



# 1 **DRAFT Cumulative Effects Technical Report**

2 February 2023



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1 **DRAFT**

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# 1 CONTENTS

2	<b>1. PROJECT OVERVIEW.....</b>	<b>1-1</b>
3	<b>2. METHODS.....</b>	<b>2-1</b>
4	2.1 Introduction .....	2-1
5	2.2 Study Areas .....	2-1
6	2.3 Relevant Laws and Regulations .....	2-3
7	2.4 General Analytical Approach .....	2-3
8	2.5 Past, Present, and Reasonably Foreseeable Future Projects.....	2-4
9	2.5.1 Past Projects and Actions.....	2-4
10	2.5.2 Recently Constructed Projects.....	2-8
11	2.5.3 Reasonably Foreseeable Future Projects.....	2-9
12	2.5.4 State, Regional and Local Plans .....	2-13
13	<b>3. BUILT ENVIRONMENT CUMULATIVE EFFECTS.....</b>	<b>3-1</b>
14	3.1 Acquisitions.....	3-2
15	3.1.1 Project Effects .....	3-2
16	3.1.2 Effects from Other Actions (Past, Present, Future) .....	3-2
17	3.1.3 Conclusions .....	3-2
18	3.2 Air Quality .....	3-3
19	3.2.1 Project Effects .....	3-3
20	3.2.2 Effects from Other Actions (Past, Present, Future) .....	3-3
21	3.2.3 Conclusions .....	3-4
22	3.3 Aviation and Navigation.....	3-4
23	3.3.1 Project Effects .....	3-4
24	3.3.2 Effects from Other Actions (Past, Present, Future) .....	3-5
25	3.3.3 Conclusions .....	3-5
26	3.4 Climate Change .....	3-6
27	3.4.1 Project Effects.....	3-6
28	3.4.2 Effects from Other Actions (Past, Present, Future) .....	3-6
29	3.4.3 Conclusions .....	3-6
30	3.5 Economics .....	3-7
31	3.5.1 Project Effects .....	3-7
32	3.5.2 Effects from Other Actions (Past, Present, Future) .....	3-8
33	3.5.3 Conclusions .....	3-8
34	3.6 Electromagnetic Fields.....	3-9
35	3.6.1 Project Effects .....	3-9
36	3.6.2 Effects from Other Actions (Past, Present, Future) .....	3-9
37	3.6.3 Conclusions.....	3-9



DRAFT Cumulative Effects Technical Report

1	3.7	Energy .....	3-10
2	3.7.1	Project Effects .....	3-10
3	3.7.2	Effects from Other Actions (Past, Present, Future) .....	3-10
4	3.7.3	Conclusion.....	3-10
5	3.8	Equity and Environmental Justice.....	3-11
6	3.8.1	Project Effects .....	3-11
7	3.8.2	Effects from Other Actions (Past, Present, Future) .....	3-12
8	3.8.3	Conclusions .....	3-12
9	3.9	Hazardous Materials .....	3-13
10	3.9.1	Project Effects .....	3-13
11	3.9.2	Effects from Other Actions (Past, Present, Future) .....	3-14
12	3.9.3	Conclusions .....	3-14
13	3.10	Land Use.....	3-14
14	3.10.1	Project Effects .....	3-14
15	3.10.2	Effects from Other Actions (Past, Present, Future) .....	3-15
16	3.10.3	Conclusions .....	3-16
17	3.11	Neighborhoods and Population .....	3-16
18	3.11.1	Project Effects .....	3-16
19	3.11.2	Effects from Other Actions (Past, Present, Future) .....	3-17
20	3.11.3	Conclusions .....	3-17
21	3.12	Noise and Vibration .....	3-18
22	3.12.1	Project Effects .....	3-18
23	3.12.2	Effects from Other Actions (Past, Present, Future) .....	3-18
24	3.12.3	Conclusions .....	3-19
25	3.13	Public Services and Utilities .....	3-19
26	3.13.1	Project Effects .....	3-19
27	3.13.2	Effects from Other Actions (Past, Present, Future) .....	3-20
28	3.13.3	Conclusions .....	3-20
29	3.14	Transportation .....	3-20
30	3.14.1	Project Effects .....	3-20
31	3.14.2	Effects from Other Actions (Past, Present, Future) .....	3-20
32	3.14.3	Conclusions .....	3-21
33	3.15	Visual Quality and Aesthetics.....	3-21
34	3.15.1	Project Effects .....	3-21
35	3.15.2	Effects from Other Actions (Past, Present, Future) .....	3-22
36	3.15.3	Conclusions .....	3-22
37	<b>4.</b>	<b>NATURAL ENVIRONMENT CUMULATIVE EFFECTS .....</b>	<b>4-1</b>
38	4.1	Ecosystems.....	4-2
39	4.1.1	Project Effects .....	4-2



DRAFT Cumulative Effects Technical Report

1	4.1.2	Effects from Other Actions (Past, Present, Future) .....	4-3
2	4.1.3	Conclusions .....	4-4
3	4.2	Geology and Groundwater .....	4-4
4	4.2.1	Project Effects .....	4-4
5	4.2.2	Effects from Other Actions (Past, Present, Future) .....	4-4
6	4.2.3	Conclusions .....	4-5
7	4.3	Water Quality and Hydrology .....	4-5
8	4.3.1	Project Effects .....	4-5
9	4.3.2	Effects from Other Actions (Past, Present, Future) .....	4-6
10	4.3.3	Conclusions .....	4-6
11	4.4	Wetlands and Waters .....	4-7
12	4.4.1	Project Effects .....	4-7
13	4.4.2	Effects from Other Actions (Past, Present, Future) .....	4-7
14	4.4.3	Conclusions .....	4-8
15	<b>5.</b>	<b>CULTURAL AND RECREATIONAL ENVIRONMENT CUMULATIVE EFFECTS.....</b>	<b>5-1</b>
16	5.1	Archaeology and Cultural Resources .....	5-1
17	5.1.1	Potential Effects .....	5-1
18	5.1.2	Effects from Other Actions (Past, Present, Future) .....	5-1
19	5.1.3	Conclusions .....	5-2
20	5.2	Historic Resources.....	5-3
21	5.2.1	Potential Effects .....	5-3
22	5.2.2	Effects from Other Actions (Past, Present, Future) .....	5-3
23	5.2.3	Conclusions .....	5-4
24	5.3	Parks and Recreation Areas .....	5-4
25	5.3.1	Project Effects .....	5-4
26	5.3.2	Effects from Other Actions (Past, Present, Future) .....	5-5
27	5.3.3	Conclusions .....	5-5
28	<b>6.</b>	<b>TEMPORARY EFFECTS – CONSTRUCTION.....</b>	<b>6-1</b>
29	<b>7.</b>	<b>REFERENCES .....</b>	<b>7-1</b>



1 **FIGURES**

2 Figure 2-1. Study Area Where Most Physical Changes Would Occur ..... 2-2

3 Figure 2-2. Reasonably Foreseeable Projects in the Program Vicinity ..... 2-11

4

5 **TABLES**

6 Table 2-1. Past Actions..... 2-5

7

8 **APPENDICES**

9 A. Project List – Transportation Model

10 *Please note: Appendix A is under preparation and will be provided with a future draft of the Cumulative*  
11 *Effects Technical Report.*



1 **ACRONYMS AND ABBREVIATIONS**

2

BIPOC	Black, Indigenous, and People of Color
CCRA	Vancouver City Center Redevelopment Authority
CFR	Code of Federal Regulations
CRC	Columbia River Crossing
C-TRAN	Clark County Public Transit Benefit Area Authority
DAHP	Department of Archaeology and Historic Preservation
DEQ	Oregon Department of Environmental Quality
EAG	Equity Advisory Group
Ecology	Washington State Department of Ecology
EJ	environmental justice
EMF	electromagnetic field
GHG	greenhouse gas
I-205	Interstate 205
I-5	Interstate 5
IBR	Interstate Bridge Replacement
LEED	Leadership in Energy and Environmental Design
MAX	Metropolitan Area Express
MCDD	Multnomah County Drainage District
Metro	Oregon Metro
Modified LPA	Modified Locally Preferred Alternative
NEPA	National Environmental Policy Act
NIOSH	National Institute for Occupational Safety and Health
ODOT	Oregon Department of Transportation
OHP	Oregon Highway Plan
OTP	Oregon Transportation Plan
PDX	Portland International Airport
ROD	Record of Decision
RTC	Southwest Washington Regional Transportation Commission
RTP	Regional Transportation Plan
SHPO	State Historic Preservation Office
SR	State Route
STS	Statewide Transportation Strategy

DRAFT Cumulative Effects Technical Report

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TMDL	Total Maximum Daily Load
TriMet	Tri-County Metropolitan Transportation District of Oregon
USACE	U.S. Army Corps of Engineers
VCCV	Vancouver City Center Vision
VMT	vehicle miles travelled
WSDOT	Washington State Department of Transportation

## 1. PROJECT OVERVIEW

2 This technical report identifies, describes, and evaluates the potential cumulative effects of the  
3 Interstate Bridge Replacement (IBR) program when combined with other past, present, and future  
4 actions. The direct and indirect effects of the program on specific resources (e.g., ecosystems,  
5 neighborhoods) are identified in the resource-specific technical reports. The Modified Locally  
6 Preferred Alternative (Modified LPA) would be designed to avoid and/or minimize these direct and  
7 indirect effects to the greatest extent possible.

8 This report first defines cumulative effects and outlines the approach, timeline, and geographic scope  
9 for analyzing those effects. It then summarizes the other past, present, and reasonably foreseeable  
10 actions that are part of the cumulative effects analysis. The results of the cumulative effects analysis  
11 are presented in Chapter 3 (built environment), Chapter 4 (natural environment), Chapter 5 (cultural  
12 environment).

13 The IBR program's Modified LPA is a modification of the Locally Preferred Alternative for the I-5  
14 Columbia River Crossing (CRC) project, which completed the NEPA process with a signed Record of  
15 Decision in 2011 and two reevaluations that were completed in 2012 and 2013. The CRC project was  
16 discontinued in 2014. The IBR program's SDEIS is evaluating the effects of changes in design since the  
17 CRC Record of Decision (ROD), as well as changes in regulations, policy, and physical conditions.

18 *Please refer to the separate IBR Program Description file on the portal for a description of the Modified*  
19 *LPA, Modified LPA Construction, and the No-Build Alternative. The IBR Program Description will be*  
20 *inserted into the final version of this Technical Report.*

## 1 2. METHODS

### 2 2.1 Introduction

3 Cumulative effects result from the incremental effect of a proposed action when added to those of  
4 other past, present, and reasonably foreseeable future actions, regardless of the agency (federal or  
5 non-federal) or person that undertakes other such actions. Cumulative effects can result from  
6 individually minor but collectively significant actions that take place over a period of time (definitions  
7 paraphrased from 40 Code of Federal Regulations [CFR], 1508.7). The combination of effects, and  
8 resulting environmental conditions, are the focus of the cumulative effects analysis.

9 The National Environmental Policy Act (NEPA) scoping process helped to inform the extent and level  
10 of analysis that were required for each environmental resource analyzed for the IBR program.  
11 Consultations with cooperating agencies, participating agencies, and the public contributed to  
12 defining the scope and scale of the cumulative effects analysis.

13 For all technical disciplines, current and planned projects included those assumed in the regional  
14 modeling of 2045 transportation conditions. On a discipline-by-discipline basis, additional projects  
15 and trends were considered if relevant to the analysis of cumulative effects. For example, the natural  
16 environment disciplines consider the effects of increased urbanization and land use changes on the  
17 amount of natural area near the project, and the built environment disciplines consider the plans and  
18 policies adopted for the area.

### 19 2.2 Study Areas

20 Each resource-specific technical report identifies a study area for evaluating effects to that particular  
21 resource (e.g., ecosystems has a different study area than acquisitions). This analysis uses the study  
22 area identified in the respective technical report when evaluating cumulative effects to that particular  
23 resource.

24 Several technical reports identified a common study area that runs along a 5-mile segment of  
25 Interstate 5 (I-5), between approximately State Route (SR) 500 in Washington and Columbia Boulevard  
26 in Oregon, as well as in downtown Vancouver west and east of I-5. This study area is where most  
27 physical changes associated with the program would occur (although mitigation could still occur  
28 outside of it). See Figure 2-1 for a map of this study area. The study area for each resource can be  
29 found in their respective technical reports.

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1 Figure 2-1. Study Area Where Most Physical Changes Would Occur



2



## 1 2.3 Relevant Laws and Regulations

2 The NEPA regulations issued in 1978 defined cumulative effects as the “impact on the environment  
3 which results from the incremental impact of the action when added to other past, present, and  
4 reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person  
5 undertakes such other actions. Cumulative effects can result from individually minor but collectively  
6 significant actions taking place over a period of time” (40 Code of Federal Regulations, 1508.7, 1978).  
7 This definition was removed as a result of revisions to the NEPA regulations by CEQ in 2020. However,  
8 because the FHWA implementing regulations for this change are not promulgated, this analysis  
9 continues to use definitions for cumulative effects, and the Final EIS and ROD that were issued for the  
10 CRC project included an analysis of cumulative effects, the IBR program will assess whether the  
11 current project will create a new or greater cumulative effect than that identified in the CRC ROD. The  
12 combination of effects, and resulting environmental conditions, are the focus of the cumulative  
13 effects analysis.

## 14 2.4 General Analytical Approach

15 The IBR program team assessed which environmental and community resources would be affected by  
16 the program and how other past, present, or reasonably foreseeable future actions may affect the  
17 same resources. These actions and their cumulative effects were compared to the potential effects  
18 resulting from the Modified LPA. In accordance with Council on Environmental Quality guidance, the  
19 cumulative effects analysis concentrates on resources that the IBR program is anticipated to affect  
20 and focuses on important issues of national, regional, or local significance.

21 This analysis considered past major actions; planned transportation projects; population,  
22 employment, and land use forecasts; comprehensive land use plans; and other major public and  
23 private projects that are under development or reasonably expected to occur. The temporal and  
24 geographic scales of analysis for the assessment of actions and forecasts can vary for each discipline.  
25 For some cumulative effects—namely, climate change and energy—the analysis also assesses how  
26 global trends could affect the No-Build Alternative or Modified LPA and, conversely, how each  
27 alternative could affect the climate and energy.

28 The analysis of cumulative effects for the IBR program first employed quantitative methods where  
29 applicable. The analysis is also qualitative, with emphasis on comparing the relative cumulative  
30 effects of the Modified LPA to the cumulative effects of the No-Build Alternative. This allows the  
31 appropriate context to be used in considering and comparing the two alternatives, based on available  
32 data.

33 The cumulative effects analysis evaluates the change in conditions since the Columbia River Crossing  
34 (CRC) Record of Decision (ROD) and updates the analysis to incorporate new or greater cumulative  
35 effects. The analysis followed an eight-step process, listed below, which is consistent with the Oregon  
36 Department of Transportation’s (ODOT’s) National Environmental Policy Act Environmental Impact

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- 1 Statement Template (ODOT 2010) and the Washington Department of Transportation’s (WSDOT’s)  
2 Guidance on Preparing Cumulative Impact Analyses (WSDOT 2008).
- 3 1. Identify the resources directly or indirectly affected by the IBR program that may have  
4 cumulative effects to consider in the analysis.
  - 5 2. Define the study area and timeframe for each affected resource.
  - 6 3. Describe the current health and historical context for each affected resource.
  - 7 4. Identify direct and indirect impacts that may contribute to a cumulative effect.
  - 8 5. Identify other historic, current, and reasonably foreseeable future actions that may affect  
9 resources.
  - 10 6. Assess potential cumulative effects to each resource; determine their magnitude and  
11 significance.
  - 12 7. Report the results.
  - 13 8. Assess and discuss potential mitigation measures for all adverse impacts.

## 14 2.5 Past, Present, and Reasonably Foreseeable Future Projects

15 To address cumulative effects, the program team established a temporal frame of reference for the  
16 analysis. The timeframe of reference for cumulative effects considered in this report is as follows:

- 17 • The relevant timeframe for considering past actions varies by general discipline.
  - 18 ➤ The natural environment analysis looks at broad changes beginning in the 1800s.
  - 19 ➤ The cultural environment starts with precontact.
  - 20 ➤ The relevant past actions for evaluating built environment cumulative effects started in  
21 the early 1950s with the construction and opening of I-5.
- 22 • The "present" is 2022.
- 23 • The "future" is 2045, the design year of the IBR program.

24 The time periods and types of projects included in the analysis are described in greater detail below.

### 25 2.5.1 Past Projects and Actions

26 Past built environment projects include transportation, urbanization, housing, and other  
27 developments that have influenced the social, economic, and natural environment in the study area.  
28 Prior to the 1917 construction of a bridge across the Columbia River in this location, ferries and other  
29 boats were used to transport people and goods between Oregon and Washington. A second bridge,  
30 currently carrying southbound I-5 traffic, was added in 1958 to provide increased capacity and to  
31 separate southbound and northbound traffic. At that time, the bridges were linked to Oregon 99, the  
32 main north/south highway. The bridges later became part of the interstate system when I-5 was  
33 opened in the study area in the early 1960s.



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1 For the built environment, the “past” will run from 1950 (prior to the opening of I-5) to the present  
 2 day. For the natural environment, an earlier base year is evaluated to capture a longer history of the  
 3 effects of development on natural resources in the area. To determine base thresholds for cultural  
 4 resources (referred to as “precontact”), the cultural environment team solicited input during the CRC  
 5 Project phase from the Cultural Resources/Section 4(f) Workgroup, which was composed of local and  
 6 state agency representatives, the Washington Department of Archaeology and Historic Preservation  
 7 (DAHP), and the Oregon State Historic Preservation Office (SHPO).

