comments received on the Draft EIS, it should be noted that it is unknown how increased travel times may or may not affect customers' willingness to travel to particular businesses.
- Worsened congestion could delay freight movement through the study area, negatively impacting the regional and state economy.

East DS1 and East DS2 Alternatives—The incremental impact of the East DS1 and East DS2 Alternatives in combination with other past, present and reasonably foreseeable projects to environmental justice populations and socioeconomic conditions would include:

- Displacement of approximately nine residences in the Boyd Acres Neighborhood would lead to localized changes in the Boyd Acres Neighborhood under the East DS1 and East DS2 Alternatives. In addition, displacement of four residences in the Hunnell Neighborhood under the East DS1 Alternative would contribute to a minor localized change in that neighborhood. These displacements could impact (require relocation of) residents with long tenure in these neighborhoods and could slightly alter community activity and communication within the neighborhoods.
- Community cohesion and quality of life could be altered by increased traffic within neighborhoods from the extension of

3rd Street through the Hunnell Neighborhood under the East DS1 Alternative, resulting in vehicular and road noise, light, glare, and exhaust. Reduced cut-through traffic in the Boyd Acres Neighborhood would benefit community cohesion.

- Improved safety and mobility would improve residents' quality of life through a reduction in commute time and costs, and more transportation options
- Pedestrian, bicycle, and roadway improvements would improve travel time and reduce congestion, leading to an overall improvement in connectivity between community facilities and residents' ease of travel to the community facilities
- Emergency service providers' travel routes would change as a result of the East DS1 and East DS2 Alternatives. Reduction in congestion would improve response times, but for some locations the changed travel routes would result in slightly longer response times.
- Displaced businesses that would choose to close their business and would not relocate could lead to a loss of tax revenue, although this could be partially offset by new commercial development resulting from other projects and future commercial development opportunities in the Urban Area Reserve lands. Business displacements would primarily be concentrated in the Nels Anderson Road business area under the East DS1 and East DS2 Alternatives.
- Roadway improvements could benefit businesses and the economy by enhancing customers' ease of travel to businesses, although customers may need to learn new travel routes to reach some businesses. Improved traffic flow and travel times resulting from roadway improvements could also benefit the regional and state economy by improving travel conditions and predictability for freight traffic.

  Based on public comments received on the Draft EIS, it should be noted that changes in travel routes could result in a potential reduction in sales from drive-by customers.

More Information

Other current and reasonably foreseeable actions in the cumulative impacts study area are shown in Exhibit 4-4 FEIS.

Overall, the East DS1 and East DS2 Alternatives would lead to more beneficial cumulative impacts related to safety, mobility, and travel time than the No Build Alternative. The East DS1 and East DS2 Alternatives would not contribute to adverse cumulative impacts to environmental justice populations. The displacements resulting from the build alternatives, however, would lead to greater adverse cumulative impacts to community character and cohesion than under the No Build Alternative.

Preferred Alternative—East DS2 Modified Alternative

The incremental impact of the Preferred Alternative in combination with other past, present and reasonably foreseeable projects to environmental justice populations and socioeconomic conditions includes:

- Displacement of approximately six residences in the Boyd Acres Neighborhood, which will result in localized changes in the Boyd Acres Neighborhood. These displacements may require relocation of residents with long tenure in this neighborhood and slightly alter community activity and communication within the Boyd Acres Neighborhood.
- Improved safety and mobility improves residents' quality of life through a reduction in commute time and costs, and more transportation options
- Pedestrian, bicycle, and roadway improvements improve travel time and reduce congestion, leading to an overall improvement in connectivity between community facilities and residents' ease of travel to the community facilities
- Emergency service providers' travel routes to some locations will change as a result of the Preferred Alternative. Reduction in congestion will improve response times to most locations.
- Displaced businesses that choose to close their business and not relocate may lead to a loss of tax revenue, although this may be partially offset by new commercial development resulting from other projects and future commercial development opportunities in the Urban Area Reserve lands. Business displacements will primarily be concentrated in the Nels Anderson Road business area.
- Roadway improvements may benefit businesses and the economy by enhancing customers' ease of travel to businesses, although customers will need to learn new travel routes to reach some businesses, which may result in a reduction in sales from drive-by customers. Improved traffic flow and travel times resulting from roadway improvements may also benefit the regional and state economy by improving travel conditions and predictability for freight traffic.

The displacement of six residences under the Preferred Alternative, in combination with displacements resulting from other current and reasonably foreseeable actions, will lead to a greater adverse cumulative impact to community character and cohesion than under the No Build Alternative. However, it will result in a notably smaller cumulative impact on neighborhoods and community character

in the larger geographic area as compared with the 19 residential displacements under the East DS1 Alternative or the 13 residential displacements under the East DS2 Alternative.

Need for Mitigation

The design of the proposed action and the mitigation measures that would be undertaken, as described in Sections 3.4.4 Environmental Justice and 3.5.4 Socioeconomic Analysis, would minimize the direct and indirect impacts on environmental justice and socioeconomic resources, and therefore also the cumulative impacts of the proposed action.

The other current and reasonably foreseeable actions (as listed in Exhibit 4-4 FEIS) would also be required to follow environmental regulations and associated mitigation measures. For example, other actions that require displacements would also have to comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.

4.1.5 Cumulative Impacts: Visual Resources

Current Status/Viability and Historical Context

Lands within the cumulative impacts study area are arid and were considered unsuitable for cultivation by Native Americans and early settlers, resulting in a harsh landscape that experienced stunted development activities through the early twentieth century. A 1947 atlas of Deschutes County soils classified the majority of land as "sloping, very stony lands suited for range, having minor conservation needs" (Soil Conservation Service 1947:40).

Due to the limitations of the landscape, growth and settlement activities did not begin to flourish until the mid to late twentieth century. The expansive growth of Bend over the last three to four decades has resulted in the construction of modern industrial and commercial buildings along US 97 and US 20, as well as in between the two highways near Robal Road and Cooley Road. Central and northern portions of the API contain a higher percentage of residential buildings, but the number of commercial buildings is beginning to increase in these areas as the Bend UGB and city limits continue to expand in tandem with its growing population.

Long before these modern housing and commercial developments were established, the open, arid lands were used for various stock raising activities made possible by Oregon's adoption of the Carey Act in 1901. In accepting the Carey Act of 1894, the state allowed settlers to acquire 160 acres of what was formerly publicly-owned arid land if they agreed to irrigate 20 acres. Private developers were then given a lien against the lands benefited by the canals and reservoir systems,

allowing private irrigation companies to raise needed capital while taking on the risk of investment (Tumalo Irrigation District 1999–2007). The adoption of the Carey Act in Oregon was felt immediately, as three canals were constructed within its boundaries during this significant period of irrigation expansion in the early twentieth century.

In the later part of the twentieth century and the beginning of this century, Bend experienced rapid population growth, as shown earlier in Exhibit 4-2 FEIS. In 2005, Bend was the sixth-fastest growing metropolitan area in the US. The recent economic downturn, however, has affected Central Oregon more severely than other areas of the state, and development in Bend has slowed tremendously.

With this growth and development has come a continual expansion of built facilities and structures outward toward undeveloped lands across the landscape. New road corridors have been built and parcels of land subdivided. Neighborhoods and shopping centers drawing regional retailers have been constructed. As a result, the visual character has transitioned from rural to urban, particularly within the City of Bend's UGB. However, outside the UGB, there are still portions of the API that are visually transitional and that retain a rural character.

Direct and Indirect Impacts

The primary direct and indirect impacts of the No Build Alternative that could contribute to cumulative impacts to visual resources are increasing light and glare encroachment and visually distracting traffic congestion.

The primary direct impacts of the East DS1 and East DS2 Alternatives that could contribute to cumulative impacts to visual resources are: vegetation removal, grading, construction of new roadway facilities and construction of new elevated structures. The primary indirect impact from the East DS1 and East DS2 Alternatives that could contribute to cumulative impacts to visual resources is land conversion from a non-transportation use to a transportation use.

The primary direct impacts of the Preferred Alternative that may contribute to cumulative impacts to visual resources are: vegetation removal, grading, and construction of new roadway facilities. The Preferred Alternative will not include a new elevated interchange. Land conversion from a non-transportation use to a transportation use is the primary indirect impact of the Preferred Alternative that may contribute to cumulative impacts to visual resources.

Current and Reasonably Foreseeable Actions

Other current and reasonably foreseeable actions (Exhibit 4-4 FEIS) that would likely impact visual resources include those projects that would require grading; construct elevated structures (such as bridges,

overcrossings, elevated roadways, and walls); add or remove vegetation; remove or fill water features; change the setting of historic features; reduce or increase open space; or construct new buildings, roadways, or above ground utilities.

Cumulative Impacts

No Build Alternative—The incremental impact of the No Build Alternative in combination with other past, present and reasonably foreseeable projects to visual resources and visual quality would include:

- Increasing light and glare coming from the highway, and an increase of light and glare on local roads as motorists use local streets to avoid congestion on US 97
- Increased visual distraction from traffic congestion on US 97 and local roads.

East DS1 and East DS2 Alternatives—The incremental impact of the East DS1 and East DS2 Alternatives in combination with other past, present and reasonably foreseeable projects to visual resources and visual quality would include:

- Landform changes, particularly grading, cuts and fills to accommodate new roads, structures or buildings which could remove or modify topographic features
- Vegetation removal leading to less overall textural, color, shape and form variation across the landscape, and/or the elimination of intact stands of mature shrubs and trees which provide a natural, visual buffer
- Reduction or elimination of water features either through filling or piping, decreasing the color, movement and textural variation that water provides
- Removal of historic resources which may have period aesthetic features, or conversion of the historic landscape surrounding such resources to more urban uses
- Open space reduction as lands are subdivided and/or converted for other uses such as residential, commercial or industrial, thereby decreasing the intactness and unity of visual resources and/or views
- Light and glare intrusion into natural spaces and increasing night-time brightness across the landscape
- Visual bisecting of otherwise intact and harmonious landscape units, particularly when new roads are created

- Intrusion upon natural edges (e.g. tree lines, rivers, rock outcroppings) by lines and angular shapes (e.g. roads, bridges, docks, buildings, signs, utilities)
- Increasing vertical development as more multi-level buildings, aerial signs and aboveground utilities rise from the landscape
- Additional visually-distracting congestion as traffic increases.

Overall, the East DS1 and East DS2 Alternatives would have a minor contribution to the cumulative impacts on visual quality in this relatively urbanized corridor. Furthermore, the use of consistent aesthetic treatments would create visual unity within the East DS1 and East DS2 Alternatives and promote visual blending with the surrounding landscape. This would further minimize the East DS1 and East DS2 Alternatives' adverse cumulative impact to visual quality. Existing development standards and requirements within the City of Bend and Deschutes County would also minimize the adverse visual impacts of the East DS1 and East DS2 Alternatives combined with other current and reasonably foreseeable projects.

Key Point

Visual Avoidance Measures

Key avoidance measures for direct and indirect impacts to visual resources would include:

- Avoid bisecting visually intact rural residential lands west of Hunnell Road
- Avoid vegetation removal and terrain grading west of Hunnell Road
- Design Cooley Road to be an undercrossing of US 97 to avoid elevated structures and minimize the visibility of US 97

Preferred Alternative—East DS2 Modified Alternative

The incremental impact of the Preferred Alternative in combination with other past, present and reasonably foreseeable projects to visual resources and visual quality will include the same changes as listed in the bullet points above for the East DS1 and East DS2 Alternatives.

The Preferred Alternative will have a smaller contribution to cumulative impacts on visual resources than the East DS1 and East DS2 Alternatives because it will not include a new elevated interchange. The use of consistent aesthetic treatments will create visual unity within the Preferred Alternative and promote visual blending with the surrounding landscape, further minimizing the Preferred Alternative's adverse cumulative impact to visual quality. Existing development standards and requirements within the City of Bend and Deschutes County will also minimize the adverse visual impacts of the Preferred Alternative combined with other current and reasonably foreseeable projects.

Need for Mitigation

The design of the proposed action and the mitigation measures that would be undertaken, as described in Section 3.8 Visual Resources, minimize the direct and indirect impacts to visual resources, and therefore also the cumulative impacts of the proposed action.

The other current and reasonably foreseeable actions would also be required to follow environmental regulations and associated mitigation measures. Other actions potentially affecting visual resources would also have to comply with City of Bend development standards relating

to visual changes in Special Planned Areas and with the requirements of Deschutes County's Landscape Management Combining Zone, which maintains scenic and natural resources.

4.1.6 Resources with Minimal Contributions to Cumulative Impacts

Some resources would have few direct and/or indirect impacts under the East DS1 and East DS2 Alternatives and under other current and reasonably foreseeable actions. The East DS1 and East DS2 Alternatives would not be expected to contribute to substantive cumulative impacts for these resources, nor would other current and reasonably foreseeable actions. A brief explanation is provided as to why each of the following resources is not included in this cumulative impact analysis.

The resources discussed in this section will have few direct and/or indirect impacts under the Preferred Alternative. The Preferred Alternative is not expected to contribute to cumulative impacts for these resources.

Transportation Facilities

The forecast traffic volumes used to analyze the transportation impacts of the East DS1 and East DS2 Alternatives in Section 3.1 Transportation Facilities include traffic from all sources, including other current and reasonably foreseeable actions; thus the transportation analysis in that section addresses cumulative adverse and beneficial impacts as well as direct and indirect impacts, so those impacts are not analyzed in this chapter.

The traffic analysis for the Preferred Alternative in Section 3.1 Transportation Facilities also includes traffic from all sources; thus it addresses cumulative adverse and beneficial impacts as well as direct and indirect impacts.

Key Point

Mitigation Commitments

Mitigation commitments for each resource are listed under the respective resource section in Chapter 3.

Right of Way and Utilities

Other than the utility relocations described in Section 3.3 Right of Way and Utilities, the East DS1 and East DS2 Alternatives would not be expected to have substantial direct or indirect adverse impacts on utilities. Similarly, other current and reasonably foreseeable actions are not expected to result in substantial impacts to utilities, so the East DS1 and East DS2 Alternatives would not be expected to cumulatively contribute to any past, current or future adverse impacts to utilities. Please refer to Sections 4.1.4 Cumulative Impacts: Land Use and 4.1.5 Cumulative Impacts: Environmental Justice and Socioeconomics for potential cumulative impacts to residents and businesses that may result from right of way acquisition.

The Preferred Alternative will contribute to cumulative impacts to right of way and utilities in the same manner as the East DS1 and East DS2 Alternatives.

Parks and Recreational Facilities

The East DS1 and East DS2 Alternatives are not anticipated to relocate, remove, temporarily disturb, or otherwise impact existing park and recreational facilities or prohibit construction of planned trails in the API. Other current and reasonably foreseeable actions, specifically planned parks and trails, would generally contribute to an enhanced network of such facilities in the Bend area, but would not be anticipated to substantially impact the overall park and recreational facilities network. The East DS1 and East DS2 Alternative are not expected to contribute to a substantial cumulative change in the park and recreational facilities within the cumulative impact study area.

The East DS1 and East DS2 Alternatives and the Preferred Alternative would not convert any existing park or recreational facilities to right of way. Like the East DS1 and East DS2 Alternatives, the Preferred Alternative will not relocate, remove, temporarily disturb or otherwise impact existing park and recreation facilities. While the conceptual alignment of the extension of North Parkway Trail and the segment of the Rails with Trails Corridor that crosses Cooley Road would require refinement, the East DS1 Alternative, East DS2 Alternative, and Preferred Alternative would retain the planned connectivity and functionality of these future trails, as discussed in Section 3.6 Parks and Recreational Facilities. The Preferred Alternative will not prohibit construction of these trails in the future. The Preferred Alternative is not expected to contribute to a substantial cumulative change in the park and recreational facilities within the cumulative impact study area.

Historic Resources

The East DS1 and East DS2 Alternatives could contribute to a minor long-term change in the historic resources within the API, including relocation or removal of the Nels and Lillian Andersen House, piping segments of the Swalley Main Canal, and construction of a new undercrossing of the Oregon Trunk Railway. However, the house is already a highly modified structure and there are no other contributing structures on the property, so its relocation or removal would have a minor impact in the more regional context of historic resources. Similarly, the changes to the Swalley Main Canal and Oregon Trunk Railway are very minor and the historic alignments of both would be retained. Impacts of other current and reasonably foreseeable actions on historic resources are unknown.

The Swalley Main Canal Pipeline is already piped throughout the API. Under the Preferred Alternative approximately 70 linear feet of the Swalley Riley Lateral, associated with the Swalley Main Canal Pipeline, will be piped for the extension of Britta Street, five existing culverts for the Swalley Rogers Lateral will be lengthened by 310 feet for the realignment of US 97 and US 20, and a new undercrossing of the Oregon Trunk Railway will be constructed. These changes are very minor and the historic alignment of both the Swalley Main Canal Pipeline and the Oregon Trunk Railway will be retained.

Water Quality, Hydrology, and Stormwater Runoff

Although there would be new impervious surface added with the East DS1 and East DS2 Alternatives, there would be few direct adverse impacts to surface water bodies and water quality. Stormwater treatment would be implemented for the East DS1 and East DS2 Alternatives which would treat some of the stormwater runoff, and the existing system of drywells and drainwells would be decommissioned according to Oregon Department of Water Resources regulations for well decommissioning. For the remaining stormwater runoff that would not be diverted to engineered treatment facilities, vegetation and soils in roadside ditches would incidentally treat the stormwater. The existing roadside ditches function well and could handle the additional volume of stormwater, there is no adjacent receiving surface water body, and groundwater resources are typically found at depths of 500 to 700 feet below ground surface. In addition, other development within the watershed would be required to comply with water quality regulations as discussed below.

The City of Bend has implemented an integrated stormwater management plan to comply with federal and state water quality regulations. As part of the plan, the City must reduce the amount of pollutants moving from homes and businesses to the storm drain system, monitor stormwater, and lessen the impacts of development on water quality. The plan also addresses drinking water protection areas. Although the City does not have jurisdiction over the water quality aspects of stormwater management on private property, private well owners must meet state requirements for stormwater quality in addition to meeting the City's requirements for managing stormwater quantity. Given the regulatory framework for managing stormwater quality and quantity within the City of Bend, other development projects would have to include stormwater controls and treatment in order to be constructed, which would contribute cumulatively to the improvement of water resources within the watershed. Thus, the East DS1 and East DS2 Alternatives would not expected to cumulatively contribute to any past, current, or future adverse impacts to water resources.

Similar to the East DS1 and East DS2 Alternatives, the Preferred Alternative is not expected to contribute to cumulative impacts on water resources.

Natural Systems and Communities

Impacts to natural systems and communities from the East DS1 and East DS2 Alternatives and other current and reasonably foreseeable actions would be the removal of numerous slivers of strategy habitats that already abut public road facilities, offer minimal habitat value, and are distributed across a relatively large area. At a regional level, removal of these small areas of habitat would not be expected to substantially contribute to cumulative impacts to natural systems and communities.

The East DS1 and East DS2 Alternatives would result in piping 950 to 2,300 feet of the Swalley Main Canal, a wildlife linkage feature for the western grey squirrel and other small mammals. The Swalley Irrigation District has just completed a project that included piping approximately 5 miles of the Swalley Main Canal to reduce water loss from evaporation. In the context of wildlife movement corridors, which includes 30 miles of habitat adjacent to US 20 and 40 miles of habitat adjacent to US 97, the cumulative impacts to wildlife linkages resulting from the East DS1 and East DS2 Alternatives or other current and reasonably foreseeable actions would be expected to be minor. No new barriers to other wildlife movement would occur under the East DS1 and East DS2 Alternatives.

