AASHTO Center for Environmental Excellence

U.S. Department of Transportation
Federal Highway Administration

Examples
of Effective Techniques for Improving the Quality of Environmental Documents

American Association of State Highway and Transportation Officials
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Introduction

For more than a decade, the Federal Highway Administration (FHWA) has been engaged in an effort to improve the quality of environmental documents prepared under the National Environmental Policy Act (NEPA). This effort has included several initiatives undertaken in collaboration with the American Association of State Highway and Transportation Officials (AASHTO) and the American Council of Engineering Companies (ACEC).

In 2006, this collaborative effort resulted in the publication of a joint report, *Improving the Quality of Environmental Documents,* which identified three core principles that should guide the preparation of high-quality NEPA documents:

- **Tell the Story:** Tell the story of the project so that the reader can easily understand the purpose and need for the project, how each alternative would meet the project goals, and the strengths and weaknesses associated with each alternative.

- **Keep it Brief:** Keep the document as brief as possible, using clear, concise writing; an easy-to-use format; effective graphics and visual elements; and discussion of issues and impacts in proportion to their significance.

- **Meet Legal Requirements**: Ensure that the document meets all legal requirements in a way that is easy to follow for regulators and technical reviewers.

Since 2006, many State departments of transportation have embraced reader-friendly approaches to NEPA documents. In addition, FHWA has actively encouraged efforts to improve NEPA document quality as part of the Every Day Counts initiative. This broad commitment has resulted in a growing body of examples of completed NEPA documents that embody reader-friendly principles. But in practice, it can be difficult for practitioners to find relevant examples of the various techniques that have emerged across the country.

The purpose of this report is to help practitioners bridge the gap between the theory and practice of producing high-quality NEPA documents by providing examples that illustrate specific techniques. The examples are organized into two broad categories:

- **Improving Overall Document Quality.** This group includes techniques for improving the quality and readability of the NEPA document as a whole. These examples address such issues such as page layout, writing style, and graphics.

- **Meeting NEPA and Related Requirements.** This group includes techniques for strengthening portions of the document that address specific requirements under NEPA and other environmental laws. These examples address issues such as purpose and need, alternatives analysis, methodologies, and mitigation.

For a full list of the techniques covered in this report, refer to the Table of Contents below.

Background

How is this report organized?

This report consists of 17 chapters, each addressing a technique for improving the quality NEPA documents. Each chapter begins with a brief introduction, which provides context and describes the technique. Following the introduction, the chapter includes a series of examples. Each example is an excerpt from a recent EIS. The examples are annotated to describe the techniques that they are intended to illustrate.

How was this report was developed?

The examples in this report were gathered based on input received from State departments of transportation and consultants, as well as independent research. The examples in this report were selected because they illustrate a range of potential methods for improving the quality and readability of NEPA documents. For a list of the NEPA documents used in developing this report, refer to the Reference Documents section below.

How is "document quality" defined?

For purposes of this report, "quality" is defined broadly to include both readability and legal sufficiency. Therefore, this report does not focus solely on ways to make NEPA documents more "reader-friendly." Some of the techniques primarily enhance readability, while others primarily enhance legal sufficiency and defensibility.

Does this report create any new requirements? Is it official guidance?

No. The goal of this report is to serve as a source of ideas about ways to improve NEPA documents. The report does not create requirements, nor does it provide official guidance.

What other materials are available to assist in improving NEPA document quality?

The 2006 report, *Improving the Quality of Environmental Documents,* provides an excellent overview of approaches to improving NEPA document quality. In addition, several States have developed their own guidance documents, as listed in Resource Materials below.

In addition, a Practitioner's Handbook on Improving NEPA Document Quality is in development by the Center for Environmental Excellence by AASHTO. The Practitioner's Handbook will synthesize and expand upon the techniques shown in this report.

Where can copies of this report be obtained?

Copies of this report are available for download, without charge, on the website of the Center for Environmental Excellence by AASHTO at www.environment.transportation.org.

Table of Contents

- Including citations to data sources
- Giving units of measurement in tables
- Overlaying data on figures showing the project area
- Using bar charts instead of tables
- Using colors to highlight key data in tables
- Using symbols (icon) to summarize differences among alternatives

Chapter 7. Figures

- Labeling important features that are mentioned in the text
- Making important elements stand out clearly against the background
- Ensuring that the legend is clear and complete

Chapter 8. Visualization

- Using computer-generated images to show project elements in 3-D
- Using photo simulations to show visual impacts of the alternatives
- Including artwork in cross-section drawings to convey scale and context

Chapter 9. Appendices

- Including specific cross-references to relevant technical reports
- Including a detailed list of the appendices in the table of contents
- Including aids to navigation within each appendix
- Including key appendices in the printed volume of the NEPA document

Chapter 10. References to Supporting Materials

- Organizing references by chapter
- Including references at the end of each chapter

B. Techniques for Demonstrating Compliance with NEPA and Related Requirements

Chapter 11. Purpose and Need

- Providing clear, succinct statement of purposes and needs
- Using bullets or numbering to itemize purposes and needs
- Providing supporting data to establish/describe the needs
- Using graphics to illustrate needs
- Describing agency and public role in developing the purpose and need

Chapter 12. Alternatives Analysis

- Explaining the criteria and approach used in alternatives screening
- Clearly describing the key elements of each detailed-study alternative
- Clearly describing the improvements included in the No Build
- Using side-by-side graphics to highlight differences among alternatives
- Summarizing any refinements made to alternatives after the draft EIS
- Describing public and agency involvement in developing the alternatives

Chapter 13. Methodologies

- Describing the methodology before the impacts analysis for each resource
- Providing step-by-step explanations of complex methodologies
- Prominently defining important technical terms - e.g., in a text box
- Explaining changes made to the methodologies during the NEPA process
- Providing a methodology overview at the beginning of the impacts chapter

Chapter 14. Mitigation/Commitments

- Including a chapter or section that lists or summarizes all commitments
- Defining who is responsible and what "will" be done
- Explaining the process for ensuring that commitments are implemented
- Summarizing and cross-referencing commitments made in other documents

Chapter 15. Regulatory Compliance

- Describing the regulatory setting
- Using regulatory terminology correctly
- Including required findings
- Including dates of key events and correspondence
- Including key documents in appendices (e.g., agency concurrence letters)

Chapter 16. Responses to Comments on DEIS

- Including an index of all commenters, showing where responses can be found
- Including summary responses to common issues
- Annotating comment letters with cross-references to relevant responses
- Summarizing key issues raised by regulatory agencies
- Preparing technical memoranda in support of responses to comments that raise complex technical issues

Chapter 17. Changes During the NEPA Process

- Listing "changes in this chapter" at the beginning of each chapter
- Summarizing agency coordination activities that occurred after the draft EIS
- Explaining changes in data sources or methodology
- Describing refinements made to the alternatives
- Summarizing the findings of a reevaluation, if applicable

Reference Documents

Excerpts from the following NEPA documents are included in this report.

Colorado

- **US 36 Corridor, Final Environmental Impact Statement** (Oct. 2009), prepared by FHWA and Colorado Department of Transportation
- **I-70 Mountain Corridor, Final Programmatic Environmental Impact Statement** (March 2011), prepared by FHWA and Colorado Department of Transportation

Illinois

- **Elgin-O'Hare Bypass, Tier 1 Final Environmental Impact Statement** (May 2010), prepared by FHWA and Illinois Department of Transportation

Indiana

- **I-69, Tier 1 Final Environmental Impact Statement** (Dec. 2003), prepared by FHWA and Indiana Department of Transportation

Maryland

- **Baltimore Red Line Project, Final Environmental Impact Statement** (Nov. 2012), prepared by FTA and Maryland Transit Administration
- **Purple Line Project, Final Environmental Impact Statement** (Aug. 2013), prepared by FTA and Maryland Transit Administration
- **Intercounty Connector, Final Environmental Impact Statement** (Jan. 2006), prepared by FHWA and Maryland State Highway Administration

North Carolina

- **Mid-Currituck Bridge, Final Environmental Impact Statement** (Jan. 2012), prepared by FHWA and North Carolina Department of Transportation

Ohio

- **Cleveland Opportunity Corridor, Draft Environmental Impact Statement** (Aug. 2013), prepared by FHWA and Ohio Department of Transportation

Oregon

- **OR 62, I-5 to Dutton Road, Final Environmental Impact Statement** (May 2013), prepared by FHWA and Oregon Department of Transportation

Utah

- **West Davis Corridor, Draft Environmental Impact Statement** (April 2013), prepared by FHWA and Utah Department of Transportation

Washington State

- **SR 520, I-5 to Medina, Final Environmental Impact Statement** (June 2011), prepared by FHWA and Washington State Department of Transportation
- **I-90 Snoqualmie Pass East, Final Environmental Impact Statement** (Aug. 2008), prepared by FHWA and Washington State Department of Transportation
- **Mukilteo Multimodal Project, Final Environmental Impact Statement** (June 2013), prepared by FTA and Washington State Department of Transportation

Resource Materials

Council on Environmental Quality

- **Final Guidance on Improving the Process for Preparing Efficient and Timely Environmental Reviews Under the National Environmental Policy Act** (March 2012).

- **Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations** (March 1981).

FHWA

- **Memorandum, Improving the Quality of Environmental Documents** (July 31, 2006) from Fred Skaer, Director, Office of Project Development and Environmental Review, to FHWA Division Administrators (adopting AASHTO-ACEC-FHWA report).

AASHTO-FHWA-ACEC

- **Improving the Quality of Environmental Documents** (May 2006), prepared AASHTO, FHWA, and the American Council of Engineering Companies.

California Department of Transportation

- **Environmental Impact Statement Annotated Outline** (Aug. 2013), prepared by California Department of Transportation.

Colorado Department of Transportation

- **CDOT NEPA Manual, Version 3** (March 2013), prepared by Federal Highway Administration and Colorado Department of Transportation.

Oregon Department of Transportation

- **NEPA Document Dos and Don'ts, 2nd Edition** (Aug. 25, 2011), prepared by Federal Highway Administration and Oregon Department of Transportation.

- **Environmental Impact Statement Template** (May 2010), prepared by Federal Highway Administration and Oregon Department of Transportation.

Washington State Department of Transportation

- **Reader-Friendly Document Tool-Kit** (2009), prepared by Washington State Department of Transportation.

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Appendices

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Table of Contents

Chapter 1. Page Layout

The readability of a NEPA document depends not only on the content, but also on the way that content is presented. For example, a reader's ability to absorb complex information can be enhanced by techniques such as white space, use of color, and careful placement of graphics in relation to the text.

The examples in this section illustrate several page layout techniques, which can be used separately or in combination. They include:

- *Use of white space and color*. Color can be used in headings, footers, tables, and even in the body text to add visual interest and alert the reader to navigation aids (e.g., section numbers). White space makes it easier for the reader to absorb complex information by presenting the content in more digestible chunks rather than in long, dense blocks of uninterrupted text, which can be overwhelming to the reader

- *Integration of graphics and text*. The selection of photos and other visual elements can be used to draw the reader's attention to specific conclusions in the text, or to highlight certain resources that are especially important to the analysis. For example, as shown in this chapter, a Section 4(f) chapter for a transit project included an inset photo showing a historic building that would be removed as part of construction of the preferred alternative.

Using these techniques may require the involvement of team members with expertise in document layout and design. It also may require using special software programs that allow more flexibility in combining graphics and text, which in turn may require more time for document production. Therefore, while layout techniques may improve the quality of the NEPA document, they do not necessarily simplify preparation. It is important to take these additional efforts into account when preparing project schedules and budgets.

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White Space, Use of Color

- OH: Opportunity Corridor DEIS
- OR: OR 62 FEIS
- CO: I-70 PEIS

Techniques to note:
- use of color
- use of white space

the CLEVELAND OPPORTUNITY CORRIDOR PROJECT

Draft Environmental Impact Statement

AUGUST 2013

U.S. Department of Transportation
Federal Highway Administration

HNTB

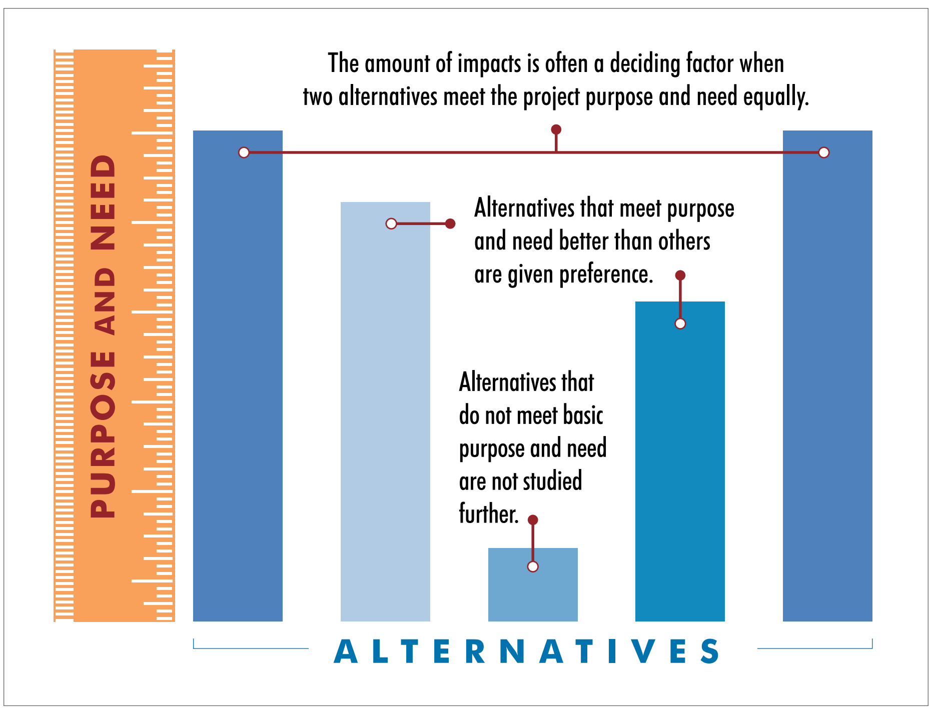
Techniques to note:
- use of color in section headings, page numbers, and charts.
- use of white space - e.g., large left margin

Chapter 2 || PURPOSE *and* NEED

WHAT ARE PURPOSE AND NEED?

The purpose and need for a project define the transportation problems that the project must solve. The purpose and need also act as "measuring sticks" for the project alternatives, helping determine to what extent each alternative meets each project need (Figure 2-1). Alternatives that do not meet the basic needs of a project are not studied further. Assuming all other concerns are equal, if one alternative meets the project purpose and need better than another, then that alternative is favored as the project progresses. And as alternatives are developed, the purpose and need can help determine if an impact is necessary.

Figure 2-1: Measuring Alternatives Using Purpose and Need



The purpose and need also help decide where a project will begin and end by defining the "who, what, where, when and why" of the transportation needs. This allows an agency to create alternatives that satisfy the project's needs completely – no more, no less. The beginning and end points of the project are also called "logical termini." Logical termini for roadway projects are usually interchanges or intersections where travel demand changes.

The purpose and need are updated throughout the planning and engineering stages as the project team learns more. The purpose and need are not final until they are approved in the Final Environmental Impact Statement (FEIS).

The purpose and need for the Cleveland Opportunity Corridor project are documented in the project's *Purpose and Need Statement*[1] (May 2011), which can be found on the CD included with this Draft Environmental Impact Statement (DEIS). Since 2011, the purpose and need have been updated with new population data from the 2010 U.S. census. These changes are included in the following sections.

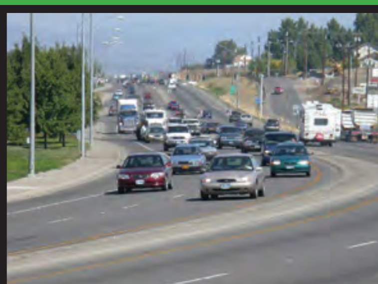
[1] *This document is incorporated by reference into this DEIS.*

Techniques to note:
- use of color on cover
- cover includes design elements used throughout the EIS.

OR 62:
I-5 to Dutton Road

Final Environmental Impact Statement and Record of Decision

May 2013


U.S. Department of Transportation
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Federal-Aid Number: X-NH-S022(022) • ODOT Key Number: 13226

ES

Techniques to note:
- use of color in headings, section numbers
- use of color to highlight text that has changed since DEIS
- use of white space

Executive Summary

How To Use This Executive Summary

In the FEIS and this Executive Summary:

- Text from the DEIS that remains substantially unchanged from the DEIS, including minor edits, such as corrections of typos and numerical errors and rewording to clarify meaning, is printed in black.
- New text is printed in burnt orange, which is the color of this text.
- Figures from the DEIS are reprinted. Where the content of a DEIS figure has changed, such as to show a change in design or impacts, the DEIS figure is immediately followed by a new figure with the same figure number, but with "FEIS" added.
- Where impact numbers or text in a table have changed because of a change in design or impacts, the numbers or text from the DEIS remain in the table and the new numbers or text are added in burnt orange immediately below the original numbers or text from the DEIS.
- The DEIS text on mitigation measures is retained, followed by the mitigation measure commitments that are incorporated into the action.

The FEIS contains new numbers and text because of changes from the DEIS in the roadway projects expected to be built under the No Build Alternative, in the design and impacts of the Preferred Alternative, and in information and circumstances. The design of the alternative and the design options that were not identified as the Preferred Alternative have not been changed and the FEIS does not contain changes to those impacts.

This Executive Summary provides an overview of the project and its potential impacts. The OR 62: I-5 to Dutton Road Project Environmental Impact Statement (EIS) provides the information in greater detail.

Introduction

The Oregon Department of Transportation (ODOT) and the Federal Highway Administration (FHWA) propose building the Oregon Highway 62 (OR 62): I-5 to Dutton Road Project, a 7.5-mile, four-lane, access-controlled expressway to serve as a bypass of existing OR 62 from Medford to north of White City in Jackson County, Oregon. The project includes the bypass, four interchanges, and changes to local streets and roads to accommodate the bypass. The project would reduce congestion and improve safety on existing OR 62 in Medford and north through White City by redirecting traffic to the bypass. The Bypass would provide faster travel and improved safety for vehicles traveling within and through the region. Figure ES-1 shows the general location of the project.

A Section 4(f) *de minimis* finding for the historic Cingcade Complex, was made by FHWA on December 16, 2011. The DEIS proposed a Section 4(f) *de minimis* use of the Denman Wildlife Area by both build alternatives, and Section 4(f) *de minimis* uses of the Bear Creek Greenway path and the planned Midway Park by the SD Alternative. These three are recreational Section 4(f) resources in the project area. A *de minimis* use of a Section 4(f) resource is a use that does not adversely affect the activities, features, and attributes that qualify a park or historic resource for protection under Section 4(f) of the U.S. Department of Transportation Act of 1966 (referred to below as Section 4(f).

FHWA has made final Section 4(f) *de minimis* determinations for impacts to the Denman Wildlife Area, the Bear Creek Greenway path, and the planned Midway Park by the Preferred Alternative and those are included in Appendix E.

If the SD Alternative is selected, 1.3 acres of land purchased with Land and Water Conservation Fund (LWCF) grants and protected by Section 6(f) would be converted to transportation use. The location of replacement land for this use would be identified prior to issuing the Final Environmental Impact Statement (FEIS).

NEPA, enacted in 1970, requires disclosure of the environmental impacts of federally-funded projects and opportunity for public comment.

Because ODOT's and Jackson County's records differ from those of National Park Service (NPS) and Oregon Parks and Recreation Department (OPRD), two additional parcels of land could also be protected by Section 6(f). This would result in an additional conversion of 0.3 acres of land protected by Section 6(f). ODOT will continue to work with NPS and the OPRD to resolve the status of these parcels. This resolution will occur as part of final design and property acquisition.

ODOT and FHWA invite review of the proposed project. Giving citizens, stakeholders, and public agencies the opportunity to review and comment on the proposed project is a vital part of the National Environmental Policy Act (NEPA) process. The process helps decision-makers evaluate project alternatives. All substantive comments submitted will be considered.

The publication of the FEIS and ROD concludes the NEPA process. Comment is no longer being invited.

To learn more about the proposed project or to submit comments on the DEIS and proposed Section 4(f) *de minimis* findings for the use of the Bear Creek Greenway, planned Midway Park, and Denman Wildlife Area, please visit the OR 62 project website at ***http://www.oregon.gov/ODOT/HWY/REGION3/hwy62_index.shtml***.

Section 4(f) *de minimis* findings have been completed. The publication of the FEIS and ROD concludes the NEPA process. Comment is no longer being invited.

Agencies and the public may send written and e-mail comments to:

Anna Henson
Oregon Department of Transportation
ODOT Region 3
100 Antelope Road
White City, OR 97503
Anna.HENSON@odot.state.or.us

Comments may also be given at a public hearing held during the review of the DEIS. Following the public hearing, ODOT and FHWA will review, consider, and address all substantive comments. Responses to comments will be provided in the FEIS. Comments on the DEIS must be received within 45 days from the date on the cover of this document.

The publication of the FEIS and ROD concludes the NEPA process. Comment is no longer being invited.

Techniques to note:
- use of color 'tab' on right side of section dividers to assist in navigation

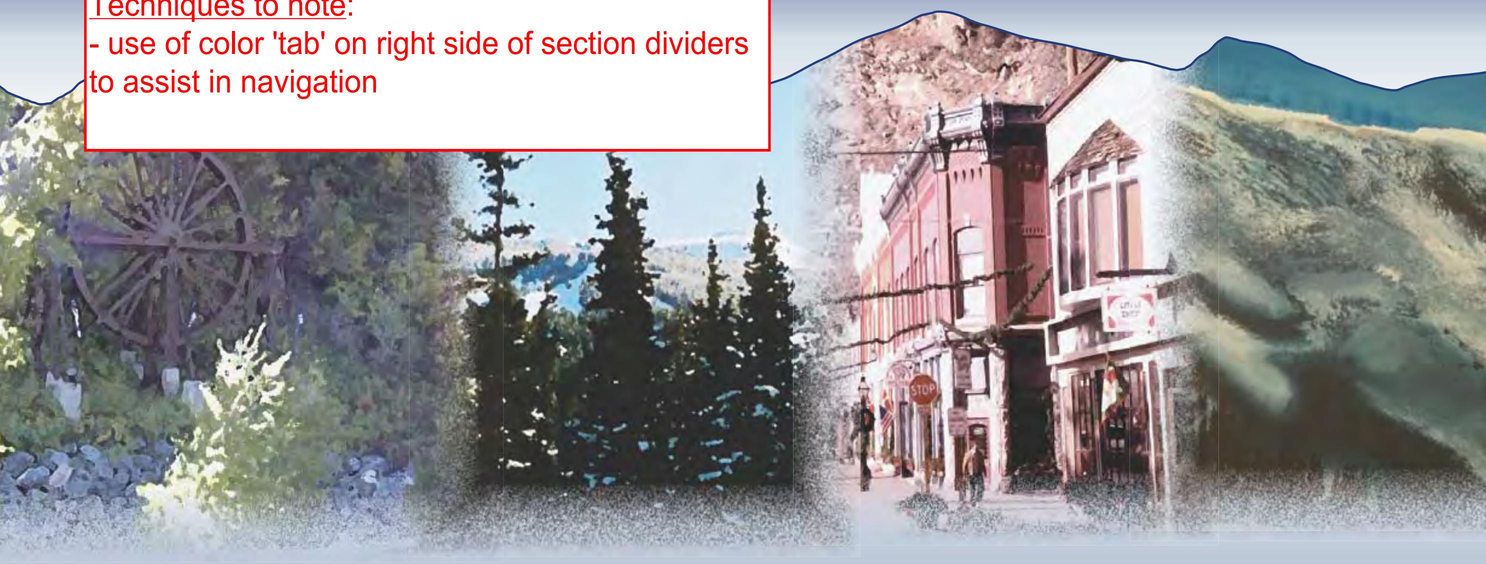

TABLE OF CONTENTS

Techniques to note:
- use of color in headings and text boxes
- use of color in header

Chapter 1. Purpose and Need

1.1 What's in Chapter 1?

Chapter 1 describes the transportation problems that exist in the Interstate 70 (I-70) Mountain Corridor (the Corridor) today and are forecast to occur in the future. These problems lead to the definition of the project purpose and need. **Chapter 1** documents the transportation problems and the need for a solution to these problems. The purpose and need provides the basis for defining reasonable alternatives and the foundation for eliminating alternatives in **Chapter 2, Summary and Comparison of Alternatives**. **Chapter 1** also describes the study limits, briefly describes the Corridor, and summarizes background information from other studies that contribute to an understanding of the Corridor and its transportation problems. Other related project information presented in **Chapter 1** includes a description of the 2035 and 2050 forecast years used to examine potential future growth and the associated travel demand, including the various types of trips that are likely to occur. For more detailed information on the travel demand forecasts, see the *I-70 Mountain Corridor PEIS Travel Demand Technical Report* (Colorado Department of Transportation [CDOT], March 2011).

1.2 Why was this Corridor study initiated?

Interstate 70 is the only east-west interstate to cross Colorado and the only continuous east-west highway in the study area. It is the major corridor for access to established communities and recreational areas that are important contributors to the quality of life and the economic base in the state. This Corridor provides access to the White River National Forest and the Arapaho and Roosevelt National Forests, the two most visited National Forests in the United States. Destinations along the Corridor include a number of major ski resorts that attract local, national, and international visitors. Recreational travel is the most predominant contributor to peak I-70 highway traffic, especially during summer and winter weekends and holidays. Existing traffic during peak travel times is characterized by congestion that noticeably affects local travel, suppresses the number of skier and other recreational visits, and affects the tourism economy.

In addition to recreational travel, the Corridor is important to freight movement in Colorado. Heavy vehicles—trucks, buses, and recreational vehicles—represent about 10 percent of traffic along the Corridor. The variation in speeds between these vehicles and faster moving automobiles, particularly on the steep grades, contributes to safety, mobility, and congestion in the Corridor. **Figure 1-1** displays Colorado and the I-70 Mountain Corridor.

> The I-70 Mountain Corridor (referred to as the Corridor) extends 144 miles from Glenwood Springs in western Colorado to C-470/Jeffco Government Center light rail on the western edge of the Denver metropolitan area (**Figure 1-1**). The Corridor includes both the I-70 highway and the associated infrastructure.

Growth in the Corridor and the Denver metropolitan region has resulted in an increase in the number of trips along the Corridor. Travelers currently experience congestion, and in the future will experience substantial travel time delays, which restrict mobility and accessibility along the Corridor. Projected travel demands in this Corridor exceed the design capacity of the facility and will result in severe congestion for extended periods of time.

The Corridor traverses the Rocky Mountains of Colorado. The portion of the I-70 highway examined in this document extends for 144 miles and traverses the rugged terrain and outstanding scenery of central Colorado, including the steep grades leading up to the Continental Divide and Vail Pass, and the narrow, steep walled Clear Creek and Glenwood Canyons. Tight curves, steep grades, deficient interchanges, and the lack of climbing and passing lanes contribute to capacity limitations throughout the Corridor's 144 miles.

The lead agencies prepared this document to identify transportation solutions at the Corridor level and to provide a foundation for future project-level analysis of specific improvements. This document recommends the general location, mode types, and capacity for future transportation improvements in the Corridor.

Integration of Text and Photos

- OH: Opportunity Corridor DEIS
- MD: Purple Line FEIS
- MD: Baltimore Red Line FEIS
- WA: 520 FEIS
- WA: I-90 Snoqualmie Pass FEIS

Techniques to note:
- inset photo, in close proximity to related text; highlights important resource in affected environment

▲ *Figure 4-32: The study area includes industrial properties that are vacant or no longer in use but that could contain polluted soil or groundwater.*

is a high possibility of pollution, a Phase II ESA is done to test the site and determine how much pollution may exist. The primary focus of these efforts is to identify potential liability from buying polluted properties, determine if there is any pollution that will need to be specially managed and identify related costs.

The ESA studies also help protect the public and construction workers. In some cases, contaminated material such as soil may need to be removed from a property. If this type of work is required, the details would be included in the final design plans.

ODOT completed an ESA screening and 29 Phase I ESAs for the project. Due to the large number of properties that need to be studied, ODOT could not complete all the Phase I ESAs prior to publication of this DEIS. No Phase II studies have been completed yet. Of the 29 properties studied, 16 would be affected by the preferred alternative and will require Phase II studies. An additional 26 properties will require Phase I studies. The properties requiring further study are shown on Figure 4-33, page 4-38.

All remaining Phase I and Phase II ESA studies will be completed during the final design of the project. The results of those ESAs and any requirements for material handling and disposal and worker protection would be included in the design plans for the project.

For additional details about the industrial properties in the area of the project, refer to the *Environmental Site Assessment Screening* (November 2009) and the *Phase I Environmental Site Assessment Opportunity Corridor Project Area* (April 2011). These reports are on the CD included with this DEIS.

As part of a separate project, the City of Cleveland received a grant from EPA to develop a plan to assess, clean up, and reuse existing brownfield sites in the study area. This grant is part of a partnership between the U.S. Department of Housing and Urban Development (HUD), USDOT and EPA. This partnership, called the Partnership for Sustainable Communities, helps communities meet their housing, transportation and environmental goals. The City's plan for brownfields redevelopment is being coordinated closely with the Cleveland Opportunity Corridor project. This coordination would continue during final design.

The No-Build Alternative would not affect land from industrial properties.

HOW WOULD CONSTRUCTION ACTIVITIES AFFECT THE SURROUNDING COMMUNITY?

Short-term impacts to the community likely would occur while the Cleveland Opportunity Corridor project is built, and then stop after construction is finished. Construction activities in any one area could last for 24 months or more. Potential temporary construction effects could include the following:

- Temporary use of land to build the new boulevard and other features;
- Temporary increase in noise from construction equipment and activities;

Techniques to note:
- inset photo, in close proximity to related text; highlights an important feature of the study area

several factors, including the loss of local manufacturing jobs and the overall shift from railroads to trucks to move goods and products. Also, the rail lines – which once served the industries in the area – and the Kingsbury Run Valley are now barriers to local access.

These changes caused local businesses to leave the area for locations with better access to the Interstate and new roads to support their needs. As businesses closed or relocated, job opportunities declined. Residents also began moving to other areas.

The decrease in population, combined with the recent economic recession, has led to a number of other trends affecting the area. Overall, approximately 29 percent of the land in or near the project area is currently vacant (Figure 4-6), and the City of Cleveland has increased its efforts to demolish vacant and abandoned structures. The increased number of vacant lots has left areas where only a few houses remain. Industrial sites no longer in use are not maintained. Lack of maintenance and abandonment have led to the demolition of some local cultural and historic resources. Property values and the tax base have also fallen, and there has been limited economic development and outside investment in the area. Declining populations and challenging economic conditions have also caused area churches and schools to close.

WOULD THE PROJECT BE CONSISTENT WITH PLANNED DEVELOPMENTS AND LOCAL LAND USE PLANS?

The City of Cleveland is working on an overall strategy to promote redevelopment and renewal in southeast Cleveland, including the area known as the "Forgotten Triangle" – an area bordered roughly by Kinsman Road, Woodland Avenue and Woodhill Road (Figure 4-5, page 4-4). The No-Build Alternative would not result in any changes to land use.

▲ *Figure 4-6: Approximately 29 percent of the land in or near the project area is currently vacant.*

Techniques to note:
- inset photo, in close proximity to related text; highlights an important resource that would be impacted by the project

continued coordination with the officials with 23 CFR 774.5(b)(2), all potential de minimis impacts are being presented for public review and comment with the FEIS, in conjunction with the requirements of NEPA. The 45-day comment period for the FEIS also applies to comments on the proposed de minimis impact findings.

The proposed Inner Harbor Station has the potential to result in a permanent, non-de minimis use of land within the Business and Government Historic District, as a result of the demolition of two historic resources that would be required for the construction of the station ancillary building (see photo below).

In accordance with Section 106 of the National Historic Preservation Act, as amended, and its implementing regulations at 36 CFR Part 800, the undertaking would result in an "adverse effect" to the Business and Government Historic District, so a finding of de minimis impact cannot be made. Therefore, an avoidance alternative evaluation and least overall harm analysis for the properties was conducted and is included the Draft Section 4(f) Evaluation (**FEIS Chapter 6**). A final analysis and conclusion would be included in the Final Section 4(f) Evaluation, based on the views of the official with jurisdiction, Section 106 consulting parties, and comments on the Draft Section 4(f) Evaluation. The Final Section 4(f) Evaluation will be completed and included as part of the ROD.

Proposed Section 4(f) permanent use of two contributing properties within the Business and Government Historic District

ES.10 Summary of Preferred Alternative Long-Term Effects

Table ES-4 below summarizes the long-term effects to resources that would result from the Preferred Alternative. Specific commitments and mitigation measures for the effects from the Preferred Alternative are identified in **Chapters 4 and 5**, when applicable and summarized in **Sections 4.7 and 5.27** of the FEIS.

Table ES-4: Summary of Preferred Alternative Long-Term Effects

Summary of Preferred Alternative Long-Term Effects
Land Use
• Minimal because the current land use plans and zoning for Baltimore County and Baltimore City have been developed to anticipate the Red Line project, and to maximize the potential benefits from the project.

Techniques to note:
- use of color accent in table
- Inset photo in close proximity to related text

Table 6-7. Summary of Preferred Alternative Historic Sites Uses/Impacts

Section 4(f) Property	Section 106 Effect	Permanent Use, Not *De minimis*	Permanent Use, *De minimis*	Existing Property Acreage	Permanent Use Acreage	Percent of Property Permanently Used
M: 35-140—Columbia Country Club	No Adverse Effect		•	146.00	0.55	<1%
M:36-87 – Rock Creek Park Montgomery County Survey Area	No Adverse Effect			500.00	0.00	0
PG: 69-26—Baltimore-Washington Parkway (Gladys Noon Spellman Pkwy)/Riverdale Road Bridges	No Adverse Effect		•	1,353.00	0.54	<1%
M: 32-15—Sligo Creek Parkway	No Adverse Effect		•	181.80	0.24	<1%
M: 36-30—Bridge No. M-0085, Talbot Avenue Bridge	Adverse Effect	•		0.04	0.04	100%
M: 37-16—Metropolitan Branch, B&O Railroad Corridor	Adverse Effect	•		3,960.00	2.40	<1%
M:36-12—Falkland Apartments	Adverse Effect	•		19.61	0.52	<1%
PG:66-35—University of Maryland Historic District	No Adverse Effect		•	1,250.00	14.19	<1%

- Prepare web-based map providing documentation and educational information on historic properties within the APE
- Develop an interpretive plan that will include historically themed signage or incorporation of historic images at stations
- Provide Consulting parties with the opportunity to review and comment on project plans during engineering design phases
- Develop a plan to monitor impacts to historic properties during construction
- Continue coordination with Consulting Parties throughout design and construction

Columbia Country Club (M: 35-140)

Section 4(f) Property Description

The Columbia Country Club (Club) (Figure 6-39) is historically significant for the period from its founding in 1911 through 1962. It is locally significant under NRHP Criterion A as an excellent example of a recreational and social complex in the suburban development of the surrounding Chevy Chase area and for its contributions, both directly and indirectly, to development of the Chevy Chase area. It is also locally significant under Criterion C for the landscape design of its golf course and the Spanish Revival-style design of its clubhouse.

Figure 6-39. Columbia Country Club Clubhouse

The boundaries of the Columbia Country Club as a National Register-eligible property generally follow the Club's existing property boundaries. The Club property is made up of two irregular parcels of land which are separated by the 100-foot-wide Georgetown Branch right-of-way. This 100-foot-wide right-of-way is the former Georgetown Branch of the B&O Railroad, which operated as a freight line from 1909 until 1985 between Silver Spring, Maryland and Georgetown, Washington DC. The Georgetown Branch predated the Columbia Country Club. The right-of-way was previously determined to be not eligible for the NRHP on April 11, 2002. An interim trail is now located in a

Techniques to note:
- use of color in headers and headings
- photos used to 'set the scene' in the introduction to the chapter
- use of white space

Chapter 4: The Project Area's Environment

The SR 520, I-5 to Medina: Bridge Replacement and high-occupancy vehicle (HOV) Project area encompasses one of the most diverse and complex human and natural landscapes in the Puget Sound region. It includes areas in Seattle from I-5 to the Lake Washington shore, the waters of Lake Washington, and a portion of the Eastside communities and neighborhoods from the eastern shoreline of the lake to Evergreen Point Road. It also includes densely developed urban and suburban areas and some of the most critical natural areas and sensitive ecosystems that remain in the urban growth area. The project area includes the following:

- *Seattle neighborhoods—Eastlake, Portage Bay/Roanoke, North Capitol Hill, Montlake, University District, Laurelhurst, and Madison Park*
- *The Lake Washington ecosystem and the bays, streams, and wetlands that are associated with it*
- *The Eastside community of Medina*
- *Usual and accustomed fishing areas of the Muckleshoot Indian Tribe, who have historically used the area's fisheries resources and have treaty rights for their protection and use*

This chapter describes what the project area is like today, setting the stage for the project's effects described in Chapters 5 and 6.

Traffic on Evergreen Point Bridge

Techniques to note:
- use of color in headers and headings
- "sidebar" photos, in close proximity to related text
- use of white space

EIS Summary

Introduction

I-90 at Gold Creek valley looking north.

Interstate 90 (I-90) is a critical link connecting Puget Sound's large population and business centers with the farmlands, diverse industries, and extensive recreational areas of Eastern Washington. The uninterrupted movement of people, freight, and business over Snoqualmie Pass is essential to our quality of life and the economic vitality of Washington State.

The I-90 Snoqualmie Pass East Project is located on the east side of Snoqualmie Pass between Hyak, at milepost (MP) 55.1, and Easton (MP 70.3). This 15-mile stretch of I-90 is in Kittitas County, Washington, and passes through the Okanogan-Wenatchee National Forest. The beginning point at Hyak is located where the existing highway narrows from six lanes to four lanes. The end point at Easton is just outside the Okanogan-Wenatchee National Forest boundary, where the terrain becomes flatter and the highway is straighter.

This project would build a safer, more efficient, and more reliable highway from Hyak to Easton, adding capacity and ensuring the continued availability of I-90 as a primary statewide transportation corridor. The Washington State Legislature has funded the first phase (Phase 1) of the project: the five miles between Hyak and Keechelus Dam.

Why is this project unique?

Gold Creek bridges. (Design visualization)

The project presents many unique environmental and design challenges due to its location along a high mountain pass in the Central Cascades. The project area receives high levels of rain and snow, requiring specialized designs to manage stormwater runoff and snow storage. In some parts of the project area, the highway exists in a narrow corridor between the eastern shore of Keechelus Lake and steep cliffs, making the area susceptible to rockfall and avalanches. Large areas of protected state, federal, and conservation lands north and south of I-90 support a broad range of habitats and a diverse array of plants and wildlife that have been separated by the highway.

What is the project purpose and need?

The purpose of the project is to meet projected traffic demands, improve public safety, and meet the identified project needs for a 15-mile stretch of I-90 between the communities of Hyak and Easton, in Kittitas County, Washington.

Avalanches in the project area regularly close I-90.

Avalanches

I-90 is frequently closed due to avalanches and associated control work. These closures strand motorists and freight on Snoqualmie Pass, resulting in substantial safety hazards to the traveling public, travel delays, and impacts to the state's economy. The traveling public and movement of goods remain at risk as long as the avalanche problem is not resolved. The risk will increase with growth in traffic volumes.

Unstable slopes in the project area regularly lead to rock fall.

Slope Instability

I-90 has several unstable slopes, which results in rock and debris falling onto the roadway, causing damage to property and loss of life. These slopes will continue to pose a threat to property and safety if they are not stabilized or if the highway is not realigned to avoid areas of slope instability.

Cracked and deteriorated pavement on I-90.

Structural Deficiencies

The pavement on I-90 is beyond its design life and the roadway is rapidly deteriorating. If it is not repaired or replaced, continued deterioration of the roadway will result in unsafe driving conditions, increased vehicle damage, travel delay, and eventual failure of the roadway.

Recreational vehicles and freight travel I-90 during a holiday weekend.

Traffic Volumes

Traffic volumes on I-90 are increasing at an estimated rate of 2.1 percent per year and are expected to increase at a similar rate well into the future. Traffic volumes already exceed the highway's design capacity during peak travel periods. The worsening traffic situation may lead to higher numbers of accidents, adverse economic impacts, and increased travel times.

Chapter 2. Writing Style

Text in the main body of a NEPA document should be written for readers who lack technical expertise in the subjects being addressed. As one court explained, the document "must be organized and written so as to be readily understandable by governmental decision-makers and by interested non-professional laypersons likely to be affected by actions taken ..." *Or. Envtl. Council v. Kunzman*, 817 F.2d 484, 494 (9th Cir.1987).

Clear writing involves explaining complex topics in a way that can be readily understood by most readers. Some effective techniques include:

- *Clear, succinct sentences*. Using plain language and keeping sentences short helps to ensure that even complex topics are presented in digestible chunks. For example, one of the NEPA documents in this chapter defines mobility very simply: "Mobility is the easy movement of people and goods through an area."

- *Use of bullets.* Bullets provide a way to highlight a series of distinct points, which could be blurred together if they were all lumped into a single block of text. For example, the examples in this chapter show how bullets can be used to summarize the elements of an alternative, the reasons an alternative was eliminated, and the consequences of the No Action Alternative and the preferred alternative.

- *Defining key terms and concepts.* Clear writing does not require avoiding the use of technical terms. In some cases, clarity *requires* using a specific term - because that term plays an important role in the environmental analysis. The key to clear writing is to explain those terms when they are first used; the explanation should be easy to understand and should be prominent – for example, in a text box.

To produce a document with high-quality writing, it is beneficial to include a technical editor and to ensure that the schedule includes time for the technical editor to review and revise chapters of the document as they are developed.

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Clear, Succinct Language

- OH: Opportunity Corridor DEIS
- WA: SR 520 FEIS
- WA: I-90 Snoqualmie FEIS

Techniques to note:
- clear, succinct explanation of key concept in Purpose & Need ("mobility")

Recent changes on two of these primary routes have reduced the capacity of the roads between the Interstates and University Circle. Carnegie Avenue once had six lanes that could be switched to provide four or five lanes in the rush hour direction and one or two lanes in the opposite direction, but the avenue was restriped in 2005 to have two fixed lanes in each direction and a center lane for left turns. This eliminated up to three lanes to and from University Circle. Two bus-only lanes were built on Euclid Avenue in 2008, reducing the lanes from four to two.

In addition, the street grid (Figure 2-2, page 2-2) is missing an east-west connection between Woodland and Union avenues, a distance of about two miles. As a result, north-south and diagonal roadways are not directly linked, and drivers must twist and turn their ways through the local streets to reach University Circle, creating a traffic bottleneck at the I-490-East 55th Street and East 55th Street-Woodland Avenue-Kinsman Road intersections. Drivers' other option to reach University Circle is to travel on I-90 or I-490, merge onto Cleveland's Innerbelt Freeway and travel through the central business district.

The Cleveland Opportunity Corridor project must provide improved access between I-77 and University Circle.

What is "mobility?"

Mobility is the easy movement of people and goods through an area. It is difficult for trucks to negotiate the roads between I-77 and University Circle. Rail lines used to move most of the goods in this area, so the streets were built mostly for cars. Today, the remaining industries are served mostly by trucks that have to use streets that were not built for them. Also, traffic to and from the houses, apartments, churches and stores in the area does not mix well with the heavy, industrial trucks.

The closest Interstate for travelers in the study area is I-490, and most, if not all, traffic traveling in this area must pass through the I-490-East 55th Street intersection before spreading out to other roads or highways. As a result, 2005 and 2010 traffic counts show that this intersection operates at Level of Service F (Figure 2-3), meaning the traffic flow has broken down. Roadways with this poor level of service have more users than they can handle.

The Cleveland Opportunity Corridor project must provide improved mobility and better levels of service for traffic traveling to, from and within the area between I-77 and University Circle.

Figure 2-3: Levels of Service (LOS)

LOS A
Most vehicles arrive at the green light and travel through without stopping.

LOS B
Vehicles still move through the intersection very well, but more have to stop at the red light.

LOS C
A substantial number of vehicles have to stop at the red light, but many still pass through without stopping.

(Target LOS for Cleveland Opportunity Corridor)

LOS D
Many vehicles have to stop at the red light, and traffic starts stacking at the intersection. There are times where the stopped vehicles do not make it through the green light.

LOS E
Traffic volumes are higher than the intersection can handle with lines of stopped vehicles. A high number of stopped vehicles do not make it through the green light.

LOS F
Traffic flow has broken down. Traffic volumes are high, and there are long backups at the intersection. Most vehicles have to wait through one or more green lights to get through.

Techniques to note:
- clear, succinct explanation of the need for the project (e.g., "vulnerable to catastrophic failure"

What is the project purpose?

In 2000, the Trans-Lake Washington Study Committee developed the project's statement of purpose, which has guided the environmental review process since that time:

The purpose of the project is to improve mobility for people and goods across Lake Washington within the SR 520 corridor from Seattle to Redmond in a manner that is safe, reliable, and cost-effective, while avoiding, minimizing, and/or mitigating impacts on affected neighborhoods and the environment.

The statement of purpose—part of a longer purpose and need statement also adopted in 2000—has helped the project team develop and evaluate alternatives for the EIS analysis by defining the objectives that the alternatives must meet. Although the project limits have changed since the original statement was adopted, the project still has the purpose of improving mobility within the SR 520 corridor, and its transportation performance is evaluated on a corridor-wide basis. The I-5 to Medina project also serves another important purpose: to replace the aging and vulnerable Evergreen Point, Portage Bay, and west approach bridges. The following section describes the need for the project in terms of both mobility and safety.

Why is the project needed now?

The Evergreen Point Bridge is a critical component of the Puget Sound region's transportation infrastructure. It is one of only two connections across Lake Washington that link urban centers in Seattle and the Eastside. The SR 520, I-5 to Medina project addresses two key issues facing the SR 520 corridor: 1) bridge structures that are vulnerable to catastrophic failure and 2) worsening traffic levels and congestion due to growth in jobs and housing over the last two decades.

SR 520's bridges are vulnerable to catastrophic failure.

The Evergreen Point Bridge and its approaches are in danger of structural failure. Recent WSDOT studies have demonstrated that the floating span of the Evergreen Point Bridge is highly vulnerable to windstorms, while the Portage Bay Bridge and the east and west approaches to the Evergreen Point Bridge are vulnerable to earthquakes. In 1999, WSDOT estimated the remaining service life of the floating portion of the Evergreen Point Bridge to be 20 to 25 years, based on its structural condition and the likelihood of severe windstorms. Its life expectancy now is only 10 to 15 years.

The floating span was originally designed for a sustained wind speed of 57.5 miles per hour (mph). In 1999, WSDOT rehabilitated the bridge to allow it to withstand sustained winds up to 77 mph. This still falls well short of the current design standard of 92 mph. Moreover, some bridge mechanisms have been damaged in recent storms. The floating pontoons currently float about 1 foot lower than originally designed, increasing the likelihood of waves breaking onto the bridge deck. Cracks in the structure leak water that WSDOT must pump out on a regular basis. The probability that the bridge will sustain serious structural damage (i.e., sink or become impassable to traffic) over the next 15 years is extremely high. To bring the Evergreen Point Bridge up to current design standards and eliminate the risk of its catastrophic failure, the existing span must be completely replaced. Exhibit ES-2 shows the vulnerable sections of SR 520.

The ever-present possibility of an earthquake in the Seattle area poses additional risks to other bridges in the SR 520 corridor. The columns of the Portage Bay Bridge and both the west and east approaches to the Evergreen Point Bridge are hollow and do not meet current seismic design standards. Hollow-core columns are difficult and costly to retrofit to today's accepted seismic protection levels; WSDOT studies indicate that such retrofitting would cost nearly as much as building new structures, and would have similar environmental effects. WSDOT estimates that over the next 50 years, there is a 20 percent chance of serious damage to these structures in an earthquake.

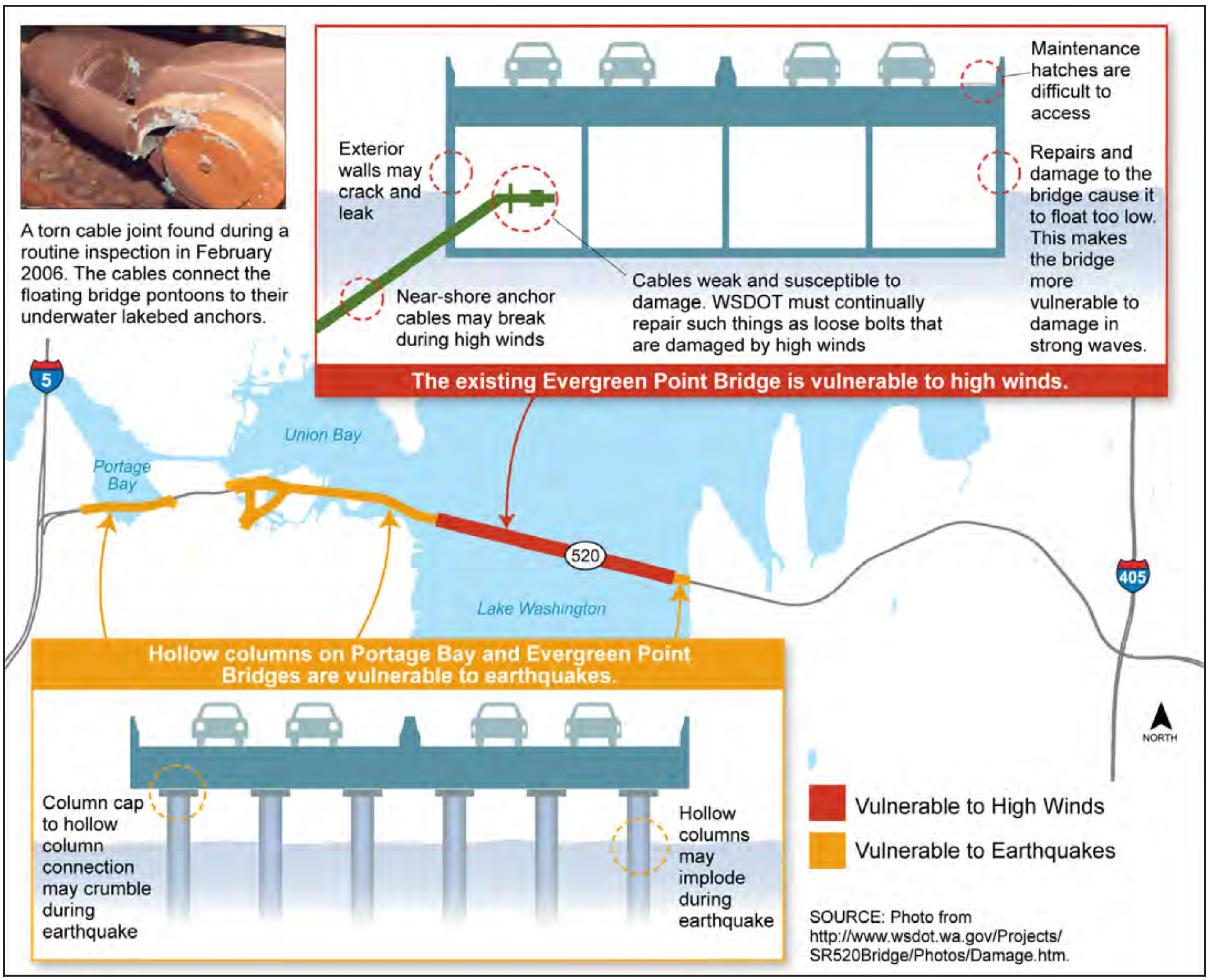
Techniques to note:
- clear, succinct explanation of key concept in Purpose & Need (existing and future congestion)

SR 520 is congested and unreliable, and does not encourage maximum transit and carpool use.

A second key reason for implementing this project now is the severe traffic congestion in the SR 520 corridor, which was the reason for initiating the original Trans-Lake Washington Study in 1997. The traffic demand in both directions exceeds the highway's capacity, creating several hours of congestion every weekday. The corridor was not built to handle as many vehicles as currently want to use it. Today, seven times more vehicles cross SR 520 each day than when the bridge first opened in 1963; traffic during peak hours is nearly equal in each direction. All of these vehicles result in frequent breakdown of the traffic flow and long backups of vehicles traveling at very slow speeds.

Beyond the number of people and cars, another important factor causing today's congestion is the design of the Evergreen Point Bridge. By today's engineering standards, the bridge is too narrow. The narrow shoulders provide no room for vehicles to pull over after an accident or breakdown. Instead, disabled vehicles must stay in the

Exhibit ES-2. **Points Along SR 520 Vulnerable to Earthquake and Windstorms**



SOURCE: Photo from http://www.wsdot.wa.gov/Projects/SR520Bridge/Photos/Damage.htm.

Techniques to note:
- clear, succinct explanation of conditions that would exist under No Action Alternative

through lane and block other traffic, immediately rendering a full lane of traffic unusable. This slows down traffic and impedes emergency vehicle response. In addition, the westbound HOV lane on the Eastside ends at the bridge, creating congestion as westbound HOV traffic is forced to merge with general-purpose traffic.

Together, growth and physical limitations will make the future traffic situation on SR 520 worse if the corridor is not improved. Under average evening peak-hour conditions today, a single-occupant vehicle traveling westbound takes approximately 39 minutes to travel SR 520 from SR 202 in Redmond to I-5 in Seattle—a distance of about 13 miles. By 2030, if the project is not built, this same trip will take over an hour. This makes it imperative that commuters be provided with travel choices that allow them to avoid driving alone, and that the proposed project be built to support increased use of transit and HOVs.

What would happen if the project were not built?

If the project were not built, the section of SR 520 between I-5 and Evergreen Point Road would not be improved, and these critical needs would not be met:

- The risk of bridge failure in a storm or earthquake would increase as the structures continued to age, with consequences ranging from severe traffic congestion to loss of life. As the floating bridge becomes more fragile, it would require more frequent closures to protect its components from damage.
- Planned growth in the project area over time would cause continued growth in traffic volumes on SR 520, increasing congestion and raising the potential economic and social cost of traffic closures and/or bridge failures.
- Transit vehicles and carpools would remain in congested general purpose lanes, increasing travel time, reducing reliability, and discouraging commuters from choosing transit.
- The facility's narrow shoulders would continue to result in blocked lanes and long delays when accidents occur.
- Without lids, SR 520 would continue to serve as a barrier between neighborhoods.
- Pedestrians and bicyclists would remain limited to I-90 as a choice for crossing Lake Washington.
- Stormwater discharging from SR 520 into Portage Bay and Lake Washington would remain untreated.

Who has been involved in the environmental process?

Who are the lead agencies?

For environmental review of this project, FHWA is the federal lead agency under NEPA, and WSDOT is the project proponent and the state lead agency under SEPA. FHWA is providing highway design guidance and environmental oversight. WSDOT is leading the highway design efforts and development of the EIS. The lead agencies also give close consideration to public, agency, and tribal comments on the project.

Who are FHWA and WSDOT's cooperating agencies for this project?

Staff from the affected jurisdictions, representatives of state and federal natural resource agencies, and tribes have provided advice and recommendations to the lead agencies about the scope and content of environmental analysis. These "cooperating agencies" are defined under NEPA as those that have an interest in a proposed project for which environmental documents are being prepared. Most cooperating agencies issue or contribute to permit decisions for a project, and will adopt the SR 520, I-5 to Medina project Final EIS under NEPA or SEPA in support of these decisions.

WSDOT worked with the cooperating agencies through a forum known as the Regulatory Agency Coordination process (RACp). All agencies with jurisdiction over the project were invited to attend, as were all tribes with fishing rights and/or cultural resource interests in the project area. While the RACp itself was primarily focused on sharing of information, smaller technical working groups (TWGs) met more often to focus on topics of specialized interest, including natural resource effects,

Techniques to note:
- clear, succinct explanation of the benefits of the Preferred Alternative

What are the expected environmental consequences?

What beneficial effects would result?

No-Build Alternative

The No-Build Alternative would result in no beneficial effects to transportation. The current transportation problems would continue and worsen over time.

Build Alternatives

Solving the transportation problems is part of the project's purpose and need. Under all of the build alternatives, WSDOT would replace the existing deteriorated pavement, widen the existing four-lane highway to six lanes, add additional chain-up and chain-off areas, and straighten unsafe curves. These improvements would have the following beneficial effects:

Avalanche Control. Under all of the build alternatives, WSDOT would make improvements at all of the avalanche chutes. These would include scaling (forcing loose rocks to fall in a controlled setting), bolting, wire mesh, reducing the steepness of the slope, and improving catchment areas. WSDOT would revegetate cut slopes with soil. The existing snowshed would be replaced with a larger and longer structure under all of the Keechelus Lake Alignment Alternatives except Alternative 1. WSDOT designed these improvements to prevent all avalanches that have a 30-year return period or less from reaching the highway.

The new snowshed will cover the entire width of I-90, preventing avalanches from reaching the highway at this location. (Design Visualization)

Avalanche return period: the average expected time between events reaching or exceeding a given positions. Larger return periods imply that the avalanche is larger. A 30-year return period event is the largest avalanche expected every 30 years (Canadian Avalanche Association).

Highway Capacity Improvements. Constructing additional lanes would increase the highway's capacity substantially. Exhibit 3-35 shows that constructing the Preferred Alternative would delay the deterioration to LOS D by approximately 23 years compared to the No-Build Alternative. These beneficial effects would be similar for all of the build alternatives.

Exhibit 3-35
Change to Level of Service – Preferred Alternative vs No-Build Alternative

	Preferred Alternative		No-Build Alternative	
LOS	Year	AADT	Year	AADT
D	2041	47,500	2013	31,500
E	2058	57,200	2025	38,400
F	2070	64,000	2033	43,000

AADT – annual average daily traffic

Unstable Slope Stabilization. WSDOT would stabilize slopes using methods including scaling, bolting, installing wire mesh, or reducing the steepness of the slope (see Section 3.1, *Geology and Soils*). Sufficient catchment at the toe of the slopes would be provided so that rock fall would not reach the highway.

WSDOT installs rock bolts and netting to improve safety from rock fall within the project area.

Low-Clearance Bridge Replacement. Replacing low-clearance bridges with new structures that meet or exceed the minimum 16-foot 6-inch clearance would reduce the need for oversized trucks to detour around them and reduce the risk of accidents. Replacing the snowshed would eliminate the need to close the eastbound lanes in order to move oversized loads around it because of its low clearance.

Additional Chain-up/Chain-off Areas. WSDOT would build additional chain-up/chain-off areas where conditions are favorable (Gold Creek to Wolfe Creek, Resort Creek to Townsend Creek, and Price Creek to Bonnie Creek) under all the build alternatives (Exhibit 3-36). Chain-up areas would be 30 feet wide, and chain-off areas would be 20 feet wide. This would reduce the potential for chain-up/chain-off activities to interfere with normal traffic flow, and would concentrate chain-up/chain-off areas closer to the Snoqualmie Pass summit, where they are needed most.

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Use of Bullets to Summarize Key Points

- NC: Mid-Currituck FEIS
- OR: OR 62 FEIS
- WA: Mukilteo FEIS

Techniques to note:
- use of bullets to summarize elements of an alternative

the combined corridor/design public hearing maps for each of the five DEIS alternatives. These maps were displayed at the public hearings and on the NCTA web site at http://www.ncdot.gov/projects/midcurrituckbridge/. They present the design features of each DEIS detailed study alternative and were used to assess the impacts of the detailed study alternatives. A list of these maps is included in Appendix D.

2.1.2.1 ER2

ER2 was developed to achieve maximum transportation benefits using the existing roadways, while minimizing impacts to communities along those roads. The basic features of ER2 are:

- Adding for evacuation use only, a third outbound evacuation lane (Figure 2-3) on US 158 between NC 168 and the Wright Memorial Bridge as a hurricane evacuation improvement or using the existing center turn lane as a third outbound evacuation lane; in either case one inbound lane on the Wright Memorial Bridge and on the Knapp (Intracoastal Waterway) Bridge would be used as a third outbound evacuation lane;
- Widening US 158 to a six-lane super-street (Figure 2-4) between the Wright Memorial Bridge and Cypress Knee Trail that widens to eight lanes between Cypress Knee Trail and the Home Depot driveway (both locations indicated are just west of the existing US 158/NC 12 intersection);
- Constructing an interchange (Figure 2-4) at the current intersection of US 158, NC 12, and the Aycock Brown Welcome Center entrance, including six through lanes on US 158 starting at the Home Depot driveway and returning to four lanes just south of Grissom Street (which is just south of the existing US 158/NC 12 intersection); and
- Widening NC 12 to three lanes (two travel lanes and a center lane for left turns; Figure 2-5) between US 158 and a point just north of Hunt Club Drive in Currituck County (except for the existing three-lane section in Duck, which will be unchanged) and to four lanes with a median from just north of Hunt Club Drive to Albacore Street (Figure 2-6).

As illustrated on Figure 2-4, the unique characteristic of a super-street is the configuration of the intersections. Side-street traffic wishing to turn left or go straight must turn right onto the divided highway where it can make a U-turn through the median a short distance away from the intersection. After making the U-turn, drivers can then either go straight (having now accomplished the equivalent of an intended left turn) or make a right turn at their original intersection (having now accomplished the equivalent of an intention to drive straight through the intersection).

2.1.2.2 MCB2

MCB2 involves construction of a Mid-Currituck Bridge, as well as improvements to existing NC 12 and US 158. MCB2 was developed to examine the travel benefits of combining a Mid-Currituck Bridge with substantial NC 12 and US 158 improvements.

Techniques to note:
- use of bullets to summarize reasons an alternative was eliminated from consideration

2.3.5 Regional Improvements: Public Alternative 1

Description

- The southern terminus of this bypass would be near the intersection of OR 62 and OR 99 on the west side of I-5.
- The bypass would widen and use Merriman Road north to its intersection with Table Rock Road, then cross I-5 on a new structure and continue north on Table Rock Road. It was assumed that the current configuration on Table Rock Rd would be four lanes. At a point south of Gregory Road it would turn east then curve northeast on a new four lane facility that follows the Medco Haul Road alignment to Agate Road. It would follow a widened Agate Road to Merry Lane.
- No interchanges were included in the design, although new ramps to and from northbound I-5 are shown connecting to the bypass.

Reasons for Not Advancing

- Did not address the OR 62 transportation problem by diverting a significant amount of the through trips. OR 62 would still experience significant mobility issues.
- Preliminary traffic analysis showed that in 2030, traffic congestion on OR 62, between Delta Waters Road and Vilas Road, would be worse than the No Build Alternative, as shown in Figure 2-23.
- There would be Section 4 (f) impacts on the Bear Creek Greenway (new access ramps/bridge).
- There would be significant impacts on the residential areas west of I-5, east of Table Rock Rd and north of OR 62.
- There would be significant impacts on businesses along Table Rock and Merriman Road.
- This alternative would have impacted an estimated 327 parcels and an estimated 439 buildings, as shown in Table 2-6.

Figure 2-23 2030 d/c Ratios for Public Alternative 1

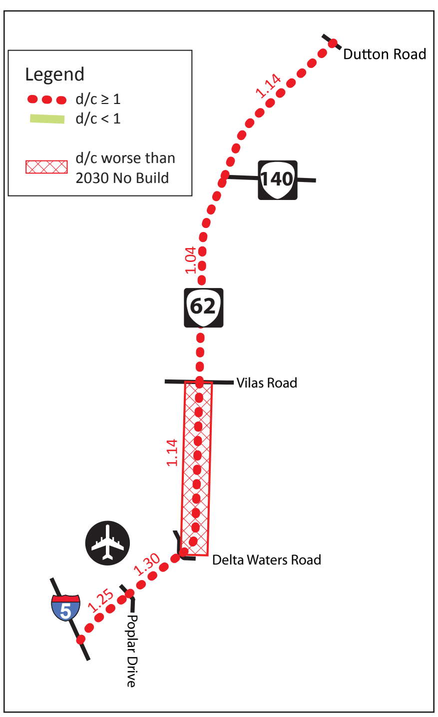

Table 2-6 Estimated Impacts from Public Alternative 1

Estimated Parcels						
	Residential	Commercial	Industrial	Farm	Forest	Total
Lots	135	34	136	5	17	327
Acres	64	18	83	7	51	223
Estimated Displacements						
	Residential	Commercial	Unknown			Total
Units	228	151	60			439

Techniques to note:
- use of bullets to describe the purposes of the project

1.4.1 Project Purpose

The purpose of the Mukilteo Multimodal Project is to provide safe, reliable, and efficient service and connections for general-purpose transportation, transit, high-occupancy vehicles (HOVs), pedestrians, and bicyclists traveling between Island County and the Seattle/Everett metropolitan area and beyond. The project is intended to:

- Reduce conflicts, congestion, and safety concerns for pedestrians, bicyclists, and motorists by improving local traffic and safety at the terminal and the surrounding area
- Provide a terminal and supporting facilities with the infrastructure and operating characteristics needed to improve the safety, security, quality, reliability, and efficiency of multimodal transportation
- Accommodate future demand projected for transit, HOV, pedestrian, bicycle, and general-purpose traffic

1.4.2 Project Need

The existing facility is deficient in a number of aspects, including safety, multimodal connectivity, capacity, and the ability to support the goals of local and regional long-range transportation and comprehensive plans, including future growth in travel demand. Those factors, which are further described below, demonstrate the need for an improved multimodal facility.

Safety and Security

Safety is WSDOT's top priority, and security at transportation facilities is a national concern. Safety and security come into play with this project in several ways: at the pedestrian/vehicle interface, with the general traffic flow in the SR 525/Front Street vicinity, and in maintaining safety and security for the facility itself. Safety and security improvements are needed because:

- The Mukilteo ferry terminal has received few improvements since it was built in 1952. The existing timber structures, including the docking facilities, are beyond the end of their useful lives.
- The existing terminal does not meet current seismic standards. The existing facility is underlain by deep, potentially liquefiable soils that are highly susceptible to lateral spreading during an earthquake.
- Changed U.S. Coast Guard and U.S. Department of Homeland Security protocols now require the ability to secure terminal areas when there is a natural disaster, heightened security alert, or other emergency. The existing facility has city streets within the terminal area and does not allow for a physical separation between the terminal and open public areas, which increases safety and security concerns, and could require WSDOT to interrupt service or close the terminal to respond to an emergency or heightened security alert.
- Collisions near the SR 525/Front Street intersection have included sideswipes, vehicle/pedestrian collisions, and collisions with parked vehicles.

Technical Terms Prominently Explained

- CO: US 36 FEIS
- MD: Purple Line FEIS

Techniques to note:
- key terms are prominently defined early in the alternatives chapter; the reader does not have to hunt for them in the glossary

2.1 INTRODUCTION

Chapter 2, Alternatives Considered, presents the development of alternatives, the alternative screening criteria, and the process used to eliminate alternatives from further consideration. This chapter also describes the packages of alternatives that are evaluated in detail in this Final Environmental Impact Statement (FEIS), the development of a hybrid alternative, and identifies a Preferred Alternative.

Useful Chapter Definitions

The alternatives development and screening process and resulting packages are presented using some technical terms, which are defined for this project as follows:

Station Types

- **Bus rapid transit (BRT) station** is a station that provides enhanced bus service and facilities. A BRT station and the associated platforms could be located in the highway median or highway on- and off-ramps.
- **park-n-Ride** is a station that provides both a parking and a loading area for bus service. Buses access the park-n-Ride from the arterial street network or via highway bus pull-outs. A pedestrian bridge or underpass connects parking on both sides of the highway.
- **Rail station** is a station that provides a boarding location for rail service.
- **Transit station** is a general term used to refer to any combination of the above station types. This term also includes multi-modal hubs, such as Denver Union Station (DUS).

Lane Types

- **BRT/high-occupancy vehicle (HOV) lanes** are lanes designated for use by buses and HOVs (including carpools and vanpools). Single-occupant vehicles (SOVs) are not allowed in these lanes.
- **Express lanes** are the existing managed lanes on Interstate 25 (I-25) and United States Highway 36 (US 36).
- **Managed lanes** are toll lanes designated for use by buses and HOVs at no cost. Any remaining capacity would be sold to SOVs through variable or dynamic pricing. The Colorado Department of Transportation (CDOT) intends to manage the high-occupancy toll lanes with the goals of optimizing their use, maximizing travel time savings, and keeping traffic flowing in the managed lanes at 45 miles per hour or faster, even when the general-purpose lanes are congested. To accomplish this goal, CDOT will employ dynamic pricing in which the toll rate is increased or decreased depending on the levels of congestion needed to meet the goals. The definition of HOV is another tool that could be used to manage the lane. The current definition of HOV requires vehicles to have two or more occupants. Revising the HOV definition to require more than two occupants per vehicle would also reduce HOV demand for the managed lane.
- **Special lanes** is a general term used to refer to BRT/HOV lanes, the US 36 managed lanes, and the I-25 express lanes.

Techniques to note:
- text box is used to define key terms that could be confusing to the reader ("exclusive" vs. "dedicated" lanes)

Based on the public and agency comments received during scoping, a range of alternatives was developed for consideration in the evaluation process. These alternatives included most of the alignments presented at scoping, as well as others identified during scoping.

Exclusive Lanes—A right-of-way that is solely for use of transit vehicles and is not occupied by any other type of vehicle or by pedestrians. Exclusive lanes may be either grade-separated or protected by a fence or substantial permanent barrier. All crossings are grade-separated.

Dedicated Lanes—Lanes used solely for transit vehicles, separated and protected from parallel traffic, but which crosses roads, driveways, and pedestrian pathways at-grade. Separation may be achieved by mountable or un-mountable curbs, barriers, or fences. If the transit is light rail, protection at grade-crossings would be provided at some locations by railroad-style flashers and gates if required, or traffic signals at others.

Mixed-use Lanes— Lanes in which the transit vehicles operate in mixed traffic, sharing the same space with other types of road users. Transit vehicles in mixed-use lanes would be controlled by the existing traffic signals and signs.

Consideration of Other Transit Modes

During scoping, two modes were proposed by MTA: LRT and BRT. Monorail and heavy rail were not included in the alternatives initially presented during scoping. These modes had been eliminated in previous studies based on prohibitive capital costs, environmental impacts, and other factors. Based on the *Capital Beltway Purple Line Study (2002)*, FTA and MTA concluded that monorail and heavy rail would not be reasonable.[2]

During the scoping process, a few commenters suggested additional consideration of heavy rail alternatives. FTA and MTA considered these comments and determined that heavy rail was not a reasonable alternative for meeting the purpose and need of this project, as concluded earlier in the *Capital Beltway Purple Line Study*. After scoping was completed, the County Executive of Montgomery County recommended consideration of a heavy rail alternative referred to as the Red Line or Metrorail Loop which would connect the Metrorail Red Line from Bethesda to Silver Spring along the Capital Beltway. MTA and FTA conducted additional analysis of this heavy rail alternative, and concluded that it should not be carried forward for detailed study because it did not meet the purpose and need of this project, and because it had other drawbacks, including environmental impacts and cost (see *Definition of Alternatives (2008), pages 1-8,* and *Supporting Documentation on Alternatives Development (2013)).*

2.1.3 Screening of Alternatives

Screening Methodology

Between 2004 and 2008, FTA and MTA examined a number of alternatives and design concepts. The screening process evaluated the alternatives based on a number of factors, including ability to meet the project's Purpose and Need, engineering feasibility, natural and social environmental impacts, preliminary cost estimates, and input from the public and agencies. Alternatives that did not meet these criteria were not considered reasonable.[3] Alternatives that were not considered reasonable were eliminated from further consideration and not included in the AA/DEIS (see *Definition of Alternatives (2008*) pages 1-7).

Many alternatives met the reasonableness standard. In order to reduce the number of reasonable alternatives for study in the AA/DEIS, the screening process focused on weighing the relative merits or disadvantages of the various alignments or options within the definition of low, medium and high investment. For example, where two low investment surface options for a particular mode were under consideration, if one had appreciably greater impacts to the environment or the local

[2] *Capital Beltway/Purple Line Study*, SHA/MTA, 2002

[3] *Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations*, 46 Fed. Reg. 18026 (1981), Response to Question 2a.

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Chapter 3. Document Structure

The CEQ regulations define a "standard format" that "should be followed [in an EIS] unless the agency determines that there is a compelling reason to do otherwise." 40 CFR 1502.10. This format includes the following elements: Cover Sheet; Summary; Table of Contents; Purpose and Need; Alternatives; Affected Environment; Environmental Consequences; List of Preparers; and List of Agencies, Organizations, and Persons.

FHWA's Technical Advisory on NEPA documents (T6640.8A, issued in 1987), recommends using the standard format outlined in the CEQ regulations. But in a memorandum issued on July 1, 2006, FHWA recognized that alternative approaches are encouraged if they convey information more effectively:

> What is more important than the way an EIS document is organized is that it convey, in reasonable and understandable terms, the substance of project purpose and need, the alternatives considered, the affected environment and environmental consequences of the action. We encourage you to consider ways to improve the effectiveness of the NEPA documents prepared in your state, including the use of different formats or alternative approaches to making documents easier to read, while demonstrating compliance with NEPA and other applicable environmental laws that satisfy the needs and expectations of our partners and stakeholders.[1]

As recommended in the 2006 guidance, the state of the practice has evolved to include variations on the standard format. Some variations include:

- *Combining the Affected Environment and Environmental Consequences chapters*. Combining these chapters helps to reduce duplication and can be easier for readers to follow because information about a resource is consolidated in one place. Typically, the combined chapter addresses regulatory setting, existing conditions, impacts, and mitigation.

[1] F. Skaer, FHWA, *Memorandum: Improving the Quality of Environmental Documents* (July 31, 2006), at http://www.environment.fhwa.dot.gov/projdev/pd_doc_quality.asp.

- *Placing the Affected Environment chapter before the Alternatives chapter.* The logic of this approach is that the Affected Environment provides context for understanding the Alternatives, so the Affected Environment should be presented first. A variant of this approach condenses the Affected Environment and re-names it "Environmental Context."

- *Adding an "Comparison of Alternatives" chapter.* This approach breaks the Alternatives chapter into two parts: "Alternatives Considered," which describes the alternatives development and screening process, and "Comparison of Alternatives," which evaluates the detailed-study alternatives.[2] With this approach, the Comparison of Alternatives is placed after the Environmental Consequences chapter.

- *Adding a Transportation Chapter.* Many NEPA documents for highway and transit projects include a separate transportation chapter. This format provides an efficient way to present information that otherwise would be scattered - such as the data sources and methods used in traffic modeling; the description of the existing transportation system; the alternatives' effects on the existing transportation system; and the alternatives' ability to meet the purpose and need.

- *Adding a Finance and Cost Chapter*. Issues related to project financing and cost may play an important role in the NEPA process, especially for large-scale projects where the availability of funding is uncertain. Where these issues are important to the analysis of alternatives, a separate chapter can be included to present cost estimates; explain how cost estimates were developed; describe potential funding sources; and address any related issues, such as potential use of innovative financing.

- *Adding a Phasing Chapter*. For large projects, phased implementation is sometimes proposed as a way to accommodate funding constraints. In some cases, FHWA has included a separate chapter or section describing the project phases and distinct impacts associated with each phase.

When a non-standard format is used, it is important to make sure that all of the required information is included and can be easily found. To this end, it may be helpful to include a table that correlates the document's chapters to the elements required in the CEQ regulations.

[2] *See* NCHRP Report 25-25(01), *Synthesis of Data Needs for EA and EIS Documentation—A Blueprint for NEPA Document Content* (Jan. 2005), at http://onlinepubs.trb.org/onlinepubs/archive/NotesDocs/25-25(1)_FR.pdf.

Combine Affected Environment Chapter and Environmental Consequences Chapter

- CO: US 36 FEIS
- OH: Opportunity Corridor DEIS
- NC: Mid-Currituck FEIS
- UT: West Davis Corridor FEIS
- WA: Mukilteo FEIS

Techniques to note:
- combining the Affected Environment and Environmental Consequences chapters
- explaining the "content and organization" of the chapter in the introduction to the chapter

CHAPTER 4 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Techniques to note:
- combining the Affected Environment and Environmental Consequences chapters
- providing an overview of the chapter and describing the purpose of the chapter at the beginning

CONTENTS

CONTENTS

Techniques to note:
- combining the Affected Environment and Environmental Consequences chapters
- grouping topics within the chapter - e.g., a section on "Community Characteristics and Impacts"

Table of Contents (continued)

Table of Contents (continued)

Techniques to note:
- EIS includes a separate chapter for each resource (e.g., farmland), containing affected environment, impacts, and mitigation for that resource

Chapter 4: Farmland

Techniques to note:
- affected environment and environmental consequences are combined
- impacts discussion is separated into four parts - long-term, construction, indirect, and cumulative.