8 Generally, it is not necessary to evaluate the impacts of individual past actions in order to describe  
 9 cumulative effects; existing conditions reflect the collective impacts of past actions. Nevertheless,  
 10 there is value in understanding how current conditions were shaped by historic actions. The general  
 11 past trends and major actions that have shaped the current built, natural, and cultural environment in  
 12 the study area are outlined below. These trends and actions were identified through conversations  
 13 with technical experts, members of the IBR program’s Equity Advisory Group (EAG) and Community  
 14 Advisory Group, and consulting tribes.

15 Native Americans have occupied or traveled through the study area for thousands of years. Their  
 16 activities had little effect on current natural and built environmental conditions in the project area;  
 17 however, there are numerous cultural resources in the study area associated with this time period. In  
 18 the 1800s European-American settlement began and expanded, and the Portland and Vancouver area  
 19 population began to dramatically increase. The following key historic events provide a basis for  
 20 analysis of past actions that have helped shape current environmental conditions; more detailed  
 21 descriptions of actions that have affected a particular resource are found in Chapters 3, 4, and 5.

22 **Table 2-1. Past Actions**

Time Period	Action
Pre-1800s	Native American villages on the shores of the lower Columbia River thrived for centuries until the 19th century, when settlers brought disease and ultimately removed Indigenous peoples to reservations.
1810 to 1850	Settlement of Fort Vancouver and the Hudson Bay Company. Commercial fur trapping on the Columbia River and associated waterways developed between 1810 and the 1850s. Fur trappers from the Hudson Bay Company operating out of Fort Vancouver adopted the Siskiyou Trail as a major transport corridor between the Northern Oregon Territory and California.
1840s	Oregon’s Constitution prohibited Black people from entering or residing in the state and was later updated to exclude Chinese Americans and Japanese Americans from basic rights, including property ownership.
1846	Ferry service across the Columbia between Vancouver and Portland was established by Carl Switzler. Private ferry service between Vancouver and Portland was offered intermittently after that time by various operators. The State of Washington later began offering ferry service at other points along the Columbia in the 1930s.





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Time Period	Action
1870s to present	Congress authorized the federal navigation system on the lower Columbia River beginning in 1878, providing for a channel of 20 feet deep from the mouth of the river to the Portland area. The channel was progressively deepened to 43 feet (completed in 2010) and extended to include Vancouver upstream to the current bridge location and adding the Oregon Slough. The Vancouver to The Dalles channel was authorized in 1937 with a depth of 27 feet. Navigation is presently maintained to 17 feet upstream to Lewiston, Idaho.
1890s to present	The advent of the trolley line system in Portland and Vancouver encouraged greater urbanization and development of neighborhoods east of the Willamette in Oregon, and north to Fourth Plain Boulevard in Vancouver. The automobile was introduced in the early 1900s, and by the 1930s many middle-class families could afford cars and travel greater distances for work, shopping, or leisure. This greatly influenced the urbanization of Portland and Vancouver.
1905	Pearson Field became a dirigible landing area. It was officially dedicated as Pearson Field in 1925.
1910 to present	Railroad construction, including a rail bridge over the Columbia River in 1910, allowed increased freight transport and increased the viability of the Port of Vancouver and Port of Portland in interstate trade. Industrialized farming, irrigation and water impoundment, and grain shipment increased.
1917	The Columbia River Interstate Bridge opened in 1917 and allowed easier transport of cargo and people between Vancouver and Portland, as well as the broader Pacific Northwest. This supported the expansion of industry and commerce in the region. In 1958, a second parallel bridge was constructed and the original 1917 bridge was converted to northbound only I-5 traffic (NPCC 2010).
1930s to 1970s	Several hydroelectric dams were built on the Columbia River between the 1930s and 1970s, including Bonneville, The Dalles, and John Day dams, to provide electricity and irrigation water for the Pacific Northwest. Overfishing, construction of these dams, and other actions dramatically decreased salmon runs. This had a negative impact on the economic well-being of Native American tribes, for whom the salmon were a significant material and cultural resource.
1940s	Mobilization of shipyard manufacturing in support of World War II brought wartime employment in the Portland and Vancouver area to 75,000. This massive influx of workers from all over the U.S. created a housing shortage, and many nearby areas were impacted by the temporary increase in housing demand and resulting building boom.
1942	President Roosevelt signed Executive Order 9066, which ordered the removal of Japanese Americans from the West Coast to inland internment camps. The Portland Expo Center (formerly named the Pacific International Livestock Exposition Center) was used as a temporary detainment camp.



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Time Period	Action
1948	The Vanport Flood occurred in 1948, when the Columbia River flooded and displaced approximately 20,000 public housing residents, including many minorities. Relocation occurred throughout the area, and the Vanport community’s residential base never recovered to the levels supported in 1948.
1950s	Post–World War II housing construction was financed through federal grants and GI loans and created a greater supply and demand of outer urban and suburban housing in both Oregon and Washington.
1958	The Vancouver-Portland Interstate Toll Bridge was constructed in 1958. This development doubled automobile capacity across the Columbia, reduced congestion, and allowed further commuting across the river. This bridge continues to carry southbound traffic today.
1960s	Portland International Raceway and Delta Park were established on former roads and land from the Vanport community that was destroyed by floods in 1948.
1952–60s	Construction of the interstate highway system in the 1950s and early 1960s was followed by increased freight and automobile traffic. The new highway separated neighborhoods in Portland and Vancouver. Construction of the interstate highway system also increased access to downtown Vancouver.
1950s to present	Urban renewal projects and large-scale transportation projects, including construction of I-5, the Memorial Coliseum, and the Emanuel Hospital expansion led, to the displacement of low-income and minority populations, including Black Portlanders in North and Northeast Portland (City of Portland 2019).
1973 to 1990s	A shopping mall opens on Hayden Island, at the location of a former amusement park. Originally an indoor mall, the site was redeveloped as an outdoor mall in the 1990s and renamed the Jantzen Beach Center.
1973 to present	Growth management and implementation of Oregon planning laws in the 1970s have limited urban sprawl in the Portland metropolitan area.
1970s to 1990s	High tech firms settling in Beaverton, Hillsboro, and other nearby suburbs were major players in the national high tech boom of the latter 20th century, an area that became known as the Silicon Forest. As the area’s economy shifted from timber processing and sales to high tech and services, a high demand for professional workers emerged. This encouraged commuting from throughout the Portland metropolitan area, including Vancouver, which increased commuting across the Columbia.
1990	The Washington Growth Management Act passed in 1990; like the growth management and planning laws adopted by Oregon in the 1970s, this act sought to restrict unplanned urban sprawl and concentrate growth in existing urban areas.



Time Period	Action
1990s to present	An increased focus on climate change led to calls for action in Oregon and Washington, as well as at the national level. Greenhouse gas emissions reduction targets were established at the federal, state, and local levels, with additional goals and policies identified to increase resiliency to climate-related impacts, such as drought.
2000 to present	The region experienced significant population growth between 2000 and 2020, with Multnomah County growing by 23% and Clark County by 46%, with most of the growth in BIPOC and/or Hispanic/Latino populations (U.S. Census Bureau 2010, 2020).
2001 to present	The Port of Portland conducted mitigation at the 90-acre Vanport Wetlands mitigation site. Efforts included the removal of invasive species, grading for improved functionality, and landscaping with native plants.
2008 to 2021	Beginning in 2008, the City of Vancouver worked with public and private partners to transform Vancouver’s historic waterfront area into a mixed-use area featuring office space, restaurants, shops, housing, and public spaces.
2000s to present	An increased focus on equity considerations leads to commitments at the local, state and federal level. Equity goals and policies are adopted by Oregon State, Washington State, and the Cities of Portland and Vancouver.

1 **2.5.2 Recently Constructed Projects**

2 Some of the more noteworthy recent transportation and development projects in or near the study  
 3 area are listed below. These projects give a sense of the recent development trends in the area. They  
 4 will create additional travel demand and generally will increase the density of housing, commercial,  
 5 and retail enterprises in the study area.

6 **2.5.2.1 Recent Transportation Projects**

- 7 • Vancouver Waterfront Renaissance Trail (Vancouver)
- 8 • Interstate Bridge northbound trunnion replacement (Vancouver/Portland)
- 9 • Interstate Bridge northbound active traffic management (Vancouver)
- 10 • C-TRAN’s Bus on Shoulder service (Vancouver)
- 11 • New metering on southbound I-5 at the 39th Street/SR 500 off ramp (Vancouver)

12 **2.5.2.2 Recent Development**

- 13 • Multifamily residential buildings along Marine Drive and N Anchor Way (Portland)
- 14 • Vanport wetlands restoration (Portland)
- 15 • Portland Meadows redevelopment (Portland)
- 16 • Jantzen Beach Center redevelopment (Portland, Hayden Island)

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- 1 • Floor and Décor (Portland, Hayden Island)
- 2 • Vancouver Waterfront (Vancouver)
- 3 • Hurley Building condominium (Vancouver)
- 4 • New Seasons (Vancouver)
- 5 • West Barracks renovation (Vancouver)
- 6 • Vancouver Community Library (Vancouver)
- 7 • The Academy Phase 1 (Vancouver)
- 8 • Block 10 (Vancouver)
- 9 • Office buildings at 210 W 4th Street and 101 E 6th Street (Vancouver)
- 10 • Vancouver Center Condo (Vancouver)
- 11 • Vancouver Innovation, Technology and Arts Elementary School (Vancouver)

### 12 2.5.3 Reasonably Foreseeable Future Projects

13 For many resources, anticipated changes in conditions over time are linked to future changes in  
14 population, employment, transportation behavior and performance, and land use patterns. Several of  
15 the resource-specific technical reports were informed by modeling that is built upon the best  
16 available projections of 2045 population, employment, and land use changes. The regional modeling  
17 includes the transportation improvements that are reasonably expected to occur by 2045; therefore,  
18 the following analyses are already cumulative in nature: air quality, climate, energy, noise and  
19 vibration, and transportation.

20 Multiple plans contain lists of reasonably foreseeable future projects. These plans include  
21 transportation system plans, neighborhood plans, and comprehensive plans, among others.  
22 Discussions with partner agencies also provided insight into planned projects in the region.

23 The No-Build Alternative includes a list of projects that are anticipated to occur through 2045,  
24 including present projects and planned improvements for which need, commitment, financing, and  
25 public and political support are identified and reasonably expected to be implemented. These  
26 projects meet the criteria of being “reasonably foreseeable.” All transportation improvements  
27 associated with the No-Build Alternative are included in either Oregon Metro’s (Metro’s) 2040 Regional  
28 Transportation Plan (RTP) (including amendments) or Southwest Washington Regional  
29 Transportation Commission (RTC’s) 2040 RTP.

30 Transportation infrastructure projects underway or planned through 2045 are listed in Appendix A,  
31 which includes highway and transit projects on both sides of the Columbia River. Transportation  
32 projects from the RTPs include the Regional Mobility Pricing Project that would initiate congestion  
33 pricing, using variable-rate tolls, for the entire I-5 and Interstate 205 (I-205) corridor in the  
34 metropolitan area. ODOT completed the NEPA scoping phase for the Regional Mobility Pricing Project  
35 in January 2023 and is now conducting NEPA analysis.

DRAFT Cumulative Effects Technical Report

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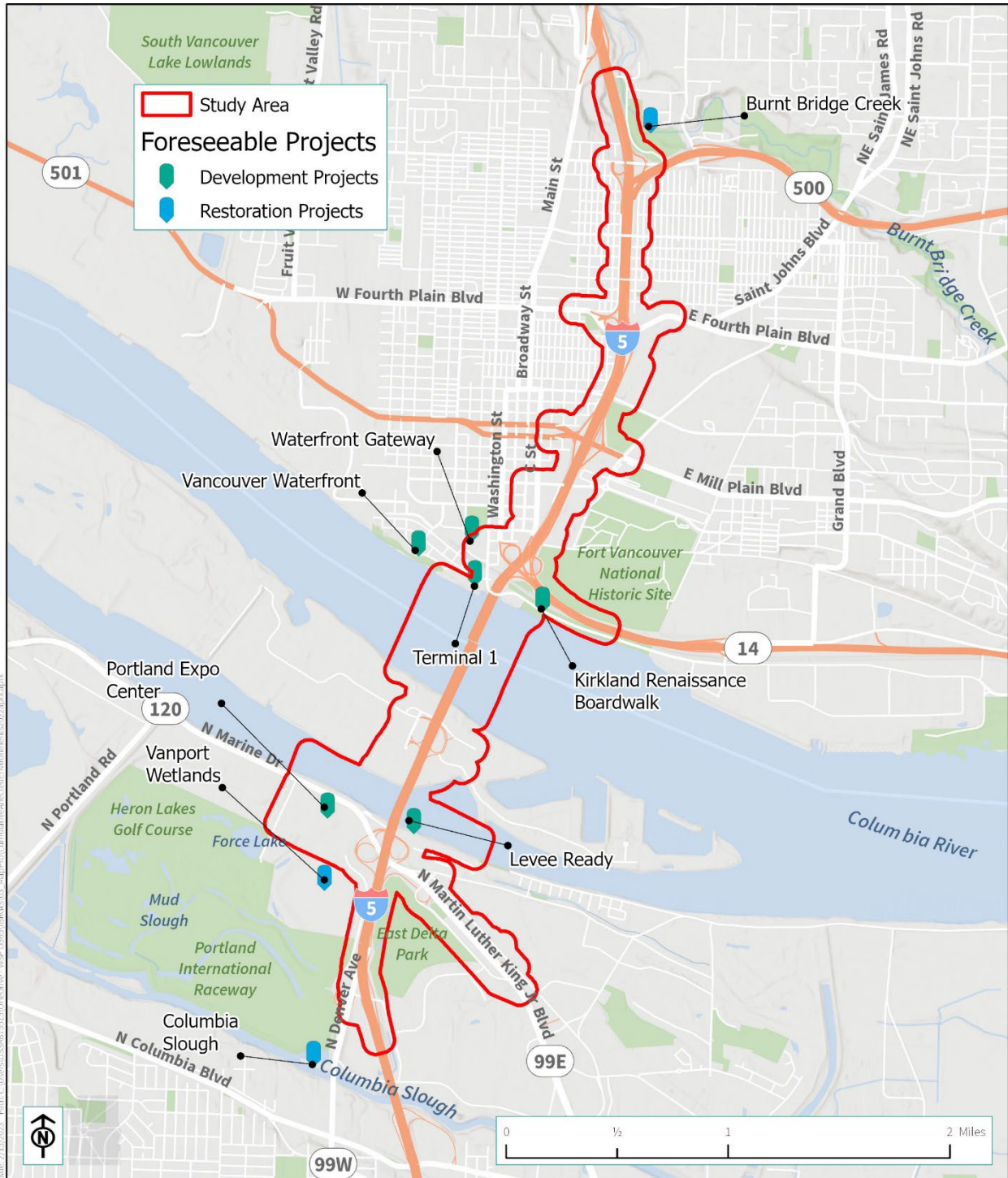
- 1 The financially constrained project list does not identify any major capacity improvements on I-5 near  
2 the program. Outside of the study area, there are I-5 capacity enhancements and several major  
3 maintenance projects. Capacity improvements on I-5 will provide additional vehicular and freight  
4 mobility and reduce travel times. The future projects will also require materials, equipment, and  
5 energy to complete and will have temporary traffic impacts associated with construction.
- 6 Projects more specific to the immediate area include local transportation improvements,  
7 infrastructure associated with higher-density residential communities along Marine Drive in Portland,  
8 ongoing revitalization of downtown Vancouver and the Vancouver Waterfront, and general  
9 infrastructure improvements, such as sewer and water facility expansions, that further enable  
10 development.
- 11 In addition to the transportation projects listed in Appendix A, other anticipated projects near the IBR  
12 program are listed below and identified on Figure 2-2. When identifying non-transportation projects  
13 that could contribute to cumulative effects, a project's proximity to the IBR program was considered  
14 (using the area shown on Figure 2-1, where most physical changes associated with the program would  
15 occur). The list of projects was confirmed with local and regional partner agencies in summer 2022.  
16 The project list will continue to be refined as individual projects progress and additional information  
17 is obtained about other reasonably foreseeable projects.



DRAFT Cumulative Effects Technical Report

1 Figure 2-2. Reasonably Foreseeable Projects in the Program Vicinity

2 Note: All transportation projects listed in the adopted RTPs are included on the list of reasonably foreseeable projects (see  
3 Appendix A). No future projects were identified near the Ruby Junction Maintenance Facility that are anticipated to  
4 contribute to cumulative effects.



5

1 **Vancouver Waterfront:** This ongoing project is a large-scale mixed-use development led by the City  
2 of Vancouver. The City completed a master plan for the 20-block, 32-acre site, which included new  
3 office and residential space in addition to a public park and multi-use trail. The first phase of  
4 construction began in 2015, and the first buildings opened in 2018. While the City’s improvements are  
5 largely complete, private properties at the waterfront continue to be developed, including Hotel  
6 Indigo and Kirkland Tower. Temporary traffic impacts may occur during project construction, but  
7 these should conclude before the IBR program begins construction.

8 **Terminal 1:** The Port of Vancouver USA is developing a 10-acre property known as Terminal 1, which  
9 is located between the Vancouver Waterfront (described above) and the existing I-5 bridges. Terminal  
10 1 would be a mixed-use development with a hotel, office and retail space, outdoor gathering areas,  
11 and a public marketplace. Terminal 1 would also complete a missing segment of the Vancouver  
12 Waterfront Renaissance Trail, connecting the existing trail at the Vancouver Waterfront to the existing  
13 trail east of Terminal 1. The Terminal 1 master plan is certified as Leadership in Energy and  
14 Environmental Design (LEED) Neighborhood (ND) Gold by the U.S. Green Building Council, and the  
15 Port’s design standards call for all new buildings to be constructed to achieve a LEED Gold  
16 Certification or higher. Vancouver Landing, Terminal 1’s first completed project, opened in June 2022  
17 and consists of a boardwalk with green space and public seating, Renaissance Trail connections, and  
18 signage displaying historical significance of the site. Full completion of Terminal 1 construction is  
19 anticipated by 2027.