Additional information about the location and status (piped/unpiped) of Swalley Irrigation District's facilities, provided in public comments on the Draft EIS, revealed that the East DS1 and East DS2 Alternatives would not require piping of the Swalley Main Canal, but would result in piping approximately 70 linear feet of the Swalley Riley Lateral for the extension of Britta Street, lengthening five existing culverts of the Swalley Rogers Lateral by a total of 310 feet for the realignment of US 97 and US 20, lengthening an existing culvert of the Swalley Rogers Lateral by 110 feet for the widening of Cooley Road, and lengthening an existing culvert of the Swalley Rogers Lateral by 25 feet to add a lane on Robal Road under the East DS1 and East DS2 Alternatives. The Preferred Alternative will also require piping 70 feet of the Swalley Riley Lateral for the extension of Britta Street and lengthening existing five culverts of the Swalley Rogers Lateral by a total of 310 feet for the realignment of US 97 and US 20. The Swalley Main Canal Pipeline no longer provides habitat linkage because it is now piped.

Piping small sections of the Swalley Riley Lateral through a culvert will have little impact on wildlife movement, as species could either

pass through the culvert, avoid the area, or cross at the road surface. Features such as waterways or riparian corridors that typically facilitate wildlife movement are not present in the API.

Wetlands and Other Waters

The East DS1 and East DS2 Alternatives would not result in additional impacts to wetland and water features in the Deschutes Watershed, and would not alter current diversion operations by irrigation districts associated with the Deschutes River.

Piping portions of the Swalley Main Canal would benefit the Deschutes Watershed by slowing the loss of surface water to evaporation. The East DS1 and East DS2 Alternatives and other current and reasonably foreseeable actions would not likely contribute to a substantial cumulative loss of wetlands or waters in the Deschutes Watershed, so cumulative impacts to wetlands and other waters would not be expected to be substantial.

Additional information about the location and status (piped/unpiped) of Swalley Irrigation District's facilities, provided in public comments on the Draft EIS, revealed that the East DS1 and East DS2 Alternatives would not require piping of the Swalley Main Canal, but would result in piping approximately 70 linear feet of the Swalley Riley Lateral for the extension of Britta Street, lengthening five existing culverts of the Swalley Rogers Lateral by a total of 310 feet for the realignment of US 97 and US 20, lengthening an existing culvert of the Swalley Rogers Lateral by 110 feet for the widening of Cooley Road, and lengthening an existing culvert of the Swalley Rogers Lateral by 25 feet to add a lane on Robal Road under the East DS1 and East DS2 Alternatives. These actions would not change the function, length, or capacity of the canals.

The East DS1 and East DS2 Alternatives would avoid all impacts to jurisdictional waters and retain the current condition. The impact of other current and reasonably foreseeable actions on wetlands is unknown, so their potential contribution to cumulative impacts cannot be assessed. However, the East DS1 and East DS2 Alternative would not contribute cumulatively to the loss of wetlands or other waters in the Deschutes Watershed.

Under the Preferred Alternative, approximately 70 feet of the Swalley Riley Lateral will be piped for the extension of Britta Street and five existing culverts of the Swalley Rogers Lateral will be lengthened by a total of 310 feet for the realignment of US 97 and US 20. The Preferred Alternative will avoid all impact to jurisdictional waters and retain the current condition. The Preferred Alternative will not contribute cumulatively to the loss of wetlands or other waters in the Deschutes Watershed.

Threatened and Endangered Species

Because no direct impacts to threatened or endangered fish or wildlife species would be anticipated, the East DS1 and East DS2 Alternatives would not be expected to cumulatively contribute to any past, current or future adverse impacts to listed fish and wildlife species. Deschutes County is one of three main population centers for Peck's milkvetch, covering approximately 640,000 acres. Therefore, the potential removal of 1 acre of marginal habitat for Peck's milkvetch under the East DS1 and East DS2 Alternatives, when combined with other past, current or foreseeable future projects in the area, would have a negligible cumulative impact.

No direct impacts to threatened or endangered fish or wildlife species will occur under the Preferred Alternative. The Preferred Alternative will have no direct, indirect, or cumulative impact on Peck's milkvetch.

Non-Threatened or Endangered Species

Non-threatened or endangered species would experience minor direct and indirect impacts associated with removal of numerous slivers of strategy western juniper and sagebrush habitats under the East DS1 and East DS2 Alternatives and other current and reasonably foreseeable actions. Because the removal of habitat would be distributed across the approximately 11,000 acre cumulative impact study area, at a regional level the project and other current and reasonably foreseeable actions would not be expected to substantially contribute to cumulative impacts to non-threatened or endangered species.

New roadways and increased human presence have the potential to result in increased deer/vehicle collisions. Similar to the East DS1 and East DS2 Alternatives, the Preferred Alternative will not contribute to substantial cumulative impacts to non-threatened or endangered species.

Invasive Species

Direct impacts to invasive species from the East DS1 and East DS2 Alternatives and other current and reasonably foreseeable actions would result from disturbing existing invasive species populations that are distributed across the 11,000 acre cumulative impact study area. The East DS1 and East DS2 Alternatives and other current and reasonably foreseeable actions would be required to mitigate for invasive species. At a regional level these disturbances would have a minor cumulative contribution to the spread of invasive species after mitigation is applied.

The Preferred Alternative will also be required to mitigate for invasive species and could have a minor cumulative contribution to the spread of invasive species after mitigation is applied.

Air Quality

The forecast traffic volumes used to analyze the air quality impacts of the East DS1 and East DS2 Alternatives in Section 3.15 Air Quality include traffic from all sources; thus, the air quality analysis in that section addresses cumulative adverse and beneficial impacts as well as direct and indirect impacts. The East DS1 and East DS2 Alternatives would result in only minor impacts to air quality which would be offset by the beneficial impacts of US Environmental Protection Agency regulations. Other current and reasonably foreseeable actions would also not be expected to result in substantial impacts to air quality, so no substantial cumulative impacts to air quality would be expected.

The Preferred Alternative is expected to minimally contribute to cumulative impacts to air quality in the same manner as the East DS1 and East DS2 Alternatives.

Noise

FHWA and ODOT criteria for noise impacts are based on the peak noise hour, which is the maximum hourly noise level generated by the roadway. The traffic conditions used to calculate the peak hour noise levels for the direct impacts of the East DS1 and East DS2 Alternatives result in the highest theoretical hourly noise levels that could occur along the road when the greatest number of vehicles operating at free flow conditions. If there are fewer cars at free flow, the noise levels generated by the road would be lower. If there are more cars and congestion occurs, resulting in slower speeds, lower noise levels would also result. Therefore, the noise cumulative impacts analysis is independent of how much traffic is actually projected for the road.

Additional road improvement projects would either result in the actual noise levels approaching the conditions modeled for the East DS1 and East DS2 Alternatives as part of the direct impacts analysis if the road is not congested (that is, the number of cars at free flow conditions in the build alternatives), or change the amount and/or time of congestion, which does not affect quantification of the peak noise hour levels. The direct impact analysis presented in Section 3.16 Noise includes planned projects and associated projected traffic. Thus, the direct impacts analysis encompassed cumulative impacts, so those impacts are not discussed further in this chapter.

The following clarification on the traffic analysis is provided in the Final EIS. Noise levels from traffic sources depend on volume, speed, and the type of vehicle. Generally, an increase in volume, speed, or vehicle size increases the traffic noise level generated by that source. Vehicular noise is a combination of noises from the engine, exhaust, and tires. Other conditions affecting traffic noise include defective

mufflers, steep grades, terrain, vegetation, distance from the roadway, and shielding by barriers and buildings.

Similar to the East DS1 and East DS2 Alternatives, the noise analysis presented in Section 3.16 Noise for the Preferred Alternative encompasses cumulative impacts.

Energy

The forecast traffic volumes used to analyze energy impacts of the East DS1 and East DS2 Alternatives in Section 3.17 Energy includes past and future transportation improvements and related energy consumption; thus, the analysis in that section addresses cumulative adverse and beneficial impacts as well as direct and indirect impacts. The East DS1 and East DS2 Alternatives would result in only minor impacts to energy consumption. Other current and reasonably foreseeable actions would also not be expected to result in substantial impacts to energy consumption, so no substantial cumulative impacts would be expected.

The impact of other current and reasonably foreseeable actions on energy consumption is unknown, so their potential contribution to cumulative impacts cannot be assessed. Since the East DS1 and East DS2 Alternatives would only result in minor impacts to energy consumption, they would not be expected to contribute to substantial cumulative impacts to energy. Similarly, the Preferred Alternative is not expected to contribute to substantial cumulative impacts to energy.

Geology

The East DS1 and East DS2 Alternatives and other current and reasonably foreseeable actions would not be expected to have direct or indirect adverse impacts on the soils or geologic conditions, nor would they be anticipated to create any new geologic hazards. Thus, the East DS1 and East DS2 Alternatives would not be expected to cumulatively contribute to any past, current or future adverse impacts to geologic resources. Please refer to Section 4.1.5 Cumulative Impacts: Land Use for potential cumulative impacts to soils identified as prime farmland if irrigated or farmland of statewide importance.

The impact of other current and reasonably foreseeable actions on geology is unknown, so their potential contribution to cumulative impacts cannot be assessed. Similar to the East DS1 and East DS2 Alternatives, the Preferred Alternative will not contribute cumulative impacts to geologic resources.

Hazardous Materials

If hazardous materials are encountered during construction, measures would be taken to avoid or remediate any contaminants present. Thus, any potential direct adverse impacts would be avoided through

remediation. This in turn produces a direct beneficial impact to human health and the environment.

As described in Section 3.9 Water Quality, Hydrology and Stormwater Runoff, the East DS1 and East DS2 Alternatives would also provide formal and incidental treatment of stormwater that would minimize the hazardous materials that would potentially enter the groundwater. Other development in the API would also be required to provide stormwater treatment of runoff from impervious surfaces to reduce hazardous materials that would potentially enter the groundwater. Since there would be no adverse direct or indirect impacts for hazardous materials under the East DS1 and East DS2 Alternatives and no substantial impacts resulting from other current and reasonably foreseeable actions, no substantial cumulative impacts would be expected.

Preliminary identification of potentially hazardous materials has already been performed, as described in Section 3.19 Hazardous Materials. Level 1 Initial Site Assessments would be conducted for all properties where a full or partial acquisition is planned. Remediation would only occur for those contaminants that would actually be encountered during construction.

The Preferred Alternative will also provide formal and incidental treatment of stormwater to minimize hazardous materials that could potentially enter the groundwater. Since there will be no adverse direct or indirect impacts for hazardous materials as a result of the Preferred Alternative, the Preferred Alternative will not substantially contribute to cumulative impacts for hazardous materials.

4.2 Climate Change

4.2.1 Greenhouse Gas Impacts and Global Climate Change

The issue of greenhouse gas emissions and global climate change is an important national and global concern that is being addressed by various state and federal agencies, including ODOT and FHWA.

Since the context for greenhouse gas emissions is a global scale, it is virtually impossible to perform a meaningful analysis of most local transportation projects. Greenhouse gas emissions analyses are more informative at regional, state, or national levels and should be accomplished during local and regional land use planning processes when more capable modeling tools are developed. While it still may be possible to quantify greenhouse gas emissions associated with a proposed transportation project, tools have not been developed for how to translate those emissions into impacts on climate change

on any scale. ODOT's recent land use and transportation modeling efforts have shown that land use patterns have a much greater impact on all emissions than do highway expansions. Further, the needs for most highway projects are typically a result of land use changes, development, growth, and other local and regional changing trends. Therefore, to best inform decision making, greenhouse gas emissions estimation needs to be done during the transportation system and land use planning processes.

As of the date of publication of this document, no federal laws specifically require greenhouse gas emissions analyses in project-level National Environmental Policy Act documents. The National Environmental Policy Act requires federal agencies to scope and address the significant issues of any proposal and to concentrate on the analyses of issues that can be truly meaningful to the consideration of and comparison between project alternatives. In the absence of federal regulations and a regional or national framework for considering the implications of project-level greenhouse gas analyses, FHWA concludes that greenhouse gas emissions calculated for project alternatives cannot be usefully evaluated in the same way that vehicle emissions are evaluated within a local project-level context and that such an attempted analysis would not inform project decision-making in any meaningful way.

4.2.2 Oregon Strategies

Greenhouse gas emissions are currently not regulated in the State of Oregon. However, there are numerous goals for states and the nation to meet, and strategies to reduce greenhouse gas emissions are currently being addressed by ODOT and other state agencies throughout Oregon. On August 7, 2007 the Climate Change Integration Act came into effect with the passage of Oregon house bill 3543. Oregon House Bill 3543 creates greenhouse gas emissions reduction goals for the State of Oregon, which aim to reduce emissions 10 percent below 1990 levels by 2020 and achieve a 75 percent reduction below the 1990 levels by 2050. Oregon House Bill 3543 also created the Oregon Global Warming Commission that is responsible for recommending policies to state and local governments to reduce greenhouse gas emissions. The Oregon Global Warming Commission is expected to promulgate rules to direct agencies on how to regulate and enforce the legislation.

Intelligent transportation systems and land use planning policies will be among several strategies necessary to meet the state's goal of reducing greenhouse gas emissions. To accomplish this, the Oregon Global Warming Commission has formed a Land Use and Transportation Committee. The scope and function of the Land Use and Transportation Committee is to work with state agencies

including ODOT and the Oregon Department of Land Conservation and Development to integrate greenhouse gas reduction goals into state transportation planning and land use policies currently under development. Transportation and land use policies will be designated to stop the growth of greenhouse gas emissions, and then reduce over time, according to the specific goals set out the Oregon Legislature.

Research is also underway to develop more capable models for measuring, analyzing, evaluating, and reporting greenhouse gas emissions. ODOT is coordinating with other state and federal agencies (including the Oregon Department of Energy, Oregon Department of Environmental Quality, FHWA, and the US Environmental Protection Agency) to determine appropriate contexts for measuring impacts from transportation and land use changes.

ODOT and FHWA specific strategies regarding climate change efforts are summarized in Appendix E.

The above discussion on climate change has been updated since publication of the Draft EIS as follows:

4.2.3 Cumulative Impacts Study Area and Resource Status

Overall, the geographic study area for the analysis of cumulative impacts affecting climate change is the entire planet because greenhouse gas emissions and climate change are a global phenomenon. However, an important context for understanding this project's alternatives and their relationship to climate change are the federal, state and local levels. For example, many federal programs and policies affect energy use and conservation measures, such as federal fuel economy standards. Further, ODOT plays an important role in allocating federal and state transportation funds throughout the state, including within the project area. Finally, this proposed project is an important component in the planned local transportation infrastructure over the next twenty or more years. Exhibit 4-7 FEIS illustrates the relationship of Oregon highway carbon dioxide emissions to current global emissions and vehicle-miles traveled in the API as compared with statewide vehicle-miles traveled. In summary, the API vehicle-miles traveled account for less than 0.001 percent of statewide vehicle-miles traveled, while Oregon statewide vehicle-miles traveled accounts for approximately 0.07 percent of global greenhouse gas emissions.

The temporal resource study area for the cumulative impact analysis for climate change begins in 1900, because it was the approximate time when automobiles started to appear in the US and because average global temperatures have risen approximately 1.5 degrees since 1900.

Exhibit 4-7 FEIS: *Estimated Global and State Greenhouse Gas Emissions*

Carbon Dioxide Emissions (Millions of metric tons)				Vehicle-Miles Traveled		
Global 2010[1]	Oregon Highways		Oregon Highway Emissions as a percent of 2010 Global Emissions	Oregon 2011[2]	API 2011	API Vehicle-Miles Traveled as a percent of Oregon Vehicle-Miles Traveled
	2010	2030				
30,990	21	15 to 18	0.07%	38.3 billion	254,844	Less than 0.001%

Source: ODOT 2013a.

Notes:

[1] Global emissions are from all sources.

[2] In 2005, annual statewide vehicle-miles traveled was 35.3 billion. The Oregon Transportation Plan growth rate for vehicle-miles traveled is 1.35 percent. As a result, annual statewide vehicle-miles traveled for 2011 is forecast to have been approximately 38.3 billion.

4.2.4 Other Reasonably Foreseeable Future Actions

Science has shown that the introduction of additional greenhouse gases into the atmosphere has contributed to the current climate change. The release of additional greenhouse gases is the cumulative result global activities humankind, but studies have shown that they primarily involve the combustion of fossil fuels, such as the use of automobiles and aircraft and the production of electricity. Those activities are occurring, at varying levels and rates, at the federal, state and local level. At all levels, those cumulative activities, which result in the emission of additional greenhouse gases, will continue to occur into the foreseeable future. However, the rate of the emissions may change over time as the result of a wide variety of factors, including demographics, technological advances, legal and procedural changes and budgetary priorities.

The federal government is addressing the issue of global climate change as an important national and global concern in several ways. The transportation sector is the second largest source of total greenhouse gases in the US and the greatest source of carbon dioxide emissions – the predominant greenhouse gas. In 2004, the transportation sector was responsible for 31 percent of all US carbon dioxide emissions. The principal anthropogenic (i.e., human-made) source of carbon emissions is the combustion of fossil fuels, which account for about 80 percent of anthropogenic emissions of carbon worldwide. Almost all (98 percent) of transportation-sector emissions result from the consumption of petroleum products, such as: gasoline, diesel fuel and aviation fuel.

Recognizing this concern, the FHWA is working nationally with other modal administrations through the US Department of Transportation's Center for Climate Change and Environmental Forecasting to develop strategies to reduce transportation's contribution to greenhouse gases, particularly carbon dioxide emissions, and to assess the risks to transportation systems and services from climate changes. The State of Oregon also has policies and programs to address greenhouse gas emissions and climate change, including: Oregon House Bill 3543,

the Climate Change Integration Act; House Bill 2001, the Oregon Jobs and Transportation Act; House Bill 2186, which initiated the Oregon Sustainable Transportation Initiative; Senate Bill 1059, which requires various state agencies to work together to examine ways to reduce greenhouse gas emissions from vehicles; and Oregon Revised Statute 366.514, which requires the construction of foot and bike paths whenever roadways are constructed or reconstructed.

At the local level, the project accounts for reasonably-foreseeable future actions that affect greenhouse gas emissions by basing its transportation, air quality and energy analyses on adopted state, regional and local land use plans and policies, which help form the basis of the adopted population and employment projections and travel demand forecasts. Further, projections of travel patterns are based on model networks that account for both existing and planned/programmed transportation facilities at the local level.

4.2.5 Cumulative Impacts of Project Alternatives

Greenhouse gas emissions analyses are most informative at regional, state, or national levels. At this level, they can be conducted during local and regional land use planning processes or as a part of federal policy analyses. ODOT's recent land use and transportation modeling studies have shown that land use patterns have a much greater impact on roadway-generated emissions than do highway expansions. Further, most highway projects that expand roadway capacities are needed because of land use changes, development, economic growth, and other regional, state and national trends.

Models used to quantify greenhouse gas emissions associated with a proposed transportation project are currently in a state of development. As a result, there is a wide range in methods used by project sponsors as they work with the FWHA to assess the effects of a proposed project on greenhouse gases. While the US Environmental Protection Agency has been working on its MOVES model, replacing the MOBILE6.2 model, the agency has plans for future enhancements to the model. Pending finalization of a dependable and standardized greenhouse gas model that can be used for all federal transportation projects, this and many other projects instead use vehicle-miles traveled as a surrogate for energy consumption and greenhouse gas emissions. As vehicle-miles traveled changes due to a proposed project and its alternatives, so would energy use and greenhouse gas production.

The Preferred Alternative will increase annual miles traveled in the API by 6 percent by 2036 over the No Build Alternative, as compared with increases of 7 percent and 2 percent under the East DS1 and East DS2 Alternatives, respectively. Also, the Preferred Alternative will minimize

impacts to neighborhoods north of Cooley Road and east of US 97; thus, the overall Transportation API for the No Build Alternative and Preferred Alternative is smaller than the Transportation API examined in the Draft EIS. The updated Transportation API does not include the Tumalo Road/Deschutes Junction interchange roadway or four miles of US 97 north of milepost 132.19.