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Separate Chapters (Not in standard EIS template)

Transportation Impacts

- CO: US 36 FEIS
- WA: Mukilteo FEIS

Financial Analysis

- CO: I-70 PEIS
- CO: US 36 FEIS

Phased Implementation

- CO: US 36 FEIS

Construction Impacts

- MD: Purple Line FEIS

Techniques to note:
- chapter on "Transportation" covers existing conditions and effects, separate from environmental impacts chapter

Techniques to note:
- chapter on "Transportation" covers existing conditions and effects, separate from environmental impacts chapter

CHAPTER 3 – TRANSPORTATION IMPACTS AND MITIGATION

CHAPTER 4 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Table of Contents

Techniques to note:
- chapter on Financial Considerations (addresses issues related to ability to pay for the project)

Techniques to note:
- chapter on Financial Considerations (addresses issues related to ability to pay for the project)

CHAPTER 5 – FINANCIAL ANALYSIS

CHAPTER 6 – PUBLIC INVOLVEMENT PROGRAM

Techniques to note:
- chapter on Phasing (acknowledges potential for project to be implemented in phases and discusses impacts of phasing)

CHAPTER 8 – PHASED PROJECT IMPLEMENTATION

Techniques to note:
- chapter on Construction Impacts (describes impacts of construction activities separately from permanent impacts of the project)

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Chapter 4. Navigation

The basic aids to navigation in any published document are a table of contents and an index. These tools, while useful, can be enhanced through techniques that make it easier for readers to move quickly and efficiently through the document. These techniques are especially valuable in a NEPA document, because most readers will be looking for specific information rather than reading the document from beginning to end.

Including useful navigational aids can be done relatively easily, without greatly adding to the work involved in preparing the NEPA document. Some examples of useful aids include:

- *"How to Use This Document (or Chapter)*." A brief guide for readers – as short as a single paragraph - can be included at the very beginning of the document, or at the beginning of a chapter. This guide is especially useful if the structure or layout of the document includes any unusual features. In one example shown in this chapter, colored text was used to identify new or modified text that was not included in the DEIS; the guide explained how the colors were used. The guide for readers also can be used to explain where additional information can be found – for example, on an enclosed DVD or on a project website.

- *Roadmaps*. A roadmap is an overview of the content of a document. The overview serves a similar purpose to a table of contents, but can be more effective because it includes some explanation of the content rather than simply listing chapter or section titles. The roadmap is often presented in bullet-point form; each bullet describes a chapter or section. Text boxes or side-bars also are effective at making the roadmaps readily visible to the reader.

- *Table of contents in each chapter*. It is standard practice to include a table of contents at the beginning of an EIS; it is less common to include one at the beginning of each chapter. Yet readers often engage with a document by going directly to a specific chapter, and then looking for information within that chapter. In addition, because NEPA documents are now made available electronically, some readers will only download individual chapters. For those readers, it is useful to find a chapter-specific table of contents, which leads the reader directly to the relevant information within that chapter.

- *Sections names/numbers in headers or footers*. Including section names and numbers in the header or footer of an EIS helps to orient the reader. For example, a reader may know that wetlands are covered in Section 4.14, and then turn to Chapter 4 and begin looking for that section. If the headers and footers contain the section names and numbers, the reader can easily locate Section 4.14 without needing to remember the exact page on which that section begins.

- *Contents of DVD listed in main document*. It is increasingly common for some of the contents of an EIS – typically, appendices – to be included on a DVD rather than being included in the printed copy of the document. Where this is done, it is a good practice to list the contents of the DVD in the table of contents of the printed copy of the NEPA document. This practice alerts the reader to the type of information that is included on the DVD, which is especially beneficial for readers who do not have a copy of the DVD.

- *Searchability of PDFs*. Most NEPA documents are now published in electronic form (e.g., as PDFs). One of the most efficient ways to find information is by searching within the electronic version of the document, but this can be done only if the document is text-searchable. The usability of the document is enhanced if the main body and appendices are fully text-searchable.

How to Use This Document

- OR: OR 62 FEIS

Techniques to note:
- including a "how to use this document" page

HOW TO USE THIS DOCUMENT

In this FEIS:

- Text from the DEIS that remains substantially unchanged from the DEIS, including minor edits, such as corrections of typos and numerical errors and rewording to clarify meaning, is printed in black.
- New text is printed in burnt orange, which is the color of this text.
- Figures from the DEIS are reprinted. Where the content of a DEIS figure has changed, such as to show a change in design or impacts, the DEIS figure is immediately followed by a new figure with the same figure number, but with "FEIS" added.
- Where impact numbers or text in a table have changed because of a change in design or impacts, the numbers or text from the DEIS remain in the table and the new numbers or text are added in burnt orange immediately below the original numbers or text in the DEIS.
- The DEIS text on mitigation measures is retained, followed by the mitigation measure commitments that are incorporated into the action.

The FEIS contains new numbers and text because of changes from the DEIS in the roadway projects expected to be built under the No Build Alternative, in the design and impacts of the Preferred Alternative, and in information and circumstances. The design of the alternative and the design options that were not identified as the Preferred Alternative have not been changed and the FEIS does not contain changes to those impacts.

Techniques to note:
- including a "how to use this document" page

ES

Executive Summary

How To Use This Executive Summary

In the FEIS and this Executive Summary:

- Text from the DEIS that remains substantially unchanged from the DEIS, including minor edits, such as corrections of typos and numerical errors and rewording to clarify meaning, is printed in black.
- New text is printed in burnt orange, which is the color of this text.
- Figures from the DEIS are reprinted. Where the content of a DEIS figure has changed, such as to show a change in design or impacts, the DEIS figure is immediately followed by a new figure with the same figure number, but with "FEIS" added.
- Where impact numbers or text in a table have changed because of a change in design or impacts, the numbers or text from the DEIS remain in the table and the new numbers or text are added in burnt orange immediately below the original numbers or text from the DEIS.
- The DEIS text on mitigation measures is retained, followed by the mitigation measure commitments that are incorporated into the action.

The FEIS contains new numbers and text because of changes from the DEIS in the roadway projects expected to be built under the No Build Alternative, in the design and impacts of the Preferred Alternative, and in information and circumstances. The design of the alternative and the design options that were not identified as the Preferred Alternative have not been changed and the FEIS does not contain changes to those impacts.

This Executive Summary provides an overview of the project and its potential impacts. The OR 62: I-5 to Dutton Road Project Environmental Impact Statement (EIS) provides the information in greater detail.

Introduction

The Oregon Department of Transportation (ODOT) and the Federal Highway Administration (FHWA) propose building the Oregon Highway 62 (OR 62): I-5 to Dutton Road Project, a 7.5-mile, four-lane, access-controlled expressway to serve as a bypass of existing OR 62 from Medford to north of White City in Jackson County, Oregon. The project includes the bypass, four interchanges, and changes to local streets and roads to accommodate the bypass. The project would reduce congestion and improve safety on existing OR 62 in Medford and north through White City by redirecting traffic to the bypass. The Bypass would provide faster travel and improved safety for vehicles traveling within and through the region. Figure ES-1 shows the general location of the project.

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Roadmaps to EIS and to Chapters

- CO: I-70 PEIS
- MD: Baltimore Red Line FEIS
- NC: Mid-Currituck FEIS

Techniques to note:
- including a roadmap to the EIS in the Executive Summary

ES.2 Organization of the FEIS

The FEIS is divided into two volumes: **Volume 1** presents the analysis of the No-Build Alternative and the Preferred Alternative, and **Volume 2** includes mapping of transportation and environmental features in the project study corridor and the Plans and Profile Drawings of the Preferred Alternative. **Volume 1** of the FEIS contains nine chapters and appendices A through K:

- **Chapter 1** presents the project study corridor and the purpose and need for the project.
- **Chapter 2** presents a chronology of the alternatives development and analysis for the project. It includes a description of the alternatives considered in the FEIS: the No-Build and Preferred Alternative. The alignment, stations, and project components of the Preferred Alternative are described.
- **Chapter 3** discusses the probable construction methods and activities for the Preferred Alternative.
- **Chapter 4** presents the existing and future transportation conditions in the project study corridor under the No-Build and Preferred Alternative, and discusses commitments and mitigation measures for potential transportation effects.
- **Chapter 5** presents the existing and future environmental conditions in the project study corridor under the No-Build and Preferred Alternative, and discusses commitments and mitigation measures for potential environmental effects.
- **Chapter 6** presents the Draft Section 4(f) evaluation, which discusses the effects of the Preferred Alternative on public parks, recreational areas, and historic properties in compliance with Section 4(f) of the US Department of Transportation Act of 1966.
- **Chapter 7** presents an evaluation of the No-Build Alternative and Preferred Alternative in meeting the project's purpose and need.
- **Chapter 8** presents a summary of the public outreach and agency coordination for the Red Line project that has occurred since the publication of the AA/DEIS in September 2008.
- **Chapter 9** presents a summary of the comments received on the AA/DEIS and responses to those comments, as presented in **Appendix A**.

The appendices are included after **Chapter 9** with the exception of **Appendix A** and **I**, which are included on the DVD.

ES.3 Project Study Corridor

The Red Line project study corridor extends approximately 14 miles from the Centers for Medicare & Medicaid Services (CMS) in the west, in Woodlawn (Baltimore County), to the Johns Hopkins Bayview Medical Center campus in the east (Baltimore City). Eleven miles of the project study corridor are in Baltimore City. The proposed Red Line light rail alignment would utilize a combination of existing transportation rights-of-way for at-grade and aerial segments and underground tunnels as identified in **Figure ES-1**.

Techniques to note:
- including a roadmap to a lengthy chapter at the beginning of that chapter

Chapter 2. Summary and Comparison of Alternatives

2.1 What's in Chapter 2?

Chapter 2 describes how the problems within the Interstate 70 (I-70) Mountain Corridor (the Corridor) are used to develop a wide range of alternatives for transportation improvements, how those alternatives are evaluated, and how that evaluation leads to a Preferred Alternative. **Chapter 1, Purpose and Need** documents the existing and future transportation problems in the Corridor, while this chapter describes and analyzes alternatives to address the problems and identifies the Preferred Alternative. As described in **Chapter 1, Purpose and Need**, the transportation problems result in project needs, and the project purpose and need is expressed as a long-term 2050 purpose and need, supported by data from the 2035 and the 2050 planning horizons. The 2050 planning horizon is used as the target for meeting the project needs and was developed based on public input and interest in a long-range vision for transportation solutions in the Corridor. The year 2035 projections are based on available projections from a variety of sources, provide the foundation for developing and evaluating alternatives, and provide a milestone allowing projections to 2050. In addition to the needs, criteria are identified to define what is important to project stakeholders and to help in comparing the attributes and impacts of the alternatives.

Project Purpose and Need

The purpose for transportation improvements is to increase capacity, improve accessibility and mobility, and decrease congestion for 2050 to destinations along the I-70 Mountain Corridor as well as for interstate travel, while providing for and accommodating environmental sensitivity, community values, transportation safety, and ability to implement the proposed solutions for the Corridor.

As described in this chapter, the evaluation process resulted in 22 alternatives, including the No Action Alternative and 21 Action Alternatives, including the Preferred Alternative. **Section 2.5** discusses the more than 200 alternative elements evaluated and explains which were eliminated and why. **Section 2.6** discusses the alternatives that were advanced and describes the components of the Action Alternatives and the No Action Alternative. **Section 2.7** describes the Preferred Alternative, how it was developed, and the process that will be used to implement improvements. The 22 alternatives analyzed (shown at the right) represent the reasonable range of alternatives for analysis in this Tier 1 document. Not all of these alternatives fully meet the purpose and need for this project but are all evaluated at the Tier 1 level to present a full comparison of the transportation tradeoffs and environmental impacts for decision makers and the public. **Section 2.8** summarizes a comparison of the 22 alternatives that are fully evaluated. **Section 2.8** also compares the subset of these alternatives that fully meet the project's purpose and need.

Project Alternatives Analyzed

- No Action Alternative
- Minimal Action Alternative
- Rail with Intermountain Connection
- Advanced Guideway System
- Dual-mode Bus in Guideway
- Diesel Bus in Guideway
- Six-Lane Highway 55 miles per hour
- Six-Lane Highway 65 miles per hour
- Reversible/high occupancy vehicle/high occupancy toll Lanes
- Combination Six-Lane Highway with Rail and Intermountain Connection
  - Build Transit with Highway Preservation
  - Build Highway with Transit Preservation
- Combination Six-Lane Highway with Advanced Guideway System
  - Build Transit with Highway Preservation
  - Build Highway with Transit Preservation
- Combination Six-Lane Highway with Dual-mode Bus in Guideway
  - Build Transit with Highway Preservation
  - Build Highway with Transit Preservation
- Combination Six-Lane Highway with Diesel Bus in Guideway
  - Build Transit with Highway Preservation
  - Build Highway with Transit Preservation
- Preferred Alternative

The purpose and need requires enough capacity to meet the 2050 demand. Today, the I-70 highway does not

Techniques to note:
- including a roadmap to a lengthy chapter at the beginning of that chapter

3.0 Affected Environment and Environmental Consequences

This chapter describes the findings of the impact assessment conducted for the detailed study alternatives, including the Preferred Alternative. Key characteristics of the affected environment also are described. Additional information on the affected environment and the impacts of the detailed study alternatives, including the Preferred Alternative, is presented in a series of technical reports contained on the compact disc (CD) that accompanies this FEIS, at public review locations listed in Appendix C, and on the North Carolina Turnpike Authority (NCTA) web site at http://www.ncdot.gov /projects/midcurrituckbridge/. Those technical reports and their tables of contents are presented in Appendix D of this FEIS.

This chapter is divided into the following sections:

The text in italics answers the question posed by the subheading under which it appears, summarizing for the reader the findings of the longer discussion that follows.

3.1 Community Characteristics and Impacts

This section presents the key findings of the community impact assessment conducted for this FEIS. Additional detail is presented in the revised *Community Impact Assessment Technical Report* (Parsons Brinckerhoff, 2011), which is contained on the CD that accompanies this FEIS, at public review locations listed in Appendix C, and on the NCTA web site at http://www.ncdot.gov/projects/midcurrituckbridge/. This section discusses the following:

- What is the general land use, and what community features are in the project area?
- How would neighborhood or community cohesion be affected?
- How would quality of life be affected?

Table of Contents at Beginning of Each Chapter

- OR: OR 62 FEIS
- UT: West Davis Corridor DEIS

CHAPTER 3

Techniques to note:
- including a table of contents at the beginning of a chapter (can be used in lieu of a roadmap in the text)

Chapter 3 Content

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

This chapter addresses the impacts of the alternatives described in Chapter 2. Each section of this chapter, as listed in the sidebar, describes relevant laws and regulations, existing conditions, the impacts of the No Build Alternative, the impacts of the build alternatives and JTA phase, and measures to avoid, minimize, and/or mitigate adverse impacts. The impacts of the build alternatives and JTA phase fall into three categories:

- **Direct Impacts.** As defined in 40 CFR 1508.8, direct impacts are impacts "caused by the action and occur at the same time and place." Examples of direct impacts are changes in travel time, the displacement of businesses, and increases in water pollution. Direct impacts can be permanent or temporary.
- **Indirect Impacts.** As defined in 40 CFR 1508.8, indirect impacts are defined as impacts "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable." Indirect impacts include induced growth and effects resulting from the induced growth, including changes in the pattern of land use, and "related impacts on air and water and other natural systems, including ecosystems."
- **Construction Impacts.** Construction impacts are the temporary impacts of construction activities.

Techniques to note:
- including a table of contents at the beginning of a chapter (can be used in lieu of a roadmap in the text)

Chapter 2: Alternatives

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Header/Footer with Chapter, Section, and Subsection

- CO: US 36 FEIS

Techniques to note:
- including section name and number in the header of every page

3.1 INTRODUCTION

This chapter presents transportation performance, impacts, and mitigation measures for the packages listed below. For a detailed description of the packages, see Chapter 2, Alternatives Considered.

- **Package 1**: No Action
- **Package 2**: Managed Lanes/Bus Rapid Transit
- **Package 4**: General-purpose Lanes, High-occupancy Vehicle, and Bus Rapid Transit
- **Combined Alternative Package (Preferred Alternative)**: Managed Lanes, Auxiliary Lanes, and Bus Rapid Transit

Between the publication of the Draft Environmental Impact Statement (DEIS) and this Final Environmental Impact Statement (FEIS), a new regional transportation plan, the *2035 Metro Vision Regional Transportation Plan* (*2035 MVRTP*), as amended (DRCOG 2009), was adopted. This plan uses 2035 as the planning horizon (the year by which all planned projects are expected to be completed), and federal requirements necessitate the use of this year in the FEIS. The work in the DEIS was based on analysis of year 2030 travel demand data. During the DEIS process two build packages were fully evaluated, and based on this evaluation it was determined to move forward in the FEIS by combining elements from both build packages to create a package of improvements called the Combined Alternative Package (Preferred Alternative). The Combined Alternative Package (Preferred Alternative) was analyzed with year 2035 travel demand data.

The project team used the Denver Regional Council of Governments (DRCOG) regional travel demand model to estimate future travel demand in the corridor. The main components of the model include the model program and supporting files, future socioeconomic assumptions, and future roadway and transit network assumptions. DRCOG is continually updating the model to reflect the best understanding of travel behavior and to apply the latest projections for socioeconomic growth and transportation system assumptions so that the model can meet all regulatory requirements.

Between the DEIS and FEIS, some of the program changes that occurred included:

- Refined the transportation analysis zones (TAZ) structure (from 2,600 to 2,800 TAZs)
- Increased the size of the region coded in the model
- Mode choice changes based on updated ridership surveys
- Other transit-related processing changes

The socioeconomic data were updated to reflect five years of growth (2030 to 2035) and were also affected by the change in the definition of the region; the region increased in size with the 2035 model assumptions, so the overall population and employment reflected in the model includes a greater area. When comparing the population and employment for 2030 and 2035 in the original model area, the population increases from 3.97 million in 2030 to 4.34 million in 2035 (a 9 percent increase), and employment increases 2.08 million to 2.20 million (a 6 percent increase).

Within the United States Highway 36 (US 36) study area the population and employment forecasts for 2035 were only 5 percent higher than 2030, less than the change region wide. The distribution of population and employment growth within the study area, however, changed compared to 2030 socioeconomic forecasts. Development forecasts in the Boulder Valley changed between the 2030 and 2035 forecast years. In 2030, the Boulder Valley was forecast to have a population of 119,700 and 103,600 jobs. The 2035 forecasts assume a population of 119,400 (no growth) and 87,600 jobs (a decrease of 15 percent). As a result, the remainder of the study area is forecast to have an increase in employment of 10 percent.

Table of Contents Describes Contents of DVD

- MD: Baltimore Red Line FEIS
- WA: I-90 Snoqualmie FEIS

Techniques to note:
- including a description of the contents of any non-printed materials as part of the table of contents in the printed document

Table of Contents

Statement (FEIS) is divided into two volumes: Volume 1 presents the analysis of the No-Build Alternative and the Preferred Alternative, and contains nine chapters and appendices A through K. Volume 2 includes mapping of transportation and environmental features in the project study corridor, including a set of six Environmental Plate Series, and the Preferred Alternative Plans and Profiles.

The DVD contains all content of Volumes 1 and 2, including all appendices. Appendix A and Appendix I are only included on the enclosed DVD.

Volume 1

Techniques to note:
- including a description of the contents of any non-printed materials as part of the table of contents in the printed document

Disc One

Disc Two

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Chapter 5. Abstracts

Abstracts can be used to summarize content that is provided in more detail in the remainder of a document, chapter, or section.

Abstracts are distinct from other reader-friendly tools, such as roadmaps. The goal of a roadmap is principally to explain how a document or chapter is organized. By contrast, the goal of an abstract is to summarize content. Abstracts help readers to absorb important facts that might otherwise be overlooked due to the length or complexity of the document.

Abstracts have been used in a variety of ways in NEPA documents, including the following:

- *Abstract for the entire document*. An abstract (sometimes called a fact sheet or preface) can be included at the beginning of the EIS, typically just after the title page and before the table of contents. In this form, an abstract typically provides a brief description of the proposed action, the structure of the EIS, key points of contact for the project, an overview of the study process, and instructions on how to comment. Unlike the summary chapter, an abstract is short – typically 1 to 3 pages.

- *Abstract for a chapter or section*. An abstract to a chapter or section summarizes the information included in that portion of the NEPA document. One example shown in this chapter includes a short abstract at the beginning of each major section in the impacts chapter. In this form, an abstract can help the reader to quickly grasp the important conclusions, before delving into a detailed discussion.

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Preface, Fact Sheet, or Abstract at Beginning of EIS

- OH: Opportunity Corridor DEIS
- MD: Baltimore Red Line FEIS
- NC: Mid-Currituck FEIS
- WA: I-90 Snoqualmie FEIS

Techniques to note:
- abstract describes proposed action, contents of EIS, study process, and how to comment.

ABSTRACT

The Federal Highway Administration (FHWA) and the Ohio Department of Transportation (ODOT), as joint lead agencies, are proposing the construction of a new arterial roadway (urban boulevard) within the City of Cleveland, Cuyahoga County, Ohio. The purpose of the new roadway is to improve connectivity, access, and mobility within the City of Cleveland. The project is also intended to support the City of Cleveland's planned economic development. The proposed urban boulevard would consist of a four- to five-lane typical section with turn lanes at intersections. It would begin in the west at the I-490-East 55th Street intersection, which is the eastern extent of the Interstate Highway System and the I-77/I-490 system interchange. The proposed boulevard would end at the East 105th Street-Chester Avenue intersection in the east.

The FHWA and ODOT have worked to avoid, minimize and mitigate the potential environmental impacts of the proposed project. This process included extensive efforts to involve the public and stakeholders in the planning and design of the proposed project. The primary environmental impacts of the project are the proposed acquisition, relocation and demolition of residences, commercial businesses, and one church.

Unavoidable impacts to low-income and minority populations would also occur. Several measures will be put into place to mitigate these impacts.

The proposed project is estimated to require a $331.3 million investment. ODOT is evaluating several potential funding sources to pay for the project, including local, state and federal funds, as well as private funding through a public-private partnership.

This Draft Environmental Impact Statement (DEIS) provides a complete picture of the Cleveland Opportunity Corridor project, from beginning to end. It describes why the transportation project is needed, the alternatives that were studied, the preferred alternative, the potential effects, the efforts to include the public and agencies in the decision-making process, as well as the outcomes of these efforts. The DEIS also identifies proposed mitigation for any unavoidable impacts.

This information is presented in a manner that is intended to facilitate the reading and understanding of this document's findings by all readers, including the public, environmental resource and regulatory agency representatives, and decision-makers.

For readers interested in the details of the studies and activities associated with the preparation of this DEIS, a series of technical reports has been published. The reports are available on the CD that accompanies this DEIS and on the project website at www.BuckeyeTraffic.org/OpportunityCorridor.

Comments on this DEIS should be sent to the individual listed below. Inquiries and requests for information should also be directed or submitted to the attention of the following individual:

Amanda Lee
ODOT District 12 Public Information Officer
5500 Transportation Blvd.
Garfield Heights, OH 44125
email: Amanda.Lee@dot.state.oh.us
phone: (216) 584-2005
fax: (216) 584-2274

Techniques to note:
- abstract describes proposed action, contents of EIS, study process, and how to comment.

ABSTRACT

This Final Environmental Impact Statement (FEIS) and Draft Section 4(f) Evaluation for the Red Line project describes and summarizes the transportation and environmental impacts for the implementation of a new east-west light rail transit alignment in Baltimore County and Baltimore City, Maryland. The Red Line project is proposed to:

- Improve transit efficiency by reducing travel times for transit trips
- Increase transit accessibility by providing improved transit access to major employment and activity centers
- Provide transportation choices for east-west commuters by making transit a more attractive option
- Enhance connections among existing transit routes
- Support community revitalization and economic development opportunities
- Help the region improve air quality by increasing transit use and promote environmental stewardship

The corridor limits for the study extend from western Baltimore County at the Centers for Medicare & Medicaid Services through the downtown central business district to the Johns Hopkins Bayview Medical Center campus in eastern Baltimore City. The corridor is approximately 14 miles in length.

This FEIS includes a description of the alternatives, as well as a comparative evaluation of the No-Build Alternative and the Preferred Alternative benefits and effects. These alternatives were analyzed for both long-term (operational) and short-term (construction-related) impacts to: public transportation; traffic; parking; freight rail service; neighborhoods and community facilities; environmental justice; property acquisition and displacements; economic activity; land use; parks, recreation, and open space; visual quality; air quality; noise and vibration; energy; hazardous materials; utilities; historic structures and archeological resources; Section 4(f) resources; habitat and species; rare, threatened, and endangered species; surface and groundwater resources; waters of the US including wetlands; floodplains; critical area; safety and security; indirect and cumulative effects; and irreversible and irretrievable resources. Measures to avoid, reduce, or mitigate impacts are identified.

In August 2011, the President issued a memorandum entitled *Speeding Infrastructure Development Through More Efficient and Effective Permitting and Environmental Reviews*, which required federal agencies to identify and expedite a set of priority projects. In October 2011, the Red Line project was selected as one of 14 infrastructure projects around the country for an expedited permitting and environmental review process.

To encourage transparency during the project development process, the Federal Infrastructure Projects Dashboard allows the public to track the progress of each priority project. The dashboard, which is part of the government's performance.gov website, highlights best practices and successful coordination efforts that result in an efficient federal permitting process and review decisions which can benefit all projects. The performance.gov website informs the public of actions that require cooperation between federal agencies for the Red

Line project. It summarizes the substantial public involvement and outreach activities to refine and improve the project.

FOR ADDITIONAL INFORMATION CONCERNING THIS DOCUMENT, CONTACT:

Daniel Koenig
Federal Transit Administration
1990 K Street, NW, Suite 510
Washington, DC 20006-1178
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Tower 2, Suite 700
Baltimore, MD 21201
410-685-2601

This FEIS is available for viewing on the project website, located at www.baltimoreredline.com, and may be reviewed at public libraries throughout the project study corridor. A 45-day review period has been established for this document, beginning on the publication date of this FEIS. Comments may be submitted in writing to Henry Kay at the address above, via e-mail at feis@baltimoreredline.com or through the project website. The date of the comment deadline is posted on the project website.

Techniques to note:
- preface describes proposed action, contents of EIS (with roadmap), study process, how to comment, and next steps.

Preface

What is the purpose of a Final Environmental Impact Statement?

The North Carolina Turnpike Authority (NCTA), a division of the North Carolina Department of Transportation (NCDOT), in cooperation with the Federal Highway Administration (FHWA), is evaluating proposed transportation improvements in the Currituck Sound area, including consideration of a Mid-Currituck Bridge.

This Final Environmental Impact Statement (FEIS) is an important milestone in the project planning process. The objective of this FEIS is to provide the public and decision-makers with the appropriate and relevant information used to make an informed decision on a Preferred Alternative to select for implementation. This environmental process is intended to provide all interested parties with the opportunity to contribute to the decision-making process.

The development and evaluation of the transportation improvement alternatives assessed in this FEIS was an iterative process that included coordination with public agencies, elected officials, stakeholders, and members of the public. Alternatives were evaluated for environmental impacts (including the human and natural environments), engineering constraints, transportation benefits, and cost. Environmental study findings were initially presented in a March 2010 Draft Environmental Impact Statement (DEIS), which was distributed for government agency and public review.

What does this FEIS include?

The table of contents presents the overall organization of this FEIS and can direct you to the appropriate page numbers in various chapters and sections in the document. Key findings are presented in the summary section. A full discussion of findings is presented in three chapters:

- Chapter 1 – Purpose of and Need for Action describes the transportation improvement needs in the project area and identifies related project objectives.

- Chapter 2 – Alternatives describes the characteristics of the alternatives considered for implementation, the "detailed study alternatives," including the Preferred Alternative. This chapter also summarizes other alternatives considered and the reasons why they were not selected for detailed study. The No-Build Alternative also is described.

- Chapter 3 – Affected Environment and Environmental Consequences describes the existing and forecast future environmental conditions, as well as potential short- and long-term beneficial and adverse effects (if any) of the detailed study alternatives on these conditions. Possible mitigation measures are identified, where appropriate.

Also included with this FEIS are several appendices. Attached to the printed version of this FEIS is a compact disc (CD) that contains this FEIS, as well as the supporting technical documentation, including responses to comments made on the DEIS and methods and assumptions that provided the basis for the technical analyses and findings presented in this FEIS. A list of the technical documentation included on the CD and the table of contents for each document is included in Appendix D.

Printed copies of this FEIS and supporting technical documentation are available for public review at public locations listed in Appendix C. Additional copies of the CD are available from NCTA upon request (see the contact information in the summary of this FEIS). All documentation is posted on the NCTA web site at http://www.ncdot.gov /projects/midcurrituckbridge/.

FHWA procedures allow for the preparation of an abbreviated version of the FEIS where the only changes needed in the document are minor and consist of factual corrections and/or an explanation of why the comments received on the DEIS do not warrant further response. FHWA also allows the preparation of a condensed FEIS, which includes only new material and references the DEIS for material that did not change between the DEIS and FEIS. Neither of these approaches was used for this FEIS primarily because notable refinements were made to the Preferred Alternative, including mitigation details, between the DEIS and FEIS. It was believed to be important to present those details and associated changes in impact within the context of the comparison of other alternatives rather than asking the reader to compare two separate documents (DEIS and FEIS) in order to understand the differences.

What happens next?

This FEIS identifies NCTA and FHWA's Preferred Alternative. Agencies or the public may review the findings of this FEIS for 30 days after the availability of the FEIS for public review is published in the *Federal Register*. The public can submit comments in writing to the address at the beginning of the summary. After the review period, FHWA will issue a Record of Decision (ROD) that responds to substantive comments on this FEIS and finalizes its decision on the Selected Alternative. With the release of the ROD, the planning process is complete, and final design, right-of-way acquisition, and construction of the Selected Alternative may begin if a build alternative is selected. NCTA expects to continue to have periodic Citizens Informational Workshops and other public involvement opportunities as the project progresses after the release of the ROD.

Techniques to note:
- fact sheet describes proposed action, alternatives considered, agency contacts, and permits and approvals needed.

Fact Sheet

Project Name:

I-90 Snoqualmie Pass East Project

Project Description:

I-90 spans 300 miles in Washington State from the Port of Seattle to the Idaho State line, and then continues east across the United States to Boston, Massachusetts. I-90 is the major east-west transportation corridor across Washington and is vital to the state's economy. WSDOT proposes to improve a 15-mile portion of I-90, beginning on the eastern side of Snoqualmie Pass at MP 55.1, just east of the Hyak Interchange, and ending at MP 70.3 at the West Easton Interchange near the unincorporated community of Easton.

WSDOT has identified a Preferred Alternative, which combines design decisions at specific locations along the 15-mile route. The first five miles (MP 55.1 to 59.9) of the project is funded through construction. WSDOT considered a range of design alternatives to meet the project needs:

- ***Avalanches.*** The highway is frequently closed due to avalanches and associated control work. WSDOT considered construction of tunnels, bridges or a new, larger snowshed.

- ***Slope instability.*** Rock fall from unstable slopes presents an ongoing safety hazard. WSDOT considered tunnels, highway realignment and slope stabilization measures.

- ***Structural deficiencies.*** The pavement on I-90 is beyond its design life and is deteriorating rapidly. WSDOT considered repair and replacement.

- ***Traffic volumes.*** Traffic volumes exceed the design capacity of the highway during peak periods, and are continuing to grow.

- ***Ecological connectivity.*** The highway is the largest barrier to the movement of wildlife between protected federal lands to the north and south.

Project Proponent:

Washington State Department of Transportation

SEPA Lead Agency:

Washington State Department of Transportation
1710 South 24th Avenue, Suite 100
Yakima, Washington 98902

Responsible SEPA Official:

Megan White, Director, Environmental Services
Washington State Department of Transportation
310 Maple Park Avenue SE
Olympia, Washington 98504
(360) 705-7480

NEPA Lead Agency:

Federal Highway Administration
711 South Capitol Way, Suite 501
Olympia, Washington 98501

Date Document Issued:

August 29, 2008 (Notice of Availability in the Federal Register)

Document Cost and Availability:

A limited number of hard copies or DVDs of the Final EIS may be obtained free of charge by contacting:

Jason Smith, Project Environmental Manager
Washington State Department of Transportation
1710 South 24th Avenue, Suite 100
Yakima, Washington 98902
(509) 577-1921
smithjw@wsdot.wa.gov

Paper copies of the Final EIS and Appendix A, Comments and Responses to the Draft EIS, are located at selected King County Libraries (Bellevue Regional, Issaquah, Lake Hills, Newport Way, North Bend), Ellensburg Library, Cle Elum Library, Central Washington University Library, Seattle Public Library (Downtown Branch only), and the Washington State Library.

Permits and Approvals:

Highway improvements are subject to federal, state, and local permit processes. The permits, approvals and agreements listed below may be required prior to project implementation on any particular phase of construction.

Permits, Approvals, and Agreements

Agency	Regulation	Permit or Approval
Federal		
US Fish and Wildlife Service/National Oceanic and Atmospheric Administration Fisheries	Endangered Species Act Section 7 Consultation and concurrence (impact to listed species) Magnuson-Stevens Fishery Conservation and Management Act Migratory Bird Act	Consultation and Biological Opinion
US Army Corps of Engineers	Clean Water Act (including demonstration that WSDOT has identified the least environmentally damaging practicable alternative) Section 404(b)(1) Alternatives Analysis	Section 404 Individual permit Jurisdictional Determination for Waters of the US
US Forest Service	Memoranda of Understanding between USFS, FHWA and WSDOT	Consistency determination with the USFS Forest Plan(s)
US Forest Service	Organic Act of 1897, National Forest Management Act of 1976	Access Permit(s) and Special Use Permit(s)
US Bureau of Reclamation	Work in Keechelus Lake	Crossing Permit(s) and/or Use Authorization
State		
Washington Department of Archaeology and Historic Preservation	National Historic Preservation Act Section 106 (impact on historic or cultural properties)	Consultation, Memorandum of Agreement for adverse effects between DAHP, FHWA, and WSDOT.
Washington State Parks and Recreation Commission	Land and Water Conservation Act Section 6(f) (impact on outdoor recreation properties)	Agreement for use of Crystal Springs Sno-Park
Washington State Department of Ecology	Clean Water Act Section 401	Water Quality Certification

Permits, Approvals, and Agreements

Agency	Regulation	Permit or Approval
Washington State Department of Ecology	Clean Water Act Section 402 (RCW 90.48)	National Pollutant Discharge Elimination System Permits for Construction, Sand and Gravel, and possible aquatic spraying
Washington State Department of Ecology	Shoreline Management Act (RCW 90.58)	Consider administrative appeals
Washington State Department of Ecology	Oil Pollution Prevention Program (40 CFR 112)	Spill Prevention, Control and Countermeasure Plan
Washington Department of Fish and Wildlife	Construction Projects in State Waters (RCW 77.55)	Hydraulic Project Approval
Washington Department of Natural Resources	Forest Practices Act (RCW 76.09)	Forest Practices Permit (if project would remove trees on state or private land)
Local		
Kittitas County	County Code Shoreline Management Act (RCW 90.58)	Substantial Development Permit(s) and/or exemption(s)
Kittitas County	County Code	Detour and Haul Road Agreements on county roads
Kittitas County	County Code Title 18.08	Floodplain permit
Kittitas County	County Code Title 18.20 Growth Management Act: RCW 36.70A, Critical Areas: WAC 365-190-080(5)	Growth Management Act Critical Areas Ordinance permit
Kittitas County	County Code Title 17.44.150	Noise regulations
Kittitas County	County Code Title 17	Limited Zoning review

CFR – Code of Federal Regulations
DAHP – Department of Archaeology and Historic Preservation
FHWA – Federal Highway Administration
RCW – Revised Code of Washington
USFS – US Forest Service
WAC – Washington Administrative Code
WSDOT – Washington State Department of Transportation

Summary at Beginning of Each Chapter or Major Section

- NC: Mid-Currituck FEIS
- WA: SR 520 FEIS

Techniques to note:
- brief, one-paragraph summary in italics at the beginning of each section of a chapter.

the future. The presence of a bridge in the mid portion of the sound would be unlikely to substantially alter the existing or future number of waterfowl that may use Currituck Sound because impacts to habitat would be confined to 4.8 acres of SAV habitat (including existing beds) by shading. This impact would be mitigated.

Although evidence of wildlife population declines as a result of roadway mortality has persisted for years, the long-term effects of road avoidance resulting from traffic noise have only recently been studied. Traffic noise is a potential threat to an animal's health, reproductive success, physiology, and behavior (Forman and Alexander, 1998; Radle, 2006). Road avoidance because of noise/human activity has been extensively documented for wildlife species such as black bears (Brody and Pelton, 1989), bobcats (Lovallo and Anderson, 1996), wolves (Thurber et al., 1994), and songbirds (Reijnen et al., 1995; Reijnen et al., 1996; Forman and Alexander, 1998). Some species may become habituated to noise disturbances, but many species display reduced nesting and activity near areas of traffic noise (Fernández-Juricic, 2001) and wildlife populations may become isolated as a result of restricted movement (Donaldson, 2005). For example, black bears frequently avoid habitat within 300 feet of roads (Jones, 2008). Even though road noise has a varying effect on wildlife, it seems to affect substantially avian communities that utilize sound in their basic behaviors (Coffin, 2007). Noise levels as low as those found in a library reading room (42 to 48 decibels) have been found to affect negatively some avian species (reviewed in Forman and Alexander, 1998).

A synthesis of studies on the effects of roads on wildlife found that more information is needed on the relation between road noise and wildlife (Kaseloo and Tyson, 2004). Many studies did not quantify noise levels or left out factors such as landscape variables that may have also contributed to wildlife behavior. However, after their analysis of the publications, Kaseloo and Tyson (2004) concluded that traffic noise does have an effect on wildlife. The effect is variable depending on the species and other factors such as surrounding landscape and type of disturbance. It is unclear in many of the studies if noise is a significant effect, predictor variable, or just a contributing factor. Traffic noise has been shown to interrupt aestivation in spadefoot toads and some waterfowl species such as wood ducks did not become habituated to noise but other species such as black ducks, became habituated to noise (Kaseloo and Tyson, 2004).

3.3.4 How would aquatic wildlife be affected?

Fill, pile placement, shading, and clearing would result directly in the permanent loss or alteration of aquatic habitat and the wildlife that live there. Construction operations could result in temporary impacts. Aquatic impacts would be the greatest with MCB2, MCB4, and the Preferred Alternative because they include a Mid-Currituck Bridge.

3.3.4.1 Aquatic Wildlife

Macroinvertebrate populations of Currituck Sound are composed primarily of burrowing amphipods near the shore, but there is a more diverse population in deeper center turn lane of US 158 for hurricane evacuation) would result in the smallest increase. The Preferred Alternative, MCB4, and ER2 with a third outbound lane on US 158 would have similar increases in impervious surface area with amounts between MCB2 and ER2 (with reversing the center turn lane). The difference between mainland approach road Option A (included in the Preferred Alternative) and Option B in terms of impervious surface would be minimal (0.4 acre). For the road widening portions of the detailed study alternatives, including the Preferred Alternative, infiltration strips and ditches that would transport water to dry infiltration basins would be implemented to treat highway runoff along NC 12. Along US 158, ditches would be used to transport water to existing outfalls.

The stormwater management plan proposed for the Preferred Alternative is described in Section 2.1.7. NCTA would comply with NC Session Law 2008-211 (An Act to Provide for Improvements in the Management of Stormwater in the Coastal Counties in Order to Protect Water Quality) to the maximum extent practicable for the additional impervious surface area created by this project. A final stormwater management plan for minimizing the potential impact of project pollutants would be developed in association with NCDENR-DWQ and other state and federal environmental resource and regulatory agencies during final design of the alternative selected for implementation and in the process of obtaining related permits.

Additional impacts to water quality could occur from single pollution events such as hazardous spill incidents on proposed bridge structures or widened roadways. Impacts to salinity, water supply and wastewater treatment should not result from any of the detailed study alternatives, including the Preferred Alternative.

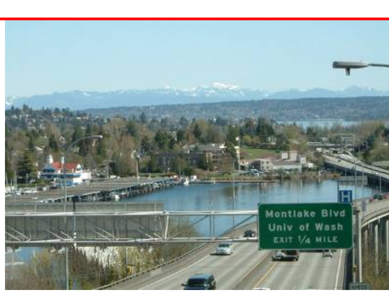
3.3.2 How would biotic resources be affected?

The detailed study alternatives, including the Preferred Alternative, would affect a variety of natural and naturalized biotic communities. The impact on natural upland communities would be least with the Preferred Alternative. The fill impact on wetlands would be similar with all of the detailed study alternatives except MCB2/B and MCB4/B, which would have the highest wetland fill impact. A Mid-Currituck Bridge would involve shading and clearing impacts in addition to fill impacts. A Mid-Currituck Bridge would affect aquatic bottom and SAV habitat and potential habitat. All of the detailed study alternatives except the Preferred Alternative would cause a minor amount of permanent shading impacts to streams in the project area, but there would be no fill placed in streams. In general, temporary impacts to biotic communities would be greatest with ER2.

3.3.2.1 Biotic Community Types

Twenty-one biotic community types occur within the project area. Of these 21 communities, seven communities are the result of direct human disturbance, including: man-dominated land, agricultural land, pine forest, shrub/scrub, wetland man-dominated land, wetland pine forest, and wetland shrub/scrub. Fourteen communities can be considered to be relatively natural systems: mixed-pine/hardwood forest,

Techniques to note:
- brief, one-paragraph summary in italics at the beginning of each chapter.




Chapter 7: Cumulative Effects

This chapter describes cumulative effects expected to be associated with the proposed SR 520, I-5 to Medina: Bridge Replacement and HOV Project. The Final Indirect and Cumulative Effects Discipline Report (included in Attachment 7) details analytical methods and other past, present, and reasonably foreseeable future actions that could add to or interact with the direct and indirect effects of the project (discussed in Chapters 5 and 6) to produce cumulative effects. WSDOT does not mitigate cumulative effects because it does not have jurisdiction over the many non-WSDOT projects that contribute to them (WSDOT et al. 2008). However, WSDOT is required to disclose cumulative effects and to suggest practical mitigation options that could be taken by the responsible parties. Consequently, this chapter suggests ways that public agencies and private developers beyond WSDOT's jurisdictional responsibilities could mitigate cumulative effects. For more information, see the Final Indirect and Cumulative Effects Discipline Report.

7.1 What are cumulative effects?

Cumulative effects (also called cumulative impacts) are defined as follows:

> ... 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 nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. (40 Code of Federal Regulations [CFR] 1508.7)

A cumulative effect is the project's direct and indirect effects on a particular resource combined with the past, present, and future effects of other human activities on that same resource. The result is the expected future condition of the resource when all of the external factors known or likely to affect it are taken into account.

Chapter 6. Presentation of Data

In any NEPA document, it is necessary to present large amounts of data on issues such as traffic congestion, air emissions, and noise levels. The volume of data can be overwhelming to readers, even those with technical expertise.

To some extent, the presentation of data can be improved simply by moving unnecessary detail out of the main body into appendices. For example, a table that list traffic congestion levels at dozens of intersections could be included in a technical report, with the main body of the NEPA document listing only those intersections where traffic congestion will exceed acceptable levels.

The presentation of data also can be improved by ensuring that standard practices for discussing data are followed consistently – for example, giving the units of measurement, providing citations to data sources, and explaining in text the significance of the numbers presented in a table. It also is a good practice to explain any anomalies or apparent inconsistencies in the data.

In addition, visual elements can help the reader to grasp the significance of the data with less need for lengthy explanation.[1] Some good practices include:

- *Overlaying data on project area figures.* Much of the data in a NEPA document is used to describe conditions in a specific location. For example, a NEPA document may include data regarding traffic congestion on a region's road network and noise impacts on a residential area. For this type of data to be meaningful, the reader needs to connect the numbers to the location that is being described. Figures can help the reader to make this connection. For example, data regarding traffic back-ups (queue lengths) can be presented on a figure showing the roads where those back-ups would occur.

- *Using bar charts.* Bar charts provide a simple but effective way to convey the relative magnitude of different numbers. Bar charts are most effective when the reader can quickly grasp the relevant point of

[1] For additional ideas on how to "make it visual," refer to the Washington State Department of Transportation's *Reader-Friendly Toolkit*, published in 2008, at http://www.wsdot.wa.gov/environment/readerfriendly.htm.

comparison. The reader should "get it" without having to read a paragraph that explains what the bar chart means.

- *Color-coding data in a table.* When data is presented in a table, it can be useful to use colors to highlight important differences among the numbers. For example, colors can be used to distinguish acceptable vs. unacceptable levels of service when presenting traffic congestion data.

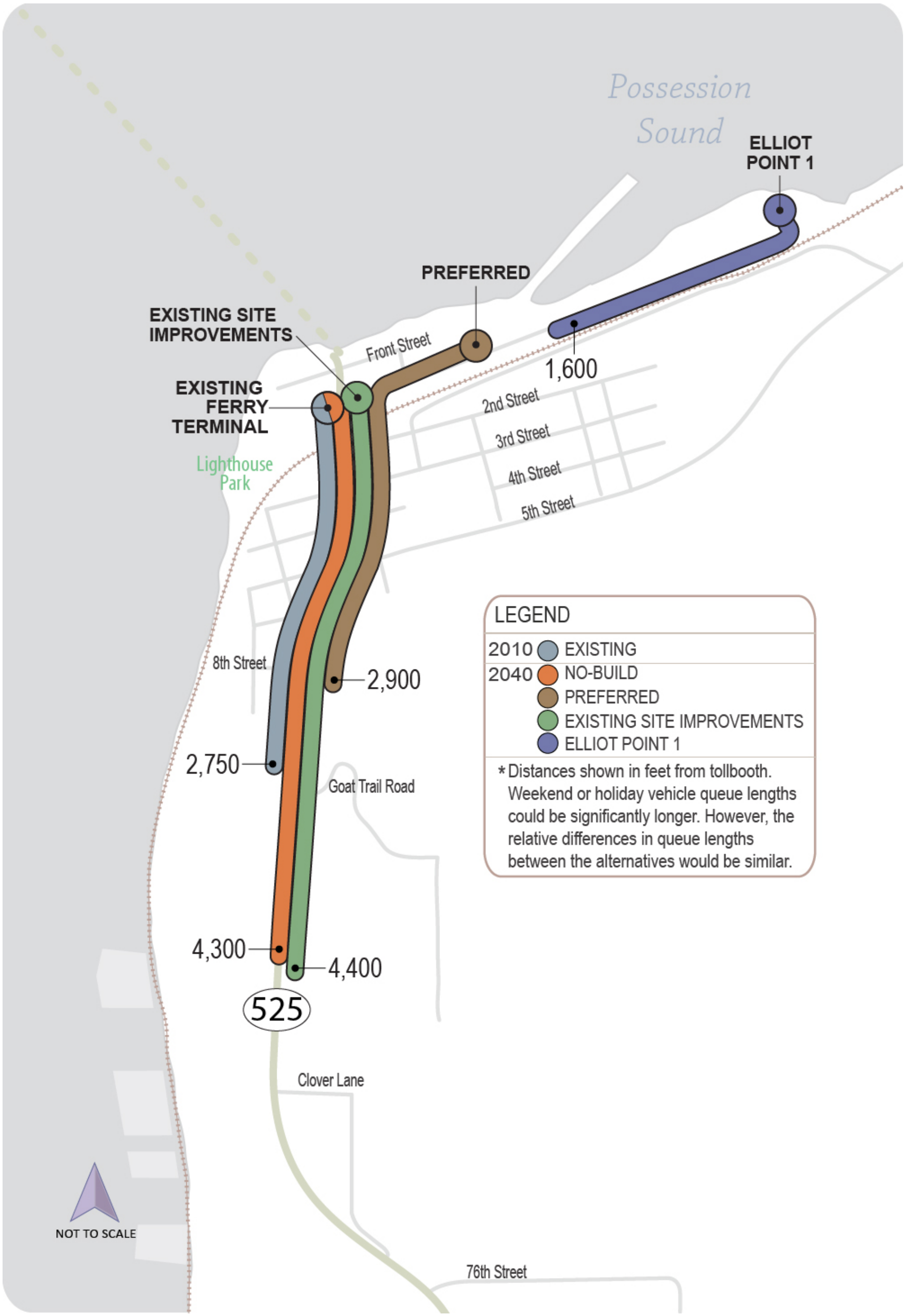
- *Using symbols to summarize differences.* In some cases, especially when summarizing a range of impacts, the evaluation of alternatives can be most effectively conveyed by using symbols (icons) rather than numbers. For example, a table that summarizes the evaluation of alternatives can use red, yellow, and green icons to indicate the relative advantages and disadvantages of the alternatives.

Data Presented in Figures

- WA: Mukilteo FEIS (queue lengths on plan view)
- CO: I-70 FEIS (P&N dta with project corridor map)

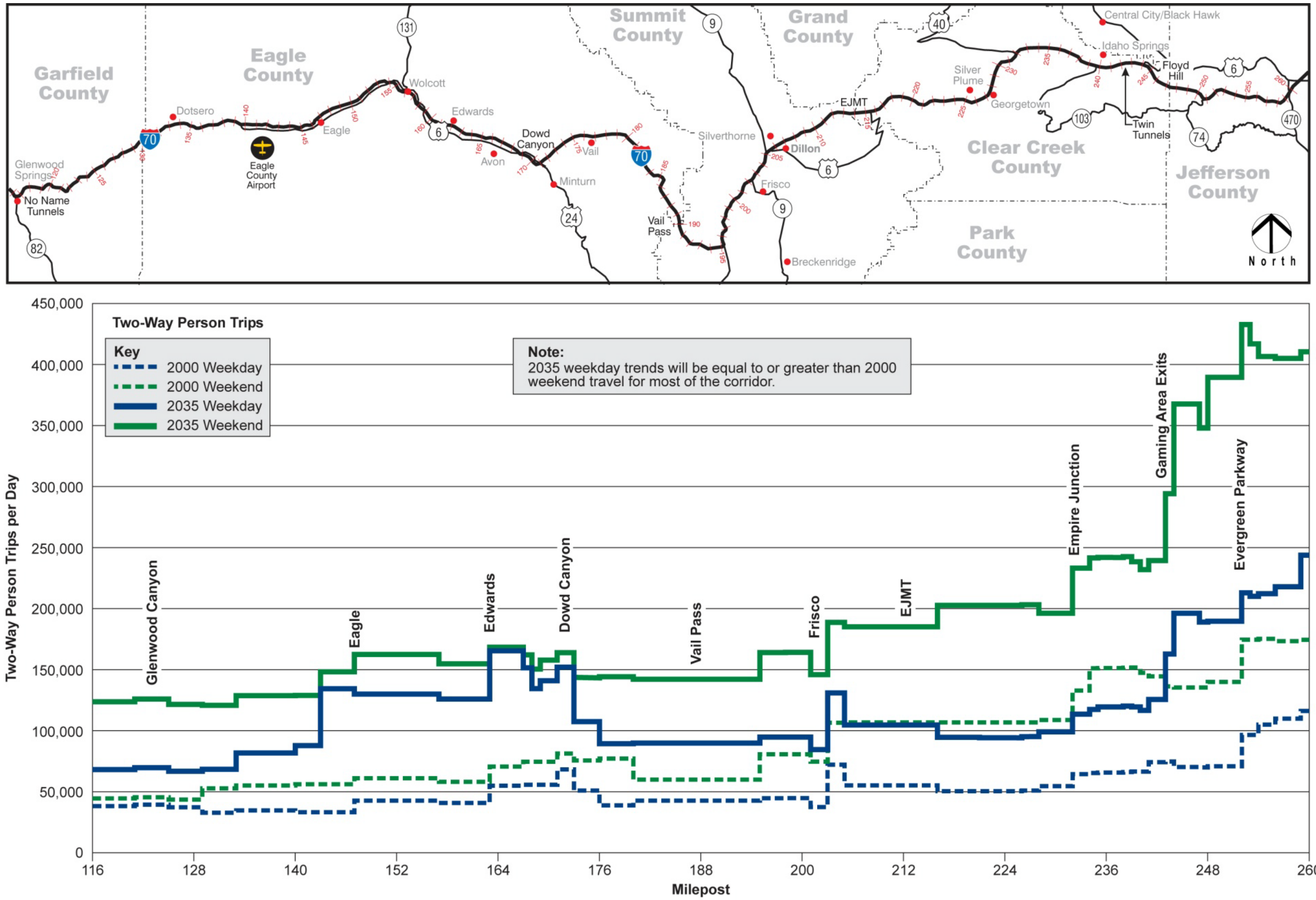
Techniques to note:
- data is presented in figures rather than tables, helping reader to visualize impacts (in this case, queue lengths)

Figure 3-6. Typical Weekday Peak Period Ferry Shoulder Queue Length in Mukilteo



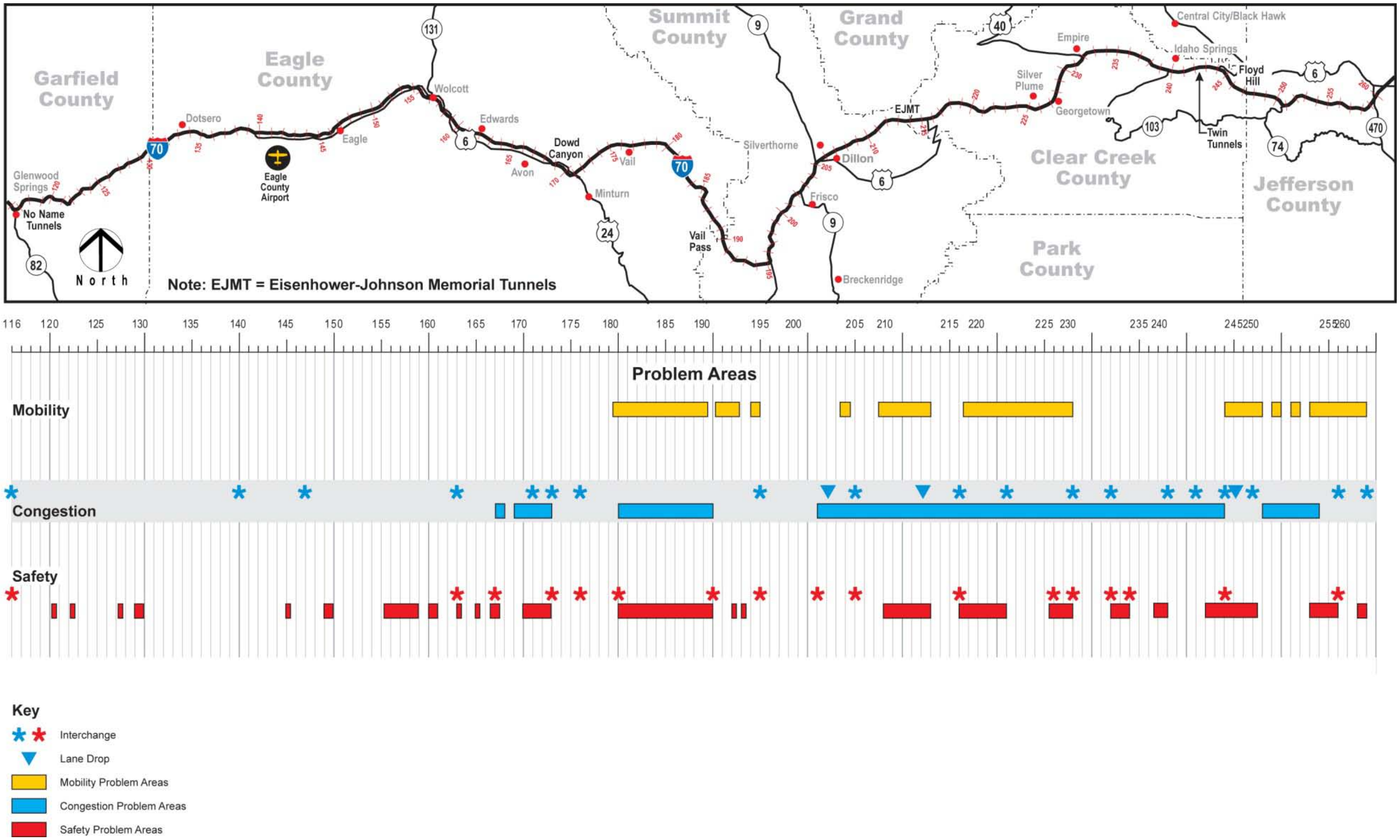
Techniques to note:
- project corridor map is used in combination with figures to help reader visualize locations referenced in the figures.

Figure 1-6. 2000 and 2035 Travel Demand



Note: EJMT = Eisenhower-Johnson Memorial Tunnels

Figure 1-10. Problem Areas for Mobility, Congestion, and Safety



Use of Colors to Highlight Important Data in Tables

- CO: US 36 FEIS (traffic volume data)
- MD: Purple Line FEIS (LOS data)
- WA: Mukilteo FEIS (summary of Level 1 screening results)

Techniques to note:
- color-coding is used to help readers understand the significance of data (in this case, how lane volumes correlate with Level of Service)

ansportation service is measured by the LOS in the a.m. peak-hour and p.m. esired LOS for peak-hour urban highway operations in general-purpose lanes is segment at LOS E or F should be considered deficient.

The LOS in special lanes is also measured based on forecast average volume per lane. The special lane operations described here meet the CDOT special-lane management strategy. This level of travel operations would provide more reliable travel times.

For a segment of freeway, the average volume per lane and LOS are typically related. As the volume per lane increases, the LOS decreases. Table 3.4-6, US 36 a.m. Peak-hour Mainline Levels of Service and Average Volume per Lane, and Table 3.4-7, US 36 p.m. Peak-hour Mainline Levels of Service and Average Volume per Lane, present the LOS and average volume per lane for each segment of US 36 during the a.m. and p.m. peak-hours, for each of the analysis packages. The two tables also summarize the number of roadway sections that would operate at LOS E or F.

Table 3.4-6: US 36 a.m. Peak-hour Mainline Levels of Service and Average Volume per Lane

Segment/Direction	General-purpose Lanes				Special Lanes			
	Package 1	Package 2	Package 4	Combined Alternative Package (Preferred Alternative)	Package 1	Package 2	Package 4	Combined Alternative Package (Preferred Alternative)
Eastbound Direction								
Foothills Parkway to McCaslin Boulevard	1,950	1,620	1,290	1,810	N/A	870	350	1,430
McCaslin Boulevard to West Flatiron Circle	2,220	1,600	1,610	1,770	N/A	870	350	1,360
East Flatiron Circle to Wadsworth Parkway	1,060	1,230	1,250	1,270	N/A	960	480	1,060
Wadsworth Parkway to Church Ranch Boulevard	1,530	1,650	1,300	1,430	N/A	960	600	890
Church Ranch Boulevard to Sheridan Boulevard	1,750	1,710	1,430	1,540	N/A	1,370	680	1,040
Sheridan Boulevard to Federal Boulevard	2,790	2,340	1,930	2,200	N/A	1,370	720	980
Federal Boulevard to Pecos Street	2,090	1,940	1,710	1,900	1,120	1,370	720	1,040
Pecos Street to Broadway	2,220	1,950	2,130	1,580	1,330	1,620	720	1,040
Westbound Direction								
Broadway to Pecos Street	1,440	1,530	1,550	1,690	N/A	480	320	N/A
Pecos Street to Federal Boulevard	1,520	1,130	1,250	1,750	N/A	1,130	320	N/A
Federal Boulevard to Sheridan Boulevard	1,730	1,490	1,590	1,920	N/A	1,130	780	910
Sheridan Boulevard to Church Ranch Boulevard	1,920	2,350	1,560	1,840	N/A	1,350	820	920
Church Ranch Boulevard to Wadsworth Parkway	1,840	1,880	1,560	1,710	N/A	1,350	820	1,150
Wadsworth Parkway to East Flatiron Circle	1,490	1,830	1,800	1,770	N/A	1,160	820	1,120
West Flatiron Circle to McCaslin Boulevard	1,970	2,090	1,690	1,400	N/A	1,160	820	1,100

Table 3.4-6: US 36 a.m. Peak-hour Mainline Levels of Service and Average Volume per Lane

Segment/Direction	General-purpose Lanes				Special Lanes			
	Package 1	Package 2	Package 4	Combined Alternative Package (Preferred Alternative)	Package 1	Package 2	Package 4	Combined Alternative Package (Preferred Alternative)
McCaslin Boulevard to Foothills Parkway	1,930	2,180	1,710	1,300	N/A	1,080	630	960
Number of Sections Operating at LOS E or LOS F	9	8	4	5	0	0	0	0

Source: US 36 Mobility Partnership, 2009.
Notes:
LOS are color-coded to facilitate comparison between packages.

a.m.	=	morning	white shading	=	LOS B or C
LOS	=	level of service	green shading	=	LOS D
N/A	=	not available	yellow shading	=	LOS E
			red shading	=	LOS F

Table 3.4-7: US 36 p.m. Peak-hour Mainline Levels of Service and Average Volume per Lane

Segment/Direction	General-purpose Lanes				Special Lanes			
	Package 1	Package 2	Package 4	Combined Alternative Package (Preferred Alternative)	Package 1	Package 2	Package 4	Combined Alternative Package (Preferred Alternative)
Eastbound Direction								
Foothills Parkway to McCaslin Boulevard	1,880	1,920	1,580	1,830	N/A	1,340	630	970
McCaslin Boulevard to West Flatiron Circle	2,080	1,330	1,590	1,520	N/A	1,190	850	910
East Flatiron Circle to Wadsworth Parkway	1,480	1,690	1,690	1,640	N/A	1,190	850	1,050
Wadsworth Parkway to Church Ranch Boulevard	1,740	1,710	1,430	1,570	N/A	1,400	960	1,040
Church Ranch Boulevard to Sheridan Boulevard	1,770	1,790	1,490	1,680	N/A	1,400	960	1,070
Sheridan Boulevard to Federal Boulevard	2,130	2,090	1,650	2,130	N/A	1,310	880	710
Federal Boulevard to Pecos Street	1,550	1,440	1,410	1,520	N/A	1,310	940	700
Pecos Street to Broadway	1,620	1,350	1,680	1,350	N/A	740	360	N/A
Westbound Direction								
Broadway to Pecos Street	1,620	1,880	1,900	1,740	1,000	1,220	1,140	1,000
Pecos Street to Federal Boulevard	1,450	1,530	1,420	1,730	1,110	1,220	1,140	730
Federal Boulevard to Sheridan Boulevard	2,120	1,720	1,590	1,900	N/A	1,220	1,180	830
Sheridan Boulevard to Church Ranch Boulevard	2,320	2,290	1,520	1,710	N/A	1,030	770	660

Techniques to note:
- color-coding is used to help readers understand the significance of data (in this case, acceptable vs. unacceptable Level of Service)

Level of Service

Level of service (LOS) is a measure of the quality of operations of a roadway. It looks at speed, traffic volume and road geometry. LOS A represents free flow conditions and LOS F represents a breakdown of vehicular flow. Typically, in urbanized areas LOS D or better is considered adequate.

As shown in Table 3-6, 11 intersections (22 percent) operate at LOS E or F during one or both peak hours. The remaining intersections currently operate at LOS D or better during the AM and PM peak hours.

Table 3-6. Levels of Service at Intersections along the Alignment that would operate at or Exceeding Capacity in 2040

Intersection	2012 Existing		2040 No Build Alternative		2040 Preferred Alternative	
	AM	PM	AM	PM	AM	PM
Wayne Avenue @ Fenton Street	C	C	C	D	C	F
Wayne Avenue @ Dale Drive	B	C	C	F	E	E
Wayne Avenue @ Sligo Creek Parkway	D	C	F	F	D	F
Wayne Avenue @ Manchester Road	E	E	F	F	C	F
Piney Branch Road @ University Boulevard	D	D	D	D	F	F
University Boulevard @ Carroll Avenue	D	C	E	C	D	C
University Boulevard @ Merrimac Drive	D	F	F	F	A	A
University Boulevard @ New Hampshire Avenue	D	E	D	F	D	E
University Boulevard @ Riggs Road	D	E	E	F	E	F
University Boulevard @ 15th Avenue	B	D	B	D	B	E
University Boulevard @ Guilford Road	C	F	B	F	A	A
University Boulevard @ Campus Drive	B	C	C	D	C	E
Campus Drive @ Adelphi Road	E	E	E	F	E	F
Campus Drive @ Regents Drive	D	F	F	F	E	E
Paint Branch Parkway @ Rossborough Lane	N/A	N/A	F	F	B	E
Paint Branch Parkway @ MFRI Building Entrance	B	B	F	F	C	B
Paint Branch Parkway @ Metro Parking	A	B	E	F	F	F
River Road @ Rivertech Court	E	F	F	F	D	D
River Road @ Haig Drive	C	C	E	D	A	A
Kenilworth Avenue @ East-West Highway	F	F	F	F	F	F
Veterans Parkway @ Glenridge Yard	E	F	F	F	A	A
Veterans Parkway @ Annapolis Road	E	E	E	E	E	F
Total LOS F Intersections (by peak period)	**1**	**6**	**9**	**15**	**3**	**9**
Intersections at or exceeding capacity (by peak period)	**6**	**11**	**15**	**16**	**8**	**15**
Total Intersections at or exceeding capacity	**11**		**18**		**15**	

Note: Green shading denotes levels of service A-D; orange and red shading denote intersection levels at or exceeding capacity, i.e., with LOS of E or F.

Source: Purple Line Traffic Analysis Technical Report (2013)

Techniques to note:
- color-coding and icons are used to summarize advantages and disadvantages of alternatives

transportation operations compared to existing conditions at the Mukilteo terminal?

- How well does the concept avoid environmental effects?

Table 1 summarizes the results of the Level 1 screening for each concept. The details of the screening results for the Level 1 analysis are documented in *Mukilteo Multimodal Project Level 1 Screening Result*. None of these concepts were eliminated in the Level 1 analysis; all were carried forward into the Level 2 analysis.

Table 1. Summary of Level 1 Screening Results

Level 1 Screening Results Summary	No Build	Existing Site Improvements	Elliot Point – Option 1	Elliot Point – Option 2	Elliot Point – Option 3	Mount Baker Terminal	Edmonds – Existing Terminal	Edmonds – Existing Site	Edmonds – Point Edwards	Port of Everett South Terminal
(1) Does the concept improve safety and security at the terminal facility compared to existing conditions at the Mukilteo terminal?										
1(A) Does the concept improve safety for vehicles, bicycles, and pedestrians by reducing conflicts?	⬢	◆	◆	▲	◆	▲	⬢	◆	▲	▲
1(B) Does the concept address the structural deficiencies of the existing terminal?	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
1(C) Does the concept allow for the facility to be secured as required by Homeland Security?	⬢	⬢	▲	▲	▲	▲	⬢	⬢	▲	▲
(2) Does the concept improve transportation operations compared to existing conditions at the Mukilteo terminal?										
2(A) Would the concept provide a terminal with improved multimodal connections?	⬢	◆	◆	▲	◆	⬢	◆	◆	⬢	⬢
2(B) Would the concept provide adequate facilities for future transit service?	⬢	▲	▲	▲	▲	▲	⬢	▲	▲	▲
2(C) Is there enough room to provide holding facilities that can handle at least 1.5 times the capacity of the ferry (approximately 215 vehicles)?	▲	▲	▲	▲	▲	▲	⬢	▲	▲	▲
2(D) Would the concept provide improved facilities for loading and unloading the ferry reliably to maintain schedules?	⬢	▲	▲	▲	▲	▲	⬢	⬢	▲	▲
(3) How well does the concept avoid environmental effects?										
3(A) Ecosystem resources (aquatic habitat, wetlands)?	◆	◆	▲	▲	▲	◆	▲	⬢	⬢	◆
3(B) Historic, cultural, and parkland resources?	⬢	⬢	⬢	⬢	⬢	⬢	◆	⬢	◆	▲
3(C) Proximity effects (noise and visual)?	◆	◆	⬢	⬢	⬢	⬢	◆	⬢	◆	▲

▲ Meets criterion or likely to avoid adverse effects
◆ Partially meets criterion or avoidance uncertain or mixed
⬢ Does not meet criterion or likely to not avoid adverse effects

4.2 Level 2 Screening

Similar to the Level 1 screening, the project team used the three primary criteria for the Level 2 screening analysis to evaluate the ten concepts. For the Level 2 screening they evaluated these criteria in more detail than the Level 1 screening. Table 2 summarizes the results of the Level 2 screening for each concept. The detailed results of the Level 2 screening are documented in *Mukilteo Multimodal Project Level 2 Screening Results*.

Table 2. Summary of Level 2 Screening Results

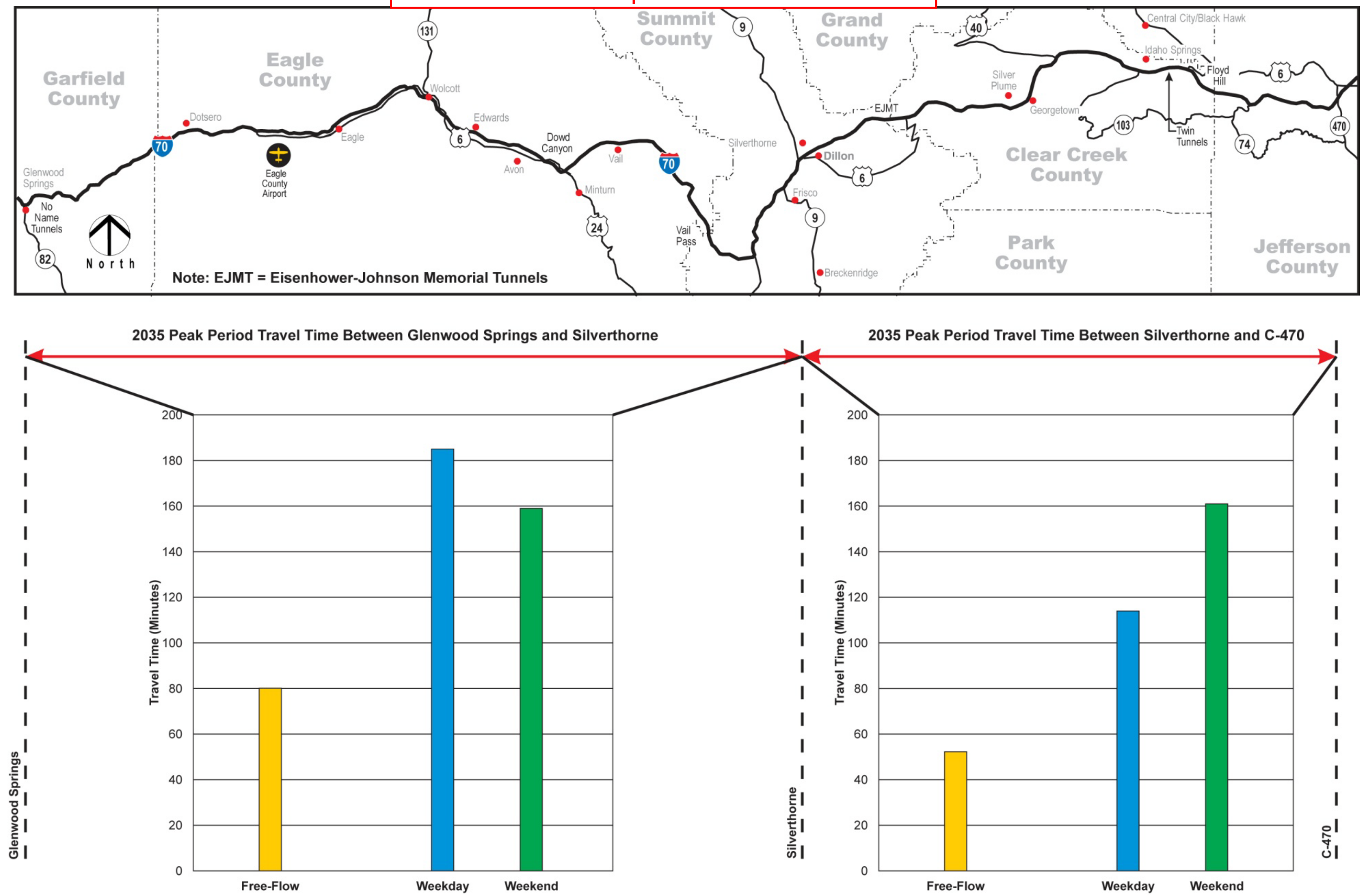
Level 2 Screening Results Summary	No Build	Existing Site Improvements	Elliot Point – Option 1	Elliot Point – Option 2	Elliot Point – Option 3	Mount Baker Terminal	Edmonds – Existing Terminal	Edmonds – Existing Site Improvements	Edmonds – Point Edwards	Port of Everett South Terminal
(1) Does the concept improve safety and security at the terminal facility compared to existing conditions at the Mukilteo terminal?										
1(A) Does the concept reduce conflicts between local and ferry vehicle traffic compared to existing conditions?	⬢	⬢	▲	▲	▲	▲	⬢	⬢	▲	▲
1(B) Does the concept reduce conflicts between vehicles and pedestrians/bicyclists during ferry loading and unloading?	⬢	◆	◆	▲	◆	▲	⬢	▲	▲	▲
(2) Does The Concept Improve Transportation Operations Compared To Existing Conditions At The Mukilteo Terminal?										
2(A) Does the concept improve the reliability of ferry loading/unloading operations compared to the existing Mukilteo terminal?	⬢	◆	▲	▲	▲	▲	⬢	⬢	▲	▲
2(B) Would the location of the terminal avoid ferry conflicts with maritime traffic that would adversely affect ferry schedule reliability?	▲	▲	▲	▲	▲	▲	◆	◆	◆	⬢
2(C) Does the concept provide effective connections between modes (ferry, bus, and rail)?	◆	◆	◆	▲	▲	⬢	◆	◆	⬢	⬢
2(D) Does the concept improve or maintain the connection between Whidbey Island and Seattle-Everett metropolitan area for the majority of users?	See below.									
2(D1) Does the concept improve or maintain peak period trip time? (estimated existing travel time in minutes)	See below.									