20 **Renaissance Boardwalk:** The Renaissance Boardwalk project is a public-private partnership between  
21 Kirkland Development and the City of Vancouver to develop a 2.3-acre plot of land directly to the east  
22 of the I-5 bridges. The development plans include two new buildings and underground parking, with  
23 230 apartments and retail space for 30 tenants. A public walkway along the water’s edge would be  
24 included in the development and connect to existing trails. The project would also demolish a City-  
25 owned pier (built in 1991). The development will include several efforts to meet the City’s climate  
26 goals, including meeting LEED Gold standards, using electric power for the residential units (no  
27 natural gas), and 100 charging stations for electric vehicles (Campbell 2021a, 2021b).

28 **Waterfront Gateway Project:** This project, run by the Vancouver City Center Redevelopment  
29 Authority (CCRA), would redevelop a 6.4-acre City-owned site in downtown Vancouver near City Hall.  
30 The CCRA selected a development team to move forward with efforts to turn the site into a mixed-use  
31 destination including office, commercial, retail, and housing uses. This project is eligible for the  
32 Affordable Housing Fund and would include 100 apartment units reserved for residents making 60%  
33 or less of the area’s median income. Initial plans call for 545 parking spaces to be located  
34 underground or at the podium levels of the buildings. The City is currently working with the developer  
35 to create a comprehensive development plan for the site.

36 **Portland Metro Levee System Project (Levee Ready):** The U.S. Army Corps of Engineers (USACE), in  
37 partnership with the Multnomah County Drainage District (MCDD), is planning improvements to the  
38 existing levee along the south side of the harbor (Levee Ready Columbia n.d.). In 2021, the USACE  
39 released a final feasibility report and environmental assessment that identified a recommended plan  
40 to fix the levee system. The report will be used to make a recommendation to Congress for funding.  
41 The IBR program is coordinating with the USACE and MCDD as the levee system project progresses.

1 **Restoration and Habitat Projects:** There are several planned restoration projects within the study  
2 area, as well as along habitat corridors or waterways that pass through the study area. Within the  
3 study area, restoration activities are planned along Burnt Bridge Creek in Vancouver and the  
4 Columbia Slough in Portland (Ecology 2021; Lee and Stamberger 2018). These projects are led by  
5 various agencies and organizations, including the Cities of Vancouver and Portland and the Columbia  
6 Slough Watershed Council.

7 **Portland Expo Center:** Metro is working on a development opportunity study for the Portland Expo  
8 Center. The study will assess the value of the 53-acre property and identify development options that  
9 could complement, support, or replace the current event center's operations. The current project  
10 timeline calls for Metro's review and evaluation of proposals in winter 2022/spring 2023. Because of  
11 the uncertainty around what will be proposed at the Expo Center, the potential contribution to  
12 cumulative effects cannot be accurately described at this time without speculation. The IBR program  
13 will continue to coordinate with Metro as the Expo Center project progresses, and the project will be  
14 included in future analysis if sufficient details become available.

## 15 2.5.4 State, Regional and Local Plans

16 Several adopted state, regional, and local plans include visions of growth or change in the study area  
17 over the next 20 years.

### 18 2.5.4.1 State Plans

19 The Washington Transportation Plan, developed by WSDOT, establishes a 20-year vision for the  
20 development of the statewide transportation system. This plan is based on the six transportation  
21 system policy goals established by the Washington Legislature (Revised Code of Washington  
22 47.04.280): preservation, safety, mobility, environment, stewardship, and economic vitality (WSDOT  
23 and Washington State Transportation Commission n.d.).

24 The Oregon Statewide Planning Goals encourage urbanized growth within the Portland metropolitan  
25 area. Applicable goals include (but are not limited to) Goal 2 (Land Use Planning); Goal 5 (Natural  
26 Resources, Scenic and Historic Areas, and Open Spaces); and Goal 12 (Transportation).

27 The Oregon Transportation Planning Rule requires local jurisdictions to consider changes to land use  
28 densities as a way to meet transportation needs and encourages transit and multimodal  
29 transportation systems. The Oregon Transportation Plan (OTP) is the overarching policy document  
30 among a series of plans that together form the state transportation system plan. An update to the  
31 OTP is currently underway and is scheduled for completion in 2023.

32 In 2018, the Oregon Transportation Commission adopted an amendment to incorporate the  
33 Statewide Transportation Strategy (STS) as part of the OTP. The Oregon STS is a state-level scenario  
34 planning effort that examines all aspects of the transportation system, including the movement of  
35 people and goods, and identifies a combination of strategies to reduce greenhouse gas (GHG)  
36 emissions.



1 The Oregon Highway Plan (OHP) includes contextual statements and policies that may have an impact  
2 on the alternatives analysis for the IBR program (ODOT 1999). The OHP has been updated multiple  
3 times since 1999 to incorporate amendments, most recently in 2015. The OHP identifies I-5 as a major  
4 truck freight route. The OHP grants alternative standards to the Portland metropolitan area due to its  
5 established higher minimum densities, mixed-use development, and multimodal transportation  
6 options. The plan requires the adoption of Interchange Area Management Plans for all new or  
7 upgraded highway interchanges where the function of the interchange may be hindered due to  
8 changes in adjacent land uses.

#### 9 2.5.4.2 Regional Plans

10 Clark County Public Transit Benefit Area Authority's (C-TRAN's) Service Preservation Plan requires  
11 equitable service hours for local urban service, paratransit services, commuter services to Portland,  
12 and service to smaller Clark County cities. The plan includes high-capacity transit planning and its  
13 integration with other services, as well as both light rail transit and bus rapid transit improvements.

14 The RTC adopted the RTP for Clark County in 2019, which identifies future regional transportation  
15 system needs, plans, and improvements necessary to maintain mobility within and through the  
16 region, as well as access to land uses within the region. The RTP incorporates light rail as a component  
17 of the multimodal transportation system in the Vancouver metropolitan region.

18 The Metro RTP is a 25-year blueprint for the Portland metropolitan region's transportation system  
19 that is updated every five years (most recently in 2018). The RTP establishes policies and priorities for  
20 all forms of transportation and anticipates the region's current and future transportation needs.

21 Metro also has a Growth Concept, Regional Framework Plan, and Climate Smart Strategy. The Metro  
22 2040 Growth Concept encourages efficient use of land, a balanced transportation system, and other  
23 elements that will aid Portland metropolitan area cities to manage growth.

24 The Metro Regional Framework Plan (2014) includes policies to provide adequate transportation  
25 facilities to support adopted land use plans and enhance jobs, housing, and community identity. It  
26 also provides for a system of arterials and collectors to connect the central city, regional centers,  
27 industrial areas, and intermodal facilities. The Climate Smart Strategy was adopted in 2014 by Metro  
28 to reduce the region's per-capita GHG emissions from cars and light trucks at least 20% by 2035. The  
29 plan is a regional strategy to realize local visions for land use and transportation while also reducing  
30 GHG emissions.

31 Tri-County Metropolitan Transportation District of Oregon's (TriMet's) Transportation Improvement  
32 Plan utilized input from public engagement with transit riders and plan stakeholders to establish  
33 transit improvement priorities and possible funding allocations. The plan establishes a five-year  
34 roadmap for the roll-out of future services and programs to improve service in low-income  
35 communities. It also provides for planned revenue and service improvements and programs within  
36 the next two years (Fiscal Year 2021 to Fiscal Year 2023).

1 2.5.4.3 Local Plans

2 **Vancouver**

3 The Vancouver City Center Vision (VCCV) Plan (2007) for the Vancouver downtown area expands the  
4 city center boundary to approximately 130 city blocks, including the city center waterfront. It includes  
5 high-density residential uses, especially along the waterfront, with public access to the river's  
6 shoreline area. Other planned uses include recreation, cultural, hospitality, entertainment, and  
7 commercial uses. The plan identifies several new city blocks in the area of the existing I-5 downtown  
8 Vancouver interchange that may be available for development as a result of the IBR program.

9 The plan proposes easy access to Oregon from downtown Vancouver through high-capacity transit  
10 and a new southbound I-5 off ramp to 6th Street. It proposes easy access to the Vancouver National  
11 Historic Reserve and an integrated pedestrian, bicycle, transit, and automobile transportation system.  
12 The plan would improve downtown connectivity through a new arterial route south of the railroad  
13 berm extending from east of I-5 to Jefferson Street, connecting with Columbia, Esther, and Jefferson  
14 Streets.

15 The City of Vancouver's Comprehensive Plan (2011–2030), updated in 2011, encourages compact  
16 urban centers, transit, and supportive development regulations for areas along the defined high-  
17 capacity transit corridors identified along I-5 and SR 500. The City maintains a separate  
18 Transportation Plan that includes policy statements. The Comprehensive Plan applies to downtown  
19 Vancouver and North Vancouver.

20 The Comprehensive Plan designates future growth within the primary impact area from the Columbia  
21 River to Mill Plain Boulevard as Public Facilities, Commercial, and Open Space/Parks. Designations  
22 north of Mill Plain Boulevard within the primary impact area include Public Facilities; Urban High,  
23 Medium, and Low Density; and Commercial.

24 The Vancouver Shoreline Management Master Program (2021) includes goals and policies for physical  
25 and visual access to the shoreline, design that enhances the waterfront, an integrated trail system,  
26 good transportation networks, and strong bike and pedestrian circulation. Shoreline designations  
27 include High Intensity from the western extent of the study area to the eastern end of Fort Vancouver,  
28 with Fort Vancouver designated Urban Conservancy.

29 Other local plans in Vancouver include the Port of Vancouver Waterfront Development Master Plan,  
30 Downtown Vancouver Transportation System Plan, Central Park Plan, and Highway 99 Subarea Plan,  
31 among others.

32 Zoning in the study area includes City Center, High and Low Density Residential, Central Park Mixed  
33 Use, and Open Space/Parks. The City of Vancouver has several zoning overlay districts within the  
34 study area. These include a Historic Preservation Overlay that preserves significant architectural  
35 character and areas within the city with cultural significance. A Noise Impact Overlay District is  
36 established along the Columbia River shoreline and extending west to the Esther Short Park  
37 neighborhood and along blocks that abut I-5 up to McLoughlin Boulevard. An Office Development  
38 Overlay District protects neighborhoods from noise, light, and increased pedestrian and automotive  
39 traffic, or other community aesthetic changes. Transit Overlay Districts within the study area

DRAFT Cumulative Effects Technical Report

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1 encourage high-density residential and commercial development along main traffic corridors. The  
2 Central Park Plan District preserves and enhances the established urban civic character of the area  
3 and its significant historical, natural, educational, recreational, public utility, and social service  
4 resources.

5 **Portland**

6 The City of Portland’s 2035 Comprehensive Plan, amended in March 2020, is built on the 2012 Portland  
7 Plan, the Climate Action Plan, and Portland’s 1980 Comprehensive Plan. The Comprehensive Plan is a  
8 long-range land use and public facility investment plan to guide future growth and physical  
9 development of the city. The plan continues the commitment to linking land use and transportation  
10 decisions. It expands the reasons for, and approaches to, improving Portland as a place that is  
11 walkable, bikeable, and transit-friendly with active main streets. The Comprehensive Plan designates  
12 future growth within the study area north of Marine Drive as General, Central, and Urban Commercial;  
13 and south of Marine Drive as Industrial Sanctuary, Mixed-Use, and Open Space. Most of the areas  
14 within the study area are developed; however, further redevelopment on Hayden Island is anticipated.

15 Zoning designations in the study area include Open Space, General Employment, General Industrial,  
16 Commercial Mixed Use, and various Residential zones. There are several zoning overlay districts  
17 within the study area, including Alternative Design Density, which encourages infill development;  
18 Environmental and Conservation overlays, which protect natural resources; Design Overlay, which  
19 preserves areas of the City with special scenic, architectural or cultural value; and Aircraft Landing  
20 Overlay, which provides safer operating conditions for aircraft in the vicinity of Portland International  
21 Airport (PDX).

22 In early 2009, the City of Portland Bureau of Planning and Sustainability published the Hayden Island  
23 Plan. The plan includes goals, objectives, proposed comprehensive plan and zoning changes, an  
24 implementation strategy, a street plan, development standards, a conservation strategy, and an  
25 affordable housing preservation strategy.

### 3. BUILT ENVIRONMENT CUMULATIVE EFFECTS

*Please note: The draft Cumulative Effects Technical Report was written based on the version of each draft technical report available at that time. Each resource section will be updated as the draft technical reports are revised.*

The built environment includes the following disciplines or resource areas:

- Acquisitions
- Air quality
- Aviation and navigation
- Climate
- Economics
- Electromagnetic fields
- Energy
- Equity and environmental justice
- Hazardous Materials
- Land use
- Neighborhoods and population
- Noise and vibration
- Public services and utilities
- Transportation
- Visual quality and aesthetics

Key elements of the built environment in the study area are the roadway and transit network, downtown Vancouver and surrounding neighborhoods, and the neighborhoods and commercial uses on Hayden Island and North Portland near the river. Development projects considered in the analysis include large commercial developments (especially near highway interchanges), highway-oriented developments, industrial developments or redevelopment (e.g., the area between Columbia Boulevard and Columbia Slough), and housing developments near the highway or urban edge.

The temporal frame of reference for the built environment “past” for this analysis is generally from 1950, prior to the opening of I-5 through Oregon and Washington, to the present. As data allow and are relevant, some parts of the cumulative effects discussion refer back to 1917, the time of construction and opening of the first bridge across the Columbia River. The current year is 2022 and the temporal frame of reference for the “future” is generally 2045, which is the planning horizon for the program and the year to which impacts can be reliably identified (either quantitatively or qualitatively) without speculation. Long-term cumulative effects extending beyond the 2045 planning horizon that are related to the program lifecycle are considered qualitatively.

## 1 3.1 Acquisitions

### 2 3.1.1 Project Effects

3 Under the No-Build Alternative, no acquisition or displacement of businesses or residences would  
4 occur.

5 Under the Modified LPA, approximately 33 acres of property would have to be permanently acquired  
6 for the construction and long-term operation and maintenance of the program, including  
7 approximately 4.3 acres in permanent easements. A total of 176 parcels would be permanently  
8 affected by the Modified LPA, with 47 full acquisitions and 129 partial acquisitions. Up to 76  
9 residences, including 35 floating homes, would need to be relocated, along with approximately 38  
10 commercial uses and two public facilities.

### 11 3.1.2 Effects from Other Actions (Past, Present, Future)

12 Most of the area directly affected by the IBR program is already occupied by public right of way  
13 resulting from previous transportation or other capital construction projects.

14 The original construction of I-5 during the late 1950s and early 1960s involved significant property  
15 acquisitions and displacements in Portland and Vancouver. For example, when the segment of I-5  
16 known as the Minnesota Freeway was constructed from the Rose Garden area to the Columbia River  
17 Slough in northeast Portland, it removed more than 180 dwellings and displaced more than 400  
18 residents (Kramer 2004). Construction of I-5, the Memorial Coliseum, and the Emanuel Hospital  
19 expansion collectively displaced thousands of Black Portlanders from the 1950s through the 1970s.

20 Future actions, such as the planned redevelopment associated with the Hayden Island Plan, would  
21 likely require the additional displacement or relocation of existing businesses on the island, while  
22 providing commercial space for the relocation of others. Proposed developments in Vancouver would  
23 displace additional businesses there as well.

### 24 3.1.3 Conclusions

25 The real estate acquisitions required for the Modified LPA are high in the context of other recent  
26 actions in this vicinity, but they are relatively low for a project of this size located in an already  
27 urbanized area. At the corridor level, impacts would be substantially smaller than the acquisitions  
28 associated with the original construction of I-5 in the corridor. There would be few residential  
29 displacements in neighborhoods that were directly affected by the original construction of I-5. Most of  
30 the displacements would be commercial properties and floating homes on Hayden Island.

31 The Modified LPA would require the displacement of up to 15 businesses on Hayden Island, which  
32 accounts for more than a quarter of all commercial displacements. This is a notable reduction from  
33 what was anticipated during the CRC Project phase, which estimated the displacement of up to 40  
34 businesses on Hayden Island. This reduction is due to the closure of many businesses in the area, as  
35 well as a reduction in the proposed footprint on Hayden Island. Future actions, such as the planned  
36 redevelopment associated with the Hayden Island Plan, would likely require the additional

DRAFT Cumulative Effects Technical Report

1 displacement of existing businesses on the island, while providing commercial space for the  
2 relocation of others. See the Land Use Technical Report for more discussion of this topic.

3 Cumulative effects on the floating home community would not be much greater than the effects of the  
4 Modified LPA on the floating home community. According to historic aerial photos, it appears that the  
5 floating home moorages were developed following the original construction of I-5, so they would not  
6 have been affected by past I-5 construction. No known future projects would require additional  
7 floating home displacements. However, state and federal regulations that make it difficult to permit  
8 new moorage space would tend to reduce opportunities for relocating displaced floating homes.  
9 Compared to past, present, and foreseeable future actions, the Modified LPA would have a negligible  
10 effect on property.

## 11 3.2 Air Quality

### 12 3.2.1 Project Effects

13 The air quality analysis for the IBR program is cumulative in nature as it incorporates projected  
14 increases in traffic and regional growth and reasonable foreseeable actions. Analysis from the Air  
15 Quality Technical Report indicates that future regional air pollutant emissions from I-5 traffic would  
16 be lower than the existing conditions with or without the program. On a regional scale, the emissions  
17 resulting from the Modified LPA would be lower than the No-Build Alternative. On a regional basis, the  
18 difference between the future 2045 emissions for project alternatives—i.e., the No-Build Alternative  
19 and the Modified LPA—is 1 percent or less, which is not a substantial difference.