Section 3.17 Energy provides additional detail on changes in vehicle-miles traveled under the alternatives. The increase in daily average daily vehicle-miles traveled for the Preferred Alternative as compared to the No Build Alternative is due to the larger roadway network. Beyond the change in vehicle-miles traveled and its relationship to greenhouse gas emissions, the Preferred Alternative will reduce congestion and improve traffic flow, compared to the No Build Alternative, which would reduce greenhouse gas emissions.

4.2.6 Potential Mitigation

No federal laws currently exist that explicitly require greenhouse gas emissions analyses per se in project-level National Environmental Policy Act documents. In the absence of federal regulations and a regional or national framework for considering the implications of project-level greenhouse gas analyses, the US Department of Transportation concludes that greenhouse gas emissions calculated for project alternatives cannot be usefully evaluated in the same way that vehicle emissions are evaluated within a local project-level context and that such an attempted analysis would not inform project decision-making in any meaningful way.

Greenhouse gas emissions are currently not regulated in the State of Oregon, but the State has developed some greenhouse gas emissions goals. On August 7, 2007 Oregon House Bill 3543 was passed, creating the Climate Change Integration Act. This Act includes goals to reduce greenhouse gas emissions 10 percent below 1990 levels by 2020 and to further reduce greenhouse gas emissions 75 percent below the 1990 levels by 2050. Oregon House Bill 3543 also created the Oregon Global Warming Commission that is responsible for recommending policies to state and local governments to reduce greenhouse gas emissions.

Intelligent transportation systems and land use planning policies will be among several strategies necessary to meet the state's goal of reducing greenhouse gas emissions. To accomplish this, the Commission has formed a Land Use and Transportation Committee. The Committee will work with state agencies to integrate greenhouse gas emission goals into transportation and land use planning. Transportation and land use policies will be designated to stop the

growth of greenhouse gas emissions, and then reduce over time, according to the specific goals set out the Oregon Legislature.

Research is also underway to develop better models for measuring, analyzing, evaluating, and reporting greenhouse gas emissions. ODOT is coordinating with other state and federal agencies to determine appropriate contexts for measuring impacts from transportation and land use changes. FHWA and ODOT strategies regarding climate change efforts are summarized in Appendix E.

4.2.7 Avoidance, Minimization, and/or Mitigation Commitments Incorporated into the Preferred Alternative

Section 3.17 Energy describes ODOT's mitigation commitments for impacts associated with energy consumption.

Chapter 5

Relationship Between Local Short-term Uses of the Human Environment and the Maintenance and Enhancement of Long-term Productivity

5.1 Build Alternatives

Chapter 5 Content

5.1 Build Alternatives
5.2 No Build Alternative

5.1.1 Short-term Impacts and Use of Resources

The East DS1 and East DS2 Alternatives would have similar temporary, short-term impacts during construction. Short-term impacts and use of resources resulting from either build alternative could include the following:

- Noise, dust, light, and glare produced by construction equipment and activities
- Traffic delays and detours for automobiles, buses, emergency response vehicles, bicyclists, pedestrians, and freight vehicles
- Use of materials, labor, and energy to construct improvements
- Changes in access to properties during construction
- Reduced visibility, dust creation, soil erosion, respiratory hazards, mobilized contaminants, changes in aesthetics of the surrounding area, establishment of invasive plants, increased sediment in stormwater runoff as a result of ground clearing construction activities
- Creation of short-term jobs to construct the project and related spending at local businesses.
- The Preferred Alternative will have the same temporary, short-term impacts and use of resources as the East DS1 and East DS2 Alternatives.

5.1.2 Maintenance and Enhancement of Long-term Productivity

The short-term impacts would be outweighed by the long-term productivity of the proposed action. Long-term productivity benefits of either build alternative include reducing congestion, improving traffic flow, and improving public safety in the API. As demonstrated in Section 3.2 Land Use, the proposed action would be consistent with federal, state, regional, and local plans subject to approval of goal exceptions and other applicable plan updates.

Implementation of the proposed action would result in the short-term impacts and use of resources as described above, while

increasing the long-term productivity of transportation, land use, and economic systems.

The Preferred Alternative will have the same long-term productivity benefits as the East DS1 and East DS2 Alternatives. The Preferred Alternative is consistent with all federal, state, regional and local plans; this alternative will not require any exceptions to the Oregon Statewide Planning Goals.

5.2 No Build Alternative

The No Build Alternative, which would not construct the improvements of the proposed action, would have long-term adverse impacts from increased congestion, which would have associated safety impacts and reduced productivity of economic systems. Thus, the No Build Alternative would not meet the purpose and need for the proposed action by reducing traffic congestion and improving traffic flow and public safety.

Chapter 6

Irreversible and Irretrievable Commitment of Resources

Chapter 6 Content

Irreversible and Irretrievable Commitment of Resources

The irreversible and irretrievable commitment of resources analysis is required by the National Environmental Policy Act Section 102 (C)(v) and 40 CFR 1502.16.

Implementing the proposed action involves a commitment of a range of natural, physical, human, and fiscal resources. Land used in the construction of the proposed transportation facility is considered an irreversible commitment during the time period that the land is used for the transportation facility. However, if a greater need arises for use of the land or if the transportation facility is no longer needed, the land could be converted to another use, although it is unlikely that the land would be converted back to a more rural use, such as agriculture. For this reason, conversion of prime farmland is considered an irreversible action. At present, there is no reason to believe that it would ever be necessary or desirable to convert land used for this transportation project to another use.

Considerable amounts of fossil fuels, labor, and highway construction materials, such as cement, aggregate, and bituminous material, are expended during construction of the proposed action. Additionally, large amounts of labor and natural resources are used in the making of construction materials. These materials are generally not retrievable. However, they are not in short supply and their use would not have an adverse impact upon continued availability of these resources. Any construction would also require a substantial onetime expenditure of both state and federal funds, which are not retrievable. The commitment of these resources is based on the concept that residents in the local area, region, and state would benefit from the improved quality of the transportation system. These benefits would consist of improved mobility and safety, which are expected to outweigh the commitment of these resources, such as savings in energy and time, reduced congestion, and fewer accidents. In addition to the costs of construction and right of way acquisition, there would be costs for roadway maintenance, including pavement, roadside, litter/sweeping, signs and markers, electrical systems, and stormwater facilities.

The Preferred Alternative will commit the same types and amount of irreversible and irretrievable resources as the East DS1 and East DS2 Alternatives.

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Chapter 7
Comments and Coordination

Early and continual coordination with the general public and appropriate public agencies is an essential part of the environmental process to determine the scope of environmental documentation, the level of analysis, potential impacts, proposed mitigation measures, and related environmental requirements. Agency consultation and public participation for the proposed action have been accomplished through a variety of formal and informal methods, including: public and agency scoping meetings, public open houses, a public hearing, a project website, online surveys, newsletters, media releases, field-based surveys, and focus group meetings. Also, ODOT-sponsored committees, including the Agency Coordination Committee, Citizen Advisory Committee, and the Steering Team were formed to provide opportunities for involvement at all stakeholder levels. Additional efforts were made to engage environmental justice populations who may be affected by the proposed action. This chapter summarizes the results of efforts to fully identify, address, and resolve project-related issues through early and continuing coordination.

Chapter 7 Content

7.1 SAFETEA-LU Section 6002 Coordination

7.2 Consultation and Coordination with Other Public Agencies

7.3 Public Participation

Key Point

A notice of intent to prepare a Draft EIS for the US 97 Bend North Corridor Project was published in the Federal Register on December 27, 2007.

Key Point

The US 97 Bend North Corridor Project Draft EIS and Draft Section 4(f) Evaluation were released to for public review and comment on July 29, 2011.

7.1 SAFETEA-LU Section 6002 Coordination

7.1.1 Invitations to Participating Agencies

On October 5, 2007, ODOT sent a project initiation letter to FHWA identifying FHWA and ODOT as co-lead agencies for the proposed action (Appendix H). As required by Section 6002 of the Safe Accountable Flexible Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), other federal, state, tribal, regional, and local government agencies that may have an interest in the project should be invited to serve as participating agencies. Nongovernmental organizations and private entities cannot serve as participating agencies. In November 2007, ODOT and FHWA invited the following entities to be participating agencies:

- City of Bend
- Deschutes County
- Oregon Department of Land Conservation and Development
- Confederated Tribes of Warm Springs
- Burns Paiute Tribe
- Klamath Tribe.

More Information

Appendix G provides additional detail on how FHWA and ODOT complied with Section 6002 of SAFETEA-LU. The US 97 Bend North Corridor EIS SAFETEA- LU 6002 Coordination Plan (ODOT 2014l) is listed in Appendix K and available in Appendix H and the document library of the project's website (www.us97solutions.org).

The City of Bend, Deschutes County, and the Oregon Department of Land Conservation and Development all accepted the invitation. All three tribes did not respond to the invitation to be a participating agency. These tribes may still provide comment on the proposed action; however, opportunities for this input may occur at different intervals than when the participating agencies review and comment on the proposed action. There are no cooperating agencies.

Definition

Project Management Team

The project management team consists of interdisciplinary engineers, scientists, planners and public involvement specialists who have been analyzing the proposed action in accordance with the National Environmental Policy Act.

7.1.2 Agency Coordination Committee

ODOT established the Agency Coordination Committee to ensure early and continual agency coordination throughout the project. The Agency Coordination Committee includes all participating agencies plus the Bend Metropolitan Planning Organization. In addition to reviewing and providing comment on key National Environmental Policy Act milestones such as the purpose and need statement, impact assessment methodologies to be applied to the environmental analysis, range of alternatives, and recommendation on the Preferred Alternative (which will occur after the Draft EIS has been circulated for public comment and a public hearing is held), the Agency Coordination Committee also provides:

- Interagency coordination for the project on technical issues and regional and local planning efforts
- Input to the Project Management Team, Steering Team, and Citizen Advisory Committee.

Key Point

All Agency Coordination Committee members were invited to the agency scoping meeting, which was held on January 10, 2008. The purpose of the meeting was to introduce the participating agencies' roles and responsibilities, provide an opportunity for agencies to comment on the project's purpose and need statement, and to gather information about the scope of environmental analysis that would be conducted for the proposed action.

The Agency Coordination Committee met on an occasional basis as project information dictated and at key National Environmental Policy Act milestones. ODOT has also met individually with Agency Coordination Committee members throughout the project. Agency Coordination Committee meeting dates are shown in Exhibit 7-1. A range of issues were identified and discussed at these meetings, including:

- Purpose and need for the proposed action
- Range of alternatives
- Project cost, design features, projected operations, potential environmental impacts
- Interchange access management plan process and coordination
- Oregon planning goal exception/compliance
- Multi-jurisdictional coordination
- Emergency service response times and travel routes

- New northern interchange or intersection type and location as well as its implications to nearby residential, commercial, and planned development areas.

Exhibit 7-1: *Agency Coordination Committee Meeting Dates*

January 11, 2007[1]	December 12, 2007	August 6, 2008
January 25, 2007[1]	December 18, 2007	September 30, 2008
April 12, 2007[1]	January 10, 2008	October 10, 2008
July 12, 2007[1]	February 28, 2008	October 30, 2008
July 26, 2007[1]	March 13, 2008	July 6, 2009
August 9, 2007[1]	May 8, 2008	November 19, 2009
September 27, 2007[1]	May 22, 2008	February 4, 2010[2]
November 30, 2007	June 24, 2008	February 10, 2011

[1] The agencies met regularly with ODOT during the Refinement Plan process, which concluded prior to the National Environmental Policy Act phase and participating agency invitation (October 2007).

[2] In addition to the agency scoping meeting on January 10, 2008, the agencies were provided with a second formal opportunity to comment on the proposed action's purpose and need and on the range of alternatives.

7.2 Consultation and Coordination with Other Public Agencies

ODOT has consulted and coordinated with other public agencies in addition to coordination with the participating agencies. These interactions have taken place as needed to coordinate compliance with required permits and approvals.

- **Collaborative Environmental and Transportation Agreement for Streamlining (CETAS) –** On August 21, 2007, ODOT presented the proposed action to the CETAS committee, which implements the Oregon Major Transportation Projects Agreement. Based on the limited impacts expected to natural resources, CETAS agreed that no formal tracking of the proposed action was necessary.
- **Deschutes County Environmental Health –** Coordination with this regional agency occurred in March 2011. The agency reviewed maps of the East DS1 and East DS2 Alternatives' water quality treatment facilities in relation to public community wells located at the Four Seasons Mobile Home Park and the Juniper Mobile Home Park. After reviewing the information, the agency concluded that formal coordination should be with the Oregon Department of Human Services, Public Health Division, Drinking Water Program.
- **Deschutes County Historic Landmarks Commission –** On February 17, 2011, ODOT presented the project to the Commission and discussed the possible impacts of the East DS1 and East DS2 Alternatives on historic properties eligible for or listed on the National Register of Historic Places. At that meeting the

Commission expressed an interest in seeing the Nels Andersen House moved, rather than demolished, to preserve the structure. The house's private owner expressed concern that the house may be unable to be moved without destroying the house because of structural issues. The Commission also asked ODOT to identify the Commission as a consulting party under Section 106 of the National Historic Preservation Act and ODOT did so.

- **National Resources Conservation Service –** Consultation with this agency to comply with the Farmland Policy Protection Act is complete. ODOT submitted a farmland conversion rating form for review by the Natural Resources Conservation Service on January 12, 2011.
- **Oregon Department of Human Services, Public Health Division, Drinking Water Program** – Coordination with this agency occurred in March 2011. The agency reviewed maps of the East DS1 and East DS2 Alternatives' water quality treatment facilities in relation to public community wells located at the Four Seasons Mobile Home Park and the Juniper Mobile Home Park. The agency concluded that these public community wells would not be affected by the project. Coordination will continue with this agency during construction.
- **Oregon Water Resources Department**—Coordination with this agency occurred in March 2011. This agency's jurisdiction is limited to private well installation and monitoring and does not include public wells. No further coordination is anticipated with this agency.
- **State Historic Preservation Office—**Consultation ~~is ongoing~~ with this agency to comply with Section 106 of the National Historic Preservation Act is complete. Six significant historic resources are located within the API. Coordination with the State Historic Preservation Office to obtain concurrence on the eligibility for listing these resources on the National Register of Historic Places was completed on January 27, 2011. Coordination on the findings of effect from the proposed action has been completed with the State Historic Preservation Office concurring with the determinations on May 23, 2011, June 17, 2011, and June 29, 2011. Documentation of all coordination with SHPO is provided in Appendix D.
- US Army Corps of Engineers—Consultation with this agency occurred in May 2010. The three canals, including the Swalley Main Canal, the North/Pilot Butte Canal and the North Main Unit Canal, connect to the Deschutes River and are defined by federal law as regulated tributaries under Section 404 of the Clean Water

Act. The minor relocations and piping of portions of the Swalley Main Canal would not require a permit from the US Army Corps of Engineers.

Since the publication of the Draft EIS, ODOT continued to consult and coordinate with multiple agencies regarding the Preferred Alternative. These consultations and meetings are summarized below.

- **Bend Landmarks Commission**—In November 2011 the Bend Landmarks Commission was established and took over the review of the Nels and Lillian Andersen House to discuss potential impacts to the Nels and Lillian Andersen House, a historic resource eligible for listing on the National Register of Historic Places and a locally designated historic landmark. Consultation with the Bend Landmarks Commission occurred on May 16, 2013.
- **Bend Metropolitan Planning Organization**—Consultation with this agency occurred on February 6, February 25, April 2, May 16, and August 15, 2013, to discuss inclusion of the project in the Metropolitan Transportation Plan. Portions of the Preferred Alternative have identified funding and are included in the financially-constrained list in the *2007-2030 Metropolitan Transportation Plan.* On August 15, 2013, the Bend Metropolitan Planning Organization voted to amend the *2007-2030 Metropolitan Transportation Plan* to include the remaining portions of the Preferred Alternative in the illustrative list, thereby making the Preferred Alternative consistent with this plan (see Appendix M).
- **Central Oregon Intergovernmental Council**—On March 5 and April 1, 2013, ODOT held a meeting to discuss transit planning and the Preferred Alternative. The Council identified a priority need for a park and ride lot in the Cascade Village shopping center area.
- **City of Bend and Deschutes County**—ODOT held multiple coordination meetings with city and county staff to discuss project phases, project impacts, and the development and identification of the Preferred Alternative. Meetings were held on July 25, 2011; February 15, March 5, March 21, April 24, May 24, July 18, September 28, and October 24, 2012; January 28, February 25, April 2, and April 11, 2013. Meetings also discussed the process to amend the City and County Transportation System Plans. The County determined that the County Transportation System Plan did not need to be updated. On March 5, 2014, the City of Bend's *Bend Urban Area Transportation System Plan* was amended to include the Preferred Alternative and to designate the new alignment of US 97 as a bypass, expressway and freight route.
- **Deschutes County Bicycle and Pedestrian Advisory Committee**—On May 7 and June 4, 2009; July 1 and August 16,

2010; and January 19, February 7, March 19, May 2, and September 18, 2013, ODOT attended Advisory Committee meetings during which the Bend North Corridor Project was discussed, particularly relating to the bicycle facilities associated with the Preferred Alternative.

- **Deschutes County Historic Landmarks Commission**—On June 24, 2013, ODOT met with the Deschutes County Historic Landmarks Commission to provide a project update and discuss the historic resources in the county: Rock O' the Range Bridge, irrigation canals, and the Oregon Trunk Railway.
- **Environmental Protection Agency**—On July 31, 2013, an in-person meeting was held that discussed the Environmental Protection Agency's comments on the Draft EIS. The meeting also included a project site visit.
- **National Resource Conservation Service**—ODOT submitted an updated farmland conversion rating form for the Preferred Alternative on April 1, 2014 (Appendix A).
- **Oregon Department of Land Conservation and Development**—ODOT held multiple coordination meetings with Oregon Department of Land Conservation and Development staff to discuss project phases, project impacts, and the development and identification of the Preferred Alternative. Meetings were held on February 25 and April 2, 2013, to discuss whether the Preferred Alternative would require exceptions to the Oregon Statewide Planning Goals. The Oregon Department of Land Conservation and Development determined no exceptions will be required.
- **North Main Irrigation District**—Consultation with this agency to discuss general project information and coordination with the District occurred in July 2011.
- **State Historic Preservation Office**—A Section 106 project-level finding of effect for the Preferred Alternative was issued by the State Historic Preservation Office on September 24, 2013 for historic resources and September 27, 2013 for archaeological resources. The Section 106 MOU to resolve the Adverse Effect due to the Nels and Lillian Andersen House impact was completed on June 9, 2014.
- **Swalley Irrigation District**—On March 11, 2013, ODOT met with the District to discuss the role of a participating agency and how the project may impact the District's facilities and easements. The District decided against becoming a formal participating agency and ODOT agreed to continue coordinating with the District.

- **US Army Corps of Engineers**—On May 13, 2010, the US Army Corps of Engineers issued a preliminary jurisdictional determination for the North/Pilot Butte Canal and the Swalley Main Canal that found these two canals are tributaries to a water of the US and therefore potentially jurisdictional waters under Section 404 of the Clean Water Act. Laterals from these two canals are not jurisdictional waters, as they do not function as tributaries and therefore are not jurisdictional or regulated tributaries. ODOT has not requested a preliminary jurisdictional determination for the North Unit Main Canal because the Preferred Alternative will have no impact on the North Unit Main Canal. Since publication of the Draft EIS, the Swalley Irrigation District has piped all previously open segments of the Swalley Main Canal within the API (now referred to as the Swalley Main Canal Pipeline). Since the Preferred Alternative will have no impact on the Swalley Main Canal Pipeline, ODOT will not be pursuing an approved jurisdictional determination from the US Army Corps of Engineers. The Preferred Alternative will pipe small sections of the Swalley Riley and Rogers Laterals, both laterals from the Swalley Main Canal. Piping these laterals will not require a permit from the US Army Corps of Engineers because laterals from the Swalley Main Canal are not jurisdictional.