Bar Charts (Instead of Tables) Used to Present Data

- CO: I-70 FEIS (P&N data)
- WA: SR 520 FEIS (vehicle demand)

Techniques to note:
- bar charts are presented in combination with corridor map to help reader visualize future travel times between points in the corridor.

ne



Techniques to note:
- bar charts are presented in combination with corridor map to help reader visualize different mixes of trip types at different locations in the corridor.

ure 1-4. 2000 Travel by Trip Purpose at Key Corridor Locations

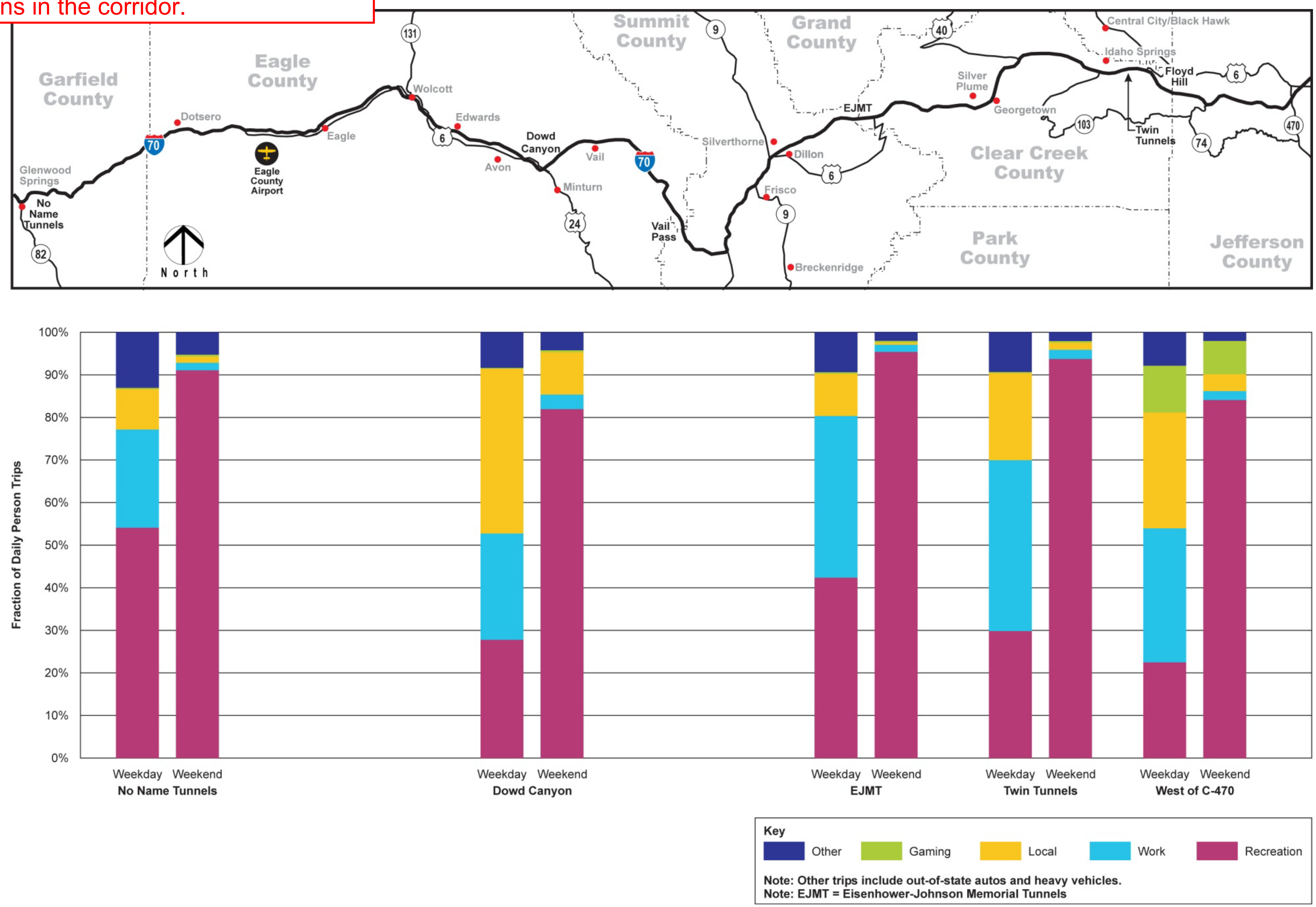
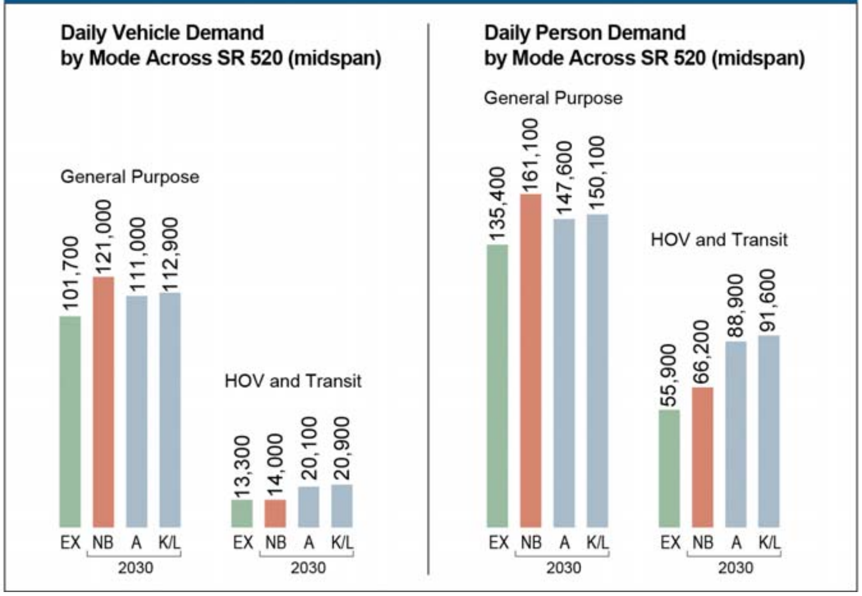


Exhibit 5.1-5. **SDEIS Analysis – Daily Vehicle and Person Demand by Mode Across the SR 520 Bridge (mid-span)**



Techniques to note:
- bar charts are presented side-by-side to highlight a key point (in this case, that HOV and Transit trips make up a low percentage of vehicles but a high percentage of person trips).

It is anticipated that if the SDEIS options were updated to reflect current regional plans and policies, they would show similar vehicle and person trip demand as shown for the Preferred Alternative while maintaining their relative differences.

How would the project affect freeway operations and travel times during peak periods?

The term "freeway traffic operations" refers to how freely traffic is flowing and is discussed here in terms of congestion and travel times. This section discusses freeway operations in terms of congestion during the peak periods of the day, including how congestion affects travel times.

Before looking at the details of operations for the east and west directions by peak time of day below, we can summarize freeway operations by saying that, without the project, congestion and travel times during the morning and evening commute would continue to worsen over existing conditions. Similar to the SDEIS findings about Options A, K, and L, the Preferred Alternative would reduce congestion and travel times for both general purpose and HOV trips, particularly during the westbound afternoon and eastbound morning peak periods. The project would also improve transit travel times and provide more reliable bus timing with the new HOV lanes. However, even with the improved throughput and travel times, not all the forecasted demand for SR 520 in 2030 would be served, due to congestion on I-405 and I-5.

Peak Period versus Peak Hour

When we refer to **peak period** in this analysis, we are referring to a 4-hour peak period.

The morning peak period for the SR 520 I-5 to Medina project occurs weekdays between 6:00 a.m. and 10:00 a.m. The evening peak period occurs weekdays between 3:30 p.m. and 7:30 p.m.

When we refer to **peak hour** in this analysis, we are referring to the "worst" hour within the peak period.

Tables—Citations to Data Sources

- OR: OR 62 FEIS (footnote cites source of data)

Targets as the replacement measure for the previously used standards in the OHP. While the previous mobility standards were viewed as rigid numerical measures, the newly adopted performance targets, while still numerical, are seen as aspirational in nature and offer a degree of flexibility to jurisdictions as they show compliance with the OHP.

Techniques to note:
- sources are cited in footnote to each table

Under 2007 baseline conditions, OR 62 just west of I-5 carried over 52,000 average daily trips (ADT). Of these trips, 5 to 6 percent of the vehicle mix consisted of trucks. Since 2007, traffic volumes on OR 62 have declined in tandem with the economic slowdown. According to traffic trends published by ODOT's Transportation Planning and Analysis Unit (TPAU), traffic volumes are anticipated to slowly increase. Currently four of the nine project area intersections exceed their applicable v/c performance targets; by 2035 eight intersections will exceed their applicable v/c targets (see Table 1-1). Congestion begins during the morning commute period (7 AM - 9 AM) and gradually increases throughout the day with little, if any, relief through the afternoon commute period (4 PM – 6 PM). High traffic volumes continue to occur in between peak periods. The continuous high traffic volumes in midday do not allow conditions to fully recover prior to the afternoon commute period.

The small reduction in the forecast 2035 v/c ratio at the intersection of OR 62 and Vilas Road in Table 1-1 is the result of a change in the phasing of the traffic signal, which is described in Section 3.1.3.2.The small reduction in the forecast 2035 v/c ratio at the intersection of OR 62 and OR 140 is the result of the addition to the roadway system under the No Build Alternative of a project to add left-turn lanes from OR 140 westbound to OR 62 southbound, as described in Section 2.1.1.

As illustrated by data for the intersection of OR 62 and Delta Waters Road (Figure 1-3), traffic volumes rise during the AM peak period and then continue to rise throughout the midday, peaking during the late afternoon. This steady presence of traffic volumes on OR 62 results in congested conditions at most intersections from the start of the morning commute to the close of the evening commute. As a result of congested conditions on OR 62, it takes approximately 16 to 18 minutes to travel through the OR 62 project area during the PM peak period, with average speeds of 25 to 29 miles per hour.

By the future year 2035 under No Build conditions, all but one of the nine signalized intersections along OR 62 between I-5 and Avenue H would fail to meet performance targets as daily traffic volumes approach 63,000 vehicles (see Table 1-1). OR 62 would experience increased congestion as volumes from turn lanes would block adjacent through lanes, and signalized intersections would operate at capacity. Mainline queue lengths would block adjacent local streets, which would cause local street queue lengths to increase and system-wide congestion would also increase. If no roadway improvements are made,

Table 1-1 Signalized Intersection Operations for OR 62 v/c Ratio, Two-Hour PM Peak Period

Key Signalized Intersections	ODOT Mobility Target	2007 Existing Conditions	Future Year 2035 No Build
I-5 SB & OR 62	0.85	0.73	0.87
I-5 NB & OR 62	0.85	0.67	0.75
Poplar Drive & OR 62	0.85	1.02	1.05
Delta Waters & OR 62	0.85	0.86	1.00
Owens Drive & OR 62	0.85	N/A	0.92
Vilas Road & OR 62	0.85	0.86	1.38 1.36
Highway 140 & OR 62	0.85	0.86	1.54 1.48
Antelope Road & OR 62	0.85	0.83	1.09
Avenue G & OR 62	0.85	0.68	0.89

Source: OR 62 Traffic Analysis, OR 62 Corridor Solutions Project. August 2011

v/c = Volume to Capacity describes the capability of an intersection to meet volume demand based upon the absolute maximum number of vehicles that could be served in an hour.

Black-shaded values indicate v/c ratios that exceed or will exceed ODOT mobility target.

N/A = The intersection of Owens Drive at OR 62 is not signalized in the existing 2007 Existing Conditions, therefore, there is no v/c ratio. Installation of the Owens Drive and OR 62 signal occurred in year 2010, as a part of the City of Medford and ODOT's Coker Butte and Owens Drive project, which realigned Crater Lake Avenue and extended Owens Drive to OR 62.

Tables—Citations to Data Sources

- OR: OR 62 FEIS (footnote cites source of data)

Techniques to note:
- sources are cited in footnote to each table

Targets as the replacement measure for the previously used standards in the OHP. While the previous mobility standards were viewed as rigid numerical measures, the newly adopted performance targets, while still numerical, are seen as aspirational in nature and offer a degree of flexibility to jurisdictions as they show compliance with the OHP.

Under 2007 baseline conditions, OR 62 just west of I-5 carried over 52,000 average daily trips (ADT). Of these trips, 5 to 6 percent of the vehicle mix consisted of trucks. Since 2007, traffic volumes on OR 62 have declined in tandem with the economic slowdown. According to traffic trends published by ODOT's Transportation Planning and Analysis Unit (TPAU), traffic volumes are anticipated to slowly increase. Currently four of the nine project area intersections exceed their applicable v/c performance targets; by 2035 eight intersections will exceed their applicable v/c targets (see Table 1-1). Congestion begins during the morning commute period (7 AM - 9 AM) and gradually increases throughout the day with little, if any, relief through the afternoon commute period (4 PM – 6 PM). High traffic volumes continue to occur in between peak periods. The continuous high traffic volumes in midday do not allow conditions to fully recover prior to the afternoon commute period.

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By the future year 2035 under No Build conditions, all but one of the nine signalized intersections along OR 62 between I-5 and Avenue H would fail to meet performance targets as daily traffic volumes approach 63,000 vehicles (see Table 1-1). OR 62 would experience increased congestion as volumes from turn lanes would block adjacent through lanes, and signalized intersections would operate at capacity. Mainline queue lengths would block adjacent local streets, which would cause local street queue lengths to increase and system-wide congestion would also increase. If no roadway improvements are made,

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Key Signalized Intersections	ODOT Mobility Target	2007 Existing Conditions	Future Year 2035 No Build
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Delta Waters & OR 62	0.85	0.86	1.00
Owens Drive & OR 62	0.85	N/A	0.92
Vilas Road & OR 62	0.85	0.86	1.38 1.36
Highway 140 & OR 62	0.85	0.86	1.54 1.48
Antelope Road & OR 62	0.85	0.83	1.09
Avenue G & OR 62	0.85	0.68	0.89

Source: OR 62 Traffic Analysis, OR 62 Corridor Solutions Project. August 2011

v/c = Volume to Capacity describes the capability of an intersection to meet volume demand based upon the absolute maximum number of vehicles that could be served in an hour.

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N/A = The intersection of Owens Drive at OR 62 is not signalized in the existing 2007 Existing Conditions, therefore, there is no v/c ratio. Installation of the Owens Drive and OR 62 signal occurred in year 2010, as a part of the City of Medford and ODOT's Coker Butte and Owens Drive project, which realigned Crater Lake Avenue and extended Owens Drive to OR 62.

Chapter 7. Figures

Figures help to enhance readability by enabling a reader to visualize conditions that are described in the text. But a figure can detract from readability if the figure itself is not clear, or if the reader finds it difficult to correlate the description in the text to the features shown on the figure.

The following good practices can help to maximize the effectiveness of figures in NEPA documents:

- *Label key elements that are discussed in the text*. In most cases, figures are intended to be read in combination with accompanying text. For the figure to be effective, features discussed in the text should be labeled on the figure. For example, if the text refers to a series of intersections or noise-sensitive receptors, the reader expects those features to be labeled on the accompanying figure. Readers are likely to become frustrated if the figures do not identify features discussed in the text.

- *Make important elements stand out against the background.* The background of a figure - e.g., the base map - should provide enough information to orient the reader, but not so much that it distracts from the primary focus of the figure. In addition, it is helpful to use light colors for the background map and bold colors for the major elements.

- *Ensure that the legend is clear and complete.* Including a clear and complete legend should be a standard practice. To ensure that this is done, the review process for a NEPA document should include special attention to legends. In addition, if colors are used for different features, the review process should ensure that colors are clearly distinguishable from one another on both the figure and the legend.

In addition to these practices, it is possible to use graphic designers with the expertise to develop figures that display complex information in compelling and creative ways. But effective use of figures does not require unusual steps. The key is to take the basic steps that enable the reader to understand what is shown on the figure and to make the connection between the figures and text.

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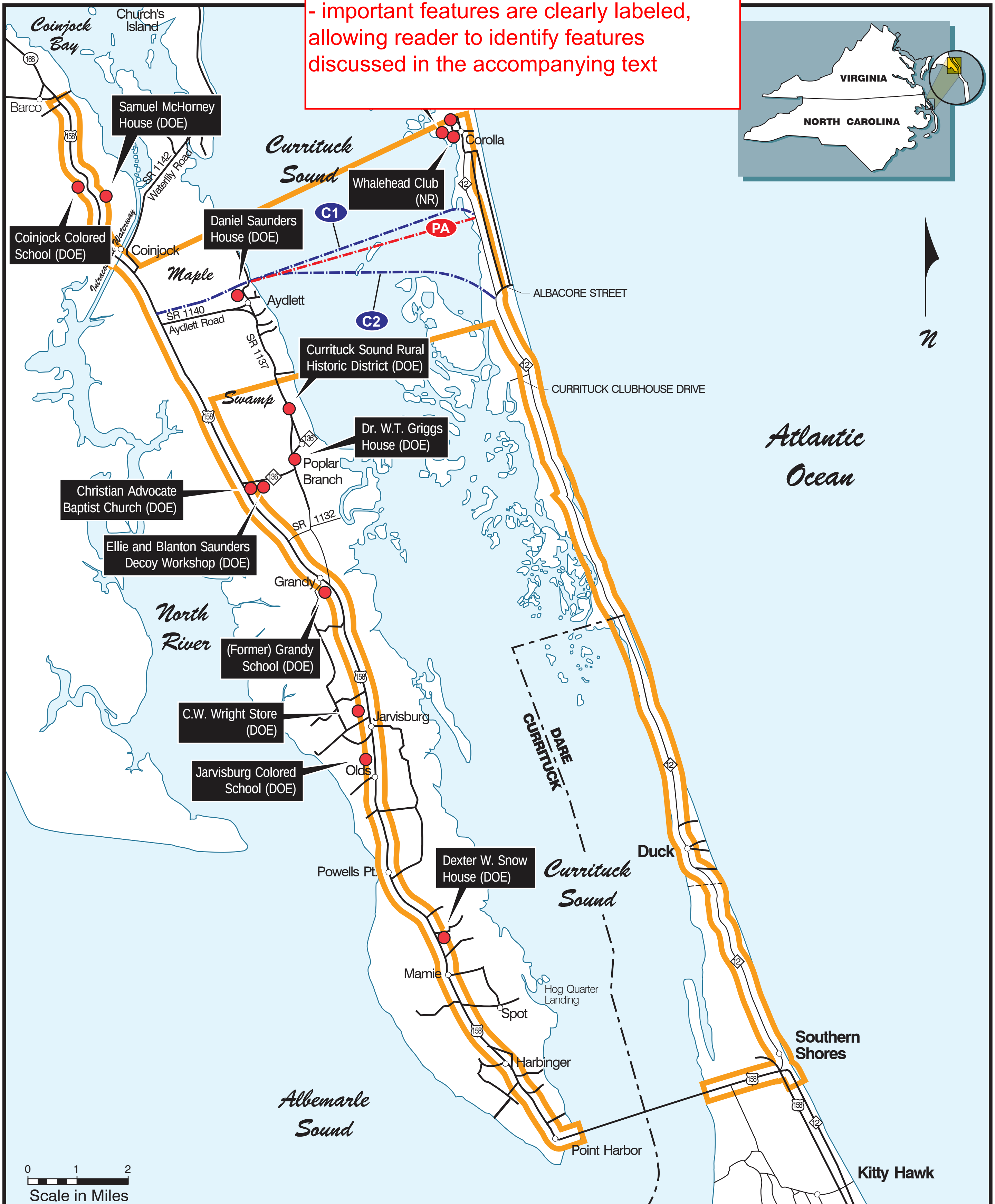
Important Features Clearly Labeled

(i.e., the figure labels features that are mentioned in the accompanying text and tables)

- NC: Mid-Currituck FEIS
- OR: OR 62 FEIS
- WA: Mukilteo FEIS

Techniques to note:
- important features are clearly labeled, allowing reader to identify features discussed in the accompanying text



LEGEND

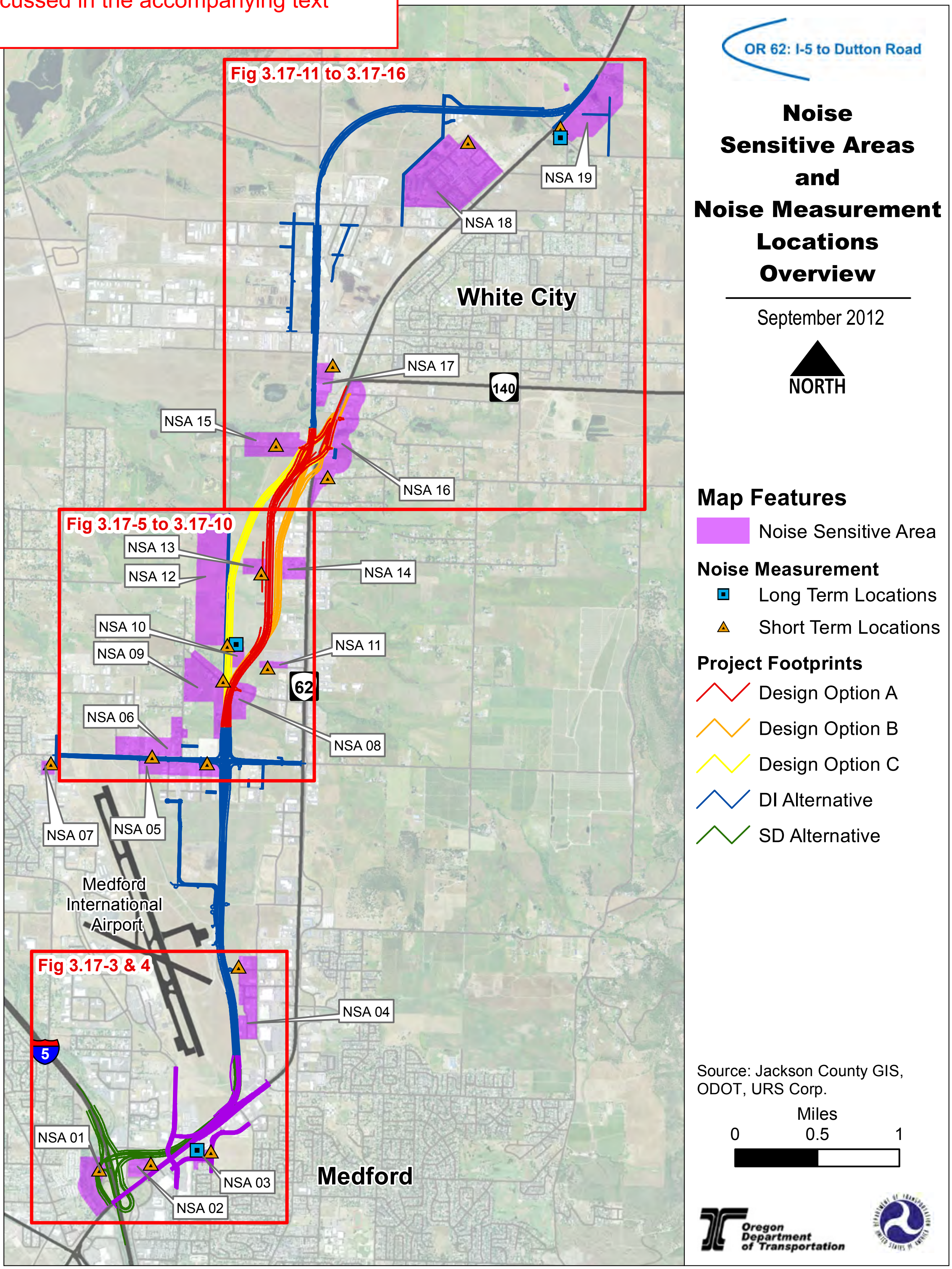
- DEIS Bridge Corridors
- Preferred Alternative Bridge Corridor
- County Boundaries
- Area of Potential Effect (APE)
- Resource listed (NR) on or eligible (DOE) for inclusion in the National Register of Historic Places

Historic Properties

Figure 3-4

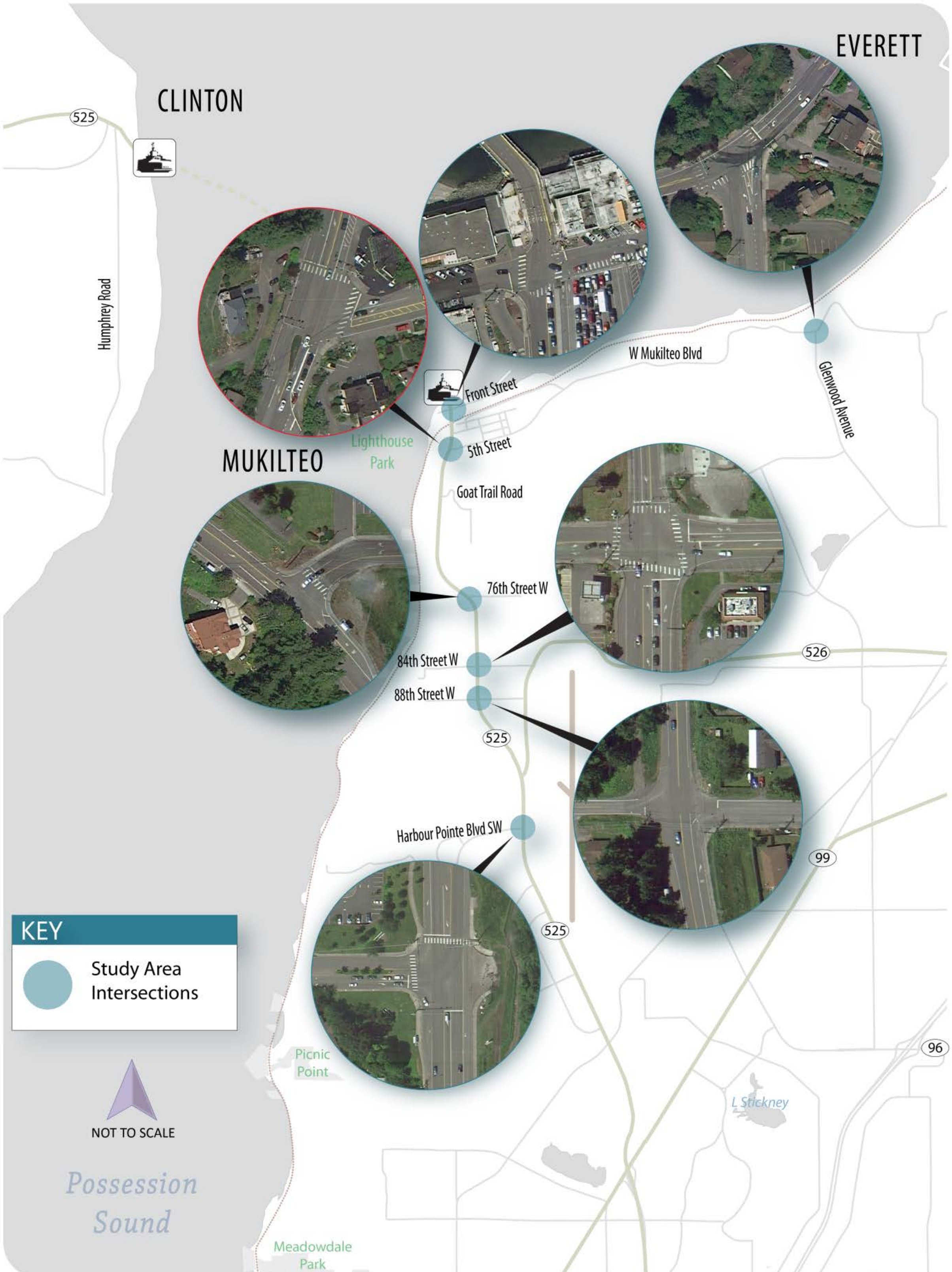
Techniques to note:
- important features are clearly labeled, allowing reader to identify features discussed in the accompanying text

Figure 3.17-2



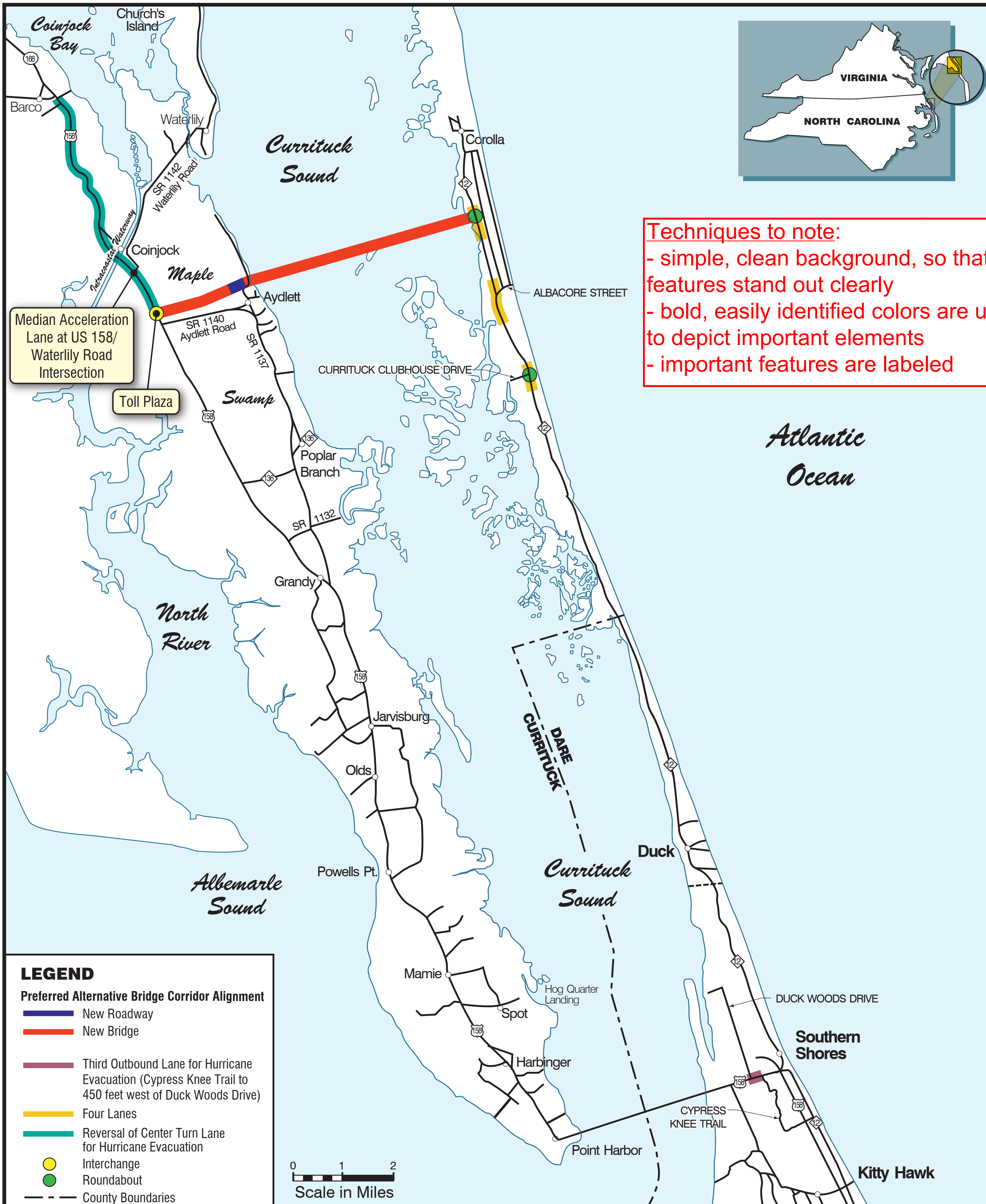
Techniques to note:
- important features are clearly labeled; inset photos help readers to visualize the intersections shown.

Figure 3-3. Study Area Intersections



Major Elements Stand Out Clearly Against Background

- NC: Mid-Currituck Bridge FEIS



Techniques to note:
- simple, clean background, so that key features stand out clearly
- bold, easily identified colors are used to depict important elements
- important features are labeled

Preferred Alternative

Figure 2-2

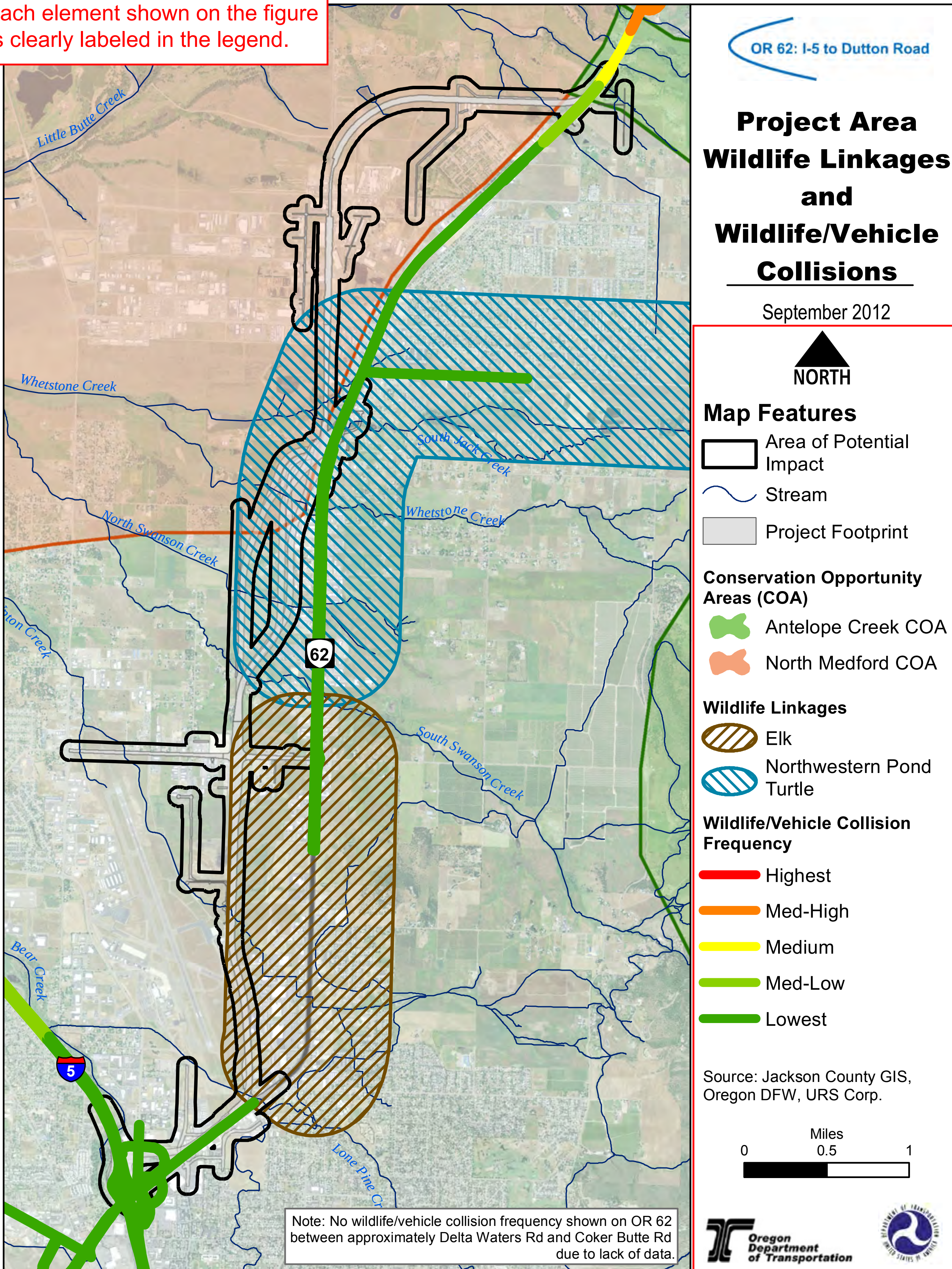
Legend Is Clear and Complete

(and includes north arrow)

- OR: OR 62 FEIS
- WA: I-90 FEIS

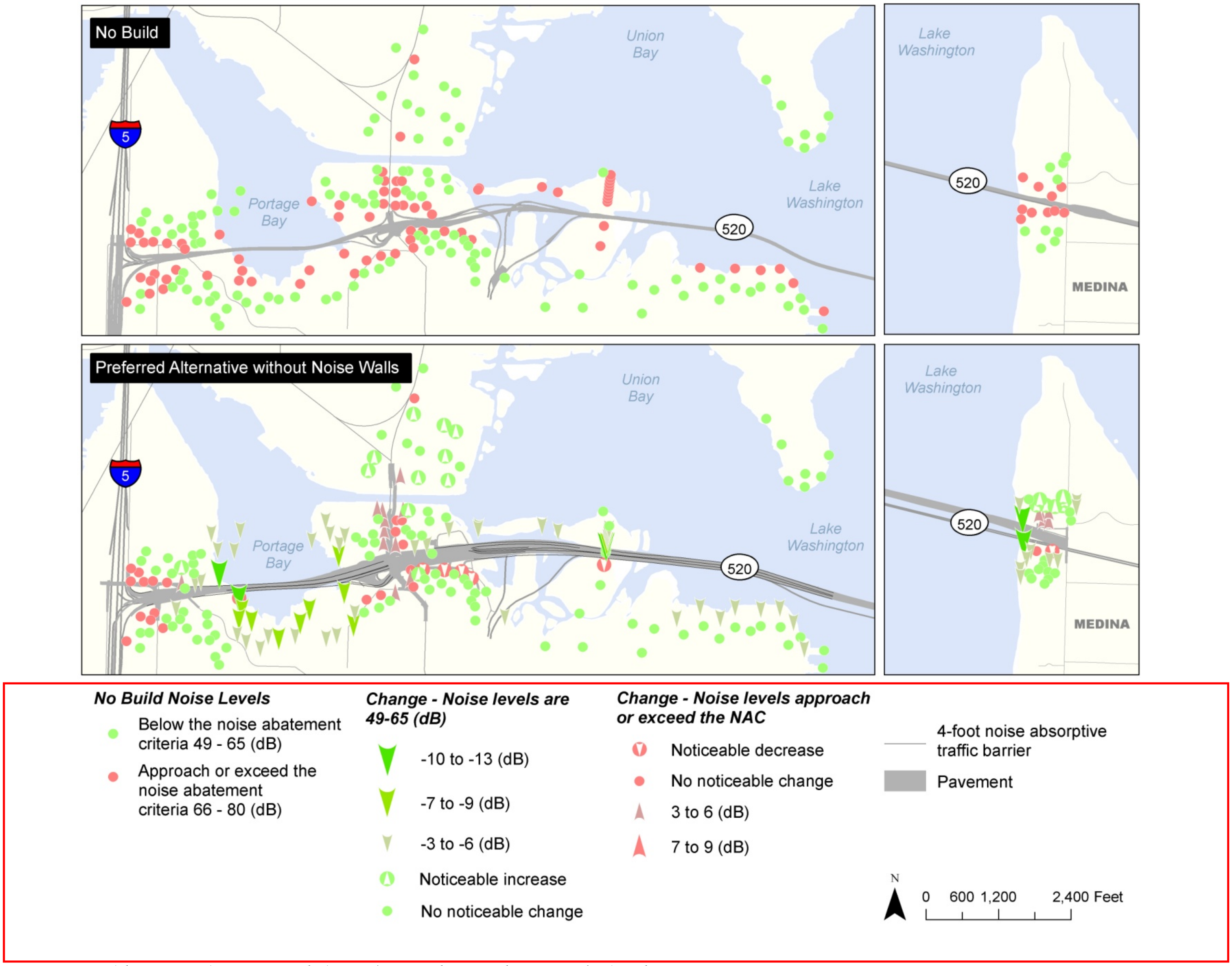
Techniques to note:
- legend is clear and complete; each element shown on the figure is clearly labeled in the legend.

Figure 3.11-3



Techniques to note:
- legend is clear and complete; each element shown on the figure is clearly labeled in the legend.

Exhibit 5.7-1. **Noise Modeling Results for Receivers without Noise Walls (2030) - Preferred Alternative**



would approach or exceed the NAC, and provides a symbol indicating whether an average person would notice an increase, decrease, or no change in traffic noise. Changes in traffic noise are typically noticeable at 3 dBA. Noise levels at locations shown as having no noticeable change would remain within 2 dBA of current levels.

As shown in Table 5.7-2 and Exhibit 5.7-2, Options A, K, and L would also decrease the number of residences where noise levels exceed the NAC, although the decrease would be less than with the Preferred Alternative. Under Option A, the number of residences exceeding the NAC would decrease to 249. Under Options K and L, the number of residences exceeding the NAC would decrease to 256 and 235, respectively. The

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Chapter 8. Visualizations

Visualizations help the reader to “see” what the project would look like in the real world. For many readers, visualizations will be among the most valuable parts of an EIS. Lengthy text and engineering drawings can be confusing; a visualization that shows what a project would like can be the picture that is worth 1000 words.

There are many visualization techniques that can be used in NEPA documents. Some common examples include:

- *Computer-generated 3-D renderings.* Transportation projects include complex structures that can be difficult to describe in text or to depict in two dimensions on plan sheets. Computer-generated renderings give the reader a better understanding of the size and configuration of the structure. For example, renderings shown in this chapter depict a multi-level underground transit station, a new light rail-line located in the middle on an existing street, and the elements of a ferry terminal.

- *Photo simulations*. By inserting project elements into a photograph of the existing landscape, photo simulations can help to show how the project would alter the existing conditions. This approach can be especially useful in depicting the visual impacts of a project.

- *Cross-sections with artwork*. A cross-section drawing is a standard visual element in many NEPA documents for transportation projects. The value of a cross-section drawing can be enhanced by adding artwork that gives the reader a sense of context and scale. One of the examples in this chapter is a cross-section drawing that shows a bicyclist and pedestrians using a trail adjacent to a proposed transit line.

Developing visualizations will require involvement of team members with expertise in graphic design and may involve additional time and expense. If visualizations will be needed, it is important to allow for their development in the project schedule and budget.

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Computer-Generated Renderings

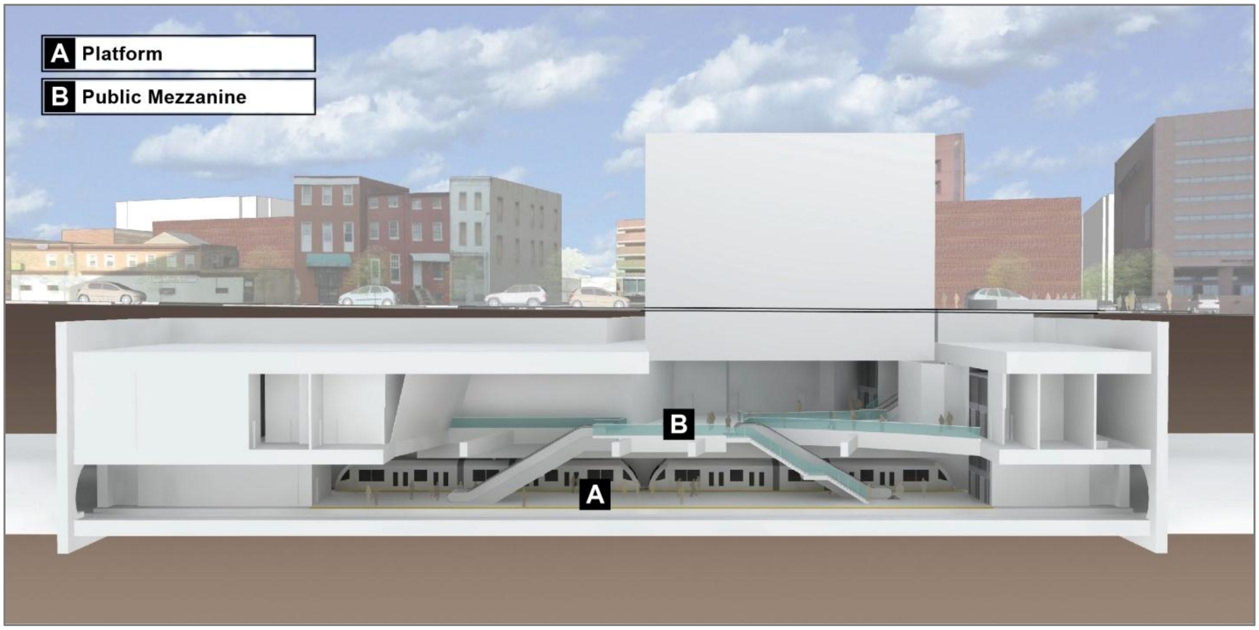
- MD: Baltimore Red Line - Station
- MD: Baltimore Red Line - Tunnel Portal
- WA: Mukilteo FEIS - Ferry Terminal

Techniques to note:
- renderings used to show project elements in three dimensions

Figure 2-13: Two-Level Underground Station Sections

Two-Level Underground Station – Cross Section

Two-Level Underground Station – Longitudinal Section



Techniques to note:
- renderings used to show how project elements would appear within existing landscape

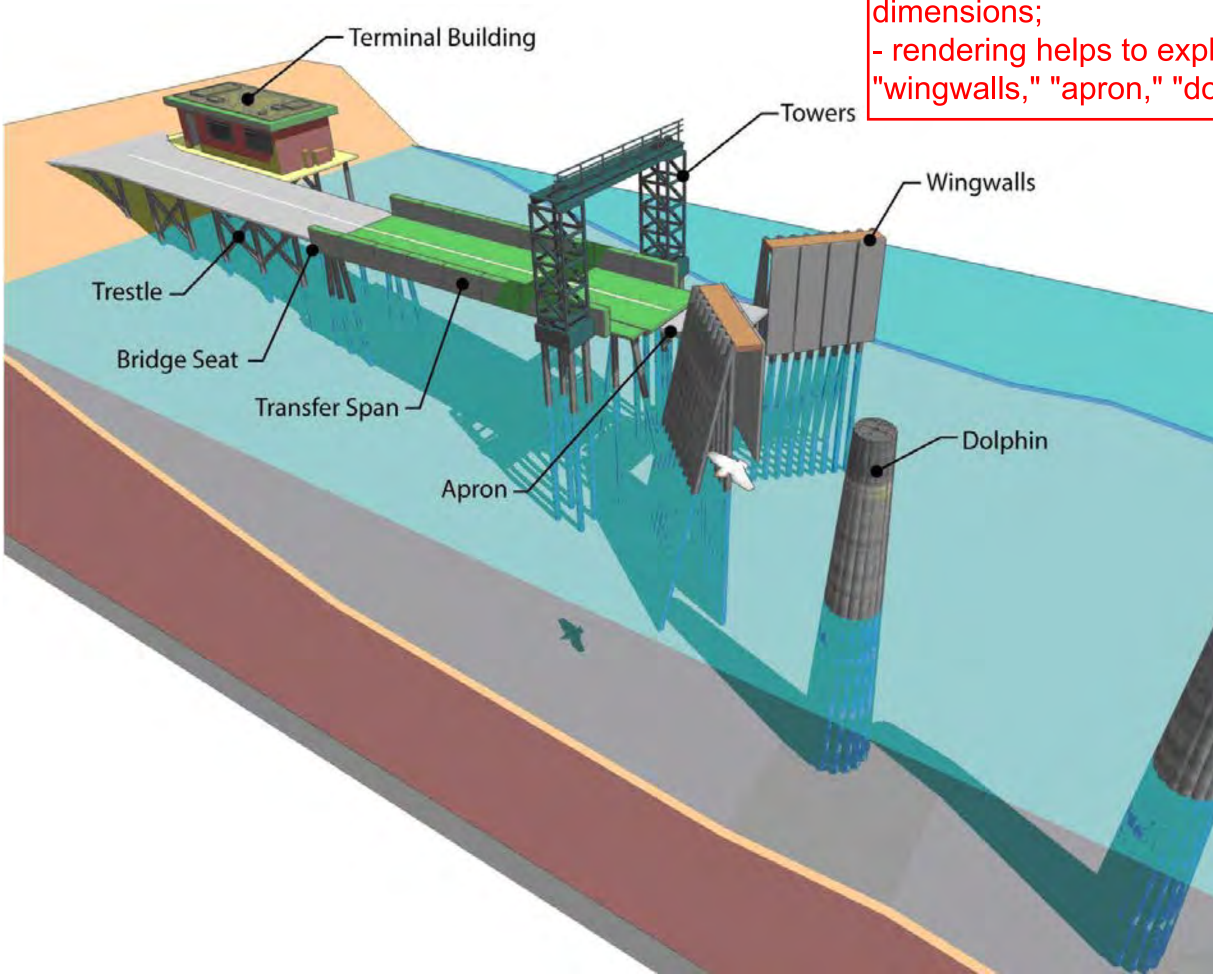
Figure ES-4: Rendering of Tunnel Portal on Boston Street

g. Parks, Recreation Land and Open Space (FEIS Section 5.8)

Eleven parks, recreation lands, or open space areas are located within or adjacent to the Preferred Alternative. Long-term and short-term effects to park, recreation and open space areas are limited and include:

- Chadwick Elementary School – Of the 13.4-acre parcel, 0.7 acre of the property would be required for construction of and access to a proposed TPSS;
- Uplands Park – Of the 33.6-acre property, a temporary easement of 0.1 acre would be required to accommodate two eastbound lanes of traffic on the south side of Edmondson Avenue during construction, as well as a temporary sidewalk to maintain pedestrian access during construction.
- Edmondson-Westside High School – Of the 26.0-acre property, approximately 150 square feet of school property near the Edmondson Avenue and Athol Avenue intersection would be purchased in fee simple to accommodate intersection improvements and stormwater management. A temporary easement of 0.1 acre along Edmondson Avenue would be required for grading, and erosion and sediment control measures.
- Boston Street Pier Park – Of the 0.8-acre property, a fee-simple area of less than 0.1 acre would be required from this park to accommodate stormwater management for the Preferred Alternative. A temporary easement of less than 0.1 acre would be required for grading, sidewalk reconstruction and erosion and sediment control along Boston Street.

Techniques to note:
- renderings used to show how project elements in three dimensions;
- rendering helps to explain jargon - "wingwalls," "apron," "dolphin," etc.



Key parts of a typical ferry terminal

fixed dolphin – an assembly of steel piles or concrete drilled shafts supporting a concrete cap and a fendering system.

floating dolphin – concrete or wooden barge structures located offshore clad with a perimeter fendering system and anchored to the seabed; used to help guide the ferry into the slip.

wingwall – an assembly of steel piles or concrete drilled shafts supporting a steel or concrete cap and a fendering system to guide and stop the ferry at its loading and unloading position.

tower – currently used to house and support the cable and counter weight system that supports, raises, and lowers the outboard end of the transfer span. (The tower system will be replaced by hydraulic lifts regardless of the alternative chosen.)

apron – adjustable ramp at the end of the transfer span that accommodates varying water heights.

transfer span – movable bridge that allows the vehicles and pedestrians access on and off the ferry; it is the link between the ferry and the trestle.

trestle and bridge seat – over-water stationary pile-supported bridge structure that serves as a connection between land and the nearshore end of the transfer span for both vehicle and pedestrian traffic (pedestrians do not use the trestle if overhead passenger loading is available).

Figure S-3. **Key Parts of a Typical Ferry Terminal**

Photo Simulations and Artist's Drawings

- NC: Mid-Currituck FEIS - Additional Lane
- WA: I-90 Snoqualmie - Avalanche Chute
- WA: I-90 Snoqualmie - 4(f) Avoidance

Techniques to note:
- photo simulations used to show how project elements overlaid on existing landscape.

Existing/No-Build Alternative

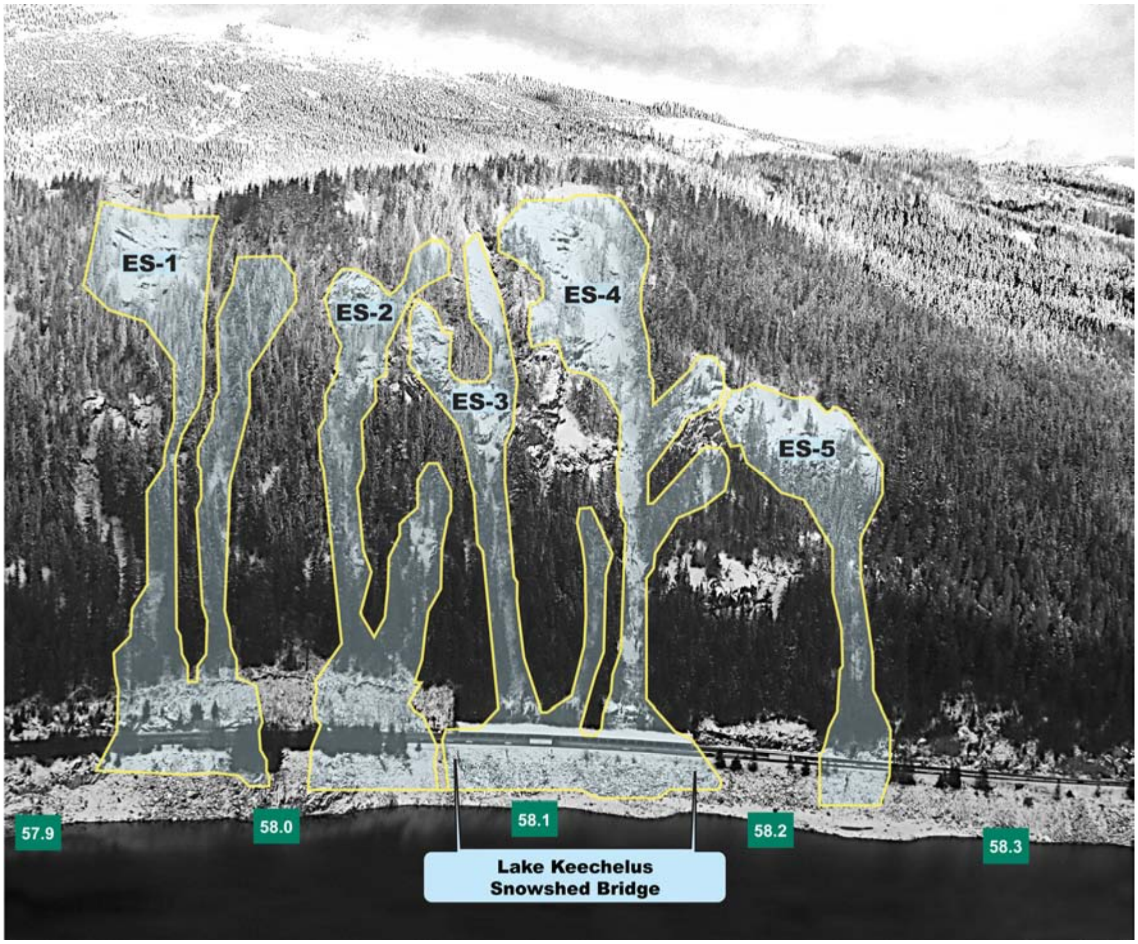
Photo Simulation

US 158 Hurricane Evacuation Lane

Figure 2-3

Techniques to note:
- photo simulations used to illustrate potential impacts in relation to project elements.

Exhibit 3-1
Avalanche Chutes



What are the expected environmental consequences?

What beneficial effects would result?

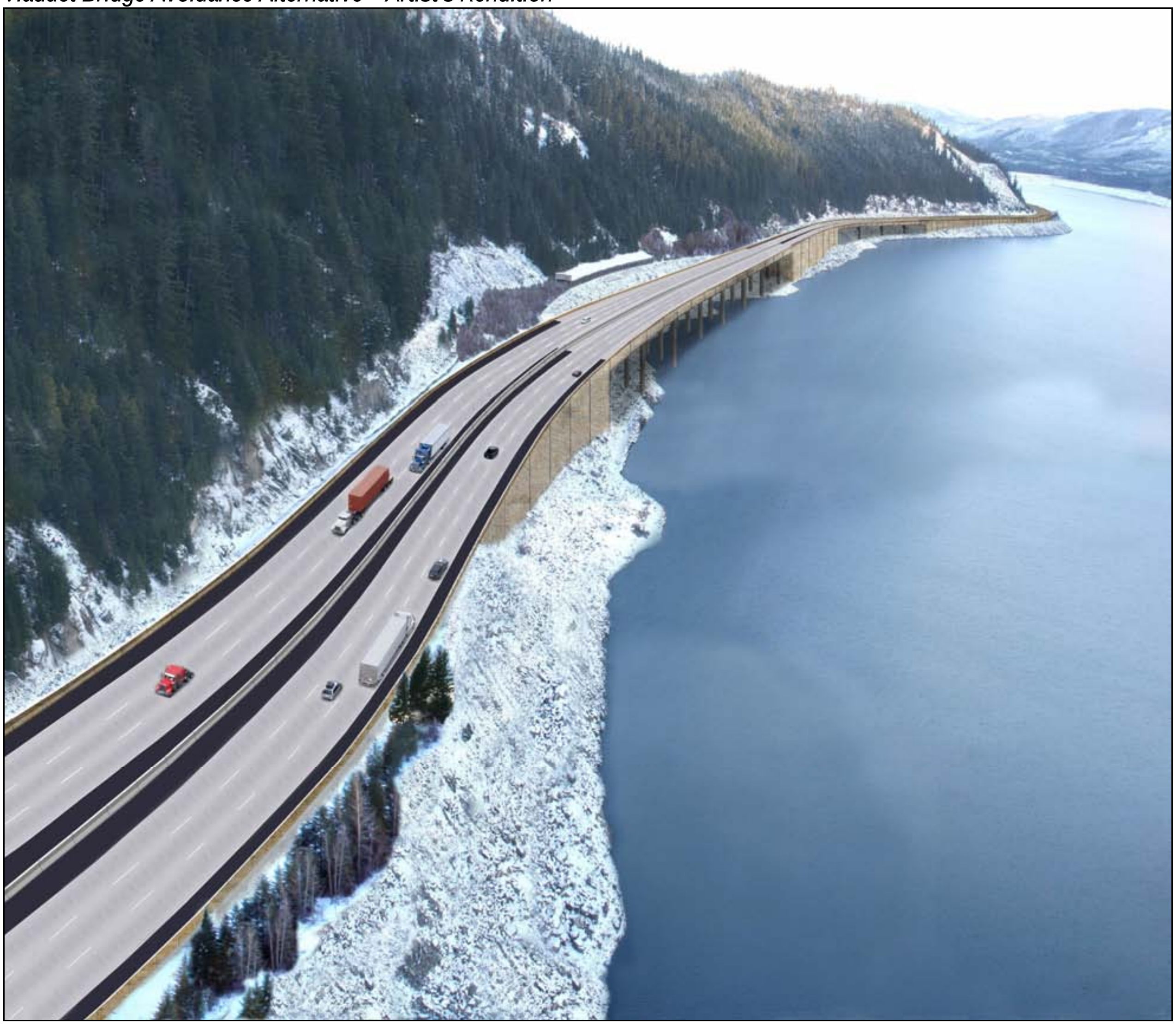
No-Build Alternative

Under the No-Build Alternative, WSDOT would continue its slope stabilization program. This program would provide some direct beneficial effects, including improving safety and reducing the danger of avalanches and rock fall. These beneficial effects would be much smaller than for any of the build alternatives. There would be no indirect beneficial effects.

Techniques to note:
- photo simulations used to show how project elements overlaid on existing landscape.

The eastbound bridge would be approximately 1,500 feet long and the westbound bridge would be approximately 1,200 feet long. Soldier pile tieback walls would retain the approach fills for both bridges. The average height above the Keechelus Lake reservoir high water level (pool) for both bridges would be 22 feet, with a maximum height of approximately 100 feet or more at low pool elevations.

Exhibit 5-10
Viaduct Bridge Avoidance Alternative – Artist's Rendition



The bridges would span an inlet and would be aligned mostly across the lake slope face, unlike a river crossing where bridges cross from one slope face to another. However, new geotechnical information

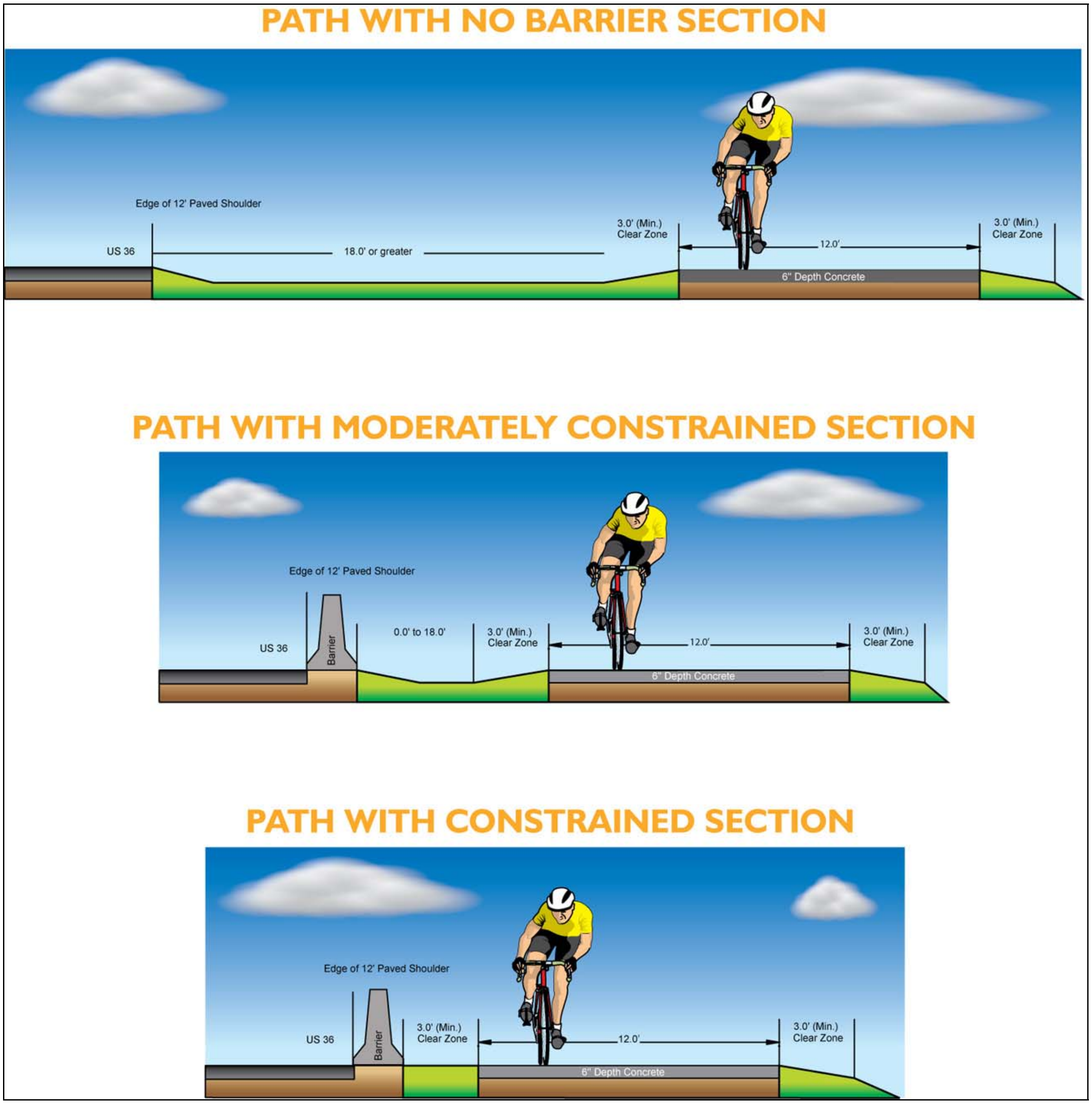
Cross-Sections with Artwork

(e.g., to show landscapes elements, human activity, vehicles)

- CO: US 36 FEIS - Trail with Bicyclist
- MD: Purple Line FEIS - Trail and Hikers
- OH: Opportunity Corridor DEIS - Depressed Road

Techniques to note:
- cross-section drawings include artwork (e.g., landscape, pedestrians, bicyclists) to provide sense of scale and context

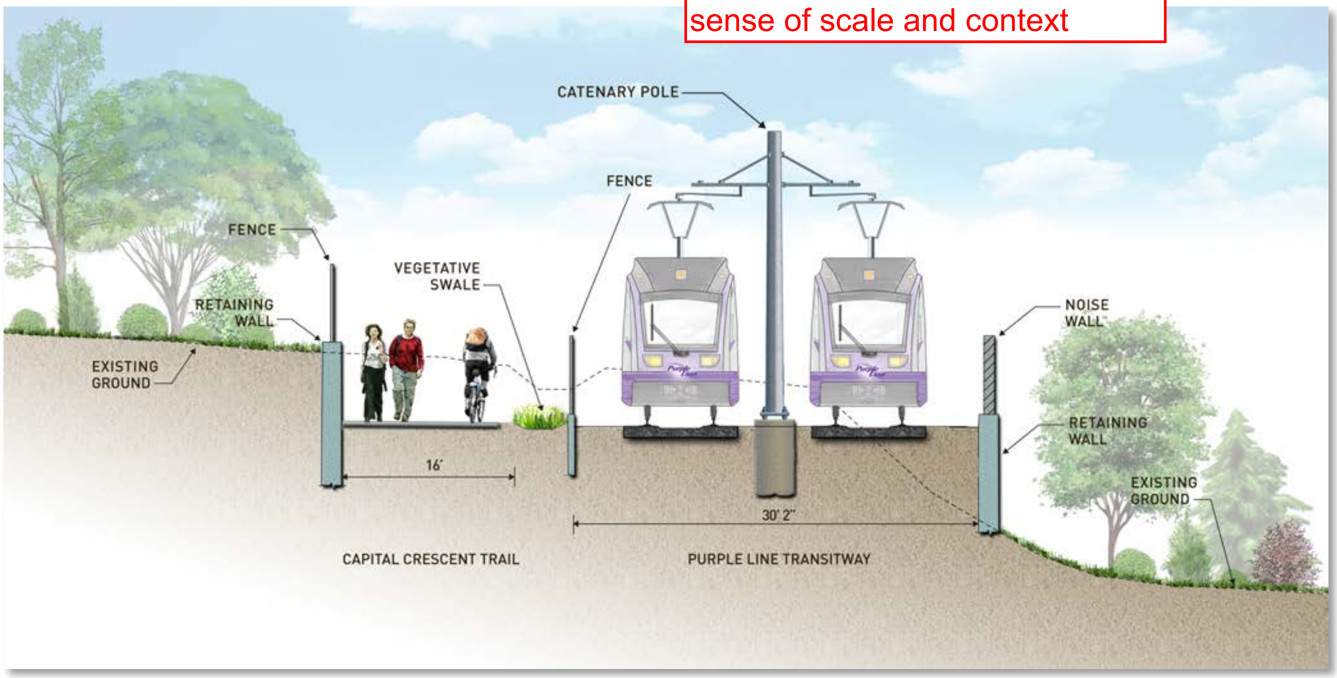
Figure 2.6-13: Bikeway Typical Section



Source: US 36 Mobility Partnership, 2009.

Techniques to note:
- cross-section drawings include artwork (e.g., landscape, pedestrians, bicyclists) to provide sense of scale and context

Figure 2-6. Typical Section in Georgetown Branch Right-of-way



Continuing along the Georgetown Branch right-of-way, the transitway would cross Connecticut Avenue on a bridge. The Chevy Chase Lake station would be on the east side of Connecticut Avenue, elevated at the level of the bridge with connections to street level provided by stairs and elevators. The transitway would continue east, returning to grade, and then pass under Jones Mill Road. A new bridge, approximately 10 to 15 feet lower than the existing pedestrian bridge, would carry the transitway across Rock Creek. The Lyttonsville Yard would be located on the north side of the transitway, mostly west of the Lyttonsville Place bridge. The Lyttonsville station would be located east of the bridge. Continuing east in the Georgetown Branch right-of-way to the CSXT right-of-way, the transitway would continue parallel to the CSXT right-of-way on the south side (see Figure 2-7 for an illustration of a typical section along the CSXT right-of-way).

It would pass under the bridges at Talbot Avenue, 16th Street, and Spring Street within or adjacent to the CSXT right-of-way, at approximately the same elevation as the CSXT tracks. The Woodside station would be just east of the 16th Street Bridge. East of the Falkland Chase Apartments, the transitway would cross over the CSXT tracks to the north on an aerial structure and enter the SSTC parallel to, but higher than, the existing Metrorail tracks. The SSTC station platform would be located between the SSTC and the existing railroad tracks.

Silver Spring Transit Center to Takoma/Langley Park Transit Center—3.2 miles

For mapping of this area see the conceptual engineering plans CV-20 though CV-37, and environmental resource maps 9 through 15.

East of the SSTC, the transitway would turn away from the CSXT right-of-way and descend to grade on the south side of Bonifant Street in dedicated lanes. The transitway would cross Georgia Avenue at grade, shifting to the north side of Bonifant Street. Just before reaching Fenton Street, the transitway would turn north to pass through the future Silver Spring Library building, the location of a station, and enter the intersection of Fenton Street and Wayne Avenue. The transitway would continue on Wayne Avenue in mixed-use lanes in the center of the roadway. The Preferred Alternative would have a station in the center of Wayne Avenue east of Dale Drive.

Techniques to note:
- cross-section drawings include artwork (e.g., landscape, pedestrians, bicyclists) to provide sense of scale and context

Figure 1-3: Proposed Boulevard Section Views

▼ East 55th Street Bridge (Looking East)

▼ Typical Boulevard at Side Street Intersection

Chapter 9. Appendices

One of the most common strategies for increasing the readability of NEPA documents is to shift some content from the main body to appendices. This approach is not new; in fact, it was recommended by the CEQ in its "40 Questions" guidance more than 30 years ago:

> The body of the EIS should be a succinct statement of all the information on environmental impacts and alternatives that the decision-maker and the public need, in order to make the decision and to ascertain that every significant factor has been examined. The EIS must explain or summarize methodologies of research and modeling, and the results of research that may have been conducted to analyze impacts and alternatives.
>
> Lengthy technical discussions of modeling methodology, baseline studies, or other work are best reserved for the appendix. In other words, if only technically trained individuals are likely to understand a particular discussion then it should go in the appendix, and a plain language summary of the analysis and conclusions of that technical discussion should go in the text of the EIS.[1]

Techniques for using appendices effectively include:

- *Provide specific cross-references to relevant content in the appendices.* Many appendices are quite lengthy, often hundreds of pages. If the main body includes a cross-reference to the appendix as a whole, it can be difficult for the reader to know where to find the relevant information within that appendix. It is often more useful to include a cross-reference to a specific section or sub-section within the appendix.

- *Provide a detailed list of the appendices in the main volume of the NEPA document.* When the main body of a NEPA document is condensed, it

[1] Council on Environmental Quality, "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations" (March 1981), Question 25, at http://energy.gov/sites/prod/files/G-CEQ-40Questions.pdf.

becomes more important to provide the reader with a clear roadmap to the information contained in the appendices. For example, rather than simply listing an appendix titled "Technical Reports," the table of contents can provide a complete list of the technical reports that are included in the appendices. In addition, rather than simply noting that appendices are included on a DVD, the table of contents can include a detailed listing of the contents of the DVD.

- *Provide aids to navigation within the appendices, if the appendices are lengthy or include several parts.* The appendices themselves should be organized and formatted in a manner that enables the reader to find relevant information. Relatively simple aids to navigation can be very effective – for example, providing a table of contents at the beginning of the appendix, and providing consistent pagination throughout the appendix. It also is helpful to make electronic versions of the appendices (PDFs) fully text-searchable.

- *Include key appendices in the printed document, if they are not voluminous.* Reducing the length of the printed NEPA document is not an end in itself; the goal is to make the document more usable. In some cases, usability is enhanced by including key appendices in the printed volume. For example, the printed appendices might include important agency correspondence, alternatives screening reports, Section 4(f) documentation, or a Section 106 memorandum of agreement.

Lastly, it is important to remember that effective use of appendices requires planning, which should begin early in the development of the NEPA document. It is a good practice to develop a written plan for the document that identifies the list of appendices and the materials that will be included in each appendix. This plan is likely to evolve, but developing it early in the NEPA process helps to provide a framework for deciding what to include in the main body and what to include in each of the appendices.

Cross-References to Technical Reports in Main Volume of EIS

- OH: Opportunity Corridor DEIS

Techniques to note:
- includes supporting studies in appendices, referenced in main body;
- note that these appendices are on the CD, not in the printed copy.

finding[8] for the impacts to historic resources. FHWA concurred with the *de minimis* finding on Jan. 18, 2013.

For additional details about the Cleveland Opportunity Corridor project's potential impacts on cultural resources, please refer to the *Phase I History/Architecture Survey Report for the Opportunity Corridor Project* (January 2010), the *Phase I Archaeological Literature Review, Prehistoric Context, and Archaeological Sensitivity Assessment for the Opportunity Corridor Project* (February 2010), and the *Phase I Archaeological Resource Review and Disturbance Assessment for the Proposed Opportunity Corridor Project* (November 2012). These reports, as well as the Section 106 and Section 4(f) coordination, are on the CD included with this DEIS.

The No-Build Alternative is not expected to impact historic resources.

WHAT RESOURCES ARE NOT PRESENT WITHIN THE STUDY AREA?

The following resources do *not* exist within the study area:

- Streams or surface water bodies;
- Wetlands;
- Aquatic habitat;
- Threatened and endangered species or habitat;
- Federally regulated floodplains;
- Farmland;
- Unique, rare or high-quality plant communities; or
- Drinking water resources.

Because they do not exist in the study area, these natural resources would not be impacted by either the No-Build Alternative or the Cleveland Opportunity Corridor project.

Ohio EPA Division of Drinking and Groundwater Water maps were reviewed to identify drinking water resources located near the project area. The project is not located within a federally designated Sole Source Aquifer (SSA) or within any source water protection area for public water systems. Additionally, there are no community or non-community public water systems that use groundwater located near the project. The City of Cleveland has a public water supply system that obtains drinking water from Lake Erie. For additional details about drinking and groundwater resources, please refer to the Ohio EPA mapping on the CD included with this DEIS.

For additional details about the natural resources field studies and conclusions, please refer to the *Level 2 Ecological Survey Report for Opportunity Corridor* (PID 77333) (January 2010). This report is on the CD included with this DEIS. A copy of the correspondence from ODOT confirming that no further ecological coordination was required for the Cleveland Opportunity Corridor project is also on the CD.

HOW WOULD WATER QUALITY BE AFFECTED?

The Cleveland Opportunity Corridor project area is currently drained by a combined sewer system, in which a single sewer pipe carries both sanitary waste and stormwater flows (Figure 4-31, page 4-36). During dry weather, sanitary waste flows directly to a wastewater treatment plant; during wet weather, sanitary and stormwater combine and continue to flow to the wastewater treatment plant.

Extra flow is stored in the sewer pipes until the pipes fill. Once the pipes are full, they overflow to local waterways – allowing untreated wastewater to enter streams and rivers. In the project area, these include the Cuyahoga River, Lake Erie and Doan Brook. The Northeast Ohio Regional Sewer District (NEORSD) has been ordered by EPA to reduce the number of combined sewer overflows.

The Cleveland Opportunity Corridor project would improve water quality by:

- Building depressed grassy areas in the boulevard median between East 55th Street

[8] *In accordance with 23 CFR 774.3 (b).*

Table 4-4: Temporary Impacts to Current and Planned Expansion Areas of Kenneth L. Johnson Recreation Center

TOTAL AREA (ACRES)	TEMPORARY EASEMENT LOCATION	TOTAL PARCELS IMPACTED	IMPACT AREA (ACRES)
11.6	Buckeye Rd	5	0.07
	Woodland Ave	4	0.06
	New Boulevard	4	0.06
Total		**13**	**0.19**

Note: The impacts listed in this table differ from the Section 6(f) impacts previously discussed because impacts to planned expansion areas are included.

planned expansion would be approximately 11.6 acres, see Figure 4-15 on page 4-13.

During construction, the Cleveland Opportunity Corridor project would need about 0.19 acres (8,420 square feet) of land from the planned park expansion area (Table 4-4). The land would only be needed on a temporary basis for grading and seeding that would take place when Buckeye Road and Woodland Avenue are widened and when the new boulevard is built.

Specific requirements within Section 4(f) describe when a "use" of a resource occurs. The temporary impacts listed above would not result in a use of or impact to Section 4(f) resources. This finding was agreed to by the City of Cleveland on Sept. 24, 2012. ODOT determined that the project does not require Section 4(f) approval on Oct. 23, 2012.[5]

As part of this agreement, the following commitments would be included in the final design plans:

- The contractor is required to protect the rec center areas and users with warnings signs, gates, barricades, and/or fences during construction;
- Rec center access would be maintained at all times. The contractor would be required to coordinate the construction schedule with the City of Cleveland. Two weeks before construction starts, the contractor would notify the city, in writing, of the occupation dates;
- Any disturbed areas would be put back to a condition at least as good as or better than what existed before construction started;
- Staging and storage of construction equipment would not take place on the rec center property; and
- If unexpected work on the rec center property is needed, advance notice would be given to the City of Cleveland and ODOT to decide if additional coordination is needed.

A copy of the Section 4(f) coordination documents, including a copy of the coordination between ODOT and the City of Cleveland, are on the CD included with this DEIS.

The No-Build Alternative would have no direct effect on parks and recreational opportunities.

HOW WOULD CULTURAL RESOURCES BE AFFECTED?

Cultural resources include historic properties that are currently listed on the National Register of Historic Places (NRHP) or that qualify for listing on the NHRP. Cultural resources can include districts, sites, buildings, structures and objects. They can be readily visible, or they can be below the ground – as is the case with archaeological resources.

Cultural resources are protected under Section 106 of the National Historic Preservation Act, which requires agencies to consider the effects of their actions on historic properties. Section 106

[5] *In accordance with 23 CFR 774 and the Programmatic Agreement for Processing of Non-Individual Section 4(f) Actions Between the Federal Highway Administration and the Ohio Department of Transportation (Agreement Number 17220), executed Aug. 24, 2012, ODOT Office of Environmental Services has determined that the project qualifies as an exception to the requirement for Section 4(f) approval.*

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Technical Reports Included in Appendices in Electronic Format

- CO: I-70 PEIS
- WA: SR 520 FEIS
- WA: Mukilteo FEIS

Techniques to note:
- table of contents in printed documents lists each of the technical reports that is included on DVD.

List of Technical Reports Contained in Electronic Appendix

Table of Contents

Techniques to note:
- table of contents in printed documents lists each of the technical reports that is included on DVD.

Tables

Techniques to note:
- table of contents in printed documents lists each of the technical reports that is included on CD (and project website)

List of Appendices

Discipline Reports

The discipline reports are available on the project's website (www.wsdot.wa.gov/projects/ferries/mukilteoterminal/multimodal), on CD (free), or in print (for the cost of reproduction).