### 20 3.2.2 Effects from Other Actions (Past, Present, Future)

21 Past and present actions affecting air quality in the study area (and region) include programs and  
22 regulations put into effect to control air pollutant emissions, as well as population growth and  
23 accompanying development leading to an increase in the number of single-occupancy and freight  
24 vehicles. Starting in the early 1970s and, more recently in the early 2000s, regulatory controls on air  
25 pollutant emissions are responsible for substantial reductions in vehicle emissions since the 1970s  
26 and additional projected vehicle emissions reductions over the next 25 to 30 years.

27 Traffic data used in the air quality analysis are based on projected land use and employment  
28 information and include expected overall growth in the region and the study area, as well as the  
29 transportation projects identified as reasonably foreseeable future actions. Non-transportation  
30 projects may increase emissions, such as general commercial and residential development in the  
31 area. The Regional Mobility Pricing Project may reduce emissions through a mode shift away from  
32 single-occupancy vehicles to carpooling, public transit, or active transportation, as well as a reduction  
33 in emissions associated with congestion. This project may also contribute to cumulative effects from  
34 the expansion of public transit and active transportation networks or other projects such as the IBR  
35 program, which may result in changes to emissions and impacts to air quality.



1 Background concentrations representing the cumulative emissions of other sources in the area are  
2 included in the predicted local concentrations for carbon monoxide at intersections. Long-term  
3 monitoring has shown that air quality has improved over the years. Current and new regulations will  
4 continue to reduce pollutant emissions from mobile sources and other sources in the future, and air  
5 quality should continue to improve (DEQ 2021; FHWA 2016).

### 6 3.2.3 Conclusions

7 The air quality analysis incorporates reasonably foreseeable changes in the region’s future land use,  
8 population, employment, and travel behavior, including the effects of the IBR program. For all  
9 pollutants analyzed, future 2045 emissions are projected to be lower than existing conditions under  
10 both the Modified LPA and No-Build Alternative. Regional improvements to transportation supply  
11 through increased roadway and transit capacity, active transportation networks, measures such as  
12 regulations on other source types, and the Regional Mobility Pricing Project would also reduce  
13 additional future emissions and have a positive effect on air quality. Therefore, the cumulative effects  
14 of air quality would improve with time despite the increase of traffic on I-5 and projected growth in  
15 the region.

## 16 3.3 Aviation and Navigation

### 17 3.3.1 Project Effects

18 The No-Build Alternative would not affect existing aviation conditions. Under this alternative, the  
19 towers of the existing I-5 bridges would continue to penetrate into the Pearson Field Part 77 airspace.  
20 The airport currently has special departure procedures that help aircraft avoid the towers. Likewise,  
21 river navigation conditions would not be expected to change under the No-Build Alternative, and  
22 navigation would continue to be affected by the existing piers and bridge lifts. In the event that the  
23 existing lift span becomes stuck in the closed position, vessels that are unable to pass under one of  
24 the fixed spans would be unable to continue downriver or upriver of the I-5 corridor. Vessels would  
25 also be unable to complete the necessary S-curve maneuver to align with the BNSF bridge opening.<sup>1</sup>

26 The Modified LPA would have no long-term effects on aviation activities at Portland International  
27 Airport but would have some benefits on operations at Pearson Field. To maintain clearance over the  
28 existing BNSF railroad lines before beginning their descent, the SR 14 ramps transitioning to and from  
29 the I-5 bridge structures would penetrate restricted airspace for Pearson Field under the Modified LPA.  
30 The Modified LPA would improve conditions for aviation at Pearson Field compared to existing  
31 conditions and the No-Build Alternative, due to the removal of the lift towers.

32 River navigation safety and security for both the main channel of the Columbia River and North  
33 Portland Harbor would be improved by the Modified LPA due to the elimination of the “S” curve  
34 maneuver, a reduction in the number of piers, elimination of river traffic delays associated with bridge

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<sup>1</sup> The primary navigation channel under the I-5 bridges lines up with the opening in the BNSF bridge, while the alternate channels under the I-5 bridges are located toward the center and south bank of the river, thus requiring vessels to make an S-curve maneuver between the I-5 bridges and the BNSF bridge opening.

1 lifts, and improved seismic resiliency. The Navigation Impact Report prepared for the program found  
2 that construction of the Modified LPA (with 116 feet of vertical clearance) would result in impacts to  
3 eight vessels/users, which could be reduced to four vessels/users through modifications of vessel  
4 operations. The IBR program would engage affected vessel owners to identify appropriate measures  
5 to reduce or avoid impacts, and these measures would be subject to future decisions and agreements  
6 between the program and affected vessel owners. These would be finalized prior to issuance of the  
7 U.S. Coast Guard bridge permit and/or construction of the Modified LPA.

### 8 3.3.2 Effects from Other Actions (Past, Present, Future)

9 Past actions that affected aviation include development in the region that penetrates the airspace of  
10 aircraft landing or departing at Pearson Field. The towers of the existing I-5 bridges and several  
11 buildings in downtown Vancouver currently penetrate the Pearson Field Part 77 airspace. There are no  
12 known planned projects in the area that would contribute to cumulative effects on airspace.

13 Past actions that affected river navigation include authorization and construction of the federal  
14 navigation channel, construction of upstream dams and navigation locks, construction of the existing  
15 bridges over the main stem of the Columbia River and North Portland Harbor, and other bridges  
16 constructed upriver and downriver of the study area, such as the BNSF rail bridge. The federal  
17 navigation channel at and upstream of the bridge was established as a deep-draft (27 feet) navigation  
18 channel to accommodate ocean-going ships upstream to The Dalles. This shipping traffic never  
19 materialized, and the USACE currently maintains the channel to 17 feet reflecting the current traffic on  
20 the river. There are no known planned navigation projects in the area that could contribute to  
21 cumulative effects on navigation. If the USACE deepens the Vancouver to the Dalles channel to 27 feet  
22 as authorized, it could contribute to a change in the type of navigation through the study area.

23 The construction of Bonneville Dam and the navigation locks, as well as other dams and locks,  
24 allowed navigation to extend upriver to Lewiston, Idaho, on the Snake River. Navigation does not  
25 extend past the Tri-Cities on the Columbia River due to river conditions and the lack of  
26 accommodation at upriver dams. The depth of the channel, size of the locks that allow passage past  
27 the dams, and height of existing bridges across the Columbia and Snake River system limit the size of  
28 vessels that can navigate upstream past Bonneville Dam. An analysis of upriver land uses showed that  
29 there is limited potential for development that could result in different navigation on the waterway.  
30 Existing political and geographic constraints limit the areas for future water-dependent land uses,  
31 including restrictions imposed by the Columbia River Gorge National Scenic Area, topography,  
32 transportation access parallel to shorelines (SR 14, Interstate 84, and BNSF and Union Pacific  
33 railroads), and existing open spaces. Therefore, there are no known reasonably foreseeable actions  
34 that would affect river navigation in the study area.

### 35 3.3.3 Conclusions

36 The Modified LPA would not affect aviation at PDX but would contribute to beneficial effects at  
37 Pearson Field. It is not anticipated that any of the identified future actions would contribute to  
38 cumulative effects at Pearson Field, and any future actions that could affect operations would be  
39 reviewed by the City of Vancouver and the Federal Aviation Administration to ensure compliance with  
40 their regulations.



1 While the Modified LPA would contribute to both adverse effects and benefits for river navigation,  
2 none of the identified future actions would affect navigation and therefore the Modified LPA would  
3 not contribute to cumulative effects.

## 4 3.4 Climate Change

### 5 3.4.1 Project Effects

6 The GHG emissions modeling prepared for the IBR program incorporates output from the  
7 transportation modeling, which includes anticipated regional growth and reasonably foreseeable  
8 future actions. As such, the results of the modeling reflect cumulative effects on annual GHG  
9 emissions in the study area. Under the No-Build Alternative and the Modified LPA, GHG emissions  
10 would continue to increase in the region compared to existing conditions, in large part due to  
11 increased vehicle miles traveled (VMT) associated with population growth and development. The  
12 Modified LPA would result in a net reduction of GHG emissions compared to the No-Build Alternative  
13 due to a decrease in congestion and vehicle idling, as well as a mode shift to public transit and active  
14 transportation, resulting in fewer VMT.

15 In addition to activities designed to minimize emissions, the Modified LPA includes features that  
16 would improve the local and regional resiliency to the anticipated effects of climate change. These  
17 include avoiding fragmentation and degradation of floodplain hydrology by sensitively locating new  
18 and modified transportation and utility project components; maximizing management of stormwater  
19 by restoring existing unused impervious paved areas to natural, permeable, and vegetated conditions  
20 during the design phase to the maximum extent practical; and ensuring that the bridge design will  
21 accommodate potential climate-change-induced effects such as larger water volumes from winter  
22 storms and more frequent snow and ice storms.

### 23 3.4.2 Effects from Other Actions (Past, Present, Future)

24 Globally, GHG concentrations have risen substantially because of human activities, and they have  
25 been a primary driver of warming. Both the Oregon Global Warming Commission and the Washington  
26 State Department of Ecology (Ecology) publish reports every two years measuring their states' GHG  
27 emissions and progress toward state and federal goals to reduce GHG emissions. Per the most recent  
28 reports, transportation (including highway, rail, and air transport) is the greatest contributor to GHG  
29 emissions in Oregon and Washington.

### 30 3.4.3 Conclusions

31 The IBR program and agency partners considered climate change during the development and  
32 selection of design modifications for the Modified LPA. As part of its standard design, the Modified LPA  
33 has incorporated features that will provide greater resilience and function under the potential effects  
34 brought on by climate change. Compared to existing conditions, GHG emissions associated with the  
35 transportation sector are expected to decline in future years due to improvements in vehicle fuel  
36 technologies and the transition away from using gasoline and diesel fuels to power vehicles. As more  
37 and more of the vehicle fleet is composed of electric cars, the decarbonization of the electric grid in

1 Washington and Oregon will further decrease GHG emissions associated with vehicle travel. Thus,  
2 although the annual VMT in the study area would increase by 37% under the No-Build Alternative as  
3 compared to existing conditions, the associated GHG emissions would decrease. The Modified LPA,  
4 when combined with other foreseeable actions, would result in marginally fewer GHG emissions than  
5 the No-Build Alternative and would improve the climate resiliency of the corridor and region.

## 6 3.5 Economics

### 7 3.5.1 Project Effects

8 Under the No-Build Alternative, no businesses would be displaced and there would be no resulting  
9 decrease in property or sales tax revenues or jobs lost. Conversely, there would be no additional  
10 employment or added sales tax associated with project construction. Economic development planned  
11 for this area may occur more slowly because business owners may be reluctant to locate in an area  
12 with poor access and mobility for employees and customers. Freight reliability decreases as  
13 congestion spreads beyond the peak hour, into times when trucks tend to travel. Customers may elect  
14 to shop in other areas with easier access and improved mobility. It is likely that congestion pricing  
15 would be implemented on this section of the I-5 corridor under the No-Build Alternative, as a result of  
16 the Regional Mobility Pricing Project.

17 The Modified LPA would have both adverse and beneficial impacts, and the overall long-term  
18 economic effects after project construction are expected to be positive. This is due to the Modified  
19 LPA's suite of highway and transit improvements that effectively and efficiently move people and  
20 commerce through this corridor, which serves a variety of interstate, regional, and local needs. The  
21 Modified LPA also improves the movement of marine traffic along the Columbia River, as noted in  
22 Section 3.3. The bulk of potential negative economic impacts would result from business  
23 displacements, losses in parking, or changes in access to businesses.

24 Extending light rail transit across the Columbia River is a great improvement to the regional network  
25 and would attract some riders from their vehicles, potentially lowering VMT and the overall forecasted  
26 volumes of single-occupancy vehicles. This would extend the service life of the IBR program's highway  
27 improvements. Furthermore, transit improvements are often linked to economic development  
28 around station areas.

29 Enhanced vehicular and transit access to downtown Vancouver and across the Columbia River is  
30 expected to positively affect employers and businesses in the area. The Modified LPA could increase  
31 the attractiveness of commercial and industrial properties located in the vicinity of the project  
32 interchanges by improving highway and transit access. This in turn may attract new businesses and  
33 make the location more attractive to employees. Tolls may temper these benefits, but potential  
34 benefits to businesses are expected to outweigh potential tolling costs.

### 1 3.5.2 Effects from Other Actions (Past, Present, Future)

2 The I-5 corridor serves as the backbone of the region's transportation network. Many past projects  
3 have worked to solidify I-5 as the central component of the regional infrastructure, though  
4 development in recent decades has accompanied increased growth in other parts of the region. I-5  
5 used for freight, business, and personal travel. Freight needs are an important driver for future  
6 improvements along the I-5 corridor.

7 The Ports of Portland and Vancouver are critical to the economic growth and prosperity of the region.  
8 In order for the ports to remain competitive with other West Coast ports, efficient and cost-effective  
9 multimodal transportation systems must be available. The total annual tonnage moving through the  
10 two ports is expected to double from approximately 300 million tons in 2007 to almost 600 million  
11 tons in 2040 (Cambridge Systematics 2015). This growth has implications for the transportation  
12 network as products move to, from, and within the region.

13 Similarly, economic growth in the region would increase demands along the I-5 corridor, as Metro  
14 forecasts that the number of jobs in the Portland-Vancouver Standard Metropolitan Statistical Area  
15 would increase by approximately 50 percent from 2015 to 2045 (Metro 2021).

16 Both the Metro RTP and RTC RTP include several capacity and safety projects west of I-5 that are  
17 designed to improve safety and flow for commercial trucks traveling between I-5 and industrial areas  
18 to the west.

19 Planned improvements along Columbia Boulevard, Lombard Street, and Marine Drive would generally  
20 improve conditions for commercial trucks. Travel times for commercial trucks traveling along I-5 are  
21 expected to improve due to capacity projects north of Vancouver and south of the Expo Center, but  
22 gains would be offset by projected growth in population and employment.

### 23 3.5.3 Conclusions

24 The Modified LPA would positively contribute to other projects aimed at reducing congestion and  
25 enhancing freight mobility by further relieving congestion. Congestion relief in the study area would  
26 benefit freight traffic generated by Swan Island, the Rivergate area, the Port of Portland, and the Port  
27 of Vancouver. Incremental benefits would decrease travel times, increase mobility, and increase travel  
28 time reliability for freight vehicles.

29 The Modified LPA would enhance vehicular and transit access to and from downtown Vancouver, SR  
30 14, Evergreen Boulevard, and Mill Plain Boulevard, which would benefit employers, businesses, and  
31 economic activity. The Modified LPA supports the VCCV and the Hayden Island Plan by providing  
32 greater access and transit service.

33 Without the Modified LPA, economic development planned for the area may occur, albeit more slowly,  
34 as business owners may be more reluctant to locate in an area with restricted access caused by  
35 mobility constraints. Customers may elect to shop in other areas with lower levels of congestion and  
36 easier access. Compared to past, present, and reasonably foreseeable future actions, the Modified LPA  
37 would have a positive effect on economics.

## 1 3.6 Electromagnetic Fields

### 2 3.6.1 Project Effects

3 The No-Build Alternative would not create any new sources of electromagnetic fields (EMF), and future  
4 EMF exposure would likely remain similar to existing conditions.

5 The extension of the light rail line with the Modified LPA would result in the generation of additional  
6 EMF within the study area (there would be no EMF-related impacts related to the highway  
7 components). Future levels of EMF along the extended light rail transit line would be identical to those  
8 produced in the current light rail system, since the proposed elements of the system such as power  
9 levels, substation ratings, and facility and system design would be the same as the existing  
10 Metropolitan Area Express (MAX) system. Based on EMF measurements and available data, operation  
11 of proposed segments of the MAX light rail would not generate sufficiently intense levels of EMF to  
12 cause significant exposure risks to human health.

13 Light-rail-generated EMF would be just one of many sources of EMF that make up the cumulative  
14 personal EMF field exposure. Because field strength decreases rapidly with distance from the source,  
15 cumulative EMF effects would only occur if other sources are co-located with project electrical  
16 infrastructure.

### 17 3.6.2 Effects from Other Actions (Past, Present, Future)

18 The existing EMF environment in the study area varies depending on location, as EMF levels are site-  
19 and time-specific. The main sources of EMF are the traction power system and traction power  
20 substations associated with the TriMet MAX light rail transit system. Future actions and trends likely to  
21 affect cumulative EMF exposure include increasing use of hybrid and electric vehicles, electronic  
22 equipment in general, and wireless devices. The frequencies and field strengths of different types of  
23 equipment vary widely. Scientists have found that EMF produce biological effects on humans and  
24 animals such as changes in the cell growth rates and intercellular communication (American Medical  
25 Association 1994). However, scientists do not agree on EMF's potential health effects because the  
26 available evidence is fragmentary, complex, and often inconclusive. The problem has been  
27 exacerbated by studies using "weak" scientific evidence, which have produced results that are  
28 contradictory to other studies (NIEHS 1991, 2002).

### 29 3.6.3 Conclusions

30 EMF is widespread throughout the general environment, and EMF levels from Portland's light rail  
31 system are well below the International Commission on Non-Ionizing Radiation Protection and  
32 American Conference of Governmental Industrial Hygienists exposure standards. Under the Modified  
33 LPA, there would be slightly increased cumulative exposure for persons riding or working on the light  
34 rail system. While there is concern about the potential health effects of EMF exposure, there is no  
35 evidence to indicate that light-rail-generated EMF would change the human health risk associated  
36 with cumulative EMF exposure. Compared to past, present, and reasonably foreseeable future  
37 actions, the Modified LPA would have a negligible effect on EMF exposure.