7.3 Public Participation

ODOT has and will continue to use many methods to share information with and gather input from the public. This section describes those methods which include: public meetings (open houses and a public hearing), a project website, focus group meetings, surveys, and project committees. A summary of public participation to date is included in Exhibit 7-2 FEIS.

As mentioned above, ODOT sponsored the formation of the Citizen Advisory Committee and the Steering Team, which have representatives from the Bend area community. In addition, online surveys, open houses, and focus group meetings were conducted to gather as much public input about the project as possible during development of the project alternatives. Additional efforts were and will continue to be made to engage environmental justice populations who may be affected by the proposed action; these efforts are described in Section 7.3.4.

ODOT uses multiple mediums for notifying the public about public participation opportunities. ODOT maintains an interested parties project mailing list of nearly 1,000 people to distribute information about public participation opportunities, including public hearings and open houses, focus group meetings, and project committee meetings. In addition to mailings, ODOT uses local media in Bend and Redmond

area for distribution of press releases and project-focused interviews. The project website provides information about public participation opportunities and project information. ODOT has also distributed project information through events such as the Deschutes County Fair.

Starting with the release of the Draft EIS on July 29, 2011, a 45-day public comment period was announced and a public hearing was held on August 24, 2011, offering the public a chance to provide formal testimony regarding the project. Approximately 103 people attended the public hearing held at the Riverhouse Convention Center in Bend. During the public comment period, 7 agency comment letters and 159 public letters and testimony were received totaling roughly 1,500 individual topical comments on the project.

Key topics raised in the comments on the Draft EIS included:

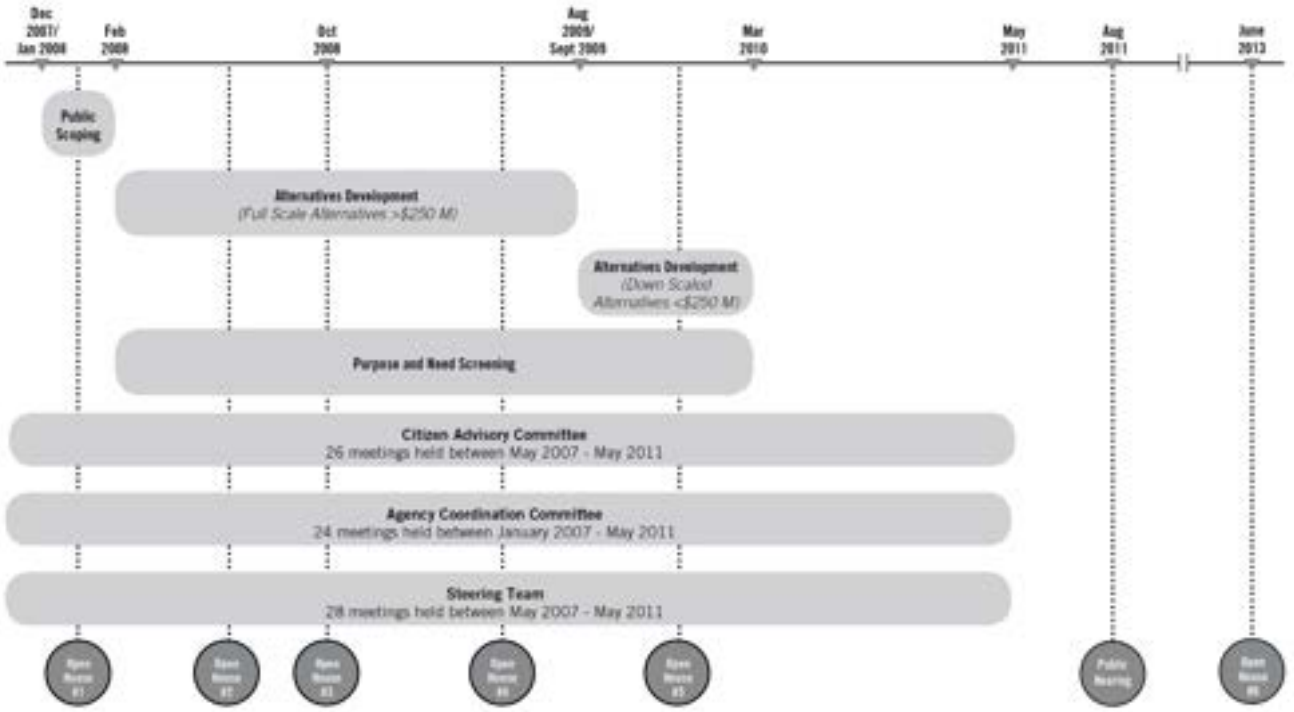
- Impacts to rural lands
- Impacts to livability of areas within the API
- Concern over the ability for ODOT to obtain funding for a project of this magnitude
- Questioning whether the project needs could be solved by making improvements only on the existing US 97 corridor
- Access to commercial businesses from US 97
- Impacts to local roads
- Concerns over the validity of the traffic analysis.

The comment letters and responses to substantive comments can be found in Appendix N.

7.3.1 Public Meetings

Five-open houses have been held to date. All open houses were open to the public and were advertised in multiple publications. These open houses are summarized in Exhibit 7-3 FEIS. Additional public meetings will occur as the project proceeds, including a public hearing during the Draft EIS public comment period.

Exhibit 7-2 FEIS: *Opportunities for Public and Agency Involvement*



Note: This exhibit was updated for the Final EIS to include the public hearing and open house #5.

Since publication of the Draft EIS, an additional open house and public hearing were held, totaling six open houses and one public hearing. The public hearing was held on August 24, 2011, as a forum for public comment on the Draft EIS, to update the public about the project since the December 2009 open house and to gather input on the No Build, East DS1, and East DS2 Alternatives. An additional open house was held on June 13, 2013 to gather input on the Preferred Alternative. All open houses and the public hearing were open to the public and were advertised in multiple publications. These open houses and the public hearing are summarized in Exhibit 7-3 FEIS.

ODOT discussed the Preferred Alternative with the public at the open house held on June 13, 2013. Overall support was expressed by the public about the design modifications that ODOT factored into the development of the Preferred Alternative, which avoided and minimized impacts that were associated with the East DS1 and East DS2 Alternatives. Public comments focused on gaining a better understanding of the design specifics associated with individual properties, including:

- Concern about impacts to the Nels and Lillian Andersen House, a historic property
- Concerns with access and connections

- Access concerns from the businesses along Empire Avenue and in the Cascade Village Shopping Center
- Schedule and timing information, particularly about when right-of-way acquisition and construction will begin
- Interest in the project approval process and funding.

ODOT also received comments from the public after the comment period for the Draft EIS closed on September 12, 2011 (ODOT 2014n). Categories of comments received include:

- Access to neighborhoods and business areas and traffic impacts resulting from the East DS1 and East DS2 Alternatives
- Access and emergency response times resulting from the Preferred Alternative
- Impacts to the Nels and Lillian Andersen House, including input on the proposed mitigation
- Property impacts, especially regarding personal property acquisition timing and the project construction schedule
- City of Bend's Transportation System Plan update.

Exhibit 7-3 FEIS: *Public Scoping and Open House Meeting Information*

Public Scoping Meeting/Open House #1	
January 24, 2008, 5:00 – 8:30pm Sky View Middle School 63555 18th Street, Bend, OR 115 attendees	■ Inform the public about the proposed action scope, purpose and need, and goals and objectives ■ Inform the public about the National Environmental Policy Act process and the EIS schedule ■ Provide historical account of past planning processes that were completed and how those processes tie into the current National Environmental Policy Act process ■ Present illustrative design concepts within the west, existing US 97, and east corridors to stimulate discussion on identifying issues, constraints, concerns, and environmental resources. ■ Gather comments from the public on all information presented, including the purpose and need statement, and goals and objectives
Advertisements	
Bend Bulletin	January 13, 20 and 24, 2008
Bend Source Weekly	January 17 and 24, 2008
Redmond Spokesman	January 16 and 23, 2008
Newsletters and postcards	January 8 and 15, 2008
Website	January 10, 2008
Press release	January 14, 2008
■ Notice of Intent published in Federal Register on December 27, 2007	
■ Television and radio: three television (KOHD, KTVZ (2)) and eight radio interviews (KBND, KMTK, KLRR, KLTW, KRCO, KWLZ, KWPK, KQAK) between January 15 and January 31, 2008	

Open House #2	
June 19, 2008, 5:00 – 8:00 pm Sky View Middle School 63555 18th Street, Bend, OR 75 attendees	■ Provide updates on the project ■ Present preliminary range of alternatives and gather public input
Advertisements	
Bend Bulletin	June 18 and 19, 2008
Bend Source Weekly	June 18, 2008
Redmond Spokesman	June 18, 2008
Newsletters and postcards	June 5, 2008
Website	June 5, 2008
Press release	June 12, 2008

Open House #3	
Oct. 22, 2008, 6:00 – 7:30pm Sky View Middle School 63555 18th Street, Bend, OR 55 attendees	■ Provide updates on the project ■ Present revised preliminary range of alternatives and gather public input
Advertisements	
Bend Bulletin	October 19 and 22, 2008
Bend Source Weekly	October 15 and 22, 2008
Redmond Spokesman	October 15, 2008
Newsletters and postcards	October 8, 2008
Website	October 8, 2008
Press release	October 6, 2008

Open House #4	
May 19, 2009, 5:30 – 7:00pm Sky View Middle School 63555 18th Street, Bend, OR 91 attendees	■ Provide updates on the project ■ Present revised preliminary range of alternatives and gather public input ■ Review the project schedule ■ Introduce the next phase of detailed environmental studies
Advertisements	
Bend Bulletin	May 17 and 19, 2009
Bend Source Weekly	May 13, 2009
Redmond Spokesman	May 13, 2009
Newsletters and postcards	May 4, 2009
Website	May 5, 2009
Press release	May 7, 2009

Open House #5	
December 4, 2009, 4:30 – 6:00pm Deschutes County Services Building 1300 NW Wall Street, Bend, OR 115 attendees	■ Update the public on effort to develop downscaled, lower-cost alternatives ■ Present preliminary downscaled (practical design) alternatives and gather public input

***Exhibit 7-3 FEIS:** Public Scoping and Open House Meeting Information*

Advertisements	
Bend Bulletin	November 29 and December 3, 2009
Bend Source Weekly	December 2, 2009
Redmond Spokesman	December 2, 2009
Newsletters and postcards	November 20, 2009
Website	November 23, 2009
Press release	December 3, 2009
Television, radio and newspaper interviews: one television interview (KOHD), one radio interview (KBND), one newspaper interview (*Bend Bulletin*)	
Public Hearing	
August 24, 2011 5:30—8:30 pm The Riverhouse Convention Center, Rooms A, B and C, 2850 NW Rippling River Court, Bend, OR 103 attendees	■ Update the public about the project since the December 2009 open house ■ Describe the East DS1 and East DS2 Alternatives under consideration in the Draft EIS as well as the No Build Alternative ■ Present an overview of the impacts and benefits to the community and environment by each alternative that was detailed in the Draft EIS and Draft Section 4(f) Evaluation ■ Review the project schedule and describe next steps ■ Receive public comment and testimony, and answer questions about the project.
Advertisements	
Bend Bulletin	August 14 and 21, 2011
Redmond Spokesman	August 17 and 24, 2011
Newsletter	July 22, 2011
Website	July 29, 2011
Press release	July 29, 2011
Deschutes County Fair booth	August 8-14, 2011
Open House #6	
June 13, 2013, 5:00—7:00pm Sky View Middle School, 63555 NE 18th Street, Bend, OR 66 attendees	■ Discuss the Preferred Alternative, East DS2 Modified, and review maps ■ Review anticipated impacts and benefits to the community and the environment ■ Provide next steps, answer questions, and gather comments and concerns.
Advertisements	
Bend Bulletin	June 2 and 9, 2013
Bend Source Weekly	May 30 and June 6, 2013
Redmond Spokesman	June 5 and 12, 2013
Newsletter	June 29 and 30, 2013
Website	May 30, 2013

7.3.2 Project Website

A project website, www.us97solutions.org, was established during the public scoping period and has remained a well-visited destination for those seeking more information. It is available in English and Spanish. Website visitors can submit comments and questions directly to the project management team through the website's "Contact Us" page. ODOT typically responds to website inquiries within one week of receipt.

The project website is updated to coincide with upcoming open houses, and on an ad hoc basis between open houses to distribute updates about the project. The website is typically updated approximately 2 weeks prior to an open house meeting. Meeting agendas and meeting minutes from the Citizen Advisory Committee, Steering Team, and focus group meetings are regularly posted in the website document library as they are finalized.



Project website: www.us97solutions.org

7.3.3 Focus Group Meetings and Surveys

To date, ODOT has conducted 20 focus group meetings to guide specialized discussions with particular interest groups and project stakeholders, such as the emergency service providers, interested parties for various business areas, and environmental justice populations. The focus groups were held on the dates shown in Exhibit 7-4 FEIS. ODOT will continue to hold focus group meetings throughout the National Environmental Policy Act process.

In general, issues that have been identified at these focus group meetings were based on the stakeholder's particular interest; for example, business owners were interested in potential changes to private driveways and public approach roads whereas neighborhood associations were interested in residential property displacements and relocations. Topics discussed by these stakeholder groups included:

Business Areas

- Approaches to business area
- Property acquisitions and business displacements.

Neighborhood Associations

- Changes in traffic volumes on local streets
- Visual impacts of elevated structures
- Property acquisitions and residential displacements
- Noise impacts and access changes.

Emergency Service Providers

- Emergency service routes and estimated travel times
- Private driveways and public approach road connections to residences
- Safety.

Bicyclists and Pedestrians

- Connectivity of bicycle routes and pedestrian trails and sidewalks
- Safety.

More Information

The August 2008 Business Survey Summary describes the findings of the July 2008 in person business survey. This report is listed in Appendix K and available in the document library of the project's website (www.us97solutions.org).

Mobile Home Parks

- Property acquisitions and residential displacements
- Comparable affordable housing for relocated residents
- Visual impacts of elevated structures
- Emergency service provider travel routes to neighborhoods
- Safety
- Access.

Since the publication of the Draft EIS, ODOT held 7 additional focus group meetings, bringing the total to 27 focus group meetings held by ODOT. Focus group meetings held on December 12, 2012, January 31, 2013, and June 13, 2013, were held to discuss the Preferred Alternative, provide project updates, answer questions, and gather input. Focus group meeting dates are listed in Exhibit 7-4 FEIS.

Exhibit 7-4 FEIS: *Focus Group Meeting Information*

Date	Audience	Location	Number of Attendees
February 8, 2008	**Businesses** ▪ Robal Road/Cooley Road businesses	747 SW Mill View Way Bend, OR	8
February 22, 2008	**Businesses** ▪ Traffic engineers representing businesses in the Robal Road/Cooley Road area	ODOT, TPAU Office 555 13th Street NE Salem, OR	6
March 7, 2008	**Businesses** ▪ Traffic engineers representing businesses in the Robal Road/Cooley Road area	ODOT, TPAU Office 555 13th Street NE Salem, OR	4
March 17, 2008 5:00 – 7:00pm	**Businesses** ▪ Nels Anderson Businesses	63099 Nels Anderson Road Bend, OR	11
March 19, 2008 6:30 – 9:00pm	**Neighborhoods** ▪ Boyd Acres Neighborhood Association	Sky View Middle School 63555 18th Street Bend, OR	9
March 26, 2008 6:00 – 8:00pm	**Neighborhoods** ▪ Hunnell United Neighbors	ODOT Region 4 63055 N Highway 97 Bend, OR	29
March 27, 2008 6:00 – 8:30pm	**Businesses** ▪ Clausen Drive Businesses	ODOT Region 4 63055 N Highway 97 Bend, OR	13
April 2, 2008 10:00 – 11:30am	**Mobile Home Parks** ▪ Four Seasons ▪ Hilltop ▪ Juniper	ODOT Region 4 63055 N Highway 97 Bend, OR	2
April 11, 2008 10:00am – 12:00pm	**Businesses** ▪ Robal Road/Cooley Road Businesses	747 SW Mill View Way Bend, OR	not recorded

Exhibit 7-4 FEIS: *Focus Group Meeting Information*

Date	Audience	Location	Number of Attendees
April 11, 2008 1:00 – 3:00pm	**Emergency Service Providers** ■ Bend Fire Department ■ Bend-La Pine School District ■ Bend Police Department ■ Deschutes County Sheriff ■ Oregon State Police	Deschutes County Sheriff's Office 63333 Highway 20 West Bend, OR	5
April 29, 2008 5:00 – 7:00pm	**Businesses** ■ Empire Avenue Businesses	ODOT Region 4 63055 N Highway 97 Bend, OR	8
July 28, 2008 2:00 – 4:00pm	**Emergency Service Providers** ■ Bend Fire Department ■ Bend Police ■ City of Bend ■ Deschutes County 911 ■ Deschutes County Rural Fire Protection District #2 ■ DKS Associates ■ Kittelson and Associates ■ Oregon State Police	Deschutes County Sheriff's Office 63333 Highway 20 West Bend, OR	8
September 3, 2008 2:00 – 4:00pm	**Emergency Service Providers** ■ City of Bend Police Department ■ Oregon State Police ■ Deschutes Rural Fire Protection District #2 ■ City of Bend ■ Bend Fire Department ■ Deschutes County Sheriff's Office	ODOT Region 4 63055 N Highway 97 Bend, OR	6
September 3, 2008	**Businesses** ■ Robal Road/Cooley Road businesses	ODOT Region 4 Annex 63085 N Highway 97 Bend, OR	13
October 16, 2008 5:30 – 7:00pm	**Businesses** ■ Empire Avenue Business Area ■ Jamison Road Business Area ■ Clausen Drive Business Area	ODOT Region 4 63055 N Highway 97 Bend, OR	9
January 21, 2009 4:30 – 7:00pm	**General** ■ Nels Anderson Businesses ■ Boyd Acres Neighborhood Association ■ Robal-Cooley Area Businesses ■ Clausen Drive Area Businesses ■ Hunnell United Neighbors ■ Empire Avenue Businesses ■ Mobile Home Parks ■ Emergency Service Providers	Central Oregon Association of Realtors Conference Room 2112 NE 4th Street Bend, OR	25
June 18, 2009 12:00 – 2:00pm	**Bicyclists and Pedestrians**	ODOT Region 4 63030 N Highway 97 Bend, OR	6

***Exhibit 7-4 FEIS:** Focus Group Meeting Information*

Date	Audience	Location	Number of Attendees
June 25, 2009 12:00 – 2:00pm	**Bicyclists and Pedestrians**	ODOT Region 4 63055 N Highway 97 Bend, OR	11
August 25, 2009	**Mobile Home Parks** ■ Four Seasons ■ Hilltop ■ Juniper	Juniper Mobile Home Park 63930 N Hwy 97 Bend, OR 97701	40
January 28, 2010 6:00 – 8:00pm	**Neighborhoods** ■ Hunnell United Neighbors	ODOT Region 4 63055 N Highway 97 Bend, OR	51
July 20, 2010	**Mobile Home Parks** ■ Four Seasons ■ Hilltop ■ Juniper	Juniper Mobile Home Park 63930 N Hwy 97 Bend, OR 97701	25-30
July 22, 2010	**Businesses** ■ Traffic engineers representing businesses in the Robal Road/Cooley Road area	ODOT, TPAU Office 555 13th Street NE Salem, OR	
November 4, 2010 5:00 – 7:00pm	**Businesses** ■ Nels Anderson Business Area ■ Empire Avenue Business Area ■ Jamison Road Business Area ■ Clausen Drive Business Area	ODOT Region 4 63055 N Highway 97 Bend, OR	15
December 12, 2012	**General** ■ Area businesses ■ Emergency service providers ■ Landowners ■ Neighborhood associations and groups.	ODOT Region 4 63055 N Highway 97 Bend, OR	40
January 2, 2013	**Emergency Service Providers in Bend Area*** ■ City of Bend Police Department ■ City of Bend Fire Department ■ Deschutes County Sheriff's Office ■ Deschutes Rural Fire Protection District #2 ■ Oregon State Police	ODOT Region 4 63055 N Highway 97 Bend, OR	12
January 31, 2013	**Businesses** ■ Empire Avenue business area ■ Jamison Road business area ■ Clausen Drive business area.	ODOT Region 4 63055 N Highway 97 Bend, OR	17
April 12, 2013	**Emergency Service Providers in Bend Area*** ■ City of Bend Police Department ■ City of Bend Fire Department ■ Deschutes County Sheriff's Office ■ Deschutes Rural Fire Protection District #2 ■ Oregon State Police	ODOT Region 4 63055 N Highway 97 Bend, OR	10

Exhibit 7-4 FEIS: *Focus Group Meeting Information*

Date	Audience	Location	Number of Attendees
August 6, 2013	**Emergency Service Providers in Bend Area*** ■ City of Bend Police Department ■ City of Bend Fire Department ■ Deschutes County Sheriff's Office ■ Deschutes Rural Fire Protection District #2 ■ Oregon State Police	ODOT Region 4 63055 N Highway 97 Bend, OR	8

*Note: Not all emergency service providers attended every emergency service provider meeting, but each emergency service provider on the list was provided with meeting notes and given an opportunity to provide additional comments or concerns.