Cultural Resources Discipline Report
Ecosystems Discipline Report
Hazardous Materials Discipline Report
Noise and Vibration Discipline Report
Transportation Discipline Report

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Key Appendices Included in Paper Copy of NEPA Document

(if not voluminous)

- MD: Red Line FEIS - Paper Copy Includes Draft Section 106 PA, Supporting Documents for Section 4(f) Evaluation

Techniques to note:
- some appendices are included in the printed copy as well as the DVD - e.g., Section 106 PA, Section 4(f) supporting documents, and agency correspondence - making this material more accessible to readers

Table of Contents

… Statement (FEIS) is divided into two volumes: Volume 1 … Build Alternative and the Preferred Alternative, and contains … hrough K. Volume 2 includes mapping of transportation and environmental features in the project study corridor, including a set of six Environmental Plate Series, and the Preferred Alternative Plans and Profiles.

The DVD contains all content of Volumes 1 and 2, including all appendices. Appendix A and Appendix I are only included on the enclosed DVD.

Volume 1

Appendices

Volume 2

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10. References

Many NEPA documents include a references chapter, which lists the sources that were relied upon in developing the document. The usefulness of this bibliography can be enhanced by grouping the references so that they correspond to the chapters in the main body of the document. Two versions of this approach have been used:

- *Insert chapter headings within the references chapter.* With this approach, all of the references are listed in a single chapter, but within that chapter they are grouped under headings that correspond to the chapters in the main body of the NEPA document – for example, Purpose and Need, Alternatives Considered, etc.

- *List the references at the end of each chapter.* This approach eliminates the references chapter altogether; instead, there is a separate list of references at the end of each chapter in the main body of the NEPA document.

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References List Is Organized by Chapter of the EIS

- CO: I-70 PEIS
- OR: OR 62 FEIS

Techniques to note:
- the references section is organized by chapter of the NEPA document, making it easier to locate references applicable to a specific chapter.

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Techniques to note:
- the references section is organized by chapter of the NEPA document, making it easier to locate references applicable to a specific chapter

R

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Chapter 2

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References Listed in Each Chapter

- OH: Opportunity Corridor DEIS - Important References Listed at Beginning of the Impacts Chapter
- UT: West Davis Corridor DEIS - References List Included at the End of Each Chapter

Techniques to note:
- references are listed directly within each chapter.

Figure 4-2: Chapter 4 Resources[2]

- *OEPA Drinking Water Source Protection Areas and Public Water System Wells and Intakes Map, Cuyahoga County, Ohio* (Ohio 2009, printed January 2013);
- *Opportunity Corridor Environmental Site Assessment (ESA) Screening* (November 2009);
- *Level 2 Ecological Survey Report for Opportunity Corridor (PID 77333)* (January 2010);
- *Phase I History/Architecture Survey Report for the Opportunity Corridor Project* (January 2010);
- *Phase I Archaeological Literature Review, Prehistoric Context, and Archaeological Sensitivity Assessment for the Opportunity Corridor Project* (February 2010);
- *Phase I Environmental Site Assessment Opportunity Corridor Project Area* (April 2011);
- *Opportunity Corridor Operational Analysis Technical Memorandum* (May 2012, revised June 2012);
- *Opportunity Corridor Certified Traffic Plates* (June 2012);
- *Opportunity Corridor Indirect and Cumulative Effects Assessment Technical Memorandum* (July 2012);
- *Opportunity Corridor Relocation Assistance Program (RAP) Survey* (September 2012);
- *Opportunity Corridor CO Hot-Spot (Microscale) Analysis Report* (November 2012);
- *Opportunity Corridor Qualitative Mobile Source Air Toxics Analysis Report* (November 2012);
- *Phase I Archaeological Resource Review and Disturbance Assessment for the Proposed Opportunity Corridor Project* (November 2012);
- *Opportunity Corridor Noise Analysis Report* (December 2012);
- *Opportunity Corridor Stormwater Summary* (December 2012); and
- *Opportunity Corridor Environmental Justice Technical Memorandum* (April 2013).

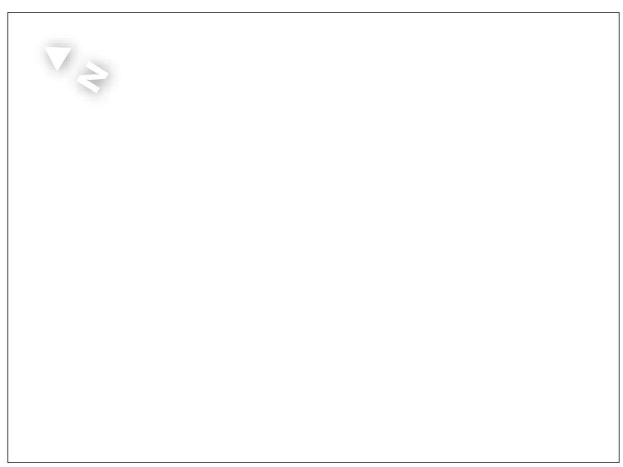
[2] *These documents are incorporated by reference into this DEIS.*

the study area does not include farmland or agricultural activity; however, it does include a number of neighborhoods and human resources such as homes, businesses, churches, schools, parks, recreation centers, historic properties, public transportation facilities, and other transportation features.

As noted in Chapter 3, the No-Build Alternative does not meet the purpose and need for the Cleveland Opportunity Corridor project. As a result, it was not recommended as a reasonable alternative. However, the No-Build Alternative is discussed throughout this chapter as a way to compare the impacts, benefits and costs of the preferred alternative.

WHAT DOES THE STUDY AREA LOOK LIKE?

The study area consists of a mix of residential, commercial, industrial and recreational land uses (Figure 4-3). In general, land use varies from parcel to parcel (Figure 4-4, page 4-3). For example, residential properties are located next to industrial properties. Mixing very different land uses very close to one another does not usually work well because the land owners have different goals and objectives. When this occurs, the land uses are called "incompatible." The Cleveland Opportunity Corridor study area is filled with incompatible land



▲ *Figure 4-3: The study area consists of varying land uses including residential, commercial, industrial and recreational properties.*

Techniques to note:
- references are listed directly within each chapter.

Chapter 6: Environmental Justice

6.1 Introduction

Environmental justice is a term used to describe the fair and equitable treatment of minority and low-income people with regard to federally funded projects and activities. *Fair treatment* means that no minority or low-income population should be forced to shoulder a disproportionately high share of negative environmental effects. Fair treatment also includes meaningful involvement and opportunities for minority and low-income people to participate in the decision-making process.

What is environmental justice?

Environmental justice is a term used to describe the fair and equitable treatment of minority and low-income people with regard to federally funded projects and activities.

This chapter describes the location and concentration of any environmental justice populations in the West Davis Corridor (WDC) study area as well as the expected impacts of the WDC alternatives on environmental justice populations based on the best available data. The impact analysis includes both direct impacts, such as relocations, and indirect impacts, such as impacts to facilities or services that support environmental justice populations.

6.5 References

[CEQ] Council on Environmental Quality

1997 Environmental Justice: Guidance under the National Environmental Policy Act. December 10.

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West Davis Corridor Team

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Chapter 11. Purpose and Need

The Purpose and Need statement is among the most important chapters in a NEPA document, because it provides the basis for determining the range of alternatives considered in detail and also plays a key role in determining the alternatives that can be approved under Section 404 of the Clean Water Act and Section 4(f) of the USDOT Act.

A strong Purpose and Need statement should (1) clearly describe each of the purposes and needs; and (2) provide specific factual information that supports the existence of those needs.

For practitioners, the challenge lies in translating this advice into practice. The following approaches can help:

- *Use plain language to describe purposes and needs.* The Purpose and Need statement should use words that most readers can easily understand. Jargon (e.g., "roadway deficiencies") should be replaced with plain language (e.g., "By today's standards, the bridge is too narrow.") When jargon is used, it should be explained in the Purpose and Need chapter itself. A sidebar or text-box is an effective way to introduce technical terms.

- *Use bullets or numbering to itemize purposes and needs.* Many transportation projects serve multiple purposes - for example, to reduce congestion and improve safety. Attempting to capture all of the elements of the purpose in a single lengthy sentence may create confusion. If the project serves several distinct purposes, they can usually be expressed most clearly in a series of bullets, each corresponding to a different element of the purpose.

- *Provide specific supporting data for each need*. Each of the project needs should be supported with data or other relevant information. In deciding what data to include, it is useful to consider each element of the need separately, and ask "Do we have the data to support *this* need?" For example, if safety is identified as a need, the Purpose and Need statement should include data demonstrating the existence of the safety problem.

- *Use graphics to illustrate needs.* Figures, maps, renderings, and other visual elements should be used to illustrate important aspects of the Purpose and Need. For example, if the need is to address road congestion, a map could be included showing the locations where congestion will occur and, ideally, the severity of the congestion in those locations. If the need is to replace a structure at risk of catastrophic failure, a figure could be included showing the problems with the existing structure.

- *Describe agency and public involvement in developing the purpose and need.* Under 23 USC 139, FHWA is required to give participating agencies and the public an “opportunity for involvement” in developing the Purpose and Need for an EIS. It is helpful to describe that outreach in the Purpose and Need chapter, including any major issues raised and how they were addressed. Including this information not only helps to document compliance with a legal requirement, but also gives the public a better sense of the reasoning that led to adoption of the Purpose and Need statement.

For additional information on developing a Purpose and Need statement, refer to the AASHTO Practitioner’s Handbook, “Defining the Purpose and Need and Determining the Range of Alternatives for Transportation Projects” (2006).

Plain Language Used to Describe Purposes and Needs

- OH: Opportunity Corridor DEIS
- WA: SR 520 FEIS

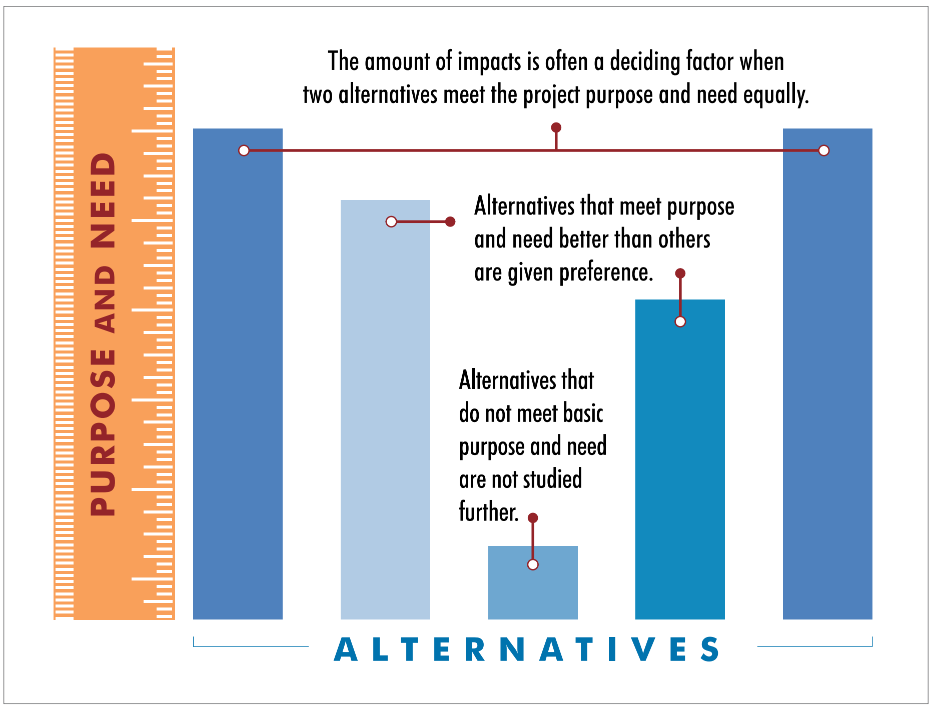
Techniques to note:
- clear, succinct explanation of what a "purpose and need" is and how it is used

Chapter 2 || **PURPOSE *and* NEED**

WHAT ARE PURPOSE AND NEED?

The purpose and need for a project define the transportation problems that the project must solve. The purpose and need also act as "measuring sticks" for the project alternatives, helping determine to what extent each alternative meets each project need (Figure 2-1). Alternatives that do not meet the basic needs of a project are not studied further. Assuming all other concerns are equal, if one alternative meets the project purpose and need better than another, then that alternative is favored as the project progresses. And as alternatives are developed, the purpose and need can help determine if an impact is necessary.

Figure 2-1: Measuring Alternatives Using Purpose and Need



The purpose and need also help decide where a project will begin and end by defining the "who, what, where, when and why" of the transportation needs. This allows an agency to create alternatives that satisfy the project's needs completely – no more, no less. The beginning and end points of the project are also called "logical termini." Logical termini for roadway projects are usually interchanges or intersections where travel demand changes.

The purpose and need are updated throughout the planning and engineering stages as the project team learns more. The purpose and need are not final until they are approved in the Final Environmental Impact Statement (FEIS).

The purpose and need for the Cleveland Opportunity Corridor project are documented in the project's *Purpose and Need Statement*[1] (May 2011), which can be found on the CD included with this Draft Environmental Impact Statement (DEIS). Since 2011, the purpose and need have been updated with new population data from the 2010 U.S. census. These changes are included in the following sections.

[1] *This document is incorporated by reference into this DEIS.*

Techniques to note:
- clear, succinct explanation of key concepts in purpose and need (in this case, "system linkage" and "mobility").

Figure 2-2: Street Grid in Study Area

WHAT IS THE PURPOSE OF THE CLEVELAND OPPORTUNITY CORRIDOR PROJECT?

The purpose of the project is to improve the roadway network within a historically underserved, economically depressed area in the City of Cleveland.

WHAT BASIC TRANSPORTATION NEEDS MUST THE PROJECT MEET?

The proposed project must:

1. **Improve system linkage.**
2. **Improve mobility.**
3. **Support planned economic development.**

What is "system linkage?"

System linkage refers to the connections among the roads, neighborhoods and businesses in an area. Today, only a few roads connect the southern and western portions of Cleveland's metro area to University Circle. Chester Avenue (US 322), Euclid Avenue (US 20) and Carnegie Avenue are the only direct connections between these areas. As a result, people traveling north on I-71 and I-77 must merge onto the Innerbelt Freeway (I-90) and travel through the central business district before reaching University Circle.

Recent changes on two of these primary routes have reduced the capacity of the roads between the Interstates and University Circle. Carnegie Avenue once had six lanes that could be switched to provide four or five lanes in the rush hour direction and one or two lanes in the opposite direction, but the avenue was restriped in 2005 to have two fixed lanes in each direction and a center lane for left turns. This eliminated up to three lanes to and from University Circle. Two bus-only lanes were built on Euclid Avenue in 2008, reducing the lanes from four to two.

In addition, the street grid (Figure 2-2, page 2-2) is missing an east-west connection between Woodland and Union avenues, a distance of about two miles. As a result, north-south and diagonal roadways are not directly linked, and drivers must twist and turn their ways through the local streets to reach University Circle, creating a traffic bottleneck at the I-490-East 55th Street and East 55th Street-Woodland Avenue-Kinsman Road intersections. Drivers' other option to reach University Circle is to travel on I-90 or I-490, merge onto Cleveland's Innerbelt Freeway and travel through the central business district.

The Cleveland Opportunity Corridor project must provide improved access between I-77 and University Circle.

What is "mobility?"

Mobility is the easy movement of people and goods through an area. It is difficult for trucks to negotiate the roads between I-77 and University Circle. Rail lines used to move most of the goods in this area, so the streets were built mostly for cars. Today, the remaining industries are served mostly by trucks that have to use streets that were not built for them. Also, traffic to and from the houses, apartments, churches and stores in the area does not mix well with the heavy, industrial trucks.

The closest Interstate for travelers in the study area is I-490, and most, if not all, traffic traveling in this area must pass through the I-490-East 55th Street intersection before spreading out to other roads or highways. As a result, 2005 and 2010 traffic counts show that this intersection operates at Level of Service F (Figure 2-3), meaning the traffic flow has broken down. Roadways with this poor level of service have more users than they can handle.

The Cleveland Opportunity Corridor project must provide improved mobility and better levels of service for traffic traveling to, from and within the area between I-77 and University Circle.

Figure 2-3: Levels of Service (LOS)

LOS A
Most vehicles arrive at the green light and travel through without stopping.

LOS B
Vehicles still move through the intersection very well, but more have to stop at the red light.

LOS C
A substantial number of vehicles have to stop at the red light, but many still pass through without stopping.

(Target LOS for Cleveland Opportunity Corridor)

LOS D
Many vehicles have to stop at the red light, and traffic starts stacking at the intersection. There are times where the stopped vehicles do not make it through the green light.

LOS E
Traffic volumes are higher than the intersection can handle with lines of stopped vehicles. A high number of stopped vehicles do not make it through the green light.

LOS F
Traffic flow has broken down. Traffic volumes are high, and there are long backups at the intersection. Most vehicles have to wait through one or more green lights to get through.

- Chapter 11 discusses the comments received during the public comment periods for the 2006 Draft EIS and the 2010 SDEIS, and WSDOT's general approach to reviewing and providing responses to the principal issues raised.

Attachments 1 through 6 are provided in hard copy in this Final EIS, and Attachments 7 through 19 are included on the DVD attached to the cover of the Executive Summary. Updated discipline reports, addenda, and errata are presented in Attachment 7 along with the corresponding discipline reports from the 2010 SDEIS. The project mitigation plans and the Section 106 Programmatic Agreement are included in Attachment 9. The comments received on the SDEIS and WSDOT's responses are found in Attachment 11, and Attachment 13 contains the Comment Summary Report prepared in response to the comments on the 2006 Draft EIS. A complete set of the Draft EIS comments is also included in Attachment 13.

Techniques to note:
- clear, succinct explanation of why the project is needed, with specific factual support
- explanation of key concept used in purpose and need ("mobility")

1.2 What is the project purpose?

In 2000, the Trans-Lake Washington Study Committee developed the statement of purpose, which has guided the environmental review process since that time:

> The purpose of the project is to improve mobility for people and goods across Lake Washington within the SR 520 corridor from Seattle to Redmond in a manner that is safe, reliable, and cost-effective, while avoiding, minimizing, and/or mitigating impacts on affected neighborhoods and the environment.

The statement of purpose—part of a longer purpose and need statement also adopted in 2000—has helped the project team develop and evaluate alternatives for the EIS analysis by defining the objectives that the alternatives must meet. Although the project limits have changed since the original statement was adopted, the project still has the purpose of improving mobility within the SR 520 corridor, and its transportation performance is evaluated on a corridor-wide basis. However, the I-5 to Medina project also serves another important purpose: to replace the aging and vulnerable Evergreen Point, Portage Bay, and west approach bridges. The following section describes the need for the project in terms of both mobility and safety.

What is mobility, and how is it measured?

The fact that the project purpose statement reads, "improve mobility for people and goods"—rather than "for vehicles and goods"—is significant. Recognizing the importance of transit and carpooling in this urban corridor, the Trans-Lake Washington Study Committee adopted evaluation criteria that measured how well potential alternatives would move people in addition to how well they would move vehicles. For this reason, the transportation analysis estimates future person-trips as well as future vehicle trips in the corridor, with an objective of serving as many *people* as possible within a given roadway capacity. While this EIS looks at many measures of transportation performance—travel times, levels of service, areas, and hours of congestion—this emphasis on maximizing the flow of people and goods through the corridor is central to the project purpose. Please see Chapter 2 for more information on evaluation criteria, and Chapter 5 (Section 5.1) for a detailed analysis of the project's effects on mobility.

1.3 Why is the project needed now?

The Evergreen Point Bridge is a critical component of the Puget Sound region's transportation infrastructure. It is one of only two connections across Lake Washington that link urban centers in Seattle and the Eastside. The SR 520, I-5 to Medina: Bridge Replacement and HOV Project addresses two key issues facing the SR 520 corridor: 1) bridge structures that are vulnerable to catastrophic failure; and 2) worsening traffic levels and congestion due to growth in jobs and housing over the last two decades.

SR 520's bridges are vulnerable to catastrophic failure.

The Evergreen Point Bridge and its approaches are in danger of structural failure. Recent WSDOT studies have demonstrated that the floating span of the Evergreen Point Bridge is highly vulnerable to windstorms, while the Portage Bay Bridge and the east and west approaches to the Evergreen Point Bridge are vulnerable to earthquakes. In 1999, WSDOT estimated the remaining service life of the floating portion of the Evergreen Point Bridge to be 20 to 25 years, based on its structural condition and the likelihood of severe windstorms. Its life expectancy now is only 10 to 15 years.

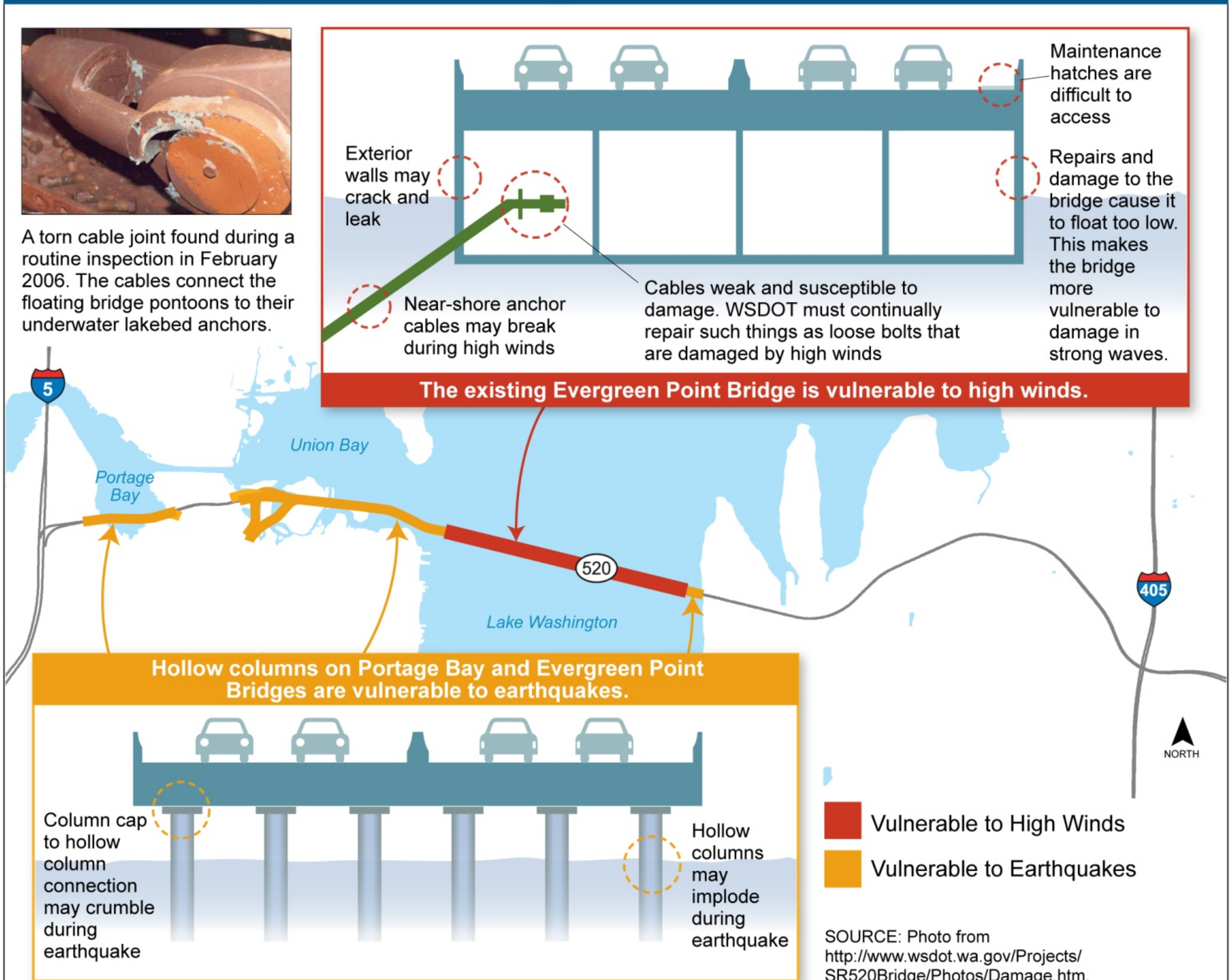
The floating span was originally designed for a sustained wind speed of 57.5 miles per hour (mph). In 1999, WSDOT rehabilitated the bridge to allow it to withstand sustained winds up to 77 mph. This still falls well short of the current design standard of 92 mph. Moreover, some bridge mechanisms have been damaged in recent storms. The floating pontoons currently float about 1 foot lower than originally designed, increasing the likelihood of waves breaking onto the bridge deck. Cracks in the structure leak water that WSDOT must pump out on a regular basis. The probability that the bridge will sustain serious structural damage (i.e., sink or become impassable to traffic) over the next 15 years is extremely high. To bring the Evergreen Point Bridge up to current design standards and eliminate the risk of its catastrophic failure, the existing span must be completely replaced. Exhibit 1-2 shows the vulnerable sections of SR 520.

The ever-present possibility of an earthquake in the Seattle area poses additional risks to other bridges in the SR 520 corridor. The columns of the Portage Bay Bridge and both the west and east approaches to the Evergreen Point Bridge are hollow and do not meet current seismic design standards. Hollow-core columns are difficult and costly to retrofit to today's accepted seismic protection levels; WSDOT studies indicate that such retrofitting would cost nearly as much as building new structures, and would have similar environmental effects. WSDOT estimates that over the next 50 years, there is a 20 percent chance of serious damage to these structures in an earthquake.

SR 520 is congested and unreliable, and does not encourage maximum transit and carpool use.

A second key reason for implementing this project now is the severe traffic congestion in the SR 520 corridor, which was the reason for initiating the original Trans-Lake Washington Study in 1998. The traffic demand in both directions exceeds the highway's capacity, creating several hours of congestion every weekday. The corridor was not built to handle as many

Exhibit 1-2. Points along SR 520 Vulnerable to Earthquake or Windstorms



SOURCE: Photo from http://www.wsdot.wa.gov/Projects/SR520Bridge/Photos/Damage.htm.

vehicles as currently want to use it. All of these vehicles result in frequent breakdown of the traffic flow and long backups of vehicles traveling at very slow speeds.

A number of factors have contributed to today's traffic congestion on SR 520. One factor is the pattern of population growth and the changing location of jobs in the project area since the highway opened in 1963. The new crossing of Lake Washington made it much easier for people to live in Eastside communities and work in Seattle, increasing the number of

westbound vehicles across the Evergreen Point Bridge in the morning and eastbound in the evening. Meanwhile, some of these Eastside communities began to develop their own commercial and employment centers, eventually leading to substantial growth of "reverse commute" traffic. Today, seven times more vehicles cross SR 520 each day than when the

Techniques to note:
- use of visual elements to explain key concepts used in purpose and need (in this case, vulnerability to failure in earthquake)

bridge first opened in 1963, and there is no longer a reverse commute: traffic during peak hours is nearly equal in each direction.

Techniques to note:
- use of plain language rather than jargon ("By today's standards, the bridge is too narrow" rather than referring to "roadway design deficiencies").

Beyond the number of people and cars, another important factor causing today's congestion is the design of the Evergreen Point Bridge. By today's engineering standards, the bridge is too narrow. The narrow shoulders provide no room for vehicles to pull over after an accident or breakdown. Instead, disabled vehicles must stay in the through lane and block other traffic, immediately rendering a full lane of traffic unusable. This slows down traffic and impedes emergency vehicle response. In addition, the westbound HOV lane on the Eastside ends at the bridge. This creates congestion as westbound HOV traffic is forced to merge with general-purpose traffic.

Together, growth and physical limitations will make the future traffic situation on SR 520 worse if the corridor is not improved. Under average evening peak-hour conditions today, a single-occupant vehicle traveling westbound takes approximately 39 minutes to travel SR 520 from SR 202 in Redmond to I-5 in Seattle—a distance of about 13 miles. By 2030, if the project is not built, this same trip will take over an hour (Final Transportation Discipline Report, Attachment 7). This makes it imperative that commuters be provided with travel choices that allow them to avoid driving alone, and that the proposed project be built to support increased use of transit and HOVs.

Traffic congestion is more than an inconvenience for drivers. It also impairs the regional economy and the quality of our lives and communities. Delays increase business costs, discourage growth, and create disincentives for businesses to locate in the region. Congestion also generates pollutants from idling vehicles, which are much less efficient than vehicles operating at higher speeds.

1.4 What would the project accomplish?

The SR 520, I-5 to Medina: Bridge Replacement and HOV Project would improve safety and mobility in the SR 520 corridor by improving SR 520 from I-5 in Seattle to Evergreen Point Road in Medina.

The project would include the following components:

- A new Evergreen Point Bridge, designed to current standards for wind and wave resistance
- New Portage Bay and west and east approach bridges to a floating bridge designed to current seismic standards
- Four general-purpose lanes and two HOV lanes, providing increased mobility and reliability for transit and carpools as well as for general-purpose vehicles

Bullets Used to Summarize Purposes and Needs

- CO: US 36 FEIS
- CO: I-70 FEIS
- MD: Baltimore Red Line FEIS
- NC: Mid-Currituck FEIS
- WA: Mukilteo FEIS

Techniques to note:
- purposes are listed at the outset; subsequent sections provide back-up for each purpose.

1.3 Purpose of and Need for the Action

The purpose of improvements in the US 36 corridor is to improve mobility along the US 36 corridor from I-25 in Adams County to Foothills Parkway/Table Mesa Drive in Boulder, and among intermediate destinations. The transportation needs of the project are listed below and described further in the following sections.

1. Increase trip capacity.
2. Expand access.
3. Provide congestion relief.
4. Expand mode of travel options.
5. Increase efficiency of transit service.
6. Update outdated highway facilities.

Transportation Need #1: Increase Trip Capacity

Historical growth in population and employment has resulted in increased travel demand within the US 36 corridor. Additional growth is forecasted. One of the ways to respond to this continued growth is to increase trip capacity of the highway.

Substantial residential and employment growth along the US 36 corridor during the late 1990s, which continues today, has greatly increased the demand placed on the highway. According to DRCOG, in 2005, the population in the US 36 project area was estimated to be 505,900 and is expected to grow to 649,100 in 2035 — a 28 percent increase. As a whole, the population in the region is expected to increase from 2.7 million in 2005 to 4.4 million in 2035 — a 63 percent increase, as illustrated in Figure 1.3-1, Anticipated Population Growth. Areas of high growth are predicted in the middle portion of the US 36 corridor, as well as on the eastern end in Adams County. These growth areas will generate additional travel demand for use of routes through and within the corridor (DRCOG 2008).

DRCOG estimated employment in the project area to be 332,500 in 2005 and it is expected to grow to 508,500 in 2035 — a 53 percent increase, as illustrated in Figure 1.3-2, Anticipated Employment Growth. Overall employment in the region is expected to increase by 69 percent, from 1.3 million in 2005 to 2.2 million in 2035. Boulder, with over 78,000 employees, has the region's third-largest employment concentration. In the project area, retail employment is expected to grow by 47 percent between now and 2035 and is projected to be the fastest-growing component of employment growth, indicating an increasing number of regional shopping centers (DRCOG 2008). Areas of high employment growth are predicted in the middle portion of the US 36 corridor, primarily north and south of US 36 and west of US 287 in Broomfield. The Interlocken Business Park in Broomfield on the south side of US 36 will experience substantial employment increases, as will some areas within the City of Boulder. Employment growth is also predicted in Adams County, particularly south of US 36. Population and employment growth will result in increased travel demand and the need for increased trip capacity.

The analysis summarized in Figure 1.3-3, US 36 2035 a.m. Peak-Hour Travel Demand, shows that the capacity available in the US 36 corridor in 2035 will not be adequate to meet projected travel demand unless substantial improvements are made. Figure 1.3-3 compares the projected travel demand in 2035 to existing highway and transit capacity during the a.m. peak-hour. The comparison is made at eight locations along the highway. The demand that can be accommodated by the existing system is shown in dark blue and labeled as "Demand Served."

Techniques to note:
- purposes are listed in bullets; each bullet briefly explains that purpose.

1.6 What is the purpose and need for transportation improvements in the Corridor?

The purpose for transportation improvements is to increase capacity, improve accessibility and mobility, and decrease congestion for travel demand (projected to occur in 2050) to destinations along the Corridor as well as for interstate travel, while providing for and accommodating environmental sensitivity, community values, transportation safety, and ability to implement the proposed solutions for the Corridor.

The relationship of capacity and congestion is not direct. Lack of capacity may lead to congested conditions but increased capacity will not necessarily reduce congestion as the additional capacity can also result in more people traveling. As a result, both increased capacity and decreased congestion are addressed as needs for the Corridor.

There is a need to address the transportation problems in the Corridor. The three interrelated need statements below specifically describe the need:

- **Increase capacity –** There is insufficient capacity to accommodate the current and projected demand for person trips in the Corridor. Person trips are used to portray the future demand, rather than vehicle trips, so that all potential modes of travel are examined similarly. Lack of capacity leads to slower travel times and congested conditions, as discussed in the two need statements that follow. It also means that person trip travel demand cannot be adequately accommodated. The inability to adequately accommodate person trip demand results in a need to increase person trip capacity.
- **Improve mobility and accessibility –** Mobility along the I-70 Mountain Corridor is defined as the ability to travel along the Corridor safely and efficiently in a reasonable amount of time. The mix of vehicle types, particularly slow-moving vehicles, directly affects mobility in this Corridor. Slow moving vehicles (trucks, buses, and recreational vehicles) make up about 10 percent of weekday traffic.

  Accessibility is related to mobility and is defined as the ability to access destinations served by the Corridor safely, conveniently, and in a reasonable amount of time.

  Currently, there are long travel times to traverse the Corridor or reach Corridor destinations during peak weekend conditions. Future increases in person trip demand will result in more congestion, more delay, and increased travel times for weekends and weekdays. Long travel times affect all types of Corridor users, and result in a need to improve mobility and accessibility in the Corridor.

Techniques to note:
- purposes and needs are listed in bullets, which are further explained later in the chapter.

lie just within the city limits, north of the project study corridor. Moving toward the downtown area, the project study corridor includes the West Baltimore MARC Station, schools, and shopping centers, all within residential neighborhoods.

The CBD is a major employment center for government, healthcare, and businesses. It includes not only the Inner Harbor, a nationally-known tourist destination, but it is also home to major league baseball, football, indoor soccer teams, universities and professional schools, hospitals, government agencies, and several financial institutions. Recently, the CBD has also become a residential area and offers a number of opportunities to connect with MARC, Metro, Central Light Rail, and the MTA core bus system.

Moving toward the eastern portion of the project study corridor, the Fell's Point and Canton areas are undergoing intense infill development, creating even greater residential density and numerous business opportunities. The easternmost edge of the project study corridor is comprised mostly of industrial and institutional uses, including Johns Hopkins Bayview Medical Center campus.

1.2 Purpose of the Project

The Red Line project is just one step in the ongoing development of an interconnected regional transit system that would improve the quality of transit service in the Baltimore Region. The purpose of the Red Line project is to provide the following improvements in the project study corridor, which extends from the Centers for Medicare & Medicaid Services in Baltimore County to the Johns Hopkins Bayview Medical Center campus in Baltimore City:

- Improve transit efficiency by reducing travel times for transit trips in the corridor
- Increase transit accessibility in the corridor by providing improved transit access to major employment and activity centers
- Provide transportation choices for east-west commuters in the corridor by making transit a more attractive option
- Enhance connections among existing transit routes in the corridor
- Support community revitalization and economic development opportunities in the corridor
- Help the region improve air quality by increasing transit use and promoting environmental stewardship

1.3 Project Need

The needs that exist in the project study corridor are:

- Roadway congestion contributes to slow travel times for automobiles and buses in the corridor
- Lack of convenient transit access to existing and future activity centers in the corridor, including downtown Baltimore, Fell's Point, and Canton, as well as employment areas in Baltimore County to the west of Baltimore
- Lack of viable transit options for east-west commuters in the corridor

- Lack of connections from existing transit routes (including Central Light Rail, Metro, MARC, and bus network) to the I-70 travel market on the west side of the corridor, and to the I-95 and East Baltimore travel markets on the east
- Need for economic development and community revitalization in communities along the corridor, both in Baltimore County and in Baltimore City
- Need to support the regional goal of improving air quality by providing alternatives to automobile usage

These needs are described in detail in **Sections 1.3.1** through **1.3.6** below.

1.3.1 Roadway Congestion and Slow Travel Times

The project study corridor currently faces traffic congestion, affecting both automobiles and buses. The main link in the project study corridor, US 40, is a heavily traveled arterial with high density residential and commercial activities throughout much of its length into downtown. There are many aspects of US 40 that contribute to the congestion and slow travel speeds, but most significant are the numerous and closely spaced traffic signals along the length of the project study corridor.

During peak travel periods, traffic speeds on US 40 range between 10-42 miles per hour (mph) on sections of roadway with posted speeds between 35-40 mph. Currently, traveling by car from the western end of the project study corridor (I-695) to downtown (Pratt Street), a distance of approximately 9 miles, can take as long as 20 minutes during the peak rush hour. This would worsen by Design Year 2035 with a projected increase in traffic of 20 percent over current conditions. By 2035, it may take as long as 28 minutes to travel the same corridor during the peak rush hour, with traffic speeds ranging between 4-32 mph.

Through the CBD and east of downtown, travel in the east-west direction is even slower and more congested. Main east-west streets such as Fayette, Lombard, Eastern, and Fleet Streets are narrow and signalized at nearly every intersection. Traffic speeds downtown range between 4-22 mph during peak travel periods on streets posted at 25 mph. Traffic through downtown and in eastern Baltimore City is projected to increase by 25-35 percent by Design Year 2035. In 2035, during rush hours, the travel time in the west-east direction from Martin Luther King, Jr. Boulevard to Conkling Street via Fleet Street and Boston Street would increase from approximately 7 minutes currently to 12 minutes by 2035. It is also anticipated that the travel time along Lombard Street would increase from 9 minutes to 26 minutes during peak travel periods, thus worsening delays experienced today.

Buses in the project study corridor are subject to the same traffic congestion as automobiles, but have longer travel times because of frequent stops. For most bus routes, speeds during the busiest travel times average only about 9 mph. For example, current bus travel times between Edmondson Village and downtown takes approximately 27 minutes. The US 40 Quick Bus currently makes the trip in approximately 20 minutes. In 2035, the same trip on the US 40 Quick Bus would take approximately 39 minutes.

Techniques to note:
- purposes and needs are listed in bullets, which are further explained later in the chapter.

1.4.1 Project Purpose

The purpose of the Mukilteo Multimodal Project is to provide safe, reliable, and efficient service and connections for general-purpose transportation, transit, high-occupancy vehicles (HOVs), pedestrians, and bicyclists traveling between Island County and the Seattle/Everett metropolitan area and beyond. The project is intended to:

- Reduce conflicts, congestion, and safety concerns for pedestrians, bicyclists, and motorists by improving local traffic and safety at the terminal and the surrounding area
- Provide a terminal and supporting facilities with the infrastructure and operating characteristics needed to improve the safety, security, quality, reliability, and efficiency of multimodal transportation
- Accommodate future demand projected for transit, HOV, pedestrian, bicycle, and general-purpose traffic

1.4.2 Project Need

The existing facility is deficient in a number of aspects, including safety, multimodal connectivity, capacity, and the ability to support the goals of local and regional long-range transportation and comprehensive plans, including future growth in travel demand. Those factors, which are further described below, demonstrate the need for an improved multimodal facility.

Safety and Security

Safety is WSDOT's top priority, and security at transportation facilities is a national concern. Safety and security come into play with this project in several ways: at the pedestrian/vehicle interface, with the general traffic flow in the SR 525/Front Street vicinity, and in maintaining safety and security for the facility itself. Safety and security improvements are needed because:

- The Mukilteo ferry terminal has received few improvements since it was built in 1952. The existing timber structures, including the docking facilities, are beyond the end of their useful lives.
- The existing terminal does not meet current seismic standards. The existing facility is underlain by deep, potentially liquefiable soils that are highly susceptible to lateral spreading during an earthquake.
- Changed U.S. Coast Guard and U.S. Department of Homeland Security protocols now require the ability to secure terminal areas when there is a natural disaster, heightened security alert, or other emergency. The existing facility has city streets within the terminal area and does not allow for a physical separation between the terminal and open public areas, which increases safety and security concerns, and could require WSDOT to interrupt service or close the terminal to respond to an emergency or heightened security alert.
- Collisions near the SR 525/Front Street intersection have included sideswipes, vehicle/pedestrian collisions, and collisions with parked vehicles.

Techniques to note:
- purposes and needs are listed in bullets, which are further explained later in the chapter.
- supporting data is provided for each need

1.0 Purpose of and Need for Action

This statement of purpose and need explains why improvements to the transportation system in the project area should be considered and implemented. Additional details related to project purpose and need are contained in a technical report, *Statement of Purpose and Need* (Parsons Brinckerhoff, 2008). The public and environmental resource and regulatory agencies were given the opportunity in April 2008 to review and comment on a draft of this report (see Appendix A). Their comments are summarized in the *Stakeholder Involvement for Draft Environmental Impact Statement Technical Report* (Parsons Brinckerhoff, 2009). These two reports are on the compact disc (CD) that accompanies this Final Environmental Impact Statement (FEIS), at public review locations listed in Appendix C, and on the NCTA web site at http://www.ncdot.gov /projects/midcurrituckbridge/.

1.1 What do you propose to build and where?

The North Carolina Turnpike Authority (NCTA), a division of the North Carolina Department of Transportation (NCDOT), in cooperation with the Federal Highway Administration (FHWA), is evaluating proposed transportation improvements in the Currituck Sound area. The project area is shown on Figure 1-1.

1.1.1 We propose to build a bridge across Currituck Sound from the mainland to the Outer Banks. Improvements to existing roads also are considered, both without a bridge and in association with a bridge.

The proposed action is included in NCDOT's *2009 to 2015 State Transportation Improvement Program* (STIP), the 2012 to 2018 Draft STIP, the North Carolina Intrastate System, the *Strategic Highway Corridors Concept Development Report* (NCDOT, 2005), and the *Thoroughfare Plan for Currituck County* (NCDOT, 1999). In those plans, the proposed action is defined as a bridge across Currituck Sound from the mainland to the Outer Banks. A bridge across Currituck Sound is a part of the Preferred Alternative. When considering the construction of a major transportation investment, it is appropriate to review a range of reasonable alternatives. Thus, the detailed study alternatives evaluated in this FEIS include alternatives that involve improvements to the existing road network. One alternative involves only existing road network improvements. The other four build alternatives involve adding a bridge across Currituck Sound and improving some sections of the existing road network. The No-Build Alternative also is evaluated. These alternatives are described in Chapter 2. Other alternatives that were considered but were not chosen to be assessed in detail are described in Section 2.5, including the reasons why these alternatives were not selected as detailed study alternatives.

1.1.2 The project area is in Currituck and Dare counties, North Carolina, and includes two existing thoroughfares, US 158 and NC 12.

The project area is in northeastern North Carolina and includes the Currituck County peninsula on the mainland and its Outer Banks, as well as a portion of the Dare County Outer Banks (see Figure 1-1). The project area encompasses two thoroughfares, US 158 from NC 168 to NC 12 (including the Wright Memorial Bridge) and NC 12 north of its intersection with US 158 to its terminus in Corolla. US 158 is the primary north-south route on the mainland. NC 12 is the primary north-south route on the Outer Banks. The Wright Memorial Bridge connects the mainland with the Outer Banks south of the proposed Mid-Currituck Bridge.

1.2 What needs is the project trying to meet?

The proposed action responds to three underlying needs in the project area:

- The need to substantially improve traffic flow on the project area's thoroughfares (US 158 and NC 12);
- The need to substantially reduce travel time for persons traveling between the Currituck County mainland and the Currituck County Outer Banks; and
- The need to reduce substantially hurricane evacuation times from the Outer Banks for residents and visitors who use US 158 and NC 168 as an evacuation route.

An improvement is considered substantial as opposed to minor if the improvement is great enough to be largely noticeable to typical users of the transportation system and if the improvement offers some benefit across much of the network, as opposed to offering only a few localized benefits. Alternatives that provide only minor or no improvement, as opposed to substantial improvement, would not meet the above needs.

These needs were identified through an iterative process that included several rounds of agency coordination and public involvement. These needs are based on the following travel conditions and planning activities:

The project area's main thoroughfares (US 158 and NC 12) are becoming increasingly congested, and congestion will become even more severe in the future.

The extent of the existing and expected congestion problems on US 158 and NC 12 in the project area can be summarized as follows:

- In the base year (2006), congestion occurs on almost all of NC 12 in the project area. The worst current congestion occurs in the summer on NC 12 just south of Southern Shores and Duck and on US 158 east of the Wright Memorial Bridge. On both the summer weekday (2 hours per day) and the summer weekend (7 hours per day) travel demand exceeds the capacity of NC 12 in Southern Shores.

- In the design year (2035), travel demand will exceed the capacity of the road to handle that demand on almost all project area segments of NC 12 and US 158 east of the Wright Memorial Bridge during summer weekday and summer weekend conditions (approximately 29 miles). On the summer weekend, travel demand also will exceed road capacity on all US 158 segments between NC 168 and the eastern end of the Wright Memorial Bridge (an additional approximately 27 miles). When demand exceeds capacity, heavy congestion occurs, and congestion occurs over more hours in the day.

- In 2035, on the summer weekday, on US 158 east of the Wright Memorial Bridge and NC 12 in Southern Shores and parts of Duck, travel demand is expected to be notably greater than the capacity of these roads for 6 to 7 hours per day. Demand is expected to be 81 percent above the capacity of US 158 and as much as 54 percent above the capacity of NC 12. Travel demand is how many vehicles want to travel on a road in an hour. Capacity is the number of vehicles a road can actually carry in an hour. If, for example, a road has the capacity to carry 10,000 vehicles in an hour and demand is 15,400 vehicles in an hour, then demand is 54 percent over capacity.

- In 2035, on the summer weekend, US 158 in Currituck County between NC 168 and the Wright Memorial Bridge will be congested for 10 to 11 hours a day, with demand 16 to 19 percent above the capacity of US 158.

- In 2035, on the summer weekend, US 158 east of the Wright Memorial Bridge and NC 12 in Dare County will be congested for 15 to 18 hours per day, with demand 117 percent of the capacity of US 158 and as much as 162 percent of the capacity of NC 12.

From the perspective of the thoroughfare network in 2035, the above factors will combine to result in an increase in the annual vehicle-miles of travel under congested conditions on US 158 and NC 12 from 5.4 million (2006) to 66.1 million (2035). Miles of road with travel demand at or exceeding road capacity in the summer is expected to increase from a weighted average (summer weekday versus summer weekend) of 3.9 miles to 22.9 miles between 2006 and 2035. For the same period, the weighted average miles where demand exceeds capacity by more than 30 percent in the summer is also expected to rise from zero to 6.3 miles.

Increasing congestion is causing travel time between the Currituck County mainland and the Currituck County Outer Banks to increase, especially during the summer.

As an example of travel time between the Currituck County mainland and the Currituck County Outer Banks, the 40.9-mile trip between Aydlett Road (SR 1140) at US 158 (on the Currituck County mainland) and Albacore Street (SR 1402) at NC 12 (on the

Currituck County Outer Banks) was evaluated. This trip was selected as a representative trip from the Currituck County mainland to the Currituck County Outer Banks. Not all trips have this origin or destination.

The uncongested travel time for this representative trip, allowing for stops at signalized intersections, is approximately 1 hour. Under base year (2006) conditions, this trip takes approximately 1 hour and 8 minutes on a summer weekday, and approximately 1 hour and 42 minutes on a summer weekend. In 2035, travel time for this trip is expected to be just over 2 hours on the summer weekday and more than 3 hours and 53 minutes on the summer weekend. Increases in travel time would result from increasing peak period congestion. These travel times would be even longer when accidents occur or if back-ups occur at signalized intersections.

Hurricane evacuation times for residents and visitors who use US 158 and NC 168 as a hurricane evacuation route far exceed the state-designated standard of 18 hours.

North Carolina's statewide hurricane evacuation clearance time standard is 18 hours (NC General Statutes § 136-102.7, "Hurricane Evacuation Standard"), which is applied to a Category 3 storm with 75 percent tourist occupancy. Clearance times begin when the first evacuating vehicle enters a roadway segment in a given evacuation corridor and ends when the last vehicle leaving the corridor reaches a point of safety.

The state standard was already exceeded at 27 hours in 2007 for evacuees leaving the Outer Banks via NC 168 and US 158. The 2035 clearance time is forecast to be approximately 36 hours with the No-Build Alternative, which is double the 18-hour standard.

1.3 What purpose will the project serve?

Given the needs described above, the purposes of the proposed action are:

- To substantially improve traffic flow on the project area's thoroughfares. Thoroughfares in the project area are NC 12 and US 158;

- To substantially reduce travel time for persons traveling between the Currituck County mainland and the Currituck County Outer Banks; and

- To reduce substantially hurricane clearance time for residents and visitors who use US 158 and NC 168 during a coastal evacuation.

The definition of "substantial" presented for the needs in Section 1.2 also applies to the three purposes.

Needs Supported by Data and Visuals

- CO: I-70 FEIS
- OR: OR 62 FEIS

Techniques to note:
- provides specific factual information to support need for increased capacity

1.11 How are the needs demonstrated by transportation problems in the Corridor?

1.11.1 The need to increase capacity

The inability to adequately accommodate person trip demand results in a need to increase person trip capacity, as summarized in **Section 1.6**. This need addresses the transportation problems described below.

The Corridor serves a wide variety of trips as described in **Section 1.8**. Many of these trips could not occur without the I-70 highway. The ability of the Corridor to accommodate these trips is a major underpinning of all activity—social, work, and recreation —occurring within the Corridor and in areas served by the Corridor. The inability of the Corridor to accommodate demand for person trips now and in the future is an acute transportation problem.

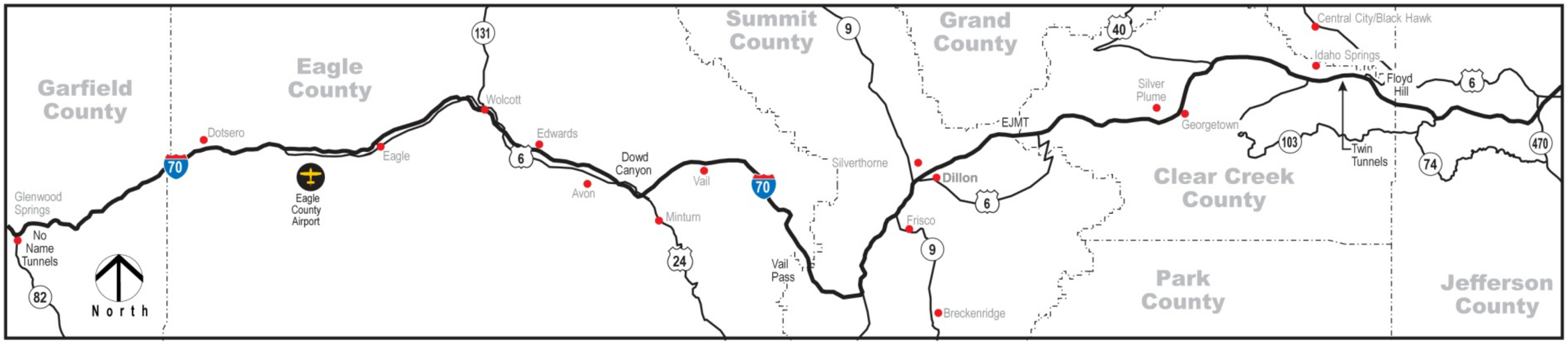
Because of poor travel conditions in the Corridor in 2050, around 9 million people annually who would use the Corridor to reach destinations will instead choose not to travel in the Corridor. These suppressed trips directly affect overall Corridor mobility, accessibility to Corridor destinations, recreational opportunities, and economic activity.

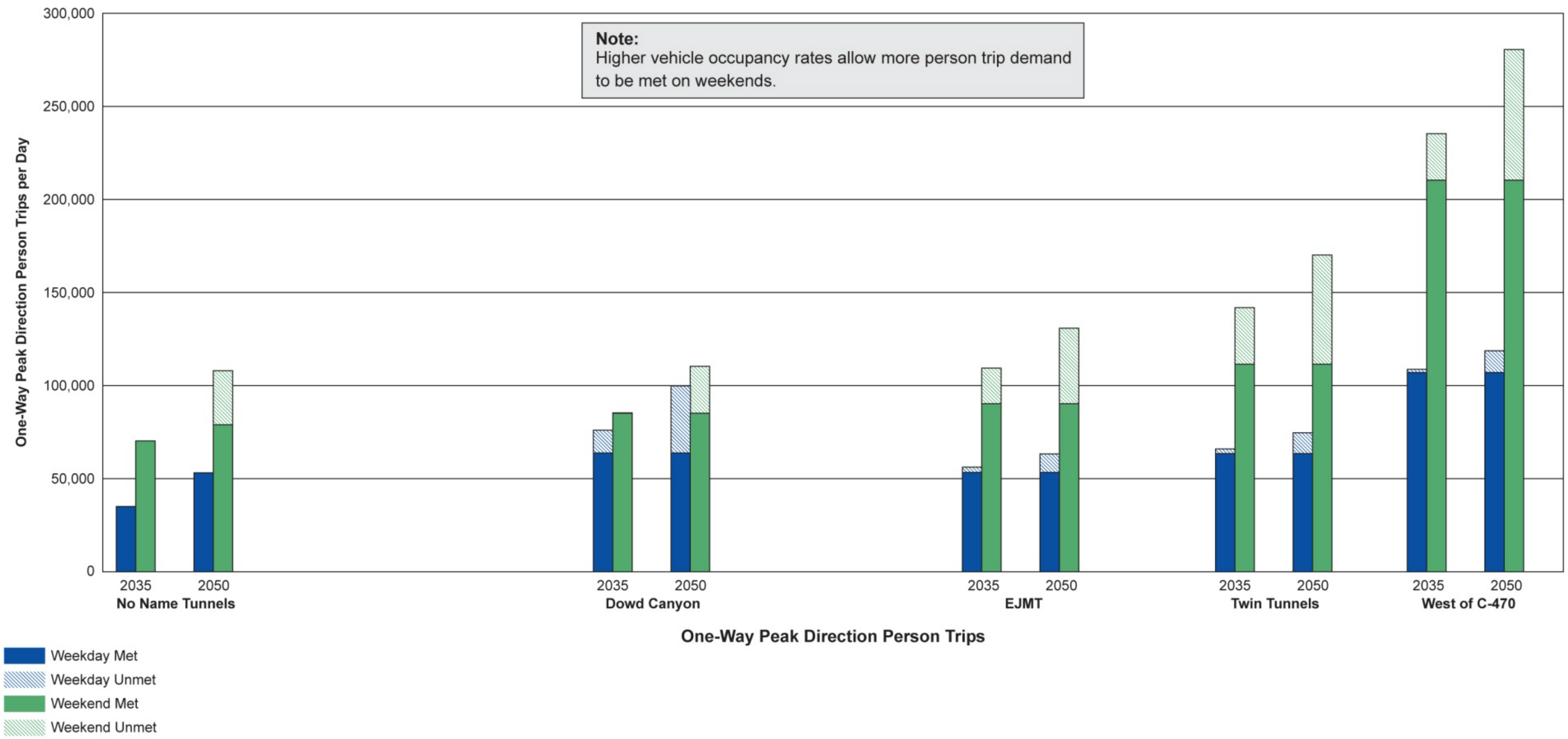
The travel demand model information presented in **Section 1.10** forecasts the amount of unmet demand as a result of severe congestion, long travel times, and other unsatisfactory travel conditions in the future. While it is recognized that there is already some unmet demand along the Corridor, particularly during weekends when congestion is the worst, the model forecasts the additional unmet demand for 2035 and 2050 relative to 2000 trip-making. **Figure 1-8** shows the unmet demand of person trips for representative locations along the Corridor. By 2035, unmet demand occurs during weekdays and weekends for locations east of and including the Eisenhower-Johnson Memorial Tunnels. Weekday unmet demand also occurs at Dowd Canyon representing the Vail Valley area. By 2050, unmet demand increases substantially in all parts of the Corridor. Unmet weekday demand at Dowd Canyon is forecast to be around 35,000 person trips per day in the peak direction. During weekends unmet demand west of C-470 is forecast to be around 70,000 person trips per day in the peak direction. These trips represent activities, such as social, work, and recreation that are desired along the Corridor but not occurring due to poor future travel conditions.

The amount of demand accommodated is different for weekdays and weekends due to automobile occupancy. On weekends, higher average vehicle occupancy ranging from 1.65 to 2.35 allows for more accommodation of person trips than weekdays, where an average rate between 1.45 and 1.65 is expected.

Techniques to note:
- uses corridor map and bar charts to illustrate the locations as well as magnitude of the need for additional capacity

Figure 1-8. 2035 and 2050 Unmet Person Trip Demand





Note: EJMT = Eisenhower-Johnson Memorial Tunnels

1.2.2 Need of the Proposed Action

Techniques to note:
- describes role of this route in the highway system
- provides data to support need for improvement on this route
- explains the needs in clear, jargon-free language

This section addresses the underlying transportation problems that were the impetus for the OR 62 corridor project. For purposes of this analysis, the approximate limits of the OR 62 project begin just west of the OR 62/I-5 interchange and extend north to the intersection of Dutton Road and OR 62, in White City (Figure 1-1). The identified transportation needs include, Roadway System Hierarchy/Linkage, Corridor Congestion, Intersection Operations, Safety and Non-Motorized Transportation Modes.

1.2.2.1 Deficient Roadway System Hierarchy/ Linkage

OR 62 is a vital part of the State's transportation network. According to the 1999 Oregon Highway Plan's (OHP's) State Highway Classification System, the segment of OR 62 from I-5 to OR 140 is designated as part of both the US and Oregon National Highway System (NHS). (ODOT 1999)

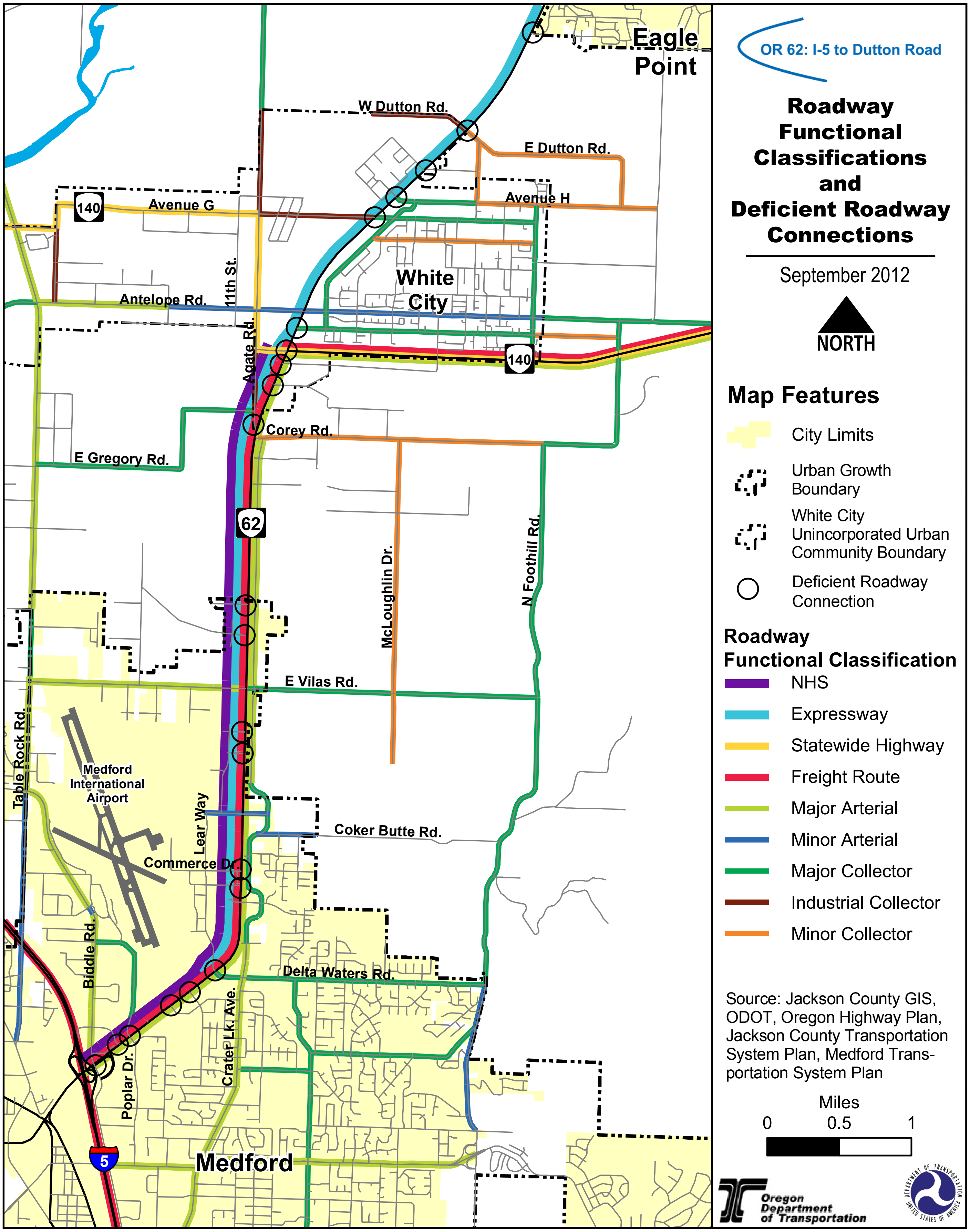
The US NHS is a national network of strategic highways within the United States. These roads connect to other strategic transportation facilities including major airports, ports and rail or truck terminals. The Oregon NHS designation is in recognition of the vital role that OR 62 plays in the economic well-being of the Rogue Valley and the State of Oregon. That same segment of OR 62 is also classified in the OHP as a freight route. In addition, the section of OR 62 from Delta Waters north to Eagle Point is further classified as an expressway in the OHP. The function of an expressway is to provide for safe and efficient high speed (55 mph) and high volume traffic movement with limited intersections and no driveways. Both Jackson County and the City of Medford classify OR 62 as a principal arterial between I-5 and OR 140. Figure 1-2 shows the system hierarchy and network linkage on OR 62. The current posted speed on OR 62 is 45 mph, while the design speed is 55 mph.

According to the OHP, OR 62 is intended by the Oregon Department of Transportation (ODOT) to function as a major interurban expressway and to operate as an interregional facility, connecting Medford to White City, Eagle Point and statewide points north and west. However, data from the origin and destination survey (May 1999) show that approximately 60 percent of traffic on OR 62 consists of local trips. These local trips conflict with the remaining 40 percent of through trips on OR 62. Trying to satisfy these two trip types has resulted in a street network that has too many intersections with OR 62 and lacks a system of hierarchy and linkages for an "orderly flow of traffic." The network does not provide the logical connections between an expressway and local streets and roads. For example, when a regional roadway system is properly designed to address hierarchy, arterials connect to expressways, collectors connect to arterials, and local streets connect to collectors. Currently, there are 36 local street intersections with OR 62 within the project area. Ten of these intersections are signalized and 26 are not signalized, and none are grade-separated. Figure 1-2 shows deficient intersections, labeled "deficient roadway connections." This deficient system of hierarchy does not allow for smooth and efficient flow of traffic, while the deficient intersections contribute to the safety concerns and congestion. A proper solution that would address this issue would be a road system that would generally separate the distinct types of trips onto separate facilities and that would provide a logical hierarchy of connections to serve the trip types. For example, the through trips would use a highway that functions as an expressway and the highway would have a relatively small number of arterial connections to the roadway system used for the local trips.

1.2.2.2 Corridor Congestion

Prior to December 2011, the OHP used Mobility Performance Standards as one of the primary measures of corridor congestion. These standards were numerical measures that needed to be met to show compliance with the OHP. In December 2011, the Oregon Transportation Commission (OTC) adopted Mobility Performance

Figure 1-2


OR 62: I-5 to Dutton Road
Roadway Functional Classifications and Deficient Roadway Connections
September 2012
NORTH
Map Features
City Limits
Urban Growth Boundary
White City Unincorporated Urban Community Boundary
Deficient Roadway Connection
Roadway Functional Classification
NHS
Expressway
Statewide Highway
Freight Route
Major Arterial
Minor Arterial
Major Collector
Industrial Collector
Minor Collector
Source: Jackson County GIS, ODOT, Oregon Highway Plan, Jackson County Transportation System Plan, Medford Transportation System Plan
Miles
0 0.5 1
Oregon Department of Transportation
Eagle Point
W Dutton Rd.
E Dutton Rd.
Avenue H
Avenue G
140
White City
Antelope Rd.
11th St.
Agate Rd.
Corey Rd.
E Gregory Rd.
62
McLoughlin Dr.
N Foothill Rd.
E Vilas Rd.
Table Rock Rd.
Medford International Airport
Lear Way
Coker Butte Rd.
Commerce Dr.
Biddle Rd.
Delta Waters Rd.
Poplar Dr.
Crater Lk. Ave.
5
Medford

Targets as the replacement measure for the previously used standards in the OHP. While the previous mobility standards were viewed as rigid numerical measures, the newly adopted performance targets, while still numerical, are seen as aspirational in nature and offer a degree of flexibility to jurisdictions as they show compliance with the OHP.

Under 2007 baseline conditions, OR 62 just west of I-5 carried over 52,000 average daily trips (ADT). Of these trips, 5 to 6 percent of the vehicle mix consisted of trucks. Since 2007, traffic volumes on OR 62 have declined in tandem with the economic slowdown. According to traffic trends published by ODOT's Transportation Planning and Analysis Unit (TPAU), traffic volumes are anticipated to slowly increase. Currently four of the nine project area intersections exceed their applicable v/c performance targets; by 2035 eight intersections will exceed their applicable v/c targets (see Table 1-1). Congestion begins during the morning commute period (7 AM - 9 AM) and gradually increases throughout the day with little, if any, relief through the afternoon commute period (4 PM – 6 PM). High traffic volumes continue to occur in between peak periods. The continuous high traffic volumes in midday do not allow conditions to fully recover prior to the afternoon commute period.

The small reduction in the forecast 2035 v/c ratio at the intersection of OR 62 and Vilas Road in Table 1-1 is the result of a change in the phasing of the traffic signal, which is described in Section 3.1.3.2.The small reduction in the forecast 2035 v/c ratio at the intersection of OR 62 and OR 140 is the result of the addition to the roadway system under the No Build Alternative of a project to add left-turn lanes from OR 140 westbound to OR 62 southbound, as described in Section 2.1.1.

As illustrated by data for the intersection of OR 62 and Delta Waters Road (Figure 1-3), traffic volumes rise during the AM peak period and then continue to rise throughout the midday, peaking during the late afternoon. This steady presence of traffic volumes on OR 62 results in congested conditions at most intersections from the start of the morning commute to the close of the evening commute. As a result of congested conditions on OR 62, it takes approximately 16 to 18 minutes to travel through the OR 62 project area during the PM peak period, with average speeds of 25 to 29 miles per hour.

By the future year 2035 under No Build conditions, all but one of the nine signalized intersections along OR 62 between I-5 and Avenue H would fail to meet performance targets as daily traffic volumes approach 63,000 vehicles (see Table 1-1). OR 62 would experience increased congestion as volumes from turn lanes would block adjacent through lanes, and signalized intersections would operate at capacity. Mainline queue lengths would block adjacent local streets, which would cause local street queue lengths to increase and system-wide congestion would also increase. If no roadway improvements are made,

Table 1-1 Signalized Intersection Operations for OR 62 v/c Ratio, Two-Hour PM Peak Period

Key Signalized Intersections	ODOT Mobility Target	2007 Existing Conditions	Future Year 2035 No Build
I-5 SB & OR 62	0.85	0.73	0.87
I-5 NB & OR 62	0.85	0.67	0.75
Poplar Drive & OR 62	0.85	1.02	1.05
Delta Waters & OR 62	0.85	0.86	1.00
Owens Drive & OR 62	0.85	N/A	0.92
Vilas Road & OR 62	0.85	0.86	1.38 1.36
Highway 140 & OR 62	0.85	0.86	1.54 1.48
Antelope Road & OR 62	0.85	0.83	1.09
Avenue G & OR 62	0.85	0.68	0.89

Source: OR 62 Traffic Analysis, OR 62 Corridor Solutions Project. August 2011

v/c = Volume to Capacity describes the capability of an intersection to meet volume demand based upon the absolute maximum number of vehicles that could be served in an hour.

Black-shaded values indicate v/c ratios that exceed or will exceed ODOT mobility target.

N/A = The intersection of Owens Drive at OR 62 is not signalized in the existing 2007 Existing Conditions, therefore, there is no v/c ratio. Installation of the Owens Drive and OR 62 signal occurred in year 2010, as a part of the City of Medford and ODOT's Coker Butte and Owens Drive project, which realigned Crater Lake Avenue and extended Owens Drive to OR 62.

travel times would approximately be double that of 2007 existing conditions. For example, PM peak period travel times on OR 62 from one end of the project area to the other would increase to 29 to 32 minutes with average speeds of 15 to 17 miles per hour.

1.2.2.3 Deficient Intersection Operations

The following are identified as key signalized intersections within the Project limits of OR 62:

- I-5 southbound (SB) & OR 62;
- I-5 northbound (NB) & OR 62;
- Poplar Drive & OR 62;
- Delta Waters & OR 62;
- Owens Drive & OR 62;
- Vilas Road & OR 62;
- Highway 140 & OR 62;
- Antelope Road & OR 62; and
- Avenue G & OR 62.

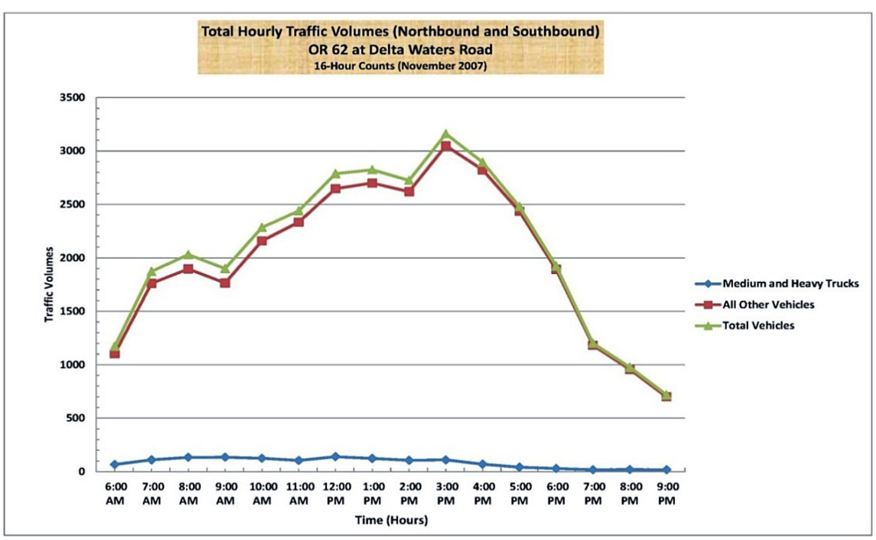
To determine the performance of an intersection, ODOT uses volume to capacity (v/c) ratio mobility targets.

Four of the key signalized intersections listed above failed to meet performance targets in 2007, as shown in Table 1-1. In addition, intersecting streets are spaced closer than the ODOT standard for almost all segments along OR 62 between Poplar Drive and Dutton Road and there are numerous driveways that connect directly to OR 62 due to a lack of access management. These conditions contribute to problems with intersection operations: vehicles turning from local streets or driveways onto OR 62 – particularly those turning left – face long delays because of the high traffic volumes and few traffic stream gaps of adequate size on OR 62. Those long delays cause queues to form on the local streets. Drivers experiencing those traffic conditions are more likely to take risks and make a turn when a smaller-than-ideal gap appears. This behavior increases the potential for crashes and also causes drivers on OR 62 to brake or make other evasive maneuvers to avoid a crash, which in turn affects traffic flow on OR 62.

By the future year 2035, eight of the nine key signalized intersections would fail to meet performance targets if no roadway improvements are made (see Table 1-1). Nearly all un-signalized intersections along OR 62, which allow left turn movements from local streets onto OR 62, would exceed performance targets in 2035. Further, traffic volumes would increase to a point that it would become difficult for traffic from local streets to enter the system. For example, left and right turn movements from local streets onto OR 62 would become extremely difficult. OR 62 queues block local streets, local street queue lengths begin to build, and system-wide congestion would occur. Consequently, mobility along OR 62 would decrease considerably, as vehicular delay would increase and travel speeds would reduce to approximately half of what they were in 2007.

As a result of congestion along OR 62, operations at the key intersections would experience diminished performance and decreased mobility. These conditions can be attributed to the current roadway geometry, intersection delay, and lack of access management. Intersection delay is measured by the average amount of time vehicles are stopped, or delayed, at signalized and un-signalized intersections. For example, at the intersection of OR 62 and Vilas Road, a time delay during the PM peak hour is experienced due to the northbound left turning movements from Vilas Road onto OR 62.

Figure 1-3 Total Hourly Traffic Volumes on OR 62 at Delta Waters Road



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Documentation of Public and Agency Role in Developing P&N

- UT: West Davis Corridor DEIS

Techniques to note:
- describes opportunity for public and agency comment on the draft P&N, under Sec. 6002 of SAFETEA-LU (23 USC 139)
- summarizes input received from the public and agencies on the draft P&N
- summarizes changes made to P&N following the public and agency input

stations. For this reason, increasing the interconnections between transportation modes has been included as a secondary objective of the WDC Project.

WFRC's Regional Transportation Plan notes that the most appropriate design for a public transportation facility balances the mobility needs of the people (motorists, pedestrians, bicyclists, or transit users) using the facility with the physical constraints of the corridor within which the facility is located.

1.7.5 Pedestrian and Bicycle Facilities

The existing pedestrian and bicycle facilities in the study area consist of bicycle lanes (Class 2 and 3 trails), multi-use paths (Class 1 trails), and sidewalks. Sidewalks are constructed as part of residential developments and are not generally planned on a regional basis. Many of the cities also have pedestrian and bicycle facilities within their city limits. However, bicycle lanes and multi-use paths often serve more than one neighborhood and, in many cases, travel through more than one city. The Denver and Rio Grande Western Trail is the only continuous north-south trail facility in the study area. Currently there are no east-west pedestrian/bicycle facilities through the study area.

Expanded trail facilities are included in the WFRC Regional Transportation Plan [see Figure 1-13, Current (2011) and Future (2040) Bicycle and Pedestrian Trails, in Volume IV]. The regional plan notes that there is a need to incorporate pedestrian and bicycle facilities into transportation projects to balance the mobility needs of people using the facility. UDOT also considers adding trails or pedestrian facilities in order to be consistent with the adopted Regional Transportation Plan. Based on results from the WFRC regional travel demand model, predicted non-motorized trips (bicycle and walking trips) accounted for 2.4% of the 2009 daily home-based work trips in the study area. By 2040, non-motorized trips are predicted to account for 2.3% of the daily home-based work trips.

1.8 Public and Agency Involvement in Developing the Project's Purpose and Need

The project's purpose and need incorporated input from the public and various other sources during the EIS scoping process. Numerous commenters said that roads in the study area are congested and supported both roadway and transit improvements to alleviate the congestion.

FHWA and UDOT published a draft of the project purpose and need document for review by the cooperating and participating agencies listed in Table 1-1 above, Cooperating and Participating Agencies for the WDC EIS, on May 5, 2010, and for review by the public on May 7, 2010. The WDC team gathered comments on the draft document through June 7, 2010. Members of the public and agencies were encouraged to provide comments by e-mail, the project website, and regular U.S. mail. The team received a total of 47 comment submissions on the draft purpose and need.

The draft purpose and need document was also discussed at a combination SAFETEA-LU Agency–Stakeholder Working Group meeting on May 19, 2010.

In general, the comments on the project's purpose and need focused on the following subjects:

- General agreement or disagreement that the WDC is needed
- Opinion that project goals should consider both transportation and environmental values
- Accuracy of assumptions about the future transportation system
- Accuracy of population and employment forecasts and associated assumptions
- Accuracy of land-use assumptions
- Transit and other needs for alternate transportation choices
- Corrections regarding the project history
- Local growth objectives
- Accuracy of the traffic modeling results
- Air quality

Most comment submissions focused on project alternatives. These comments were considered as the WDC team began developing alternative concepts (see Chapter 2, Alternatives).