## 1 3.7 Energy

### 2 3.7.1 Project Effects

3 The energy analysis for the IBR program is cumulative in nature as it incorporates projected increases  
4 in traffic and regional growth and reasonable foreseeable actions. Analysis for the Energy Technical  
5 Report showed that for future conditions (under both the No-Build Alternative and the Modified LPA),  
6 energy consumption and GHG emissions are expected to be substantially lower than existing values  
7 for the region, which is consistent with national trends. Although the annual VMT in the study area  
8 would increase by 37% under the No-Build Alternative as compared to existing conditions, GHG  
9 emissions would decrease substantially as compared to existing conditions due to the  
10 implementation of fuel and engine regulations. On a regional basis, emissions would be similar under  
11 the No-Build Alternative and Modified LPA.

### 12 3.7.2 Effects from Other Actions (Past, Present, Future)

13 Past actions that contributed to energy demand and use in the region include general development,  
14 such as the Vancouver Waterfront and multifamily buildings along Marine Drive, as well as population  
15 growth and transportation projects that led to an increase in the number of single-occupancy and  
16 freight vehicles. Some transportation projects, such as the expansion of C-TRAN's bus service in  
17 Vancouver (including the introduction of bus rapid transit) and increase in service of TriMet's bus and  
18 light rail system (including the extension of light rail to the Expo Center), likely reduced energy  
19 demand and use due to a mode shift from personal vehicles to public transit.

20 Most of the reasonably foreseeable future projects would increase the demand for energy, either  
21 through fuel for vehicles or through energy needs to support new development. However, the future  
22 demand for energy will depend on trends in population, economic activity, energy prices, and  
23 adoption and implementation of technology. The Regional Mobility Pricing Project may reduce energy  
24 use through a reduction in the number of single-occupancy vehicles on the road caused by a mode  
25 shift to carpooling, public transit, and active transportation. Other planned developments—namely  
26 Terminal 1 and the Renaissance Boardwalk development—will be designed and constructed to meet  
27 LEED Gold standards, which include requirements for reducing energy use.

### 28 3.7.3 Conclusion

29 Cumulative effects related to energy use are partially incorporated into the long-term energy demand  
30 estimates prepared for the IBR program. Those estimates are based on travel demand forecasts that  
31 factor in projected local changes in land use patterns, employment, population growth, and other  
32 programmed transportation improvements. Two factors related to the IBR program—1) the energy  
33 demand to construct the project and 2) background traffic growth in the corridor—are projected to  
34 increase petroleum demand, which will add to global oil demand. At the same time, operation of the  
35 Modified LPA is projected to lower the transportation demand for petroleum relative to the No-Build  
36 Alternative. Compared to past, present, and foreseeable future actions, the Modified LPA will have a  
37 negligible beneficial effect on energy.

## 1 3.8 Equity and Environmental Justice

### 2 3.8.1 Project Effects

3 The IBR program has made a commitment to the community to place equity at the center of the  
4 program, beyond legal and statutory requirements, such as the NEPA requirement to evaluate  
5 impacts to environmental justice (EJ) populations (low-income and minority populations). A  
6 foundational component of this commitment was the formation of an EAG, which developed a  
7 program-specific definition of equity and identified “equity priority communities” as those who  
8 experience and/or have experienced discrimination and exclusion based on identity or status. The  
9 communities include Black, Indigenous, and People of Color (BIPOC); people with disabilities;  
10 communities with limited English proficiency; persons with lower incomes; houseless individuals and  
11 families; immigrants and refugees; young people; and older adults.

12 The No-Build Alternative would not change the existing conditions that affect equity priority  
13 communities. There would be no acquisitions or displacements of residences or businesses. It would  
14 not provide the benefits that the Modified LPA would provide, including the extension of light rail and  
15 improvements to active transportation facilities in the corridor. The limited multimodal options  
16 hinder access to jobs and services—in particular, for segments of the population that use transit at a  
17 higher rate, including low-income individuals and people with disabilities. In addition, there would be  
18 no job creation associated with construction of the project.

19 The Modified LPA would acquire right of way from residences and businesses along I-5 and the light  
20 rail transit alignment (see Section 3.1). It would displace households throughout the study area, and  
21 most of the displacements would occur in neighborhoods that have similar or lower proportions of  
22 minority and low-income populations relative to the region. The anticipated displacements are not  
23 anticipated to be disproportionate, as low-income or minority census tracts would not be impacted  
24 more than other census tracts. However, the characteristics of individual households will need to be  
25 assessed before this can be determined definitively. In accordance with the Uniform Act, potentially  
26 displaced residents and businesses would be contacted and surveyed, and any displacements would  
27 be mitigated with a dedicated relocation plan.

28 Approximately 14 businesses on Hayden Island would be displaced, which would affect approximately  
29 130 employees. These service- and sales-sector jobs are sources of employment for low-income  
30 residents of Vancouver and North Portland. Some of these displaced businesses may choose not to  
31 relocate locally. Even with relocation assistance, some of the employees may be unable to retain their  
32 jobs; for example, an employee may have to accept a new job during the transition period of  
33 relocation.

34 For low-income populations, which are disproportionately BIPOC, the impact of tolling may be  
35 disproportionate. The IBR program and EAG are looking into how this impact could be mitigated  
36 through a low-income toll program. Low-income populations would also benefit from the Modified  
37 LPA through the construction of light rail transit; improved travel times on I-5; significantly improved  
38 bike and pedestrian facilities; and safer vehicle, bicycle, and pedestrian travel. Please note: The  
39 discussion and conclusions regarding equity and environmental justice will be updated as additional  
40 conversations occur and decisions are made regarding a low-income toll program.



1 The Modified LPA will provide benefits to equity priority communities in terms of increased mobility  
2 and accessibility, particularly due to the high-capacity transit and active transportation elements. The  
3 decrease in transit travel time and increase in transit reliability would be a key benefit for all those  
4 traveling through the area, but particularly for low-income individuals and people with disabilities,  
5 who ride transit proportionally more than people with higher incomes or without a disability. Transit  
6 access would be improved for all equity priority communities within the study area, with a 50% or  
7 greater increase in access to jobs (compared to the No-Build Alternative).

### 8 3.8.2 Effects from Other Actions (Past, Present, Future)

9 EJ populations and equity priority communities in the study area have been affected by past actions  
10 that generate noise and air pollution (see Sections 3.2 and 3.11) that have displaced residents and  
11 businesses (see Section 3.1) and that have had socioeconomic impacts on these populations (see  
12 Sections 3.4 and 3.10). The Vanport Flood and subsequent displacements, in particular, had a  
13 disproportionate impact on EJ populations.

14 Some past actions have also provided benefits to one or more of these populations, including  
15 improved access and mobility associated with roadway and transit improvements, public housing  
16 development, and employment and training opportunities associated with commercial and  
17 educational development. Generally, the development of transit by C-TRAN and TriMet, including the  
18 MAX Yellow Line through North Portland, benefits the general population as well as communities with  
19 a higher reliance on transit, including low-income populations and people with disabilities.

20 The original construction of I-5 through Portland had significant effects on the populations in and  
21 adjacent to the highway's path. ODOT cleared entire blocks for development of the roadway, dividing  
22 neighborhoods, displacing residences, and affecting businesses in the historic epicenter of Portland's  
23 Black community. The construction of I-5 through Vancouver changed the city by closing 5th Street  
24 (the route heading east) and encouraging development of housing to the north of downtown. Fewer  
25 displacements occurred in Vancouver because the area was less densely developed than Portland at  
26 that time.

27 One socioeconomic impact attributed to the cumulative effect of population growth and  
28 development is an increase in the cost of living. Between 2000 and 2021, median gross rent increased  
29 52% in Portland, 48% in Multnomah County, 40% in Vancouver, and 41% in Clark County (adjusted for  
30 inflation) (U.S. Census Bureau 2000, 2017-2021 ACS). In the same time period, median household  
31 income increased just 15% in Portland and 11% in Multnomah County, and median household income  
32 decreased 4% in Vancouver and 7% in Clark County (U.S. Census Bureau 2021). As the cost of living  
33 increases, low-income households often move farther from jobs and services to find affordable  
34 housing. This can result in longer commute times and higher transportation costs for low-income  
35 households.

### 36 3.8.3 Conclusions

37 Past projects directly affected equity priority communities, including EJ populations, in the I-5  
38 corridor (such as the displacements associated with the 1960 construction of I-5 through North  
39 Portland). Construction of the Modified LPA would not generate a disproportionately high and

1 adverse human health or environmental effect on an equity priority community. In addition, the  
2 benefits of the Modified LPA are expected to accrue to equity priority communities as well as the  
3 general population. Some people, including minority and low-income individuals, would be adversely  
4 affected by the program (i.e., by displacement of businesses and residents, and noise and traffic  
5 during construction). But in general, the Modified LPA would be likely to improve conditions (such as  
6 noise, air pollution, poor access, and poor transit service) for populations and neighborhoods that  
7 have historically been adversely affected by other past actions.

8 Finally, potential mitigation, as discussed in the Equity and Environmental Justice Technical Reports  
9 (e.g., transportation assistance for tolling impacts and enhanced communications), could minimize  
10 impacts and increase benefits to equity priority communities, including EJ populations. Compared to  
11 past, present, and reasonably foreseeable future actions, the Modified LPA will have a negligible effect  
12 on equity priority communities populations.

## 13 3.9 Hazardous Materials

### 14 3.9.1 Project Effects

15 The study area is heavily urbanized, and many of the past and present land uses have generated,  
16 used, and/or stored hazardous materials. Hazardous material sites that are most likely to impact the  
17 project are those being acquired for right of way or near the roadway or guideway alignments.  
18 Because there would be no acquisitions or displacements under the No-Build Alternative, there is no  
19 potential for property acquisition liability. However, the potential for adverse effects from spills or  
20 releases of hazardous substances or petroleum products is higher than for the Modified LPA, and  
21 adverse effects on the environment could occur from the operation and maintenance of the existing  
22 stormwater conveyance and treatment facilities.

23 For the Modified LPA, disturbances of existing hazardous materials sites would result in site cleanup  
24 and could increase demand for contaminated soil disposal facilities. Construction and excavation  
25 workers or ecologic receptors could be subject to cumulative exposure to hazardous materials. It is  
26 not anticipated that the operation or maintenance of the Modified LPA would increase the occurrence  
27 or transport of hazardous materials within the study area.

28 Compared to the No-Build Alternative, long-term adverse effects on human health and the  
29 environment from hazardous materials would likely be reduced because the Modified LPA would  
30 involve:

- 31 • Upgrades or enhancements to the current stormwater conveyance and treatment system,  
32 which would reduce the spread of existing residual contaminants to soil, surface water, and  
33 groundwater from stormwater runoff and infiltration.
- 34 • Likely placement of surficial caps or barriers at any sites identified with existing  
35 contamination, which would decrease likelihood of direct exposure to potential receptors.
- 36 • Increases and enhancements of roadway and transit system capacities. This could lower the  
37 frequency of incidental spills or releases of hazardous substances associated with trucking  
38 and automotive transit.



## 1 3.9.2 Effects from Other Actions (Past, Present, Future)

2 The evaluation of risks to the IBR program from existing hazardous materials is based on a review of  
3 past actions and their effects on existing and potential soil and groundwater contamination.

4 There may also be unknown contamination caused by past land uses and actions in the study area  
5 that pose additional risks.

6 Future unrelated development in the study area could add exposure risks, as well as provide cleanup  
7 and remediation benefits. Population and employment growth could cause increased traffic that may  
8 result in slightly more incidents of hazardous materials spills. Since 1964, several laws have been  
9 implemented that have led to improved handling of hazardous materials, reducing the amount of new  
10 hazardous materials released into the soil and groundwater. Environmental liability laws generally  
11 require identification and cleanup of hazardous materials during property transfers, which have  
12 resulted in the overall reduction of hazardous material contamination near the study area.

## 13 3.9.3 Conclusions

14 Construction of the Modified LPA would involve cleanup of some contamination associated with past  
15 releases of hazardous materials (by cleaning up existing contaminated sites that would be acquired  
16 for the program) and would reduce the risk of future contamination from highway crashes (by  
17 improving highway safety and by capturing, conveying, and treating stormwater runoff). Because any  
18 hazardous material discovered during construction would be remediated, development of the  
19 Modified LPA could result in reduced hazardous material exposure for the general public. Because the  
20 Modified LPA is unlikely to introduce new hazardous material sites, and may identify or remediate  
21 existing hazardous material sites, it may contribute to a cumulative beneficial impact to groundwater,  
22 human, and ecological receptors in the study area. Compared to past, present, and reasonably  
23 foreseeable future actions, the Modified LPA would have a positive effect on hazardous materials in  
24 the area.

## 25 3.10 Land Use

### 26 3.10.1 Project Effects

27 The No-Build Alternative would fail to support the principal elements of adopted growth management  
28 and community plans for the area, including goals pertaining to accepted levels of service; improved  
29 freight mobility; multimodal transportation; focused, compact development; and safety.

30 The Modified LPA is consistent with local plans and policies, which encourage investment in inner  
31 urban infrastructure, multimodal transportation, freight mobility, economic development, and  
32 compact urban development. In total, the Modified LPA would convert approximately 39 acres of land  
33 to transportation use (see Section 3.1). Although these conversions could reduce the area of land  
34 potentially available for non-transportation uses to a small extent, they would account for only a  
35 small portion of the total land in the Portland/Vancouver area and therefore would not be substantial  
36 in a regional context. Further, these changes, which would result from the extension of light rail transit  
37 and the development of parking structures and other transportation infrastructure, are consistent

1 with the goals and policies of adopted land use and transportation plans. The greatest direct impacts  
2 on existing land uses would result from the displacement of an estimated 14 businesses on Hayden  
3 Island and, potentially, the construction of a large park-and-ride facility in downtown Vancouver,  
4 depending on the location chosen.

5 Adding light rail stations in Hayden Island and downtown Vancouver is expected to contribute to  
6 economic development with vibrant mixed-use urban nodes. There is a moderate to high potential for  
7 transit-oriented development on Hayden Island and in the city of Vancouver (particularly the Mill Plain  
8 district). Plans adopted by the City of Portland and Metro call for the extension of light rail to Hayden  
9 Island. The Modified LPA is not expected to lead to different future land uses than would occur  
10 without the program.

### 11 3.10.2 Effects from Other Actions (Past, Present, Future)

12 Historic development in the area transformed land use from frontier wilderness to agriculture and  
13 settlement, followed by ever-increasing urbanization. Since the 1950s, actions affecting land use have  
14 included the construction of I-5 and other transportation projects, increasing urbanization, and new  
15 growth management regulations. Modeling also suggests that regional land use plans that channeled  
16 growth and transportation development to other parts of the region may have reduced employment  
17 growth and housing demand in the North Portland and Vancouver portions of the I-5 corridor. The  
18 lack of any major improvements to I-5 highway operations in this location since the 1960s has also  
19 allowed gradual deterioration of highway operations and safety and reliability, which in turn could  
20 further contribute to the distribution of some portion of population and employment growth to other  
21 parts of the region.

22 Land use on Hayden Island has been defined by residential development and commercial  
23 development, including the Jantzen Beach Center (a regional large-format retail shopping center) and  
24 surrounding retailers. Residential uses in the area include manufactured homes and floating homes  
25 associated with small marinas, as well as other low- to medium-density developments. The City of  
26 Portland completed a planning project for Hayden Island in 2009, which calls for redevelopment of  
27 the commercial core—transitioning from the current large-scale retail land use pattern to a more  
28 urban form with more mixed uses, pedestrian-scale design, and transit orientation. The plan identifies  
29 a replacement I-5 bridge as one element of future development on the island.

30 Vancouver’s downtown has changed greatly during the past decade. The focus of the downtown and  
31 waterfront areas has broadened from predominantly office (and some industrial) uses to tourism and  
32 recreation development, retail shopping, meeting and convention activities, housing, and  
33 entertainment. Along with revitalizing overall downtown activity, new residential opportunities and  
34 revitalization of the retail core and central waterfront have been emphasized. New office and mixed-  
35 use development has increased in the last decade, with projects such as the Vancouver Waterfront  
36 and numerous smaller projects. New and growing uses in the downtown area include eateries, bars/  
37 taverns, and personal services. These projects have value commercially, in terms of both tax revenue  
38 and providing inner urban opportunities for family-wage jobs.

39 The VCCV, adopted in 2007, continues to guide development in and around downtown Vancouver.

### 1 3.10.3 Conclusions

2 The Modified LPA would generally support the land use policies listed in Section 2.5.4, above, and be  
3 generally consistent with expected development trends. Under the Modified LPA, subsequent  
4 development would potentially be more urban in nature and focused near light rail facilities. The  
5 Modified LPA would support the intensification and mixing of land uses both on Hayden Island and in  
6 Vancouver. These changes in land use have been planned for and are consistent with adopted  
7 policies. Large transportation projects can have far-reaching effects on regional travel and land use  
8 patterns, and decreased highway travel times could have an indirect influence on land development  
9 demand near the current urban fringe. However, Portland and Vancouver have accounted for future  
10 anticipated growth in their planning documents and provide strategies, visions, and goals to guide  
11 growth and development within the area. Additionally, both Oregon and Washington have adopted  
12 statewide land use and growth management planning mechanisms to guide and control land use and  
13 development patterns. As a result, the Modified LPA is not expected to have indirect growth-inducing  
14 impacts that are contrary to the goals of applicable land use plans or to change existing land use  
15 patterns. See the Land Use Technical Report for additional details.

16 The Modified LPA would continue the trend of roadway development, and the more recent trend of  
17 transit development, and would balance that development with the improvement of bicycle and  
18 pedestrian infrastructure. Compared to past, present, and foreseeable future actions, the Modified  
19 LPA would have a slightly positive effect on land uses in the area.

## 20 3.11 Neighborhoods and Population

### 21 3.11.1 Project Effects

22 The No-Build Alternative would not displace any residences or businesses and would not impact  
23 community cohesion. However, traffic congestion and safety would continue to worsen, and there  
24 would be no improved access associated with the extension of light rail service and improvements to  
25 the active transportation network.

26 The largest neighborhood-related adverse impact from the Modified LPA would occur on Hayden  
27 Island, where the program would require the displacement of 32 floating homes in North Portland  
28 Harbor.