A door-to-door, in-person survey of businesses within the API was conducted July 22–23, 2008. The survey focused on five areas with concentrations of businesses: Clausen Drive, Robal Road/Cooley Road, Nels Anderson Road, Jamison Road, and Empire Avenue. The purpose of the survey was to: document existing businesses including estimated number of full-time, part-time and seasonal employees; identify businesses employing individuals from environmental justice populations; identify businesses providing goods and/or services to environmental justice populations; document existing parking conditions; determine client origin (destination clients versus driveby clients); determine the businesses' awareness of the project; ask about the most effective public involvement strategies for the businesses; and solicit general comment about the project.

Three online surveys were conducted during the alternatives development phase. They coincided with the public open houses on January 24, 2008, June 29, 2008, and October 22, 2009 and are detailed in Exhibit 7-5.

Exhibit 7-5: *Online Survey Details*

Date	Survey Purpose	Number of Respondents
January 10–February 11, 2008	■ Determine generally where survey respondents lived ■ Learn how and when highway travelers use transportation facilities within the API ■ Identify and prioritize issues and concerns ■ Solicit input on the proposed action's purpose and need	293
June 10–30, 2008	■ Collect demographic information about survey respondents ■ Ask about frequency and use of the US 97 corridor ■ Collect comments about the alternatives.	45
October 6–31, 2008	■ Collect demographic information about survey respondents ■ Ask about frequency and use of the US 97 corridor ■ Collect comments about the alternatives.	18

7.3.4 Outreach to Environmental Justice Populations

The known concentration of minority and low-income populations in the API is within three mobile home parks located immediately east of US 97 in the vicinity of Fort Thompson Lane and Bowery Lane.

More Information

See Section 3.4 Environmental Justice, for information about community demographics, composition, and impacts from the proposed action.

Individuals from the mobile home parks were invited to all public open houses, including the public scoping meeting; Spanish language interpreter was provided at all of these meetings and Spanish meeting announcements were sent to all residents in the Juniper and Hilltop mobile home parks.

In addition to the focus group meetings and the public open houses, meetings with environmental justice populations were held on two separate occasions, August 25, 2009 and July 20, 2010. The July 20, 2010 meeting was held at the Juniper Mobile Home Park; flyers were sent to residents at all three mobile home parks. About 40 individuals attended the August 25, 2009 meeting and about 25 to 30 attended the July 20, 2010 meeting. The purpose of these meetings was to present the alternatives, discuss potential impacts and benefits of the alternatives to the mobile home park residents, and identify community concerns about the project. ODOT gave a presentation about the alternatives and answered questions at each meeting.

General questions and concerns that arose at each of these meetings included:

- Increase travel distance to reach homes
- Noise and visual impacts
- Safety
- Project cost
- Desire to stay in or relocate from the mobile home park neighborhoods
- Various opinions about the design features of the East DS1 and East DS2 Alternatives.

On June 18-19, 2008, an in-person survey was conducted of residents at the Juniper Mobile Home Park, Four Seasons Mobile Home Park, and Hilltop Mobile Home Park. Prior to the survey, appointments were set for interviewing residents at specified times. The remaining residents were queried door-to-door as available. The purpose of the survey was to confirm the presence of minority and low-income persons in these parks, to assess residents' awareness of the project, and to identify public involvement techniques that would facilitate involvement of park residents in the project. The survey achieved an approximately 40 percent or higher response rate from each mobile home park.

During the 2008 business survey described above, business representatives were also asked to identify whether or not they employed individuals from environmental justice populations or if they provided goods and/or services primarily to environmental justice populations.

More Information

The July 2008 *Mobile Home Park Survey Summary* describes the findings of the June 2008 in person mobile home park survey.

The April 2011 *Mobile Home Park Survey Summary* describes the findings of the March 31 and April 4, 2011 in person mobile home park survey.

Both reports are listed in Appendix K and available in the document library of the project's website (www.us97solutions.org).

On March 31 and April 4, 2011, a followup survey was conducted of residents at the mobile home parks. This survey was conducted in-person at the Juniper Mobile Home Park and the Hilltop Mobile Home Park, and was conducted via mail at the Four Seasons Mobile Home Park. The purpose of the survey was to determine if residents of mobile home parks work at business areas where proposed business displacements would occur as a result of the project: Nels Anderson Road business area and Clausen Drive business area. The survey also gathered information about whether residents of these mobile home parks purchase/use goods or services from these businesses, and how they travel to and from these businesses. The survey achieved an approximately 45 percent or higher response rate from each mobile home park.

Individuals from the mobile home parks were invited to attend the public hearing conducted during the Draft EIS public review period on August 24, 2011. ODOT hand-delivered invitations for this hearing to the Juniper and Hilltop mobile home park residences.

7.3.5 Citizen Advisory Committee

The Citizen Advisory Committee consists of community members representing various interest groups within the API: Boyd Acres Neighborhood Association; Hunnell United Neighbors; Four Seasons, Juniper and Hilltop mobile home parks; and representatives of local businesses, bicyclists and pedestrians, emergency services, and the freight industry. The Citizen Advisory Committee meets approximately every other month and sometimes more frequently. The role of the Citizen Advisory Committee is to raise important community issues, concerns and ideas to ODOT throughout the project. Citizen Advisory Committee has held 26 meetings to date; meeting dates are listed in Exhibit 7-6 FEIS.

A range of issues were identified and discussed at these meetings, including:

- Project cost, design features, projected operations, potential environmental impacts
- Displacement of businesses
- Approaches and travel routes to residential and commercial properties
- Grade separation of US 97 and Cooley Road and implications to nearby residential and commercial areas

- New northern interchange type and location as well as its implications to nearby residential and commercial areas
- Emergency service response times and routes to areas in the API and greater Bend area.

Since the publication of the Draft EIS, the Citizen Advisory Committee held 3 additional meetings, bringing the total to 29 Citizen Advisory Committee meetings to date. The December 12, 2012, meeting discussed the Preferred Alternative, provided project updates, answered questions, and gathered comments and concerns. Meeting dates are listed in Exhibit 7-6 FEIS.

Exhibit 7-6 FEIS: *Citizen Advisory Committee Meeting Dates*

May 21, 2007[1]	September 10, 2008	February 10, 2010
July 26, 2007[1]	October 8, 2008	March 31, 2010
September 13, 2007[1]	December 10, 2008	May 19, 2010
October 11, 2007[1]	January 14, 2009	July 14, 2010
December 13, 2007	February 11, 2009	November 16, 2010
March 12, 2008	April 8, 2009	March 9, 2011
May 14, 2008	May 13, 2009	August 10, 2011
June 11, 2008	June 10, 2009	November 9, 2011
July 9, 2008	October 14, 2009	December 12, 2012
August 13, 2008	November 19, 2009	

[1] The committee met regularly with ODOT during the Refinement Plan process, which concluded prior to the National Environmental Policy Act phase.

7.3.6 Steering Team

The Steering Team consists of four members: the ODOT Region 4 Manager, a representative from the City of Bend, a representative from Deschutes County, and the Citizen Advisory Committee chairperson. The Steering Team's role is to:

- Consider input from the public, project stakeholders, Citizen Advisory Committee and Agency Coordination Committee
- Understand technical data and analysis provided by the interdisciplinary Project Management Team
- Provide input on policy implications to local and regional agencies.

Upon considering the above information, the three advisory members of the Steering Team (the representatives from the City of Bend and Deschutes County, and the Citizen Advisory Committee chairperson) provide their recommendations to the ODOT Region 4 Manager at key project milestones. These project milestones include:

- Purpose and need for the proposed action
- Range of alternatives that are forwarded into the Draft EIS for detailed study

- Selection of the Preferred Alternative (to occur after the Draft EIS is circulated for public comment and a public hearing is held).

The Steering Team meets approximately quarterly or as project milestones dictate. Twenty-nine Steering Team meetings have been held to date (Exhibit 7-7 FEIS). A range of issues were identified and discussed at these meetings, including:

- Project cost, design features, projected operations, potential environmental impacts
- Addressing access to residential and commercial properties
- Practical design of the public infrastructure improvements
- Community support and public involvement
- Interagency coordination.

Since the publication of the Draft EIS, the Steering Committee met one additional time, bringing the total to 29 Steering Committee meetings. The August 2, 2011, meeting included discussion around the process of identifying the Preferred Alternative. Meeting dates are listed in Exhibit 7-7 FEIS.

Exhibit 7-7 FEIS: *Steering Team Meeting Dates*

May 15, 2007[1]	April 24, 2008	January 13, 2009
June 28, 2007[1]	May 27, 2008	January 27, 2009
July 31, 2007[1]	June 10, 2008	April 2, 2009
September 27, 2007[1]	July 8, 2008	April 28, 2009
October 25, 2007[1]	August 5, 2008	September 22, 2009
November 29, 2007	August 19, 2008	November 5, 2009
January 22, 2008	September 9, 2008	February 24, 2010
March 13, 2008	September 23, 2008	March 29, 2011
March 25, 2008	October 14, 2008	August 2, 2011
April 8, 2008	December 4, 2008	

[1] The Steering Team met regularly with ODOT during the Refinement Plan process, which concluded prior to the National Environmental Policy Act phase.

Upon receiving recommendations and input from the public, project stakeholders, Project Management Team, the Citizen Advisory Committee, the Agency Coordination Committee, and the Steering Team, the ODOT Region Manager is responsible for making final project recommendations on the purpose and need statement, range of alternatives, and Preferred Alternative, which are subject to FHWA approval. The final project recommendation on the Preferred Alternative occurred after the Draft EIS was published, a public hearing was held, all public comments on the Draft EIS were evaluated.

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Chapter 8
List of Preparers

Exhibit 8-1: *List of Draft EIS Preparers*

Name	Company/ Agency	Project Role	Education	Years of Experience
Chris Woods	FHWA	Program Development Team Leader	Master of Public Education	18
Chris Bucher, PE	FHWA	Project Engineer	BS Civil Engineering	11
Allison Cowie	ODOT	Wetland Specialist	MS Wetland Science	20
Jon Heacock, PE	ODOT	Project Manager	BS Civil Engineering	28
Rex Holloway	ODOT	Community Liaison Representative	BS Forest Management	19
Michael G. Holthoff	ODOT	National Environmental Policy Act Program Coordinator	MS Environmental Science	18
Amy Pfeiffer	ODOT	Environmental Project Manager	BS Geology Oregon Project Management Certification Program	20
Peter Schuytema, PE	ODOT	Sr. Transportation Analyst	BS Civil Engineering	19
Dan Serpico, PE	ODOT	Senior Traffic Analyst	BS Civil Engineering	18
Rick Thompson, PE	ODOT	Stormwater Analyst	BS Forestry Engineering	30
Ray Thwaits, PE	ODOT	Roadway Designer	BS Forest Engineering	25
Mary Whitaker	ODOT	Right of Way Specialist	Engineering, Architectural Studies	23
Rick Williams, AICP	ODOT	Assistant District 10 Manager	MPA Public Administration	17
Sine Adams, AICP	PB	Socioeconomic and Environmental Technical Report EIS Preparation	MURP Urban and Regional Planning BA Geography	5
Cameron Booth	PB	EIS Layout and Design	AA Graphic Design	17
Jason Bright	PB	Energy Technical Report	MS Anthropology BS Anthropology	16
Abby Caringula	PB	Transportation Technical Report	MS Civil Engineering BS Civil Engineering	5
Angela Findley	PB	Consultant Project Manager	MS Forest Resources BA Mathematics	17
Evan Garich, PE	PB	Geology Technical Report	MS Civil Engineering BS Civil Engineering	3
Peter Geiger	PB	Water Resources Technical Report	MSc Physics BS Physics	22
Larissa King-Rawlins, AICP	PB	Technical Report Coordinator, EIS Preparation	BA Environmental Planning	11
Ginette Lalonde	PB	Air Quality Technical Report	BS Civil Engineering	11
Scott Noel, AICP, GISP	PB	Noise Technical Report, GIS	BA Environmental Planning	10

Name	Company/ Agency	Project Role	Education	Years of Experience
Scott Polzin	PB	EIS Preparation	MCRP Community and Regional Planning BS Finance	15
Jennifer Rabby, AICP	PB	Land Use Technical Report, Section 4(f) Evaluation, EIS Preparation	MCRP Community and Regional Planning BA Biology and Environmental Studies	9
Patrick Romero	PB	Hazardous Materials Technical Report	MS Environmental Policy and Management BS Environmental Science	13
Hillary Seminick	PB	Energy Technical Report	BS Geography	5
Stephanie Sprague, AICP	PB	Visual Quality Report, Description of Alternatives Report, EIS Preparation	MS Natural Resource Policy BS Environmental Microbiology	11
Andrea Blaser	AINW	Historic Resources Report	MS Historic Preservation, Architectural History	5
Judith Chapman	AINW	Historic Resources Report	MA Architectural History, History, Archaeology	28
John Fagan	AINW	Archaeological Resources Report	PhD Anthropology	45
Jonathan Held	AINW	Historic Resources Report	MA, History	14
Elizabeth O'Brien	AINW	Historic Resources Report	B Architecture	19
Darci Rudzinski, AICP	Angelo Planning Group	Interchange Area Management Plan	MUP Urban Planning BA German Literature	12
Sarah Hartung	ESA Adolfson	Natural Systems and Communities Technical Report	MS Avian Ecology BA Biology	11
Mark Greenfield, JD	Mark J. Greenfield	Land Use Specialist	JD Law BA History	33

PB = Parsons Brinckerhoff

AINW = Archaeological Investigations Northwest

Exhibit 8-1 FEIS: *List of Final EIS Preparers*

Name	Company/ Agency	Project Role	Education	Years of Experience
Michelle Eraut	FHWA	Program Development Team Leader	MPA (Public Administration)	17
Anthony Boesen	FHWA	Operations Engineer	BS Civil Engineering	23
Allison Cowie	ODOT	Wetland Specialist	MS Wetland Science	23
Jon Heacock, PE	ODOT	Project Manager	BS Civil Engineering	31
Rex Holloway	ODOT	Community Liaison Representative	BS Forest Management	22
Michael G. Holthoff	ODOT	National Environmental Policy Act Program Coordinator	MS Environmental Science	21
Amy Pfeiffer	ODOT	Environmental Project Manager	BS Geology Oregon Project Management Certification Program	23

Name	Company/ Agency	Project Role	Education	Years of Experience
Peter Schuytema, PE	ODOT	Sr. Transportation Analyst	BS Civil Engineering	22
Dan Serpico, PE	ODOT	Senior Traffic Analyst	BS Civil Engineering	21
Rick Thompson, PE	ODOT	Stormwater Analyst	BS Forestry Engineering	33
Ray Thwaits, PE	ODOT	Roadway Designer	BS Forest Engineering	28
Mary Whitaker	ODOT	Right of Way Specialist	Engineering, Architectural Studies	26
Laurel Arndt	PB	Socioeconomic and Land Use Technical Reports; EIS Preparation	MUEP Urban and Environmental Planning BS Business	13
Angela Findley	PB	Consultant Project Manager	MS Forest Resources BA Mathematics	20
Evan Garich, PE	PB	Geology Technical Report	MS Civil Engineering BS Civil Engineering	6
Peter Geiger	PB	Water Resources Technical Report; EIS Preparation	MSc Physics BS Physics	26
Srinivas Goundla, PE, PTOE	PB	Transportation Analyst	MS Civil Engineering BS Civil Engineering	11
Larissa King Rawlins, AICP	PB	Technical Report Coordinator; EIS Preparation	BA Environmental Planning	14
Ginette Lalonde	PB	Air Quality Technical Report; Energy Technical Report	BS Civil Engineering	14
Scott Polzin	PB	EIS Preparation; Quality Control	MCRP Community and Regional Planning BS Finance	18
Jennifer Rabby, AICP	PB	Land Use Technical Report; Section 4(f) Evaluation; EIS Preparation	MCRP Community and Regional Planning; BA Biology and Environmental Studies	12
Patrick Romero	PB	Hazardous Materials Technical Report; Noise Technical Report	MS Environmental Policy and Management; BS Environ-mental Science	16
Stephanie Sprague, AICP	PB	Visual Quality Report; Description of Alternatives Report; EIS Preparation	MS Natural Resource Policy BS Environmental Microbiology	14
Kirsten Tilleman	PB	Final EIS Preparation	MS Environmental Science and Management; BS Natural Resources	2
Andrea Blaser	AINW	Historic Resources Report	MS Historic Preservation; Architectural History	8
Judith Chapman	AINW	Historic Resources Report	MA Architectural History, History, Archaeology	31
John Fagan	AINW	Archaeological Resources Report	PhD Anthropology	48
Darci Rudzinski, AICP	Angelo Planning Group	Interchange Area Management Plan	MUP Urban Planning; BA German Literature	15
Sarah Hartung	ESA Adolfson	Natural Systems and Communities Technical Report	MS Avian Ecology; BA Biology	14

Only individuals who worked on the Final EIS are listed.

PB = Parsons Brinckerhoff

AINW = Archaeological Investigations Northwest

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Chapter 9

Draft and Final Environmental Impact Statement Distribution List

This chapter documents those who received the Draft and Final EIS. The Interested Parties Distribution List (Exhibit 9-1 and Exhibit 9-1 FEIS) includes agencies and organizations identified as project stakeholders and is specific to the proposed action. The Agency Distribution List (Exhibit 9-2 and Exhibit 9-2 FEIS) includes a standardized list of federal and state agencies that may have an interest in the proposed action. Private citizens with an interest in the proposed action also received copies of the Draft and Final EIS, but are not included in the lists presented here.