UDOT and FHWA made changes to the draft purpose and need document in response to these comments and provided the revised document to the agencies and to the public on the project website (www.udot.utah.gov/westdavis). The WDC team did not receive any comments that resulted in major changes to the information supporting the project need or to the project purpose presented in this chapter.

In June 2011, WFRC released version 7.0 of the travel demand model and a new Regional Transportation Plan. The May 5, 2010, draft purpose and need document provided to the public was based on the 2007 Regional Transportation Plan and version 6.0 of the travel demand model. In the summer of 2011, UDOT used version 7.0 of the travel demand model to conduct a sensitivity analysis to determine whether the decisions about the boundaries of the needs assessment study area and the project purpose and need, which were made with version 6.0 of the travel demand model, were still valid with version 7.0 of the travel demand model (for more information, see Section 1.2, Description of the Needs Assessment Study Area).

As stated in Section 1.2, Description of the Needs Assessment Study Area, based on the sensitivity analysis, the northern limits of the study area changed from 12th South to 3000 South in Weber County. The revised study area boundary was provided to the public for comment in November 2011 as part of the release of *Technical Memorandum 15: Alternatives Screening Report* (West Davis Corridor Team 2012). No public or agency comments were received on the revised study area boundary.

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Chapter 12. Alternatives

In recent years, FHWA has placed renewed emphasis on improving the readability and reducing the length of the alternatives chapter. It is now a common practice to document alternatives development and screening in a technical report, with a brief summary of that process in the main body of the NEPA document. In some cases, the structure of the alternatives chapter itself is changed: the chapter begins by describing the alternatives carried forward for detailed study, and discusses alternatives screening at the end.

Condensing the alternatives chapter helps to focus the analysis on the issues of greatest interest to most readers; organizational changes also can help to improve readability. But as these changes are made, it is important to ensure that the analysis remains rigorous and precise. Some effective approaches that promote both readability and legal sufficiency include:

- *Explain the reasoning, not just the results, of the screening process.* The alternatives chapter, even if condensed, should describe a logical process that led to the screening decisions. This explanation should describe the preliminary alternatives considered, the criteria used to screen alternatives, and the rationale for eliminating some alternatives while others were carried forward. Visuals can be useful in depicting the steps in the screening process. Tables can be useful in listing the screening criteria and performance measures for those criteria.

- *Summarize the major elements of each detailed-study alternative.* The main body of the NEPA document should describe the major elements of each detailed-study alternative in a way that makes it easy for the reader to see the key differences. One effective approach is to provide a bullet-point list of the key elements of each alternative. Detailed descriptions of the alternatives can be provided in an appendix.

- *Describe the improvements included in the No Action alternative.* The No Action alternative is always one of the alternatives carried forward for detailed study. Like other detailed-study alternatives, it should be clearly described. The main body should summarize any noteworthy future improvements that are assumed as part of the No Action; details should be provided in an appendix.

- *Use side-by-side figures to show differences among alternatives*. One useful technique for describing alternatives is to present them in a series of side-by-side figures, in which each alternative is shown on a separate figure.

- *Describe refinements made during the NEPA process.* After the detailed-study alternatives are identified, their design may be modified based on stakeholder input, additional engineering, more information about environmental impacts, or for other reasons. While not every minor change needs to be described in the NEPA document, it is helpful to summarize the noteworthy changes and explain why they were made.

- *Describe agency and public involvement in developing alternatives.* Under 23 USC 139, FHWA is required to give participating agencies and the public an "opportunity for involvement" in developing the alternatives for an EIS. It is helpful to describe that outreach in the alternatives chapter, including any major issues raised and how they were addressed.

For additional information on developing the range of alternatives, refer to the AASHTO Practitioner's Handbook, "Defining the Purpose and Need and Determining the Range of Alternatives for Transportation Projects" (2006).

Screening Discussion Condensed; Moved to End of Chapter

(with details in appendix)

- NC: Mid-Currituck FEIS
- WA: Mukilteo FEIS

Techniques to note:
- alternatives chapter begins with a description of the alternatives that are studied in detail; screening process is summarized at the end of the chapter

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Table of Contents (continued)

2.0 Alternatives

This chapter describes the five DEIS detailed study alternatives and the Preferred Alternative considered. It also describes the No-Build Alternative, as well as other alternatives considered but not selected for detailed study. The reasons why the Preferred Alternative was selected also are discussed. This chapter is divided into the following sections:

- Description of the detailed study alternatives, beginning on page 2-2;
- Description of how the detailed study alternatives differ in their ability to meet the project's purpose and need, beginning on page 2-44;
- Description of the cost of each alternative and how each would be financed, beginning on page 2-46;
- Description of when and how each alternative would be built, beginning on page 2-50;
- Description of other alternatives considered but not selected for detailed study and why they were not selected, beginning on page 2-52; and
- A presentation of the reasons why the Preferred Alternative was selected, beginning on page 2-54.

Five detailed study alternatives were evaluated in the DEIS. They are named:

- ER2;
- MCB2/C1 (MCB2 using bridge corridor C1);
- MCB2/C2 (MCB2 using bridge corridor C2);
- MCB4/C1 (MCB4 using bridge corridor C1); and
- MCB4/C2 (MCB4 using bridge corridor C2).

The Preferred Alternative identified in this FEIS is MCB4/C1 with refinements made to help avoid and minimize impacts.

The "ER" in ER2 stands for "Existing Roads." A Mid-Currituck Bridge is not included in this alternative, but only widening existing US 158 and NC 12. The "MCB" stands for Mid-Currituck Bridge. MCB2 and MCB4 both include a Mid-Currituck Bridge and different amounts of improvements to existing US 158 and NC 12. The bridge components of MCB2 and MCB4 are evaluated with two bridge corridor alternatives (C1 and C2). The preferred bridge corridor, C1 as refined between the DEIS and FEIS to help avoid and minimize impacts, is included in the Preferred Alternative. The "C" stands for "Central," as opposed to other corridor possibilities further north (N) and south (S).

For all five DEIS alternatives, two hurricane evacuation options are considered. The preferred hurricane evacuation option is included in the Preferred Alternative. For the four MCB2 and MCB4 alternatives, two design options also are under consideration for the mainland approach to the bridge over Currituck Sound (between US 158 and Currituck Sound). The preferred design option is included in the Preferred Alternative.

The information included in this chapter is considered important to understanding the general characteristics of the detailed study alternatives and how they were selected. For readers desiring additional information on a particular topic, items contained on the compact disc (CD) that accompanies this FEIS, at public review locations listed in Appendix C, and on the NCTA web site at http://www.ncdot.gov/projects /midcurrituckbridge/ are referenced in the text.

2.1 Describe the alternatives considered.

2.1.1 What alternatives are considered?

The five DEIS detailed study alternatives are considered in this FEIS. They are named ER2, MCB2/C1, MCB2/C2, MCB4/C1, and MCB4/C2. The No-Build Alternative also is considered. The DEIS detailed study alternatives are shown on Figure 2-1. The alternatives screening process used to determine these detailed study alternatives is described in the *Alternatives Screening Report* (Parsons Brinckerhoff, 2009).

For all five DEIS alternatives, two hurricane evacuation options are considered. For the four MCB2 and MCB4 alternatives, two design options (Option A and Option B) also are considered for the mainland approach to the bridge over Currituck Sound (between US 158 and Currituck Sound). When impacts differ between the mainland approach road design options (Option A and Option B), the names of the alternatives are augmented with an additional suffix. For example, MCB2 with mainland design Option B and the C1 corridor is referred to as MCB2/B/C1.

The Preferred Alternative is MCB4/C1 with refinements made to help avoid and minimize impacts. The Preferred Alternative was selected based on cost and design considerations; travel benefits; community, natural resource, and other impacts; agency comments; and public involvement comments. The Preferred Alternative is illustrated in Figure 2-2. The features included in the Preferred Alternative to help avoid and minimize impacts in a cost-effective manner are described in Section 2.1.2.5.

2.1.2 Where would the alternative transportation improvements occur and what would they include?

The location and key components of the five DEIS detailed study alternatives are shown on Figure 2-1. The following paragraphs describe these alternatives. The CD includes building the Currituck Sound bridge would be via Aydlett Road (between US 158 and Aydlett only) and Narrow Shore Road. Depending on allowable use of project right-of-way in Maple Swamp, the bridge corridor through Maple Swamp also may for used for access to the Narrow Shore Road area. Such a use, however, could not involve placing fill in wetlands. Construction materials and equipment also would be staged on vacant upland sites along Narrow Shore Road near the western Currituck Sound bridge ending.

On the Outer Banks with all the detailed study alternatives, including the Preferred Alternative, construction materials and equipment would be transported by truck via NC 12 to construction sites. Construction materials and equipment would be staged on vacant upland sites near the NC 12 widening areas and at the eastern endings of the C1 and C2 bridge corridors for the Currituck Sound bridge.

Oversize-overweight loads for certain bridge elements would be transported on US 158, NC 12, Aydlett Road, and Narrow Shore Road. Delivery of these oversize-overweight loads would be required to both sides of Currituck Sound. To ensure minimal traffic disruption, particularly on US 158 and NC 12 during peak travel periods, nighttime or other non-peak period delivery could be made when traffic volumes are at the lowest level if permitted by NCDOT. This would be more expeditious for the bridge construction and would limit traffic interruptions to periods of low travel demand.

2.5 Describe the other alternatives that were considered and explain why they are no longer under consideration

An alternatives screening study was conducted for the project. Its findings were discussed with federal and state environmental resource and regulatory agencies in a series of Turnpike Environmental Agency Coordination (TEAC) meetings in 2006, 2007, 2008, and 2009. Based on discussions at TEAC meetings, and written comments received from the agencies and public, the *Alternatives Screening Report* (Parsons Brinkerhoff, 2009) identified the DEIS detailed study alternatives described in Section 2.1. Alternatives were evaluated from the perspective of:

- Ability to meet the purpose and need and level of benefit offered in relation to those purposes;
- Improvement to system efficiency;
- Economic feasibility (cost and funding capacity); and
- Potential impacts on natural resources and communities.

The findings of the *Alternatives Screening Report* are summarized below. A description of the process followed and the specific numerical indications of benefit and environmental impact associated with the findings are included in that report. That report is included on the CD that accompanies this FEIS, at public review locations listed in Appendix C, and on the NCTA web site at http://www.ncdot.gov/projects/midcurrituckbridge/.

The other road widening and bridge alternatives considered were:

- ER1, which was identical to ER2 except NC 12 was assumed to be widened to four lanes instead of three lanes from US 158 to Albacore Street;

- MCB1, which was identical to MCB2 except NC 12 was assumed to be widened to four lanes instead of three lanes from US 158 to the Mid-Currituck Bridge terminus on the Outer Banks; and

- MCB3, which was identical to MCB4 except it did not include a third outbound lane on US 158 between the Wright Memorial Bridge and NC 12.

It was decided not to study ER1 and MCB1 in detail because the additional four-lane widening on NC 12 would result in more than 200 total displacements (including over 50 businesses) with these two alternatives.

MCB3 was dropped because it could only achieve a 2035 hurricane evacuation clearance time with construction of a third outbound lane on US 158 of 27 hours compared to 22 hours with the other alternatives. Clearance times with reversal of the center turn lane would be identical for MCB3 and MCB4 (27 hours). Therefore, it was only the third outbound lane option that was relevant to the decision to drop MCB3.

Other alternative concepts also were considered but were not carried forward as detailed study alternatives. These were: (1) shifting rental times; (2) transportation systems management; (3) bus transit; and (4) a ferry service across Currituck Sound as an alternative to a Mid-Currituck Bridge. The first three considered whether there were opportunities to reduce congestion and travel time by:

- Making better use of existing road capacity by shifting peak travel demand (asking property managers to start and end additional vacation home rental times on days other than Saturday and Sunday);

- Making minor improvements to the road system, including optimizing traffic signal timing, improving major intersections, and restricting side-road access where duplicate side roads exist; and

- Providing bus transit.

None of these alternatives was found to make more than a minimal reduction in congestion and travel time; thus, all were eliminated from consideration.

Building a ferry across Currituck Sound was considered as an alternative to a bridge. This alternative was dropped because a ferry would not notably reduce congestion or travel times, would be costly, and would require substantial dredging in Currituck Sound, with resulting impacts to the natural environment.

Several additional bridge corridors were considered and evaluated. The two selected for detailed study (C1 and C2) were the two that appeared to best balance community and natural resource trade-offs while meeting the objectives of the project. The other corridors considered were C3, C4, C5, and C6, all in the Aydlett area but south of Aydlett Road. Alternatives north of the community of Aydlett and near the Intracoastal Waterway (N1 and N2) and further south in the Poplar Branch area (S) also were considered over the course of alternatives studies.

The No-Build Alternative was retained as a baseline for comparison with the detailed study alternatives. The identification of the No-Build Alternative as the Selected Alternative could be an outcome of this project's decision-making process.

2.6 For what reasons did you choose the Preferred Alternative?

As indicated at the beginning of this chapter and described in Section 2.1.2.5, the Preferred Alternative is MCB4/A/C1 with refinements made to help avoid and minimize impacts. This preference is made taking into account the key findings associated with travel benefits; community, natural resource, and other impacts; public involvement comments; and financing and design considerations.

The Preferred Alternative is only a preference; it is not a final decision. The NEPA process will conclude with a ROD, which will document the Selected Alternative.

MCB4/A/C1 with refinements made to help avoid and minimize impacts is identified as the Preferred Alternative based on the considerations that follow. This list is not in order of importance, but is organized by issues as they are presented in this FEIS. Also, this list does not represent all benefits or impacts of the Preferred Alternative, just those elements that differentiated the Preferred Alternative when compared to the other detailed study alternatives. Quantities associated with the impact considerations are presented in Table S-1 in the Summary and the impact assessments in Chapter 3. Costs are also presented in Section 2.3.

Travel Benefit Considerations

- The Preferred Alternative, as well as MCB4, would provide substantial congestion reduction and travel time benefits while minimizing the widening of NC 12, and also would not require widening of US 158 from the Wright Memorial Bridge to NC 12, or an interchange at the US 158/NC 12 intersection.
- Should additional improvements to NC 12 and US 158 and a US 158/NC 12 interchange (e.g., the components of MCB2 not included in the Preferred Alternative and MCB4) be pursued in the future, they could be built without additional impact over that defined for MCB2. With the Mid-Currituck Bridge included in the Preferred Alternative and MCB4, a future interchange at NC 12 and US 158 would not carry as much traffic (traffic would divert to the Mid-Currituck Bridge), and the interchange configuration would result in fewer community and access impacts than without a Mid-Currituck Bridge (ER2).

Techniques to note:
- alternatives chapter begins with description of detailed-study alternatives; screening process is summarized at the end of the chapter

2 ALTERNATIVES

This chapter describes the alternatives being evaluated in this EIS, and summarizes how they were developed. It discusses each alternative's permanent facilities and operations, as well as temporary construction activities. It also briefly describes alternatives that are no longer being considered. The chapter concludes with a discussion of separate projects that are in this project's vicinity, and the next steps in the project's development.

2.1 Proposed Alternatives

The project is considering four alternatives, as shown on Figure 2-1:

- The No-Build Alternative maintains the existing facility but does not improve it; this alternative provides a basis for comparing the effects of the Build alternatives.
- The Preferred Alternative (a modified Elliot Point 2 Alternative) would relocate the terminal to the western portion of the Mukilteo Tank Farm as part of an integrated multimodal center; the existing terminal would be removed.
- The Existing Site Improvements Alternative would construct an improved multimodal facility by replacing the existing Mukilteo ferry terminal with an expanded terminal at the current site.
- The Elliot Point 1 Alternative would relocate the terminal to the eastern portion of the Mukilteo Tank Farm as part of an integrated multimodal center and remove the existing terminal.

The Preferred Alternative and the Elliot Point 1 Alternative assume transfer of the Mukilteo Tank Farm from the U.S. Air Force to the Port of Everett, consistent with federal legislation passed in 2001 (see *Section 2.4*).

2.1.1 No-Build Alternative

The No-Build Alternative provides a baseline against which to compare the effects of the Build alternatives. It includes what would be needed to maintain the existing ferry terminal at a functional level. Under the No-Build Alternative, an improved multimodal transportation facility to meet future demand or operational needs would not be developed. Instead, the No-Build Alternative assumes that maintenance and structure replacements would occur in accordance with legislative direction to maintain and preserve ferry facilities, but WSDOT would make no investments to improve the operation, safety, security, or capacity at the terminal. Figure 2-2 shows the key elements of the terminal and the areas that would be affected by planned maintenance and preservation activities.

- Clearing, grubbing, excavation, fill, grading, and disposal of materials
- Construction of temporary in-water structures
- Construction or reconstruction of structures, including retaining walls, bulkheads, and the terminal buildings (including associated footings)
- Pile driving
- Drilled shaft or stone column installation (could require temporary roads or fill in shoreline and beach areas)
- Concrete casting
- Roadway construction, including intersections, signal systems, sidewalks, bicycle facilities, and trails
- Landscaping
- Transport of workers, equipment, materials, and debris
- Storage of equipment, including heavy trucks, cranes, and bulldozers, as well as storage of construction materials and debris

2.3 Alternatives Development Process

Nearly three decades of planning activities have focused on different approaches and alternatives to address the need for an improved multimodal facility serving travel between Whidbey Island and the Mukilteo area. Alternatives for improving the terminal have been discussed in various efforts since the 1970s. The City of Mukilteo completed a *Mukilteo Multimodal Terminal and Access Study* in 1995 (City of Mukilteo 1995). WSDOT began detailed master plan efforts with multiple concepts in the *Mukilteo Multimodal Terminal Master Plan Design Report* (WSDOT 2004). This was followed by additional planning, design, and environmental studies of a variety of concepts.

Appendix E, Alternatives No Longer Considered, identifies the previously considered alternatives developed throughout the planning process and summarizes the reasons why other alternatives are no longer being considered. The project has also produced an *Alternatives History through 2009* report (WSDOT 2010), which provides additional detail on the alternatives and concepts previously considered.

Alternatives Considered for the Current EIS

The discussion below describes how WSDOT developed the alternatives now being considered. In 2010, WSDOT developed nine concepts, or initial alternatives, to meet the purpose and need of the project. The focus was on improved constructability and environmental performance compared to the alternatives considered in the 2004 EA and 2006 EIS processes, particularly in terms of impacts on cultural resources and marine and shoreline areas. These initial alternatives built on lessons learned through earlier efforts to address current terminal deficiencies, improve operating efficiency and safety, reduce costs, and develop more compact designs to reduce impacts on archaeological sites and natural resources.

Using transportation performance, constructability, policy, and environmental measures, FTA, WSDOT, and their stakeholders evaluated the initial alternatives.

The initial alternatives included modifying the current terminal site; relocating the terminal to Elliot Point north of the existing terminal; or relocating it entirely to Edmonds or Everett:

- Existing Mukilteo Terminal
  - No-Build Alternative
  - Existing Site Improvements Alternative
- Elliot Point (Mukilteo Tank Farm)
  - Elliot Point – Option 1
  - Elliot Point – Option 2
  - Elliot Point – Option 3
  - Mount Baker Terminal
- Edmonds
  - Edmonds – Existing Terminal
  - Edmonds – Existing Site Improvements
  - Point Edwards
- Everett
  - Port of Everett South Terminal

The alternatives were evaluated by WSDOT and FTA using a set of criteria based on the project's purpose and need. These criteria included the ability of each alternative to meet the project's design, operational, environmental, and technical objectives. The results were shared with agencies, tribes, and the public during the scoping period. At the conclusion of the scoping process in 2010, WSDOT and FTA found that the three Build alternatives in Mukilteo have the best potential to meet the project's purpose and need and achieve regulatory and stakeholder approvals. The public comments during the scoping period overwhelmingly supported this direction.

Some public comments also suggested the project should include park-and-ride spaces to serve people who may want to drive to the terminal and then walk on to the ferry. WSDOT does not currently have spaces for this purpose at Mukilteo, although the City of Mukilteo has monthly permit spaces near the current terminal. WSDOT considered the direction of the Long-Range Plan, as well as cost, environmental impacts, safety, transportation benefits, and the limited available waterfront land in evaluating the various concepts. WSDOT found that alternatives focusing on multimodal improvements, reducing vehicle trips, improving safety and security, and minimizing environmental impacts best met the purpose and need.

The alternatives that failed to advance for evaluation in the EIS included relocating the terminal to the Port of Everett South Terminal or Edmonds, and developing a ferry terminal at the Port of Everett Mount Baker Terminal. These alternatives failed to satisfy the project's purpose and need because of worsened transportation performance, including traffic impacts, longer travel times, reduced service, and poor multimodal connections; environmental impacts stemming from the displacement or conflicts with existing marine-dependent uses; and socioeconomic impacts anticipated from the loss or reduction of service to the city of Mukilteo. During scoping, the project also received written comments from a large number of its participating and cooperating agencies opposing the Everett and Edmonds alternatives.

Appendix E, Alternatives No Longer Considered, details the rejected alternatives, shows the screening evaluation measures and results, and describes the extensive process FTA and WSDOT conducted with the public, the project's cooperating and participating agencies, and interested tribes. All of these stakeholders reviewed the evaluation results and participated in the identification of the alternatives for inclusion in the EIS.

Other Alternatives Previously Considered

During the initial EIS process starting in 2006, another set of alternatives was also studied. These alternatives were removed from further consideration after they were determined to be no longer reasonable for WSDOT to pursue, based on potential impacts on archaeological resources, the amount of over-water construction, geotechnical conditions, and technical issues. The project at that time had a series of alternatives using the Mukilteo Tank Farm and a No-Build Alternative.

Project components under consideration in 2006 (see *Appendix E Alternatives No Longer Considered*) had some similarities to the current Mukilteo Tank Farm alternatives. The biggest differences were:

- A ferry dock with two ferry slips
- Incidental commercial space for retail and other services
- A 275- to 480-stall parking structure

2.4 Other Activities in the Area

The following actions are planned or have been recently completed by others in the project area. While WSDOT is coordinating with the other parties, the activities that are described in the following pages are separate actions that could be taken even if the Mukilteo Multimodal Project is not developed. The EIS sections on cumulative effects discuss the impacts of the Mukilteo Multimodal Project in combination with these and other past, current, or planned activities and projects.

U.S. Air Force Mukilteo Tank Farm

The nearly 20-acre parcel called the Mukilteo Tank Farm, east of the current ferry terminal, was used as a fuel storage and transfer facility, operated through McChord Air Force Base, from 1953 to 1973. The U.S. Air Force continued ownership after that, but operated the facility through the Defense Energy Support Center (DESC) within the Defense Logistics Agency (DLA). In 1972, the NOAA Mukilteo Research Station began operations on a portion of the property. Fuel storage and transfer operations on the site ceased in 1989 and the Air Force removed the ten bulk fuel aboveground storage tanks in 1999.

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Screening Criteria and Steps Are Clearly Explained

- OR: OR 62 FEIS

Techniques to note:
- alternatives chapter explains the criteria and process used to screen alternatives, with reference to more detail in tech.report

2.2 Screening Criteria and Evaluation Measures

Early in the project, ODOT sought input on potential solutions to the problems identified in the Purpose and Need. As described more fully in Section 7.4.1, ODOT held public meetings to obtain input and ideas for potential alternatives. ODOT also requested (and received) ideas from the public in Moving Ahead, an insert in the Medford Mail Tribune. The PDT and CAC (described more fully in Section 7.3) also developed a range of potential alternatives, some of which had been identified during the North Medford Interchange project. Overall, ODOT received 23 concepts. Many of those concepts were similar. Four concepts recommended converting the existing OR 62 into a limited-access highway and providing frontage and/or "backage" roads for local access. Those four concepts were grouped together to become the "Existing Highway Build Alternative."

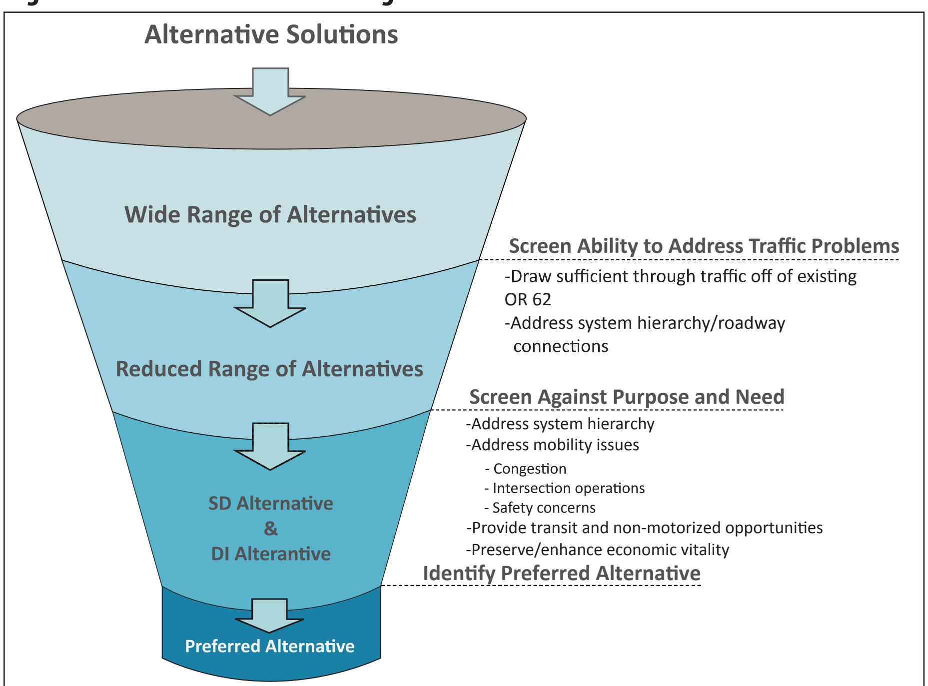
Ten concepts recommended bypassing existing OR 62, using a variety of slightly different alignments. Those ten concepts were grouped together to become the "Bypass Alternative," which later was refined to become the SD and DI Alternatives. After the grouping, there were 11 alternatives that constituted the "wide range of alternatives" that were subjected to the screening criteria. During the screening process, the SD Alternative was added to the set of 11 alternatives, for a total of 12 alternatives.

This section describes the application of the screening criteria and evaluation measures that was conducted to narrow the wide range of alternatives to the two build alternatives that are evaluated in the EIS. Figure 2-12 provides a schematic illustration of the alternatives narrowing process.

The project used a two-part screening process to evaluate and dismiss alternatives. The initial screen was a pass/fail evaluation of each alternative's ability to address the basic transportation issues as defined in the transportation problem. This screen evaluated whether each alternative would separate through-trips from local trips and thereby sufficiently address future capacity needs. Alternatives that passed the initial screen were advanced to the second screen. The second screen evaluated the degree to which each alternative met the project's Purpose and Need and the project's Goals and Objectives using the project's evaluation measures for transportation issues. If an alternative did not address the transportation problem, it could not meet the project's Purpose and Need.

For further information regarding the process of developing and selecting project alternatives, see the *Alternatives Considered Technical Report, Highway 62 Corridor Project*. This report is available from the ODOT contact person identified on page i of this EIS.

Figure 2-12 Alternatives Narrowing Process

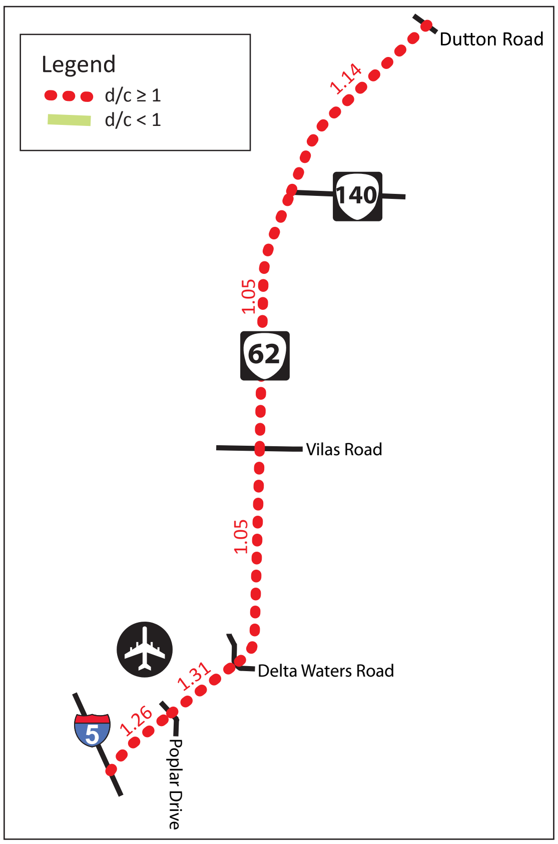


The two-part screening process is described in greater detail in Sections 2.2.1 Application of Initial Screen and 2.2.2 Evaluation Criteria. Section 2.3 Alternatives Considered but Eliminated from Further Consideration, provides maps and descriptions of all of the alternatives that were evaluated and dismissed. Section 2.4 Comparison of Alternatives provides a comparison of the SD and DI Alternatives that are evaluated in this DEIS.

2.2.1 Initial Screening Process

As stated above, the initial screen was a pass/fail evaluation of the alternative's ability to address the basic transportation issues as defined in the transportation problem. The initial screen evaluated whether each alternative would separate through-trips from local trips and therefore be likely to meet future capacity needs. The OR 62 Transportation Problem was first defined in the Oregon Highway 62 Origin and Destination Study (1999). This study documented trip types and travel behavior on OR 62. The study concluded that 60 percent of the total OR 62 trips have an origin and/or destination within the OR 62 project area while the remaining 40 percent have an origin and destination outside of the OR 62 project area. OR 62 is used both as a local connector as well as a regional and interurban connector.

Figure 2-13: d/c Ratios for No Build Alternative



The initial screen consisted of travel demand forecasting using the Rogue Valley Council of Government (RVCOG) EMME/2 regional travel demand computer model. Travel demand models are widely used for transportation project development, transportation planning and land use planning. This model was used to determine how well each alternative would address travel demand on OR 62 in the year 2035. [2]

The EMME/2 travel demand model breaks the regional road system into links or segments. The beginning and end point for each link is an intersection with another roadway. Each link has general characteristics like number of travel lanes and speed; these characteristics determine the link's carrying capacity. The EMME/2 model assigns traffic to the regional road network based on travel patterns, population, employment areas, and other factors. Results of the EMME/2 model runs show capacity on road links expressed as a demand-to-capacity ratio (d/c). The d/c is the number of vehicles at a snapshot in time, divided by the capacity of the roadway. D/C is generally reported as a decimal, e.g. 0.8 or 1.2. A road link with a d/c greater than 1.0 would be extremely congested (demand for the roadway is greater than the roadway's capacity), while a link with a low d/c such as 0.2 would be free-flowing. The d/c also implies how the intersections at either end of the link are operating. If the d/c of the roadway link is greater than 1.0, the intersections at either end of that link would also be over capacity and congestion will occur in the form of queues.

Since the model capacities are generally less than the detailed operational capacities, links with a d/c less than 1.0 would range from relatively free of issues to having problems that could be solved with a reasonable level of effort. Results that include links that are over capacity (d/c >1.0) indicate serious issues that would require a substantial level of additional improvements.

The d/c analysis that was used for this initial screen allowed all 12 alternatives to be evaluated at the appropriate level of detail and within a reasonable amount of time. The travel demand model d/c ratios included in this chapter cannot be compared with v/c ratios included in Section 3.1 Transportation Facilities, because those v/c ratios were developed using a more detailed analysis and a different methodology.

[2] ODOT projects typically use a 20-year planning horizon. The traffic analysis for this screen was conducted in 2005 and used 2030 as its forecast year. Although the OR 62 Corridor Solutions Project has since extended the forecast year to 2035 for the DEIS traffic analysis, the conclusions based on 2030 traffic remain valid.

For the initial screen, each alternative was added to the EMME/2 regional road network and travel demand model d/c ratios were obtained for the year 2030. Project staff converted model outputs for each alternative into diagrams like the one shown in Figure 2-13. This figure shows travel demand model d/c ratios for the No Build Alternative conditions in 2030. The red dotted lines represent segments of OR 62 that would have a d/c ratio of greater than 1.0. In similar figures for other alternatives that were considered, segments of OR 62 that would have a d/c ratio of less than 1.0 are shown with pale green lines. As shown in Figure 2-13, all segments of OR 62 between I-5 and Dutton Road are forecasted to have travel demand model d/c ratio of greater than 1.0 and experience heavy congestion in 2030 if no additional improvements are made to the highway.

The travel demand model d/c ratios on OR 62 for each alternative were compared to No Build Alternative conditions in the year 2030 to determine the effectiveness of each proposed alternative. Alternatives that not only showed improved travel demand model d/c ratios on OR 62 compared to the 2030 No Build Alternative conditions, but also had d/c ratios less than 1.0, were assumed to address the project's transportation problem and were therefore advanced for further study in the second screen. Those alternatives were then subjected to a more detailed evaluation as described in Section 2.2.3 Evaluation Criteria.

Alternatives that included multiple segments of OR 62 with travel demand model d/c ratios greater than 1.0 were dismissed from further consideration. The assumption was that there would need to be substantial changes to the proposed alternative in order to reduce the forecasted volumes to acceptable levels. If an alternative resulted in worse travel demand model d/c ratios than the 2030 No Build Alternative – that is, it contained more "failing" segments of OR 62 than the No Build Alternative – it would obviously fail to solve the congestion problem on OR 62. Failing to solve the congestion (capacity) problem would also fail to improve intersection operations and safety. Alternatives that showed little or no improvement in the travel demand model d/c ratios on OR 62 as compared to the 2030 No Build Alternative were dismissed during the initial screen. The initial, wide range of alternatives are described in Section 2.3. Of the twelve alternatives that were initially developed it was determined that eight of them did not solve the transportation problem and therefore could not meet the project's Purpose and Need. The remaining four alternatives were evaluated to see if they addressed the project's Purpose and Need Statement which embodied the desirable characteristics of a proposed design solution.

2.2.2 Application of the Purpose and Need

Four alternatives remained after the initial screen was completed: the Existing Highway Build Alternative, the Texas Turnaround Alternative, the Bypass with a Split Diamond Interchange Alternative, and the Bypass with a Directional Interchange Alternative (also referred to as the "Plain Bypass"). ODOT engineers developed the designs for each of these four alternatives to the point where the alternative could be evaluated in greater detail than had been possible during the preliminary screen. Design refinements were informed by feedback received during targeted outreach with businesses and community groups, as described in greater detail in Section 7.4.2.

The preliminary travel demand analysis showed that each of these four proposed alternatives was successful in diverting at least 40 percent of the current and future trips onto the OR 62 Bypass. There were also two design options for the northern terminus of the project: the Existing Highway which was a widening of the existing Hwy 62 and the new Bypass to the West. The Existing Highway, Texas Turnaround, and north terminus "Existing Highway" design options were all dismissed because they failed to meet the Purpose and Need as described below.

With respect to the project's Purpose and Need, these four alternatives were evaluated for whether they would accomplish the following goals.

- Simplify roadway connections along OR 62
- Comply with ODOT operational standards
- Improve deficient intersection operations
- Address safety concerns
- Maintain the regional economic role of commercial areas along OR 62
- Address transit and non-motorized transportation mode deficiencies

During the second screen, the four alternatives were subjected to a more detailed traffic analysis than was conducted for the first screen. This analysis developed a preliminary assessment as to whether key intersections for each alternative would comply with the applicable operational standards. The results of this evaluation helped to determine whether each alternative would address the mobility issues included in the Purpose and Need Statement and described below. This additional analysis is a more refined application of the d/c ratios to specific conditions.

Address current and future highway capacity needs. ODOT d/c ratio standards are designed to ensure that proposed transportation improvements are designed with sufficient highway capacity to serve the volume of traffic that is forecast within a 20-year planning horizon. As described in the methodology section below, the initial screen was based on an analysis of 2030 traffic volumes.

Improve intersection operations. The initial screen did not specifically evaluate intersection operations. Instead it looked at d/c ratios for midblock sections, because d/c ratios on roadway segments are related to the intersection operations at either end of those segments. Intersections are designed to accommodate the volumes of traffic that flow through them; if a roadway segment is shown to be well over capacity (i.e. the d/c ratio is greater than 1.0), the intersections at either end of that segment will be over capacity.

Provide enhanced transportation safety. Although there are multiple factors that influence safety, crash rates typically increase as congestion increases. Safety can also be compromised when there are a number of un-signalized local streets connecting directly to OR 62. When congestion occurs, the distance between vehicles decreases, giving drivers less time to react to changes in traffic speed and less space in which to merge or change lanes. As d/c ratios approach (or exceed) 1.0, the level of congestion is great enough to pose a potential safety problem.

Preserve the local and regional economic importance of the businesses along OR 62. An efficient transportation system is critical to the region's economic health. Mobility issues can contribute to the economic decline of an area. Areas suffering from chronic, long term transportation and mobility problems will naturally decline as people seek out areas that do not have these problems. The ability to provide a safe and efficient movement of goods and services is critical to maintaining the health of manufacturing, commercial and retail activity centers. D/c ratios greater than 1.0 represent significant mobility deficiencies, including congestion, which can deter customers from patronizing businesses. Addressing the region's transportation demand and capacity needs, as well as other mobility issues, such as safety, can help to ensure the region's continued economic health and vitality.

The area along OR 62 between I-5 and White City is a business, retail and employment district considered critical to the Rogue Valley region. The area contains a mixture of commercial and industrial employment, regional and local retail sales. The area contains two large shopping centers, six big box stores, 16 retail buildings with more than 30,000 square feet of floor area, and many small or moderate-sized strip malls, shopping centers, motels, restaurants, retail stores, offices, and services businesses, all located along OR 62. In addition, there is a large area of employment in White City on Antelope Road, between OR 62 and

Table Rock Road. Employment in this area includes timber products, general manufacturing and state and local government employment. This business/ employment district represents a significant proportion of the economic activity of the Medford region.

Transit and non-motorized transportation mode deficiencies. The wide range of alternatives that were subjected to the initial screen did not include multimodal enhancements such as bicycle lanes, sidewalks, or transit improvements. Because multimodal enhancements could have been added to any of the alternatives at a later stage in the project development, no alternative was dismissed for its lack of such improvements. This aspect of the Purpose and Need was applied during the second screen.

2.2.3 Evaluation Measures

The Evaluation Measures were used to provide additional factual information and help inform the discussion that determined whether the proposed alternative met the Project's Purpose and Need. Early in the Project planning, the PDT and CAC developed project Goals and Objectives to help guide the alternatives analysis process. The Goals and Objectives included relevant criteria with specific evaluation measures that provided a basis of comparison between the alternatives.[3]

Appendix A lists the goals, objectives, criteria, and evaluation measures. The table also includes quantitative or yes/no responses to the measures for each of the four alternatives as they existed at the time when the measures were applied. [4]

At the time when the evaluation measures were applied, the designs were preliminary and did not include enhancement and mitigation measures or specific information about materials and appearance. As a result, some of the evaluation measures such as "Number of enhancements for native fish and wildlife habitats" (Goal 2) and "Provides improvements that are visually pleasing" (Goal 6) could not be answered at that time because those aspects had not been designed. In such cases where an answer would have been speculative, the evaluation measures were not applied and a comment was included about the lack of design information. In other cases, some evaluation measures required a fairly extensive technical analysis, such as those that related to noise or travel times. In lieu of conducting technical analyses at that point, evaluation measures were assessed with estimates. All of the responses were based on the information that was available at the time, and on the designs that existed at the time. In the years since the evaluation measures were applied, the alternatives that are being analyzed in the EIS have been further refined and more extensive technical analyses have been conducted.

[3] More recently during the project development, when the DEIS alternatives were identified, CETAS representatives requested that the Goals, Objectives, Evaluation Criteria, and Measures be refined. The refinements provide more precise means for evaluating the alternatives (the EIS alternatives are more alike than the four alternatives being described in this section, and therefore required a more fine-grained set of measures).

[4] The impact calculations for the two Bypass Alternatives listed in Table 4-1 of the Alternatives Considered Technical Report may be slightly different than the impact calculations now included in the EIS because more refined designs are now available upon which to provide more detailed technical analysis.

Elements of Each Alternative Are Clearly Described

- NC: Mid-Currituck Bridge FEIS - Build Alternatives
- OR: OR 62 FEIS - Projects Included in No Build Alternative

Techniques to note:
- alternatives chapter includes a clear description of each alternative carried forward for detailed study, making it easy to understand the key differences among those alternatives

2.0 Alternatives

This chapter describes the five DEIS detailed study alternatives and the Preferred Alternative considered. It also describes the No-Build Alternative, as well as other alternatives considered but not selected for detailed study. The reasons why the Preferred Alternative was selected also are discussed. This chapter is divided into the following sections:

- Description of the detailed study alternatives, beginning on page 2-2;
- Description of how the detailed study alternatives differ in their ability to meet the project's purpose and need, beginning on page 2-44;
- Description of the cost of each alternative and how each would be financed, beginning on page 2-46;
- Description of when and how each alternative would be built, beginning on page 2-50;
- Description of other alternatives considered but not selected for detailed study and why they were not selected, beginning on page 2-52; and
- A presentation of the reasons why the Preferred Alternative was selected, beginning on page 2-54.

Five detailed study alternatives were evaluated in the DEIS. They are named:

- ER2;
- MCB2/C1 (MCB2 using bridge corridor C1);
- MCB2/C2 (MCB2 using bridge corridor C2);
- MCB4/C1 (MCB4 using bridge corridor C1); and
- MCB4/C2 (MCB4 using bridge corridor C2).

The Preferred Alternative identified in this FEIS is MCB4/C1 with refinements made to help avoid and minimize impacts.

The "ER" in ER2 stands for "Existing Roads." A Mid-Currituck Bridge is not included in this alternative, but only widening existing US 158 and NC 12. The "MCB" stands for Mid-Currituck Bridge. MCB2 and MCB4 both include a Mid-Currituck Bridge and different amounts of improvements to existing US 158 and NC 12. The bridge components of MCB2 and MCB4 are evaluated with two bridge corridor alternatives (C1 and C2). The preferred bridge corridor, C1 as refined between the DEIS and FEIS to help avoid and minimize impacts, is included in the Preferred Alternative. The "C" stands for "Central," as opposed to other corridor possibilities further north (N) and south (S).

For all five DEIS alternatives, two hurricane evacuation options are considered. The preferred hurricane evacuation option is included in the Preferred Alternative. For the four MCB2 and MCB4 alternatives, two design options also are under consideration for the mainland approach to the bridge over Currituck Sound (between US 158 and Currituck Sound). The preferred design option is included in the Preferred Alternative.

The information included in this chapter is considered important to understanding the general characteristics of the detailed study alternatives and how they were selected. For readers desiring additional information on a particular topic, items contained on the compact disc (CD) that accompanies this FEIS, at public review locations listed in Appendix C, and on the NCTA web site at http://www.ncdot.gov/projects/midcurrituckbridge/ are referenced in the text.

2.1 Describe the alternatives considered.

2.1.1 What alternatives are considered?

The five DEIS detailed study alternatives are considered in this FEIS. They are named ER2, MCB2/C1, MCB2/C2, MCB4/C1, and MCB4/C2. The No-Build Alternative also is considered. The DEIS detailed study alternatives are shown on Figure 2-1. The alternatives screening process used to determine these detailed study alternatives is described in the *Alternatives Screening Report* (Parsons Brinckerhoff, 2009).

For all five DEIS alternatives, two hurricane evacuation options are considered. For the four MCB2 and MCB4 alternatives, two design options (Option A and Option B) also are considered for the mainland approach to the bridge over Currituck Sound (between US 158 and Currituck Sound). When impacts differ between the mainland approach road design options (Option A and Option B), the names of the alternatives are augmented with an additional suffix. For example, MCB2 with mainland design Option B and the C1 corridor is referred to as MCB2/B/C1.

The Preferred Alternative is MCB4/C1 with refinements made to help avoid and minimize impacts. The Preferred Alternative was selected based on cost and design considerations; travel benefits; community, natural resource, and other impacts; agency comments; and public involvement comments. The Preferred Alternative is illustrated in Figure 2-2. The features included in the Preferred Alternative to help avoid and minimize impacts in a cost-effective manner are described in Section 2.1.2.5.

2.1.2 Where would the alternative transportation improvements occur and what would they include?

The location and key components of the five DEIS detailed study alternatives are shown on Figure 2-1. The following paragraphs describe these alternatives. The CD includes the combined corridor/design public hearing maps for each of the five DEIS alternatives. These maps were displayed at the public hearings and on the NCTA web site at http://www.ncdot.gov/projects/midcurrituckbridge/. They present the design features of each DEIS detailed study alternative and were used to assess the impacts of the detailed study alternatives. A list of these maps is included in Appendix D.

2.1.2.1 ER2

ER2 was developed to achieve maximum transportation benefits using the existing roadways, while minimizing impacts to communities along those roads. The basic features of ER2 are:

- Adding for evacuation use only, a third outbound evacuation lane (Figure 2-3) on US 158 between NC 168 and the Wright Memorial Bridge as a hurricane evacuation improvement or using the existing center turn lane as a third outbound evacuation lane; in either case one inbound lane on the Wright Memorial Bridge and on the Knapp (Intracoastal Waterway) Bridge would be used as a third outbound evacuation lane;
- Widening US 158 to a six-lane super-street (Figure 2-4) between the Wright Memorial Bridge and Cypress Knee Trail that widens to eight lanes between Cypress Knee Trail and the Home Depot driveway (both locations indicated are just west of the existing US 158/NC 12 intersection);
- Constructing an interchange (Figure 2-4) at the current intersection of US 158, NC 12, and the Aycock Brown Welcome Center entrance, including six through lanes on US 158 starting at the Home Depot driveway and returning to four lanes just south of Grissom Street (which is just south of the existing US 158/NC 12 intersection); and
- Widening NC 12 to three lanes (two travel lanes and a center lane for left turns; Figure 2-5) between US 158 and a point just north of Hunt Club Drive in Currituck County (except for the existing three-lane section in Duck, which will be unchanged) and to four lanes with a median from just north of Hunt Club Drive to Albacore Street (Figure 2-6).

As illustrated on Figure 2-4, the unique characteristic of a super-street is the configuration of the intersections. Side-street traffic wishing to turn left or go straight must turn right onto the divided highway where it can make a U-turn through the median a short distance away from the intersection. After making the U-turn, drivers can then either go straight (having now accomplished the equivalent of an intended left turn) or make a right turn at their original intersection (having now accomplished the equivalent of an intention to drive straight through the intersection).

2.1.2.2 MCB2

MCB2 involves construction of a Mid-Currituck Bridge, as well as improvements to existing NC 12 and US 158. MCB2 was developed to examine the travel benefits of combining a Mid-Currituck Bridge with substantial NC 12 and US 158 improvements.

Thus, MCB2 includes the existing road improvements similar to ER2, plus a Mid-Currituck Bridge. The basic features of this alternative are:

- Constructing a 4.7- to 5.3-mile-long two-lane (see Figure 2-7) toll bridge across Currituck Sound, with approach roads, in Currituck County;
- Adding for evacuation use only, a third outbound evacuation lane on US 158 between NC 168 and the Mid-Currituck Bridge as a hurricane evacuation improvement (Figure 2-3) or using the existing center turn lane as a third outbound evacuation lane; in either case one inbound lane on the Knapp (Intracoastal Waterway) Bridge would be used as a third outbound evacuation lane;
- Widening US 158 to a six-lane super-street (Figure 2-4) between the Wright Memorial Bridge and Cypress Knee Trail and an eight-lane super-street between Cypress Knee Trail and the Home Depot driveway (both locations indicated are just west of the existing US 158/NC 12 intersection);
- Constructing an interchange (Figure 2-4) at the intersection of US 158, NC 12, and the Aycock Brown Welcome Center entrance, including six through lanes on US 158 starting at the Home Depot driveway and returning to four lanes just south of Grissom Street (which is just south of the existing US 158/NC 12 intersection); and
- Widening NC 12 to three lanes (two travel lanes and a center lane for left turns; Figure 2-5) between US 158 and a point just north of Hunt Club Drive in Currituck County (except for the existing three-lane section in Duck, which will be unchanged) and to four lanes with a median from just north of Hunt Club Drive to the NC 12 intersection with the Mid-Currituck Bridge (Figure 2-6).

2.1.2.3 MCB4

MCB4 involves construction of a Mid-Currituck Bridge, as well as limited improvements to existing NC 12 and US 158. MCB4 was considered in order to identify the extent to which network congestion and travel time could be improved, as well as other associated benefits, if only a Mid-Currituck Bridge were built. Limited existing road improvements were added to MCB4 to ensure that southbound traffic stopped at traffic signals on NC 12 would not queue back onto the bridge on the summer weekend. The basic features of this alternative are:

- Constructing a 4.7- to 5.3-mile-long, two-lane toll bridge across Currituck Sound, with approach roads, in Currituck County;
- Adding for evacuation use only, a third outbound evacuation lane on US 158 between NC 168 and the Mid-Currituck Bridge as a hurricane evacuation improvement (Figure 2-3) or using the existing center turn lane as a third outbound evacuation lane; in either case one inbound lane on the Knapp (Intracoastal Waterway) Bridge would be used as a third outbound evacuation lane;

- Adding for evacuation use only, a third outbound evacuation lane on US 158 between the Wright Memorial Bridge and NC 12 as a hurricane evacuation improvement or using the existing center turn lane as a third outbound evacuation lane; in either case one inbound lane on the Wright Memorial Bridge would be used as a third outbound evacuation lane; and

- Widening NC 12 to four lanes with a median (Figure 2-6) from Seashell Lane to the NC 12 intersection with the Mid-Currituck Bridge.

2.1.2.4 MCB2 and MCB4 Corridor Alternatives and Design Options

For MCB2 and MCB4, two bridge corridors were evaluated in detail in the DEIS. The locations of the two Outer Banks termini, C1 and C2 (see Figure 2-1 and Figure 2-8), are:

- Corridor C1 on the mainland would be between Aydlett Road (SR 1140) and approximately 500 feet north of the power line that parallels Aydlett Road. On the Outer Banks, C1 would end at the southern end of Phase I of the Corolla Bay subdivision. C1 would connect with NC 12 at an intersection approximately 2 miles north of the Albacore Street retail area. The length of the proposed bridge over Currituck Sound would be approximately 4.7 miles with C1.

- Corridor C2 on the mainland would include the same area as C1 and on the Outer Banks would end near Albacore Street (SR 1402). C2 would connect with NC 12 approximately 0.5 mile south of the Albacore Street retail area. The length of the proposed bridge over Currituck Sound would be approximately 5.3 miles with C2.

For MCB2 and MCB4, two design options (Option A and Option B) also were evaluated in detail in the DEIS for the mainland approach to the bridge over Currituck Sound (between US 158 and Currituck Sound). The options are (see Figure 2-9):

- Option A would place a toll plaza within the US 158 interchange (see Figure 2-10). The mainland approach road to the bridge over Currituck Sound would include a bridge over Maple Swamp. Drivers traveling between US 158 and Aydlett would continue to use Aydlett Road. In Aydlett, the two-lane approach road would pass through Aydlett on fill (approximately 3 to 23 feet high) and bridge Narrow Shore Road.

- With Option B, the US 158 interchange would not include the toll plaza (see Figure 2-11). The approach to the bridge over Currituck Sound would be a road placed on fill within Maple Swamp. Wildlife passages would be incorporated into the fill. The preliminary design developed to assess impacts includes five wildlife passages: two bridges with 180-foot spans at the eastern and western sides of the swamp, a 12-foot by 8-foot box culvert at the center of the swamp, and two 43-inch by 68-inch pipes for passage of reptiles and amphibians. Exclusionary fencing along the road also is assumed.

CHAPTER 2

Techniques to note:
- alternatives chapter includes a clear description of the alternatives carried forward for detailed study, including the No Build, making it easy to understand how the alternatives differ from one another

Chapter 2 Content

Alternatives

This chapter first describes the alternatives the DEIS analyzed. It then describes other alternatives considered but eliminated from further consideration and the basis for eliminating them. The end of the chapter identifies permits and approvals needed.

2.1 Description of Alternatives

For further information regarding the alternative transportation strategies considered, see *Alternative Transportation Strategies, Highway 62 Corridor Project* (April 20, 2011). This report is available from the ODOT contact person identified on page i of this EIS.

The DEIS analyzed three alternatives: the No Build Alternative, the Split Diamond Interchange at I-5 (SD) Alternative, and the Bypass with a Directional Interchange at OR 62 (DI) Alternative. Also included is the Jobs and Transportation Act (JTA) Phase, an initial phase of the build alternatives. This section describes those alternatives.

2.1.1 No Build Alternative

The No Build Alternative would result in no improvements or modifications to existing OR 62. Highway facilities on OR 62 would remain as they are today. Reconstruction of the North Medford Interchange, the interchange between I-5 and OR 62, was completed in 2005. Figure 2-1 is a diagram of the interchange as it now exists. There would be no additional changes to the interchange under the No Build Alternative. Between I-5 in Medford and Dutton Road in White City, OR 62 varies in width and lane configuration. For much of its length, OR 62 is approximately 80 feet wide, consisting of four 12-foot travel lanes (two in each direction) with a 10-foot center turn lane and two 10-foot shoulders. Figure 2-2 is a typical cross-section of existing OR 62. Near the I-5 interchange and intersections with high-volume local streets, OR 62 is wider and includes dedicated turn lanes to accommodate traffic volumes. Businesses on OR 62 have driveway access to the highway, although some are restricted to right in/right out movements.

Improvements to other roadways in the project area would be built under the No Build Alternative. These future projects are identified in the fiscally constrained portion of the Rogue Valley Metropolitan Planning Organization (MPO) 2009-2034 Regional Transportation Plan (RTP) and listed in Table 2-1. Figure 2-3 shows the location of the projects. The Rogue Valley MPO is scheduled to adopt a new RTP in April 2013. There are no additional funded transportation projects within the vicinity of this project in any of the jurisdictions' capital improvement programs.

(Note: in this EIS, the colored text indicates text that was added or modified in the FEIS.)

The Rogue Valley MPO has added to the RTP two projects and expanded one project, as shown in Table 2-1. One added project is the realignment of Springbrook Road south of its intersection with Delta Waters Road. It is shown on Figure 2-3 FEIS as project 5007. The other added project is the addition of left-turn lanes from OR 140 westbound to OR 62 southbound. It is shown on Figure 2-3 FEIS as project 940. The expanded project is number 812, as shown in Figure 2-3 FEIS and Table 2-1. It is now called "Table Rock Road, Wilson Road to Elmhurst Street" and is described as widening to add a center turn lane, bike lanes, and sidewalks and aligning the Gregory Road intersection.

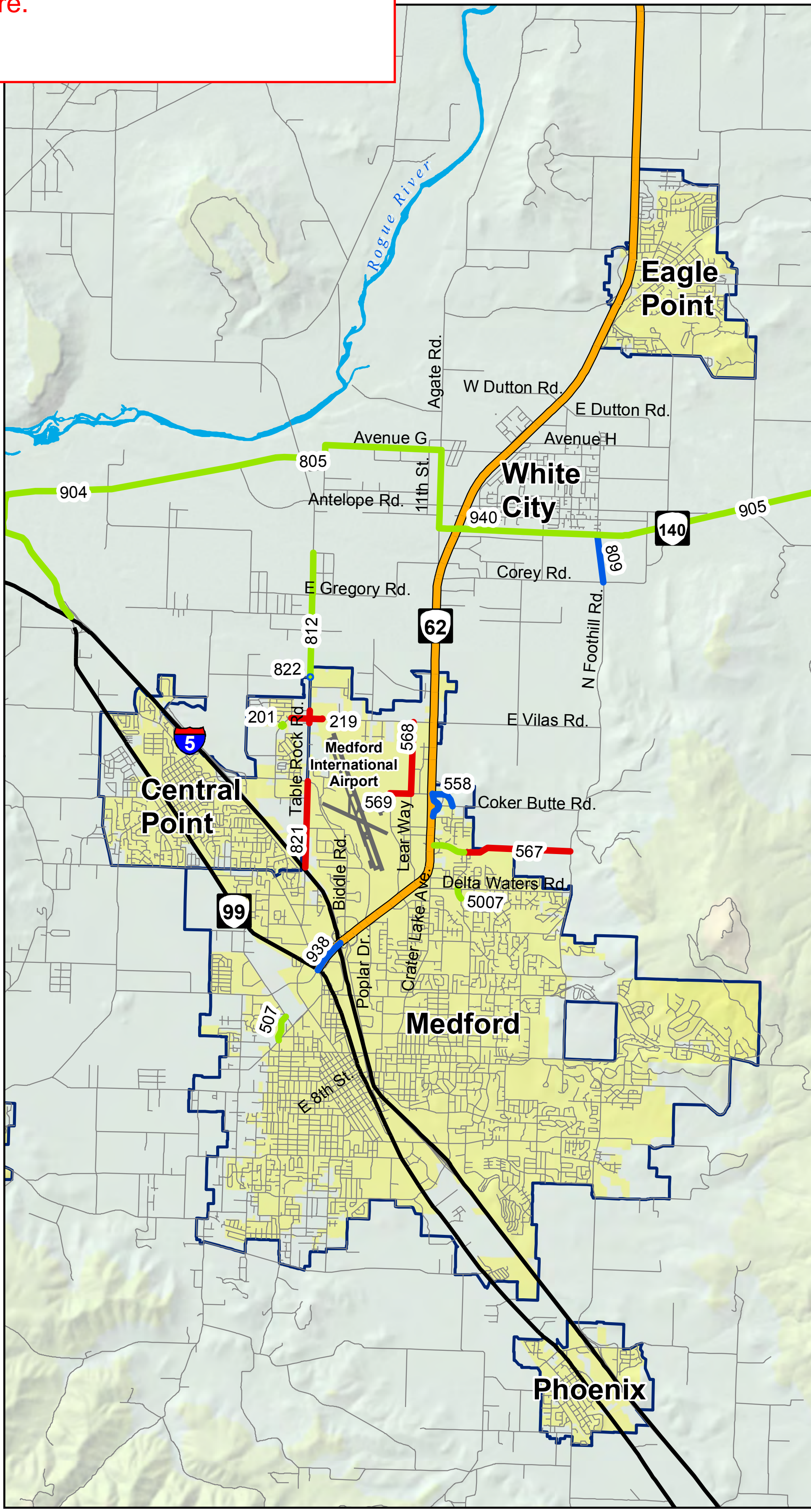
Table 2-1 Related Projects in the Rogue Valley MPO 2009-2034

Project	Location	Description	Timing*
Central Point			
201	New Haven Road - Hamrick Road intersection	Add signal for pedestrian crossing	short
219	Table Rock Road and Vilas Road intersection	Widen to increase capacity	long
Medford			
502	Various locations in Medford	Construct sidewalks, storm drains, curbs	short
507	Columbus Avenue, McAndrews Road to Sage Road	Extend Columbus Avenue to Sage Road, with center turn lane, bike lanes, sidewalks	short
5007	Springbrook-Delta Waters Realignment	Realign intersection; add center-turn lane, bicycle lanes, sidewalks	short
558	Coker Butte Road, OR 62 to East of Crater Lake Avenue	Move Coker Butte Road north, re-align Crater Lake Avenue, add sign	medium
567	Owens Drive, Crater Lake Avenue to Foothill Road	Construct new three lane street with bike lanes and sidewalks	long
568	Lear Way, Coker Butte Road to Vilas Road	Construct new two lane street with bike lanes and sidewalks	long
569	Coker Butte Road, Lear Way to Haul Road	Construct new five lane street with bike lanes and sidewalks	long
Jackson County			
805	Avenue G - Kirtland Road, Pacific Avenue to Table Rock Road	Upgrade to Urban Industrial Collector: Straighten 90º curves	short
812	Table Rock Road: Wilson Road to Gregory Road Table Rock Road: Wilson Road to Elmhurst Street	Widen to 5 lanes: curb, gutter, sidewalk, bike lanes Widen to add center turn lane, bicycle lanes, sidewalks; align Gregory Road intersection	short
822	Table Rock Road at Wilson Road	New traffic signal	medium
809	Foothill Road: Corey Road to Atlantic Street	New two lane rural major collector and signal	medium
821	Table Rock Road: I-5 Crossing to Biddle Road	Widen to 3 and 5 lanes: curb, gutter, sidewalk, and bike lanes	long
ODOT			
534, 558	OR 62: Owens Drive and Coker Butte Road	New 5-lane street from OR 62 to Springbrook Road, Realign Crater Lake Ave and Coker Butte Road, Signalization	short
904	OR 140 Freight Extension	Lane and shoulder widening for freight movements	short
940	OR 62 & OR 140 Intersection Improvements	Relocate signal, modify lane configuration	short
938	OR 62: Access Management	Major approach relocation west of I-5	medium

*Timing: Short = 2009-2013; Medium = 2014-2019; Long = 2020-2034.

Source: Rogue Valley Metropolitan Planning Organization, Regional Transportation Plan, 2009-2034, Table 5.5.2, as amended September 7, 2010. Additions are from amendments adopted October 23, 2012.

Techniques to note:
- projects in the No Build alternative are clearly identified in text and figure.



OR 62: I-5 to Dutton Road

Projects Included in the No Build Alternative

April 2013

NORTH

Map Features

OR 62
City Limits
Urban Growth Boundary

RTP Project Timing

RTP Project Numbers Shown.
See Table 2-1 for Project Descriptions

Long-term
Medium-term
Short-term

Source: Jackson County GIS, RVMPO 2009 RTP

Miles
0 1 2

Oregon Department of Transportation

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Refinements to Alternatives Are Summarized

- NC: Mid-Currituck Bridge FEIS
- UT: West Davis Corridor DEIS

Techniques to note:
- FEIS summarizes refinements included in the Preferred Alternative, relative to the DEIS alternatives

2.1.2.5 *Preferred Alternative*

The Preferred Alternative is MCB4/C1 with Option A (see Figure 2-2) and primarily with reversing the center turn lane on US 158 between the Mid-Currituck Bridge interchange and NC 168 to reduce hurricane evacuation clearance times. The Preferred Alternative also includes several design refinements to help avoid and minimize impacts, in response to government agency and public input and comments. These refinements include:

- Provision of a median acceleration lane at Waterlily Road (see Figure 2-10). This safety feature would allow left turns to continue to be made at Waterlily Road and US 158. Bulb-outs for u-turning vehicles also would be provided at the re-aligned US 158/Aydlett Road intersection and the US 158/Worth Guard Road intersection to provide greater flexibility for local traffic in turning to and from existing side streets near the US 158/Mid-Currituck Bridge interchange.

- Reducing the amount of four-lane widening along NC 12 from that with MCB4/C1 from approximately 4 miles to approximately 2.1 miles, plus left turn lanes at two additional locations over approximately 0.5 mile. The 2.1 miles of NC 12 widening would be concentrated at three locations: the bridge terminus, the commercial area surrounding Albacore Street, and Currituck Clubhouse Drive.

- Constructing roundabouts on NC 12 instead of signalized intersections at the bridge terminus and Currituck Clubhouse Drive.

- Terminating the bridge in a roundabout at NC 12 also allowed the C1 bridge alignment to be adjusted to remove curves and thereby reduced its length across Currituck Sound by approximately 250 feet (from approximately 24,950 feet [4.7 miles] to 24,700 feet).

- Provision of marked pedestrian crossings along NC 12 where it would be widened. They would be placed at locations identified by Currituck County plans (Albacore Street, Orion's Way, and Currituck Clubhouse Drive are under consideration for inclusion in the next Currituck County thoroughfare plan), as well as at North Harbor View Drive and the bridge terminus (one across NC 12 and one across the bridge approach road).

Hurricane evacuation clearance time reduction features include:

- On the mainland, reversing the center turn lane on US 158 between the US 158/Mid-Currituck Bridge interchange and NC 168.

- On the Outer Banks, adding approximately 1,600 feet of new third outbound lane to the west of the NC 12/US 158 intersection to provide additional road capacity during a hurricane evacuation. The additional lane would start at the US 158/Cypress Knee Trail/Market Place Shopping Center intersection and end approximately 450 feet west of the Duck Woods Drive intersection, a total distance of approximately 1,600

Techniques to note:
- FEIS summarizes refinements included in the Preferred Alternative, relative to the DEIS alternatives

2.1.6 Refinement of the Alternatives Considered for Detailed Study in the EIS

This section describes how the alternatives advanced from the screening process to be considered for detailed study in the EIS were further refined. The main refinements included alignment shifts of Alternatives A and B, the inclusion of new and relocated trail facilities for both advanced alternatives, the addition of drainage facilities, accommodations for relocated utilities, the addition of park-and-ride lots, and other roadway considerations based on comments from stakeholders, the public, local government officials, and resource agencies.

2.1.6.1 Alignment Shifts

After the screening process, the alternatives considered for detailed study in the EIS were further refined based on existing environmental data as well as input from the public and resource agencies. The alignments were modified to minimize or avoid relocations or other development impacts and minimize or avoid impacts to Section 4(f) resources, cultural sites, wetlands, farmland, and wildlife habitat. These refinements were made between the fall of 2011 and the fall of 2012 and were posted to the project website for the public, agencies, and other stakeholders.

What is a relocation?

A relocation occurs when constructing an alternative would require purchasing an occupied structure, such as a home or business. The residents or business would need to relocate.

Because all of these changes reduced impacts to the natural and built environment, they did not change the results of the alternatives-screening process for any of the alternatives.

The following changes were made to the alignments between the fall of 2011 and the fall of 2012:

- Shift the Glovers Lane alignment north between Tippets Lane and 1325 West in Farmington. This change was made because the shifted Glovers Lane alignment would avoid one residential relocation and 6 acres of wetland impacts in this area.
- Shift the Glovers Lane alignment to the east by the Buffalo Ranch and Farmington Meadows subdivisions. This change was made because the shifted Glovers Lane alignment would avoid 3.1 acres of wetland impacts in this location.
- Refine and modify the Shepard Lane option interchange based on additional engineering work and comments from residents and from representatives of Oakridge Country Club. The refinements of the Shepard Lane option included a new slip ramp design for the Shepard Lane interchange. This change was made because the addition of a slip ramp replaced the U-turn design on Shepard Lane east of I-15. Replacing the U-turn with the slip ramp would minimize impacts to Oakridge County Club and neighborhoods on the east side of I-15 by Shepard Lane. The U-turn on Shepard Lane would have restricted access to the neighborhoods east of I-15 and Oakridge Country Club and would have acquired property from the Oakridge Country Club parking facilities.

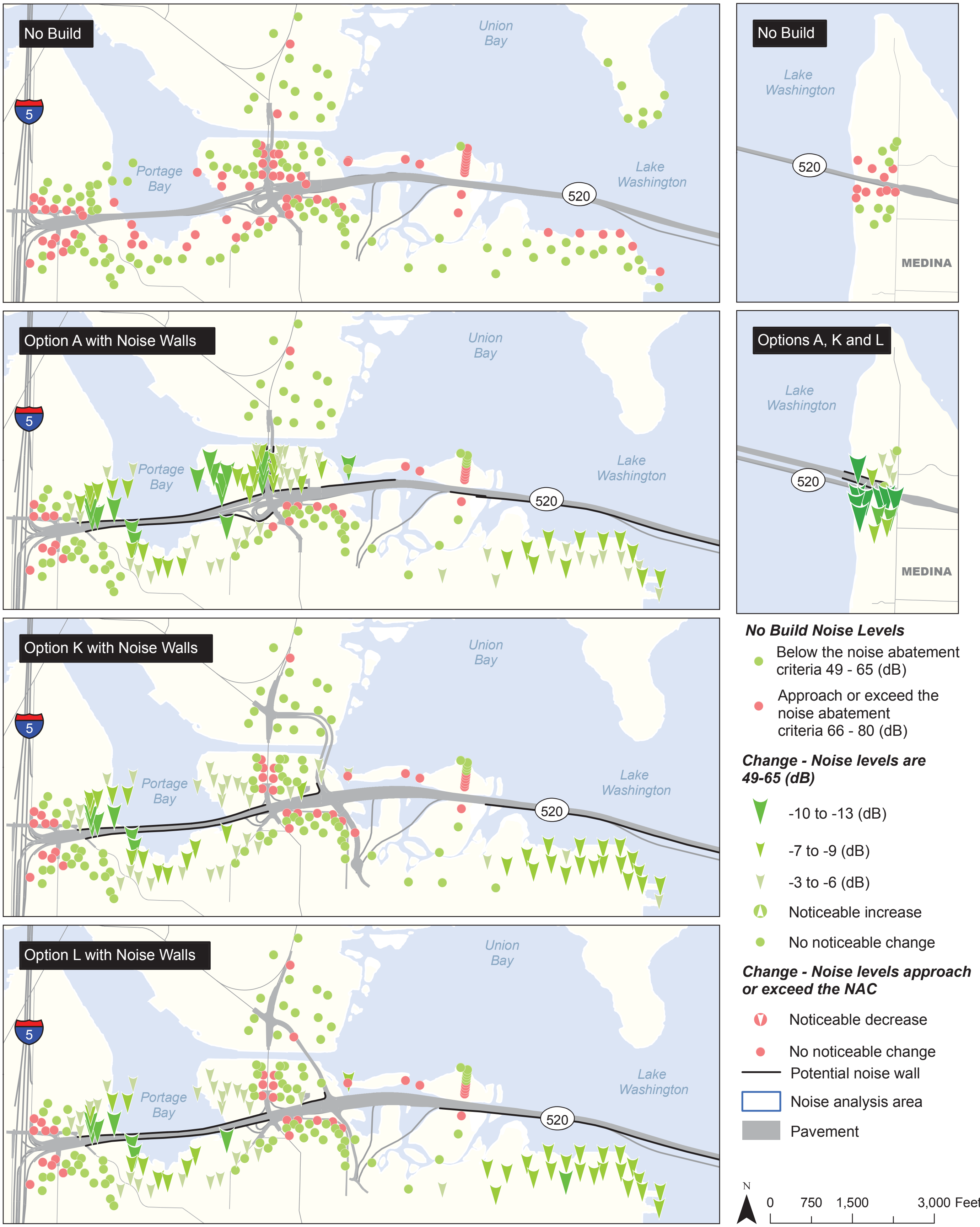
- Shift the Shepard Lane interchange connecting road from 50 East in Kaysville to Foxhunter Drive in Farmington to the west. This change was made because it would avoid one potential residential relocation on Foxhunter Drive and would minimize property impacts to other residential properties in the Hunters Creek subdivision.
- Shift the south side of the Kaysville 200 North interchange to the northeast to minimize impacts to properties owned by The Nature Conservancy.
- Shift the alignment of Alternatives A1, A2, A3, and A4 to the east between 1800 North (Davis County) and 5500 South (Weber County). This change was made because it would avoid two adverse impacts to historic properties [which are also Section 4(f) resources], would have 0.5 acre less of direct impacts to Agriculture Protection Areas, and would minimize indirect impacts to Agriculture Protection Areas.
- Shift the alignment of Alternatives B1 and B3 in West Point (4100 West option) to the east at 800 North in West Point. This change was made because it would avoid three residential relocations and one adverse impact to a historic property.
- Shift Alternatives B1, B2, B3, and B4 a small distance to the east of the Hooper Canal between 5900 South and 5500 South in Hooper. This change was made to minimize impacts to the Hooper Canal.
- Shift Alternatives A1, A2, A3, and A4 to the east of the Davis and Weber Canal property near 200 South in West Point. This change was made to minimize impacts to the Davis and Weber Canal properties and infrastructure.
- Shift Alternatives A2 and A4 to cross 5100 West farther south to avoid the new meetinghouse of the Church of Jesus Christ of Latter-day Saints at about 4950 South 5100 West in Hooper.

Side-by-Side Figures Used to Compare Alternatives

- WA: SR 520 FEIS

Techniques to note:
- figures are shown side-by-side to show similarities and differences among alternatives considered.

Exhibit 5.7-4. Noise Modeling Results for Receivers - Noise Walls (2030)



Note: No noise walls were evaluated for the Laurelhurst neighborhood because noise levels from SR 520 would remain below the NAC for the 6-Lane Alternative with the design options.

Exhibit 5.4-7. Permanent Acquisition in Washington Park Arboretum (Options K and L)

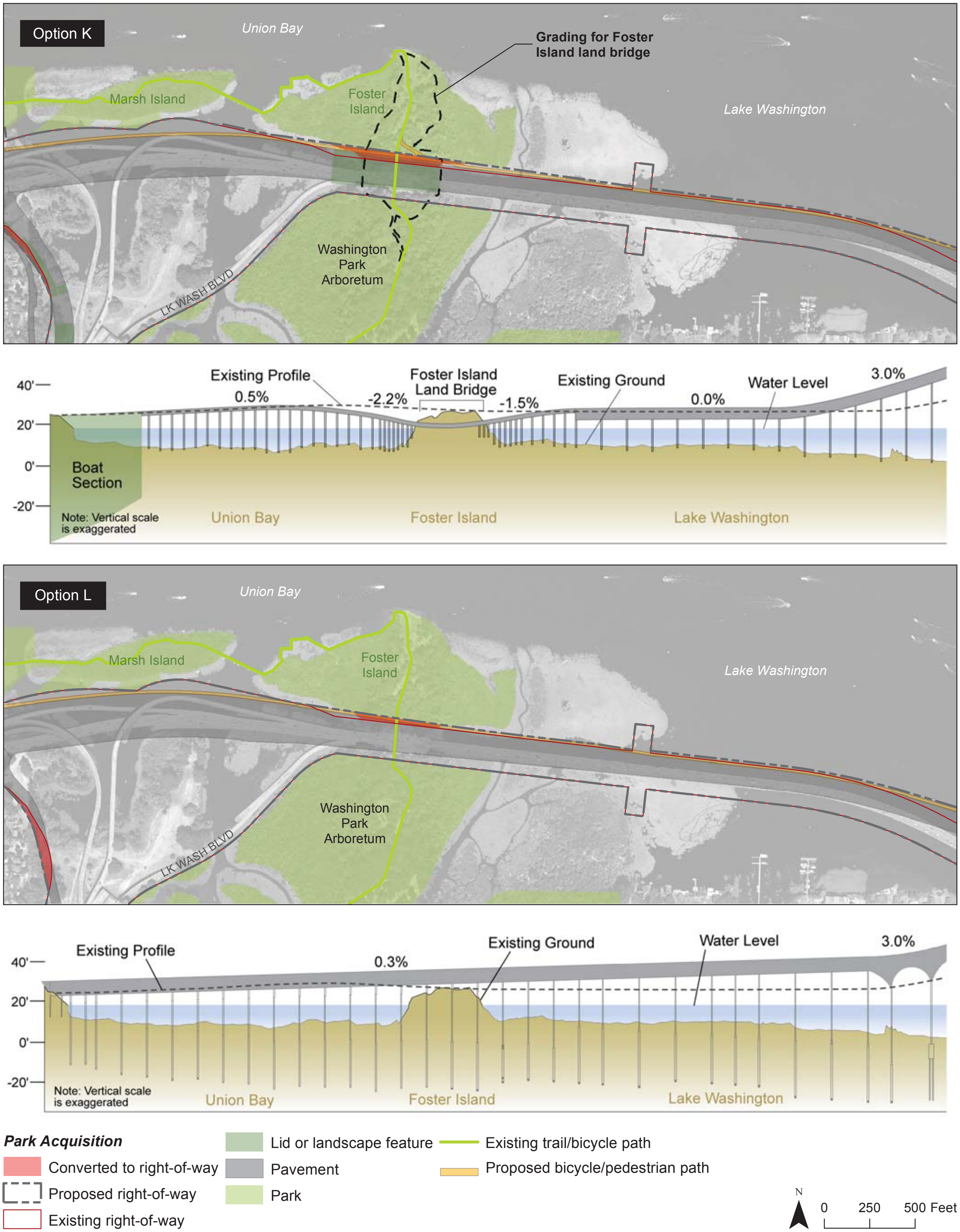
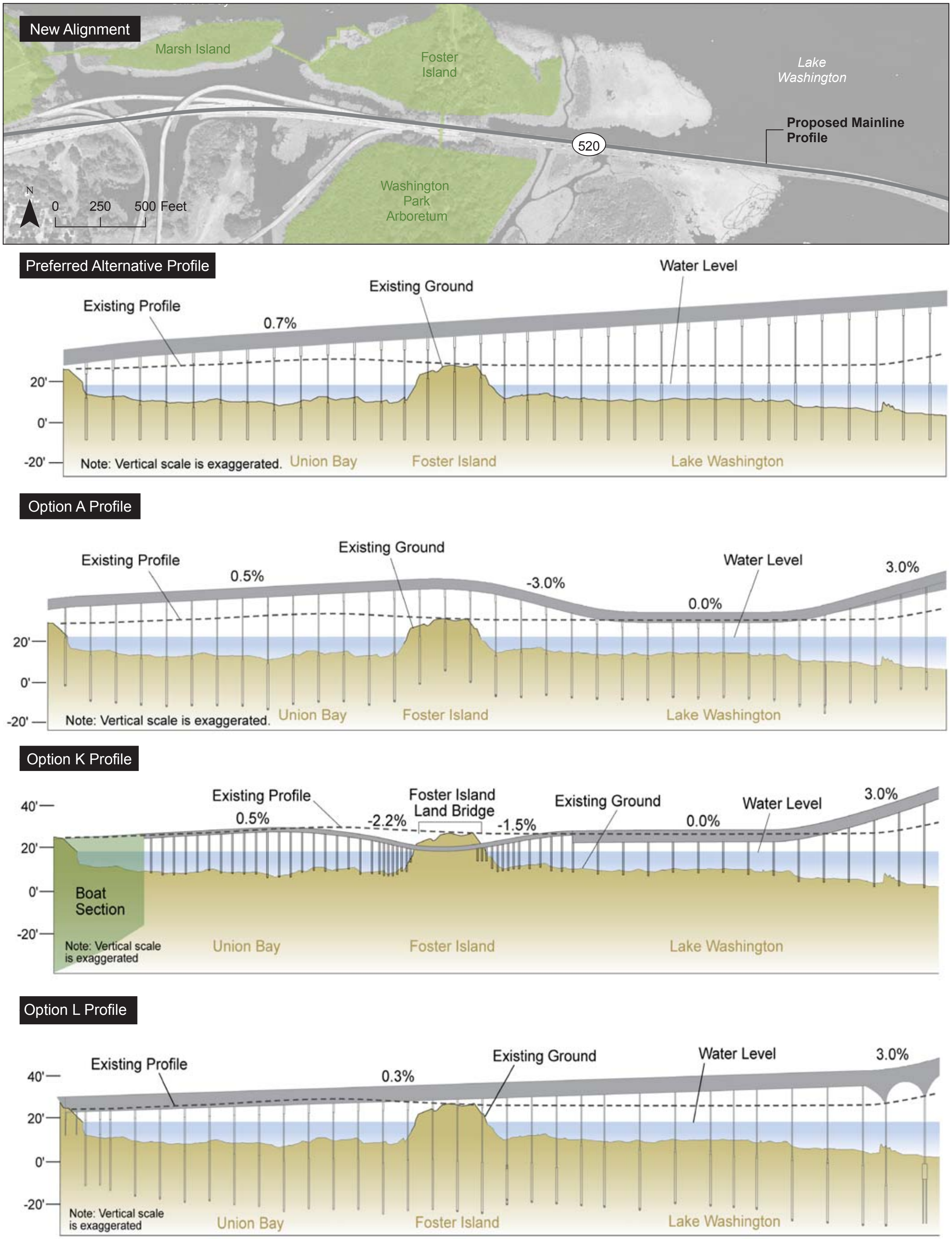


Exhibit 2-21. West Approach Profiles (Preferred Alternative and Options A, K, and L)



Documentation of Public and Agency Role in Developing Alts

- UT: West Davis Corridor DEIS

Techniques to note:
- alternatives chapter documents involvement of agencies and the public in developing the range of alternatives.