29 The Modified LPA would displace approximately 14 commercial/retail businesses on Hayden Island,  
30 most of which are chain restaurants directly adjacent to the current location of the highway. Although  
31 restaurants are not typically considered community resources, the loss of these businesses, if not  
32 relocated on the island or replaced by other businesses, would result in fewer dining choices on  
33 Hayden Island and could impact neighborhood cohesion. This is a notably smaller contribution to  
34 cumulative effects than the CRC Project, which would have displaced approximately 40 businesses on  
35 Hayden Island, including the only grocery store and bank on the island (which have since closed).

36 Four parcels would be affected by the expansion of the maintenance center in the Rockwood  
37 neighborhood in Gresham, Oregon. Within these four parcels, one residence and three light industrial  
38 businesses would be displaced. The residence is a single-family home that is currently vacant and no

1 longer habitable. Because of previous impacts, little neighborhood cohesion remains in the  
2 immediate area.

3 The Modified LPA would improve circulation on Hayden Island and reduce the hours of congestion in  
4 this area along I-5. Additionally, the bike and pedestrian connection to the existing I-5 bridge, which is  
5 currently substandard and difficult to navigate, would be replaced by a new shared-use path, and a  
6 light rail transit station would serve the island. Other neighborhoods would also be affected by the  
7 Modified LPA. In the Kenton neighborhood, the Modified LPA would displace several structures  
8 around the Marine Drive interchange, including three floating homes and one single-family home on  
9 land. Three businesses would also be displaced in this area.

### 10 3.11.2 Effects from Other Actions (Past, Present, Future)

11 As described in Section 3.8, past highway development had significant effects on neighborhoods  
12 along the I-5 corridor. The development of I-5 required the acquisition of right of way and the  
13 relocation of many businesses and homes, and contributed to a loss of community cohesion. Local  
14 planning efforts serve to strategically place and design current and future transportation so as to  
15 maximize benefits and minimize negative impacts.

16 In the Rockwood neighborhood in Gresham, the original development of the Ruby Junction  
17 Maintenance Facility (opened in 1984), and subsequent expansions and improvements displaced  
18 existing uses from that site, including single-family residences.

19 The only supermarket on Hayden Island (Safeway) closed in 2018, leaving residents of Hayden Island  
20 without a full grocery store. However, groceries are available at the Target in the Jantzen Beach  
21 Shopping Center, and simple groceries are also available at the Plaid Pantry on North Hayden Island  
22 Drive. The only bank in the neighborhood, Wells Fargo on Jantzen Drive, closed in 2020. Now, financial  
23 services on Hayden Island are limited to a handful of ATMs. While past actions, such as the  
24 construction of I-5, have reduced community cohesion on Hayden Island, potential future  
25 redevelopment of the area that is less auto-oriented and more pedestrian-friendly could improve  
26 community cohesion.

### 27 3.11.3 Conclusions

28 Past projects (such as the displacements associated with the construction of I-5 through North  
29 Portland) directly impacted neighborhoods in the I-5 corridor. These neighborhoods have  
30 experienced both incremental adverse effects and improvements since then. More recent  
31 transportation projects have generally provided net benefits through improved access, pedestrian-  
32 oriented development, mitigation, and other amenities. The Modified LPA is expected to continue this  
33 more recent positive trend in the corridor. The exception would be on Hayden Island, where the  
34 Modified LPA would displace sufficient commercial and residential activities on the island to  
35 constitute an adverse impact. However, the provision of a light rail station, the connection of  
36 Tomahawk Island Drive under I-5, and the improved access and capacity of the Hayden Island  
37 interchange all may contribute to the viability and success of redevelopment plans for the island.

1 One major difference, however, between these impacts and the impacts of past actions, is that past  
2 projects were not always planned and implemented with meaningful input and communication with  
3 the public. Involving communities and understanding impacts has become an essential part of project  
4 planning. This allows projects to reduce impacts more successfully where possible or mitigate  
5 impacts where they cannot be reduced. Providing overall benefits to Hayden Island neighborhoods  
6 would require successfully relocating displaced floating home residents, and successfully relocating  
7 or reestablishing the neighborhood-serving businesses that would be displaced during construction.  
8 Compared to past, present, and foreseeable future actions, the Modified LPA will have a slightly  
9 positive effect on neighborhoods.

## 10 3.12 Noise and Vibration

### 11 3.12.1 Project Effects

12 The noise modeling prepared for the IBR program incorporates anticipated regional growth and  
13 reasonably foreseeable future actions. As such, the results of the modeling reflect cumulative effects  
14 on noise and vibration conditions in the study area. As documented in the Noise and Vibration  
15 Technical Report, the Modified LPA would contribute to existing and projected levels of noise and  
16 vibration. Design features associated with the Modified LPA, such as noise walls and the Community  
17 Connector south of East Evergreen Boulevard, may mitigate traffic noise levels that are projected.

### 18 3.12.2 Effects from Other Actions (Past, Present, Future)

19 The noise environment in the general program vicinity has long been characterized by typical urban  
20 noise sources and noise levels. Sources include traffic on I-5, SR 14, SR 500, Martin Luther King Jr.  
21 Boulevard, Marine Drive, and various arterials and other roadways. Air traffic associated with PDX and  
22 Pearson Field is also a substantial source of noise that has increased over time. Marine vessels on the  
23 river, trains on two rail lines, and industrial uses and the Portland International Raceway further add  
24 to the cumulative noise environment.

25 In the future, projected growth in both air traffic and freight rail traffic are expected to increase noise  
26 levels in the study area. If the land use plans for the City of Vancouver and Hayden Island are realized,  
27 then residential and commercial construction activities could be a substantial, intermittent source of  
28 noise over the next couple decades. Highway noise would also be expected to increase over time as  
29 population and employment growth lead to increased single-occupancy and freight vehicle trips. This  
30 projected highway noise increase is reflected in the IBR program traffic noise analysis, which is based  
31 on the region's projected increase in population and employment through 2045. Similarly, noise and  
32 vibration effects from the light rail corridor will continue to increase as rail volumes increase.

33 In the study area, there are currently an estimated 164 traffic noise impacts to noise sensitive land  
34 uses along I-5, and that number is expected to increase to 235 (under the future No-Build Alternative).  
35 Under the No-Build Alternative, no new noise walls would be constructed. Background traffic growth  
36 would cause a general increase in traffic noise levels throughout the study area.

### 1 3.12.3 Conclusions

2 Many residences and other uses in the study area, including those adjacent to I-5 and the proposed  
3 light rail transit guideway, have experienced increasing noise levels over time resulting from steady  
4 growth in vehicle traffic, air traffic, and other urban noise sources. These receivers are expected to  
5 experience continually increasing noise levels in the future as population, employment, highway  
6 traffic, air traffic, freight rail traffic, and other sources grow. To mitigate potential program-related  
7 noise effects, mitigation measures that meet ODOT's and WSDOT's feasibility and reasonableness  
8 criteria may be recommended for inclusion in the program. Mitigation measures will consider criteria  
9 for impacts related to the program, as well as the cumulative effects of traffic noise from prior actions.

## 10 3.13 Public Services and Utilities

### 11 3.13.1 Project Effects

12 The No-Build Alternative would not change existing utility connections and public services, such as  
13 emergency response, however over time both would be adversely impacted by safety issues and/or  
14 worsening congestion. The North Portland Harbor and I-5 bridges are not designed to current seismic  
15 standards and could fail and possibly collapse in the event of a catastrophic earthquake, which would  
16 disrupt both utility connections and public services. In addition, public services such as schools and  
17 libraries would continue to be hindered by limited public transit and substandard bicycle and  
18 pedestrian facilities.

19 Overall, the direct physical impacts to public services from the Modified LPA would be minor. The  
20 Modified LPA would directly impact six public service facilities: one medical center property, two  
21 school-related sites and three "other" (non-categorized) facilities. Of these facilities, the medical  
22 facility, schools, and two of the "other" facilities would undergo limited impacts that would not affect  
23 their operations or services. The remaining facility (the Federal Highway Administration's Western  
24 Federal Lands office property) would lose some parking, landscaping, and signage under Design  
25 Option A, but with the exception of the loss of some parking and potentially altered access routes, the  
26 operations would not be adversely affected. The Modified LPA would impact several major utilities,  
27 including water, power, gas, and communications infrastructure in Vancouver, as well as on or near  
28 the North Portland Harbor bridge. Proposed mitigation would generally consist of either protecting a  
29 utility in situ or relocating it. The goal would be to ensure that program-related changes do not impair  
30 existing overall levels of service.

31 Projected traffic congestion on local streets under the No-Build Alternative and the Modified LPA  
32 would include some intersections performing at unacceptable levels of service. Intersections with  
33 unacceptable levels of service negatively impact the mobile services of public service providers and  
34 cause delays in response times for emergency vehicles. Mitigation is proposed under the Modified LPA  
35 to reduce the number of failing intersections, which would lessen the impact to public services.



### 1 3.13.2 Effects from Other Actions (Past, Present, Future)

2 Past population growth has incrementally increased demand on public services and utilities. It is  
3 anticipated that the primary effects from most future projects would be changes to traffic patterns  
4 and increased demand on services and utilities. These effects are mitigated via coordination with and  
5 participation from affected service providers. These providers are generally included in planning  
6 processes and have adequate time to make needed adjustments prior to changes in development  
7 patterns and the street network.

### 8 3.13.3 Conclusions

9 Adopted land use plans and projected population growth are expected to create an increased  
10 demand for public services and utilities. However, since those increases are planned, it is reasonable  
11 to assume that the public service sector and utility providers would have adequate time to plan and  
12 adjust for future conditions. The adverse effects of increased demand could be slightly exacerbated by  
13 the proposed light rail operations as they would decrease auto capacity on some local streets and  
14 prohibit some turning movements. Beneficial impacts from the Modified LPA would include fewer  
15 accidents on I-5 due to safety improvements and improved emergency response times on I-5 and  
16 other roadways where congestion would be decreased. Compared to past, present, and reasonably  
17 foreseeable future actions, the Modified LPA would have a positive effect on public services and little  
18 to no effect on utilities.

## 19 3.14 Transportation

### 20 3.14.1 Project Effects

21 The traffic and transit modeling prepared for the IBR program incorporates anticipated regional  
22 growth and reasonably foreseeable future actions. As such, the results of the modeling reflect  
23 cumulative effects on transportation conditions in the study area. The Transportation Technical  
24 Report documents that the Modified LPA would reduce freight and vehicle congestion, improve safety,  
25 and improve the reliability and connectivity of active transportation and transit networks. The  
26 highway, transit, and active transportation network improvements make the I-5 corridor more  
27 attractive to users, and the shift in traffic patterns would result in increased traffic volumes on some  
28 local roads.

### 29 3.14.2 Effects from Other Actions (Past, Present, Future)

30 Past and present actions affecting transportation in the study area (and region) include population  
31 growth and accompanying development, which have subsequently led to an increase in the number  
32 of single-occupancy and freight vehicles on roads, as well as the expansion of public transit and active  
33 transportation networks. The increase in congestion and vehicle collisions can largely be attributed to  
34 this growth. Past transportation improvements in the area include expansion and increase in service  
35 of TriMet's bus and light rail system (including the extension of light rail to the Expo Center), as well as  
36 C-TRAN's bus service (including the introduction of bus rapid transit). See Appendix A for a full list of  
37 transportation projects in the area.

1 The Regional Mobility Pricing Project (currently under assessment) is anticipated to have notable  
2 effects on transportation conditions on the I-5 and I-205 corridors, with spillover effects onto other  
3 roads in the region. The introduction of congestion pricing would likely contribute to the cumulative  
4 effects of several future projects, including the IBR program, that will reduce congestion and increase  
5 the use of public transit and active transportation.

6 It is likely that future growth and development will continue to drive increases in the number of  
7 vehicles, as well as expansions of the transit and active transportation systems. Planned  
8 transportation improvements in the study area (in addition to those included in the program) include  
9 the Bridgeton Trail along the shoreline of North Portland Harbor in Portland and a public walkway  
10 along Vancouver's shoreline as part of the Renaissance Boardwalk development.

### 11 3.14.3 Conclusions

12 When the Modified LPA is considered alongside other future actions, the key drivers of transportation  
13 demand—population growth and accompanying development patterns—will continue to affect the  
14 mobility of all transportation modes (single-occupancy and freight vehicles, transit, and active  
15 transportation) in the study area and region. Improvements to transportation supply through  
16 increased roadway and transit capacity, travel demand management programs, and improved active  
17 transportation network connections will mitigate the forecasted increase in congestion and vehicle  
18 collisions.

## 19 3.15 Visual Quality and Aesthetics

### 20 3.15.1 Project Effects

21 Natural and cultural visual elements associated with the No-Build Alternative would be expected to be  
22 compatible with the existing visual environment and would likely not change the existing visual  
23 quality or aesthetics of the study area. Project coherence would be negatively affected by increased  
24 traffic and congestion, while other planned transportation projects would be coherent with the  
25 existing environment. However, since traveling and neighboring viewers would typically not be  
26 sensitive to changes in project coherence, the overall impact on visual quality would be neutral.

27 The primary elements of the Modified LPA that affect visual quality and character are new highway  
28 bridge structures across North Portland Harbor and the Columbia River, interchanges, transit bridges,  
29 stations, park-and-ride facilities, and light rail transit guideways. The visual quality of the entire length  
30 of the corridor and all landscape units would be affected. Visual changes would occur from the  
31 following:

- 32 • The removal of the existing bridges, including the lift towers.
- 33 • Additional of the new structures across the Columbia River.
- 34 • The widened or higher ramps for reconfigured interchanges at Marine Drive, Hayden Island, SR  
35 14, Mill Plain, and SR 500.
- 36 • The effective widening of I-5 corridor due to the addition of auxiliary lanes and safety  
37 shoulders along I-5.

1 Existing roadside vegetation serves to soften the effect of the built environment within the  
2 transportation corridor. Elimination of roadside vegetation without restoration of such would reduce  
3 natural elements within the corridor.

4 Other visual changes would result from new transit stations and accompanying park-and-ride  
5 structures.

### 6 3.15.2 Effects from Other Actions (Past, Present, Future)

7 In the Columbia River, Portland, and Vancouver areas, visual character has steadily evolved from  
8 frontier, through rural and agriculture, to suburban and urban. The I-5 corridor has steadily grown in  
9 development intensity and in use as a major transportation route.

10 The continued intensification of the corridor has led to a decline in the quality of many views due to  
11 obstruction of scenic or natural landscapes by buildings, walls, signage, berms and ramps, pilings,  
12 columns, bridges, and loss of vegetation. Continued decline is not inevitable if cities and the region  
13 implement well-designed, visually coherent urban design that protects scenic or important views.  
14 Existing regulations include City of Vancouver, City of Portland, Clark County, Multnomah County, and  
15 other local, regional, state, and federal agency plans that include policies that protect views and  
16 aesthetic resources.

17 Unrelated projects involving transportation, urban design, and development will be implemented and  
18 continue the transformation of the landscapes of the Columbia River, Portland, and Vancouver region.  
19 The trend has been and is likely to continue to be one of increasing urbanization. The following  
20 projects are being considered by various jurisdictions and agencies:

- 21 • Interchange improvements such as constructing or rebuilding highway ramps.
- 22 • Bridge upgrades, replacement, or construction.
- 23 • Local street network and regional access route improvements.
- 24 • New traffic signals, wider sidewalks, curb extensions, bike lanes, on-street parking and street  
25 trees, pedestrian crossings, and pavement reconstruction.
- 26 • Intersection realignment.
- 27 • Various urban development projects throughout downtown Vancouver.
- 28 • The redevelopment of the central Hayden Island commercial area.

### 29 3.15.3 Conclusions

30 Cumulative visual impacts are observable when the character of a place changes over time (for  
31 example, from an agricultural landscape to residential development) or when the vividness, unity, or  
32 intactness of the visual environment changes. Within the study area, visual character has steadily  
33 progressed toward a compact mixed-use urban form, progressing from a largely frontier character  
34 prior to the mid-1800s through rural, agricultural, and early settlement periods. The I-5 corridor has  
35 steadily grown in footprint and intensity of use as a major transportation route.

DRAFT Cumulative Effects Technical Report

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- 1 Overall, impacts from the Modified LPA would continue and reinforce that urban transportation  
2 corridor character. In some cases, such as a light rail station, the intensification would implement  
3 adopted goals for urban vibrancy and activity centers. In other cases, such as the higher and more  
4 visually complex SR 14 interchange, visual impacts would represent a continuation of changes that  
5 are less supportive of downtown livability, human scale, and historic preservation. Lighting elements  
6 would be unified throughout the project using similar lines, colors, and styles; furthermore, light and  
7 glare impacts from fixed light sources are expected to be less than under the No-Build Alternative, as  
8 replacement lights would be designed with modern fixtures and materials that limit light spill and  
9 glare and reduce ambient light levels.
- 10 Compared to past, present, and reasonably foreseeable future actions, the Modified LPA would have a  
11 negligible effect on visual and aesthetic resources.

## 4. NATURAL ENVIRONMENT CUMULATIVE EFFECTS

*Please note: the draft Cumulative Effects Technical Report was written based on the version of each draft technical report available at that time. Each resource section will be updated as the draft technical reports are revised.*

This section discusses the cumulative effects on the natural environment. Local, state, and federal regulations require protection of natural areas, slowing the destruction of these habitats and mandating replacement of their functions. Where feasible, the approach for analyzing cumulative effects under the federal Endangered Species Act and other state or federal regulations, as applicable, was coordinated to develop a common area of analysis.

The natural environment includes the following resource areas:

- Ecosystems (terrestrial and aquatic habitats, and plant and animal species)
- Geology and groundwater
- Water quality and hydrology
- Wetlands and waters

Key natural resources in the vicinity of the program include Burnt Bridge Creek, the Columbia River, and the backwaters and other tributaries of the Columbia River, including the Columbia Slough. Non-transportation-related projects that are considered in the analysis include the Columbia River levee project and active habitat improvement and restoration activities on the Columbia Slough and Burnt Bridge Creek.