Exhibit 9-1: *Draft EIS Interested Parties Distribution List*

Organization/Agency	Contact	Address
Bend Metropolitan Planning Organization	Tyler Deke, Manager	575 NE 15th Street Bend, Oregon 97701
Bend Parks and Recreation District	Steve Jorgensen, Planning Manager	799 SW Columbia Street Bend, Oregon 97702
City of Bend	Eric King, City Manager	710 NW Wall Street Bend, Oregon 97701
Confederated Tribes of the Warm Springs	Rob Suppah, Tribal Council Chairman	1233 Veteran Street Post Office Box C Warm Springs, Oregon 97761
~~Confederated Tribes of~~ Burns Paiute Tribe	Don Munkers, General Manager	100 Pasigo Street Burns, Oregon 97720
Deschutes County	Dennis Luke, County Commissioner	1300 NW Wall Street Bend, Oregon 97701
Deschutes County Public Library—Downtown Bend Branch	Reference Librarian	601 NW Wall Street Bend, Oregon 97701
Deschutes County Public Library—East Bend Branch	Reference Librarian	6280 Dean Swift Road Bend, Oregon 97701
Deschutes County Public Library—La Pine Branch	Reference Librarian	16425 1st Street La Pine, OR 97739
Deschutes County Public Library—Redmond Branch	Reference Librarian	827 SW Deschutes Avenue Redmond, Oregon 97756
Deschutes County Public Library—Sisters Branch	Reference Librarian	110 N Cedar Street, PO Box 1209 Sisters, Oregon 97759
Federal Highway Administration	Phillip A. Ditzler, Division Administrator	530 Center Street NE, Suite 100 Salem, Oregon 97301
Klamath Tribe	Joseph S. Kirk, Chairman	PO Box 436 Chiloquin, Oregon 97624
Oregon Department of Land Conservation and Development	Bob Cortright	635 Capitol Street NE, Suite 150 Salem, Oregon 97301-2540

Exhibit 9-1 FEIS: *Final EIS Interested Parties Distribution List*

Organization/Agency	Contact	Address
Bend Metropolitan Planning Organization	Tyler Deke, Manager	575 NE 15th Street Bend, Oregon 97701
Bend Parks and Recreation District	Steve Jorgensen, Planning Manager	799 SW Columbia Street Bend, Oregon 97702
City of Bend	Eric King, City Manager	710 NW Wall Street Bend, Oregon 97701
Confederated Tribes of the Warm Springs	Rob Suppah, Tribal Council Chairman	1233 Veteran Street Post Office Box C Warm Springs, Oregon 97761
Burns Paiute Tribe	Don Munkers, General Manager	100 Pasigo Street Burns, Oregon 97720
Deschutes County	Alan Unger, County Commissioner	1300 NW Wall Street Bend, Oregon 97701
Deschutes County Public Library—Downtown Bend Branch	Reference Librarian	601 NW Wall Street Bend, Oregon 97701
Deschutes County Public Library—East Bend Branch	Reference Librarian	6280 Dean Swift Road Bend, Oregon 97701
Deschutes County Public Library—La Pine Branch	Reference Librarian	16425 1st Street La Pine, Oregon 97739
Deschutes County Public Library—Redmond Branch	Reference Librarian	827 SW Deschutes Avenue Redmond, Oregon 97756
Deschutes County Public Library—Sisters Branch	Reference Librarian	110 N Cedar Street, PO Box 1209 Sisters, Oregon 97759
Federal Highway Administration	Phillip A. Ditzler, Division Administrator	530 Center Street NE, Suite 420 Salem, Oregon 97301
Klamath Tribe	Joseph S. Kirk, Chairman	PO Box 436 Chiloquin, Oregon 97624
Oregon Department of Land Conservation and Development	Scott Edelman	650 South Columbia Street, Millpoint Building 7100 Bend, Oregon 97702

Exhibit 9-2: *Draft EIS Agency Distribution List*

Agency	Contact	Address
Advisory Council on Historic Preservation		1100 Pennsylvania Avenue NW, Suite 803 Old Post Office Building Washington, DC 20004
Deschutes County Historic Landmarks Commission	Heidi Kennedy	710 NW Wall Street Bend, Oregon 97701
National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Oregon State Habitat Office		1201 NE Lloyd Boulevard, Suite 1100 Portland, Oregon 97232
Oregon Department of Agriculture		635 Capitol Street NE Salem, Oregon 97301-2532
Oregon Department of Energy		625 Marion Street NE Salem, Oregon 97301-3737
Oregon Department of Environmental Quality		811 SW 6th Avenue Portland, Oregon 97204-1390
Oregon Department of Fish and Wildlife	Land Resources Program Manager	3406 Cherry Avenue NE Salem, Oregon 97303
Oregon Department of Geology and Mineral Industries		800 NE Oregon Street #28, Suite 965 Portland, Oregon 97232

Exhibit 9-2: *Draft EIS Agency Distribution List*

Agency	Contact	Address
Oregon Department of State Lands		775 Summer Street NE, Suite 100 Salem, Oregon 97301-1279
Oregon Economic and Community Development Department		775 Summer Street NE, Suite 200 Salem, Oregon 97301-1280
Oregon Parks and Recreation Department		725 Summer Street NE, Suite C Salem, Oregon 97301
Oregon State Library		250 Winter Street NE Salem, Oregon 97301-3950
Oregon Water Resources Department		725 Summer Street NE, Suite A Salem, Oregon 97301
Public Utilities Commission of Oregon		P.O. Box 2148 Salem, Oregon 97308-2148
State Historic Preservation Office	Heritage Programs	725 Summer Street NE, Suite C Salem, Oregon 97301
US Army Corps of Engineers, Portland, CENWP		P.O. Box 2946 Portland, Oregon 97208-2946
US Department of Interior		1849 C Street, NW Washington, DC 20240
US Department of Interior, National Park Service		1849 C Street, NW Washington, DC 20240
US Department of Interior, Fish and Wildlife Service, Oregon Fish and Wildlife Office	Paul Henson, State Supervisor	2600 SE 98th Avenue, Suite 100 Portland, Oregon 97266
US Environmental Protection Agency, Region 10		1200 Sixth Avenue, Suite 900 National Environmental Policy Act Unit (ETPA-088) Seattle, Washington 98101
US Environmental Protection Agency, Oregon Operations Office	Yvonne Vallette	805 SW Broadway, Suite 500 Portland, Oregon 97205

Exhibit 9-2 FEIS: *Final EIS Agency Distribution List*

Agency	Contact	Address
Advisory Council on Historic Preservation	Carole Legard	401 F Street NW, Suite 308 Washington, DC 20001–2637
Bend Landmarks Commission		710 NW Wall Street Bend, Oregon 97701
Deschutes County Historic Landmarks Commission	Heidi Kennedy	710 NW Wall Street Bend, Oregon 97701
National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Oregon State Habitat Office		1201 NE Lloyd Boulevard, Suite 1100 Portland, Oregon 97232
North Unit Irrigation District		2024 NW Beech Street Madras, Oregon 97741
Oregon Department of Agriculture		635 Capitol Street NE Salem, Oregon 97301-2532
Oregon Department of Energy		625 Marion Street NE Salem, Oregon 97301-3737
Oregon Department of Environmental Quality		811 SW 6th Avenue Portland, Oregon 97204-1390
Oregon Department of Fish and Wildlife	Land Resources Program Manager	3406 Cherry Avenue NE Salem, Oregon 97303
Oregon Department of Geology and Mineral Industries		800 NE Oregon Street #28, Suite 965 Portland, Oregon 97232

Exhibit 9-2 FEIS: *Final EIS Agency Distribution List*

Agency	Contact	Address
Oregon Department of State Lands		775 Summer Street NE, Suite 100 Salem, Oregon 97301-1279
Oregon Economic and Community Development Department		775 Summer Street NE, Suite 200 Salem, Oregon 97301-1280
Oregon Parks and Recreation Department		725 Summer Street NE, Suite C Salem, Oregon 97301
Oregon State Library		250 Winter Street NE Salem, Oregon 97301-3950
Oregon Water Resources Department		725 Summer Street NE, Suite A Salem, Oregon 97301
Public Utilities Commission of Oregon		P.O. Box 2148 Salem, Oregon 97308-2148
State Historic Preservation Office	Heritage Programs	725 Summer Street NE, Suite C Salem, Oregon 97301
Swalley Irrigation District	Suzanne Butterfield, General Manager	64672 Cook Avenue, Suite 1 Bend, OR 97701
US Army Corps of Engineers, Portland, CENWP		P.O. Box 2946 Portland, OR 97208-2946
US Department of Interior		1849 C Street, NW Washington, DC 20240
US Department of Interior, National Park Service		1849 C Street, NW Washington, DC 20240
US Department of Interior, Fish and Wildlife Service, Oregon Fish and Wildlife Office	Paul Henson, State Supervisor	2600 SE 98th Avenue, Suite 100 Portland, Oregon 97266
US Environmental Protection Agency, Region 10	Elaine Somers	1200 Sixth Avenue, Suite 900 National Environmental Policy Act Unit (ETPA-088) Seattle, Washington 98101
US Environmental Protection Agency, Oregon Operations Office	Yvonne Vallette	805 SW Broadway, Suite 500 Portland, Oregon 97205

Chapter 10
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Final Section 4(f) Evaluation

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1. Introduction

The Final Section 4(f) Evaluation has undergone extensive revisions from the Draft Section 4(f) Evaluation. The Draft Section 4(f) Evaluation included all Section 4(f) properties within the API if there was a use, a *de minimis* use, or no use due to avoidance. Section 4(f) properties that have either no use or a *de minimis* use, are discussed in Section 3.6 (Parks and Recreational Facilities) or Section 3.7 (Historic Resources) of the Final EIS. Only one property, the Nels and Lillian Andersen House will have a Section 4(f) use beyond *de minimis*. The Final Section 4(f) Evaluation addresses the use to that Section 4(f) property.

More Information

All references cited in this Section 4(f) Evaluation can be found in Chapter 10 of the Final EIS.

Terms used in this evaluation are defined in Appendix J.

Section 4(f) of the Department of Transportation Act of 1966, codified in federal law at 49 USC 303, declares that "it is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites."

Section 4(f) specifies that the Secretary [of Transportation] may approve a transportation program or project requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of an historic site of national, state, or local significance (as determined by the federal, state, or local officials having jurisdiction over the park, area, refuge, or site) only if:

- There is no prudent and feasible alternative to using that land; and
- The program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use; or
- The use would not affect the features, activities, or attributes which qualify the property for Section 4(f) consideration and the Federal Highway Administration has made a determination that the Section 4(f) use is *de minimis*.

Section 4(f) further requires consultation with the Department of the Interior and, as appropriate, the involved offices of the Departments of Agriculture and Housing and Urban Development in developing transportation projects and programs that use lands protected by Section 4(f). If historic sites are involved, then coordination with the State Historic Preservation Officer or Tribal Historic Preservation Officer is also needed.

2. Description of Proposed Action

The Oregon Department of Transportation (ODOT) and Federal Highway Administration (FHWA) propose to improve a segment of US 97 in Deschutes County, Oregon between the Deschutes Market Road/Tumalo Road Junction interchange and the Empire Avenue interchange.

An approximate 6-mile corridor has been identified as the Section 4(f) study area (Exhibit 1). The study area extends from north of Fort Thompson Lane to Butler Market Road. US 97 is a National Highway System freight route, the only major north-south state highway east of the Cascade Mountains in Oregon, complements the I-5 corridor, and is the key transportation corridor for interstate and regional travel of trucks and passenger cars in Central Oregon. It is classified as a statewide facility and freight route along its entire length, and as an expressway through the Section 4(f) study area.

US 97 is a critical link in moving goods and people through Central Oregon. Through the Section 4(f) study area, US 97 also serves as a route for local residents to travel to and from home and work, and it is a connection to area shopping, dining, businesses, schools, and recreation. US 20 is similarly designated as a statewide freight route and expressway through the study area.

2.1 Purpose and Need for the Proposed Action

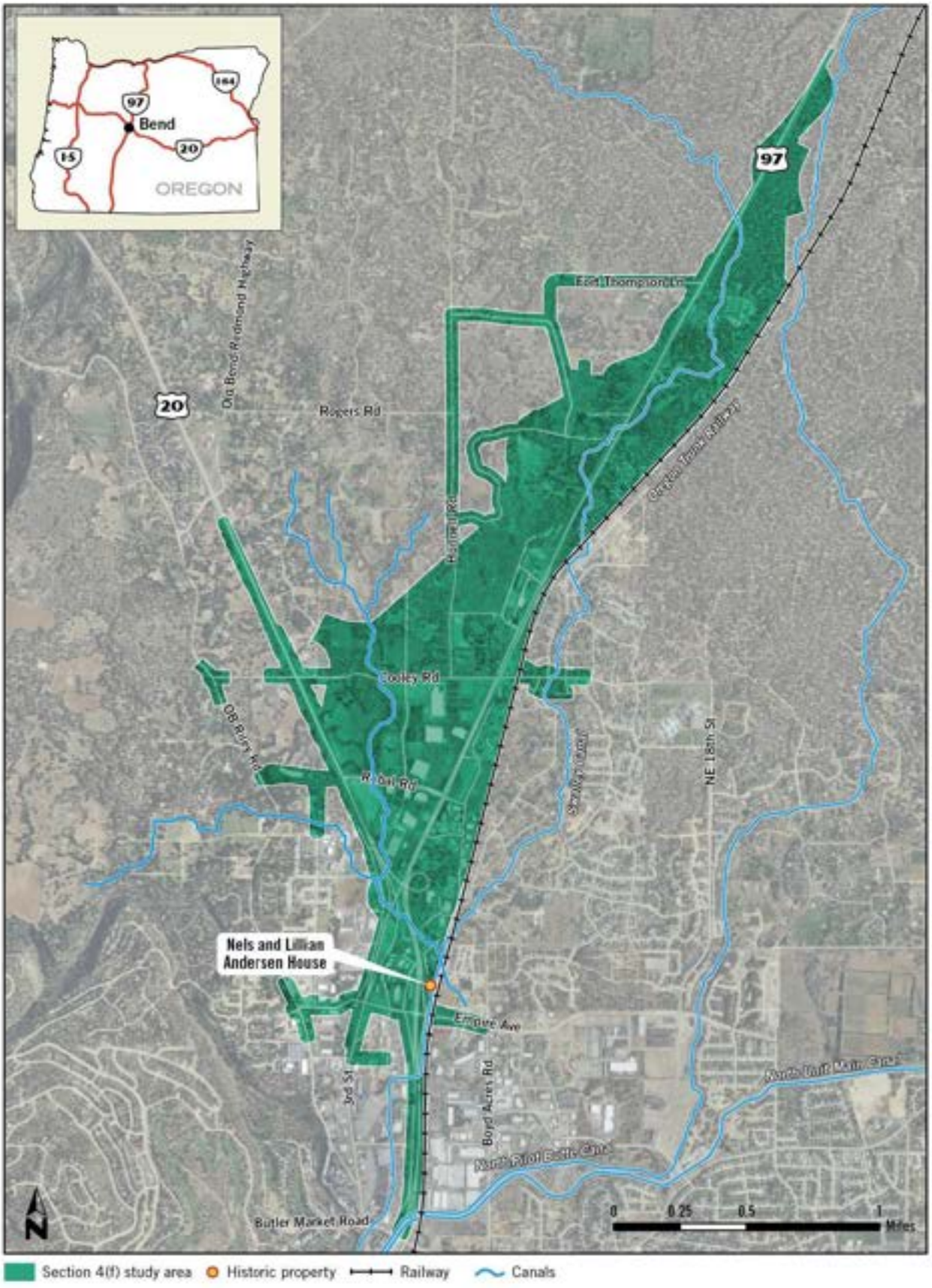
The purpose of the proposed action is to improve safety and mobility for trucks and automobiles on US 97 by implementing a practical design solution that is affordable within the potential 20-year funding opportunities and that meets the following performance objectives for the medium-term (5-10 years) and long-term (over 10 years) planning periods as defined by the Bend Metropolitan Planning Organization's *2007–2030 Metropolitan Transportation Plan.* Performance objectives for the proposed action include:

- Makes incremental improvements to reduce delay, congestion, and the number and severity of crashes at the US 97/Cooley Road and US 97/Robal Road intersections within the medium-term planning period
- Reduces delay and congestion, and improves safety and operations on US 97 as an expressway between the Deschutes Market Road/Tumalo Road Junction interchange and Empire Avenue interchange
- Supports economic development consistent with local agency plans; minimizes impacts to existing and planned local economic base; and provides for existing and planned local connectivity within the long-term planning period.

Based on the current and future traffic conditions on US 97, the proposed action must address the following:

- Congestion at approaches
- Traffic flow within the corridor
- Safety

Exhibit 1. Final Section 4(f) Study Area



2.2 Project Alternatives

The Draft EIS considered the No Build Alternative and two build alternatives: East DS1 Alternative and East DS2 Alternative; however, a broader range of alternatives was considered before being narrowed to this reasonable range of alternatives. This broader range of alternatives included a Transportation System Management/Transportation Demand Management Alternative and 20 build alternatives that would improve US 97 within three generalized corridors: west corridor, existing corridor, and east corridor.

In the Final EIS, the Preferred Alternative identified is the East DS2 Modified Alternative, which is a scaled down version of the East DS2 Alternative included in the Draft EIS.

For purposes of this Section 4(f) evaluation, only those alternatives that met the purpose and need for the project (the East DS1 Alternative, East DS2 Alternative, and Preferred Alternative) or avoided all impacts to Section 4(f) properties (the No Build Alternative) are evaluated with respect to Section 4(f) properties. Each of the alternatives is described in more detail in Chapter 2 of the Final EIS and is summarized below.

Definition

Section 4(f) Property

Section 4(f) property means publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of an historic site of national, state, or local significance (23 CFR 774.17).

More Information

Please see Chapter 2 of the Final EIS for detailed discussion and maps of the project alternatives and the Area of Potential Impact (API), which extends from approximately Fort Thompson Lane to Butler Market Road.

Specific maps showing the project alternatives in relation to impacted Section 4(f) properties are included in Section 3.1.2 of this Section 4(f) Evaluation.

2.2.1 No Build Alternative

The No Build Alternative would not include any improvements to the existing transportation system other than previously planned and fiscally-constrained projects that are independent of the proposed action. The No Build Alternative would not impact Section 4(f) properties; however, the No Build Alternative does not meet the purpose and need for the project.

2.2.2 East DS1 Alternative

The East DS1 Alternative would construct a new facility east of the existing US 97 facility. The northern interchange would be a full diamond interchange north of Bowery Lane. This alternative would result in a use of the Nels and Lillian Andersen House as described in Section 3.1.

2.2.3 East DS2 Alternative

The East DS2 Alternative would construct a new facility east of the existing US 97 facility. The northern interchange would be a directional interchange south of Bowery Lane. This alternative would result in a use of the Nels and Lillian Andersen House as described in Section 3.1.

2.2.4 Preferred Alternative – East DS2 Modified Alternative

The Preferred Alternative will construct a new facility east of the existing US 97 facility. A new signalized intersection at US 97 and 3rd Street will be constructed at the northern portion of the realigned segment of US 97. The

Preferred Alternative will have the same use of the Nels and Lillian Andersen House as the East DS1 and East DS2 Alternatives.

3. Description of and Impacts on Section 4(f) Properties

The analysis of impacts to Section 4(f) properties in this evaluation considers Section 4(f) uses. Sections 3.6 and 3.7 of the Final EIS describes the Section 4(f) analysis that resulted in determinations that Section 4(f) uses would not occur or the uses would only be *de minimis*. On November 7, 2013 FHWA made a Section 4(f) *de minimis* finding for the use of the Oregon Trunk Railway and on November 12, 2013 FHWA made a Section 4(f) *de minimis* finding for the use of the Swalley Canal and associated Riley Sub-Lateral Canal. Section 4(f) *de minimis* documentation is included in Appendix L of the Final EIS.

The only property that would have a Section 4(f) use is the Nels and Lillian Andersen House.

3.1 Section 4(f) Property with an Impact from the Preferred Alternative, East DS1 Alternative, and East DS2 Alternative

3.1.1 Nels and Lillian Andersen House

The Nels and Lillian Andersen House (Exhibit 2) was constructed in 1929 in the Tudor style using locally produced building materials. Brooks-Scanlon lumber was used to frame the house, lava stone was used to erect the foundation, and the chimney and fireplace are composed of Bend Brick. The privately owned house has been restored by its current owner to reflect its historic appearance; the restoration process included replacing non-original siding with a new coat of stucco, repairing original wood double-hung windows, replacing original windows that could not be repaired in-kind with modern wood windows of similar size and shape, and refinishing the original wood floors, when possible (Kennedy 2008).