2.1.4.2 Public Involvement Activities

The following strategies were used to receive input on *Technical Memorandum 15: Alternatives Screening Report*:

- Notify stakeholder groups and the general public of the advanced alternatives.
- Hold three public open houses (February 8, 9, and 10, 2011).
- Develop two Resident Working Groups (meetings were held on June 21, 2011; September 12 and 13, 2011; December 6, 2011; and January 18, 2012).
- Give the resource agencies, stakeholders, and the public access to information about the development of alternatives.
- Provide feedback opportunities.
- Increase the public's awareness of the project.

The main methods for informing the public about the Level 2 alternatives were posting project materials on the project website, holding public open houses in February 2011, holding Resident Working Group meetings, and holding other meetings with the public or stakeholders on request. The public was invited to leave comments in writing, mail them in, or submit them through the project website. Copies of the *Alternatives Screening Report* were also made available on the project website. See Chapter 30, Public and Agency Consultation and Coordination, for a complete description of the activities and tools used to support these public involvement strategies.

2.1.4.3 Summary of Public Comments

The WDC Project received over 4,500 comments from the public, local government officials, and resource agencies after the draft *Alternatives Screening Report* was released in February 2011. Some of these comments addressed the range of preliminary project alternatives, options to consider during Level 1 and Level 2 screening, and resources to consider as part of the Level 2 screening criteria. *Technical Memorandum 15: Alternatives Screening Report*, Appendix A, Spring 2011 Public Involvement Summary, provides a summary of the comments received during this period.

After the release of the November 14, 2011, *Alternatives Screening Report*, the WDC team received comments from about 200 people. These comments included suggestions for new or modified alternatives, comments on the screening process and Level 2 screening criteria, and comments in support of or in opposition to WDC alternatives.

The suggestions for new or modified alternatives were primarily focused on the alignments in the Syracuse area and the Equestrian Estates area in Kaysville. Members of the public provided the WDC team with different interchange concepts to consider on Antelope Drive. Some comments requested that the WDC team reconsider mass transit alternatives instead of roadway alternatives.

Some comments on the screening process and Level 2 screening criteria requested that some resources (for example, community impacts or wetland impacts) be weighted more heavily than other resources. Many comments expressed concern about the WDC alternatives' impacts to residences, communities, farmland, air quality, noise, property values, wetlands, safety, and local streets. Many other comments expressed appreciation to the WDC team for providing information and meeting with interested or affected stakeholders. The WDC team also received many comments from farmers stating their opposition to alternatives that would affect farmland.

The majority of the comments the WDC team received in favor of, or in opposition to, an alignment were about the Shepard Lane option, the Glovers Lane option, or the WDC alignments in Syracuse.

The WDC team reviewed all public comment information for consideration in the alternatives-refinement process. The WDC team also attended numerous meetings with stakeholders between September 2011 and March 2012. The public comments and information provided by stakeholders in meetings resulted in the WDC team revising the alternatives during the alternatives-refinement process and guided the resource analyses in the EIS.

2.1.4.4 Summary of Agency Comments

In March 2011, the U.S. Environmental Protection Agency (EPA), the U.S. Army Corps of Engineers (USACE), and the U.S. Fish and Wildlife Service (USFWS) all provided comments on the February 2011 *Alternatives Screening Report*. The comments included requests for additional information, a new alternative from USFWS (see Section 3.5.2, Input from the Cooperating and Participating Agencies during the Level 1 Screening Process, in the *Alternatives Screening Report)*, questions about how practicability was considered per the Clean Water Act 404(b)(1) guidelines, questions about the wetlands data used in Level 2 screening, and questions about the assumptions used for evaluating impacts during Level 2 screening.

In addition to providing formal responses to the comments, the WDC team had ongoing coordination with the resource agencies listed above about the *Alternatives Screening Report* comments and the Clean Water Act practicability of WDC alternatives during the alternatives-screening process. The WDC team prepared a separate *Section 404(b)(1) Practicability Analysis* (West Davis Corridor Team 2012c) for the resource agencies and had many meetings with resource agency staff to address questions and comments about the Section 404(b)(1) process. The *Section 404(b)(1) Practicability Analysis* is summarized in Section 2.1.5, Consideration of Clean Water Act Section 404(b)(1) during Alternatives Development.

2.1.4.5 Comment Consideration

Comments received from resource agencies, city staff members, and the general public after Level 2 screening contributed to the further refinement of the eight Level 2 alternatives. Agencies helped identify wetlands that should be avoided as well as other natural resources and historic structures. Alternative alignments were adjusted to minimize impacts to resources identified by the resource agencies, the public, and local government officials.

The WDC team held many meetings with city staff members to identify interchange locations, drainage facilities, and other design elements for use in the conceptual design of the alternatives. Individual meetings with city staff were held as needed to resolve interchange functionality, prioritization of historic structures and public spaces [Section 4(f) properties], and treatment of cross streets. The design team addressed local plans and desires in the conceptual design where possible.

Public comments also played a role in developing and refining the alternatives. A number of comments suggested that the team take another look at an alignment on the 2001 *North Legacy Transportation Corridor Study* corridor in Syracuse and West Point. In response to these comments, the WDC team reconsidered different alignments on or near the 2001 *North Legacy Transportation Corridor Study* alignment in Syracuse. For more details, see Section 2.1.6.1, Alignment Shifts.

2.1.5 Consideration of Clean Water Act Section 404(b)(1) during Alternatives Development

Techniques to note:
- explains role of Section 404 (LEDPA) requirements in alternatives screening process

The Clean Water Act Section 404(b)(1) guidelines state that “no discharge of dredged or fill material [to Section 404–regulated waters] shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences” [Section 230.10(a)]. The guidelines also state that, for actions subject to NEPA for which USACE is the permitting agency, the analysis of alternatives required under NEPA will in most cases provide the information for the evaluation of alternatives considered under the Clean Water Act 404(b)(1) process.

Although USACE makes official determinations under the Clean Water Act, the WDC team considered the requirements of the Clean Water Act during the alternatives-development process. The WDC team produced an additional technical memorandum, *Section 404(b)(1) Practicability Analysis*, that provides more details about the practicability analysis that was conducted to address the Clean Water Act Section 404(b)(1) guidelines. Between October 2011 and November 2012, the WDC team coordinated extensively with the resource agencies on this evaluation as part of the screening process. Following a review of the *Section 404(b)(1) Practicability Analysis*, USACE and EPA concurred with the WDC team that no less environmentally damaging practicable alternatives were eliminated during the Level 2 screening process (see Appendix 2A, Alternatives Correspondence).

Chapter 13. Methodologies

In the interest of brevity and readability, it might seem logical to describe methodologies solely in appendices or elsewhere outside the NEPA document. But there are good reason to describe methodologies, at least briefly, within the main volume of the document.

- Describing the methodology can enhance the credibility of the NEPA document by helping the reader to see the careful, systematic process that was used to reach the results.

- Describing the methodology can be a useful a way to explain anomalies in the data. In some cases, the results may be misleading if the reader does not understand how they were developed.

- Describing the methodology can be a useful way to introduce technical terms or concepts that are important for the reader to understand – e.g., how noise levels are measured.

The following approaches can be used to discuss methodologies in the main body of the NEPA document, without adding excessive detail:

- *Include a methodology section just before the impacts analysis for each resource.* Many NEPA documents include a brief description of the relevant methodology just before the impacts analysis for each resource. For example, the methodology for noise analysis can be summarized at the beginning of the chapter or section that presents the noise impacts.

- *Explain methodologies in steps.* One effective way to describe a methodology is to list the steps in bullets or a table. Even a complex process is easier to understand if it is broken down into steps.

- *Prominently define important technical terms.* If a technical term is used, and is important to the analysis, the NEPA document should define it early and display the definition prominently (for example, in a text box).

- *Explain noteworthy changes in methodologies.* There are times in any NEPA process when a methodology changes, or new data becomes available, or there is some other change that alters the results of the previous analysis. When this happens , the credibility of the analysis is enhanced if the EIS acknowledges and explains the change.

- *Address any over-arching methodology issues at the beginning of the environmental consequences chapter.* The introduction to the environmental consequences chapter is a good place to address any over-arching issues regarding the methodology for impact assessment – for example, explaining the use of GIS mapping to calculate impacts.

Methodologies Briefly Explained

(with details in appendix)

- MD: Baltimore Red Line - Visual Impacts
- WA: SR 520 FEIS - Cumulative Impacts

Techniques to note:
- simple, step-by-step explanation of methodology used in impact assessment

[...]hich MTA may acquire real property through a negotiated purchase or through condemnation.

5.7 Visual and Aesthetic Resources

5.7.1 Introduction and Methodology

The approach for identifying and analyzing effects to visual and aesthetic resources for the Red Line project applies a modified version of the Federal Highway Administration (FHWA) Visual Impact Assessment for Highway Projects. The FHWA methodology provides seven main components, which are addressed as follows in this section. Additional details regarding methodology for assessment and potential effects are available in the *Visual and Aesthetic Resources Technical Report* (**Appendix D**).

1. Define Project Viewshed/Setting: The "project viewshed" generally encompasses the existing natural and manmade physical features that are located within 200 feet adjacent to the Preferred Alternative and up to 3 miles where longer-range views are possible. Five visual districts have been identified within the project viewshed to facilitate the assessment of visual and aesthetic conditions that may be affected from the introduction of the Preferred Alternative.

2. Determine Viewer Groups: Each visual district/sub-district was reviewed to identify the major groups of viewers who would be affected by the new visual elements of the project. Such groups might include residents; workers who are employed by businesses in the district; visitors who come to the district to access entertainment, cultural, educational, or other commercial venues in the district; and, transit riders, pedestrians, cyclists or motorists who travel through the district to locations within or outside of the district.

3. Identify Key Viewpoints and Views and Assess Visual Quality: The FHWA methodology calls for identifying very specific key viewpoints and coming up with a numerical assessment of "visual quality" based on three factors: "vividness," "intactness," and "unity," resulting in a numerical qualification of the relative value of the identified landscape. Given the diverse nature of the areas and communities through which the Preferred Alternative passes, it was determined that making a numerical judgment as to the quality of a particular visual environment would be inconsistent with the *Community Compact*. An alternative methodology was therefore applied in which both general and key views were identified and a neutral determination of the "compatibility" of the project components with the identified context was assigned.

4. Analyze Changes in Existing Visual Resources and Viewer Response: Visual change is a function of the ease of visibility of the project component and/or the amount the project component effects on existing view. Viewer response is subjective, and thus is best analyzed by applying presumed sensitivity ratings for particular identified viewer groups. In general, it is assumed that there is a direct relationship between the amount of exposure to the district by the viewer group and that group's sensitivity to changes. Similarly, it is also assumed that a viewer group's sensitivity rises with the amount that group identifies, or feels invented in, the district. Thus residents are perceived as having a higher sensitivity than workers, even if they might have a similar amount of exposure to the district.

5. Depict Visual Appearance with the Project: The Final Environmental Impact Statement (FEIS) and associated technical memoranda provide verbal descriptions and image visualizations of a range of physical components that comprise the project. These components will continue to be defined through Final Engineering, but are described to the level known at this time.
6. Assess the Project's Visual Impacts: The visual effect of the Preferred Alternative is assessed by weighing four factors: 1) the nature of the project components, 2) the context in which those components are placed, 3) the changes to the visual landscape and 4) the viewer's response to those changes.
7. Propose Methods to Mitigate Adverse Visual Impacts: A high level of visual impact does not necessarily imply that the visual effect is negative. Instead, the adverse nature of a visual effect must be determined through input from affected viewer groups, with regard to the positive or negative perception of a visual impact. Potential adverse visual impacts can be avoided decreasing the visibility of a design component or, making the component similar to existing context. Further identification of visual effects and appropriate mitigation would be defined in conjunction with community involvement through the Final Design.

Based on the criteria described above, general visual effects were assigned a rating of low, medium, or high as dependent on these factors: the nature of a project component, contextual compatibility between the visual component and its surroundings, changes to the visual landscape as a result of the visual component, and viewer sensitivity. A more detailed discussion of how the general visual effects ratings were assigned follows.

a. Nature of the Project Component

The nature of the project component refers to the design, size, and type of the project element. **Table 5-14** summarizes the types of project components that comprise the Preferred Alternative. Also identified is the anticipated level of effect that would result from the introduction of the component into the project viewshed. The project components are more fully described in **Chapter 2, Section 2.4.2** of this FEIS. The level of general visual effect reflects the visibility of a component absent from context, location, or exposure to a specific viewing group. Therefore, the level is a reflection of the components design, size, and type.

Table 5-14: Red Line Project Components

Component	General Visual Effect
1. Overhead Catenary System (OCS)	Medium to High
2. LRT Tracks	
-Ballasted	Medium to High
-Direct Fixation	Medium
-Embedded	Low
-Green Track	Low
3. Transitway	
-Aerial	High
-At Grade	Medium
-Underground	Low

Techniques to note:
- simple, step-by-step explanation of methodology used in impact assessment

7.2 Why are cumulative effects considered in an EIS?

Federal regulations (40 CFR 1502.16, 1508.7, 1508.8) require that cumulative effects be considered in an EIS because they inform the public and decision-makers about possible unintended consequences of a project that are not always revealed by examining direct effects alone. This information places the proposed action in context with other development and transportation improvement projects planned throughout a region, and provides a brief assessment of each resource's present condition and how it is likely to change in the future as a result of the cumulative effect.

7.3 How did WSDOT assess cumulative effects?

To identify and evaluate likely cumulative effects and the extent to which the project would contribute to them, WSDOT first reviewed the general guidance in Section 412 of the *Environmental Procedures Manual* (WSDOT 2009j) and in FHWA Technical Advisory T 6640.8A (FHWA 1987). Next, it followed the eight-step procedure set forth in *Guidance on Preparing Cumulative Impact Analyses* (WSDOT et al. 2008), shown in Table 7-1.

Table 7-1. WSDOT's Approach for Assessing Cumulative Effects

Step	Approach
1	Identify resources to consider
2	Define the study area for each resource
3	Describe current status/viability and historical context for each resource
4	Identify direct and indirect project effects that might contribute to a cumulative effect
5	Identify other current and reasonable foreseeable actions
6	Identify and assess cumulative effects
7	Document the results
8	Assess the need for mitigation

Source: WSDOT et al. 2008.

WSDOT conducted cumulative effects assessments for the same resources for which direct and indirect effects assessments were conducted (discussed in Chapters 5 and 6). WSDOT made two general assumptions in following the guidance: first, in most cases it considered construction-related effects to be short-term, with the effect ending at the same time as the construction activity causing it. Secondly, operational effects of the project were considered to be long-term and permanent through the project design year, 2030.

Unusual/Complex Methodology Issues Are Explained

(e.g., where the appropriate methodology was uncertain)

- MD: Red Line FEIS - use of thresholds in EJ analysis
- UT: West Davis Corridor FEIS - effects of noise on wildlife
- UT: West Davis Corridor FEIS - waters of the U.S.
- UT: West Davis Corridor FEIS - environmental justice

Techniques to note:
- explanation of methodology specifically describes and explains assumptions that are important to the analysis (in this case, how "low-income" areas were defined)

s, such as diesel particulate filters, for up to 80 percent
ipment

rting excavated materials or other loose materials

uel for diesel equipment

- For areas identified with moderate or severe impacts for noise during LRT operations, MTA will identify mitigation measures where practicable and reasonable during final design
- For areas identified with the potential for vibration impacts during LRT operations, MTA will identify mitigation measures that are both feasible and reasonable during final design
- MTA will provide noise and vibration control measures during construction whenever feasible and reasonable in accordance with applicable local and MDE noise ordinances. Such measures could include the following:
    - Construction methods that avoid pile-driving at locations containing noise- and vibration-sensitive receptors, such as residences, schools, and hospitals. Whenever possible, cast in place drilled hole (CIDH) or drilled piles rather than impact pile drivers will be used to reduce excessive noise and vibration
    - Development and implementation of a vibration monitoring program during construction.
    - Where practical, erect temporary noise barriers between noisy construction activities and noise-sensitive receptors.
    - Locate construction equipment and material staging areas away from sensitive receptors, where applicable.
    - Use best available control technologies to limit excessive noise and vibration when working near residences.
    - Notify the public of construction operations and schedules. Methods such as construction-alert publications or a Noise Complaint Hotline could be used to handle complaints quickly.

5.4 Environmental Justice

5.4.1 Introduction and Methodology

Executive Order 12898 – *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations* requires all Federal agencies to "develop an agency-wide environmental justice strategy that identifies and addresses disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." The United States Department of Transportation (USDOT) and the Federal Transit Administration (FTA) policies on environmental justice are included in USDOT Order 5610.2(a), *Final DOT Environmental Justice Order* (USDOT 2012) and in FTA Circular 4703.1, *Environmental Justice Policy Guidance for Federal Transit Administration Recipients* (FTA 2012).

The strategies developed under Executive Order 12898 and the USDOT and FTA policies on environmental justice are intended to ensure that there is no discrimination based on race, color, or national origin; that communities are provided the opportunity to provide input on the planning and design of a project, as well as potential effects and mitigation measures; and that any disproportionately high and adverse effects on minority or low-income populations are appropriately addressed.

The environmental justice (EJ) analysis in this chapter describes the potential human health and environmental effects on minority and low-income neighborhoods that would result from the construction and operation of the Preferred Alternative, and evaluates whether those effects would be disproportionately high and adverse.

a. Definitions of "Minority" and "Low-Income"

Executive Order 12898, itself does not define the terms "minority" or "low-income," but these terms have been defined in the USDOT and FTA orders on environmental justice. The USDOT and FTA Orders provide the following definitions, which have been used in this analysis:

- Minority Individual – The US Census Bureau classifies a minority individual as belonging to one of the following groups: American Indian or Alaskan Native, Asian American, Native Hawaiian or Other Pacific Islander, Black (not of Hispanic Origin), and Hispanic or Latino.
- Minority Populations – Any readily identifiable groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who would be similarly affected by a proposed FTA program, policy, or activity.
- Low-Income Individual – A person whose household income is at or below the US Department of Health and Human Services poverty guidelines.
- Low-Income Population – Any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who would be similarly affected by a proposed DOT program, policy, or activity.

b. Identifying Minority and Low-Income Populations in the Project Study Area

As a tool for evaluating the proportionality of impacts and benefits, this analysis identifies "EJ areas" and "non-EJ areas" within the project study corridor. An "EJ area" was defined to include any census tract in which the minority or low-income population meets either of the following thresholds:

a) the minority or low-income population in the census tract exceeds 50 percent, or

b) the percentage of a minority or low-income population in the affected area is "meaningfully greater" than the percentage of minority population in the general population.

For this study, "meaningfully greater" was defined to mean a census tract in which the percentage of minority or low-income residents was at least 10 percentage points more than the corresponding percentage in the surrounding jurisdiction (Baltimore City or Baltimore County) within the project study corridor.

The use of thresholds for identifying EJ areas was based on the Council on Environmental Quality (CEQ) guidance document, *Environmental Justice Guidance under the National Environmental Policy Act* (NEPA) (CEQ 1997). This approach was used in the Alternatives Analysis/Draft Environmental Impact Statement (AA/DEIS), which identified EJ and non-EJ areas bases on the criteria described above. On August 15, 2012, FTA issued Circular 4703.1, which does not adopt the CEQ's approach and instead calls for EJ analyses to include "reasonable efforts to identify the presence of distinct minority and/or low-income communities residing both within, and in close proximity to, the proposed project, or activity." The guidance also cautions that "While the minority or low-income population in an area may be small, this does not eliminate the possibility of a disproportionately high and adverse effect of a proposed action."

For consistency with the approach used in the AA/DEIS, this Final Environmental Impact Statement (FEIS) continues to identify EJ areas based on a threshold approach. In accordance with Circular 4703.1, this FEIS also considers the potential for EJ populations outside areas identified as "EJ areas."

c. Data Sources

- *Minority Populations*. The US Census 2010 tract level data provided the basis for establishing the location of minority populations in the project study corridor.
- *Low-Income Populations*. Income data was obtained from the American Community Survey (ACS) 2010 5-year estimate at the census tract level.
- Other data sources that were used to confirm the location of minority and low-income populations included information and data from the National Center for Educational Statistics (NCES), government assisted housing programs, historical references, City and County officials, field visits, community meetings and interviews and a review of revitalization efforts within the project study corridor.

5.4.2 Existing Conditions

The project study corridor for the Preferred Alternative includes all or parts of 55 census tracts (47 in Baltimore City and 8 in Baltimore County). The total population in the project study corridor is 162,287 persons, with 117,500 of these persons (72.4 percent) identifying themselves as minorities and 33,798 persons (20.8 percent) meeting the definition of low-income. **Figure 5-4** presents the EJ areas and non-EJ areas within the project study corridor, and also illustrates the 1,000 foot potential impact area beyond the project's limit of disturbance. The impact area was used in the analysis to estimate impacts that extend beyond the limit of disturbance.

Table 5-4 presents a summary of population data including the percentages for minority and low-income persons. The census data revealed that the project study corridor census tracts located within Baltimore County contained a percentage of minority persons (15.5 percent)

WEST DAVIS CORRIDOR

Techniques to note:
- explains what is and it not known regarding a topic that is the subject of ongoing research, and for which there is no established methodology for assessing a highway project's impacts

14.4.3.3 Wildlife Noise Impacts

Overview of Noise Impacts

The effect of construction and traffic noise on wildlife has been an ongoing topic of research in the transportation industry. In the last decade, several studies have been published on the effects of human-induced noise on wildlife, though no conclusive distance of effect from roads has been determined. Few noise studies have been conducted for invertebrates, reptiles, or amphibians, but more studies have been conducted for fish, birds, and mammals. For birds, noise can have a substantial effect; however, the results are not consistent or universal. Some species are adversely affected, many are unaffected, and others become more common near interstate highways (Peris and Pescador 2004; Kaseloo 2005; FHWA 2007; Parris and Schneider 2009).

Possibly the greatest effect of noise on wildlife is its interference with communication if traffic noise is in the same decibel range as the audible communication range for a species. Birds use vocal signals to communicate information on many aspects of their status and behavior that are important for survival, social cohesion, and reproductive success. Songs and calls function to identify the caller’s species, sex, age (experienced adult versus juvenile), territorial status, and motivational state (such as aggressive or submissive); to attract mates and repel rivals; to stimulate egg laying and synchronize hatching; to strengthen pair bonds; to signal changes in domestic duties; to entice young to eat; to warn of predators; to maintain flock cohesion; and to incite group mobbing action against intruders (FHWA 2007; Dooling and Popper 2007). Therefore, the life history period during which most species would be most sensitive to added noise from the WDC is the reproductive period, which is generally in the spring through mid-summer for most species.

Many species have complex vocal repertoires of songs and calls that can vary subtly in many ways, including frequency and timing of use, intensity (amplitude variation), and syntax (order of signal presentation). Clear transmission and reception of these signals and the subtleties of their variation are critical for maintaining the normal biological and ecological function of each species. Other noise effects include stress and damage to hearing (Dooling and Popper 2007).

Impacts from increases in noise levels could also cause an overall reduction in functional habitat area, reduce connectivity between habitats, and introduce barriers to dispersal for some species (Forman and others 2003). The reduced habitat size could decrease the habitat resources available to wildlife, which in turn would reduce the local carrying capacity (Seiler 2001; Torres and others 2011). These changes could reduce the ecological buffering capacity of the habitat areas and thus affect wildlife. These effects would be greater in previously undisturbed native habitats than in either urban or disturbed partially native habitats where species that are able to thrive in such places have presumably adapted to the increased levels of noise and other disturbances.

Highway noise typically is neither loud nor startling enough to cause marked stress effects on wildlife (Sarigul-Kligin and others 1977). However, highway noise can mask important vocal communication and natural sounds important for mate attraction, social cohesion, predator avoidance, prey detection, navigation, and other basic behaviors. Using birds as an example for explaining how noise created from highways can affect a wildlife species, vocal communications can be masked when highway noise interferes with the transmission of a sound by drowning out the sound or parts of the sound (for example, the low-amplitude elements of a bird song) or by degrading the sound to a point where it is no longer recognizable to other members of a species (Dooling and Popper 2007).

What is masking?

Masking is the direct interference of sound with effective communications between organisms.

Depending on the degree of masking and the particular species' capacity to adapt (for example, by singing louder), sound masking could cause a species to abandon an area or could reduce the species' ability to reproduce and survive (Halfwerk and others 2011). Sound masking could also prevent males from attracting mates or repelling territorial rivals. Additional energy could be required for a male bird to maintain a territory and to sing louder or alter the frequency of its song (Patricelli and Blickley 2006; Parris and Schneider 2009). Predator warning signals and parent-offspring signals can be impaired. All of these factors could reduce the survival and reproductive success of affected populations adjacent to the highway.

Not all bird species are affected the same way by noise. These masking effects are highly species-specific and depend largely on the unique bioacoustic characteristics of each species' vocal signals. Some species might be more tolerant of increased noise or might be able to adapt their communications by modifying the pitch or speed of their song (Slabbekoorn and den Boer-Visser 2006; Leonard and Horn 2008; Summers and others 2011). The distance at which a species could be affected by noise can extend from less than 125 feet to much greater than 3,500 feet from the highway (Benitez-Lopez and others 2010).

Noise effects might not apply equally to other groups, such as reptiles and amphibians, because of differences such as calling at night instead of the daytime (Herrera-Montes and Aide 2011). In addition, the effects of roads on reptiles and amphibians appear to be local and likely due to highway-related deaths or creating a barrier to movement. Mammals (particularly large species) might avoid highway noise, but other road effects are likely involved (Fahrig and Rytwinski 2009; Benitez-Lopez and others 2010). However, there is evidence for smaller mammal species that noise might be less important than the additional habitat and corridors for movement that could be provided by roads (FHWA 2007).

Legacy Parkway Avian Study

The Legacy Avian Noise Research Program was designed to assess the impacts of highway noise on breeding bird communities in the Great Salt Lake ecosystem in an area that is similar to the WDC study area. This section discusses the findings of the final report that summarizes and provides conclusions based on 4 years of data collection (2007–2010) (Bio-West 2011). The effects of highway noise on breeding bird communities were assessed at nine study sites throughout the Great Salt Lake ecosystem by measuring effects of noise on (1) the abundance, diversity, and richness of breeding bird communities and (2) the nesting success of two abundant and widespread semicolonially nesting shorebirds: the American

Techniques to note:
- explains how an existing methodology was adapted for this study, with input from regulatory agencies

The WDC team analyzed the effect of each alternative on the non-inundated habitat that would remain with the high and intermediate lake levels specified above. For each alternative, the analysis summarized, by habitat quality, the acres of directly affected wildlife habitat and the percent of the total non-inundated wildlife habitat for each of the lake levels that these direct impacts would represent.

14.4.1.2 Methodology for Identifying Impacts to Wetlands and Waters of the U.S.

The Clean Water Act mandates an evaluation to determine a proposed project's least environmentally damaging practicable alternative; USACE uses this determination when deciding whether to issue a Clean Water Act Section 404 permit. This mandate was considered when assessing impacts to wetlands and other waters of the U.S.

What is a Section 404 individual permit?

Section 404 of the Clean Water Act regulates the discharge of dredged, excavated, or fill material in waters of the U.S. USACE is the federal agency authorized to issue Section 404 permits for certain activities conducted in wetlands or waters of the U.S. An individual permit is required for activities that would potentially affect jurisdictional wetlands that exceed 0.5 acre or 300 linear feet of stream.

Assessment of wetland quality, in terms of functions and values, was also conducted using a methodology developed by the WDC team with cooperation from agencies such as USACE, EPA, and USFWS (HDR 2010b). In consultation with the resource agencies, the WDC team developed a streamlined version of the UDOT Functional Assessment (UDOT 2006) to characterize wetlands affected by the WDC so that this EIS could compare the quality of wetlands affected by the project alternatives.

Note that the GIS data layer describing wetlands and waters of the U.S. that was used for the direct and indirect wetland and waters of the U.S. analyses has not been approved by USACE and is not a formal wetland delineation. USACE and the WDC team agreed that a formal wetland delineation report would be submitted for the selected alternative and would be submitted with the Clean Water Act Section 404 permit application.

Direct Impacts within the Right-of-Way

Impacts to wetlands and other waters of the U.S. from the project alternatives were calculated and assessed using the wetland and water feature data. A GIS analysis, which overlaid each alternative's footprint on the wetlands and waters data, was performed to calculate the acreage of directly affected wetlands and waters. The directly affected wetlands were classified by quality and type for each alternative. Linear feet of all linear waters (not ponds and lakes) were also calculated by overlaying the alternative's footprint onto the water feature layer and then measuring the linear feet of each feature that would be affected by the WDC alternative.

Techniques to note:
- justifies an important assumption used in the impacts analysis (in this case, why a 300-foot buffer was used when assessing wetland impacts)

Impacts within 300 Feet of the Right-of-Way

Potential impacts to wetlands and other waters of the U.S. adjacent to the project alternatives were calculated and assessed using a 300-foot buffer from the right-of-way on each side (West Davis Corridor Team 2012a). Studies have shown that buffers between roadways and other human uses can limit the water quality disturbance to wetlands from silt, urban contaminants, and nutrients. A study conducted by USACE (Lin 2006) found that buffers between about 100 and 200 feet effectively protect water resources, and buffers of about 100 feet provide adequate protection of 77% of wetland-dependent species.

The study *Functional Assessment of the Great Salt Lake Ecosystems Slopes and Depressional Wetlands* (Keate 2005) used 300 feet as the area potentially affected by runoff from adjacent land uses. The study recommends using a 300-foot perimeter around a wetland to assess impacts from adjacent land uses for non-wildlife-related impacts. Another study (Miller 1997) concluded that buffers less than 15 to 30 feet provide little protection for aquatic resources. Buffers should be a minimum of 45 to 90 feet under most conditions. The lower range (45 feet) is necessary for maintaining physical and chemical protection, while the upper range (90 feet) is a minimum for protecting biological components.

Based on the literature cited above, most water quality effects (from silt, nutrients, and urban-related contaminants) and hydrology effects to wetlands occur within 300 feet of the source of the impact (in the case of the WDC, the source would be the paved roadway). Therefore, for the EIS analysis, the WDC team used 300 feet from the edge of the right-of-way, which provides a total distance of about 350 feet from the edge of the roadway pavement. However, stormwater from the WDC would be detained and would not flow into adjacent wetlands, so the water quality of the wetlands would likely not be affected.

For each alternative, the acreage of wetland and water features within the 300-foot buffer was calculated and classified by quality and type. Note that the 300-foot buffer represents only an area of potential indirect effects to wetland water quality. A full assessment of indirect impacts to wetlands adjacent to the right-of-way would be completed as part of the Clean Water Act Section 404 permitting process after wetland delineations have been completed and verified by USACE for the selected alternative.

14.4.2 No-Action Alternative

With the No-Action Alternative, the WDC would not be constructed. No direct impacts to ecosystem resources would occur from WDC-related activities. Other transportation projects identified in the Wasatch Front Regional Council's (WFRC) Regional Transportation Plan and by local communities would be constructed. These projects, along with other future projects, could affect ecosystem resources in the future.

As development continues on the west side of Davis and Weber Counties, previously undeveloped land—mostly consisting of farmland and pasture land that provides some wildlife habitat—would be lost. The Utah Governor's Office of Planning and Budget has projected that there could be 66,000 acres of new development between 2005 and 2040, most of which would occur on farmland and pasture land (GOPB 2008). The No-Action

Techniques to note:
- explains why the methodology did not follow recommendations in guidance (in this case, CEQ's recommendation to use census data)

6.3 Affected Environment

6.3.1 Methodology

The WDC team defined minority and low-income people and identified specific environmental justice populations, communities, and individual residences using the following methods:

- Examining the 2010 U.S. Census data for minority populations
- Examining the U.S. Census Bureau's American Community Survey for low-income populations (U.S Census Bureau 2012).
- Examining student data from local schools
- Holding meetings with local city and county officials
- Holding meetings with and gathering data from the area's housing authorities, including data about Section 8 housing
- Interviewing low-income and minority community and social service providers and minority chambers of commerce
- Holding meetings with Departments of Community and Economic Development and the Utah Housing Corporation (which provides loan assistance)
- Analyzing data using geographic information systems (GIS) software
- Performing fieldwork

Even though CEQ specifically recommends using census data, these data have some limitations as a basis for identifying minority and low-income populations (which are also referred to as *communities* in this EIS) and therefore can be misleading. For example, large census tracts in rural or relatively unpopulated areas do not identify the specific locations of low-income and minority populations or individuals.

What are census tracts and block groups?

Census data are reported by geographical areas called *census tracts* and smaller areas within the census tracts called *block groups*.

Since the WDC study area does have large, sparsely populated census tracts, other methods suggested by CEQ were also used to identify minority and low-income populations in addition to census data. A summary of the census data regarding minority and low-income communities is shown in Figure 6-1, Distribution of Minority Population by Census Block; Figure 6-2, Distribution of Hispanic or Latino Population by Census Block; and Figure 6-3, Distribution of Poverty Population by Census Tract, in Volume IV.

Furthermore, both Weber and Davis Counties as a whole have low average percentages of minority and low-income populations (see Section 6.3.3, Environmental Justice Populations). If an area has a slightly higher percentage of minority or low-income populations than the county average (for example, 11% compared to a county average of 10%), this might not mean that there is a high concentration of environmental justice populations, only that the area's average is above the county average. Since FHWA recommends against using specific thresholds to determine the presence of environmental justice populations, this EIS considers the context of the area (such as the presence of low-income housing, ethno-centric facilities, and other factors) as well as demographic statistics to identify environmental justice populations.

To refine the census data, the WDC team contacted organizations including minority community representatives and service providers, low-income service providers, and city economic and community planners (West Davis Corridor Team 2011). The team then consolidated the information that was obtained and plotted it on a map of the impact analysis area. This map was analyzed to determine the number and location of environmental justice populations.

Census data for minority populations in the impact analysis area are shown in Figure 6-1, Distribution of Minority Population by Census Block, and Figure 6-2, Distribution of Hispanic or Latino Population by Census Block, in Volume IV. Census data for low-income populations are shown in Figure 6-3, Distribution of Poverty Population by Census Tract, in Volume IV. Information that was identified through direct contact with government and community entities or site visits is also shown on the figures and is included in the *Environmental Justice Technical Memorandum* (West Davis Corridor Team 2011).

6.3.2 Public Outreach

A primary goal of environmental justice is to reach low-income and minority populations that have historically not been able to participate in the transportation decision-making process as readily as other groups (see Chapter 30, Public and Agency Consultation and Coordination). The WDC team made specific efforts to contact all people living in the study area, including any low-income or minority populations.

The information gathered from the outreach was used to identify the environmental justice populations and service providers discussed in this chapter. The purpose of the outreach for the WDC Project was not only to identify low-income and minority populations but also to identify community service providers, recreational facilities, schools, and other areas or facilities that could be used by these populations and that could be affected by the WDC.

The area near the project alternatives consists of single-family residences with no apartment complexes. Overall, the home ownership rate within the cities in the impact analysis area is about 86%, although this number could be higher in the impact analysis area, since some cities extend to areas east of Interstate 15 (I-15), outside of the study area, where many of the apartment units are located near I-15. For comparison, Davis and Weber Counties had home ownership rates of 78% and 73%, respectively. Given the high home-ownership rate in the impact analysis area, direct mailers were used as one of many ways to inform residents.

Changes in Methodology Are Summarized

- OR: OR 62 FEIS - change based on USFWS comment

Techniques to note:
- explains noteworthy changes in methodology that were made during the course of the NEPA process.

DI Alternative

Aquatic Species and Habitat

The DI Alternative would have many of the same indirect impacts as the SD Alternative, but some key differences exist:

- **Habitat access and fish passage barriers -** The DI Alternative would not cross Bear Creek. However, for all other API streams, the DI Alternative would construct the same number of new and replacement stream crossings as the SD Alternative (Table 3.13-4). All new and replacement stream crossings would be constructed to be fish passable.
- **Loss of Riparian Habitat –** The DI Alternative would not remove any Bear Creek riparian habitat. It would remove the same amount of riparian habitat as the SD Alternative for all other API streams.
- **Water quality impairment –** Water quality impairment impacts are quantified by impervious surface acreage. The DI Alternative would create 12.5 acres of net new impervious surface within the Bear Creek watershed (1.6 acres less than the SD Alternative) and approximately the same (within 0.1 acre) of net new impervious surface within all other API stream watersheds.
- **Stream Flow Modification –** Impacts on fish from stream flow modification are quantified by impervious surface acreage, which is quantified above for the DI Alternative.
- **Predator-prey interactions –** Impacts on predator-prey interactions are quantified by number of stream crossings, net new impervious surface acreage, and riparian habitat removal, which are all quantified above for the DI Alternative.

Terrestrial Wildlife Species and Habitat

The DI Alternative would have similar indirect impacts on vernal pools. It would indirectly impact 0.1 acre more than the SD Alternative. The DI Alternative would impact the same amount of vernal pool fairy shrimp designated critical habitat as the SD Alternative (19.8 acres). Figure 3.13-2 shows the differences in impacts between the SD and DI Alternative. Figure 3.13-3 shows the differences in indirect impacts between design options. Figure 3.13-4 shows indirect impacts in the northern portion of the project, where the build alternatives are identical and there are no design options.

The methodology used to calculate indirect impacts to vernal pool fairy shrimp designated critical habitat was modified by the USFWS in March 2013. The revised method was employed to refine impact numbers reported in the 2011 Biological Assessment submitted by FHWA to USFWS. The original methodology for calculating indirect impacts to critical habitat looked only at areas where the project boundaries overlapped the critical habitat polygons. Under the revised methodology, indirect impacts are considered only for impacts where the 250-foot project buffer overlaps delineated vernal pool complexes (delineated vernal pool basin plus the 100-foot upland buffer) that occur within critical habitat polygons. Consequently, the impact values have decreased from those reported in the DEIS. Under the revised assessment methodology, there are no anticipated indirect impacts to vernal pool fairy shrimp critical habitat from the preferred alternative. Table 3.13-5 includes the revised acreage impacts associated with the Preferred Alternative.

Plant Species and Habitat

The DI Alternative would have the same indirect impacts on Cook's lomatium and large-flowered woolly meadowfoam designated critical habitat as the SD Alternative.

The methodology used to calculate indirect impacts to critical habitat for Cook's lomatium and large-flowered woolly meadowfoam was modified by the USFWS in March 2013. Under the revised assessment methodology, indirect impacts to Cook's lomatium critical habitat decreased by 6.6 acres, to a total of 4.7 acres. Indirect impacts to large-flowered woolly meadowfoam critical habitat decreased by 28.5 acres, to a total of 0.3 acre. Impacts to individuals of the species have not changed from those reported in the DEIS. Table 3.13-5 includes the revised acreage impacts associated with the Preferred Alternative.

Cross-Cutting Issues Are Explained Early in Effects Chapter

(e.g., methodology for impacts analysis in tiered EIS)

- CO: I-70 - tiered approach
- IN: I-69 - tiered approach

Techniques to note:
- impacts chapter begins with explanation of overall approach to impact assessment

What is the general methodology for the natural and human environment resource evaluations?

The Project Leadership Team and Issue Task Force processes identified the main natural and human environment resource issues. **Chapter 6, Public and Agency Involvement** provides more information on the following:

- Resource agency input,
- Workshops with jurisdictions and special interest groups,
- Public comment, and
- Data sources.

Resource and built environment specialists collected data through the use of geographic information systems, public databases, published resources, and fieldwork.

The natural and human environment resource subsections describe more specific methodologies. Techniques for assessing impacts of the alternatives at the Tier 1 level of analysis include geographic information systems resource mapping overlaid with the project footprint, alternative design interpretation, and modeling. The project footprint includes the physical conceptual footprint of the alternatives, plus an additional 30 feet on each side. The 30 feet includes a 15-foot construction disturbance zone and an additional 15-foot sensitivity zone. Alternative designs at Tier 1 are conceptual and provide detail appropriate for a first tier assessment to assess the types of impacts that could occur and compare Action Alternatives and their relative impacts. While this level of detail is adequate to make the decisions of general location, mode, and capacity at the Tier 1 level, specific locations and design decisions will be refined during Tier 2 processes. At that time alignments and alternatives and their corresponding impacts will be evaluated.

How did the lead agencies collect and update data for environmental analyses?

This project started in 2000. Some of the initial data collection to characterize the Corridor's affected environment occurred early in the study process – between 2001 and 2004 – and has not been updated. As time progressed, the lead agencies evaluated changes in the Corridor (such as development, land use, wetlands, biological resources, water quality, air quality, and visitation trends), and broader factors (such as economic conditions, gasoline prices and oil supply, and regulatory trends), to determine if these data remain representative of the Corridor conditions and provide a reasonable baseline to compare environmental impacts of the Action Alternatives. The lead agencies identified resources that might be sensitive to changes to evaluate whether data needed to be updated and, if necessary, updated those data accordingly. In most cases, the data collected in the early part of this study still accurately characterize resource conditions in the Corridor. Updating the data would not result in a discernible difference in the comparative analysis due to the relatively stable conditions in the Corridor over the last decade and because small variations in the existing conditions have little effect at the Tier 1 level when comparing impacts in 2035 or beyond. As Tier 2 processes are undertaken, new and often more detailed data will be collected and analyzed. Each resource area includes a discussion related to the validity of the data used for the comparative analysis.

How were impacts quantified?

For purposes of presenting impact quantities in this document, the Combination alternatives include the Six-Lane Highway and Rail with Intermountain Connection, Six-Lane Highway with Advanced Guideway System, and Six-Lane Highway with Bus in Guideway. The Preferred Alternative is also a Combination alternative. These following eight Preservation Alternatives are quantified within the category of Combination alternatives:

- Combination Six-Lane Highway with Rail and Intermountain Connection, Preserve for Highway Alternative
- Combination Six-Lane Highway with Rail and Intermountain Connection, Preserve for Transit Alternative
- Combination Six- Lane Highway with Dual Mode Bus in Guideway, Preserve for Highway Alternative
- Combination Six-Lane Highway with Dual Mode Bus in Guideway, Preserve for Transit Alternative
- Combination Six-Lane Highway with Diesel Bus in Guideway, Preserve for Highway Alternative
- Combination Six-Lane Highway with Diesel Bus in Guideway, Preserve for Transit Alternative
- Combination Six-Lane Highway with Advanced Guideway System, Preserve for Highway Alternative
- Combination Six-Lane Highway with Advanced Guideway System, Preserve for Transit Alternative

The Preservation Alternatives are not presented separately in this document because they are all assumed to be built, so that the components that are "preserved" or "not precluded" are actually constructed and operating in 2050. These Preservation Alternatives become phasing options for implementing whichever Combination Alternative contains those same components.

How and in what order specific components of the Combination alternatives are built create subtle differences in impacts on various resources. These could include differences such as:

- Economic or community impacts of a longer or two phased construction period
- Increases in overall construction costs because of a need to pay for mobilization of labor and materials twice
- Greater responsiveness to funding sources

The Highway alternatives and highway components of the Combination alternatives have greater construction impacts on Clear Creek County than the Transit alternatives due to the constrained right-of-way in this area and the wider construction footprint needed. The phased approach of the Preferred Alternative provides ongoing opportunities to avoid, minimize, and mitigate impacts during implementation. The impacts discussed in this chapter reflect these differences.

All Action Alternatives are included in the resource analyses, but as described in **Chapter 2, Summary and Comparison of Alternatives** the single mode alternatives, those alternatives consisting solely of roadway improvements or transit improvements, but not both, do not meet the purpose and need of the I-70 Mountain Corridor project. In addition, the Preferred Alternative Minimum Program does not meet purpose and need either, as highway capacity will be exceeded before 2050.

Techniques to note:
- impacts chapter begins with explanation of overall approach to impact assessment

Chapter 5 - Environmental Consequences

5.1 Methodology for Evaluating Environmental Impacts

This section provides an overview of the methodology that has been used in evaluating the environmental impacts of the Build and No Build Alternatives. More detailed explanations of the methodologies used for evaluating specific impacts can be found in subsequent sections of this chapter. The purpose of this introductory section is simply to explain the overall approach used in evaluating environmental impacts and to introduce key terms and concepts that will be used later in this chapter.

The changes to this chapter since the completion of the DEIS include:

- Impact calculations have been updated to reflect the selection of variations, route shifts, and other changes, as described in Section 5.1.3.
- Discussion on tiering has been expanded.
- Updates to GIS layers, including discussion of layers removed for homeland security reasons.

5.1.1 Tiered Approach

As a result of the size and complexity of this project, FHWA and INDOT determined that it was appropriate to use a "tiered" procedure for completing the environmental studies required under the National Environmental Policy Act (NEPA). The use of a tiered process to comply with NEPA is authorized under the Council on Environmental Quality (CEQ) regulations, which applies to all federal agencies, and under FHWA's own NEPA regulations. (See 40 CFR 1508.28 and 23 CFR 771.135(o)).

In recent years, the use of tiering for FHWA NEPA documents has increased. In the context of one recent project, which involved an existing section of I-70 in Missouri, FHWA headquarters explained the agency's overall approach to preparing tiered documents:

> "As contemplated in our regulations and in the Council on Environmental Quality regulations, tiering is an option available to organize analysis and decision-making in complex circumstances in a way that takes into account the different geographic scope and timing for different decisions. The difference in scope and timing for the strategic decision of how to address long range needs on a 200 mile long section of I-70 between the major metropolitan areas in Missouri versus the specific location and design decisions for much shorter "projects" on I-70 certainly justifies a tiered approach. Because tiering is an option available to address complex situations, we have deliberately stayed away from prescriptive guidelines on how to apply tiering, so that each tiered process can be custom designed to the specific situation."

The Council on Environmental Quality (CEQ) and Federal Highway Administration (FHWA) regulations allow for the use of tiering for large-scale, complex projects. This project involves a 26-county Study Area, encompassing approximately one-quarter of the State of Indiana; it involves the consideration of alternatives approximately 150 miles in length. The alternatives under consideration are geographically widespread, resulting in the need to consider environmental issues across a broad area. As a result, the overall scale of this study is far larger than the scale of a typical, non-tiered environmental impact statement for a highway project. It also is consistent with the scale of other tiered EISs currently being prepared or recently completed by FHWA in other states, such as Colorado and Missouri.

The tiered approach for this study was developed in consultation with resource agencies and the public. From the onset, FHWA and INDOT have stated that the goal in Tier 1 is to develop sufficient information to make a Build/No Build decision and to select a corridor for I-69 between Evansville and Indianapolis; it is not intended to resolve the exact alignment or to specify details of mitigation measures. This approach has guided all decisions regarding the level of detail to be developed in Tier 1.

In accordance with this flexible approach, a tiered process has been developed to meet the specific needs of this project. In this process, the purpose of the Tier 1 EIS is to provide the basis for an informed decision on a "corridor" for I-69 between Evansville and Indianapolis, *not* to determine the exact alignment for the highway. (The concept of a corridor is explained further below.) As a result, the environmental data in this Tier 1 EIS has been developed with the intention of providing the level of detail needed to make an informed decision on a corridor. As can be seen by the scope of this document, FHWA and INDOT have determined that a substantial amount of information is needed even at this first tier. Nonetheless, it must also be recognized that this study is not intended to provide the basis for selection of an exact alignment, and therefore does not contain the level of engineering or environmental detail that would be needed to make a specific alignment decision. That information will be developed in Tier 2 NEPA studies.

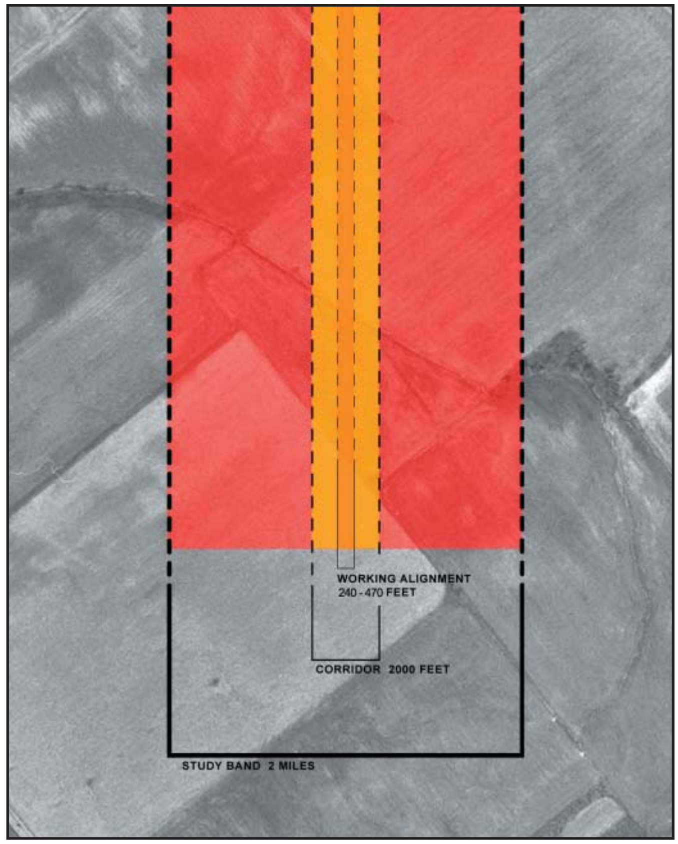


Figure 5.1-1: Illustration of Study Band Corridor and Working Alignment

5.1.2 Key Concepts: Study Bands, Corridors, and Working Alignments

Each build alternative considered in the initial screening stage of this study was developed as a "route concept," which may be thought of as a simple line connecting points on a map. Throughout the screening process, the initial set of route concepts (A through L) was reduced to five major alternatives (1 through 5). These five alternatives – several of which include a range of potential connections to Indianapolis, or Options, at their northern end – were carried forward for detailed analysis. Including these Options, there were a total of 12 distinct alternatives considered in the EIS. These 12 alternatives are: 1, 2A, 2B, 2C, 3A, 3B, 3C, 4A, 4B, 4C, 5A, and 5B.

In order to provide a set of tools for analyzing environmental impacts of these alternatives, the study team defined each alternative as a set of three overlapping bands (see Figure 5.1-1).

- **Study Band** – A "study band" is a 2-mile-wide band within which the environmental data-gathering efforts were focused for each alternative. It should be noted that much of the environmental data was gathered throughout the entire 26-county Study Area. However, more intensive efforts – for example, field verification of recorded resources – were concentrated within the two-mile-wide study bands.

- **Corridor** – A "corridor" is generally 2000 feet wide, but its width is narrower in some places and broader in others. If a Build Alternative is selected, it is FHWA's intention to approve a Record of Decision (ROD) for a corridor at the end of Tier 1, rather than approving a specific alignment.

- **Working Alignment** – A "working alignment" is a potential location for a highway right-of-way within the 2000-foot-wide corridor. The Tier 1 EIS is not intended to result in the selection of a specific alignment. However, working alignments have been developed within each corridor in order to provide a sound basis for estimating the environmental impacts of each alternative. The working alignments range in width from 240 to 470 feet. Three factors were considered in estimating the right-of-way width for sections of each working alignment: (1) the topography of the land, (i.e. flat, rolling, hilly); (2) the number of local service (frontage) roads expected, if any; and (3) the number of lanes expected. (See Appendix E, "Typical Sections," for detailed information on the widths of each working alignment.)

5.1.3 Calculation of Environmental Impacts

Use of GIS

The basic tool used for estimating the environmental impacts of each alternative, was the project's Geographic Information System (GIS). As explained in Section 4.1, *GIS Approach*, the GIS is an electronic database that consists of a series of data layers. The GIS database for this project includes layers containing each of the study bands, corridors, and working alignments, as well as more than 170 layers containing the locations of various environmental resources and other features.

The GIS database provided two powerful tools for developing the environmental impact information that has been presented in this Tier 1 EIS. First, the GIS was used to generate maps showing the relationship between each alternative and specific environmental resources and other features. Some of these maps are contained in Chapter 5, *Environmental Consequences*; additional maps are included in the Environmental Atlas, which is contained in a separate volume but also is part of the Tier 1 EIS. In addition to generating these maps, the GIS also was used to calculate the impacts that would be caused by each of the working alignments. The impact calculations are given in the tables contained in Chapter 5 and elsewhere in the document.

Since completion of the DEIS, several GIS layers used in this study have been updated to reflect more current information received from agency and public comment. The following information has been updated in the FEIS, including the Environmental Atlas for Preferred Alternative 3C: Cemeteries, Martin State Forest Boundary, Resource Conservation and Recovery Act (RCRA) Sites, Landfills, Patoka National Wildlife Refuge Boundary, Petroleum Wells, Pipelines, Powerlines, Recreation Areas, Superfund Sites, Threatened & Endangered Species, Recreation Trails, Towers, Underground Storage Tanks (USTs), and Leaking Underground Storage Tanks (LUSTs). Also, in recognition of recently enacted state laws and evolving regulations for state agencies, certain data layers were removed from the FEIS Environmental Atlas at the request of the Indiana Department of Environmental Management (IDEM) in the interest of homeland security. These files were considered for impacts and are discussed as applicable within the text of the FEIS. The treatment of this data was comparable to the established confidentiality procedures for sensitive sites such as archaeology sites and endangered species locations. These data layers include: Public Water Wells, Public Water Intakes, Wellhead Protection Areas, Drinking Water Supply Sites, Wastewater/Runoff Treatment Plants, and Water Towers.

Methodology for Calculating Impacts

The direct impact calculations shown in this document reflect the impacts *within the footprint of the working alignment of each alternative,* subject to the following qualifications:

- **Impacts of I-70 Widening and SR 641 (Terre Haute Bypass) Project.** The impacts associated with the planned widening of I-70 and the completion of SR 641 have not been counted as part of the impacts for the alternatives presented in this document. Instead, the impact calculations are based on the impacts of each alternative from its southern terminus at I-64 near Evansville to the point at which the alternative connects with I-70 or SR 641 (or I-465 in the case of those alternatives that do not use any portion of I-70 or SR 641). This approach has been followed because the completion of SR 641 and the widening of I-70 are expected to occur without regard to whether I-69 is completed. Excluding the impacts of those projects from the alternatives analysis for this project allows the reader to compare the I-69 alternatives based on the additional impact that each alternative would cause, over and above the impact that would result from projects that will occur independently of the I-69 project. (The impacts of the SR 641 were disclosed in a Final Environmental Impact Statement, which was signed by FHWA on January 3, 2000. The impacts of the I-70 widening have not been studied in a separate NEPA document, but are summarized in the Cumulative Effects chapter of this document based on existing information, along with other reasonably foreseeable actions that are independent of the I-69 project.)

- **Use of Existing SR 37 and US 41 Right-of-Way.** Several alternatives incorporate portions of existing SR 37 and US 41. Both of these routes are four-lane, divided highways with at-grade access points (partial access control, with signalized and unsignalized intersections). Upgrading these routes to meet freeway standards (which do not allow for at-grade access) would require additional right-of-way for interchanges, local service (frontage) roads, and other improvements. For sections of alternatives that follow these routes, the impact estimates reflect only the additional right-of-way that would be needed beyond the existing SR 37 or US 41 right-of-way.

- **Working Alignments with Multiple Variations.** In the DEIS, several of the working alignments included multiple variations. Each variation had slightly different impacts. Consequently, the impact totals for each alternative were presented as ranges in the DEIS. The ranges reflected the different levels of impact associated with the various working alignments that had been developed in these areas. For a description of these variations see Section 3.3.4.

- **Interchanges.** This document reflects potential interchange locations. Interchange locations and access issues will be refined in Tier 2. These potential locations were determined using the following criteria:

    - The functional classification of intersecting roadways
    - The traffic volumes on intersecting roadways
    - Service to significant communities which otherwise would be isolated
    - Distance between interchanges
    - Ability to relocate/consolidate state highways which are close to each other
    - The number of interchanges serving particular communities
    - The presence of sensitive resources (such as karst) and thus the desire to minimize potential indirect impacts in those areas

During the Tier 2 NEPA studies and design analysis, some interchange locations could be discarded. New locations could also be added.

Techniques to note:
- impacts chapter explains changes in impact calculations between DEIS and FEIS

For this I-69 project, right-of-way needs of approximately 10 acres were assumed for each potential interchange. The actual amount of land could be greater than or less than 10 acres depending upon the interchange configuration. The 10 acre estimate of land for an interchange includes only the land needed for the interchange. Impacts from indirect development as a result of the interchange are incorporated into the Cumulative Impacts analysis in Section 5.26. *Cumulative Impacts.*

Post-DEIS Changes Affecting Impact Calculations

Since publication of the DEIS, Alternative 3C has been selected as the Preferred Alternative. In addition, several changes have been made that affect the environmental impact calculations. These changes are discussed below.

- **Southport Road Interchange.** Since the publication of the DEIS, an interchange has been added at SR 37/ Southport Road in Marion County. This interchange is now shown in the Volume III Environmental Atlas of the FEIS. The traffic modeling and impact calculations in the FEIS include the Southport Road interchange.

- **Rest Areas.** Specific rest area locations have not been identified for this I-69 project. If a build alternative is approved in the Tier 1 ROD, rest areas will be identified and located in the Tier 2 NEPA studies. However, to avoid underestimating the right-of-way needs for the I-69 alternatives, the acreage for four potential rest areas (two northbound and two southbound) has been included in the total right-of-way needs for each alternative. It is expected that approximately 40 acres will be needed for each rest area, for a total of 160 acres. The land acquired for the rest areas is assumed to be agricultural land. In addition, solely for the purposes of calculating impacts, the land for rest areas was assumed to be prime farmland. In the DEIS, acreage required for rest areas was not included.

- **Alignment Shifts.** Several alignment shifts occurred after the distribution of the DEIS in response to comments received from the public and environmental review agencies. These shifts affected the corridor and working alignment for Alternatives 3, 4, and 5. See Section 6.3.5 for more information. Such shifts are as follows:

    - **Prides Creek Shift (Alternatives 3, 4, and 5).** The corridor and working alignment was shifted approximately 0.4 mile to the east to minimize impacts to the Prides Creek wetland complex in Pike County. This shift reduced wetland impacts by approximately 35 acres. Information on the impact trade-offs for the Prides Creek Shift can be found in Section 6.3.5.

    - **Combs Forest Property Shift (Alternative 3).** The corridor and working alignment was shifted approximately 0.2 mile to the south to avoid direct impacts to the Combs Unit of the Martin State Forest. The Combs Unit was recently acquired by the Martin State Forest and is located just south of Koleen in Greene County. In shifting the alignment care was given to avoid both human (homes) and natural (springs, caves) environmental concerns. Information on the impact trade-offs for the Combs Forest Property Shift can be found in Section 6.3.5.

    - **Virginia Iron Works Shift (Alternative 3).** The corridor and working alignment and corridor was shifted approximately 800 feet to the west to avoid the Virginia Iron Works, which contains a number of industrial archaeological sites. It has been determined to be potentially eligible for the National Register of Historic Places. Information on the impact trade-offs for the Virginia Iron Works Shift can be found in Section 6.3.5.

- **Variation Selections.** Since the completion of the DEIS, a single route was selected for the Preferred Alternative 3C by selecting a single variation in the vicinity of Washington and eliminating the Mann Road

Variation. In addition, for purposes of the analysis in the FEIS, a single variation was selected for Alternative 4 at the crossing of the West Fork of the White River, and for Alternatives 3A and 3B in the vicinity of the Keisler Forest Legacy Property. As a result, impact calculations for Alternatives 3, 4, and 5 are presented in the FEIS as a single number rather than as ranges. As a result, impact calculations for Alternatives 1 and 2 are still presented as a range because they still contain variations near Fort Branch, Vincennes, or Farmersburg. Variations were not selected in these areas because of complex issues associated with the decision about whether to remain on US 41 through densely developed areas or construct the project as a bypass around those areas. For a description and map of the variations, refer to Section 3.3.4. The variation selections are described below.

- **Mann Road Variation (Alternatives 2C, 3B, 3C, 4C, and 5B).** The Mann Road Variation that diverted from SR 37 and connected to I-465 to the west has been eliminated from further study due to wetlands, social, and neighborhood impacts. For a further explanation on the Mann Road Variation see Section 6.3.4.

- **Washington Variation (Alternatives 3, 4, and 5).** There were originally four variations around Washington in Daviess County, two to the west and two to the east. The easternmost variation (WE2) has been chosen due to lower natural environmental impacts and resource agency comments. However, the flexibility is being preserved to consider the other eastern variation (WE1) during the Tier 2 studies if necessary in order to avoid or minimize impacts. For a further explanation of the Washington Variation, see Section 6.3.3.

5.1.4 Format for Impact Evaluations

Each section within the Environmental Consequences chapter of this document typically includes: (1) introduction to the resource; (2) methodology used to analyze the resource; (3) policies that may accompany the resource; (4) results of the analysis; (5) mitigation for impacts to the resource; and (6) summary of the discussion. The procedure detailed above describes the process used to determine potential environmental impacts. If a different process was used for a particular resource, it is noted in the methodology section of that discussion.

The alternatives that are discussed in the following sections of this Section are shown in Figure 5.1-2.

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Chapter 14. Commitments

Most NEPA documents include a large number of environmental commitments, which may relate to project design elements, measures to mitigate impacts, or other actions. A high-quality NEPA document clearly describes these commitments and explains how they will be implemented.

The following practices can help to improve the discussion of environmental commitments in a NEPA document:

- *Include a commitments list in the document.* Many NEPA documents now include a master list of commitments. This list is included in various places: as its own chapter, as a section in the environmental consequences chapter, as part of the summary chapter, or elsewhere. Regardless of location, it helps provide a "one-stop shop" for anyone who seeks a clear and complete list of the project commitments.

- *Use definite language ("will") when describing a commitment.* The wording of a commitment is important. Wording that simply describes a possibility (such as "may") does not make a commitment. Definite wording (such as "will") conveys that a commitment is being made.

- *Create and document a process for implementing commitments.* The credibility of the commitments in a NEPA document is enhanced if the document describes a systematic process for ensuring that the commitments are implemented. One of the examples in this chapter included a commitment to establish a "commitment tracking database" and to assign an "independent environmental monitor" to ensure that the environmental commitments are carried out.

- *Cross-reference commitments in other documents.* Many of the commitments in a NEPA document are based on other documents, such as a Section 106 memorandum of agreement (MOA). There is always a risk of error when restating commitments from another document. This risk can be minimized by summarizing and cross-referencing the commitments in the other document, rather than re-stating them.

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Separate Section or Chapter Lists Commitments

- NC: Mid-Currituck FEIS - in introduction to EIS
- MD: Purple Line FEIS - within impacts chapter
- OH: Opportunity Corridor DEIS - separate chapter
- OR: OR 62 FEIS - within impacts chapter
- WA: I-90 Snoqualmie - separate mitigation chapter

Techniques to note:
- FEIS includes a stand-alone list of project commitments, compiled from statements made elsewhere in the document

Mid-Currituck Bridge Study

Currituck and Dare Counties, North Carolina

Federal-Aid Project Number. BRSTP-000S(494)
WBS Element: 34470.1.TA1
STIP Project No. R-2576

Project Commitments

1. NCTA will coordinate with the US Coast Guard to determine appropriate horizontal and vertical navigation clearances for the Preferred Alternative (see Section 2.1.3).

2. NCTA will finalize (in association with environmental resource and regulatory agencies) and implement a stormwater management plan for the Preferred Alternative (see Section 2.1.7.2).

3. NCTA will finalize (in association with environmental resource and regulatory agencies) and implement bridge construction techniques to minimize aquatic resource impacts with the Preferred Alternative, including approaches to minimize impact to SAV habitat and potential SAV habitat (see Section 3.3.4.4).

4. NCTA will use standard details for installed features used to discourage roosting/ perching birds. During final design, NCTA will investigate proven methods of reducing collisions between vehicles operating on the bridge and flying birds and incorporate them as appropriate (see Section 3.3.3.2).

5. NCTA will include bicycle safe rails on the bridge parapet across Currituck Sound (see Section 2.1.11).

6. A Design Noise Study will be prepared to update the FEIS noise analysis based upon the most recent FHWA regulations and NCDOT noise policies and guidance, traffic forecasts, and the final design (see Section 3.4.1.5).

7. NCTA will replace sections of existing multi-use paths that are displaced as a result of NC 12 widening in Currituck County and US 158 widening in Dare County. NCTA also will provide space in the NC 12 right-of-way and complete the grading for future multi-use paths to be provided by others in three locations along the widened sections of NC 12 in Currituck County (see Section 2.1.11).

8. NCTA will purchase land-locked parcels north of Aydlett Road in Maple Swamp and west of US 158 in Great Swamp in addition to public right-of-way. The purchased land (i.e., the land-locked parcels) will be set aside as a conservation area and allowed to retain or return to its natural state (see Section 3.3.6.4).

9. Construction contracts will require compliance with the US Fish and Wildlife Service's (USFWS) 2003 *Guidelines for Avoiding Impacts to the West Indian Manatee: Precautionary Measures for Construction Activities in North Carolina Waters* with the exception of the two guidelines that specify the use of no wake/idle speeds. USFWS agreed to the exceptions.

10. Construction contracts will require compliance with National Marine Fisheries Service's (NMFS) 2006 *Sea Turtle and Smalltooth Sawfish Construction Conditions*. NMFS has indicated that the condition related to no wake/idle speeds will not apply to this project.

11. Construction contracts will require compliance with USFWS guidelines for the protection of eagles contained in their 2007 *National Bald Eagle Management Guidelines.*

The changes in the list of commitments since the DEIS reflect that some DEIS commitments have already been addressed. In addition, some new commitments were noted as expectations or intentions in the body of the DEIS and are in this FEIS. NCTA and FHWA decided to highlight them as Project Commitments in this FEIS. One entirely new commitment (10) was added.

Techniques to note:
- FEIS includes a stand-alone list of project commitments, compiled from statements made elsewhere in the document

density of residential development, activity centers, and creation of transfer points to other transit services. These locations are evenly distributed along the corridor and serve all populations, including environmental justice populations equally. Therefore, EJ populations will not be denied the benefits of the proposed Purple Line.

Full and Fair Participation

Full and fair access to meaningful involvement by low-income and minority populations in project planning and development is an important aspect of environmental justice. Ensuring full and fair access means actively seeking the input and participation from those typically under-represented groups throughout all the project stages. Residents can provide important information on community concerns, special sites, and unusual traffic, pedestrian or employment patterns in the corridor. This information can be used in the design and evaluation of alternatives, to avoid negative impacts to valued sites, and to support the development of safe, practical, and attractive transportation options that are responsive to the concerns of environmental justice communities.

Findings

Taking all of these factors into account, MTA and FTA have concluded that the Preferred Alternative as a whole would not have "disproportionately high and adverse effects" on EJ populations. Nonetheless, MTA and FTA recognize that some of the specific impacts of the Preferred Alternative may adversely affect EJ populations. Therefore, where possible, the alignment options have been refined through the NEPA process to minimize impacts to both the human and natural environment. Environmental commitments and mitigation measures identified throughout Chapters 3.0, and 4.0 of this FEIS will address impacts from LRT operations and construction activities that may affect EJ populations. MTA will mitigate adverse impacts throughout both EJ and non-EJ communities. MTA, however, will provide enhanced outreach to EJ communities, particularly Spanish-speaking communities with limited English proficiency, to implement mitigation strategies effectively in those communities.

4.20 Commitments

This section summarizes MTA's commitments to minimize and mitigate impacts on the natural and built environment described in Sections 4.2 through 4.19 during the design, construction, and operation of the Preferred Alternative. MTA is considering a range of procurement methods including a Public Private Partnership. MTA is responsible for implementing the commitments in this FEIS regardless of the procurement method used.

Land Use, Zoning, and Public Policy (Section 4.2)

- MTA will provide alternative access for properties that would be subject to changes in access or closures of portions of their property during construction, as necessary.

Neighborhoods and Community Facilities (Section 4.3)

- The Purple Line Fire Life/Safety & Security Committee will continue to meet prior to and during construction with emergency responders to identify and resolve issues arising from construction and operation.
- MTA will work to negotiate just compensation or mitigation to the First Korean Presbyterian Church on Kenilworth Avenue.
- MTA will construct the Glenridge Maintenance Facility at a lower grade than the existing park maintenance facility and provide a landscape buffer, as appropriate, to the adjacent park and school; MTA will install retaining walls to minimize the area of grading needed.
- MTA will coordinate with the counties to identify alternative access or temporary off-site parking for community facilities and businesses where access or parking may be temporarily removed, as appropriate.
- MTA will coordinate with UMD, Rosemary Hills Elementary School, Sligo Creek Elementary School, and Silver Spring International Middle School to minimize disruptions to the extent reasonably feasible.

- MTA will provide alternative access to community facilities if access is temporarily removed, where practical.
- MTA will build traction power substations with landscaping or appropriate architectural treatments to be compatible with adjacent land uses in areas of moderate or high visual sensitivity.

Property Acquisition and Displacements (Section 4.4)

- MTA will perform property acquisition and relocation activities in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act) as amended and FTA Circular 5010.1D, Grants Management Requirements and all applicable Maryland State laws that establish the process through which MTA may acquire real property through a negotiated purchase or through condemnation.
- For areas that would be subject to construction easements for staging or access areas, MTA will compensate owners based on fair market appraisal.
- MTA will use vacant or publicly-owned property, rather than privately-owned, developed property, for temporary construction activities to the greatest extent possible.
- MTA will restore properties affected through a temporary easement to an acceptable pre-construction condition following construction activities, in accordance with the individual easement agreements.
- MTA will provide a parking facility for both County and MTA employees in Lyttonsville.

Economics (Section 4.5)

- MTA will continue to coordinate with affected commercial property owners to identify strategies to minimize the effects of temporary construction easements, lane or road closures, and other property restrictions on existing corridor businesses.
- MTA will implement a Business Impact Minimization Plan as described in the Environmental Justice section.

Parks, Recreational Facilities, and Open Space (Section 4.6)

- MTA will include drainage improvements and water quality facilities in four stream valley parks (Sligo Creek, Long Branch, Northwest Branch, and Anacostia River), Long Branch Local Park, and New Hampshire Estates Neighborhood Park.
- MTA, through coordination with M-NCPPC, the NCPC, the NPS, and the public, will implement the following measures:
    - Expand and upgrade facilities and plant trees in Glenridge Community Park, as well as convert approximately 2 acres of land currently used for the Prince George's County Parks' Northern Area Maintenance—Glenridge Service Center either to parkland within Glenridge Community Park or to upgrade and expand athletic fields at the Glenridge Elementary School
    - Restore park properties that are disturbed as a result of construction activities to acceptable conditions through coordination with the park owners
    - Provide replacement parkland for all park impacts; the amount and location of replacement parkland will be determined by MTA in consultation with park owners
    - Coordinate selective tree clearing and identification of significant or champion trees with agencies having jurisdiction.
- MTA will continue to coordinate with the public and agencies to develop appropriate minimization strategies during construction. Efforts will include the following:
    - Roadway or sidewalk closures will be staged to maintain pedestrian and vehicular access.
    - Trail detours needed during construction will be coordinated with the agency having jurisdiction over the trail to identify and develop a plan for a temporary detour route, and the trail routes would be restored at the end of construction.
    - MTA will continue to coordinate during further design development with the agencies having jurisdiction over the

Techniques to note:
- FEIS includes a stand-alone list of project commitments, compiled from statements made elsewhere in the document

Chapter 6

ENVIRONMENTAL COMMITMENTS *and* MITIGATION

WHAT WILL BE DONE TO REDUCE OR MITIGATE THE IMPACTS OF THE CLEVELAND OPPORTUNITY CORRIDOR PROJECT?

The following sections summarize the steps that will be taken to reduce or mitigate the impacts of the Cleveland Opportunity Corridor project. The project sponsor will make sure that the final plan package includes the necessary engineering drawings, notes and specifications to carry out the environmental commitments outlined in this Draft Environmental Impact Statement (DEIS). It is possible that additional commitments could be identified based on comments received on the DEIS or at the public hearing. If this happens, the additional commitments will be discussed in the Final Environmental Impact Statement (FEIS).

Kenneth L. Johnson (Woodland) Recreational Center

During construction, the Cleveland Opportunity Corridor project would need about 0.19 acres (8,420 square feet) of temporary easement from the planned expansion area of the Kenneth L. Johnson (Woodland) Recreational Center, 9206 Woodland Ave. The land would only be needed for about six months for grading and seeding that would take place when Buckeye Road and Woodland Avenue are widened and when the new boulevard is built.

To minimize impacts to the rec center, the following items will be included in the final design plans:

- The plans will require the contractor to protect the rec center areas and users with warnings signs, gates, barricades or fences during construction;
- Access to the rec center will be maintained at all times. The contractor will be required to closely coordinate the construction schedule with the City of Cleveland. Two weeks before the construction starts, the contractor will notify the City, in writing, of the occupation dates;
- Any disturbed areas will be put back to a condition at least as good as or better than what was there before construction started;
- No staging and/or storage of construction equipment will be on the rec center property; and
- If unexpected work on the rec center property is needed, advance notice will be given to the City of Cleveland and ODOT to decide if additional coordination is needed.