Historical environmental conditions within the study area were greatly influenced by the seasonal flows of the Columbia River. Historically, river volumes were highest between April and September during basinwide snowmelt, and lowest from December to February when much of the basin's moisture can be locked up in snow and ice.

Although annual flooding affected the Oregon side of the study area much more than the Washington side, flood control measures have been implemented that affect the entire lower Columbia River environment. Levees and river embankments were constructed in the early 1900s on both sides of the river, which isolated the majority of the floodplain from all but the highest flows. As the floodplain experienced increased development, elaborate pumping operations were implemented on the Oregon side to prevent overbank flow. Today, pumps run 9 to 10 months a year, and continuously 24 hours every day during the winter rainy period, resulting in over a billion gallons pumped per day by MCDD #1. Dams constructed in the mainstem Columbia River have effectively regulated flows, starting with completion of the Bonneville Dam in 1938.

The temporal frame of reference for the natural environment “past” will generally be from the broad changes that began in the 1800s. The temporal frame of reference for the “future” will generally be through 2045, which is the planning horizon for the regional transportation model, and the year to which impacts can be reliably identified (either quantitatively or qualitatively) without speculation. Long-term cumulative effects that can be non-speculatively predicted extending beyond the 2045 planning horizon that are related to project lifecycle will be considered qualitatively.

## 1 4.1 Ecosystems

### 2 4.1.1 Project Effects

3 Ecosystem resources within and around the study area include fish, wildlife, and plants, and their  
4 habitats. Natural habitats in the area are generally small, fragmented, and modified from their historic  
5 conditions. The No-Build Alternative would continue to contribute to an adverse effect on ecosystem  
6 resources due to the lack of sufficient stormwater treatment and disturbance during intermittent  
7 maintenance activities. If a catastrophic event occurred, such as a major earthquake, it could affect  
8 fish and wildlife species in both the immediate vicinity of the bridges and downstream. Fish and  
9 wildlife in the immediate vicinity of the bridge at the time of the event could be directly affected by  
10 falling debris and injured or killed if struck, and fallen debris would diminish habitat suitability at the  
11 site by displacing benthic habitat. Fallen debris from the bridge could also contribute chemical  
12 contaminants to the water and result in reductions in water quality that could affect aquatic species  
13 and habitats downstream of the bridge.

14 Effects on ecosystem resources associated with the Modified LPA would include impacts to both  
15 aquatic and terrestrial resources. The piers associated with the new bridges would displace benthic  
16 habitats and introduce new overwater shading; however, the net area affected would be similar to the  
17 area affected by the existing I-5 bridge piers. Construction of the Modified LPA would also result in  
18 temporary impacts to sensitive aquatic species and their habitats, including species of significance to  
19 consulting tribes. The Modified LPA would create new impervious surfaces, which would generate  
20 stormwater but would also provide water quality treatment for both new and existing impervious  
21 surfaces, and would result in a significantly improved water quality condition in area waterways  
22 compared to the No-Build Alternative.

23 The Modified LPA would also result in both permanent and short-term disturbance to sensitive  
24 terrestrial habitats, including riparian buffers, trees, wetlands, and wetland buffers. These impacts  
25 would be avoided and minimized to the extent practicable, and compensatory mitigation would be  
26 provided such that the net effect of the Modified LPA would be no net loss of habitat function.

27 The Modified LPA would remove an existing peregrine falcon nest in the steel structure of the existing  
28 I-5 bridges. Whether this would result in temporary effects, with peregrine falcons reestablishing  
29 themselves on new bridge structures, or permanent, long-term adverse effects on the overall viability  
30 of the species cannot be determined in advance. Bird nests on the bridge structures could pose  
31 aviation hazards due to bird strikes (which also adversely affect bird species). All structure types  
32 currently under consideration for the Modified LPA would reduce the areas on which birds can land  
33 and roost when compared to the existing bridges. The Modified LPA would also improve the seismic  
34 resiliency of the I-5 bridges, thus reducing the likelihood of impacts to species and habitat associated  
35 with a bridge collapse.

36 Discussions with federal, state, and local regulatory agencies, tribes, and public stakeholders are  
37 ongoing to identify the specific compensatory mitigation and conservation measures that would be  
38 implemented as part of the Modified LPA.



#### 1 4.1.2 Effects from Other Actions (Past, Present, Future)

2 Native Americans lived in the region for 11,000 years before the arrival of Euro-American settlers.  
3 However, human populations were very low in the region prior to settlement (Hulse et al. 2002). Since  
4 approximately the mid-1800s, human population growth and development have gradually displaced  
5 and reduced the quality and quantity of wildlife habitat. As noted above, natural habitats in the area  
6 are generally small and fragmented compared to their historic conditions. Nevertheless, these areas  
7 do provide habitat for a variety of plants, terrestrial wildlife, birds, and fish, including both common  
8 species and species with special regulatory status.

9 Historically, many activities, including deforestation, urbanization, dams for hydroelectricity,  
10 irrigation and flood control, hatchery operations, and overfishing have contributed to a loss of habitat  
11 and a reduction in fish and wildlife species. These past actions have made significant changes to the  
12 health and capacity of the natural environment in the region.

13 No specific projects have been identified in or adjacent to the study area that would significantly impact  
14 habitat; however, growth and development are likely to continue to impact species present in the study  
15 area—in particular, protected fish species. While the Levee Ready project would fill a small amount (less  
16 than 0.25 acres) of ponded areas, the USACE has determined that the impact would not be significant  
17 and that no sensitive populations are anticipated to be affected (USACE and CCDD 2021).

18 Compliance with the relevant laws, regulations, policies, and codes in force at the time of such  
19 development would help minimize or mitigate the effects of such actions on resources that are  
20 important to juvenile salmonids and other aquatic species. However, even if new development has a  
21 net positive impact on these fish species, many of them would still face the possibility of extinction.

22 For protected fish species, the impacts of Modified LPA construction would contribute to, and be  
23 overshadowed by, conditions in the larger Columbia River Basin. Federal agencies have developed a  
24 Basinwide Salmon Recovery Strategy aimed at recovering the threatened and endangered salmon  
25 and steelhead species in the Columbia River Basin, most of which travel through the study area. The  
26 recovery strategy includes changes in habitat, hydropower, hatcheries, and harvest—all factors that  
27 will have the greatest impact on species survival.

28 Recent research has also indicated that climate change has affected and will continue to affect  
29 species and to modify fish and wildlife habitat in the Pacific Northwest in multiple ways (May et al.  
30 2018). In August 2021, the U.S. Environmental Protection Agency issued a draft Total Maximum Daily  
31 Load (TMDL) for addressing exceedances of various state and tribal criteria for temperature in the  
32 Columbia River and lower Snake River (EPA 2021). This TMDL documented that water temperature  
33 impairments are widespread, primarily due to the cumulative effects of climate change and dam  
34 impoundments. Changes include less snowfall due to warmer temperatures that, in turn, decreases  
35 snowpack and changes the flow timing, including peak flow levels, of streams and rivers, as well as an  
36 overall increase in water temperatures. It is important to note that river dams on the Columbia and  
37 Snake Rivers would manage flows in the study area, such that the flow extremes in the Columbia River  
38 would be moderated where the river flows through the study area. See Section 3.4 of this technical  
39 report for more discussion related to fish habitat impacts related to climate change.

### 1 4.1.3 Conclusions

2 The impacts to ecosystem resources that would result from the Modified LPA are relatively small and  
3 would be fully offset through avoidance, minimization, and mitigation, but historic development and  
4 expected growth throughout the region are likely to continue to impact ecosystems. The mitigation  
5 measures that are likely to occur under the Modified LPA would serve to reduce harmful effects and  
6 even improve parts of the local ecosystem relative to existing conditions. Compared to past, present,  
7 and reasonably foreseeable future actions, the Modified LPA would have a net positive effect on  
8 ecosystem resources.

## 9 4.2 Geology and Groundwater

### 10 4.2.1 Project Effects

11 The study area consists of soils with high relative earthquake hazard rating, susceptible to severe  
12 ground shaking and liquefaction during a major seismic event. The primary difference between the  
13 No-Build Alternative and the Modified LPA is that the No-Build Alternative would not include upgrades  
14 to or retrofitting of the existing bridge, whereas new infrastructure related to the Modified LPA would  
15 be built to modern seismic safety standards. As such, the Modified LPA would likely better withstand a  
16 major seismic event.

17 Sensitive groundwater resources have been identified in the study area that supply municipal,  
18 commercial, and irrigation water to surrounding communities. The distribution and occurrence of  
19 groundwater resources are not anticipated to be adversely impacted by project activities. Compared  
20 to the No-Build Alternative, the Modified LPA would have beneficial effects on groundwater resources,  
21 due to an improvement in the management of stormwater volume and flow rates and stormwater  
22 treatment facilities. This would likely result in improved local groundwater quality for the Troutdale  
23 Sole Source Aquifer and surface water quality for drainage areas around the Columbia River and Burnt  
24 Bridge Creek.

25 The steep slopes and soils susceptible to erosion in the Burnt Bridge Creek area have been disturbed  
26 in the past from the construction of I-5 and SR 500. Compared to the No-Build Alternative, the  
27 Modified LPA would disturb these soils again with construction activities in this area.

28 Concrete construction may require more aggregate than is available through local suppliers. The  
29 construction contractor may need to transport construction material to the project site from several  
30 suitable source areas throughout the region.

### 31 4.2.2 Effects from Other Actions (Past, Present, Future)

32 Contaminants from historical commercial and industrial activities within both the city of Vancouver  
33 and the city of Portland have resulted in diminishing groundwater quality. Past activities in the study  
34 area include settlement and development of the region, clearing of native vegetation, filling of  
35 lowland areas, grading of slopes, and construction in earthquake-prone areas. Current development  
36 projects, including roads, bridges, and buildings, are being constructed under updated codes that  
37 require additional protection against earthquakes and measures to limit adverse effects in sensitive

1 zones (such as landslide-prone areas). However, in some cases, future actions may include  
2 development and regrading that could lead to soil erosion, even with erosion control practices in  
3 place. Past actions have also resulted in contamination of groundwater. Updated construction codes  
4 help protect groundwater sources from present and future actions that could further contaminate  
5 groundwater. Several soil and groundwater remediation actions have helped and will continue to help  
6 reduce existing contaminants in groundwater.

### 7 4.2.3 Conclusions

8 Many of the geologic effects of the Modified LPA would be beneficial and would help offset adverse  
9 geologic impacts of other past actions. The existing bridges and other I-5 structures were built before  
10 design standards addressed the impacts associated with subduction zone earthquakes, including  
11 severe liquefaction. The new bridges and other structures would substantially improve the seismic  
12 resiliency of the region. The Modified LPA could also improve groundwater quality by remediating  
13 some existing contamination and improving stormwater management and treatment; it would not  
14 contribute to past actions that have introduced contaminants to the groundwater, including the sole  
15 source aquifer.

16 The Modified LPA would disturb some steep slopes and soils susceptible to erosion that have been  
17 impacted by past actions. It would also decrease the risk of landslide and erosion in some areas by  
18 building retaining walls, improving soil stability and improving drainage.

19 Construction of the Modified LPA would require aggregate for concrete, adding to the cumulative  
20 demand of past, present, and other future construction projects. This would further decrease local  
21 supplies and lead to either this or other future projects seeking aggregate from sources outside the  
22 area. Compared to past, present, and foreseeable future actions, the Modified LPA will have a positive  
23 effect on geology and groundwater.

## 24 4.3 Water Quality and Hydrology

### 25 4.3.1 Project Effects

26 The No-Build Alternative would continue existing effects on water quality in the long term, including  
27 stormwater quality degradation, as most of the existing impervious area remains untreated.

28 Under the Modified LPA, an overall increase in impervious surfaces within the study area would result  
29 in increased stormwater runoff rates and volumes. Without mitigation, this would adversely affect the  
30 hydrology of waterways in the study area. The Columbia River and Columbia Slough are large, tidally  
31 influenced waterbodies, and the program-related increase in stormwater quantity would not result in  
32 a measurable increase of flows in these surface waters. Burnt Bridge Creek and Fairview Creek are  
33 smaller waterbodies and more prone to be affected by increased stormwater quantity resulting from  
34 increased impervious surfaces. However, engineered water quality facilities would also be designed to  
35 reduce the rate of runoff related to the program to these two waterbodies to pre-development  
36 conditions, as required by federal and state agencies.

1 Improvements to stormwater treatment on new and resurfaced impervious surfaces, including the I-5  
2 and North Portland Harbor bridges, would result in a net improvement for water quality in the  
3 Columbia Slough, Columbia River, North Portland Harbor, Burnt Bridge Creek, and Fairview Creek,  
4 with the exception of an increase in dissolved copper levels at the Columbia Slough. Most of the runoff  
5 generated by the existing highway corridor is not treated before being discharged.

6 All new and rebuilt impervious surfaces, as well as some resurfaced and existing pavement, would be  
7 treated in accordance with current stormwater treatment standards before being discharged to  
8 receiving streams in the study area.

#### 9 4.3.2 Effects from Other Actions (Past, Present, Future)

10 Historic land use changes and increasing urbanization have decreased the amount of natural areas  
11 and natural flow regimes in the study area. Flood -control measures have been implemented that  
12 affect the entire lower Columbia River environment. Levees and river embankments were constructed  
13 in the early 1900s on both sides of the river, which isolated the majority of the floodplain from all but  
14 the highest flows. Projected population and employment growth will continue to increase  
15 urbanization and the geographic extent of development. Most of the immediate study area is already  
16 developed, so future projects would mostly consist of redevelopment and would be subject to current  
17 regulations, which are more stringent and generally result in a reduction in stormwater runoff and  
18 associated pollutants. The Levee Ready project would temporarily affect water quality due to  
19 construction activities as well as an increase in impervious surface in the Columbia Slough watershed;  
20 however, the USACE determined that these effects would be minor due to minimization measures and  
21 the limited area of impervious surface (approximately 0.5 acres) (USACE and CCDD 2021).

22 A recent decrease in upstream heavy industrial activities and the enactment of environmental laws  
23 beginning in the 1960s (such as the Clean Water Act) have resulted in addressing many known  
24 contamination sources and improving water quality in the Columbia Slough, although the water quality  
25 remains substantially impaired. In July 2005, a ROD was issued for a cleanup program developed by the  
26 Oregon Department of Environmental Quality (DEQ) and the City of Portland (DEQ 2005). The Columbia  
27 Slough Sediment Program aims to remediate widespread sediment contamination through source  
28 control contamination reduction, contaminant removal by dredging “hot spots,” and long-term  
29 monitoring to ensure the program’s effectiveness (BES 2006). Anticipated projects that would improve  
30 water quality in the study area include restoration activities along Burnt Bridge Creek in Vancouver and  
31 the Columbia Slough in Portland (Ecology 2021; Lee and Stamberger 2018).

32 Increased scrutiny by regulatory agencies on chemicals at much lower levels than current standards is  
33 occurring and may result in new standards. Current treatment systems and regulations do not fully  
34 address these likely new standards. However, even with new treatment systems, increased  
35 development may still lead to impaired water quality in some locations.

#### 36 4.3.3 Conclusions

37 The Modified LPA is likely to reverse some of the adverse water quality and hydrology impacts  
38 associated with past actions. With new stormwater treatment and infiltration, the Modified LPA is  
39 expected to improve surface water quality, increase groundwater recharge, and help restore natural

1 flow regimes. This will also be true of other future actions that 1) are constructed on already  
2 developed property, 2) decrease the area of untreated, pollutant generating surfaces, and 3) infiltrate  
3 treated runoff. On the other hand, future actions that convert undeveloped areas into impervious  
4 surfaces are likely to add to the adverse effects of past actions, though regulatory requirements will  
5 reduce those effects compared to historic actions. Compared to past, present, and reasonably  
6 foreseeable future actions, the Modified LPA will have a slightly positive effect on water quality and  
7 hydrology.

## 8 4.4 Wetlands and Waters

### 9 4.4.1 Project Effects

10 The No-Build Alternative would not result in the filling of a wetland or the fill or reduction of a wetland  
11 buffer within the study area. Untreated stormwater within the study area would continue to be  
12 discharged into wetlands and jurisdictional waters. The No-Build Alternative could also result in  
13 cumulatively increased impervious surface from development that would continue to occur along  
14 roadways in the study area.

15 The long-term effects on wetlands and waters resulting from the Modified LPA include decreased  
16 vegetated wetland buffer areas, increased impervious surface areas, and placement of fill and other  
17 alterations of waters of the states and the U.S.

18 The Modified LPA would impact approximately 0.06 acres of a wetland in the Burnt Bridge Creek  
19 watershed and approximately 0.58 acres of five wetlands in the Columbia Slough watershed. The  
20 Modified LPA would impact the buffers of eight wetlands in the study area, totaling 7.39 acres. These  
21 impacts could have an indirect effect on the wetland functions. In addition, the Modified LPA would  
22 increase the area of impervious surface in the vicinity of wetlands and decrease the distance between  
23 wetlands and roadway traffic, which could have an indirect effect on wetlands through the potential  
24 for increased stormwater flow and pollutants from stormwater.

25 The Modified LPA would include permanent bridge piers in the Columbia River and North Portland  
26 Harbor to support the replacement bridges. While the replacement bridges have a smaller in-water  
27 footprint than the existing bridges, the Modified LPA would temporarily increase the area of piers by  
28 0.29 acres over existing conditions, as the original bridges would remain in place until the  
29 replacement bridges are functional. Demolition of the existing bridge piers would remove 0.66 acres  
30 from the in-water footprint, resulting in a net restoration of approximately 0.37 acres of benthic  
31 habitat.