Exhibit 2. Nels and Lillian Andersen House



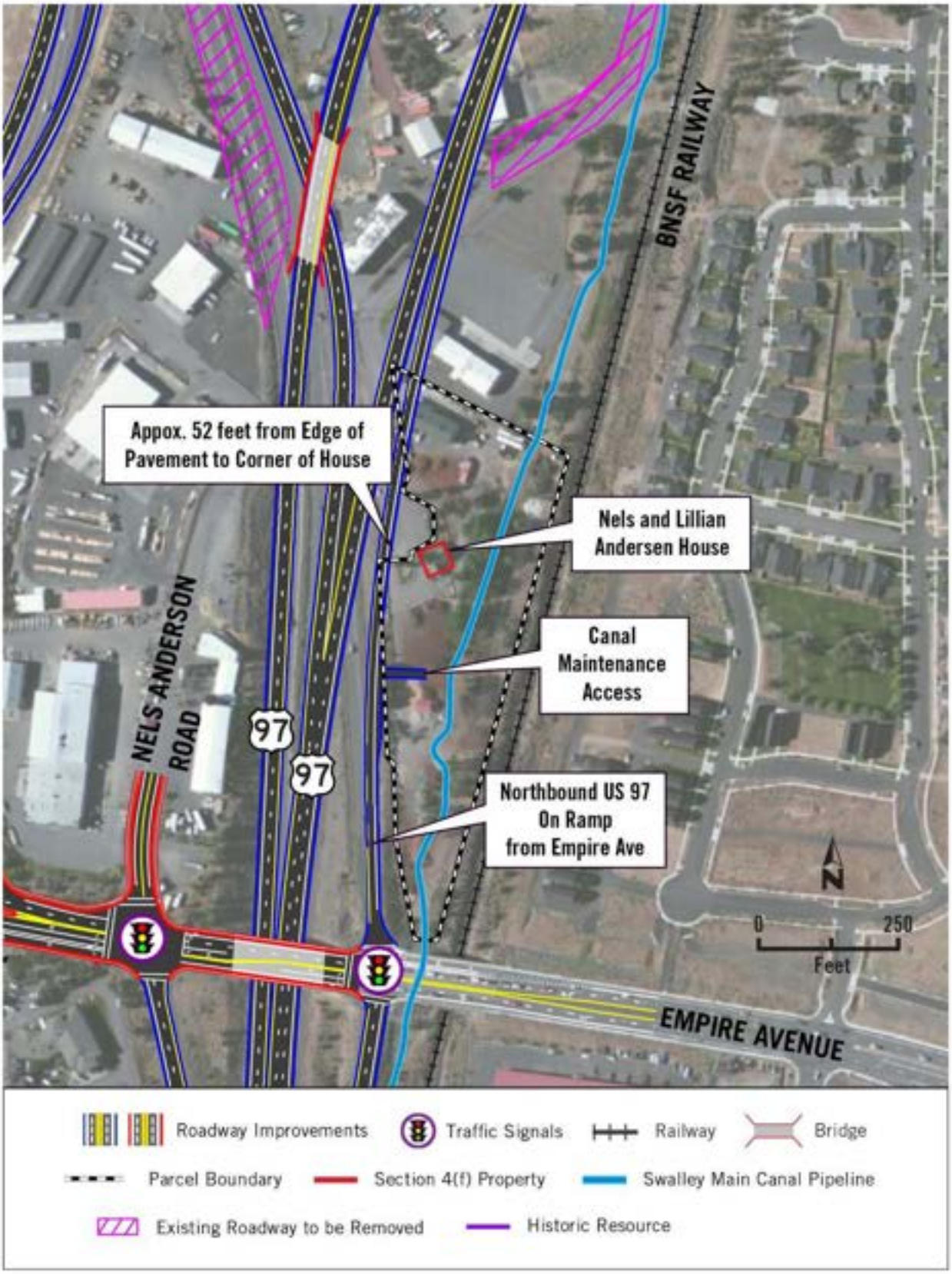
The Oregon State Historic Preservation Office concurred on January 27, 2011 that the house is eligible for listing in the National Register of Historic Places under Criterion C as a representative example of the English Tudor style of architecture in Bend, Oregon (Oregon Parks and Recreation Department, 2011).

3.1.2 Impacts to the Nels and Lillian Andersen House

Construction of the Preferred Alternative will result in impacts to the Nels and Lillian Andersen House (Exhibit 3). The East DS1 and East DS2

Alternatives would have resulted in the same impacts as the Preferred Alternative.

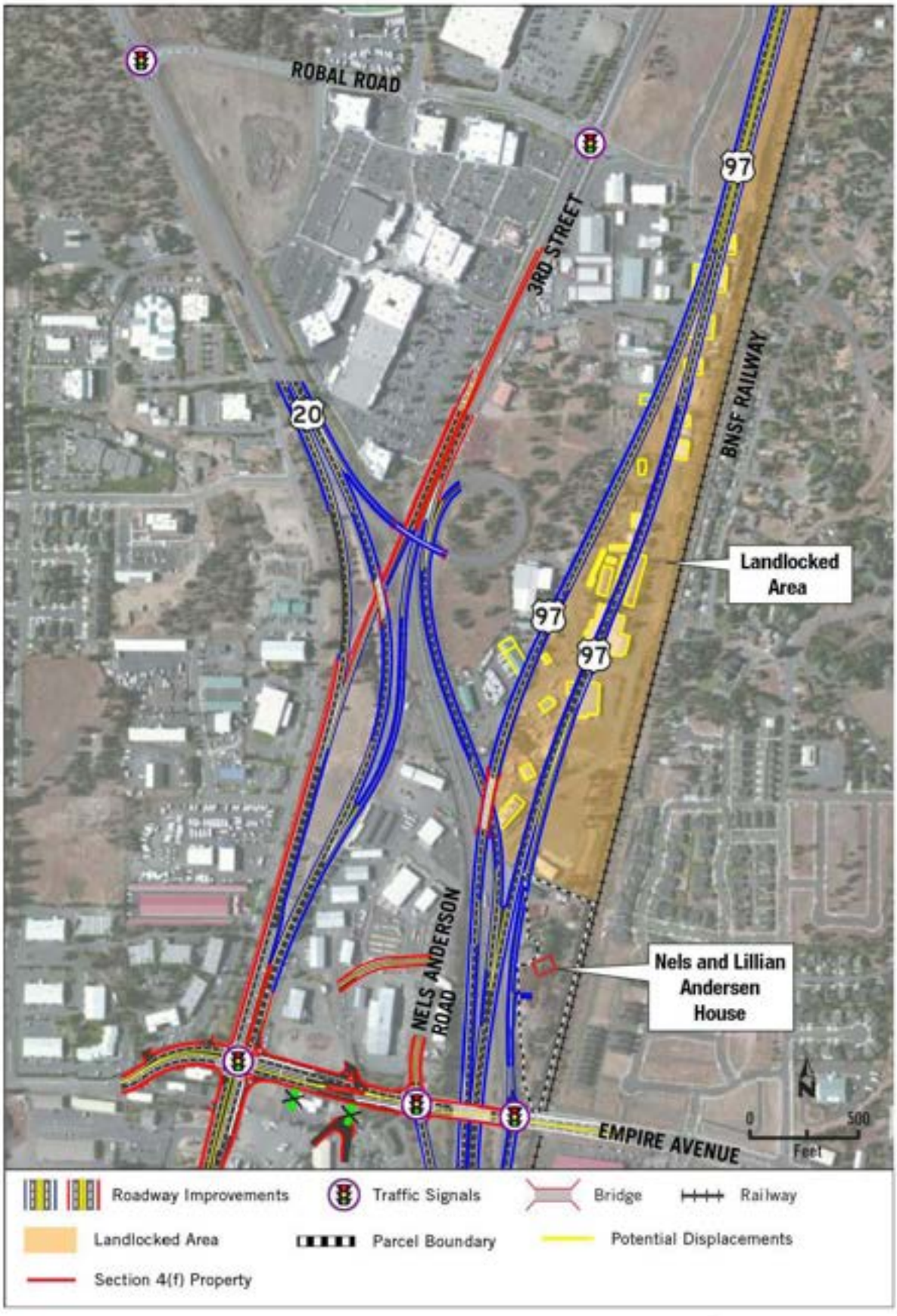
Exhibit 3. Nels and Lillian Andersen House and the Preferred Alternative



Direct Impacts—Under the Preferred Alternative a new highway ramp will be constructed across the west side of the Nels and Lillian Andersen House property, with the final roadway alignment within 52 feet from the northwest corner of the house. During construction, work areas will likely encroach even closer than 52 feet to the house. While this improvement will not traverse the area occupied by the house itself, other structures and vegetation on the property will be removed. Further, the Preferred Alternative will also remove the existing street access to the remaining portion of the parcel containing the house. The existing 0.8-mile segment of Nels Anderson Road that provides access to this property from Robal Road east of the current alignment will be completely removed by the Preferred Alternative. All parcels to the north of the Nels and Lillian Andersen House property will also be landlocked between the limited access US 97 and the railroad and are subject to full or partial acquisition (Exhibit 4). Because access to the house could not be provided under the Preferred Alternative, the house will need to be removed for safety and liability reasons as ODOT will not be able to provide access for fire, life, and safety services from the City of Bend to the house and the house will become an unoccupiable space.

Section 4(f) Use Determination—The use determination for the Nels and Lillian Andersen House is that permanent incorporation of a portion of the property into a transportation facility, and the resulting loss of access to the property, will result in a "use" under Section 4(f) under the Preferred Alternative.

Exhibit 4. Nels and Lillian Andersen House and the Preferred Alternative—Landlocked Area



3.1.3 Alternatives Considered to Avoid Impacts to the Nels and Lillian Andersen House

Location alternatives, alternative actions, alignment shifts, and design changes to avoid the use of the Nels and Lillian Andersen House were considered during the development of the Preferred Alternative.

3.1.4 Provide Vehicle Access to the Property

In an attempt to avoid landlocking the parcel under the Preferred Alternative, ODOT considered providing vehicular access to the parcel from other transportation facilities located west, north, east, and south of the Nels and Lillian Andersen House.

Provide Vehicle Access from the West: Access from the west would be precluded by the access controlled US 97 facility. The proposed US 97 facility will be approximately 250 feet wide at this location and the nearest street to the west to make a new overcrossing connection would be Nels Anderson Road, approximately 400 feet to the west of the center of the Nels and Lillian Andersen House property (Exhibit 5). To meet ODOT vertical clearance standards (Highway Design Manual, Section 5.2.8) and City of Bend design standards for maximum profile grade on local roadways (10 percent) would require a minimum of 575 feet of approach ramp from the western edge of the proposed southbound US 97 lane to the western edge of the connecting road. This distance would locate the connecting road within the ramp from southbound 3rd Street and US 20. Because of these design constraints, this overpass is geometrically infeasible. An undercrossing from the west would have similar profile and clearance problems and would conflict with the irrigation canal. This alternative is not feasible because it is not constructible.

Provide Vehicle Access from the North: A relocated Nels Anderson Road from Robal Road to the Nels and Lillian Andersen House property could be built to provide access from the north (Exhibit 6). The new road would be 4,200 feet in length, would originate west of the new US 97 facility extending south from Robal Road, pass under US 97, and then terminate at the Nels and Lillian Andersen House property between the BNSF Railway and US 97. Access to the property would require construction of a cul-de-sac that would allow for emergency vehicles, such as fire trucks, to turn around. This cul-de-sac would be built within 10 feet of the corner of the Nels and Lillian Andersen house. The crossing under US 97 would require bridges on US 97 with a minimum of 14 feet of clearance which would allow a 12-foot-tall fire truck access to the property. Although a new Nels Anderson Road is feasible because it is constructible; it would not be prudent because it results in additional construction, maintenance or operational costs of extraordinary magnitude; and, it causes other unique

problems or unusual factors as described below [23 CFR 774.17(3) (iv) and (v)].

Exhibit 5. US 97 Overpass—Access from the West

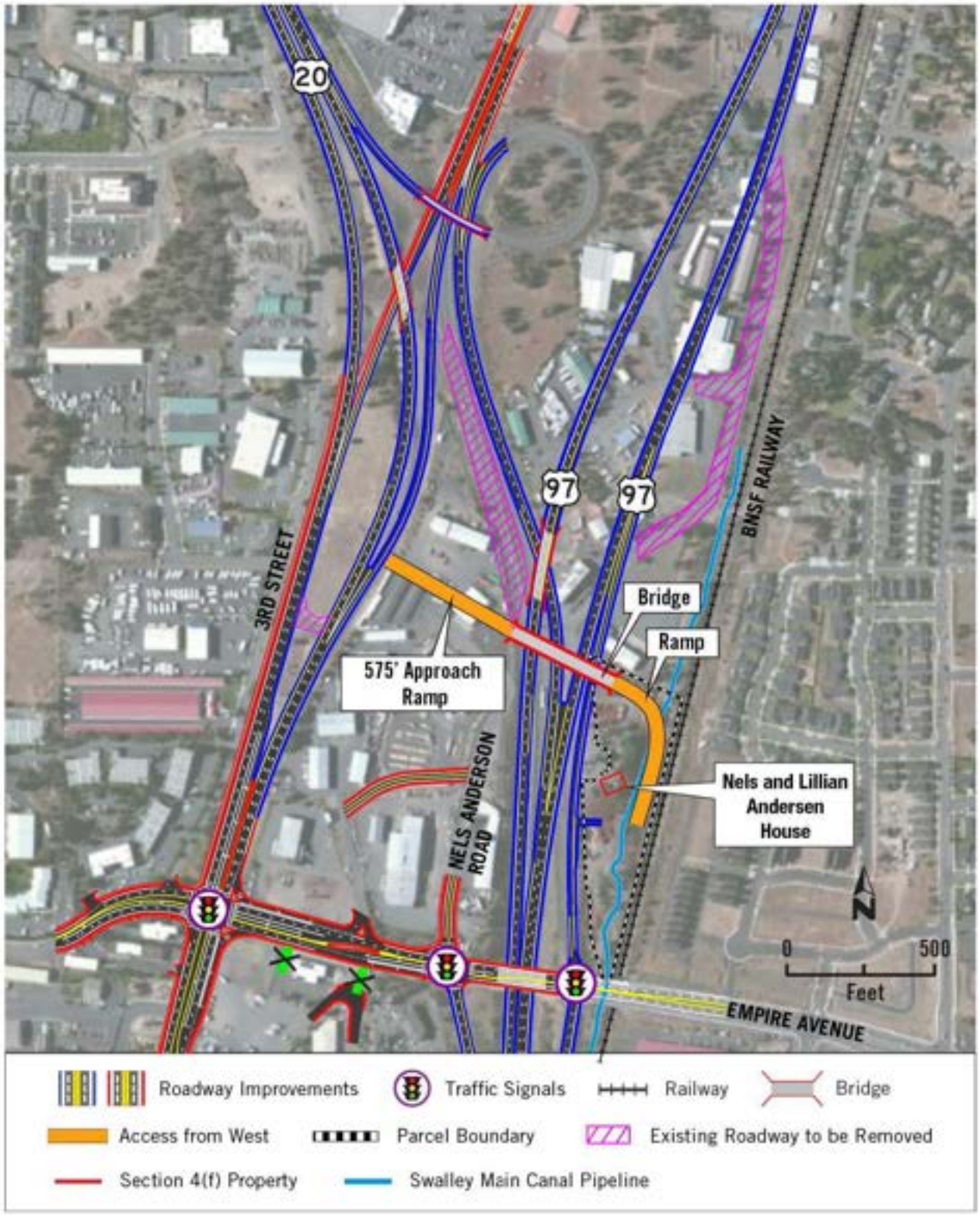


Exhibit 6. Relocated Nels Anderson Road—Access from the North



The estimated additional construction cost for the new Nels Anderson Road and the northbound and southbound US 97 bridges, including walls, would be approximately $10.7 million (2016 dollars). Right of way and displacement costs of approximately $0.2 million (2016 dollars) would be in addition to these construction costs. Therefore, the construction and acquisition costs of the new Nels Anderson Road would increase the overall cost of the Preferred Alternative (currently estimated at $174 million in 2016 dollars) by approximately 6 percent, which is an extraordinary magnitude. The new Nels Anderson Road would be a local street that would need to be maintained and operated by the City of Bend. , which would be a financial burden for the city. According to the *2007-2030 Metropolitan Transportation Plan,* the City of Bend currently has a backlog of road maintenance that requires funding above and beyond current funding levels. By fiscal year 2016, the level of operations and maintenance costs will exceed the amount of unrestricted revenue collected by the City of Bend.

The new Nels Anderson access road would cause several unique problems. The new Nels Anderson access road would require the partial acquisition of one parcel and one building, and the displacement of two businesses that would not be acquired and displaced for the Preferred Alternative. These acquisitions and displacements would limit the redevelopment of parcels south of Robal Road between the realigned US 97 and 3rd Street. The new Nels Anderson Road would also require two bridges to be constructed, one for the northbound lanes and one for the southbound lanes of US 97, which are not needed for the Preferred Alternative. These bridges would create an additional visual impact to residents of the Boyd Acres neighborhood just east of the BNSF Railway that the Preferred Alternative does not create. The new Nels Anderson Road would likely need an exception to the City of Bend Development Code as the new road would not create continuous through streets and provide the desirable pattern of orderly developed streets and blocks. The length of the new Nels Anderson Road would not comply with the 660-foot block length standard. (Bend Code, Chapter 10-10 Development Code, Section 3.1.200 D.2).

Based on the above analysis, providing access from the north by a new Nels Anderson access road is not be prudent due to the additional extraordinary construction costs; additional maintenance costs for the City of Bend and the unique problems construction of the facility would cause as described above.

Provide Vehicle Access from the East: Access from the east would be precluded by the BNSF Railway. Constructing a bridge over the railway to the Nels and Lillian Andersen House property from the east, following ODOT and City of Bend design standards for vertical clearance over railroads and maximum profile grade (10 percent), would require 305 feet of ramps on the Nels and Lillian Andersen House property (Exhibit 7). The

maximum width of the Nels and Lillian Andersen House property is less than 300 feet, as a result the bridge over the railroad would not be able to touch down on the Nels and Lillian Andersen property and would instead land in the northbound lane of US 97. Because of these design constraints, this overpass is geometrically infeasible. An undercrossing from the east would have similar slope problems and would conflict with the Swalley Main Canal Pipeline. This alternative is not feasible because it is not constructible.

Provide Vehicle Access from the South: Access from the south would be precluded by the northbound US 97 on-ramp, the elevated Empire Avenue, and the Empire Avenue bridge over the BNSF Railway (Exhibit 8). Empire Avenue is approximately 30 feet above the southern portion of the Nels and Lillian Andersen House property. The spacing between the new highway ramp and the BNSF Railway centerline along the southern boundary of the Nels and Lillian Andersen House property is approximately 120 feet. ODOT standards (Highway Design Manual, Section 9.1.3) do not allow access turnouts/driveways to be constructed on a crossroad within 750 feet of a freeway ramp centerline. This alternative is not feasible because it does not meet ODOT's Highway Design requirements to such a degree that a design exception could not be granted.

The Preferred Alternative does provide access from the northbound US 97 on-ramp to the southern portion of the Nels and Lillian Andersen House property for the Swalley Irrigation District maintenance personnel to access the Swalley Main Canal Pipeline (Exhibit 3). This access point is a controlled access driveway that will be gated and locked and is not designed as a public access road. The American Association of State Highway and Transportation Officials (AASHTO) guidelines, which ODOT follows, extend access control down the entrance ramp to a controlled access facility per Figure 10-2 of the AASHTO 2011 Green Book. Therefore a public access road from the entrance ramp is not feasible because it would not meet controlled access facilities standards. This alternative is not feasible because it does not meet ODOT's Highway Design requirements to such a degree that a design exception could not be granted.

Summary: Constructing an overcrossing or undercrossing to access the parcel from the south, west, and east would be geometrically infeasible due to large grade separations and access distance restrictions from the Empire Avenue interchange (from the south), large distance spans over US 97 (from the west) and large distance spans over the BNSF Railway (from the east).