During final design, the project sponsor will coordinate with the National Park Service (NPS) through the Ohio Department of Transportation (ODOT) and the Ohio

▲ *Figure 6-1: Stormwater management will continue to be coordinated with the Northeast Ohio Sewer District.*

Department of Natural Resources (ODNR) for any anticipated Section 6(f) impacts to the rec center. This coordination will occur approximately one to two years before the plans are finalized.

Stormwater

An Ohio Environmental Protection Agency (OEPA) National Pollutant Discharge Elimination System (NPDES) permit will be obtained before construction activities occur. The contractor will fully follow the regulations and conditions outlined in the permit. A Stormater Pollution Prevention Plan (SWPPP) will be prepared by the contractor. The contractor will also follow Best Management Practices (BMPs) for sediment and erosion control during construction and after construction according to ODOT's Construction and Material Specifications. Coordination with OEPA and Northeast Ohio Sewer District (NEORSD) will continue during final design.

Industrial properties (regulated materials)

During final design, the project sponsor will complete the remaining Phase I Environmental Site Assessments (ESAs) for the properties affected by the proposed project. Any properties recommended for further study will also be evaluated through Phase II ESAs. The results of those studies, including any requirements for material handling and disposal and worker protection, will be included in the design plans for the project.

Traffic noise

Noise walls are recommended in three areas to mitigate increased traffic noise:

- South side of the boulevard between 71st Street and 75th Street
  - Approximate length: 610 feet
  - Height range: 11 to 14 feet
- North side of the boulevard between GCRTA Blue-Green Line and 75th Street
  - Approximate length: 540 feet
  - Height range: 13 feet
- North side of the boulevard between Evins Avenue and Buckeye Road
  - Approximate length: 500 feet
  - Height range: 13 feet

The final decision about whether to build the noise walls will not be made until the project is in its final design stage. ODOT will gather input from residents and property owners who

▲ *Figure 6-2: The plans will include requirements for the disposal of regulated materials.*

would be affected by the noise walls. ODOT will decide whether to build the noise walls based on the desires of the affected people. If noise walls are desired, the people who are affected will help decide how the walls will look on their side of the wall.

Temporary noise impacts from construction activities will be minimized through the use of pre-approved haul routes to bring materials to/from the project. These routes will be designed to minimize impacts to the community. The contractor must comply with City of Cleveland noise ordinances and other local laws governing construction.

Air quality

State and local regulations regarding dust control will be followed to minimize air quality impacts during construction. Emissions from construction activities will be minimized through dust control measures outlined in ODOT's *Construction and Material Specifications.*

Traffic maintenance

As part of final design, a maintenance of traffic plan will prepared to provide access to residences, businesses, public facilities, community services, and local roads during construction. Local police and fire departments will be notified in advance of construction activities to allow for planning to minimize disruption of community and emergency services. Signs will be used, and local media will be contacted to provide early notice of detours, closings and other major construction activities that could disrupt the community.

Public involvement

As part of the context sensitive solutions (CSS) process, public involvement will continue during final design to determine locations and details of community-focused design features. The public will also give input on details to improve the look of the study area such as colored concrete and form liners. Public involvement will be conducted during the

▲ *Figure 6-3: Utility relocations will be coordinated to minimize inconvenience to customers.*

construction phase according to ODOT District 12's communication plan for major projects.

Utility relocations

Utility relocations will be coordinated between the contractor and the utility owners to avoid and/or minimize inconvenience to customers. Upon the contract award, the coordination of necessary relocations with the utilities will become the responsibility of the contractor.

Environmental justice

The following measures are proposed to mitigate the impacts of the project and provide added benefits to the local community:

- ODOT will build two pedestrian/bike bridges: one at East 59th Street and one at East 89th Street.
- ODOT will implement a voluntary residential relocation program to allow some residents whose homes are not directly impacted by the project to be eligible for relocation assistance.
- ODOT will contribute $500,000 toward the planned expansion of the Kenneth L. Johnson (Woodland) Recreational Center.
- For required relocations, ODOT will work to provide replacement housing that has similar

access to public transit, as long as those options are currently available in the housing market. ODOT will also make all reasonable efforts to relocate residents within the same neighborhood, if that is what they desire.

ODOT will present other possible mitigation and enhancement measures during the DEIS review period and at the public hearing (pages 4-29 and 4-30). Based on the comments received, additional measures may be incorporated into the project.

3.1.5 Avoidance, Minimization, and/or Mitigation Commitments Incorporated into the Preferred Alternative

ODOT makes the following commitments.

Techniques to note:
- FEIS includes a stand-alone list of project commitments, compiled from statements made elsewhere in the document
- commitments are listed by project implementation phase (design, then constructon)

3.1.5.1 Project Design

JTA Phase

- To guide access decisions in implementation of the JTA Phase, ODOT will prepare an AMS for the northern terminus intersection, which will be similar to the AMS ODOT has prepared for the southern terminus interchange. The AMS for the southern terminus interchange provides for the closure, consolidation, or modification of most driveway and local street connections to OR 62 at or near the interchange. This will improve mobility and safety to reduce crashes at the southern terminus interchange.
- The project design allows U-turns on OR 62 at Poplar Drive/Bullock Road under the JTA phase.
- The project design removes the intersections of Gregory Road and Corey Road with existing OR 62 and replaces them with an intersection of Fowler Lane and existing OR 62 to increase spacing between OR 62 intersections and reduce congestion between the north terminus intersection of the bypass with existing OR 62 and the intersection of OR 62 with OR 140.
- The project design realigns Crater Lake Avenue near the northern terminus to separate the intersections of Fowler Lane with Crater Lake Avenue and existing OR 62.
- The project design includes gates at the cul-de-sacs where Justice Road terminates on both the east and west sides of the bypass to allow emergency vehicles to enter or leave the bypass, providing for better emergency response times.
- The project design provides for bicycle access to and egress from the bypass at the north and south termini.

JTA Phase and Preferred Alternative Subsequent to Construction of the JTA Phase

- ODOT will allow bicycles and pedestrians on the shoulders of the bypass. The shoulders of the bypass will not be striped because, under Oregon State law, striping for bicycles prohibits pedestrian use and the intent is to allow use by both pedestrians and bicyclists.
- ODOT will convene a committee beginning in early 2013 to discuss implementation of projects recommended by the Transit Subcommittee listed in Appendix M, Recommendations for Transit and Non-Motorized Transportation.
- ODOT will mitigate for operational issues arising from the incursion into the RPZ, including design changes to the Preferred Alternative that will minimize the placement of objects within this zone. ODOT will continue coordination efforts with the FAA and Medford Airport.

Preferred Alternative Subsequent to Construction of the JTA Phase

- ODOT will develop an IAMP for the Vilas Road Interchange before it is constructed, in collaboration with the City of Medford and Jackson County.

3.1.5.2 Project Construction

- ODOT will prepare a traffic management plan for project construction. The traffic management plan will provide for detours, flaggers, time-of-day lane closure restrictions, weekend closure restrictions, staging plans, detour identification, ADA compliance, and provision of local access.
- ODOT will prepare a public involvement plan to inform and engage those affected by project construction. This plan will include a project website to provide current information on construction activities.

3.1.5.3 Mitigation Measures Recommended for the City of Medford

ODOT recommends that the City of Medford install a traffic signal at the intersection of Crater Lake Avenue and Owens Drive. As described in Section 3.1.3.2, the intersection is forecast to have a v/c ratio of over 2.0. A traffic signal at the intersection will substantially lower the v/c ratio.

Techniques to note:
- FEIS includes a summary of mitigation commitments made elsewhere in the document

Chapter 4 Mitigation Summary

This chapter summarizes FHWA and WSDOT's commitments for project construction and compensatory mitigation. Commitments for construction include specific BMPs to be used by contractors before, during and after construction to minimize environmental impacts. BMPs are tools or actions designed to achieve a desired result by establishing factors such as the timing of construction, construction methods, or methods to protect specific resources. Commitments for compensatory mitigation include the actions the lead agencies will take to replace or substitute for unavoidable environmental impacts.

Commitments listed in this chapter do not include the many actions that the project has taken to avoid and minimize environmental impacts. These are important elements of environmental mitigation, and they have been incorporated into the project design. They are not included in this chapter because avoidance and minimization measures do not require subsequent commitments from WSDOT other than to build the project as designed.

Mitigation commitments are based on legal requirements and performance standards, which establish specific thresholds for project actions. To meet these commitments, the lead agencies will implement BMPs during construction and carry out specific compensatory mitigation.

4.1 Commitments Related to Best Management Practices

As WSDOT completes the project design and construction plans, it will include and use BMPs designed to meet the project commitments and performance standards for each resource. Some example BMPs are found in each section of Chapter 3. The effectiveness of the BMPs will be monitored as part of WSDOT's construction compliance program. This will allow WSDOT to adjust or replace BMPs in order to assure compliance with performance standards and meet project commitments.

Geology and Soils

BMPs for geology and soils will be designed to meet applicable commitments and performance standards, including:

- NPDES General Permit for Construction Activities
- NPDES General Permit for Sand and Gravel Operations
- Temporary Erosion and Sediment Control Plans
- Erosion and sediment control requirements of the WSDOT *Design Manual* (WSDOT 2007c) and *Standard Specifications for Road, Bridge, and Municipal Construction* (WSDOT 2008b)
- Spill Prevention, Control and Countermeasure Plans
- Applicable permit requirements
- Conditions imposed by the USFS related to use of federal land for additional easement
- Applicable conservation measures included in the NOAA Fisheries' ESA Consultation Concurrence Letter (NOAA Fisheries 2008)
- Applicable parts of the *Implementing Agreement between the Washington State Department of Ecology and the Washington State Department of Transportation* (Ecology and WSDOT 1998), or as revised
- Objectives of the USFS ACS
- Construction safety requirements and maintaining operation of the highway during construction, including Occupational Safety

WSDOT may use plastic covering as an erosion control measure.

WSDOT may use rock netting at high risk locations throughout the project area.

and Health Administration requirements and highway safety standards

Air Quality

Water wagon wetting down field for dust control.

BMPs for air quality will be designed to meet applicable commitments and performance standards, including:

- Permit conditions from Ecology's Central Regional Office for temporary exhaust emissions sources and suspended particulates
- The NAAQS
- Air quality BMPs included as permit requirements or as conditions imposed by the USFS related to use of federal land for additional highway easement

Water Resources

BMPs for water resources will be designed to meet applicable commitments and performance standards, including:

Straw matting and hydroseeding are effective erosion control measures.

- Clean Water Act Section 404 Permit(s)
- Clean Water Act Section 401 Water Quality Certification
- NPDES General Permit for Construction Activities
- NPDES General Permit for Sand and Gravel Operations
- Temporary Erosion and Sediment Control Plans
- Spill Prevention, Control and Countermeasures Plans
- Erosion and sediment control requirements of the WSDOT *Design Manual* (WSDOT 2007c) and *Standard Specifications for Road, Bridge, and Municipal Construction* (WSDOT 2008b)

- WSDOT *Highway Runoff Manual* (WSDOT 2006b)
- Applicable measures specified in the USFWS Biological Opinion
- Applicable conservation measures included in the NOAA Fisheries' ESA Consultation Concurrence Letter (NOAA Fisheries 2008)
- Applicable parts of the *Implementing Agreement between the Washington State Department of Ecology and the Washington State Department of Transportation* (Ecology and WSDOT 1998), or as revised
- Objectives of the USFS ACS
- MDT design objectives and performance standards
- Applicable permit conditions
- Applicable conditions and stipulations related to the transfer of federal land for highway easement

WSDOT would conduct work around Keechelus Lake during low pool elevations when the shoreline is exposed.

Wetlands and Other Jurisdictional Waters

BMPs for wetlands will be designed to meet applicable commitments and performance standards listed in Section 3.3, *Water Resources,* as well as:

- The Final Wetland & Aquatic Resources Mitigation Plan
- The project-specific roadside master plan, which will guide re-vegetation adjacent to the highway

High visibility fencing is used to reduce accidental impacts to habitat.

Commitments Are Clearly and Consistently Defined

(e.g., identify who is responsible; proper use of “will”)

- MD: Purple Line FEIS
- NC: Mid-Currituck FEIS

Techniques to note:
- the word "will" is used consistently when describing commitments (steps the State will take if the project is approved)

Mid-Currituck Bridge Study

Currituck and Dare Counties, North Carolina

Federal-Aid Project Number. BRSTP-000S(494)
WBS Element: 34470.1.TA1
STIP Project No. R-2576

Project Commitments

1. NCTA will coordinate with the US Coast Guard to determine appropriate horizontal and vertical navigation clearances for the Preferred Alternative (see Section 2.1.3).

2. NCTA will finalize (in association with environmental resource and regulatory agencies) and implement a stormwater management plan for the Preferred Alternative (see Section 2.1.7.2).

3. NCTA will finalize (in association with environmental resource and regulatory agencies) and implement bridge construction techniques to minimize aquatic resource impacts with the Preferred Alternative, including approaches to minimize impact to SAV habitat and potential SAV habitat (see Section 3.3.4.4).

4. NCTA will use standard details for installed features used to discourage roosting/perching birds. During final design, NCTA will investigate proven methods of reducing collisions between vehicles operating on the bridge and flying birds and incorporate them as appropriate (see Section 3.3.3.2).

5. NCTA will include bicycle safe rails on the bridge parapet across Currituck Sound (see Section 2.1.11).

6. A Design Noise Study will be prepared to update the FEIS noise analysis based upon the most recent FHWA regulations and NCDOT noise policies and guidance, traffic forecasts, and the final design (see Section 3.4.1.5).

7. NCTA will replace sections of existing multi-use paths that are displaced as a result of NC 12 widening in Currituck County and US 158 widening in Dare County. NCTA also will provide space in the NC 12 right-of-way and complete the grading for future multi-use paths to be provided by others in three locations along the widened sections of NC 12 in Currituck County (see Section 2.1.11).

8. NCTA will purchase land-locked parcels north of Aydlett Road in Maple Swamp and west of US 158 in Great Swamp in addition to public right-of-way. The purchased land (i.e., the land-locked parcels) will be set aside as a conservation area and allowed to retain or return to its natural state (see Section 3.3.6.4).

Techniques to note:
- the word "will" is used consistently when describing commitments (steps the State will take if the project is approved)

density of residential development, activity centers, and creation of transfer points to other transit services. These locations are evenly distributed along the corridor and serve all populations, including environmental justice populations equally. Therefore, EJ populations will not be denied the benefits of the proposed Purple Line.

Full and Fair Participation

Full and fair access to meaningful involvement by low-income and minority populations in project planning and development is an important aspect of environmental justice. Ensuring full and fair access means actively seeking the input and participation from those typically under-represented groups throughout all the project stages. Residents can provide important information on community concerns, special sites, and unusual traffic, pedestrian or employment patterns in the corridor. This information can be used in the design and evaluation of alternatives, to avoid negative impacts to valued sites, and to support the development of safe, practical, and attractive transportation options that are responsive to the concerns of environmental justice communities.

Findings

Taking all of these factors into account, MTA and FTA have concluded that the Preferred Alternative as a whole would not have "disproportionately high and adverse effects" on EJ populations. Nonetheless, MTA and FTA recognize that some of the specific impacts of the Preferred Alternative may adversely affect EJ populations. Therefore, where possible, the alignment options have been refined through the NEPA process to minimize impacts to both the human and natural environment. Environmental commitments and mitigation measures identified throughout Chapters 3.0, and 4.0 of this FEIS will address impacts from LRT operations and construction activities that may affect EJ populations. MTA will mitigate adverse impacts throughout both EJ and non-EJ communities. MTA, however, will provide enhanced outreach to EJ communities, particularly Spanish-speaking communities with limited English proficiency, to implement mitigation strategies effectively in those communities.

4.20 Commitments

This section summarizes MTA's commitments to minimize and mitigate impacts on the natural and built environment described in Sections 4.2 through 4.19 during the design, construction, and operation of the Preferred Alternative. MTA is considering a range of procurement methods including a Public Private Partnership. MTA is responsible for implementing the commitments in this FEIS regardless of the procurement method used.

Land Use, Zoning, and Public Policy (Section 4.2)

- MTA will provide alternative access for properties that would be subject to changes in access or closures of portions of their property during construction, as necessary.

Neighborhoods and Community Facilities (Section 4.3)

- The Purple Line Fire Life/Safety & Security Committee will continue to meet prior to and during construction with emergency responders to identify and resolve issues arising from construction and operation.
- MTA will work to negotiate just compensation or mitigation to the First Korean Presbyterian Church on Kenilworth Avenue.
- MTA will construct the Glenridge Maintenance Facility at a lower grade than the existing park maintenance facility and provide a landscape buffer, as appropriate, to the adjacent park and school; MTA will install retaining walls to minimize the area of grading needed.
- MTA will coordinate with the counties to identify alternative access or temporary off-site parking for community facilities and businesses where access or parking may be temporarily removed, as appropriate.
- MTA will coordinate with UMD, Rosemary Hills Elementary School, Sligo Creek Elementary School, and Silver Spring International Middle School to minimize disruptions to the extent reasonably feasible.

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Process for Monitoring Implementation Is Described

(e.g., commitments tracking database)

- MD: Intercounty Connector FEIS

5. Process for Environmental Review During Detailed Design and Construction

Effective environmental management of the ICC project is paramount to the successful implementation of the transportation facility in harmony with the surrounding sensitive environment. Considerable effort is currently being expended during the project planning and preliminary design phase to define environmental commitments and permit parameters.

a. Environmental Management Plan

The Environmental Management Plan, which will be implemented by the Environmental Management Team (EMT), has been created to facilitate success of the ICC project. The key components include:

- Creation and management of the Record of Decision (ROD)/permit tracking database
- Implementation of an environmental design review team
- Implementation of an environmental construction inspection team
- Implementation of a mitigation/stewardship implementation team
- Coordination with regulatory agencies through the IAWG on permit compliance, commitment tracking, and design review in accordance with the Memorandum of Agreement (MOA) that will be developed between the sponsoring agencies and regulatory agencies.

An Independent Environmental Monitor with no affiliation with the design, permitting, or construction aspects of the project will provide quality assurance services and report concurrently to the regulatory agencies and the sponsoring agencies.

To successfully complete the FEIS and obtain the ROD, environmental permits, Invitation for Bid (IFB) packages and other required documents necessary to advertise and construct the project, the EMT will be seamlessly integrated into the on-going environmental efforts for the ICC under the leadership of the ICC-Environmental Manager. Whether or not the ICC Project enters the design-build or the design-bid-build process the EMT will implement the following environmental management practices to ensure compliance and stewardship.

ROD/Permit Tracking Database

To track and ensure compliance with the project commitments and conditions throughout the life of the project (design, construction, and post construction monitoring) a **ROD/Permit Tracking Database** (RTD) will be generated and implemented. The IAWG will be provided with access to the regularly updated database to monitor environmental commitments as the project moved forward. Formal compliance reports will be generated during designated design milestones and quarterly during construction, and final reports will be generated at the end of each contract or phase to document compliance with commitments, permit conditions, and permitted impacts. The RTD will be created by a database expert using a computer platform that can be expanded, divided, or queried to suit the needs of the project, and will be used to organize and store all ICC project commitments including permit conditions.

Design Reviews and Permit Compliance

An Environmental **Design Review Manager (DRM)** will lead the **Environmental Design Review Team (EDRT)**. The team will consist of environmental scientists, engineers, and landscape architects to coordinate design reviews and permit modification issues with the environmental permitting agencies.. The EDRT will utilize the RTD to ensure that all commitments and permits are appropriately incorporated into and/or complied with during the design efforts. The EDRT will work with the design build teams and the regulatory agencies to find methods to continue avoidance/minimization/reduction of impacts to resources in the study area while they are developing final plans. The EDRT will attend all progress and partnering meetings and manage all design-related agency coordination including permit modifications.

Environmental Construction Management

A full-time, on-site, dedicated environmental construction inspection team composed of **Environmental Inspectors (EIs)** and managed by the **Environmental Construction Manager**, will be provided to ensure the project commitments and conditions are adhered to during construction. Close coordination will occur between the Environmental Construction Manager and the DRM to ensure compliance and fulfillment of commitments if construction and design intermingle.

The specialized EI Team will be a blend of environmental scientists and construction inspectors; they will have degrees in environmental sciences but know and understand construction processes and sequences, particularly ESC, SWM, and working in sensitive areas. The EIs will ensure daily compliance by focusing on environmental issues during construction. The EIs, prior to the start of construction, will gain a working knowledge and full understanding of the NEPA documentation, the project permits, MOAs, Memorandums of Understanding, and all other authorizations, including the intent of all special permit conditions.

The EIs will also review and understand the construction plans and documents, especially the approved ESC plan sheets, the permit-defined limits of disturbance, and the sequence of construction. The EIs will closely interact with the contractors and the construction inspection teams to foresee and avoid potential problems, and will acknowledge, react to, and resolve unforeseen issues that will inevitably arise as part of a large, complex project. These actions prevent violations, protect the surrounding environment, and keep the project moving forward.

The EI Team will produce weekly inspection reports, weekly ESC rating reports, quarterly formal compliance reports, and final reports to document compliance on highway, bridge, utility, and mitigation/stewardship construction.

The Environmental Construction Management Team will be prepared for implementation before the start of construction and will maintain a constant presence throughout the construction phase. The EIs will maintain open communication between the designer's environmental engineer and the Contractor's designated ESC Manager throughout the project. The Environmental Construction Management Team will attend all progress and partnering meetings and manage all construction-related agency coordination including permit modifications and agency compliance inspections.

Mitigation Implementation Team

The **Mitigation Implementation Team** (MIT) will be managed by an **Environmental Mitigation Manager (EMM)** who will coordinate with the mitigation team, the DRM, the sponsoring agencies, and the regulatory agencies to ensure the project commitments and conditions are adhered to during construction of the mitigation and stewardship sites.

During construction, the EMM will work closely with the mitigation Contractor and the design team to ensure that individual projects are effective in meeting mitigation and stewardship goals established in the Comprehensive Mitigation and Environmental Stewardship Plan.

The EMM is involved in the startup phase of mitigation construction to ensure that an appropriate working environment is developed between the MIT, the mitigation Contractor, the designer, the regulatory agencies, and the landowner.

The EMM will remain involved in the process through completion, and will organize and conduct regular progress and partnering meetings as well as facilitate regulatory approvals, manage staff, provide technical oversight, and guidance during construction. On very specialized projects such as fish passage, the designer-of-record may provide an on-demand design specialist to ensure compliance with design intent.

All changes to project plans that involve impacts to project permits, ESC plans, and sequences of construction will be coordinated with the design specialist, the sponsoring agencies, and the appropriate regulatory compliance department. If the mitigation site is not owned by SHA, the EMM will also provide coordination services to the landowner and local communities to ensure that mutual goals for the project are achieved.

Independent Environmental Monitor

An **Independent Environmental Monitor (IEM)** with no affiliation with the design, permitting, or construction aspects of the project will be provided to review final design plans and monitor construction to provide added assurance that the project commitments and conditions are adhered to during construction.

The IEM will be a full time extension of regulatory agencies and allow for a compliance office on site. The IEM will concurrently communicate issues to the sponsoring agencies and the regulatory agencies so that all parties are informed and involved in the solution process.

Post Construction Monitor

The EMM will lead the post construction monitoring team. The team will consist of environmental scientists, and/or landscape architects to perform post construction monitoring and submit reports yearly to the sponsoring and regulatory agencies. Theses tasks will ensure SWM systems and mitigation projects are built according to plans and to ensure the success of mitigation projects.

b. Conclusion

The Environmental Management Plan has successfully worked on the Woodrow Wilson Bridge Project, the design-build US 113 Project, and other high profile, environmentally sensitive projects. The plan has proven to ensure compliance with commitments and permits throughout the project through traditional fundamentals and cutting edge innovation en route to ultimate environmental excellence and success.

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Chapter 15. Regulatory Compliance

Projects that require compliance with NEPA typically also require compliance with a host of other federal environmental laws, which protect historic properties, parklands, water resources, air quality, endangered species, and other resources. Federal actions also must comply with Executive Orders on wetlands, floodplains, environmental justice, and other topics.

When an EIS or EA is prepared, FHWA's NEPA regulations require that the FEIS or FONSI either (1) "document compliance" with the requirements under other laws and Executive Orders or, if that is not possible, (2) "reflect consultation with the appropriate agencies and provide reasonable assurance that the requirements will be met." 23 CFR 771.133.

Because of this requirement, compliance with other laws and Executive Orders should normally be discussed in a NEPA document. The appropriate level of detail will vary from project to project.

The following practices should help to ensure that the NEPA document sufficiently documents compliance with other laws and executive orders:

- *Describe the regulatory setting.* Many NEPA documents include a brief discussion of the regulatory setting before discussing impacts on a resources. This practice is an effective way to introduce relevant legal requirements and set the stage for documenting compliance. This approach is most effective if the requirements are described; it is much less useful to recite a list of laws without explaining what they require.

- *Use correct terminology when describing findings.* Compliance with other laws often involves specific findings – for example, a finding that the project is "not likely to adversely affect" a threatened or endangered species. It is important to use precise wording when stating these findings, so that there is no confusion about whether the required findings have been made.

- *Document the steps taken to comply with consultation requirements.* Some laws define a consultation process that must be followed – for example, Section 106 consultation for historic resources, and Section 7 consultation for threatened and endangered species. For these laws, demonstrating compliance involves showing that the required consultation has occurred. One efficient way to document compliance with such laws is to include a table in the NEPA document that lists the required consultation steps and shows when each one occurred.

- *Include dates of important documents and events.* Documentation of compliance should include specific dates – month, day, and year – for important events. For example, if the U.S. Fish and Wildlife Service issues a Biological Opinion (B.O.), the NEPA document should not just say that the B.O. was issued – it should give the exact date on which it was issued.

- *Include key correspondence and reports in appendices.* The appendices to the NEPA document can be used to compile documents that help to demonstrate compliance with other laws. It is especially valuable to include correspondence in which other agencies have made or concurred in findings – for example, letters in which officials concur in "de minimis" impact findings under Section 4(f).

Regulatory Setting Is Briefly Summarized

- OR: OR 62 FEIS - T&E Species
- OR: OR 62 FEIS - Water Quality
- UT: West Davis Corridor FEIS - Water Quality

Techniques to note:
- begins each resource section (e.g., T&E species) with a brief discussion of applicable regulatory requirements

T&E SPECIES

3.13

Section 3.13 Content

3.13 Threatened and Endangered Species

3.13.1 Regulatory Setting

3.13.1.1 Federal

The primary federal law protecting threatened and endangered species is the federal ESA: 16 United States Code (USC), Section 1531-1544, et seq. FHWA and ODOT's responsibilities under the act are regulated at 50 CFR Part 402. This 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 ESA, federal agencies, such as FHWA, are required to consult with the USFWS and/or the National Marine Fisheries Service (NMFS), jointly referred to as the Services, 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. Section 3 of ESA defines take as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or any attempt at such conduct."

Compliance with ESA can be demonstrated through "No-Effect" documentation, which is generally prepared by the applicant (in this case ODOT). For actions which are "Not Likely to Adversely Affect" species or their critical habitat, informal consultation is conducted and typically results in a concurrence letter from the Services. For actions which are "Likely to Adversely Affect" species or their critical habitat, formal consultation is conducted. The outcome of formal consultation is a Biological Opinion (BO) which may include an incidental take authorization. Additionally programmatic approaches for ESA consultations may be available.

3.13.1.2 State

Consultation with ODFW and/or Oregon Department of Agriculture (ODA) is required when species are state-listed as threatened or endangered. State-listed fish and wildlife species are regulated by the ODFW in ORS 496.171 to 496.192. State-listed plants are regulated by the ODA 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.

For further information regarding ESA species, including citations to source documents, refer to the *OR 62 Corridor Solutions Project Terrestrial Resources Technical Report*, November 2011 and the *OR 62 Corridor Solutions Project Aquatic Resources Technical Report*, July 2011. These reports are available from the ODOT contact person identified on page i of this EIS

3.13.2 Affected Environment

The API for this analysis is defined as the project footprint with a 250 foot buffer on all sides, as shown in Figure 3.13-1. Areas within the API have the potential to support federal and state listed plant and wildlife species. Federal and state species lists were reviewed to determine which ESA species and critical habitat could potentially occur within the API.

WEST DAVIS CORRIDOR

Techniques to note:
- begins each resource section with a brief discussion of applicable regulatory requirements

14.2.4 Clean Water Act

What are waters of the U.S. and wetlands?

Waters of the U.S. are waters currently or previously used for interstate or foreign commerce; all interstate waters; any waters, the destruction of which could affect interstate or foreign commerce; all impoundments; tributaries of the previously mentioned waters; the territorial seas; and wetlands adjacent to waters.

Wetlands are a subset of waters of the U.S. and are considered special aquatic sites.

The U.S. Army Corps of Engineers (USACE) developed a definition of waters of the U.S. in the 1972 Clean Water Act (33 USC 1251). *Waters of the U.S.* are defined as waters currently or previously used for interstate or foreign commerce; all interstate waters; any waters, the destruction of which could affect interstate or foreign commerce; all impoundments; tributaries of the previously mentioned waters; the territorial seas; and wetlands adjacent to waters.

Wetlands are defined as a subset of waters of the U.S. and, under the Clean Water Act 404(b)(1) regulations (40 Code of Federal Regulations [CFR] 230), are considered special aquatic sites.

Pursuant to the Clean Water Act, USACE has jurisdiction over all waters of the U.S., including but not limited to traditionally navigable waters. USACE further defines wetlands in Section 404 of the Clean Water Act as:

> … those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

USACE presently has jurisdiction over any waters that are adjacent to, bordering, or contiguous with navigable waterways. This EIS assumes that all waters of the U.S. in the ecosystem impact analysis area are jurisdictional and are subject to the authority of USACE.

Under Section 404 of the Clean Water Act, no discharge of dredged or fill material is permitted in waters of the U.S. if there is a less environmentally damaging practicable alternative to that part of the activity that would result in a discharge of fill material to waters of the U.S. An alternative is *practicable* if it is available and capable of being implemented after taking into consideration cost, existing technology, and logistics in light of the overall project purposes.

For actions that require a Section 404 permit, FHWA seeks to ensure that the alternatives analysis in FHWA's NEPA document provides the information necessary for USACE to conduct a Clean Water Act Section 404(b)(1) alternatives analysis and to select the least environmentally damaging practicable alternative.

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Consultation Process Is Documented, with Key Dates Specified

(e.g., a chronological summary of steps in consultation process)

- MD: Red Line FEIS - Sec. 106 consultation
- OR: OR 62 FEIS - Sec. 7 consultation
- UT: West Davis Corridor FEIS - Sec. 7 consultation
- WA: I-90 Snoqualmie FEIS - Sec. 106 consultation

Techniques to note:
- summarizes steps taken to comply with procedural requirements, such as Section 106 consultation for historic resources
- includes references to key dates in consultation, which facilitates locating relevant supporting documents

adverse effects, which could include unanticipated oise and vibration. This stipulation acknowledges that ffects assessments and provides for consultation on nted. The draft Programmatic Agreement is included ammatic Agreement will be included in the project Record of Decision (ROD).

5.9.5 Section 106 Consultation

a. MD SHPO Consultation

This section discusses consultation efforts with Section 106 consulting parties, including the MD SHPO. The purpose of consultation has been to share information on the Preferred Alternative and to discuss the following:

- methodology in developing the APE;
- identification of historic properties listed or determined eligible for listing in the National Register (Determinations of Eligibility);
- assessment of effects; and
- avoidance, minimization, or mitigation efforts that may be needed to offset any adverse effects on cultural resources.

FTA has consulted with the MD SHPO to delineate the built environment APE, identify historic properties, and evaluate properties not previously evaluated for NRHP eligibility. To date, the MD SHPO has reviewed and commented on the following:

- *Cultural Resources Technical Report: Volume 1 – Red Line Corridor Transit Study: Cultural Resources Reconnaissance Survey* and APE delineation (August 25, 2005 correspondence)
- Evaluations in the *Historic Structures Survey Technical Report* (March 19, 2007 correspondence)
- *Cultural Resources Technical Report: Volume 4 – Red Line Corridor Transit Study: Bayview Extension Cultural Resources Reconnaissance Survey* and APE delineation (April 7, 2008 meeting)
- Evaluations in the *Red Line Corridor Transit Study – Bayview Extension; Historic Architectural Resources Survey* (June 9, 2010 correspondence, included follow-up comments on the original evaluations)
- Refined APE and list of additional properties for evaluation (January 17, 2012 correspondence)
- DOE and Short Forms provided in May and June 2012 (concurrence received in July 2012 and September 2012)

b. Section 106 Consulting Parties

The Red Line public outreach process was initiated in 2003, and a series of public scoping meetings and open houses continued into 2004 and 2005. MTA sent public notification mailings in 2005; these mailings included approximately 5,000 individuals and 250 community organizations. A community newsletter sent in 2005 described the Section 106 process and invited interested and consulting parties to a series of public meetings in 2005.

In 2006, MTA developed a Section 106 Public Participation Program that has been followed throughout the course of the project. At that time, no individuals or community groups had requested consulting party status and only three public comments on the project related to historic properties concerns. Twenty-six community organizations and three government agencies were invited to become consulting parties. No community organizations responded to the invitation. MTA proceeded with consultation with MHT, the Baltimore City Commission on Historic and Architectural Preservation (CHAP) and the Baltimore County Planning Department's preservation services staff. Only MHT and CHAP chose to participate actively.

In 2009, MTA received correspondence from a group of community organizations expressing concerns about the project's effects on the Canton Historic District. These organizations included the Anchorage Homeowners Association, Baltimore Harbor Watershed Association, Canton Community Association, Canton Cove Association, Canton Square Homeowners Association, and Waterfront Coalition. The groups requested and were granted consulting parties status, and were provided with project documentation related to the project and Canton Historic District. As project work continued in 2010 and 2011, consultation continued with MHT staff and CHAP, as appropriate.

FTA has complied with 36 CFR Part 800.2, and identified and contacted nine federally-recognized Native American tribes in October 2012, including the Absentee-Shawnee Tribe of Oklahoma, Delaware Nation, Delaware Tribe of Indians, Eastern Shawnee Tribe, Oneida Indian Nation, Onondaga Nation, Saint Regis Mohawk Tribe, Shawnee Tribe, and Tuscarora Nation. In addition, FTA has identified and contacted state-recognized tribes with cultural ties to the project area, including the Piscataway Indian Nation, Inc., Piscataway Conoy Confederacy and Subtribes, Inc., and the Cedarville Band of Piscataway Indians. The Delaware Tribe of Indians wishes to be considered a consulting party, and notified and further consulted if human remains or objects of cultural patrimony are found during construction activities. The Shawnee Tribe wishes to be considered a consulting party, if unanticipated discoveries are found during construction activities.

A consulting party meeting was held on September 25, 2012 to share project information and listed/eligible historic properties within the APE identified. A second meeting was held on October 17, 2012 to provide an overview of potential effects, and to discuss potential avoidance, minimization, and mitigation measures. Additional consulting party meetings are being planned to continue discussions on the effects, potential avoidance, minimization and mitigation measures, and the Programmatic Agreement.

In a letter dated November 6, 2012, the FTA notified the ACHP of the proposed finding of adverse effect on historic properties, in accordance with 36 CFR Part 800.6. The FTA asked the

ACHP to review information attached to the letter, to determine if the agency wishes to join the consultation process.

Additional tasks are required to complete the Section 106 process. Comments on the proposed effects determinations in the *Section 106 Assessment of Effects for Built Historic Properties* from MHT, consulting parties, and the public will be incorporated into a final *Section 106 Assessment of Effects for Built Historic Properties.* Additional consulting parties meetings will be held in December and January, as appropriate, to discuss comments on the effects determinations and finalize the Programmatic Agreement (refer to **Appendix H** for a draft of the document). Following formal concurrence on the effects determination and Programmatic Agreement, the Programmatic Agreement will be circulated for signatures. The executed Programmatic Agreement will be completed prior to the ROD.

5.10 Archeological Resources

The archeological investigations undertaken in support of the Red Line project have been conducted in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 USC 470 et. Seq.); Archeology and Historic Preservation: The Secretary of the Interior's Standards and Guidelines (FR 48: 44716-44742), September 1983; Maryland Historical Trust's (MHT) Standards and Guidelines for Archeological Investigations in Maryland (1994); and MHT's Standards and Guidelines for Architectural and Historical Investigations in Maryland (2000).

5.10.1 Introduction and Methodology

A *Phase IA Archeological Assessment Technical Report* was prepared in 2007 by the Maryland Transit Administration (MTA) in support of the Alternatives Analysis/Draft Environmental Impact Statement (AA/DEIS). The *Phase IA Archeological Survey* provided a comprehensive overview of the archeological context and sensitivity for prehistoric and historic archeological sites within the project study corridor. Prehistoric sites include resources associated with Native American activities prior to Euro-American occupation in the region. Historic sites represent activities post-dating Euro-American occupation in the region.

For the current study, a predictive model for the Preferred Alternative was developed which incorporated evidence of prior disturbance, current land use and previously recorded cultural resources to justify areas of high, medium, and low cultural resource sensitivity. The results of the Phase IA survey and supporting predictive models identified 22 areas of archeological sensitivity along the Preferred Alternative, five areas in Baltimore County and 17 areas in Baltimore City.

Concurrently, data regarding subsurface conditions is being gathered through the archeological monitoring of project geotechnical borings. Initiated in December 2009, archeologists, working in conjunction with the geotechnical staff, are recording the soils in geotechnical bores collected from areas of archeological sensitivity in the limit of disturbance. The bores provide a glimpse of the soil stratigraphy in the project setting, including modern and historic fill, as well as the natural subsoil development. The soils information and any archeological observations are shared with the project geomorphologist. This monitoring effort is allowing the archeological team to verify the anticipated subsurface conditions in potentially sensitive

Techniques to note:
- summarizes steps taken to comply with procedural requirements, such as Section 106 consultation for historic resources
- includes key dates
- shows how the process was concluded (in this case, with a B.O. issued by the USFWS)

Electrofishing uses electric current to stun fish so they can be netted and removed from the area.

- **Hydroacoustic Noise.** Impact pile driving construction for the proposed crossing at Bear Creek, if necessary, would create hydroacoustic noise that has the potential to disturb, harm, or potentially kill aquatic species including SONCC coho salmon. The potential impacts from hydroacoustic noise include damage to internal organs, reduction of feeding success, increase in predation, and displacement from suitable habitat to less suitable habitat. The number of individuals affected depends on site conditions and the extent, duration, and timing of pile driving.
- **Potential for Toxic Spills.** There is a potential for leaks or spills of contaminants from equipment used in proximity to Bear Creek and other project-area streams. Such spills or leaks could be toxic to SONCC coho salmon. As described in Section 3.10.3, construction activities would include BMPs that, among other things, are meant to prevent spills and leaks from construction equipment or minimize the potential effects from a spill if one occurred.
- **Fish Removal.** In-water or near-water work typically includes isolation measures to prevent fish from entering the work area. In some cases, such as the pile driving next to Bear Creek and construction of a temporary bridge in Bear Creek, electrofishing could be necessary to remove fish from the work area which could result in harassment or death to some individual fish. These potential impacts are more thoroughly described in the Biological Assessment submitted to the NMFS dated December 21, 2010.
- **Storm water.** Ground disturbance during construction could result in increased sedimentation and turbidity to Bear Creek and other API streams; however with the incorporation of erosion and sediment control BMPs described in Section 3.10.3, impacts are expected to be negligible.

Impacts Common to Both Build Alternatives and JTA Phase

Construction impacts on SONCC coho salmon common to all build alternatives and JTA phase would occur in all other streams within the API except for Bear Creek. Bear Creek is the only stream crossed by the project that is known to support SONCC coho salmon within the API. All other streams in the API are designated critical habitat for SONCC coho salmon based on historic species usage, but there is no known SONCC coho salmon usage of these streams within the API boundary. Impacts could result from potential toxic spills and storm water runoff and would be similar to those described above for the SD Alternative.

Terrestrial Wildlife Species and Habitat

Construction-related activities would occur exclusively within the proposed footprint or within other already developed areas. Storm water runoff from disturbed areas during construction could cause some impacts if stormwater were to reach vernal pools. These impacts could include degradation of vernal pool habitat due to pollutants in the storm water and altered hydrology. Measures would be taken as part of construction storm water permit compliance to protect vernal pools from receiving storm water runoff during construction, thus reducing the potential for this type of impact to occur.

Plant Species and Habitat

There would be no additional impacts on Cook's lomatium or large-flowered woolly meadowfoam due to construction activities.

Federal ESA Consultation Process

Based on the impacts discussed above, FHWA found that the project "may affect, (and is) likely to adversely affect" SONCC coho salmon, vernal pool fairy shrimp, Cook's lomatium, and large-flowered woolly meadowfoam. A Biological Assessment (BA) was prepared for the aquatic species for review by NMFS, submitted on December 21, 2010, and for the terrestrial species to USFWS, submitted on December 22, 2011, in support of consultation with these agencies and to satisfy compliance with the federal ESA. The Biological Opinions (BOs) from both NMFS and USFWS will contain non-discretionary terms and conditions and recommended conservation measures. These BOs will be issued prior to the availability of the Final EIS. Cover letters which transmitted the BAs to USFWS and NMFS are included in Appendix G of this EIS.

NMFS issued its BO for the OR 62: I-5 to Dutton Road project March 20, 2013 (NMFS Highway 62 BO). The USFWS issued its BO for the project March 14, 2013 (USFWS Highway 62 BO). Both BOs are included in Appendix G.

Table 7-2 Consultations with Agencies That Are Not Cooperating or Participating Agencies

Agency Name	Coordination Topic
National Marine Fisheries Service	ESA
City of Medford	Traffic, Section 4(f)
Oregon Department of State Lands	404 Permit
Oregon State Historic Preservation Office	Section 106, Section 4(f)
Oregon Parks and Recreation Department	Section 6(f)
Confederated Tribes of Grand Ronde	General project information has been provided
Confederated Tribes of Siletz	General project information has been provided
Oregon Department of Land Conservation and Development	Statewide Planning Goal Exception
Jackson County	Statewide Planning Goal Exception

Techniques to note:
- includes a summary table that lists key events (with dates) in the consultation process

Table 7-3 ESA Consultation and Related Activities

Date	Description	Agencies
October 4, 2004	Agency scoping meeting for proposed project and site visit	ODOT FHWA Corps USFWS ODFW DSL
October 6, 2010	Pre-consultation meeting to discuss project vernal pool impacts, BA format, assessment methodology. First direction about forthcoming Programmatic Biological Opinion (PBO) from USFWS. The PBO was concerned about vernal pool fairy shrimp (*Branchinecta lynchi* (fairy shrimp or VPFS)); Cook's Lomatium (*Lomatium cookii* (Lomatium)); and large-flowered woolly meadowfoam (*Limnanthes flocossa ssp. grandiflora*) (meadowfoam)). Collectively, these species are referred to as the listed vernal pool species. The PBO is targeted for the vernal pool complexes of Jackson County, Oregon.	ODOT USFWS
December 21, 2010	Aquatic Resources BA submitted to NMFS from FHWA	ODOT FHWA NMFS
January 25, 2011	USFWS issued Jackson County PBO for Vernal Pool Conservation Strategy (FWS Reference Number 13420-2011-F-0064) as described in October 6, 2010 entry above.	USFWS ODFW
December 22, 2011	Terrestrial BA submitted to USFWS from FHWA	ODOT FHWA USFWS
December 13-14, 2011	Pre-application meeting at ODOT Region 3 Tech Center for the JTA Phase of the OR 62: I-5 to Dutton Road Project and the Fern Valley Interchange Project.	ODOT ODFW USFWS Corps DSL
March 20, 2013	Biological Opinion received from NMFS	ODOT FHWA NMFS
March 26, 2013	Biological Opinion received from USFWS	ODOT FHWA USFWS

Techniques to note:
- summarizes steps taken to comply with procedural requirements, and gives the status of each step (completed, not required, submitted, etc.)

The Endangered Species Act is not pertinent to the WDC Project because there are no federally listed threatened or endangered species in the ecosystem impact analysis area that could be affected by the project alternatives. Table 14-1 provides an overview of the Endangered Species Act consultation process for the WDC Project. For copies of the correspondence related to this consultation, see Appendix 14B, Ecosystems Correspondence.

In addition to threatened and endangered species, USFWS also identifies a third category: candidate species. This category implies that a species of concern has a strong possibility of being listed under the Endangered Species Act in the future, though at this time the species does not benefit from the full regulatory weight of the Endangered Species Act.

FHWA's policy on candidate species (FHWA 2002) states that impacts on candidate species should be addressed in environmental documents for federal-aid highway projects. The FHWA policy states that documents prepared under the National Environmental Policy Act (NEPA) should identify candidate species as such and should describe any planned conservation measures. The FHWA policy also encourages state Departments of Transportation to implement conservation measures or proactively partner with federal agencies to avoid the need to list the species in the future.

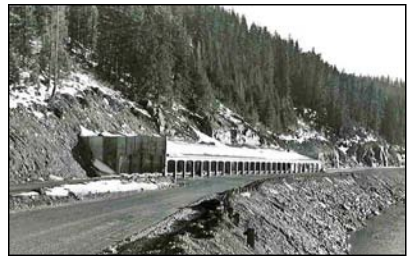
Table 14-1. Status of the Informal Endangered Species Act Consultation Process for the WDC Project

Step	Status
Develop species list; USFWS concurs with list.	**Completed.** Initial species list reviewed in June 2010. List updated yearly during EIS process. ↓
Identify threatened or endangered species and/or critical habitat.	**Completed.** Conducted field surveys and literature reviews of the ecosystem impact analysis area. ↓
If species or critical habitat are identified, prepare a Biological Assessment.	**Completed.** A Biological Assessment is required only if the preferred alternative could affect federally listed species. No threatened or endangered species are in areas that could be affected by the project alternatives. ↓
Make determination to USFWS if the preferred alternative is likely to adversely affect species or critical habitat.	**No-effect determination submitted to the Utah Department of Transportation (UDOT).** USFWS does not require consultation if there is a no-effect determination. ↓
USFWS concurs with determination of no adverse impacts or starts the formal consultation process.	**Not required.** USFWS does not have to concur with no-effect determinations. ↓
Start the formal consultation process.	**Not required.**

Techniques to note:
- summarizes steps taken to comply with procedural requirements, such as Section 106 consultation for historic resources

Permanent Impacts

Keechelus Lake Alignment Alternatives 2, 3, and 4 (the Preferred Alternative) would require removing and replacing the snowshed, which is a historic structure listed on the NRHP. None of the build alternatives for the Keechelus Lake Alignments or for the remaining project area would result in either direct or indirect impacts to any other known historic, archaeological, or cultural resource in the area of potential effect.



The existing snowshed, built in 1950, only covers two of the four lanes on I-90 and does not adequately protect the highway from avalanches, or accommodate traffic volumes and oversized loads.

FHWA and WSDOT analyzed removal of the snowshed under Section 106 of the National Historic Preservation Act, and Section 4(f) of the Department of Transportation Act of 1966. Section 106 and Section 4(f) regulate the use of historic, cultural, and archaeological resources by transportation projects.

Section 106

Section 106 promotes historic preservation by ensuring that historic properties are considered as part of a federal agency's decision-making process. Section 106 establishes a consultation and agreement process that FHWA must follow before approving WSDOT actions that have the potential to adversely affect cultural resources. The process includes the following steps:

Cabins along Old US Highway 10 in the 1930s.

1. ***Consultation.*** Consultation is a major component of the archaeological and historical survey. For this project, WSDOT carried out Section 106 consultation with FHWA, affected tribes including their Tribal Historic Preservation Officer (THPO), the SHPO from the Washington State DAHP, and the federal Advisory Council on Historic Preservation, which oversees Section 106 compliance. WSDOT consulted with the Confederated Tribes of the Colville Reservation, Muckleshoot Tribe, Snoqualmie Tribe, Tulalip Tribe, Wanapum Tribe and Yakama Nation. During consultation, WSDOT agreed to coordinate revegetation and mitigation plant lists with interested tribes to include plants traditionally used by Native Americans.

2. ***Determining NRHP Eligibility.*** NRHP eligibility is determined in the archaeological and historical survey by licensed professionals. WSDOT confirmed NRHP eligibility determinations in consultation with the SHPO and the THPOs.

3. ***Determining Adverse Effects.*** FHWA and WSDOT must determine if the project would have an adverse effect on any historic, cultural, or archaeological resources, based on the Section 106 criteria defined in CFR 800.5(a)(1), on all eligible resources within the area of potential effect. FHWA and WSDOT, in consultation with the SHPO and THPOs, determined that no cultural or archaeological resources would be adversely affected, and only one historic resource (the snowshed) would be adversely affected by the project. Following the decision to remove the snowshed, the lead agencies made a separate determination of impact for that resource and concluded that there would be an adverse impact. The DAHP concurred with these determinations.

4. ***Memorandum of Agreement.*** FHWA, WSDOT, and DAHP signed a Memorandum of Agreement on October 10, 2007. (See Chapter 5, *Programmatic Section 4(f) Evaluation*). This agreement commits FHWA and WSDOT to carry out measures to mitigate for adverse impacts to the snowshed.

Section 4(f)

Section 4(f) of the Department of Transportation Act prohibits the use of NRHP-eligible or -listed cultural and recreational resources for transportation projects unless there is no prudent and feasible alternative. If a project causes an adverse effect to an NRHP-eligible or -listed resource, it is considered a “use” under Section 4(f), and a Section 4(f) evaluation must be prepared. FHWA concluded that removal of the snowshed is a use under Section 4(f) and prepared a Programmatic Section 4(f) Evaluation, which appears as Chapter 5 of this document.

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Relevant Factors Listed and Considered

(e.g., factors listed in Section 4(f) regulations)

- MD: Red Line FEIS - Section 4(f) least harm
- WA: Mukilteo FEIS - Section 4(f) least harm

Techniques to note:
- demonstrates that each required factor has been considered (in this case, for compliance with Section 4(f))

...ary structures would need to be

Emergency exits would be constructed in the sidewalk on the south side of Lombard Street. No additional extensions to the pedestrian connector between the Red Line Inner Harbor and Charles Center Metro Stations would be required because the underground station structure would be constructed adjacent to the proposed tunnel. While closures would occur on East Lombard Street during cut-and-cover construction activities, the intersection at Light and East Lombard Streets would remain open to traffic during construction.

The first row of the 100 East Pratt Street parking garage would require underpinning. The potential for and duration of, temporary access restrictions of building occupants would be determined during Final Design. All businesses and tenants of 104 East Lombard Street/111 Water Street would need to be relocated.

The estimated cost of Inner Harbor Station Alternative 9, including real estate acquisition, business relocation, building demolition, and construction of the three-level station structure would be approximately $132.3 million.

6.10.8 Least Overall Harm Analysis Summary

The Preferred Alternative proposed Inner Harbor Station would require a Section 4(f) use because of demolition of two contributing historic buildings to the Business and Government Historic District, located at 108-112 and 114 East Lombard Street. Each alternative was weighed against the seven criteria for evaluating least overall harm per 23 CFR 774.3(c)(1).

1. <u>The ability to mitigate adverse impacts to each Section 4(f) property including any measures that result in benefits to the property</u>: For those alternatives that include demolition of contributing buildings to the Business and Government Historic District (Preferred Alternative proposed Inner Harbor Station and Alternatives 4, 6, and 9), mitigation of adverse impacts would be the same or similar, and would be outlined in the Programmatic Agreement (PA) with the SHPO and consulting parties. Under each of these alternatives, impacts to additional contributing buildings because of structural underpinning would be avoided. Mitigation for the minor impacts because of structural underpinning of contributing buildings under Inner Harbor Station Alternatives 5, 7, and 8 would be mitigated through the terms identified in the PA.

2. <u>The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection</u>: There would be “no adverse effect” to the Business and Government Historic District as a result of structural underpinning to contributing buildings under Inner Harbor Station Alternatives 5, 7, and 8. Of the alternatives that would require demolition of contributing buildings, several factors were considered. The Business and Government Historic District includes over 200 contributing buildings. Approximately 15 buildings within the district are individually listed or eligible for listing in the National Register, such as Baltimore City Hall and the Old Post Office and Court House. The buildings in the vicinity of the Inner Harbor Station are not individually listed in the National Register.

However, because of their prominent locations with frontages on multiple streets, the remaining harm to the Business and Government Historic District would be greater under Inner Harbor Station Alternatives 4, 6, and 9 than under the Preferred Alternative. The contributing buildings at 108-112 and 114 East Lombard Street are in the middle of a block with frontage on Lombard Street only, making them less prominent within the district than the other buildings being considered for demolition.

3. The relative significance of each Section 4(f) property: The contributing buildings in the vicinity of the Inner Harbor Station are considered to be of equal significance within the historic district. However, the historic buildings at the intersection at 31 Light Street and 34-36 Light Street are large and visually prominent from several vantage points. The mid-block building at 104 East Lombard Street (111 Water Street) has frontage on two streets within the district and occupies a larger footprint than those buildings at 108-112 and 114 East Lombard Street. Additionally, Water Street retains much of its historic character, and demolition of 104 East Lombard Street (111 Water Street) would affect the character of two blocks within the historic district.

4. The views of the official(s) with jurisdiction over each Section 4(f) property: At a consultation meeting on July 17, 2012 with the MTA and FTA, the MHT (official with jurisdiction) expressed informal support for the Preferred Alternative proposed Inner Harbor Station. This occurred in context of a discussion regarding projected ridership and connections at the Inner Harbor Station in relation to Purpose and Need, constraints within the vicinity including historic buildings and active businesses, and avoidance and minimization measures and consideration undertaken by the Red Line team. MHT would have an opportunity to review and comment on this Draft Section 4(f) Evaluation, and their views would be detailed in the Final Section 4(f) Evaluation.

5. The degree to which each alternative meets the purpose and need for the project: Each alternative meets the Purpose and Need; however, Inner Harbor Station Alternative 5 would require an additional connection to the proposed pedestrian tunnel leading to the Charles Center Metro Station.

6. After reasonable mitigation the magnitude of any adverse impacts to properties not protected by Section 4(f): only the Preferred Alternative proposed Inner Harbor Station would not directly impact or displace any current or foreseeable business operations within the downtown central business district. Each of the other alternatives evaluated in this least overall harm analysis would require permanent impacts or relocations to active businesses. This factor weighed heavily in the initial selection of a site for the Inner Harbor Station ancillary buildings, and in this draft least overall harm analysis.

7. Substantial differences in costs among the alternatives: The Preferred Alternative proposed Inner Harbor Station would cost less than all other alternatives under consideration, and includes real estate costs, business relocations required under each of the other Inner Harbor Station alternatives, and construction costs.

Table 6-4 presents a comparison of the alternatives by each of the seven factors discussed above. Based on the draft evaluation presented in this section and in **Table 6-4**, several factors outweigh the importance of protecting the Section 4(f) properties at 108-112 and 114 East Lombard Street. A final analysis and conclusion would be included in the Final Section 4(f)

5.5.3 Absence of Prudent and Feasible Avoidance Alternatives

Because none of the project's proposed alternatives completely avoids using Section 4(f) resources, Section 4(f) regulations require an analysis to determine if there are prudent and feasible avoidance alternatives.

The Preferred Alternative would use four resources that also would be used by the other Build alternatives. Any other alternative within the Mukilteo waterfront area would have a similar likelihood of using these resources, even if some design elements were modified or the alternatives had different footprints. Alternatives outside of Mukilteo that would have avoided these resources were considered but eliminated because they did not meet the project's purpose and need and worsened environmental effects (see *Chapter 2 Alternatives* for more information). The No-Bu Alternative would not avoid the use of at least one Section 4(f) resource, and as it also does not satisfy the purpose and need, it does not qualify as a prudent and feasible alternative to a use. Therefore, none of the alternatives considered would constitute a feasible and prudent Section 4(f) avoidance alternative.

Techniques to note:
- demonstrates that each required factor has been considereded (in this case, for compliance with Section 4(f))
- provides the full analysis in an appendix, in order to make the main volume more readable

5.5.4 Determining "Least Harm" Alternatives

Because no alternative completely avoids Section 4(f) uses, FTA can identify one or more "least harm" alternatives, considering factors defined in Section 4(f) regulations. *Appendix I* lists the factors to be considered; they include the remaining impacts to the Section 4(f) resources after mitigation, the degree to which each alternative meets the project's purpose and need, and any adverse impacts after mitigation to resources not protected by Section 4(f) resources.

FTA has incorporated in its analysis the results of the environmental analysis, public comments on the Draft EIS, the information gathered through continuing Section 4(f) evaluation and coordination, and Section 106 consultations with other agencies, tribes, and interested parties. *Appendix I* describes in more detail each of the alternatives' performance with respect to all of the least harm factors. The text below focuses on the primary conclusions of this complex analysis:

- The Preferred Alternative is most able to mitigate adverse impacts on the affected Section 4(f) properties. It includes measures that protect the affected historic properties, and replace the affected recreation property. Its mitigation measures reduce the remaining harm, after mitigation, to the properties, and offers design opportunities that recognize the historic significance of several of the properties. The mitigation measures are supported by the other agencies with jurisdiction over each of the properties.
- The Preferred Alternative best meets the project's purpose and need because it offers the most improvements to transportation conditions for pedestrians, bicyclists, transit riders, and vehicles; it has the shortest distances between the transit center, terminal, and the commuter rail station; and it performs at least as well as the other alternatives in all the other purpose and need areas.
- The Preferred Alternative has similar or lower environmental impacts and offers the highest benefits to other environmental resources. It addresses upland and in-water sources of contamination, including the Tank Farm Pier

and existing terminal facilities; it reduces the ferry system's impacts on the local transportation system and parking; it supports local land use plans; it avoids displacing a local business; and it opens up the largest area of the waterfront to public use, access, and potential developments consistent with the City of Mukilteo's plans.

The costs of the Preferred Alternative are reasonable compared to the other alternatives, and would not require the selection of any other alternative.

5.5.5 Section 4(f) Evaluation

The full Section 4(f) evaluation in *Appendix I* provides a more complete description of the factors FTA has considered and the analysis performed to support its finding that:

- FTA has found no feasible and prudent avoidance alternatives to using protected Section 4(f) resources.
- In developing the Preferred Alternative, WSDOT and FTA have conducted all possible planning to minimize harm to each property that would be used.
- Considering the Preferred Alternative's mitigation and enhancement measures for Section 4(f) uses, as well as its impacts and benefits, the Preferred Alternative would have the least overall harm to Section 4(f) resources and the environment.

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Required Findings Made, with Correct Wording

(e.g., EJ Determinations)

- CO: US 36 FEIS - Section 106 Findings
- UT: West Davis Corridor - EJ Findings
- WA: SR 520 FEIS - EJ Findings

Techniques to note:
- uses precise wording (consistent with regulations) when making findings of eligibility and effect under Section 106).

Keewaydin Subdivision

Site Description

The Keewaydin Subdivision is located on the north side of US 36 and directly west of Foothills Parkway. It is bounded by Apache Avenue on the south, Sioux Drive and Eutaw Drive on the north, Thunderbird Drive on the east, and Pawnee Drive on the west.

Eligibility Determination

This subdivision, constructed between 1958 and 1963, was initially developed by William Suitts and Richard Gray on land bought from Loyal and Sadie King, Jimmie H. Queen, Reginald Howard, and Willard M. Queen, Jr. The homes were constructed by individual builders that contracted for a certain number of homes while the development of curb, gutter, sewage, other utilities, and other issues, were handled by William Suitts, who also financed the development. While two models appear to have been made available to homeowners (a single-story ranch and a bi-level), most of the homes were custom, architect-designed homes as evidenced in the neighborhood's eclectic mix of architectural details from the late 1950s and early 1960s. Additional research is necessary to determine the significance of William Suitts and the local history of the development of this subdivision. For the purposes of the FEIS, it is being treated as an NRHP-eligible historic district associated with Criterion C.

Effects Determination

All three build packages include the construction of a noise wall within CDOT ROW south of Apache Avenue. The wall would end at the open space parcel west of the homes on Fox Drive. There are other homes that would be impacted by the wall west of 4125 Apache Avenue, but they were built after 1964, the cutoff date for surveying historic properties. This subdivision and the surrounding area is shown on Figure 4.7-24, Impacts to Keewaydin Subdivision and William Martin Homestead Addition Subdivision.

The new wall would be visible from the homes with front yards that face Apache Avenue and the highway, and the homes located on the corners of Mohawk Drive, Osage Drive, Ottowa Place, and Pawnee Drive, within the boundaries of the historic subdivision. The wall would have a visual impact on the potential historic district, but would be located approximately 100 feet from the edge of the district and the homes that face Apache Avenue and the highway. The noise walls would have a beneficial impact on the noise levels in the neighborhood/historic district. The indirect nature of these changes and the proposed benefits to the homes would not change or modify any of the qualities that may make the subdivision eligible as a historic district. Therefore, CDOT and FHWA have determined that the proposed undertaking would result in the Section 106 determination of No Adverse Effect.

Techniques to note:
- uses precise wording (consistent with regulations) when making findings regarding disproportionality of impacts under the the Executive Order on environmental justice

WDC. To mitigate this impact, UDOT will build a pedestrian underpass under the WDC to connect the communities on the opposite sides of the WDC. This underpass will also provide access to Fremont Park.

In Farmington, Alternatives B1 and B2 would not relocate any residences in an area with a higher concentration of minority populations but would cause noise impacts at four residences.

Overall, the B Alternatives would cause noise impacts at between 233 and 301 residences (B1–243; B2–233; B3–301; and B4–291). Of these, between 38 and 43 residences would be in areas with higher concentrations of low-income, minority, and poverty populations (B1–43; B2–39; B3–42; and B4–38).

No schools within 0.5 mile of the B Alternatives have a substantially higher percentage of minority students or students eligible for free or reduced-price lunches than the district-wide average.

According to FHWA's guidance on environmental justice and NEPA (FHWA 2011), a disproportionately high and adverse effect on an environmental justice population would occur in the following situations:

- The adverse effect associated with the transportation project would be predominantly borne by the environmental justice population.
- The effect suffered by the minority population and/or low-income population would be appreciably more severe or greater in magnitude than the adverse effect that would be suffered by non-minority populations and/or low-income populations.

As noted above in this section, some areas with higher concentrations of minority and low-income populations would be affected by the WDC. However, the adverse effects from the WDC would not be predominantly borne by these populations, since a substantially greater number of non–environmental justice populations would be relocated, would have their communities divided, and would be affected by noise. In addition, the relocation, noise, and community cohesion effects that would be suffered by the minority and low-income populations would not be appreciably more severe or greater in magnitude than the adverse effects that would be suffered by non-minority populations and/or non-low-income populations. All populations would receive a similar benefit from the improved mobility provided by the WDC.

In summary, based on the above analysis, Alternatives B1–B4 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 6640.23a. No further environmental justice analysis of Alternatives B1–B4 is required.

Techniques to note:
- uses precise wording (consistent with regulations) when making findings regarding disproportionality of impacts under the the Executive Order on environmental justice

d Discipline Report (Attachment 7) contain more information about mitigation relating to Foster Island. With implementation of these measures, there would be no disproportionately high and adverse effects on tribes regarding the Foster Island TCP.

A draft version of the Memorandum of Agreement with the Muckleshoot Tribe is expected to be completed for review by summer 2011 and signed by the end of the year. Conditional upon execution of this agreement, WSDOT anticipates that effects on tribal treaty fishing will be fully mitigated and that there will be no disproportionately high and adverse effect on minority populations as a result of the project.

What is the Environmental Justice Determination for the project?

According to the FHWA implementing order, when determining whether a particular program, policy, or activity will have disproportionately high and adverse effects on minority and low-income populations, FHWA must take into account mitigation measures, enhancements, and potential offsetting benefits to the affected minority or low-income populations. Other factors that may be taken into account include design, comparative effects, and the relevant number of similar existing transportation system elements in non-minority and non-low-income areas.

There would not be a disproportionately high and adverse effect to minority or low income populations as a result of tolling. This finding was reached considering the following:

- All SR 520 users would benefit from a safer bridge that is less vulnerable to catastrophic failure and that would provide a faster, more reliable trip across SR 520.
- Increased transit options (including more routes, improved headways, and vanpool and ride-sharing programs) are being implemented across Lake Washington to provide more affordable and convenient options for avoiding the toll.
- Tolls would be lower at non-peak hours.

There would not be a disproportionately high and adverse effect on minorities as a result of project construction or operation on Foster Island. In this case, the finding specifically refers to the tribal cultural resources of Foster Island.

This finding was reached considering:

- Measures in the current project design to minimize effects on the TCP
- The mitigation measures agreed upon as part of consultation under Section 106 of the NHPA

There would not be a disproportionately high and adverse effect to minorities as a result of project construction or operation in Lake Washington and associated waterbodies. In this case, the finding specifically refers to Muckleshoot Indian Tribe's treaty fishing rights.

This finding was reached considering:

- Measures in the project design to minimize effects on tribal fishing
- WSDOT's anticipated execution of an agreement with the Muckleshoot Indian Tribe to fully and fairly resolve issues associated with the impacts of the project on treaty rights.

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Supporting Documents Included in Appendix and Referenced

(e.g., cultural resources reports to support Section 106 findings)

- MD: Red Line FEIS - Support for Wetlands Delineations
- NC: Mid-Currituck FEIS - Support for Section 106 Findings

Techniques to note:
- includes references to correspondence in which regulatory agencies have made specific findings (e.g., jurisdictional determinations for waters of the U.S.)

E, November 2010) and Eastern Mountains and Piedmont Region (USACE, July 2010). These manuals employ a three-parameter approach to wetland identification using hydrophytic vegetation, hydric soils, and hydrology. All three parameters must be present for an area to be considered a jurisdictional wetland under Section 404 of the Clean Water Act. Areas that do not meet all three of these parameters, but may still be regulated include palustrine open water (ponds), stream systems (waterways), and certain disturbed areas.

Agency field reviews were conducted with the USACE and the Maryland Department of the Environment (MDE) on May 9 and September 27, 2012 to gain agency jurisdictional determination concurrence on the waters of the US and wetland boundaries. Informal concurrence on the wetland and waterway boundaries was received in the field as reflected in meeting minutes, however, the preliminary jurisdictional determination letter formally documenting this concurrence is pending. The wetlands and waterways described below and shown on the mapping provided in the **Volume 2 Environmental Plate Series, Plate Series 2** reflect the results of these field reviews with the boundaries as shown. Minutes of the agency field reviews are provided in the *Natural Resources Technical Report* in **Appendix I** of this FEIS.

5.18.2 Existing Conditions

During the field investigation, 19 wetlands and 19 waterways were identified. All of the wetlands and waterways have been influenced to some degree by the intense development in the project study corridor, and the majority of the systems identified have been heavily manipulated through past ditching or filling. Despite the high degree of manipulation, these areas may still provide some limited functions such as groundwater discharge/recharge, wildlife habitat, and sediment trapping. The least affected and highest functioning wetlands in the project study corridor are those vegetated systems located in the forested floodplain of Dead Run and its tributaries along I-70 (W13, W18, and W21). These wetlands would be expected to provide groundwater discharge/recharge, flood desynchronization, terrestrial and aquatic wildlife habitat, and water quality benefits such as nutrient uptake and sediment trapping.

Each of the waters of the US, including wetlands, identified during the field investigation is described in detail in the *Natural Resources Technical Report.* The locations of waters of the US, including wetlands, are shown on detailed maps provided in **Volume 2 Environmental Plate Series, Plate Series 2**.

5.18.3 Future No-Build Conditions

The No-Build Alternative would not result in changes to the natural environment and no short and long-term effects are anticipated. A discussion of the effects from the Preferred Alternative follows.

5.18.4 Preferred Alternative

Effects to waters of the US, including wetlands, resulting from the Preferred Alternative, are shown in **Table 5-46**. At this stage of design, calculated effects are based on the anticipated limit of disturbance and include both long-term, permanent effects from project structures and facilities needed for operation of the transitway, and short-term, temporary effects from project construction. Both short- and long-term combined effects were calculated together,

Techniques to note:
- includes references to correspondence in which regulatory agencies have made specific findings (e.g., effects findings under Section 106 of the NHPA)

Improvements at the Dexter W. Snow Hours are not a part of the Preferred Alternative. The benefits and limitations of the two options for reducing hurricane evacuation clearance times are discussed in Section 2.1.10. In the case of ER2, emergency management officials have indicated that the 27-mile lane reversal associated with ER2 is not a realistic option.

Concurrence was requested and received from the HPO under the requirements of Section 106 of the National Historic Preservation Act of 1966 that the detailed study alternatives would not adversely affect the activities, features, and attributes that qualify the Dexter W. Snow House for protection under Section 4(f). That effects determination is included under "Historic Architectural Resources Supplemental Materials" on the CD that accompanies this FEIS, at public review locations listed in Appendix C, and on the NCTA web site at http://www.ncdot.gov/projects/midcurrituckbridge/. Thus, it appears there were grounds for a finding of *de minimis* (minimal) effect. Section 4(f) property may be used when FHWA determines that the use of the property, including any measure(s) committed to in order to minimize harm (such as any avoidance, minimization, mitigation, or enhancement measures), would have a *de minimis* impact on the property (as defined in Title 23 CFR, Section 774.17). A *de minimis* impact determination under Title 23 CFR, Section 774.3(b) considers the requirement for all possible planning to minimize harm by reducing impacts on the Section 4(f) property to a *de minimis* level (Title 23 CFR, Section 774.117[5]). By publishing the DEIS, FHWA requested comments on the proposed finding of *de minimis* impact for the Dexter W. Snow House. None were received. A finding of *de minimis* impact for this property is not needed for the Preferred Alternative since it does not include a third outbound lane on US 158 and would not affect this property.

3.3 Natural Resource Characteristics and Impacts

This section considers the impacts of the detailed study alternatives, including the Preferred Alternative, on natural resources in the project area. It considers:

- How would water resources in the project area be affected?
- How would biotic resources be affected?
- How would wildlife on land be affected?
- How would aquatic wildlife be affected?
- How would invasive species be controlled?
- What impacts would occur to waters under the jurisdiction of the US Army Corps of Engineers?
- Would habitat used by threatened and endangered species be affected?

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Chapter 16. Responses to Comments on NEPA Documents

The CEQ regulations require the final EIS to include responses to comments on the draft EIS and require copies of "all substantive comments on the DEIS (or summaries thereof where the response has been exceptionally voluminous)" to be attached to the final EIS (40 CFR 1503.4).

The CEQ has not prescribed any specific format for responding to comments. However, in its "40 Questions" guidance, the CEQ does acknowledge that grouping comments is an acceptable practice: "If a number of comments are identical or very similar, agencies may group the comments and prepare a single answer for each group."[1] That guidance also emphasizes the need for specificity, especially when responding to specific criticisms of methodologies.

In more recent guidance, CEQ has emphasized that responses to comments on a draft EIS should be "reasonable and proportionate."[2] This guidance suggests that brief responses are adequate in some cases, while the more complex and important questions should be addressed in greater detail.

In general, high-quality responses to comments will ensure that:

- Readers can readily ascertain the overall range of issues raised in the comments and understand how those issues have been addressed.
- Individual commenters can readily locate their own comments and the responses to their comments.
- Responses to similar comments are consistent with one another.
- The main body of the NEPA document is consistent with the responses.
- Specific, substantive comments receive specific, substantive responses.

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[1] Council on Environmental Quality, "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations" (March 1981), Question 29a, http://energy.gov/sites/prod/files/G-CEQ-40Questions.pdf.
[2] Council on Environmental Quality, "Process for Preparing Efficient and Timely Environmental Reviews Under the National Environmental Policy Act," 77 Fed. Reg. 14473 (March 12, 2012).

The following practices tend to promote readability and consistency in responses to comments, and are especially beneficial when comments are voluminous or raise complex issues:

- *Include an index of all commenters, showing where responses can be found.* One of the simplest and most effective aids to navigation is an index that lists all commenters individually, with a cross-reference to the locations where responses to their comments can be found.

- *Provide summary responses to common issues.* As noted above, the CEQ specifically allows similar comments to be grouped and addressed in a single response. This approach not only reduces duplication and streamlines the preparation of responses; it also makes it easier for readers to understand the range of issues presented and how those issues have been addressed. One variant on this approach is to provide summary responses to frequent comments (e.g., a "top 10"), combined with individual responses for all comments.

- *Annotate comment letters with cross-references to relevant responses.* When summary responses are provided, it can be difficult for readers to understand how their individual comments have been addressed. It is beneficial to provide a tool that correlates the individual comments to the summary responses. One effective approach is to annotate the comment letters (e.g., by bracketing each comment and assigning it a code that refers to the applicable response.)

- *Summarize key issues raised by regulatory agencies.* Many readers have an interest in understanding the concerns raised by agencies that have a role in reviewing or approving the project – for example, the U.S. Environmental Protection Agency. For these readers, it is helpful to include a synopsis of the comments received from the agencies. The synopsis can be included in the public involvement chapter of the final EIS, or in the appendix that includes responses to comments.

- *Prepare technical memoranda to support responses to comments that raise technical issues.* In some cases, a comment raises specific concerns that are difficult to address thoroughly in a few paragraphs. Where a more extended response is needed, a technical memorandum can be prepared and attached to the responses.

Agency Comments Are Summarized in Main Body of FEIS

- IL: Elgin O'Hare FEIS

Techniques to note:
- summarizes the key issues raised by resource/regulatory agencies in their comments on the DEIS

5.3.7 Web Site

The project Web site (www.elginohare-westbypass.org) provides information that can be accessed at the convenience of the user. The site began service on September 7, 2007, and is updated regularly. General project information and topic-specific details are provided. Materials are available for viewing or downloading, including project documents and reports such as the project purpose and need, meeting materials and minutes, and public involvement materials, such as newsletters and press releases. The alternatives under the various stages of development and screening are posted for public review and comment, including the alternatives carried forward. A page is also provided for those who wish to submit comments. Responses to comments are provided and become part of the project record. The page has received over 700 hits since it began service.

5.3.8 Mailing List

A project mailing list was developed using available information including names and addresses of officials from other recent projects in the area, and Internet searches. The list is updated regularly with attendance lists from public meeting, speaker bureau events, and so on. The list is comprehensive including government and business leaders, area residents, and special interest groups. It is used as a distribution list for newsletters, meeting and workshop invitations, and project documents. The mailing list has about 2,000 entries.

5.4 Draft EIS Comments

The Notice of Availability for the Draft EIS was published in the Federal Register on September 11, 2009. The comment period closed on October 26, 2009. During that time, 74 comments were received from regulatory/resource agencies, municipalities, and other stakeholders. Overall, agency representatives indicated that the build alternatives' environmental and social impacts are comparable and identified actions to be taken in Tier Two. No comments required reconsideration of the range of alternatives or the technical analyses contained in the document. Nine letters or resolutions were submitted by local governmental entities in the study area, four of which were resolutions passed in favor of Alternative 203 and/or Option D; one expressed a preference for Alternative 402. Others focused on issues important to the communities in the next phase of the project such as noise abatement, stormwater management, and preserving transit as a part of the solution. Fifty-seven comments were received from the public at-large, and most (41) supported Alternative 203 and/or Option D. Other comments included requests for specific information or clarification of the proposed concept.

The following section is a summary of substantive comments from agencies and municipalities. Copies of all comments and complete responses to substantive comments are contained in Appendix D.

5.4.1 Resource/Regulatory Agency Comments

5.4.1.1 USEPA

The USEPA noted that the project team provided an abundance of opportunities for stakeholders to be engaged in the process and was able to identify a manageable number of reasonable alternatives in such a sizeable project area. The agency assigned a rating of "Lack of Objections" to the Draft EIS and the two build alternatives indicating that no changes to the document and alternatives are required. The USEPA identified environmental resources that will require detailed impact analysis in Tier Two along with evaluation and identification of impact mitigation measures including wetlands, air, and stormwater management. Finally, the agency requested that additional information be provided on conceptual mitigation measures for wetland impacts in the Tier One Final EIS. USEPA's comment (C-1) can be found starting on page D_5-1.

IDOT, in the agency's response, acknowledged that the resources identified in the USEPA's letter would receive detailed evaluation in Tier Two and detailed mitigation measures would be identified. The agency noted that conceptual wetland mitigation measures were described in Section 4.13.5, *Wetland Mitigation*, of the Draft EIS, but that additional information will be added, as appropriate, and a reference to this subsection would be added to the wetland impacts discussion in the Final EIS. IDOT's response (R-1) can be found starting on page D_5-5.