### 32 4.4.2 Effects from Other Actions (Past, Present, Future)

33 Urbanization and land use changes have led to a decrease in the acreage of wetlands in the study area  
34 since the 1800s, which is consistent with state and national trends (Morlan et al. 2010). Oregon and  
35 Washington lost an estimated 38 percent and 31 percent (respectively) of their wetlands between the  
36 1780s and 1980s (Dahl 1990). The advent of stricter federal and state protections in the 1970s–1990s  
37 led to a reduction in annual wetland loss in the Willamette Valley, but they did not stop the loss of  
38 wetlands (Morlan et al. 2010).

1 Since 1958 (the base year of I-5 construction), improvements have occurred to some wetlands near  
2 the southern portion of the study area. The Port of Portland completed a wetland restoration project  
3 at the 90-acre Vanport wetlands parcel, located immediately west of the existing highway and light  
4 rail line (maintenance of the site is ongoing). Other historic wetlands east of the highway, in the Delta  
5 Park area and on Hayden Island, have undergone increased development, draining, or filling since  
6 1964. Located just south of the study area, the Lombard to Delta Park project affected a relatively  
7 small area of wetland habitat and natural areas.

8 Continued growth throughout the region will affect portions of the study area. The Levee Ready  
9 project is estimated to affect approximately 0.5 acres of wetlands (USACE and CCDD 2021). Some  
10 anticipated projects would improve wetlands in the program vicinity, including planned restoration  
11 projects near the Columbia Slough and the Smith and Bybee Wetlands Natural Area (Lee and  
12 Stamberger 2018).

13 Although no additional projects have been specifically identified that would impact wetlands in or  
14 near the study area, temporary and permanent impacts from future projects are likely to occur.

15 Local, state, and federal regulations require protection of wetlands and jurisdictional waters, slowing  
16 the destruction of these habitats and mandating replacement of their functions.

### 17 4.4.3 Conclusions

18 Compared to historical conditions, there are few wetlands remaining in the study area. Mechanical  
19 methods introduced to control water flow (dikes in the program vicinity and dams on the Columbia  
20 River) have reduced the presence of wetlands in the study area. The habitat losses due to these  
21 activities are irrecoverable. The Modified LPA would neither exacerbate nor help to recover the loss of  
22 such habitats.

23 In the context of widespread urban development in the study area, the potential impacts to wetlands  
24 buffers resulting from the Modified LPA are minor. Although the affected wetlands perform important  
25 functions and are valuable due to their relative rarity, they are not of high quality.

26 Mitigation of these impacts would replace or improve the functions to the extent possible, as close to  
27 the project as is feasible.

28 Based on the volume of flow and the existing conditions in the Columbia River, the removal and fill  
29 associated with the Modified LPA is not likely to have measurable effects on the function of the river.  
30 Compared to past, present, and reasonably foreseeable future actions, the Modified LPA would have a  
31 negligible effect on wetlands and a small benefit associated with the reduction the in-water footprint.



## 5. CULTURAL AND RECREATIONAL ENVIRONMENT CUMULATIVE EFFECTS

*Please note: the draft Cumulative Effects Technical Report was written based on the version of each draft technical report available at that time. Each resource section will be updated as the draft technical reports are revised.*

Resources categorized as cultural and recreational environment include archaeological resources, historic resources, and parks and recreation areas. They involve issues associated with resources regulated by Section 4(f) of the U.S. Department of Transportation Act of 1966 and Section 106 of the National Historic Preservation Act of 1966. Tribal consultations contributed to the cultural resources technical analysis for the IBR program. Key cultural resources in the project vicinity include Fort Vancouver, recorded and anticipated archaeological (historic and precontact) sites along the Columbia River, and a variety of historic buildings and properties in the study area.

The temporal frame of reference for the “past” varies for precontact resources, historic resources, and parks, as identified in the sections below. The temporal frame of reference for the “future” for all three resources is 2045, which is the planning horizon for the regional transportation model, and the year to which impacts can be reliably described without speculation.

The analysis examined the general adverse and beneficial effects of past development, and the cumulative effects resulting from the Modified LPA in conjunction with other past, present, and reasonably foreseeable future actions. Issues considered include past effects on cultural resources in the study area, including loss of historic resources due to development and past effects on areas used as cultural sites. The IBR program team conducted the analysis with the appropriate consultation with DAHP, SHPO, tribal governments, local planners, and other stakeholders.

### 5.1 Archaeology and Cultural Resources

#### 5.1.1 Potential Effects

*Note: This section will be provided in a future draft. The Archaeology and Historic Built Environment technical reports will be available in mid-2023, at which time they will be incorporated into the Cumulative Effects technical report.*

#### 5.1.2 Effects from Other Actions (Past, Present, Future)

Both shores of the Columbia River have been the location of extensive development in the past 200 years. Several types of historic-era development occurred within or immediately adjacent to the present I-5 transportation corridor, and there are indications of Native American settlements associated with those developments, as well as precontact use of the area.

Since the late 19th century, diking, draining, dredging, and filling along the shores have altered the banks of the Columbia River, possibly damaging archaeological sites, or encapsulating them under fill.

DRAFT Cumulative Effects Technical Report

1 The Interstate Bridge transformed both Hayden Island and Vancouver. The first bridge was completed  
2 in 1917 as part of the major West Coast highway corridor (Pacific Highway 99) running from Canada to  
3 Mexico. A second bridge structure was built in 1958, and it began service as I-5 in 1964. Traffic on the  
4 route has mounted with the steady growth and development of Clark and Multnomah Counties and  
5 surrounding areas. Intensive residential, commercial, and transportation development over the past  
6 160 years has had major impacts on the cultural and historic landscape in the I-5 corridor and vicinity.  
7 In particular, the construction of I-5 and SR 14 affected the historic archaeology of the Hudson’s Bay  
8 Company/Kanaka Village/U.S. Army presence in Vancouver.

9 The earliest settlement and development in the city of Vancouver occurred in the 1850s in the area  
10 immediately west of modern-day I-5. Historic Sanborn insurance maps indicate that the city of  
11 Vancouver had begun to spread north of 20th Street by 1907 and had reached 41st Street by 1949,  
12 indicating a moderate to high likelihood of encountering buried historical archaeological deposits  
13 associated with residences and businesses dating to the early 20th-century settlement of Clark  
14 County. While the development of Vancouver formed the historic part of the archaeological record,  
15 the construction of each road, house, and trash pit potentially destroyed or disturbed evidence of  
16 precontact sites in the area.

17 While not every parcel is likely to contain significant archaeological resources, recent historical  
18 archaeological investigations demonstrate the potential for encountering archaeological resources  
19 associated with early residences, businesses, and industries in this portion of Vancouver. Based on the  
20 results of these projects, there is reason to believe that abundant and well-preserved archaeological  
21 resources are present beneath the older portions of Vancouver.

22 It is likely that 20th-century development along the I-5 corridor altered near-surface evidence of  
23 precontact or historic-period Native American occupancy and use of the area. However,  
24 geoarchaeological and geomorphological investigations in Oregon indicate that deep alluvial soils  
25 have the potential to contain evidence of the precontact archaeological record as well as important  
26 paleoenvironmental data (CRC 2011). The proposed depth of the Modified LPA’s impacts would have  
27 an incrementally greater potential to affect deeply buried resources than other past and reasonably  
28 foreseeable actions.

29 Recent transportation projects in the area of these resources include the Land Bridge pedestrian  
30 overpass and Interpretive Trail over SR 14, and the Vancouver Barracks, West Reserve Area, and other  
31 improvements planned for the Fort Vancouver Historic Reserve.

### 32 5.1.3 Conclusions

33 *Note: This section will be provided in a future draft. The Archaeology and Historic Built Environment*  
34 *technical reports will be available in mid-2023, at which time they will be incorporated into the*  
35 *Cumulative Effects technical report.*

## 1 5.2 Historic Resources

### 2 5.2.1 Potential Effects

3 *Note: This section will be provided in a future draft. The Archaeology and Historic Built Environment*  
4 *technical reports will be available in mid-2023, at which time they will be incorporated into the*  
5 *Cumulative Effects technical report.*

### 6 5.2.2 Effects from Other Actions (Past, Present, Future)

7 The historic resources analysis considers cumulative effects of actions beginning in 1950, which was  
8 prior to I-5 construction. This time period captures the substantial change in land use and historic  
9 context in the study area that occurred with I-5 construction. Construction of the highway involved  
10 the removal of several buildings that had been constructed during the early history of Vancouver, and  
11 the highway created a substantial barrier between eastern and western portions of the historic  
12 community.

13 Several other substantial projects and developments have had an impact on the historic built  
14 environment in the study area, including:

- 15 • Significant population growth from 1950 to the present in Portland, Vancouver, and  
16 surrounding areas, which has put a high demand on housing in historic neighborhoods,  
17 causing new development both adjoining and within the historic sections of town, and  
18 ultimately diminishing the integrity of historic neighborhoods.
- 19 • Significant population growth from 1950 to present in Portland, Vancouver, and the  
20 surrounding areas, which has attracted urban and industrial development in the study area,  
21 changing the use and nature of the open space along the river and causing the displacement  
22 and alteration of some historic buildings.
- 23 • The completion of I-5 through Vancouver in 1954, which resulted in the demolition of large  
24 sections of the city's historic neighborhoods to access the 1917 bridge to Portland.
- 25 • Construction of the parallel bridge in 1958 (southbound), which accommodated increased  
26 traffic flow on the new highway, resulting in increased interstate traffic and commerce.
- 27 • In 1961, an urban renewal project that covered 28 blocks in downtown Vancouver and  
28 removed or altered many 19th- and early-20th-century buildings and substantially altered the  
29 setting of those remaining.
- 30 • The loss of businesses in downtown Vancouver from competition with shopping malls built at  
31 Jantzen Beach in Portland and the Vancouver Mall in the 1970s.

32 Unrelated present and future development would likely affect historic properties in the study area.  
33 For example, the Providence Academy redevelopment project, under construction at Evergreen  
34 Boulevard and C Street, involves the removal of several derelict historic structures and the  
35 introduction of contemporary architecture directly adjacent to the Academy (House of Providence),  
36 which is listed on the National Register of Historic Places.

DRAFT Cumulative Effects Technical Report

1 In addition, historic resources that are currently vacant or underutilized may be lost through  
2 deterioration because of their current state of disrepair and the high cost of adapting them for reuse.

### 3 5.2.3 Conclusions

4 *Note: This section will be provided in a future draft. The Archaeology and Historic Built Environment*  
5 *technical reports will be available in mid-2023, at which time they will be incorporated into the*  
6 *Cumulative Effects technical report.*

## 7 5.3 Parks and Recreation Areas

### 8 5.3.1 Project Effects

9 The No-Build Alternative would not affect parks and recreation resources, or access to these  
10 resources, compared to existing conditions. Access to these resources would continue to be hindered  
11 by limited public transit service and substandard active transportation facilities.

12 The Modified LPA would improve access to regional recreational resources in Portland and Vancouver,  
13 including the Portland Expo Center, Portland International Raceway, East Delta Park, and Vancouver  
14 National Historic Reserve. Additionally, the Modified LPA would result in improved pedestrian and  
15 bicycle access in the area, particularly between Oregon and Washington. Trail linkages, including  
16 those in and through the Marine Drive Interchange in Portland and along the Columbia River in  
17 Vancouver, would be greatly improved.

18 The Modified LPA would not result in long-term direct effects to Waterfront Park, beyond the changes  
19 in eastern and southern views from the new I-5 bridges. While the Columbia River Renaissance Trail,  
20 Discovery Historic Loop Trail, and the Marine Drive Multi-use Trail would be realigned beneath the  
21 existing and new I-5 bridges.

22 The largest parkland acquisitions required for the Modified LPA would be 1.4 acres from East Delta  
23 Park and 0.2 acre from Old Apple Tree Park.

24 Additional property acquisitions would be required at Kiggins Sports Fields/Stadium and Marshall  
25 Community Center, the Luepke Senior Center, and Marshall Park, though it is not expected that the  
26 recreational use of any of these facilities would be affected. The IBR program would work with the  
27 Cities of Portland and Vancouver to identify potential mitigation measures for loss of parkland and  
28 other impacts.

29 Lastly, the Modified LPA would not adversely affect the planned Bridgeton Trail connection near the  
30 Marine Drive interchange.

1    **5.3.2    Effects from Other Actions (Past, Present, Future)**

2    Park and trail development have been ongoing efforts in the region. These efforts will be continued  
3    and are supported by current plans and programs. The impacts listed above are small in the context  
4    of local park resources and are balanced by recent investments in parks and trails elsewhere in the  
5    area (e.g., the Vancouver Waterfront Trail, open space at the Vancouver Waterfront and Terminal 1).

6    Planned park and trail development at the Portland waterfront, Hayden Island, the Vancouver  
7    Waterfront, Terminal 1, the Vancouver National Historic Reserve, and Kiggins Bowl would expand the  
8    provision of park and recreation facilities to the public. Other development could result in loss of  
9    parkland, but no reasonably foreseeable projects have been identified that are anticipated to reduce  
10   park or recreation facilities, and the extent of a potential loss is currently not known. Parks in the  
11   study area that received Land and Water Conservation Fund grant dollars are regulated by Section 6(f)  
12   protections and may only be converted out of parkland use with replacement.

13   **5.3.3    Conclusions**

14   Effects on parks resulting from the Modified LPA, considered in context of the past and planned  
15   projects (including park expansions), are relatively minor and do not constitute a negative cumulative  
16   effect for the region. Additionally, the Modified LPA would improve access to the Vancouver  
17   Waterfront and connect parks on both the east and west sides of the bridges. This would essentially  
18   restore the once-connected waterfront that was bifurcated by the existing bridges. Because the  
19   Modified LPA would provide mitigation for any adverse effects to parks and recreation areas, it is not  
20   anticipated to contribute to cumulative adverse effects on park and recreation areas.

## 6. TEMPORARY EFFECTS – CONSTRUCTION

Cumulative effects during construction can result when simultaneous or sequential construction projects have an additive effect to the temporary effects resulting from construction, demolition, and associated activities of the proposed improvements. Simultaneous or sequential construction projects can increase congestion, create more employment opportunities, cause community and natural resource impacts, and require additional public and private spending. Construction projects that may contribute to these effects when combined with the IBR program include:

- Vancouver Waterfront
- Terminal 1
- Renaissance Boardwalk
- Waterfront Gateway Project
- Levee Ready

These projects have, or would have, their own traffic control plans, but some may influence the travel routes of commuters and freight and could place more traffic in the study area. Likewise, some of the projects are on planned haul routes and could influence the delivery of supplies and materials to the job sites for the IBR program. As more detailed plans are developed, traffic control plans would need to be developed with consideration of these projects and their timelines.

Other likely or potential construction projects in the vicinity are described in the Land Use Technical Report.

Construction activities associated with the Modified LPA have the potential to cause economic impacts by temporarily blocking visibility and access to businesses, causing traffic delays, and rerouting traffic on detours that increase travel times and make access to some locations difficult. Access restrictions or difficulties may divert customers and clients, hamper deliveries, and complicate the provision of emergency services. However, most traffic movements would remain open throughout the construction stages of the Modified LPA.

Construction of the Modified LPA could also result in increased employment and spending in the study area during construction. The extent of these effects depends on the source of project funding and the makeup of work crews used during construction. Federal or State funds that are new to a region can have a measurable economic effect on employment and income gains resulting from project construction. The federal government and the States of Oregon and Washington would provide the funds for the IBR program, resulting in some income and job benefits that would otherwise not occur.



DRAFT Cumulative Effects Technical Report

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1 The Modified LPA is likely to have the following effects on marine commerce:

- 2 • The duration of in-water construction is projected to be periodic over four years.
- 3 • The lift span channel would be closed for a two-month period. This channel is one of three  
4 channels available to marine commerce; during construction, efforts would be made to keep  
5 at least one channel open at all times.
- 6 • The 300-foot channel is expected to be closed for a three-month period; after this, there could  
7 be room for selected river traffic, but it would be on a case-by-case basis and require  
8 coordination to maintain safe and effective working conditions. This channel is one of three  
9 channels available to marine commerce, and efforts would be made during construction to  
10 keep at least one channel open at all times.
- 11 • Marine commerce may need an extra tow to help maneuvering during construction, which  
12 would carry an extra cost.
- 13 • Temporary river travel restrictions are anticipated under the Modified LPA as barges are used  
14 to ferry materials to and from work sites.

15 In terms of the built environment, the temporary effects from the Modified LPA, in combination with  
16 other planned projects, would cause delays and disruptions to local residents and businesses.

17 Mitigation plans, including traffic control plans and business assistance, would reduce the negative  
18 consequences of construction, while the employment demands would result in positive economic  
19 outcomes for the region.

20 Temporary cumulative effects on the community may occur due to local traffic congestion and  
21 rerouting, as well as noise and air quality impacts, where construction under the Modified LPA  
22 overlaps with the construction of other projects in the area. The highest potential for such impacts is  
23 likely to be near the bridge landing in Vancouver and on Hayden Island, where other large projects are  
24 anticipated and where construction duration and intensity under the Modified LPA are likely to be  
25 high.

26 In terms of the natural environment and biological resources, most of the construction impacts would  
27 be localized to the extent that cumulative effects from other projects may not create notable impacts.  
28 Other projects in the area could directly impact the same waters or wetlands or regulated habitats  
29 that the Modified LPA would affect, such as the Levee Ready project and Renaissance Boardwalk.  
30 Temporary water quality impacts include turbidity due to sediment disturbance associated with in-  
31 water work, toxic contamination due to disturbance of hazardous sediments during in-water work,  
32 and toxic contamination due to accidental equipment leaks or spills in the vicinity of waterways in the  
33 study area. Additional short-term effects on aquatic resources include harassment and non-lethal  
34 disturbance from in-water work; potential sub-lethal injury due to hydroacoustic impacts associated  
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37

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