Providing access to the property from the north is feasible, meaning it could be constructed; however, it is not prudent as described above.

Exhibit 7. BNSF Railway Overpass—Access from the East

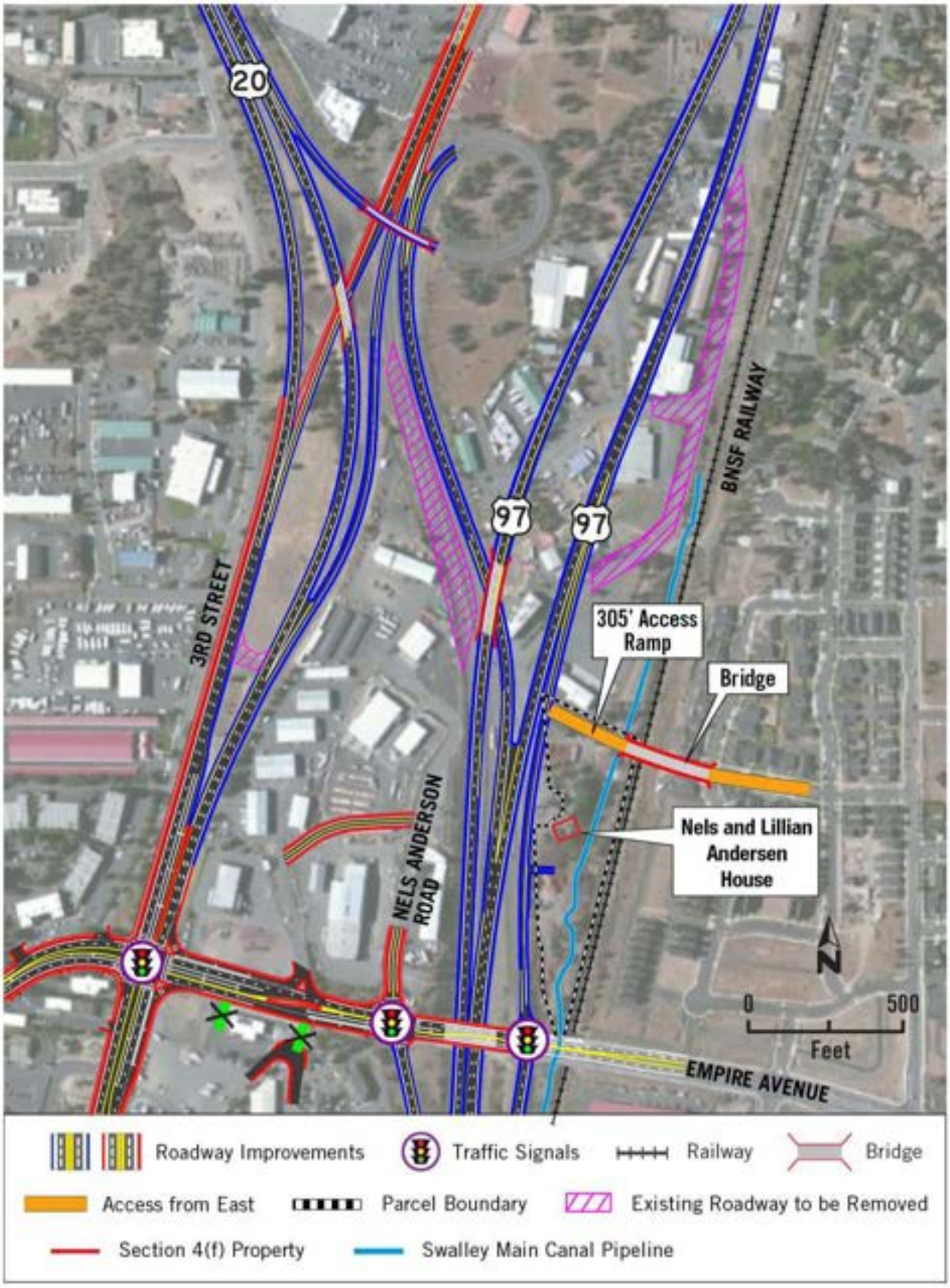
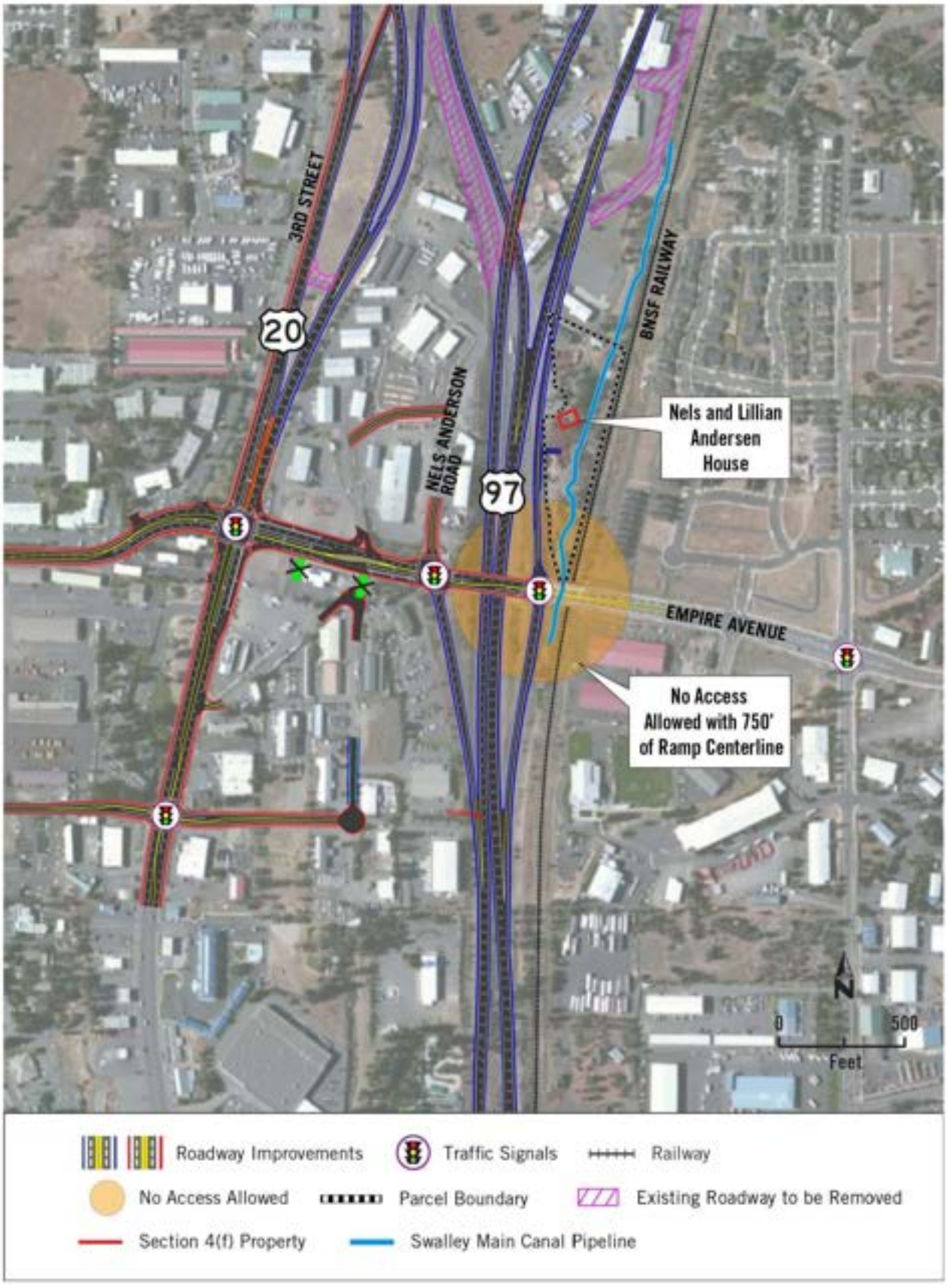


Exhibit 8. Access from Empire Avenue—Access from the South



3.1.5 Examination of Alternatives

As discussed in Section 3.1.1 through 3.1.4, providing vehicle access to the Nels and Lillian Andersen House is not feasible except from the north. However, providing access from the north is not prudent due to the extraordinary magnitude of additional construction costs and additional unique problems that it would cause. Providing non-vehicular access to the Nels and Lillian Andersen House is feasible but not prudent because it would result in unacceptable safety or operational problems.

4. Measures to Minimize Harm to the Nels and Lillian Andersen House

Impacts to the Nels and Lillian Andersen House have been minimized during the design and development of the Preferred Alternative. Section 4(f) requires that all possible planning for minimizing and mitigating impacts to Section 4(f) properties that are used by the proposed action must be documented. 23 CFR 774.17 lists factors to consider in determining which minimization and mitigation measures are reasonable:

- The views of the official(s) with jurisdiction over the Section 4(f) property
- Whether the cost of the measures is a reasonable public expenditure in light of the adverse impacts of the proposed action on the Section 4(f) property and the benefits of the measure to the property
- Any impacts or benefits of the measures to communities or environmental resources outside of the Section 4(f) property.

The project considered providing non-vehicular (pedestrian and bicycle) access to the parcel, converting the site to a public park, and retaining the house in its current location as a measure to minimize harm.. To allow pedestrian and bicycle access to the parcel, Nels Anderson Road would be extended south. Two crossings would be constructed under US 97 to allow pedestrians and bicyclists only to access the Nels and Lillian Andersen House parcel. The undercrossings would be built to connect with existing pedestrian and bicycle facilities and not preclude connection with future planned trails. Ownership of the parcel would be transferred to the Bend Park and Recreation District or the Oregon Parks and Recreation Department.

Benefits would include retaining the Nels and Lillian Andersen House in its current location and allowing its potential, future development as a park by other entities, adding parkland and historical interpretation opportunities within the City of Bend, and improving existing and future pedestrian and bicycle connectivity in this area.

Definition

All Possible Planning

All possible planning means that all reasonable measures identified in the Section 4(f) evaluation to minimize harm or mitigate for adverse impacts and effects must be included in the proposed action.

The full definition can be found in 23 CFR 774.17.

However, the Deschutes County Historical Landmarks Commission raised doubts about the viability of this site as a park due to its close proximity to the noise and visual impacts of US 97 and the BNSF Railway. This potential measure to minimize harm would also not provide direct fire, life, and safety services access to the house. Therefore, providing non-vehicular access to the property by pedestrian undercrossings is not practical.

Through the analysis of providing vehicular access and evaluating other measures to minimize harm, land-locking of the Nels and Lillian Andersen House is unavoidable under the Preferred Alternative as described in Section 3.1.2 due to its close proximity to US 97 and the highway ramp improvements that will be constructed. There are no feasible and prudent alternatives that would avoid Section 4(f) impacts. Mitigation measures could potentially reduce the amount of land used on the Nels and Lillian Andersen House parcel but it would be a minimal change. Further, even if the land use impacts were minimized, the Nels and Lillian Andersen House will remain landlocked and would need to be removed for safety and liability reasons. Therefore, mitigation measures will not change the requirement to remove the house and will not change the Section 4(f) determination of use of this property. The following mitigation measures to minimize harm have been incorporated into the Preferred Alternative:

- Potential for Removal and Relocation— As outlined in the Section 106 Memorandum of Agreement (Appendix D of the Final EIS) to resolve the adverse effect, ODOT plans to market the house and make it available for relocation to an interested third-party buyer. The Nels and Lillian Andersen House could be relocated to an alternate location by an interested party. If an interested third-party buyer is identified, ODOT would prepare the house for removal including preparing an estimate for the cost of removal and coordination with the interested party to take ownership of the house. Because the property will be landlocked under the Preferred Alternative the house could not be relocated on the same property. The option to relocate the house will require: an interested third party to buy the house; identifying a location were the house could legally be placed; determining that the house is structurally sound enough to be moved; and that the willing buyer will cover any costs that exceed the $30,000 ODOT financial commitment to prepare and move the house.

  If this option is pursued, the house will be moved in a manner consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties and in accordance with recommended approaches for moving historic buildings advocated by SHPO and the Bend Landmarks Commission. A historical architect will be retained for consultation and a licensed mover will relocate the building. ODOT will place a protective covenant on the property deed/title to ensure continued stewardship of the property in

perpetuity. SHPO and ODOT will be afforded the opportunity to review all rehabilitation documents and to monitor the building and site until the relocation is complete. This cost of preparing the house for moving is not expected to be a large public expenditure (not to exceed $30,000), and therefore will be a reasonable mitigation measure in keeping with the value of the Nels and Lillian Andersen House.

- Potential for Providing Content and Funding for Des Chutes County Historical Museum's Architectural Walking Tour Mobile Application— If an interested third-party buyer is not identified or conditions exist that do not allow the house to be moved, ODOT will provide information to the Des Chutes County Historical Museum to assist in their development of a mobile application that will guide participants along walking tours of historic sites in Bend. Possible topics of research may include the experience of European immigrants, such as Nels Andersen, that settled in the Bend area during the early twentieth century or the development of local dairying industries during that same time period. Specific topics of interest would be refined through discussions between the Des Chutes County Historical Museum and ODOT. Once research goals are defined and accomplished, the information gathered will be provided electronically to the Des Chutes County Historical Museum for their use as needed for mobile applications. This mitigation measure is not expected to be a large public expenditure (not to exceed $30,000), and therefore is a reasonable mitigation measure in keeping with the historic value for the significance of the Nels and Lillian Andersen House.

5. Coordination

ODOT has coordinated with the official with jurisdiction for the Nels and Lillian Andersen House: the State Historic Preservation Officer. In addition, ODOT has coordinated with other interested parties including the, Advisory Council on Historic Preservation, Bend Landmarks Commission, and Deschutes County Historical Landmarks Commission. Specifically, as described below, ODOT engaged in discussions with these parties regarding the impacts to the Nels and Lillian Andersen House and potential mitigation measures.

5.1 Prior to the Draft Section 4(f) Evaluation

The current private property owner of the Nels and Lillian Andersen House was an active member of the project's Citizen Advisory Committee, which served as a guiding body to ODOT through the project's Draft EIS process, and also attended the Nels Anderson business area focus group meetings. Therefore, prior to publishing the Draft Section 4(f) Evaluation, ODOT had coordinated with the current property owner on the project's potential impacts on multiple occasions.

In March 2010 architectural historians completed a reconnaissance –level survey of the Nels and Lillian Andersen House identifying the house as eligible for listing on the National Register of Historic Places. On January 27, 2011 the Oregon State Historic Preservation Office concurred with this eligibility determination (Oregon Parks and Recreation Department 2011). Appendix D of the Final EIS contains this concurrence.

On February 17, 2011 ODOT presented the project to the Deschutes County Historical Landmarks Commission and discussed the possible impacts of the East DS1 and East DS2 Alternatives, being evaluated at that time, on historic properties eligible for or listed on the National Register of Historic Places. At that meeting the Commission expressed an interest in seeing the Nels and Lillian Andersen House moved, rather than removed, to preserve the structure. At that time the house's private property owner expressed concern that the house may be unable to be moved without destroying the house because of structural issues. The Deschutes County Historical Landmarks Commission also asked ODOT to identify them as a consulting party under Section 106 of the National Historic Preservation Act.

5.2 After the Draft Section 4(f) Evaluation

During the public review of the Draft EIS and Draft Section 4(f) Evaluation, ODOT received a comment letter on September 7, 2011 from the U.S. Department of the Interior. The U.S. Department of the Interior concurred that there is no feasible or prudent alternative to the Section 4(f) impacts presented in the Draft Section 4(f) Evaluation, and that all reasonable measures to minimize harm to the Section 4(f) property were identified.

The Swalley Irrigation District commented on the Draft Section 4(f) Evaluation on September 9, 2011 regarding the historic status of the Swalley Main Canal Pipeline which was recently piped within the project's area of potential impact. Research following the receipt of the Swalley Irrigation District's letter clarified that only piped portions of the canal are eligible for listing on the National Register of Historic Places. These clarifications have been made throughout the Final EIS. As the Section 4(f) impact to the Swalley Main Canal Pipeline and associated laterals is only *de minimis,* the Swalley Main Canal Pipeline is not evaluated in this Final Section 4(f) Evaluation.

Although there were no other comments from the public on the Draft Section 4(f) Evaluation, nine comment letters on the Draft EIS were submitted that expressed concern about the impacts to the Nels and Lillian Andersen House. The nine comment letters and the responses to the concerns raised can be found at P-58, P-95, P-97, P-103, P-106, P-113, P-117, P-125, and P-127 in the project's Record of Comments included as Appendix M of the Final EIS.

In November 2011 the Bend Landmarks Commission was established and took the lead from the Deschutes County Historical Landmarks Commission in coordinating with ODOT on impacts to the Nels and Lillian Andersen House.

On February 21, 2013, ODOT sent a letter to the Deschutes County Historical Landmarks Commission to formally invite them to participate in consultation regarding historic resources. The Deschutes County Historical Landmarks Commission responded to this letter at their June 24, 2013 meeting, as described further below.

On May 16, 2013 ODOT met with the Bend Landmarks Commission to give a presentation on the historic resource impacts of the Preferred Alternative including the Nels Andersen House, which in addition to being eligible for listing on the National Register of Historic Places is a locally designated historic landmark. A copy of the presentation to the Bend Landmarks Commission was also provided to the private property owner of the Nels and Lillian Andersen House. At that time, the Bend Landmarks Commission noted that review and approval by the Bend Landmarks Commission may be required prior to alterations (including demolition or relocation) of the Nels and Lillian Andersen House. On May 17, 2013 the Bend Landmarks Commission sent a written request to ODOT to be a consulting party per Section 106 of the National Historic Preservation Act for the US 97 Bend North Corridor Project.

On June 24, 2013, ODOT again met with the Deschutes County Historical Landmarks Commission to provide a project update and discuss the historic resources in the county and their proximity to the project's Preferred Alternative. At that meeting, the Deschutes County Historical Landmarks Commission acknowledged that the Preferred Alternative would not impact historic resources in the county. However, the Deschutes County Historical Landmarks Commission stated that they would like to continue to be a consulting party per Section 106 of the National Historic Preservation Act.

In August 2013 FHWA and ODOT drafted a Section 106 Memorandum of Agreement (MOA) for impacts to the Nels and Lillian Andersen House. On August 22, 2013 the Bend Landmarks Commission and the Deschutes County Historical Landmarks Commission were provided an opportunity to comment on the Draft MOA. Also in August 2013, ODOT provided a copy of the draft Section 106 MOA to the owner. In September 2013 ODOT received review comments from the owner's attorney and in December 2013, ODOT met with the owner to review the MOA and to explain the right of way process that would occur under the Preferred Alternative.

A Section 106 project-level finding of Adverse Effect due to the impacts to the Nels and Lillian Andersen House for the Preferred Alternative was issued by the State Historic Preservation Office on September 27, 2013.

Documentation of this coordination is provided in Appendix D of the Final EIS.

On January 8, 2014 FHWA provided notification to the Advisory Council on Historic Preservation of the adverse effect finding and asked the Council if they would like to participate in the resolution of the adverse effect to the Nels and Lillian Andersen House. On March 25, 2014, the Council declined to participate because the criteria for Council involvement did not apply to this project.

The MOA among FHWA, SHPO, and ODOT for Resolution of the Adverse Effect to the Nels and Lillian Andersen House from the US 97 Bend North Corridor Project was finalized on June 9, 2014,. A copy of the final MOA was filed via letter dated June 10, 2014, with the Advisory Council on Historic Preservation completing the requirements of Section 106 of the National Historic Preservation Act.

Final Section 4(f) Determination

Based upon the above considerations, there is no feasible and prudent alternative to the use of land from the Nels and Lillian Andersen House and the proposed action includes all possible planning to minimize harm to the Nels and Lillian Andersen House resulting from such use.

Phillip A. Ditzler — July 24, 2014

Phillip A. Ditzler — Date

Oregon Division Administrator

Federal Highway Administration