5.4.1.2 USFWS

The USFWS acknowledged that detailed engineering studies and environmental impact analysis would occur during Tier Two, but requested information related to potential noise impacts to birds, lists of birds found in forest preserves, and cumulative effects of edge takes on parks and forest preserves be included in the Tier One Final EIS. USFWS's comment (C-2) can be found starting on page D_5-6.

IDOT's response stated that general information relating to potential traffic noise impacts on birds would be included in the Tier One Final EIS. In subsequent discussions regarding this issue, USFWS requested additional information to determine the need for further studies in Tier Two. Data was assembled and showed that current traffic levels far exceeded the threshold of disturbance to birds at locations of concern. The USFWS determined that no further study of the issue was warranted in Tier Two. In the agency's response, IDOT also confirmed it would include the list of birds found in forest preserves in the Tier One Final EIS. Finally, IDOT noted that it will include a general discussion on the cumulative effects of edge takes on parks and forest preserves in the Tier One Final EIS, but that detailed engineering design developed in Tier Two of the process would be required to provide a more detailed analysis of the cumulative effects of edge takes on such special lands. IDOT's response (R-2) can be found starting on page D_5-9.

5.4.1.3 USACE

The USACE remarked that all of the agency's comments on this project had been successfully addressed and that the agency did not have any additional comments on the Tier One Draft EIS. The USACE also identified activities the agency may require during Tier Two. As a follow-up to the USACE's letter, IDOT held further discussions with USACE to discuss the preferred alternative and the rationale for its identification. During these discussions, USACE requested additional information to assist the agency in its determination of concurrence. USACE's comment (C-3) can be found starting on page D_5-12.

IDOT, in response, provided additional information to support the agency's determination of concurrence. Information included clarification of the tiering process and the purpose and intent of Tier One and Tier Two. Other information included clarification of the wetland data used for Tier One, meeting minutes addressing the agency's agreement to utilize existing and available data for Tier One analysis, and meeting minutes summarizing the outcome of the agency field visit. Information was also included that showed the relative differences of wetland impacts between Alternative 203 and 402 and roadway operational performance. IDOT's response (R-3) can be found starting on page D_5-14.

5.4.1.4 IDNR and IEPA

IDNR and IEPA noted no objection to the project and described the alternatives' impacts as comparable. Both agencies identified measures to be taken in Tier Two, including evaluating stormwater permit needs and applying the "avoidance and minimization" concept of reducing impacts to environmental resources. IDNR and IEPA's comments (C-4 and C-5) can be found starting on pages D_5-45 and D_5-47.

In the agency's responses, IDOT acknowledged the actions required by the resource agencies for Tier Two. IDOT's responses (R-4 and R-5) can be found starting on page D_5-46 and D_5-48.

5.4.2 Local/Other Agency Comments

5.4.2.1 City of Des Plaines

The City of Des Plaines requested a list of businesses and residences that would be displaced by Alternatives 203 and 402. The City also requested clarification as to whether the Des Plaines Oasis would be removed as a result of Alternative 203 and why congestion is expected to worsen on arterials within Des Plaines under both build alternatives. Des Plaines also identified corrections on two exhibits in the Draft EIS. Finally, Des Plaines indicated a preference for Alternative 402 because it satisfies the purpose and need with fewer impacts to Des Plaines than Alternative 203. The City of Des Plaines's comment (C-6) can be found starting on page D_5-49.

IDOT, in response, noted that a list of businesses and a map showing displacements resulting from Alternatives 203 and 402 were provided at the November 16, 2009 meeting with the city and confirmed that the Des Plaines Oasis would be removed to accommodate the Alternative 203 improvements. Regarding increased congestion on arterials proximate to the Elmhurst Road/I-90 interchange, IDOT noted that travel demand increases on secondary roadways that provide interstate access; as a result, travel performance decreases on arterials near freeway interchanges. In Des Plaines, Alternative 203 would cause slightly greater congestion on local arterials than Alternative 402.

IDOT indicated that as the process moves to Tier Two, more refined traffic studies will be conducted, and further coordination with the City will be necessary to review the new information and supporting improvement needs. IDOT confirmed that the exhibit changes would be made for the Final EIS. Regarding Des Plaines's preference for Alternative 402, IDOT communicated that the agency considered the City's input, but after also considering travel performance, environmental and social impacts and benefits, and other public comments, Alternative 203 was identified as the Preferred Alternative.

FEIS Includes Index of All Commenters on DEIS

(with references indicating where responses can be found)

- MD: Red Line FEIS
- WA: Mukilteo FEIS

Techniques to note:
- includes an index of all commenters with reference to page where comment and response is located
- groups commenters by type (agencies, organizations, etc.)

Index of Comments Received

Agency Comments

Elected Official Comments

Organization Comments

Techniques to note:
- includes an index of all commenters with reference to page where comment and response is located
- groups commenters by type (agencies, organizations, etc.)

K. DRAFT EIS COMMENTS AND RESPONSES

Item Code **Item Name**

(This page is intentionally left blank.)

Responses to Frequent Comments on DEIS Are Summarized

(e.g., in public involvement chapter in main body of FEIS)

- MD: Red Line FEIS - responses to “common themes”
- WA: I-90 Snoqualmie FEIS - responses to “top 10”

Techniques to note:
- summarizes common issues raised in comments and provides summary responses to those issues
(Note: this EIS also responded to each comment individually.)

9. AA/DEIS Public Comments Summary

9.1 Introduction

The Alternatives Analysis/Draft Environmental Impact Stat
Corridor Transit Study was approved on September 2, 2008. Subsequently, the document was made available to the public and appropriate federal, state, and local agencies for review and comment. (Refer to the Distribution List in the Appendix of the AA/DEIS, pages A-6 and A-7.) The formal Notice of Availability was published in the Federal Register on October 3, 2008 initiating the 90-day public review and comment period (October 3, 2008 through January 5, 2009). Comments received during this period were in the form of written correspondence (which included letters, emails, and comment forms) and verbal testimony at one of four public hearings held for the project. For additional information about the public involvement associated with the AA/DEIS, refer to **Chapter 8** of this Final Environmental Impact Statement (FEIS).

Changes to this Chapter since the AA/DEIS

This is a new chapter for the FEIS. This chapter summarizes the comments received during the 90-day public comment period and provides the context for **Appendix A** of this FEIS where the official response to each of the 729 comments including six petitions received is provided. Issues raised in the comments have also been addressed throughout this FEIS where appropriate.

9.2 Summary of Comments Received

Of the total comments received, 164 comments were from elected officials, agencies, or organizations, 559 from individuals, and six petitions. During the 90-day public review and comment period there were multiple ways comments could be submitted to the Maryland Transit Administration (MTA): email or online comment form through the project website, oral testimony at four public hearing meetings, letters addressed to the MTA or Federal Transit Administration (FTA), or hard copy comment forms available at the public hearings or locations where the document was available for public review. A summary of the comments received by method is listed below. Please note that some organizations and individuals commented using more than one method or submitted multiple emails, letters, comment forms, or testimonies. Each individual comment has been counted once, regardless of who submitted the comment.

9.3 Response to Common Themes in Comments Received

The comments received included many common themes or issues raised. The following is a summary of the most common themes and issues raised in the AA/DEIS comments received and a response is shown in *italics.*

9.3.1 Support for Red Line Project

Comments were received which did not specify support for a specific alternative, as presented in the AA/DEIS, but supported the Red Line project in general and emphasized the need for transit improvements in the Baltimore Region.

The Preferred Alternative presented in the FEIS improves transit in the Baltimore Region, as your comment recommends. The Preferred Alternative is a light rail transit line, with tunnels under *downtown Baltimore and Cooks Lane, primarily surface in other portions of the corridor, and a limited amount of aerial structure. Since 2009, refinements and enhancements to the 2009 Locally Preferred Alternative have been made based upon further environmental analysis, engineering, cost estimating, geotechnical investigation, input from stakeholders, and the public involvement program. Some of these refinements include new alignment along Security Boulevard as opposed to through the Security Square Mall property, alignment along I-70 and the highway ramp from I-70 westbound to I-695 northbound, slight extension of the Cooks Lane tunnel, new alignment along Franklintown Road, tunnel under Fremont Avenue, new aerial from Norfolk Southern right-of-way over I-895 to Johns Hopkins Bayview Medical Center, and new alignment on the Bayview Campus. These refinements, along with the decrease from 20 stations to 19 stations, have resulted in the Preferred Alternative presented in the FEIS. A description of the Preferred Alternative can be found in Chapter 2 of the FEIS. An evaluation of the Alternatives which led to the Preferred Alternative can be found in Chapter 7 of the FEIS. The Preferred Alternative meets the project purpose and need and also is consistent with your comments on the need for the Red Line Build Alternative.*

9.3.2 Requesting the No-Build Alternative

Comments were received requesting selection of the No-Build Alternative, rather than support the Red Line project. While some comments provided no justification for this request, others suggested that the project is not needed, the resultant impacts to residences would not justify the need, or MTA should focus on improving existing services.

The No-Build Alternative represents the future conditions of transportation facilities and services in 2035 if the Red Line is not built. The No-Build Alternative integrates forecasted transit service levels, highway networks and traffic volumes, and demographics for the year 2035 for projects identified in the 2011 Baltimore Regional Transportation Board's Constrained Long Range Plan (CLRP), Plan It 2035. The CLRP consists of the existing highway and transit network as well as planned and programmed (committed) transportation improvements. The No-Build Alternative represents a continued investment in regional and local transportation projects, but does not address the purpose and need of reducing travel times, increasing transit accessibility, providing transportation choices for east-west commuting, or supporting community revitalization and economic development opportunities.

Under the No-Build Alternative, existing and future populations along the study corridor would continue to be served by the local bus system, with only planned and programmed transit improvements. Congestion on the roadways and highways would continue to negatively impact the reliability of travel by automobile and bus. The No-Build Alternative end-to-end transit travel time in 2035 is projected to be 79 minutes, whereas The Preferred Alternative would operate with an end-to-end transit travel time of 45 minutes, nearly half the travel time of the No-Build Alternative.

The Preferred Alternative would improve the quality of east-west transit service along the project study corridor by providing frequent and reliable service. Light rail traveling in a dedicated right-of-way would not be subject to congested roadway conditions, resulting in dependable, on-time service. The Preferred Alternative would provide park-and-ride facilities and feeder bus service to enhance access to the rail transit service and expanding the ridership *market. The Preferred Alternative will not require any acquisition of real property that would result in an involuntary residential displacement.*

Chapter 7 of the FEIS compares the No-Build Alternative with the Preferred Alternative while providing detailed information on transit efficiency and accessibility, transportation choices, system wide transit connections, and community revitalization and economic development.

9.3.3 Support for Alternative 4C

Several comments were received expressing support of Alternative 4C as presented in the AA/DEIS. Other comments noted support for Alternative 4C with various modifications.

The Locally Preferred Alternative selected in 2009 by the State of Maryland, with input from local governments, most closely resembles Alternative 4C in the AA/DEIS. Alternative 4C in the AA/DEIS was light rail in mode, with tunnels under downtown Baltimore and Cooks Lane, primarily surface in other portions of the corridor, and a limited amount of aerial structure. Since 2009, refinements and enhancements to the 2009 Locally Preferred Alternative have been made based upon further environmental analysis, engineering, cost estimating, geotechnical investigation, input from stakeholders, and the public involvement program. Some of these refinements include new alignment along Security Boulevard as opposed to through the Security Square Mall property, alignment along I-70 and the highway ramp from I-70 westbound to I-695 northbound, slight extension of the Cooks Lane tunnel, new alignment along Franklintown Road, tunnel under Fremont Avenue, new aerial from Norfolk Southern right-of-way over I-895 to Johns Hopkins Bayview Medical Center, and new alignment on the Bayview Campus. These refinements along with the decrease from 20 stations to 19 stations, have resulted in the Preferred Alternative presented in the FEIS. A description of the Preferred Alternative can be found in Chapter 2 of the FEIS.

9.3.4 Support for a Heavy Rail Alternative

Comments were received stating that a heavy rail alternative should be studied in the AA/DEIS.

Two alternatives which incorporated Heavy Rail were considered in the AA/DEIS for the Red Line. They were described in Chapter 2, page 29 of the AA/DEIS. Each of these alternatives was proposed by members of the public.

The first of the two alternatives was a full Heavy Rail Alternative from Social Security Administration to Greektown, 14.3 miles. This alternative was estimated to cost $2.383 Billion in 2007 dollars. The alternative was not carried forward through full analysis in the AA/DEIS due to its high capital cost as compared to Light Rail and Bus Rapid Transit Alternatives being studied. The Preferred Alternative for the Red Line in the FEIS has a cost of $2.575 Billion in year-of-expenditure dollars. The year-of-expenditure dollars are based on a schedule that has the Red Line opening in 2021 and escalation occurring at a rate of +3.1 percent per year. Escalating the previously studied Heavy Rail Alternative capital cost at the same rate that is being used for the Preferred Alternative, with a project opening in 2021 and a mid-point of construction in the year 2018, yields a year-of-expenditure capital cost of $3.334 Billion. This cost estimate for Heavy Rail is $759 Million higher than the Preferred Alternative. This 30 percent cost differential still renders the Heavy Rail Alternative as too costly when compared with the Preferred Alternative.

Techniques to note:
- summarizes common issues raised in comments and provides summary responses to those issues

Exhibit 1-6
Top 10 Comments on the Draft EIS

Comment	WSDOT Response
1. I support this project.	Thank you for your comments and your support of the I-90 project.
2. WSDOT should choose Keechelus Lake Alignment Alternative 1.	FHWA and WSDOT identified Keechelus Lake Alignment Alternative 4 as the Preferred Alternative based on the IDT's recommendations. FHWA and WSDOT did not recommend any of the tunnel alternatives, including Alternative 1. Tunnels were all found to have severe operational problems and high construction and maintenance costs. The high cost of tunnel construction would have forced WSDOT to reduce its investments in ecological connectivity improvements or to seek additional funding from the Washington State Legislature. The identified Preferred Alternative makes maximum use of the existing alignment, allows funding for the maximum number of connectivity structures, and most effectively satisfies the project's purpose and need.
3. WSDOT should choose Improvement Package A at all CEAs where this choice exists.	FHWA and WSDOT identified the Preferred Alternative based on the recommendations of the project's IDT and MDT. In general, the IDT and MDT recommended the CEA options included in Improvement Package A. When Option A did not represent the best connectivity option, the IDT identified an alternate or modified an option. At Swamp Creek, WSDOT recommended Option B as modified to meet the MDT's recommended bridge height. The IDT created a new option (Option D) for the Price/Noble Creeks CEA and the Kachess River CEA. FHWA and WSDOT adopted the IDT's Preferred Alternative recommendations in June 2006. The IDT and WSDOT also made minor design modifications at Resort Creek, Townsend Creek, Cedar Creek, and Telephone Creek, because the original designs did not fully meet their connectivity objectives. At these locations, except Resort Creek, the IDT recommended increasing the culvert sizes beyond the minimums suggested by the MDT. At Resort Creek, WSDOT would replace the culverts with two bridges.
4. The MDT recommendations should be the primary tool for choosing a preferred alternative.	FHWA and WSDOT used the MDT recommendations as the basis for identifying the Preferred Alternative. The MDT's recommendations appear throughout the Final EIS where appropriate.
5. Wildlife crossing structures can work.	The project includes wildlife crossing structures at all major wildlife crossing areas. WSDOT designed these structures using the recommendation of the MDT, a multi-agency team of biologists and hydrologists whose work is considered the best available science for ecological connectivity in the project area. WSDOT has begun pre-construction wildlife and hydrology monitoring, which will continue during construction and after construction is complete. WSDOT will use the results of this monitoring program when designing the crossing structures for the remaining project area.
6. This project is an important investment for public safety and wildlife.	Increasing ecological connectivity and public safety are part of the project's purpose and need. WSDOT designed the build alternatives to reduce the risk to both wildlife and to the public from wildlife/vehicle collisions.

Exhibit 1-6
Top 10 Comments on the Draft EIS

Comment	WSDOT Response
7. The Draft EIS contains insufficient information regarding stormwater.	Since the Draft EIS, WSDOT conducted additional technical studies on stormwater, which appear in the Final EIS and its appendices. FHWA and WSDOT have committed to treating stormwater runoff for all new and existing impervious surfaces in the project area. In some parts of the project area, stormwater treatment is physically impossible because the highway is located between a steep rock bank and Keechelus Lake, with no additional room. WSDOT will compensate for the lack of stormwater treatment in these areas by providing additional treatment in other areas.
8. WSDOT should purchase additional mitigation area to compensate for impacts to wetlands and forests.	WSDOT designed all of the build alternatives to avoid and have benefits to forests, wetlands, and other sensitive areas. However, there would be some permanent impacts. FHWA and WSDOT will compensate for these unavoidable impacts through appropriate mitigation. Mitigation would be through restoration of wetlands, stream channels, and riparian zones at the CEAs. This approach will yield watershed- and landscape-level benefits that would not be achieved by purchasing isolated mitigation sites. WSDOT has purchased a property in the Gold Creek valley for preservation that contains wetlands and mature forest. In addition, WSDOT is working with federal and state partner agencies on several similar acquisitions. The project generally will not purchase land immediately adjacent to crossing structures because that land is almost all federal land managed by the USFS. FHWA and WSDOT anticipate that the USFS will mange land adjacent to crossing structures in a manner that is consistent with their use for wildlife.
9. Some of the design options do not meet ecological connectivity objectives.	The Preferred Alternative meets ecological connectivity objectives. Where site conditions allowed, WSDOT developed three design options for each CEA: A, B, and C. The MDT found that in some cases Option C did not meet its ecological connectivity objectives and in response created a new option, which became Option D. In general, the IDT recommended Option A as the Preferred Alternative. At the locations where Option A did not represent the best connectivity option, the IDT modified an option or recommended Option D as the Preferred Alternative. FHWA and WSDOT adopted the IDT's recommendations in June 2006. Option C was not identified as the Preferred Alternative for any of the CEAs.
10. There is insufficient detail in the Draft EIS on the design of the project and its potential impacts.	The Draft EIS was based on the design of the project alternatives at that time. Since publication of the Draft EIS, FHWA and WSDOT focused additional studies primarily on areas suggested by commenters. The Final EIS presents more detailed information on both the project design and potential impacts of all of the build alternatives.

CEA – connectivity emphasis area
EIS – environmental impact statement
FHWA – Federal Highway Administration
IDT – Interdisciplinary Team
MDT – Mitigation Development Team
USFS – US Forest Service
WSDOT – Washington State Department of Transportation

Responses Include Specific Cross-References to Relevant Sections of the FEIS and Appendices

- OR: OR 62 FEIS

Techniques to note:
- responses to comments include specific cross-references to relevant sections of FEIS or technical reports.

Table 7-10 Comments on Draft Environmental Impact Statement and Responses

Commenter No.	Comment No.	Commenter	Affiliation	Comment	Federal Highway Administration (FHWA) Response
Agency Comments					
A1	A1-01	Jeff Bontemps	Jackson County Fire District 3	**Hwy 62 By-pass from Poplar Road to Agate Road** • Double cul-de-sac on Justice Road: As agreed in our meeting, ODOT will provide emergency vehicle access from the west-side of the Hwy 62 By-pass directly onto Justice Road. This access will allow 24/7 emergency access to the residences that populate Justice Road and Peace Lane. This access will include the following essential components: » An improved approach road that will allow emergency vehicles to fully exit all lanes of travel and the shoulder/bike lane. » An automatic gate (open upon siren activation) at the termination of the approach road and the cul-de-sac at Justice Road.	ODOT will provide emergency vehicle access from the west side and east side of the bypass directly to Justice Road, as detailed in this comment. This mitigation is described in Section 2.1.2.3 of the FEIS and illustrated in Figure 2-4, Sheet 7C FEIS.
A1	A1-02	Jeff Bontemps	Jackson County Fire District 3	**Hwy 62 By-pass from Poplar Road to Agate Road** • Vilas Road Interchange: The current design of the Hwy 62 By-pass is such that emergency vehicle access for the entire length of the by-pass can only occur at Poplar Drive on the south-end and Agate Road on the north-end. The unfortunate consequence of this limited access is that Medford Fire and Rescue will be required to mitigate all emergency incidents that occur in the northbound lanes of the by-pass to include those occurring within the jurisdictional boundaries of District 3, and in a similar fashion District 3 will be required to mitigate all emergency incidents occurring in the southbound lanes; including those that occur in the City of Medford. The only viable solution that will remedy this situation is the construction of an interchange at Vilas Road. District 3 strongly encourages ODOT to consider the construction of this interchange as being the first priority project for future by-pass improvements.	The recommendation that ODOT make an interchange at Vilas Road the first priority project for future bypass improvements is acknowledged and is part of the record. The emergency access gates on both sides of the bypass at Justice Road should help alleviate this issue.
A1	A1-03	Jeff Bontemps	Jackson County Fire District 3	**Phase 2 – Hwy 62 By-pass from Dutton Road to Agate Road** • Viaduct over Agate Road: As Greg and I expressed to you and your team, Jackson County Fire District 3 has serious concerns regarding the impacts of having a multi-lane viaduct fronting the District's administration/fire station/training campus at the 8300 block of Agate Road. Although the viaduct is conceptual in nature; with a build date possibly two to three decades into the future, the District anticipates the following impacts: » Encroachment onto District property (easement issues/loss of property).	The Preferred Alternative will not encroach on the property designed to remain within the existing right-of-way of Aga

Commenter No.	Comment No.	Commenter	Affiliation	Comment	Federal Highway Administration (FHWA) Response
A1	A1-04	Jeff Bontemps	Jackson County Fire District 3	» Access onto Agate Road (traveling north and south).	The Preferred Alternative will retain the current access from the station to Agate Road north, but will close Agate Road south of Avenue G. Access from the station to the south will be via either Avenue G and 11th Street, which the project will improve, or via Avenue G and existing OR 62. As a result, emergency response times to some locations, which would currently be accessed via Agate Road south of Avenue G, may increase somewhat. For example, emergency response time to a representative location at OR 62 and OR 140 could increase from 1.5 minutes under No Build to 2.8 minutes with the bypass.
A1	A1-05	Jeff Bontemps	Jackson County Fire District 3	» Increase in response times to areas that are normally accessed by responding south on Agate Road from Avenue G.	Table 3.5-4 of the FEIS identifies representative travel time comparisons between the build alternatives and the No Build Alternative in which the primary difference would be the removal of Agate Road south of Avenue G. According to these travel time comparisons, emergency response times from this station to OR 62 and OR 140 could increase from 1.5 minutes under No Build to 2.8 minutes with the bypass.
A1	A1-06	Jeff Bontemps	Jackson County Fire District 3	» Increase in traffic noise.	While the Preferred Alternative is predicted to increase noise levels at the administration/fire station/training campus, it will not cause a noise impact, as defined in the July 2011 ODOT Noise Manual.
A1	A1-07	Jeff Bontemps	Jackson County Fire District 3	» All of the challenges associated with mitigating traffic emergencies (motor vehicle collisions, vehicle fires, hazardous material incidents, etc.) that occur on the viaduct.	Accessing motor vehicle collisions, vehicle fires, and hazardous material incidents that occur on the viaduct will take longer than accessing such incidents on surface streets. The selection of the preferred alternative considered the increased difficulty of emergency response on the viaduct in balance with fewer motor vehicle crashes that are expected to occur because more traffic will be on the access-controlled bypass, where accident rates will be lower.
A1	A1-08	Jeff Bontemps	Jackson County Fire District 3	» Limited access on-to and off-of the viaduct.	The viaduct will extend approximately 1,600 feet from Avenue G to north of Avenue H in order to maintain access between the Jackson County Fire District White City Headquarters Station and Agate Road. There will be no access onto and off of the viaduct except at the bypass interchanges at Agate and Dutton Roads.
A2	A2-01	Christine Reichgott	Environmental Protection Agency	(Note: The following comments from the EPA included a cover letter that states that the EPA rating for this Draft EIS as EC-2, Environmental Concerns, Insufficient Information, and summarizes the following detailed comments in a bullet list. These summary bullet points are not included here because the substance of the summary bullet points is already covered in the following detailed comments.)	

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Comment Letters Annotated to Identify Specific Comments

(e.g., with code numbers identifying each comment)

- OR: OR 62 FEIS - letters annotated with comment codes
- WA: Mukilteo FEIS - letters annotated with comment codes

Techniques to note:
- comment letters are annotated to identify each comment and provide a code identifying the corresponding response

Jackson County Fire District 3

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To:	Anna Henson Environmental Project Manager ODOT – Region 3
From:	Jeff Bontemps Deputy Chief of Operations Jackson County Fire District 3
Subject:	Comments Regarding OR 62: I-5 to Dutton Road Project
Date:	October 4, 2012

The purpose of this memo is to formally document the comments, concerns, and recommendations that Battalion Chief Greg Winfrey and I expressed to you, Dick Leever, and Brian Sheadel during our meeting on September 20, 2012.

Hwy 62 By-pass from Poplar Road to Agate Road

Comment A1-01

- Double cul-de-sac on Justice Road: As agreed in our meeting, ODOT will provide emergency vehicle access from the west-side of the Hwy 62 By-pass directly onto Justice Road. This access will allow 24/7 emergency access to the residences that populate Justice Road and Peace Lane. This access will include the following essential components:
  - An improved approach road that will allow emergency vehicles to fully exit all lanes of travel and the shoulder/bike lane.
  - An automatic gate (open upon siren activation) at the termination of the approach road and the cul-de-sac at Justice Road.

Comment A1-02

- Vilas Road Interchange: The current design of the Hwy 62 By-pass is such that emergency vehicle access for the entire length of the by-pass can only occur at Poplar Drive on the south-end and Agate Road on the north-end. The unfortunate consequence of this limited access is that Medford Fire and Rescue will be required to mitigate all emergency incidents that occur in the northbound lanes of the by-pass to include those occurring within the jurisdictional boundaries of District 3, and in a similar fashion District 3 will be required to mitigate all emergency incidents occurring in the southbound lanes; including those that occur in the City of Medford. The only viable solution that will remedy this situation is the construction of an interchange at Vilas Road. District 3 strongly encourages ODOT to consider the construction of this interchange as being the ***first priority*** project for future by-pass improvements.

Phase 2 – Hwy 62 By-pass from Dutton Road to Agate Road

Comment A1-03

- Viaduct over Agate Road: As Greg and I expressed to you and your team, Jackson County Fire District 3 has serious concerns regarding the impacts of having a multi-lane viaduct fronting the District's administration/fire station/training campus at the 8300 block of Agate Road. Although the viaduct is conceptual in nature; with a build date possibly two to three decades into the future, the District anticipates the following impacts:
  - Encroachment onto District property (easement issues/loss of property).
  - Comment A1-04 Access onto Agate Road (traveling north and south).
  - Comment A1-05 Increase in response times to areas that are normally accessed by responding south on Agate Road from Avenue G.
  - Comment A1-06 Increase in traffic noise.
  - Comment A1-07 All of the challenges associated with mitigating traffic emergencies (motor vehicle collisions, vehicle fires, hazardous material incidents, etc.) that occur on the viaduct.
  - Comment A1-08 Limited access on-to and off-of the viaduct.

Thank-you again for taking time out your busy schedule to meet with Greg and me on this very important topic. It was a genuine pleasure meeting each of you. Please give me a call at 541-831-2754 if you have and questions or concerns regarding this memo.

Techniques to note:
- comment letters are annotated to identify each comment and provide a code identifying the corresponding response

United States Department of the Interior

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March 12, 2012

Paul W. Krueger
Project Environmental Manager
Washington State Dept. of Transportation
Ferries Division
2901 3rd Avenue, Ste. 500
Seattle, Washington 98121

Dear Mr. Krueger:

F-001-001

The Department of the Interior (Department) has reviewed the Department of Transportation (DOT), Federal Transit Administration (FTA) and Washington State Department of Transportation (WSDOT), Draft Environmental Impact Statement (DEIS), Mukilteo Multimodal Project, Snohomish County, WA. The Department offers the following comments for use in the development of the Final Environmental Impact Statement (FEIS).

The proposed project is located on the shoreline of Puget Sound, where federally-listed bull trout (Salvelinus confluentus) and marbled murrelets (Brachyramphus marmoratus) occur. Both species are listed as threatened. Additionally, the project vicinity provides habitat for numerous migratory birds, interjurisdictional fish, and other marine resources.

In reviewing the DEIS, the Department's primary concern centers around protection and enhancement of habitats utilized by marbled murrelets. The project vicinity provides year-round foraging habitat for marbled murrelets and they occur with some regularity in the area. The marbled murrelet continues to experience significant declines throughout its range, and in particular, in Washington. Over the past ten years, the species' population has declined by approximately 50% in the state. As such, we are encouraged that the proposed project may present some potential benefits to murrelet foraging habitat. However, based on the information provided in the DEIS, the proposed project presents several pathways for exposure to a variety of stressors. Therefore, the Department provides these comments with the intent of informing the development and selection of alternatives such that impacts to this declining species are avoided.

F-001-001

Thank you for identifying your primary concern centering around the protection of habitats for marbled murrelets, and for identifying issues related to other species and habitats. The Final EIS includes the Biological Assessment prepared by WSDOT and FTA, addressing threatened and endangered species, and the resulting Biological Opinion issued by the Services.

Chapter 17. Changes During the NEPA Process

The environmental analysis presented in a final EIS frequently includes updates to the analysis presented in the draft EIS. Some common examples include updates that result from the availability of new data, changes in background conditions, revisions to traffic or air quality models, or changes in the design or location of alternatives themselves.

When the updates are minimal, an agency can publish a final EIS that consists of "errata pages" and responses to comments on the draft EIS. 40 CFR 1503.4(c). For the reader, this format has the advantage of making it easy to locate the new information; the new information is contained in the errata pages. But one drawback of this format is that the reader has to refer to both the draft EIS and the final EIS, which can be cumbersome.

When the errata-page format is not used, the final EIS consists of an updated version of the entire draft EIS. This format avoids the need for the reader to refer back to the draft EIS. For readers, the main drawback of this format is that it can be difficult to discern the new information within the final EIS.

The following techniques can enhance the readability and completeness of the final EIS by making it easier for the reader to identify content that has changed and new events that have occurred since the draft EIS:

- *Provide a roadmap to key changes at the beginning of each chapter.* One useful technique is to include a brief paragraph at the beginning of each chapter or major section of the final EIS, summarizing the key changes made to that chapter or section since the draft EIS. This approach is especially effective if the key changes are listed in bullets, with cross-references to the locations where the new information can be found.

- *Summarize agency coordination activities since the draft EIS*. Much of the work that occurs between the draft EIS and final EIS involves agency coordination, and often includes important agency actions – for example, a concurrence, finding, or other approval. Documenting these steps in the final EIS helps to demonstrate compliance with regulatory requirements. It also can be a good way to explain additional analysis that was performed at the request of another agency.

- *Acknowledge and explain any important changes to the analysis (e.g., new data, new models, new guidance).* When the final EIS contains updated analysis, it is important to give the reader some understanding of what actually changed. For example, rather than simply saying that traffic forecasts have been updated, the final EIS can explain that a new traffic model became available and was used.

- *Describe refinements to alternatives since the draft EIS.* It is common to make refinements to one or more alternatives – and, most often, to the preferred alternative – between the draft EIS and final EIS. The readability of the final EIS will be enhanced if the document clearly and succinctly summarizes refinements that affected the impacts analysis. One effective approach is to include this summary as part of an introduction to the environmental impacts chapter.

- *Summarizes the results of a reevaluation, if one was prepared.* When analyses are updated between the draft EIS and final EIS, the lead agency may need to prepare a reevaluation as the basis for determining whether a supplemental EIS is required. When a reevaluation is prepared, it is a good practice (although not required) for the final EIS to acknowledge the reevaluation and summarize its findings.

Each Chapter of FEIS Begins with a Brief Summary of Changes to That Chapter Since the DEIS

- IN: I-69 Tier 1 FEIS - land use
- MD: Red Line FEIS - purpose and need
- MD: Red Line FEIS - impacts chapter

Techniques to note:
- changes since DEIS are summarized at the beginning of each chapter or major section in the FEIS

5.2 Land Use Impacts

5.2.1 Introduction

Transportation projects can influence land use changes as a result of direct impacts or indirect impacts (See Section 5.26, *Cumulative Impacts*). Direct impacts are defined by the Council on Environmental Quality (CEQ) regulations as *"effects which are caused by the action and occur at the same time and place"* (40 CFR 1508). For this project, the direct impacts are due to the right-of-way needs of the various I-69 alternatives.

Indirect impacts are defined by the CEQ regulations as *"effects which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate…"* (40 CFR 1508). For this project, the indirect impacts caused by the project have been forecasted using a combination of an economic forecasting model and a transportation planning model.

Since the publication of the DEIS, the following changes have been made to this section:

- Impact calculations have been updated to reflect the selection of variations, route shifts and other changes, as described in Section 5.1.3.
- Additional research concerning the status of local land use plans in the 26 counties in the Study Area.
- Updated the information to incorporate the 160 acres needed for rest areas.

5.2.2 Methodology

The review of land use impacts included (1) a review of all land use plans adopted by counties in the Study Area, and (2) an evaluation of the alternatives to determine consistency with land use plans and to quantify the direct and indirect impacts of each alternative on different land use types, specifically, forest, farmland, wetlands, developed areas, and others.

The direct and indirect impacts of the various alternatives were calculated using the Geographic Information System (GIS) and the economic and transportation planning modeling combination. Section 5.1, *Methodology,* discusses the GIS and explains how this tool is used in identifying impacts for the alternatives. For more information about the GIS approach, see Section 4.1, *The GIS Approach.*

The direct land use impacts of the alternatives corridors consists of the right-of-way needs for the working alignment. This was calculated by placing the estimated roadway cross-sections on top of the United States Geological Survey Land Cover data layer in the GIS. Using tools in the GIS, the land uses impacted due to the cross-sections were grouped into five categories: forest, farmland, wetlands, developed areas, and other. The other category includes such land uses as open water areas, quarries, bare rock areas, shrubland, and urban grasses. The total acreages include the right-of-way needs for the highway as well as the interchanges and rest areas.

The indirect land use impacts were calculated using a combination of the economic forecasting model and transportation planning models. County-level population and employment forecasts to the year 2025 were obtained from Woods and Poole (a nationally recognized company specializing in demographic and economic forecasts). These forecasts were divided into sub-county areas based on existing development patterns and input into the Indiana

Techniques to note:
- changes since DEIS are summarized at the beginning of each chapter or major section in the FEIS

1. Purpose and Need

1.1 Introduction

The need for an east-west transit route through the Baltimore Region was identified in the 2002 *Baltimore Regional Rail System Plan* where the Red Line was designated as a priority project. The purpose and need for the Red Line project was first defined and presented to the public during the scoping process in 2003.

The Maryland Transit Administration (MTA), in coordination with the Federal Transit Administration (FTA), is considering the implementation of the Red Line light rail transit line from western Baltimore County, through the central business district (CBD), to eastern Baltimore City. The Red Line project is intended to improve system connectivity, transportation choices, and mobility in the project study corridor, as well as support economic development efforts and help improve regional air quality.

Changes to this Chapter since the DEIS

Similar to the Alternatives Analysis/Draft Environmental Impact Statement (AA/DEIS), this chapter presents the purpose and need for the project and summarizes the context of the project study corridor. The Final Environmental Impact Statement (FEIS) is a condensed document. Therefore the supporting documentation that was included in Chapter 1 of the AA/DEIS, such as corridor land use, corridor transportation, and agency goals, can now be found in the *Purpose and Need Technical Report* located in **Appendix I**.

The purposes of the project remain the same. However, the wording of the purpose statement has been slightly revised for clarification. The wording of the needs has also been revised to better express needs rather than purposes/goals. Additionally, this chapter includes updated data in support of the purpose and need. Traffic data and forecast data have been updated from 2030 to 2035, which is the FEIS Design Year. The FEIS also assumes the Opening Year for service would be 2021.

Corridor Overview

The project study corridor extends approximately 14 miles from the Centers for Medicare & Medicaid Services (CMS) on the west in Woodlawn (Baltimore County) to the Johns Hopkins Bayview Medical Center campus on the east (Baltimore City). The majority of the project study corridor falls within Baltimore City. The downtown CBD is comprised of commercial and institutional land uses, with densely developed residential areas radiating out toward the city/county boundary.

The 3-mile section of the project study corridor in Baltimore County contains major employment centers, shopping centers, interstate highways, and housing. One of the region's largest employment centers, Social Security Administration, is located in the Woodlawn area. The residential development in Baltimore County is somewhat less dense compared to that of the city.

Traveling east toward the city line, residential densities increase where the pattern of development resembles a grid. Leakin Park and Gwynns Falls Park, large city-owned resources,

Techniques to note:
- changes since DEIS are summarized at the beginning of each chapter or major section in the FEIS

5. Environmental Resources, Consequences, and Mitigation

5.1 Introduction

This chapter presents the environmental resources, anticipated effects to those resources, and measures that have been taken to avoid, minimize, and mitigate unavoidable effects. Additional opportunities to avoid and minimize impacts will be considered as the project continues through Final Design. Both adverse and beneficial effects are described for the No-Build Alternative and for the Preferred Alternative, including short-term construction related effects and long-term operational effects. Because much of the documentation of existing resources and assessment methodologies are included in project technical reports and/or memoranda, this chapter focuses on the effects and mitigation of resources that would occur if the Preferred Alternative is selected for implementation. A brief summary of existing resources and methods is included and the full details can be found in the project technical reports and/or memoranda. Several of the technical reports have been included in **Appendix I**, and other references have been identified in **Appendix D**. These project technical reports and/or memoranda include additional information related to the inventory and assessment of resources and methodologies.

Chapter 3 of this Final Environmental Impact Statement (FEIS), Construction Methods, and Activities provides further detail on how the Preferred Alternative could be built based on the level of engineering prepared to date.

a. Changes to this Chapter since the AA/DEIS

A number of changes have occurred since the Alternatives Analysis/Draft Environmental Impact Statement (AA/DEIS) was issued including level of engineering detail, legislation and guidance, available data, and additional efforts concerning the inventory of resources and potential effects to those resources, as well as mitigation measures. The following is a listing of key changes that have resulted in revisions to the assessment of resource effects and are described in detail by resource in the reminder of this chapter:

- Environmental Justice Circular, effective August 15, 2012, on incorporating environmental justice principles into plans, projects, and activities that receive funding from Federal Transit Administration
- Publication of guidance by Maryland Department of Environment (MDE) in 2010 and 2011 on the technical procedures and calculations for the environmental site design (ESD) requirements under the Stormwater Management Act of 2007.
- Field surveys and delineations of wetlands, trees and forested areas specific to the Preferred Alternative
- Short-term construction effects assessed for a peak construction activity year of 2016
- Long-term effects assessed for the No-Build and Preferred Alternative for 2035
- Use of available 2010 Census data
- Detailed noise and vibration monitoring and assessments for locations along the Preferred Alternative

- Identification of property needs for construction and implementation of the Preferred Alternative
- Identification of locations for traction power substations (TPSSs) and central instrument houses (CIHs) locations as part of additional design for systems elements
- Identification of locatons for above ground elements related to underground station location, such as ventilation buildings and station entrances
- Identification of the operations and maintenance facility location
- Corridor-wide visual assessments, now that more engineering detail is known for stations and other above-ground elements
- Complete Draft Section 4(f) Evaluation (**Chapter 6**)
- Additional historic resource investigations including a refined Area of Potential Effect (APE), coordination with Consulting Parties and meetings, and archeological field investigations
- Further geological field investigations
- Additional investigation of potential contaminated soils
- More detail on utilities along the project study corridor

The following sections present the environmental resources, anticipated effects to those resources, and measures that have been taken to avoid, minimize, and mitigate unavoidable effects. Existing resources were identified, and environmental effects were assessed for the entire project study corridor, which is generally defined as the study area for the Preferred Alternative, including the project's proposed limit of disturbance. The No-Build Alternative was also assessed as a baseline condition.

5.2 Land Use and Zoning

5.2.1 Introduction and Methodology

The section characterizes and documents the land use, zoning, and development trends in the project study corridor. For assessment purposes, an area extending approximately 200 feet on both sides of the centerline of the Preferred Alternative alignment and within a one-half mile radius surrounding proposed stations, park-and-ride lots and other ancillary facilities, including tunnel portals and ventilation buildings, have been considered.

Information about land use was gathered by reviewing the comprehensive plans and zoning maps for Baltimore County and City, as well as through verification from field visits to the project study corridor. Additional details related to this Final Environmental Impact Statement (FEIS) subject area can be found in the 2012 *Land Use, Zoning, and Public Policy Technical Memorandum* (**Appendix D)**.

For the purposes of this chapter, it should be understood that a change in use of a single parcel is not the same as a change in the land use of the surrounding neighborhood. A commercial district that loses one commercial building is still a commercial district. Similarly, a residential

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Post-DEIS Agency Coordination Is Summarized

(with dates of important meetings)

- NC: Mid-Currituck FEIS - lists agency meetings since DEIS

Techniques to note:
- FEIS includes a summary of agency coordination that has occurred since the DEIS

comments are reflected in revisions to the DEIS assessment of impacts that are included in this FEIS.

Post-DEIS Submittal Agency Involvement

Several meetings were held with local government officials and state and federal environmental resource and regulatory agencies after the release of the DEIS, most of which focused on the selection of the Preferred Alternative and refinements being made to further avoid, minimize, and mitigate its impacts. Table A-6 provides a summary of the agency coordination meetings that have occurred since the release of the DEIS. Meeting summaries and complete meeting minutes are included in the *Stakeholder Involvement for Final Environmental Impact Statement Technical Memorandum* (Parsons Brinckerhoff, 2011). Both the responses to DEIS comments and the outcomes of the meetings listed in Table A-6 are reflected in revisions to the DEIS assessment of impacts that are included in this FEIS.

Table A-6. Post-DEIS Submittal Agency Coordination Meetings

Date	Topics of Discussion
Local Officials Meetings	
May 18 and 19, 2010	Local officials were briefed on the DEIS and its findings prior to public hearings on the same days.
July 16, 2010	Coordination with county representatives on issues raised in agency and public comment on the DEIS.
Turnpike Environmental Agency Coordination (TEAC) Meetings	
March 9, 2010	Presentation of an overview of the DEIS format and findings; discussion of construction options in Currituck Sound, including construction moratorium applicability in Currituck Sound; discussion of recent and future public involvement activities and schedule.
August 10, 2010	Discussion of DEIS comments, the Preferred Alternative Identification Information Package (Handout 23 in Appendix B of the *Stakeholder Involvement for Final Environmental Impact Statement Technical Report* [Parsons Brinckerhoff, 2001]), and "practicable" as it relates to project funding.
September 8, 2010	Discussion of bridge stormwater management, bridge construction methodologies, and the practicability of ER2.
November 2, 2010	Discussion of new groundwater and surface water hydrology studies in Maple Swamp and FHWA/NCTA's Preferred Alternative.
January 20, 2011	Further discussion of FHWA/NCTA's Preferred Alternative and refinements made since the November meeting. NCTA indicated that they planned to announce the selection of MCB4/A/C1 with refinements as the Preferred Alternative.

Table A-6 (concluded). Post-DEIS Submittal Agency Coordination Meetings

Date	Topics of Discussion
Other Agency Meetings	
August 19, 2010	Discussion with Currituck and Dare county emergency management officials to solicit input on the hurricane evacuation improvement options presented in the DEIS, as well as on which option to select as the hurricane evacuation clearance time improvement component of the Preferred Alternative.
October 1, 2010 and March 21, 2011	Discussions with the North Carolina Department of Environment and Natural Resources, Division of Water Quality (NCDENR-DWQ) to gain collectively an understanding of what could be reasonable and permitable approaches to stormwater management for a Mid-Currituck Bridge project that employs the best management practices (BMPs) to meet the provisions of NC Session Law 2008-211 to the maximum extent practicable.
April 6, 2011	Continued coordination with the US Army Corps of Engineers (USACE), National Marine Fisheries Service (NMFS), North Carolina Wildlife Resources Commission (NCWRC), NCDENR-DWQ, NCDENR-Division of Coastal Management (DCM), and NCDENR-Division of Marine Fisheries (DMF) on what could be reasonable and permitable approaches to construction of the Mid-Currituck Bridge with the Preferred Alternative that would minimize or mitigate impacts on fisheries and SAV.

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Post-DEIS Refinements to Alternatives Are Described

(e.g., design changes made in response to comments)

- OR: OR 62 - changes in preferred alternative
- WA: SR 520 - compares preferred alternative to DEIS alts.
- MD: Red Line FEIS - alternatives chapter

Preferred Alternative (Split Diamond Alternative with Design Option C)

Techniques to note:
- FEIS includes a summary of design refinements that have occurred since the DEIS
- FEIS describes updated to No Build alternative since DEIS, as well as updates to traffic forecasts

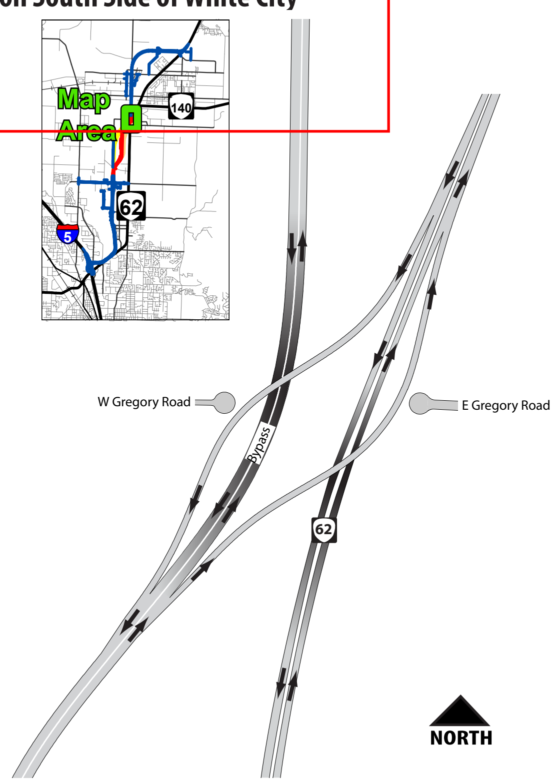
ODOT and FHWA have identified the SD Alternative with Design Option C as the Preferred Alternative. Several design refinements have occurred since the publication of the DEIS. This section describes the SD Alternative as it was studied in the DEIS and describes the design changes that were made for the FEIS.

Sheets 1A, 1B, 2A, and 3 to 13 of Figure ES-2 show the Split Diamond (SD) Alternative. Under it, the existing interchange between OR 62 and I 5 would be converted to a split diamond interchange design. Sheets 1A and 1B of Figure ES-2 shows the split diamond interchange design. East of the interchange, the bypass would be elevated on fill slope, cross over Biddle Road, Hilton Road, and Bullock Road on overpasses, then descend to ground level. See Sheets 1A, 1B, and 2A. At approximately Whittle Avenue, the bypass would turn north. The bypass would remain at-grade until just south of Vilas Road, where it would ascend on fill and cross over Vilas Road. See Sheet 6. A single-point urban interchange (SPUI) would provide connections between the bypass and Vilas Road. Sheet 6 of Figure ES-2 contains a diagram of the Vilas Road SPUI. The dotted lines show left turn movements between the proposed bypass and Vilas Road. A single traffic signal would control these movements. The intersection and signal would be at grade level, beneath the bypass overpass.

Three minor changes to the design of the Preferred Alternative have been made in this area. First, an exclusive right-turn lane from existing OR 62 southbound to Bullock Road westbound has been added as shown on Sheet 2A FEIS of 13 of Figure ES-2. Second, the bypass will cross over Commerce Drive on an elevated structure, rather than Commerce Drive ending in a cul-de-sac at the bypass, as shown on Sheet 3 FEIS of 13 of Figure ES-2. This will enable Commerce Drive to continue to serve as the main approach road to the United States Citizenship and Immigration Services (USCIS) building and other commercial facilities located on the eastern edge of the Medford Airport. Extending Commerce Drive under the bypass also makes it possible to remove from the project the extension of roadway access to the USCIS building and other buildings from Vilas Road via Airway Drive (as shown on Sheet 4 of 13 of Figure ES-2). Third, the interchange at Vilas Road will be a tight diamond design rather than a SPUI to reduce project cost, as shown on Sheet 6 FEIS of 13 of Figure ES-2. The estimated cost savings is $5.25 million (ODOT 2012).

The traffic analysis has been updated to incorporate design refinements to the Preferred Alternative, including updating the No Build Alternative to include the updates to the projects described above that have been included in the RTP following the distribution of the DEIS.

Figure ES-3 Proposed Directional Interchange on South Side of White City



As Figure ES-2 shows, there are three design options for the bypass alignment between the Vilas Road interchange and the interchange on the south side of White City. The three design options would function the same, but are intended to offer a choice among different combinations of impacts on vernal pool wetlands, farmland, and businesses. Regardless of design option, the bypass would bisect Justice Road. On the east side of the bypass, Justice Road would terminate in a cul-de-sac. On the west side of the bypass, Justice Road would intersect with the Justice/Gregory connector road. This is shown in Sheets 7A, B, and C of Figure ES-2.

ODOT and FHWA have identified Design Option C as part of the Preferred Alternative. Two changes have been made to the design of the Preferred Alternative in this segment. The Justice/Gregory connector road has been eliminated from the project to reduce project cost and will not be built. The estimated cost savings is $1.6 million (ODOT 2012). Justice Road will end in a cul-de-sac on both the east and west side of the bypass. Gates will be included at the end of each cul-de-sac to allow emergency vehicles to enter or leave the bypass, providing for better emergency response times. These changes are shown on Sheets 7C FEIS and 8C FEIS of Figure ES-2.

Techniques to note:
- FEIS summarizes differences between Preferred Alternative and the alternatives studied in the DEIS

Table ES-6. **Preferred Alternative compared to SDEIS**

Geographic Area	Preferred Alternative	Comparison to SDEIS Options A, K, and L
I-5/Roanoke Area	The SR 520 and I-5 interchange ramps would be reconstructed with generally the same ramp configuration as the ramps for the existing interchange. A new reversible transit/ HOV ramp would connect with the I-5 express lanes.	Similar to all options presented in the SDEIS. Instead of a lid over I-5 at Roanoke Street, the Preferred Alternative would include an enhanced bicycle/ pedestrian path adjacent to the existing Roanoke Street Bridge.
Portage Bay Area	The Portage Bay Bridge would be replaced with a wider and, in some locations, higher structure with six travel lanes and a 14-foot-wide westbound managed shoulder.	Similar in width to Options K and L, similar in operation to Option A. Shoulders are narrower than described in SDEIS (2-foot-wide inside shoulders, 8-foot-wide outside shoulder on eastbound lanes), posted speed would be reduced to 45 mph, and median plantings would be provided to create a boulevard-like design.
Montlake Area	The Montlake interchange would remain in a similar location as today. A new bascule bridge would be constructed over the Montlake Cut. A 1,400-foot-long lid would be constructed between Montlake Boulevard and the Lake Washington shoreline, and would include direct-access ramps to and from the Eastside. The Lake Washington Boulevard ramps would be removed, and access would be provided to Lake Washington Boulevard via a new intersection at 24th Avenue East.	Interchange location similar to Option A. Lid would be approximately 75 feet longer than previously described for Option A, and would be a complete lid over top of the SR 520 main line, which would require ventilation and other fire, life, and safety systems. Transit connections would be provided on the lid to facilitate access between neighborhoods and the Eastside. Montlake Boulevard would be restriped for two general-purpose lanes and one HOV lane in each direction between SR 520 and the Montlake Cut.
West Approach Area	The west approach bridge would be replaced with wider and higher structures, maintaining a constant profile rising from the shoreline at Montlake out to the west transition span. Bridge structures would be compatible with potential future light rail through the corridor.	Bridge profile similar to and higher than Option L; structure types similar to Options A and L. The gap between the eastbound and westbound structures would be wider than previously described to accommodate light rail in the future.
Floating Bridge Area	A new floating span would be located approximately 190 feet north of the existing bridge at the west end and 160 feet north of the existing bridge at the east end. The floating bridge would be approximately 20 feet above the water surface (about 10 to 12 feet higher than the existing bridge deck).	Similar to design described in the SDEIS. The profile of the bridge would be approximately 10 feet lower than described in the SDEIS, and most of the roadway deck support could be constructed of steel trusses instead of concrete columns.
Eastside Transition Area	A new east approach to the floating bridge, and a new SR 520 roadway would be constructed between the floating bridge and Evergreen Point Road.	Same as described in the SDEIS.

Techniques to note:
- FEIS includes a summary of design refinements that have occurred since the DEIS and why they were made

r. Boulevard to Central Avenue. This ighly congested streets of downtown Baltimore. Due to the large number of cross streets, any surface alignment would have been required to stop at numerous intersections, resulting in slower transit travel times. Surface options analyzed in the AA/DEIS showed transit travel times of approximately 13 minutes, where as the transit travel time with the tunnel option was 5 minutes, a transit travel time savings of approximately 8 minutes. Surface options in the CBD, with associated crossing of major north-south streets and traffic lights would not only increase transit travel times, but would also add to the traffic congestion in this area. The tunnel option beneath the CBD avoided the impacts to traffic lanes and reduces congestion downtown. The tunnel option was selected through the CBD due to travel time savings and that it avoids at-grade crossing of transit with all major north-south streets downtown.

The downtown tunnel extends from the CBD eastward into the residential neighborhoods of Little Italy, Fell's Point and Canton from Central Avenue to Boston Street. A tunnel was selected in this area because of the lack of viable surface options. A surface alignment was not viable in this area for several reasons. As in the CBD, this portion of the corridor is highly congested and has multiple cross streets, which would result in slower transit travel times. In addition, the streets in the historic Fell's Point neighborhood have a narrow right-of-way with buildings located close to the edge of the street. A surface alignment would require over 200 on-street parking spaces between Central Avenue and Chester Street. Therefore, the tunnel continues through Fell's Point returning to the surface on Boston Street, where the roadway is wider and there is sufficient room to accommodate transit in the median.

Existing Fleet Street

Surface transit options in the Eastern Avenue/Fleet Street corridor were studied in the AA/DEIS. The surface options were not selected because the options either significantly reduced roadway capacity and affected access to residents and businesses, or resulted in a significant loss of on-street parking spaces where these residents have no off-street parking option. Therefore, the most benefit with the least amount of impact would be gained by tunneling from the CBD and Fell's Point to Canton.

For additional information refer to the *Alternatives Technical Report – 2012 Update*.

2.3.2 Refinements to the LPA

Subsequent to the announcement of the LPA in August 2009, MTA has continued to refine the LPA. A summary of the refinements is presented in **Table 2-1**. The refinements were made based on: public and stakeholder input, station planning, and additional engineering (including ridership, transit operations and constructability), which resulted in reduced environmental impacts, reduced project costs, and improved safety. These refinements have been incorporated in the Preferred Alternative that is presented in this FEIS (refer to **Figure 2-7** and **Figure 2-8**). These refinements were presented to the public at the Summer 2012 Public Open House Meetings held June 6th, 9th, 12th, and 16th, 2012. **Table 2-1** summarizes the refinements to the LPA and the reasons for the refinements. A more detailed explanation of the refinements follows **Table 2-1**.

In accordance with 23 CFR 771.129, the MTA prepared a reevaluation because more than three years had passed since publication of the AA/DEIS for this project. MTA submitted the reevaluation to FTA on August 16, 2012. The reevaluation compared the current Preferred Alternative as examined in the FEIS to the build alternatives considered in the AA/DEIS, and concluded that a Supplemental Environmental Impact Statement (EIS) of the AA/DEIS is not required because there are no new significant environmental impacts beyond those evaluated in the AA/DEIS. In correspondence dated September 17, 2012, FTA concurred with the findings in the reevaluation but indicated that the FEIS should include the information on the changes in the project so that these changes could be subject to public review.

Table 2-1: Summary of Refinements to the LPA

Refinement	Reasons for Refinement					Key to Figure 2-7
	Ridership/ Transit Operations	Environmental Factors	Public/ Stakeholder Input	Capital Costs	Constructability	
Security Boulevard						
Added tail track at west terminus	✓					A
Shifted alignment on Security Boulevard at west end to stay within existing roadway		✓	✓			B
Modified alignment at Security Square Mall to continue along Security Boulevard, as opposed to traversing Mall property	✓		✓	✓		C
I-70						
Modified alignment between Beltway and Woodlawn Drive, adjacent to ramp from I-70 to I-695	✓	✓	✓	✓		D
Shifted alignment to use portions of existing I-70	✓	✓	✓	✓	✓	E
New location for I-70 Park-and-Ride lot and Station		✓	✓	✓		F
Cooks Lane						
Shifted Cooks Lane tunnel portal 400 feet east on Edmondson Avenue		✓			✓	G

Table 2-1: Summary of Refinements to the LPA

Refinement	Reasons for Refinement: Ridership/ Transit Operations	Environmental Factors	Public/ Stakeholder Input	Capital Costs	Constructability	Key to Figure 2-7
US 40						
Shifted Edmondson Village Station to mid block between Swann and Athol Avenues			✓			H
Shifted Rosemont Station and alignment from US 40 to Edmondson Avenue and Franklintown Road	✓	✓	✓			I
Downtown Tunnel						
Downtown tunnel alignment shifted from MLK Jr. Blvd to Fremont Avenue; Poppleton station placed underground and further south	✓	✓	✓		✓	J
Shifted Howard Street Station to east of Howard Street				✓	✓	K
Eliminated Government Center/ Inner Harbor Station				✓		L
Shifted tunnel alignment to under President Street		✓	✓	✓	✓	M
Lowered tunnel depth for downtown tunnel		✓			✓	Not shown
Eliminated underground crossover				✓		Not shown
Boston Street						
Shifted Canton Station to west of Lakewood Ave	✓		✓			N
Shifted alignment near Boston and Haven Streets			✓			O
Bayview Campus Area						
New location for bridge over CSX and I-895	✓		✓	✓	✓	P
New alignment and station location on Bayview Campus	✓		✓	✓		Q
Added tail track at eastern terminus	✓					R

a. Security Boulevard from Western Terminus to Security Square Mall

With the LPA, the alignment was located on south side of Security Boulevard and then turned south along the west side of Rolling Road. At the intersection of Rolling Road/Rolling Bend Road, the alignment turned east following Rolling Bend Road on the north side until reaching a reconstructed portion of the mall loop road. The dedicated alignment and station with parking was inside the reconstructed portion of the mall loop road. The alignment crossed the mall loop road at grade before rising over I-695 on structure.

At the western terminus, the Preferred Alternative alignment includes a 380-foot “tail track.” Tail track is an additional section of track at the terminus of the project, and is added for operational flexibility. This extension would be required for all LRT alternatives previously shown in the AA/DEIS.

The Preferred Alternative alignment was shifted to the north to maintain some vegetative buffer between the residences, the Red Line and Security Boulevard. The alignment now continues west adjacent to the south side of Security Boulevard through the Rolling Road intersection and along the north edge of the Security Square Mall property. This alignment shift reduces the impacts to businesses along Security Boulevard and the mall property.

The Security Mall station was shifted to the west between Lord Baltimore Drive and Belmont Avenue at the request of community input to have the station closer to residential areas and existing bus stops, but still adjacent to the Mall.

b. I-70 Area from I-695 to Cooks Lane

From the Security Square Mall area the LPA alignment continued to the east in a strip of land between the mall parking lot and the interchange ramp to I-695, crossing over the beltway and traversing through the SSA’s West Campus parking lot, continuing east through a strip of forested land between Parallel Drive and the I-70 westbound lanes to the I-70 park-and-ride lot that was proposed in the northwest quadrant of the I-70/Security Boulevard interchange.

Continued coordination with the State Highway Administration (SHA), Baltimore County, Social SSA, and the communities resulted in some refinements to the alignment adjacent to I-70. The proposed Red Line bridge crossing I-695 was refined to accommodate future widening of I-695. On the SSA West Campus the alignment was refined to follow the I-70/I-695 ramp. This avoided the Red Line crossing the entrance road to the SSA West Campus. After coordination with SHA, the Red Line alignment transitions to the excess pavement of I-70 sooner than the LPA alignment in order to take advantage of the existing underutilized pavement of I-70 for the track bed for the Red Line and to reduce impacts to forests and streams.

The Preferred Alternative alignment continues on existing westbound I-70 and uses the existing structure over Woodlawn Drive. In the Preferred Alternative alignment, the I-70 Park-and-Ride Station was relocated from the northwest quadrant of the I-70/Security Boulevard interchange to west of Ingleside Avenue. This change was made because the previous location would require significant excavation to create the parking area, while the current proposed location has less topography relief to overcome. The LPA alignment would have also required low-speed curves and street grade crossings, while the current Preferred Alternative alignment enables a faster travel time through the area and more parking spaces at full development of the station. The Preferred Alternative recommends that I-70 be reconfigured to transition from an interstate at I-695 to a 40 mph boulevard. Intersection and roadway improvements would be required on Security Boulevard, Ingleside Avenue, and Parallel Drive. The Preferred Alternative alignment utilizes the existing structure over Ingleside Drive and continues south of I-70.

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New Information Is Acknowledged and Explained

(e.g., new data, models, guidance)

- OR: OR 62 FEIS - changes to guidance
- WA: SR 520 FEIS - changes to traffic model
- WA: I-90 Snoqualmie - new studies

Techniques to note:
- FEIS acknowledges changes in guidance and explains the implications of those changes
- FEIS describes additional analysis that has been done since the DEIS

For each alternative (No Build and both build alternatives, including the JTA phase), the amount of MSATs emitted would be proportional to the VMT, assuming that other variables, such as fleet mix, are the same for each alternative. The daily and annual VMT for each alternative and year are shown in Table 3.16-4.

The annual VMT estimated for each of the build alternatives is slightly higher than that for the No Build Alternative, because the additional capacity (at the bypass) increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. This increase in VMT would lead to higher MSAT emissions for the build alternatives along the highway corridor (the bypass), along with a corresponding decrease in MSAT emissions along the parallel routes (in most cases, including the existing Highway 62). The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds. According to EPA's MOBILE 6.2 emissions model, emissions of all of the priority MSATs, except for diesel particulate matter, decrease as speed increases. The extent to which these speed-related emissions decreases will offset VMT-related emissions increases cannot be reliably projected due to the inherent deficiencies of technical models.

The estimated VMT under each of the build alternatives is between 24 and 28 percent greater than VMT under the No Build Alternative (for year 2035, including the Bypass VMT). Therefore, it is expected that the overall MSAT emissions would be no more than this percentage greater. VMT for the JTA phase is lower than the No Build Alternative. Regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce MSAT emissions by 83 percent between 2010 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

A 2012 update of the FHWA interim guidance regarding MSATs states that the EPA model forecasts "significantly higher diesel PM emissions, especially for lower speeds," compared to the previous model (FHWA 2012). MSAT emissions nationwide are projected to decline more rapidly under EPA's new model, since it incorporates regulations that were not in place at the time that the previous model was developed.

The additional travel lanes contemplated as part of the project alternatives will have the effect of moving some traffic closer to nearby homes, schools, and businesses; therefore, under each alternative there may be localized areas where ambient conditions of MSATs could be higher under certain build alternatives than the No Build Alternative. The localized increases in MSAT concentrations would likely be most pronounced along the additional turn lanes at some intersections and along the Bypass routes under the build alternatives. However, as discussed above, the magnitude and duration of these potential increases compared to the No Build Alternative cannot be accurately quantified due to the inherent deficiencies of current models. In sum, when a highway is widened and, as a result, moves closer to receptors, the localized level of MSAT emissions for the build alternative could be higher relative to the No Build Alternative; however, this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSATs will be lower in locations where traffic shifts away from them (such as on the existing Highway 62 route under the build alternatives). However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will, over time, cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

Additional analysis conducted since the publication of the DEIS indicates that the Preferred Alternative will reduce exposure to MSATs in two ways. First, the Preferred Alternative will divert traffic from existing OR 62 and other parallel routes, especially Biddle Road, Table Rock Road and Foothills Road. More residential uses are located along Biddle Road, Table Rock Road and Foothills Road than along the bypass and many more commercial uses are located along

Techniques to note:
- FEIS explains how growth projections have changes since the DEIS; affirms that findings in DEIS remain valid despite the change.

5.1 Transportation

The transportation analysis conducted for the Final EIS evaluated an updated No Build Alternative and the Preferred Alternative. The Preferred Alternative and the SDEIS options are designed to improve the corridor safety and mobility by addressing traffic flow and operations of SR 520 and access between the freeway and the local road system. As part of the mobility improvements on the corridor, the Preferred Alternative and the SDEIS options A, K, and L would also improve transit connections and reliability, as well as the interactions of nonmotorized transportation (bicycles and pedestrians) with cars, trucks, and buses along SR 520. This section provides a summary of findings from the SDEIS, which included an analysis of the No Build Alternative and Options A, K, and L, and compares them with the findings from the updated Final EIS No Build Alternative and Preferred Alternative analyses.

How was traffic evaluated for this project?

WSDOT used the Puget Sound Regional Council (PSRC) four-county travel demand model that was updated in 2006 to identify where and how traffic volumes would increase as a result of the growth in population and employment. Taking into account the projected population and employment growth, the transportation analysis identified the average daily traffic by evaluating the number of people and vehicles expected to move through the study area over the course of a day, in terms of person demand (the number of people forecasted to need to travel through an area) and vehicle demand (the number of vehicles forecasted to want to travel through an area). WSDOT also evaluated peak period traffic that would occur on SR 520 during the busiest times of day—in terms of the morning and evening commute times when demand would be highest and traffic conditions would likely be the worst—and modeled the anticipated throughput (the number of vehicles or persons forecasted to be able to travel through an area) for those peak times. Mode choice (the type of vehicle—whether single occupant vehicle, carpool, bus or other type of multi-person transit) was a factor in identifying how much person throughput (number of people modeled who would be likely to make a trip) would occur on cross-lake roadways (I-90 and SR 520) by vehicle type. This led to findings about congestion and travel times on SR 520 under the No Build Alternative and build alternatives during those peak periods, and provided more information about how the highway would operate under all alternatives. WSDOT forecasted traffic volumes on the local streets and at intersections within the study area to determine how local streets would function and intersection levels of service (LOS, a measure of intersection operations) that would be expected with each alternative.

How have growth projections used in the travel demand model changed since the SDEIS?

The population and employment information used for the Final EIS travel demand model has been supplemented by the Puget Sound Regional Council (PSRC) since publication of the SDEIS.

The SDEIS used the population growth estimates that were current at the time, which predicted that the region would add 1.1 million people and 850,000 new jobs between 2010 and 2030. For the SDEIS, this led to a finding that traffic on area roadways would increase by 50 percent. The updated growth estimates used for the Final EIS showed an increase of 1 million people and 640,000 jobs, resulting in an estimated 40 percent increase in traffic by 2030. While less than the previous estimate, this is still a substantial level of traffic growth to be absorbed by an already overburdened transportation system.

The lower increases in employment and population used for the Final EIS generally resulted in less demand for area roadways. Lower levels of demand resulted in lower levels of congestion on study area highways than described in the SDEIS. Nevertheless, as discussed in this chapter, traffic growth would continue to increase congestion on SR 520 between now and 2030. The Preferred Alternative would reduce traffic and congestion on SR 520 compared to the No Build condition without appreciably increasing it on alternate routes. Similar relative findings would likely result for Options A, K, and L as they were described in the SDEIS.

Techniques to note:
- FEIS describes in detail the changes in traffic analysis between DEIS and FEIS.

How does the traffic analysis for the Final EIS differ from the analysis conducted for the SDEIS?

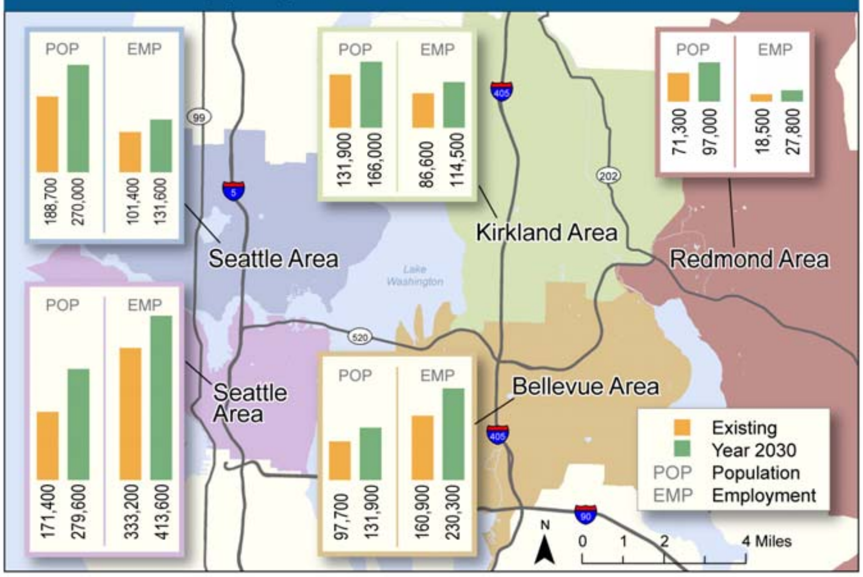
The first step in analyzing traffic for both the SDEIS and the Final EIS was to determine how much the traffic on area roadways is estimated to grow in the region by the year 2030. As noted in the text box on the previous page, this analysis was updated between the SDEIS and the Final EIS because the PSRC released an updated travel demand model and new data to supplement their population and employment estimates. The new estimates indicate that between today and the year 2030, the region's population is expected to grow by 1 million people and employers in the region are likely to add over 640,000 new jobs. This higher population and the expanded employment opportunities generate a need to accommodate close to 40 percent more traffic (PSRC 2010e) on area roadways. This is less than the 50 percent traffic growth estimated under the SDEIS; however, it still represents a large additional increment of demand on a transportation system that is already over capacity for many hours on weekdays. Projected population and employment growth for selected Seattle and Eastside areas are shown on Exhibit 5.1-1. Both Seattle and Eastside forecasts are shown because regional travel patterns, including traffic across SR 520, are influenced by population and employment changes on both sides of the lake.

How did the updated transit assumptions affect the travel demand model used in the Final EIS?

The more extensive light rail network that will be operational by 2030 will provide new travel options to meet demand. Use of light rail by commuters is expected to change vehicle volumes on roadways throughout the region, as well as within the SR 520 corridor.

For instance, with the connection of the North Link and East Link light rail systems, transit riders could have a "one seat" transit trip between Northgate and Seattle on the west side of Lake Washington to Mercer Island, Bellevue, and Overlake on the east side of the lake. With this type of new service, some transit riders that today use SR 520 bus service are forecasted to use light rail service across I-90.

Exhibit 5.1-1. **Forecasted Growth in Population and Employment between Existing (2006) and 2030**



As with the SDEIS, the analysis for the Final EIS was completed in a manner consistent with regional plans and policies in place at the time of the analysis. The transportation system modeled for the Final EIS uses some different assumptions than those used for the SDEIS about the road improvements and transit services that would be in place by 2030.

The Final EIS analysis also includes the latest assumptions for tolling on SR 520 as outlined through the Washington State Legislature in Engrossed Substitute Senate Bill (ESSB) 6392. See Chapter 1 for more information on tolling assumptions. Table 5.1-1 summarizes the differences in daily traffic assumptions between the SDEIS and Final EIS analyses.

Table 5.1-1. Comparison of SDEIS and Final EIS Traffic Modeling

Assumption	SDEIS	Final EIS
Transportation System	Included road and transit projects that were planned and funded when transportation analysis began in spring 2008. East Link light rail and other Sound Transit 2 (ST2) improvements were not included because they had not yet been approved by voters.	Includes road and transit projects that were planned and funded when transportation analysis began in spring 2010. All of the ST2 improvements, including East Link light rail, approved by voters are reflected in the analysis.
Regional Land Use and Economy	Included up-to-date factors for population, employment, and user costs, which were periodically updated based on new regional data.	Uses updated population and employment forecasts provided by PSRC.
2030 Modeling Scenarios	Travel demand and operations analysis for direct project effects: • No Build Alternative – No toll • 6-Lane Options A, K, and L – Segmental toll Travel demand evaluation: • Tolled 4-Lane Alternative	Travel demand and operations analysis for direct project effects: • No Build Alternative – No toll • Preferred Alternative – Single-point toll Travel demand evaluation: • No Build • Tolled, transit-optimized 4-Lane Alternative • 6-Lane Alternative with initial light rail transit (LRT)
Tolling Locations	Included segmental tolling, from an earlier (2007) toll finance analysis, which would have collected smaller tolls at more locations along the SR 520 corridor between I-5 and I-405.	Includes single-point tolling, which was authorized by the legislature in 2009 after analysis by the Tolling Implementation Committee. Tolls to cross Lake Washington on SR 520 would be collected at a single location on the Evergreen Point Bridge.

See Chapter 2 for a more detailed description of the travel demand evaluations.

For the SDEIS, tolling on the SR 520 corridor was assumed to be “segmental.” This meant that tolls would be collected from people who traveled between interchanges, but did not necessarily cross the SR 520 floating bridge. In the Final EIS, this was changed to assume a single-point toll (tolls would only be collected for trips that cross the SR 520 floating bridge). The modification occurred after an extensive outreach process was completed with the Tolling Implementation Committee (discussed in Chapter 1) in 2008. They found through their outreach program that there was very little support for segmental tolling and that the benefits of additional revenue might not offset the management costs. Therefore, single-point tolling has been assumed for the Final EIS transportation modeling.

Techniques to note:
- FEIS includes a section describing the additional information that has been developed for a specific resource since the DEIS.

3.10 Recreation Resources

This section discusses the expected impacts of the project alternatives to recreation resources. The study area for recreation is approximately one mile on either side of the existing highway. Other recreation sites that are outside the study area have been included in instances where I-90 provides the primary access route to these areas. More information on recreation resources is available in the *Recreation Baseline Study* (WSDOT 2002h), the *Recreation and Section 4(f) Evaluation Discipline Report* (WSDOT 2002i), and the *Snoqualmie Pass Adaptive Management Area Plan FEIS* (USFS and USFWS 1997).

Trails and roads within the project area provide a variety of opportunities for recreation activities throughout the year.

What new information has been developed since the Draft EIS?

Since publishing the Draft EIS, WSDOT developed the *Recreation Impacts/Preliminary Mitigation Site Analysis* (Appendix S), which discusses mitigation for permanent impacts to the Price Creek Sno-Park (Westbound). This section is also based on statewide recreation planning described in the *I-90 Corridor Winter Recreation Strategy* (State Parks 2007).

Since the build alternatives have the potential to affect publicly owned parks and recreation lands, WSDOT has completed a *Section 6(f) Recreation Lands Technical Memorandum* (49 USC § 303) (Appendix T). The memorandum discusses the use of Land and Water Conservation Fund Act grant money to purchase or develop recreation property in the project corridor. It also discusses the potential impacts to those properties from the project. WSDOT also completed a *Programmatic Section 4(f) Evaluation* (see Chapter 5), which discusses potential temporary impacts to recreation resources, and analyzes the proposed removal of the existing snowshed.

Winter recreation opportunities include snowmobiling, skiing, snowshoeing, and dog sledding. (Shown: Price Creek Sno-Park)

Comments from the public and reviewing agencies have been incorporated into this section.

Summarize Findings of Re-Evaluation

(e.g., as part of a section that discusses changes since the DEIS)

- MD: Red Line FEIS - alternatives chapter

Techniques to note:
- FEIS notes that a reevaluation was prepared, gives the date, and summarizes the findings of the reevaluation.

n this FEIS (refer to **Figure 2-7** and **Figure 2-8**). These refinements were presented to the public at the Summer 2012 Public Open House Meetings held June 6th, 9th, 12th, and 16th, 2012. **Table 2-1** summarizes the refinements to the LPA and the reasons for the refinements. A more detailed explanation of the refinements follows **Table 2-1**.

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Modified alignment at Security Square Mall to continue along Security Boulevard, as opposed to traversing Mall property	✓		✓	✓		C
I-70						
Modified alignment between Beltway and Woodlawn Drive, adjacent to ramp from I-70 to I-695	✓	✓	✓	✓		D
Shifted alignment to use portions of existing I-70	✓	✓	✓	✓	✓	E
New location for I-70 Park-and-Ride lot and Station		✓	✓	✓		F
Cooks Lane						
Shifted Cooks Lane tunnel portal 400 feet east on Edmondson Avenue		✓			✓	G